Articulation, antagonism, and intercalation in Western military imaginaries

Sean Lawson

Security Dialogue 2011 42: 39
DOI: 10.1177/0967010610393775

Article

SECURITY DIALOGUE

Security Dialogue
42(1) 39–56

DOI: 10.1177/0967010610393775
sdi.sagepub.com
SAGE

Articulation, antagonism, and intercalation in Western military imaginaries

Sean Lawson
University of Utah, USA

Abstract

This article provides a discursive grounding for understanding the construction of military imaginaries by adding the concepts of 'antagonism' and 'intercalation' to articulation theory. By examining the cases of industrial-mechanized warfare theory and network-centric warfare theory through the lens of this expanded articulation theory, it is argued that military imaginaries often serve to define and link conceptions of science, technology, society, economy, war, and military organization, thought, and practice into a unified image of the larger security environment – that is, the military imaginary. Military imaginaries often share a common narrative structure that privileges co-periodized change among the elements of the articulation, resulting in the phenomenon of 'antagonism' serving as a generic threat used to justify military modernization and even the use of force.

Keywords

military theory, military imaginaries, security imaginaries, articulation theory, network-centric warfare, industrial-mechanized warfare

> *Across the 1990s global rule sets became seriously misaligned, with economics racing ahead of politics ... and technology racing ahead of security (e.g., the rise of transnational terrorists exploiting globalization's growing network connectivity). Now it is time to play catch up ... with the U.S. military once again serving as an instrument of rule-set exportation through the global war on terrorism.*
>
> (Cebrowski and Barnett, 2003: 42–43)

> *We have now something that can be called a governance gap. What compels that gap is that we have mismatches. Some things simply run ahead of others.*
>
> (Cebrowski, 2003a)

Introduction

The opening statements above were made by two of the chief architects of the theory of 'network-centric warfare': the director of the now-defunct Office of Force Transformation (OFT) within the

Corresponding author:
Sean Lawson, Department of Communication, University of Utah, USA
E-mail: sean.lawson@utah.edu

US Department of Defense, Vice Admiral Arthur Cebrowski, and his assistant for strategic futures, Thomas PM Barnett. Network-centric warfare theory was not only at the heart of US Secretary of Defense Donald Rumsfeld's efforts to 'transform' the US military into an 'Information Age' fighting force, but also shaped the use of US forces in the 'War on Terror' launched in response to the attacks of 11 September 2001. As a result of its profound influence on 'the way the Pentagon view[ed] its enemies, vulnerabilities and future structure' between the attacks of September 2001 and the invasion of Iraq in March 2003 (Jaffe, 2004), Dillon (2002: 71) has identified network-centric warfare as the 'key concept that will govern this war and the discourse that will characterize it'. And, while the closure of the OFT, the replacement of Rumsfeld, and the rise of counterinsurgency doctrine have all been heralded as a repudiation of network-centric warfare and transformation (DiMascio, 2006; Sieff, 2007; Barry and Thomas, 2007; Gates, 2009; US Department of Defense, 2010), both supporters and critics alike recognize that Cebrowski, the OFT, and associated ideas about network-centric warfare and transformation have had a lasting impact upon the US military (Barnett, 2006; DiMascio, 2006; Groh, 2010).

Network-centric warfare marked the confluence of a number of discourses from the 1990s about the revolution in information and communication technologies (ICTs) and associated changes in society, economy, and military affairs (Dillon, 2002: 72). Of the many theories advanced during that decade about the meaning of these changes for military affairs – theories with names like 'fourth generation warfare' (Lind et al., 1989; Lind, 2001), 'netwar' (Arquilla and Ronfeldt, 1996), 'neocortical warfare' (Szafranski, 1997), 'softwar' (DeCaro, 1998), among others – network-centric warfare emerged as perhaps the most complete and certainly the most influential theory guiding US military preparations for Information Age warfare at the turn of the 21st century. More importantly, network-centric warfare is an example of the kind of theoretical knowledge that often serves as the intellectual foundation of preparations for war and the conduct of military forces. Indeed, formal doctrines, strategies, and other 'knowledge-laden routines' occur within, reflect, and are powered by a knowledge of the world that precedes them (Eden, 2004; Pretorius, 2008: 103).

Of course, from Caesar in the West to Sun Tzu in the East, soldiers have thought about war and have sometimes recorded their insights for the benefit of both contemporaries and future generations. Yet, Azar Gat (2001: 3) has noted that classical military theory often involved merely the 'imitation of strategems' employed by the great generals in the great battles of history. Similarly, John Alger (1982: 14) has noted that classical theory was neither systematic nor comprehensive. In the West, the modern notion of 'military theory', meaning the systematic study of warfare in search of universal laws and principles that can be discovered, taught, and applied, only became an important activity with the European Enlightenment and the emergence of professional, standing armies (Gat, 1992). But, in addition to presenting laws and principles of war, such theories have also increasingly served to articulate an understanding of the social, economic, technological, and other factors shaping the larger threat environment. Therefore, to the degree that the term 'theory' might imply a narrow, scientistic focus on universal laws and principles, it may be more appropriate to identify military theory as an integral part of what some scholars of security and military affairs have referred to as 'security imaginaries' (Pretorius, 2008), 'organizational frames' (Eden, 2004), and 'regimes of truth' (Bousquet, 2009).

The work of these and other scholars is part of a larger effort spanning a number of disciplines to develop a discursively focused study of war, security, and international relations. Of course, scholars of the Copenhagen School have introduced the concept of 'securitization'. Based in John L Austin's speech-act theory, securitization focuses on the discursive construction of 'threats' to

security (Buzan et al., 1998). Similarly, in the field of communication, rhetoricians have a long tradition of studying war rhetoric, in particular the ways that heads of state justify the use of military force (Ivie, 1980, 1987; Medhurst, 1990; Goodnight, 1998; Dauber, 2001; Mitchell, 2002, 2009; Noon, 2004; Hartnett and Stengrim, 2006; Winkler, 2007; Zarefsky, 2007; Stahl, 2008). In both cases, some have begun to look more closely at the practices of discourse that shape the construction of security- or war-related knowledge produced by 'professionals of security' (Bigo, 2002; c.a.s.e. collective, 2006; Mitchell, 2006), which includes military professionals.

This article contributes to these efforts by using an expanded form of articulation theory to provide a discursive grounding for understanding the construction of Western military imaginaries. An examination of two cases – early 20th-century industrial-mechanized warfare theory and late 20th-/early 21st-century network-centric warfare theory – demonstrates that military theories often serve to define and link dominant military conceptions of science, technology, society, economy, war, and military organization to provide high-level 'situational awareness', a unified image of the world that shapes the military's observations, decisions, and actions. Though scholars have begun to use articulation theory to examine various aspects of national security discourse (Weldes, 1996; Pretorius, 2008; Sikka, 2008; Brunner and Cavelty, 2009), there are two important theoretical concepts that have not yet found their way into these works: the concept of 'antagonisms' from Ernesto Laclau and Chantal Mouffe's (1985) work on articulation theory and the concept of 'intercalation' from the history of science (Galison, 1997). Incorporating these concepts provides an expanded articulation theory that adds a diachronic focus to the synchronic focus found in existing accounts – that is, it allows us not only to map the linkages that constitute existing imaginaries, but also to track changes over time, to observe imaginaries-in-the-making. By examining the two cases mentioned above through the lens of this expanded articulation theory, it becomes clear that Western military imaginaries often share a common narrative structure that privileges co-periodized over intercalated change among the elements of the articulation, resulting in the phenomenon of antagonism as such serving as a generic form of exigency or threat that can be used to justify military modernization and even the use of force.

The next section lays out the theoretical framework of this study by discussing articulation theory and the concepts of imaginaries, antagonisms, and intercalation in more detail. The subsequent two sections use this theoretical framework to examine theories of industrial-mechanized warfare and network-centric warfare, respectively. Finally, the concluding section provides some thoughts on how the common narrative structure that emerges from this analysis can serve as a basis for scholars to critically engage military theory discourse.

Antagonism, intercalation, and the articulation of military imaginaries

Sociologist Charles Taylor (2004: 23–4) has defined the social imaginary as 'the ways people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper normative notions and images that underlie these expectations', which together form the foundations for 'common understanding that makes possible common practices and a widely shared legitimacy'. Imaginaries are 'both factual and normative', entailing not only 'a sense of how things usually go' but also 'an idea of how they ought to go'.

In turn, Pretorius (2008: 117) has defined the security imaginary as 'that part of the social imaginary that deals with the understanding of the security world and in turn makes security practices

possible'. It is about how 'security and insecurity (or threat) ... are constructed through the fixing of meanings to things, an identity to "the self" and others, and the relationships that are thus instituted' (Pretorius, 2008: 100). Similarly, military organizations and associated 'professionals of security' in and out of uniform engage in the production of what might be called 'military imaginaries', in part through the production of theoretical knowledge about war, which can provide a sense of shared awareness about the military organization's position within the wider environment. And because military organizations and practices, as well as the larger social, political, and economic environments in which they operate, are increasingly affected by rapid changes in technology and the natural sciences, it is appropriate to classify Western military imaginaries as a form of 'technoscientific imaginary' (Marcus, 1995: 3–4), the study of which involves paying particular attention to 'how people shape and are shaped by complex technical, social, and political-economic systems' (Fortun and Fortun, 2005: 44).

While it would be a mistake to focus solely on elites or official policy statements (Pretorius, 2008: 105), we should also remember that the articulation of particular theories of warfare by military professionals is not only an indicator or reflection of a wider security imaginary, but also helps to constitute it by contributing to 'the circular construction of public mind and military self-understanding' (Pretorius, 2008: 103). As Taylor notes (2004: 24), 'it often happens that what start off as theories held by a few people come to infiltrate the social imaginary, first of elites, perhaps, and then of the whole society'. What begins as formal theory can end up constituting a wider, more diffuse imaginary by providing the 'logic', 'underlying presuppositions', or 'rhetorical software' that are, nonetheless, 'rarely made explicit and remain largely unconscious both to their authors and to those required to make sense of them' (Makus, 1990: 498). As Doyle (1997: 10) writes, 'the contagion of the unthought suggests that the influence of rhetorical software rises as it is "forgotten", ignored, or, what amounts to the same thing, assumed'. Thus, military theory can provide us with a window into existing military and security imaginaries, as well as imaginaries-in-the-making.

Scholars in various fields, including those who take a discursively focused approach to the study of security and military affairs, have deployed articulation theory in examining the construction of imaginaries. Formulated originally in the cultural studies work of Stuart Hall (Grossberg, 1986), articulation theory as deployed by cultural studies scholars has traditionally eschewed the production of top-down accounts focused on 'elites', focusing instead on the subaltern or the oppressed. However, as mentioned above, this does not mean that we should ignore elites or professional discourses. Thus, a number of scholars have begun to deploy articulation theory to examine areas of elite, professional discourse that have not traditionally been the subject of such analysis. This includes, for example, the use of articulation theory to explore the professional discourses and imaginaries of scientists (Fortun and Bernstein, 1998; Fortun and Fortun, 2005). Among scholars of security and military affairs, articulation has been used alongside the notion of security imaginaries to investigate the phenomenon of military isomorphism (Pretorius, 2008); to investigate US military theories of 'perception management' and 'information warfare' (Brunner and Cavelty, 2009); and to provide a critical examination of the Bush administration's case for ballistic missile defense (Sikka, 2008). In each case, these works draw from the important contribution of Jutta Weldes (1996), who introduced articulation theory as a means of studying the construction of national interests and threats to security in her work on the Cuban missile crisis. Likewise, articulation can be used to examine military theories as a constitutive element of larger military and security imaginaries.

'Articulation' refers to a phenomenon, a theory, and a method. It is a method of analyzing the way that 'discursive structures constitute and organize social relations' that begins with the

observation that the formation of those discursive structures is the 'result of an articulatory practice' (DeLuca, 1999: 335). Articulation as practice involves enunciating elements (e.g. beliefs, values, individuals, organizations, technologies, practices, discourses, etc.) and then linking those elements into a 'unity', which often has the effect of empowering certain ways of seeing, being, and acting while disempowering or constraining others. Discourses as articulations are contingent and occur within and help to constitute particular historical conjunctures (Laclau and Mouffe, 1985: 105, 113; Grossberg, 1986: 53; DeLuca, 1999: 335; Slack, 2006: 225). As we will see, in the wake of the terrorist attacks of 11 September 2001, a very particular linking of then-dominant military conceptions of science and technology, society and economy, war, and the military organization – that is, network-centric warfare theory – helped to empower certain foreign policy options while constraining or completely disempowering others, including the individuals and groups who advocated them, even if those options were based on many of the same assumptions as network-centric warfare. For example, even though a fourth-generation warfare theory shares network-centric warfare's assumption that large-scale sociotechnical changes meant that future threats would be primarily asymmetric ones, and like network-centric warfare has even sought insight in popular accounts of the non-linear sciences, nonetheless the ascendance of network-centric warfare meant that fourth-generation warfare theorists' warnings against overemphasis on hi-tech weapons systems and the use of traditional military forces to counter asymmetric threats would go largely unheeded in the initial US response to the attacks of 11 September 2001 (Lind et al., 1989, 2001; Lind, 2001; Hammes, 2004; House National Security Committee, 1997a,b).

While most of the work on security- or military-related imaginaries that has drawn from articulation theory has embraced the synchronic enunciating and linking practices associated with articulation, another important aspect of articulation has been largely overlooked: the role of the 'antagonism'. Drawing heavily from the linguistics of Ferdinand de Saussure and the philosophy of Jacques Derrida, Ernesto Laclau and Chantal Mouffe introduced the antagonism as a way of accounting for change in articulations over time. Starting from the premise that articulations of any kind, including the social imaginary, are systems of differences like language, Laclau and Mouffe argue that the antagonism represents the fact that such systems are never entirely stable, never constitute a closed, sutured totality. Thus, the 'antagonism as the negation of a given order is, quite simply, the limit of that order', which in turn arises from within the system itself 'as something subverting it, destroying its ambition to constitute a full presence' (Laclau and Mouffe, 1985: 126–7). While there are no essential, a priori antagonisms (DeLuca, 1999: 336; Laclau and Mouffe, 1985: 127) – that is, no particular forms of antagonism are inevitable – nonetheless, the emergence of antagonisms is a 'natural' result of the fact that no articulation can ever be total or complete. In this sense, then, Cebrowski and Barnett are correct in their statement that 'some things simply run ahead of others'.

One clear methodological result of the antagonism for studying the articulation of imaginaries is the requirement to think beyond mapping static linkages to understanding articulation as a dynamic process of change. Another, perhaps less obvious, implication is the need to pay attention to social actors' own expectations about how and even if articulations will or should change. In this task, the concept of 'intercalation' as developed by historian of physics Peter Galison (1997) is helpful. Intercalation is the result of Galison's contribution to the longstanding debate among philosophers, sociologists, and historians of science about the relationships among instrumentation, experimentation, and theory within the sciences, as well as how change occurs in and among scientific disciplines. Galison noted that while positivists argued that theories were the result of instrumented experimentation, anti-positivists argued for the 'theory-ladenness' of both scientific instruments and experiments. In both cases, however, scholars tended to agree that instruments,

experimental practices, and theories did and should change in a 'co-periodized' way, as did/should the various subdisciplines within a given scientific discipline – that is, if a major change occurs in instruments, experimental practice, or theory, then all of the others must change as well; if one subdiscipline within a larger discipline changes, the others must change as well so that the discipline maintains its unity. But, in his extensive work on the history of physics, Galison has convincingly demonstrated that disciplines, subdisciplines, and their associated instruments, experimental practices, and theories do not change in a co-periodized way, but rather in an intercalated fashion – indeed, with some of these things running ahead of others. Thus, he demonstrates that disunity is at the heart not only of individual disciplines but also of the sciences in general. However, Galison (1997: 14, 18–19, 797–803) sees intercalated change and disunification not as weaknesses but as contributors to the strength of the sciences.

Theories of industrial-mechanized warfare and network-centric warfare alike engage in defining and linking dominant conceptions of science, technology, society, economy, war, and the military organization, including its weapons and practices, for the purposes of understanding and then responding to perceived large-scale socioeconomic changes believed to be caused by changes in science and technology. In the case of industrial-mechanized warfare, concern over an emergent Industrial Age brought about by technological advances like the internal combustion engine and the assembly line led to calls for the mass production and adoption of mechanized tools of war like the airplane and the tank. Popular understandings of the sciences of psychology and biology were used to speculate upon the impacts of using these weapons in future wars. Similarly, in network-centric warfare theory, concern over an emergent Information Age brought about by advances in information and communication technologies (ICTs) led to calls for the adoption of ICT-enabled weapons and digitally networked military organizational structures. Popular understandings of the non-linear sciences of chaos theory and complexity theory were used to understand the potential implications of the transformation of the US military into an Information Age fighting force.

In both cases, the pattern of articulation is remarkably similar, with each relying upon a number of key ideas, which together form a common narrative structure underlying both theories:

- The socioeconomic system has undergone massive changes as a result of changes in science and technology.
- Military technologies, thought, and practice are out of sync with these changes.
- Technology-induced socioeconomic change has led to both vulnerabilities and opportunities, which combine to require the military to play 'catch up', to get itself in sync with larger socioeconomic changes by mirroring those changes within itself.
- Mirroring those changes involves adopting the technologies behind larger socioeconomic changes and looking to the sciences as tools for understanding the socioeconomic system and guiding the conduct of military forces.

This narrative rests upon the assumption that the elements in the articulation (e.g. science, technology, society, economy, war, and the military) should be congruent, should mirror one another, and should change in a co-periodized way. The result in each case is that technology-induced socioeconomic change is identified as causing 'antagonisms' that then serve as a generic form of exigency or threat that always already seems to justify the kinds of massive changes in military technology, doctrine, and organization variously labeled 'progress', 'modernization', 'reform', or 'transformation'. The next two sections examine theories of industrial-mechanized warfare and network-centric warfare, respectively, to illustrate the pattern identified above.

Industrial-mechanized warfare theory

In the early 20th century, a number of European and US military professionals theorized about the future of industrial, mechanized warfare. Theories about the impacts of new technologies such as the airplane and the tank were the most notable. But, these theories and theorists were not solely concerned with technology. Rather, in theorizing the impacts of new technologies, they often implicitly or explicitly articulated theories of science, technology, and society as well.

Theorists of industrial-mechanized warfare were responding to rapid and dramatic changes in society and technology, which seemed to have altered the very nature of war itself (Hacker, 1982: 53). In her study of the development of theories of strategic bombardment in the USA and Britain between 1914 and 1945, Tami Davis Biddle (2002: 15, 18) has demonstrated that military planners and policymakers at the turn of the century were well aware of the technological and societal shifts that were contributing to an emerging 'industrial age'. In turn, the factory became a guiding metaphor in Anglo-American theories of strategic bombardment, which often portrayed societies as factories writ large, composed of 'key plants' and 'bottlenecks of production' (Biddle, 2002: 38–9). One post-World War I British survey of the effects of aerial bombardment even used the terms 'town' and 'industrial centre' interchangeably (Biddle, 2002: 58).

Bart Hacker (1982) has noted that theorists of mechanized warfare, in particular JFC Fuller, who is widely considered to be the father of blitzkrieg-style tactics, also started from the observation that advances in science and technology in the previous century had utterly remade society, but that, unfortunately, these changes had not been recognized by pre-World War I military leaders. Fuller (1923: 102–3) argued that 'this intellectual and moral revolution, which was brought about through the growth in the physical sciences, was not grasped by the military mind.... It was not realized that, as the whole aspect of civilization had changed, so also must the whole aspect of warfare be changed'. Thus, not only was contemporary military thought and practice seen as out of sync with science, technology, and society, it was seen as out of sync with war itself, a 'fact' that was cause for great concern. Indeed, Fuller (1923: 25) concluded that the tragedy of World War I was a direct result of military professionals' failure to recognize and respond to large-scale changes in science, technology, and society. His diagnosis not only was shared by other theorists of air-power and tank warfare, such as BH Liddell Hart (1925: 7–9), but was also reflective of a wider crisis of self-confidence and erosion of traditional forms of social authority that swept Europe and, to a lesser degree, the United States in the aftermath of the war, which included the belief that the war had been either a misapplication or a failure to apply science to the conduct of war in particular, but also to the formation of policy and the affairs of state more generally (Adas, 1989: 380–1).

For theorists of industrial-mechanized warfare, the supposed failure to stay in sync with large-scale changes in science, technology, and society was all the more frustrating because they believed that these changes left industrialized societies vulnerable in a number of ways. First, many of these theorists were influenced by enormously popular works on industrial society, like those written by HG Wells and John Maynard Keynes, which posited the increasing interdependence and fragility of modern, industrial, and increasingly global economies (Gat, 2001: 538, 552–3). Thus, Liddell Hart (1925: 52–3, 33–4) was able to argue not only that 'in the mechanical future of war supremacy will go to the nation with the greatest industrial resources', but also that interdependence and fragility meant that 'in a modern nation at war its industrial resources and communications form its Achilles' heel'. Similarly, Major William C. Sherman (1926: 217–18), the father of US air-warfare theory in the 1920s, believed not only that industry was at the very heart of the modern nation's ability to wage war successfully but also that a massive strike against an enemy's 'key plants' could

have the effect of delivering a knock-out blow. Finally, Fuller (1923: 102–3) believed that 'while in the year 1800, the nervous system of a civilized nation was of a low and ganglionic order, by 1900 it had become highly sensitive and centralized'.

But these were not just metaphors. Derived from popular writings about crowd psychology, eugenics, and social Darwinism, military theorists identified a second vulnerability of industrialized societies: industrialization-induced changes in human physiology resulting in the 'nervous complexion of the modern mind' (Biddle, 2002: 14, 18). The urban poor and working classes, often referred to as 'industrial populations', were seen as particularly prone to the maladies of neuroses, panic, and hysteria (Biddle, 2002: 13, 64; Freedman, 2005; Jones et al., 2006; Clodfelter, 2010). Liddell Hart (1925: 41–2) argued that bombardment of 'the slum districts' would result in 'industrial populations' being 'maddened into the impulse to maraud'. Sherman (1926: 13–14) believed that the 'elbow-to-elbow' living conditions of industrial populations made them prone to the transmission of a 'wave of hysteria' and the 'propagation of panic', both of which he considered a 'disease'. In short, with industrialization came great strength, but also great vulnerability. Thus, for military theorists, minimizing one's own vulnerabilities while exploiting the enemy's vulnerabilities required, first and foremost, understanding the effects of large-scale changes in science, technology, and society.

The 'prophets of mechanization', as Hacker has called them, 'urged, even demanded, change to meet the crisis of modern war and to align the army "with the trend of civil life and modern scientific thought"' (Hacker, 1982: 56). Of course, bringing the military into alignment with larger changes involved the adoption of the technologies behind industrialization, including weapons like tanks and airplanes powered by internal combustion engines and mass-produced on factory assembly lines. But, as demonstrated above, ideas borrowed from 'modern scientific thought' of the day served as an aid to understanding large-scale change, as well as devising responses to it. Fuller was quite clear in arguing that 'as science had accomplished the civil changes, so also must science accomplish the military ones' (Fuller, 1923: 103), and that, therefore, 'we of the fighting services must grasp the wand of this magician and compel the future to obey us' (Fuller, 1920: 293). Likewise, Liddell Hart (1925: 16) believed that avoiding a repeat of the tragedy of World War I would require the development of a 'more scientific conception of war' that would provide the basis for a 'more scientific and economic military policy', whose objective would be 'to wage war in a manner less injurious to the interwoven fabric of modern civilization'.

Ironically, however, lessons about the 'nervous complexion' of 'industrial populations' derived from the latest in psychology, eugenics, and social Darwinism seemed to justify the targeting of civilian populations first and foremost. Liddell Hart, Sherman, and many proponents of strategic bombing viewed it as 'an aerial shortcut to the accomplishment of a Clausewitzian dictum: to end a war one must destroy the enemy's will to fight' (Biddle, 2002: 139–40). And, given their supposed susceptibility to panic, neuroses, and hysteria, the bombardment of civilian populations in general, and the urban poor and working classes in particular, was seen as the fastest, most effective means of attacking the enemy's will to fight (Liddell Hart, 1925: 31, 37; Sherman, 1926: 5, 210). Fuller agreed that destruction of the enemy's will to resist should be the main objective. Citing works by crowd psychologist Gustave LeBon, eugenicist Karl Pearson, neurologist Wilfred Trotter on the *Instincts of the Herd in Peace and War*, and social Darwinist Herbert Spencer (coiner of the phrase 'survival of the fittest') (Gat, 2001: 540), he concluded that because 'soldiers are controlled by discipline [and] civilians by fear', 'the main targets of the moral attack are the civilian inhabitants of the country attacked' (Fuller, 1923: 105). Though Fuller and others believed that this 'scientific' way of conducting war would result in the ability to dictate the will of the enemy

nation with less bloodshed, making war both less barbarous and more profitable (Fuller, 1923: 103–4; 1925: 38), Biddle (2002: 9) has noted that, at least where the implementation of theories of strategic bombing were concerned, World War II saw 'nothing less than a form of aerial Armageddon played out over the skies of Germany and Japan'.

Network-centric warfare theory

The case for network-centric warfare made by various US military professionals almost eighty years later followed much the same pattern as the case made for industrial-mechanized warfare examined above. First articulated in 1998 by Vice Admiral Arthur Cebrowski, who would go on to become a key adviser to US Secretary of Defense Donald Rumsfeld following the attacks of 11 September 2001, network-centric warfare started from the observation that the world had recently witnessed large-scale changes in science, technology, and society. Drawing on popular works on the 'information revolution' like those written by Alvin and Heidi Toffler (Toffler, 1984, 1993), Cebrowski, his assistant for strategic futures, Thomas Barnett, and others believed that information and communication technologies (ICTs) had already revolutionized the US economy (Cebrowski and Garstka, 1998; House National Security Committee, 1997b). What is more, the revolution in ICTs was identified as the driver of economic globalization. Cebrowski has argued that 'useful societies across the globe' – what he and Barnett called the 'functioning core' of globalization (Barnett, 2003) – 'are moving from the industrial age to the information age ... fueled by the ubiquitous nature of low cost, but very powerful information technology' (Cebrowski, 2002).

In turn, they believed that 'globalization and the rise of the New Economy are generating new rule sets with regard to how nation-states and national economies interact with one another'.[1] Those 'new rule sets' were believed to be behind the misalignments, gaps, and mismatches mentioned in the quotes that open this article. And, though network-centric warfare theorists believed that the US military had begun to make the technological changes necessary to operate effectively in this new environment, playing 'catch up' would require the adoption of new organizational structures and operating concepts because existing structures and concepts were believed to be out of sync with changes in technology (House National Security Committee, 1997b). Even Secretary of Defense Rumsfeld expressed concern that 'the Department of Defense is bogged down in the micromanagement and bureaucratic processes of the industrial age – not the information age' (Cebrowski, 2003a). In short, network-centric warfare advocates argued that the US military had not yet come to grips with 'how these changes [in technology, economy, 'rule-sets', etc.] redefine the U.S. Military's historic role as "security enabler" of America's commercial network ties with the world'.[2]

Theorists of network-centric warfare identified a number of dangers flowing from the emergence of an 'information age' and associated misalignments, gaps, and mismatches, including the US military's supposed failure to keep pace. The first and most dangerous among these was the emergence of the so-called non-integrating gap of globalization – that is, those parts of the world that had not been subjected to economic globalization, which Barnett (2003) believed 'incubate the next generation of global terrorists'. The uneven spread of globalization and the advantages accrued via the use of networked ICTs by organizations of all types (including terrorists) were seen as the chief causes of international instability and threats to US security. Indeed, Barnett (2003) had 'a simple new security rule set' to guide the use of US military force: 'a country's potential to warrant a U.S. military response is inversely related to its globalization connectivity', or, even more simply, 'disconnectedness defines danger'.

Network-centric warfare theorists deployed concepts and metaphors from the science of complexity theory to explain why. The global system, they explained, was subject to 'system perturbations' – that is, dangerous 'butterfly effects'. Cebrowski (2003a) explained that system perturbations are 'an information age phenomenon' that can result in 'a vertical shock to the international system.... That is much of what we witnessed post-9/11'. He explained that the dense technological and economic interconnectivity of globalization had allowed this, but so did the ability of terrorist organizations to use networked ICTs to carry out operations and have effects of global scale. Terrorist groups like Al-Qaeda, which had become ICT-enabled 'super-empowered groups' or 'global guerrillas' (Cebrowski and Barnett, 2003; Robb, 2007), were identified as a threat precisely because they had been able to keep pace with the emergence of the Information Age. Donald Rumsfeld lamented that while the US Department of Defense was 'bogged down' in the Industrial Age, 'terrorists move information at the speed of an email, money at the speed of a wire transfer, and people at the speed of a commercial jetliner' (Cebrowski, 2003a).

Network-centric warfare advocates believed that two general responses to the overall situation were necessary: (1) bringing the US military into sync with larger technological and socioeconomic changes, and (2) eliminating the misalignments, gaps, and mismatches 'out there' that were supposedly the root cause of threats to US security. In both cases, concepts and metaphors gleaned from the natural sciences, in particular the 'non-linear sciences' of chaos theory and complexity theory, were used to explain and justify the necessary steps. First, to the degree that Al-Qaeda was supposedly more in sync with the Information Age, playing 'catch up' meant that the USA needed to 'morph or change or transform in some way to mirror the target set' (Cebrowski, 2003a). Employing concepts such as 'increasing returns', 'lock-out', and 'co-evolution' gleaned from the work of researchers who had used complexity theory to study the dynamics of the 'new economy' and associated business practices (Arthur, 1988, 1989, 1994, 1996; Beinhocker, 1997, 1999a,b), Cebrowski and Garstka (1988: 29) explained that

> network-centric warfare and all of its associated revolutions in military affairs grow out of and draw their power from the fundamental changes in American society. These changes have been dominated by the co-evolution of economics, information technology, and business processes and organizations.... Network-centric warfare ... is analogous to the new economic model, with potentially increasing returns on investment ... 'locking-out' alternative enemy strategies and 'locking-in' success.

Just as networked ICTs were at the heart of the transition from the Industrial Age to the Information Age, so they were said to be at the heart of 'transforming' the military into a 'complex adaptive system' – that is, a system structured as a decentralized network and operating in a non-linear, self-organizing manner (Cebrowski and Garstka, 1998).

Second, only after 'morph[ing] into a military of super-empowered individuals fighting against super-empowered individuals' would the US military be able to 'embrace [the] more sharply focused global cop role' of a global 'systems administrator' working to 'shrink the gap' of globalization and thereby 'master system perturbations' (Cebrowski and Barnett, 2003; Cebrowski, 2003b). Mastering system perturbations would require 'taking advantage of path dependency' in the complex, adaptive international system (Cebrowski, 2002, 2003a). To do that, Cebrowski believed that complexity theory called for the use of 'precisely placed early efforts' to 'change critical initial conditions ... and stop something before it starts' (House National Security Committee, 1997b). He argued that this meant that 'deterrence now has to be based on prevention' (Cebrowski, 2002). Thus, the terms 'deter forward', 'rule-set exportation', and 'exporting security' became

euphemisms for the preventive use of force (Barnett and Gaffney Jr, 2002; Cebrowski, 2002; Barnett, 2003; Cebrowski, 2003b).[3] Inspired by the supposed lessons of non-linear science and the requirements of the Information Age, Cebrowski declared in 2003 that 'security is our nation's largest single public sector export, and it's booming.... If you are fighting globalization, if you reject the rules, if you reject connectivity, you are probably going to be of interest to the United States Department of Defense' (Cebrowski, 2003b).

In short, network-centric warfare was an attempt to respond to the world as a complex system by making the military itself into a complex system. It was meant to be not only a response to changes in science, technology, and society, but also a mirroring of those changes within the military. Most importantly, it was meant to give the US military the ability to use preventive force to eliminate seemingly dangerous misalignments, gaps, or mismatches – that is, antagonisms – in the international system.

Intercalation and antagonism as threats

There are a number of conclusions that can be drawn from the preceding analysis, both about the particular military theories or imaginaries examined here and about Western military imaginaries more generally. Together, these conclusions can aid in scholars' efforts to engage critically with military theory discourses. First, as mentioned previously, articulation involves defining and linking 'elements' or various types. Understanding that the elements articulated in military theory typically fall into a number of categories (i.e. science; technology; society/economy; military organization, thought, and practice) and that such articulations of military theory are typically accompanied by assumptions that privilege co-periodized over intercalated change among the categories of elements provides a useful model that scholars can use to critically analyze military and security imaginaries. For example, from this perspective, one can see that recent, highly influential statements about supposed threats to US cyber-security generally fit the pattern identified here. While the identification of specific threat subjects has remained ambiguous at best (Bendrath, 2003), the emergence of an information age/society/economy in general and the belief that the US government is once again out of sync with technological, economic, and social changes (CSIS Commission on Cybersecurity for the 44th Presidency, 2009: 12, 14) become the warranting conditions behind calls to 're-engineer the Internet' (McConnell, 2010) or to give the US president an Internet 'kill switch' (McCullagh, 2010) – that is, efforts to prevent the emergence of antagonisms as such, rather than responses to specific, identifiable threats.

Second, while the construction of more immediate interests or threats can be analyzed from the perspective of articulation, immediate threats are often portrayed by military and other security professionals as merely symptomatic of a larger threat – that is, the more generic exigency of a system out of sync, the securitization of antagonism or intercalation in general. In industrial-mechanized warfare theory, intercalated change among science, technology, society, and economy, on the one hand, and military technology, thought, and practice, on the other, was identified as the root cause of the bloodbath in the trenches of World War I, a result that theorists said would inevitably be repeated unless steps were taken to bring the system back into balance by adopting new military technologies and ways of thinking and acting informed by the latest from the natural sciences. Similarly, theorists of network-centric warfare saw the attacks of 11 September 2001 in particular, and global terrorism more generally, as symptoms of a system out of sync. Again, changes in science, technology, society, and economy were believed to have 'run ahead' of military technology, organization, thought, and practice. In fact, in the case of network-centric warfare, the

identification of the generic threat of antagonism or intercalation among these elements preceded the attacks of 11 September 2001 and the subsequent 'War on Terror'. Yet again, the solution was seen as bringing the system back into sync by adopting new military technologies, organizational structures, and ways of thinking and acting. In both cases, explanations of and responses to immediate threats were not unique to those threats, but were filtered through larger discourses or ideologies about war writ large at a particular historical moment.

But, network-centric warfare went even further in its attempts to correct a system out of sync. While both industrial-mechanized warfare theory and network-centric warfare theory called for efforts to correct a perceived antagonism between the military and the larger threat environment, network-centric warfare theorists also called for efforts to correct perceived antagonisms in the wider environment 'out there'. 'Rule-set exportation', 'deterring forward', and 'exporting security' via the 'War on Terror' – that is, the preventive use of force – as a response to some things running ahead of others is an attempt to banish antagonism as such rather than a response to a particular form of antagonism. Cebrowski and Barnett are correct in their statement that international terrorism of the kind witnessed on 11 September 2001 exposes an antagonism within, a limit to the discourse of neoliberal globalization. But, the response to that particular antagonism, that specific limit, is an attempt not only to eliminate that antagonism or limit (i.e. the 'War on Terror'), but also to eliminate the possibility of antagonisms or limits as such (i.e. 'shrinking the gap', 'mastering system perturbations').

Understanding the role of intercalated change as antagonism in network-centric warfare helps us to understand better the emergence and widespread acceptance of the idea that the current conflict should be known as 'The Long War' (Bradley and White, 2006). Indeed, Barnett has claimed that the ultimate goal of the 'operating theory of the world and a military strategy to accompany it' (Barnett, 2003) that he and Cebrowski offered was 'the end of war' entirely (Barnett, 2004: 383). The goal was a system in sync now and forever, a final, total, complete articulation. But, if Laclau and Mouffe are correct, then this is a fool's goal, because antagonism as such cannot be eliminated. Specific enemies or threats might be eliminated, but antagonism in general will not be. Thus, by framing the response to 11 September 2001 in terms that indicate a goal of eliminating antagonism in general, one is left with the inevitability of an open-ended and never-ending process of transformation and conflict. The definition of 'transformation' provided by Cebrowski would seem to support this conclusion: 'Transformation is foremost a continuing process. It does not have an end point. Transformation is meant to create or anticipate the future. Transformation is meant to deal with the co-evolution of concepts, processes, organizations and technology. Change in any one of these areas necessitates change in all'.[4] So does Barnett's (2003) attempt to explain that realizing 'the end of war' is the reason 'why we're going to war, and why we'll keep going to war'.

In these statements, we see a powerful and frightening example of the dangers of the kind of technological determinist mindset that has become increasingly dominant in Western societies over the last two centuries, especially among policymakers. Even when military professionals and civilian policymakers grasp the fact that 'technological change emerges from a set of social conditions and social pressures for new technical adaptations' – often conditions and pressures that they themselves have created – and that technology 'is not a pure exogenous force' (Hirst, 2001: 8), nonetheless, it is all too easy to slip back into a hard determinist mindset that sees technological change as the driving force behind successive waves of wholesale change in society, economy, and culture (Marx, 1997: 984). In the United States defense community, the best example might be the rapid shift from depicting a 'revolution in military affairs' as the result of purposeful responses to the perceived exigencies of the threat environment of the 1970s and 1980s to concern over 'keeping

pace with [a] military-technical revolution' depicted as having taken on a life of its own (Krepinevich, 1992, 1994).

Such determinist thinking is, of course, not limited to the defense community and has resulted in an increasing sense of 'technological pessimism' (Marx, 1994: 238), in which concern 'that somehow technology has gotten out of control and follows its own course, independent of human direction' (Winner, 1977: 13) results in 'a gathering sense ... of political impotence' and 'the feeling that our collective life in society is uncontrollable' (Marx, 1997: 984). One possible negative result of such a mindset is paralysis in the face of seemingly overwhelming and uncontrollable forces (Winner, 1977: 18). But, in the other direction, we can see a tendency to respond to seemingly technologically induced total transformations of society with the construction of equally totalizing and technologically focused strategies to regain control at all cost. That is what we see in the theories of industrial-mechanized warfare and network-centric warfare analyzed above. But, such totalizing articulations can be described as what disaster sociologist Lee Clarke (1999) has called 'fantasy documents', which are always already incomplete, both in terms of their grasp of what is happening and in terms of their creators' ability to fulfill the promises made in such visions. Thus, strategic bombing did not lead to quick, bloodless victory, and the 'War on Terror' has become 'The Long War' rather than 'the end of war' that Barnett had envisioned.

Conclusion

The use of an expanded articulation theory, which includes the concepts of antagonism and intercalation, provides the discursive grounding necessary to allow for a diachronic as well as a synchronic understanding of the construction of a military imaginary, which is the military organization's collective understanding of its place within the larger security environment. When examining imaginaries-in-the-making, it is important to take formal military theory into account, because of the central role that the production of theoretical knowledge about warfare plays in the construction of Western military imaginaries. When we examine industrial-mechanized warfare theory and network-centric warfare theory through the lens of this expanded articulation theory, it becomes clear that Western military theories often serve to define and link dominant conceptions of science, technology, society, economy, war, and military organization, thought, and practice to provide a unified image of the world that shapes the military organization's preparation for war, the conduct of its forces, and attempts to justify the use of force. Additionally, Western military imaginaries often share a common narrative structure that privileges co-periodized over intercalated change among the elements of the articulation, resulting in the phenomenon of antagonism as such serving as a generic form of exigency or threat that can be used to justify military modernization and even the use of force.

Classifying the types of elements typically articulated in military imaginaries, drawing out the common narrative structure behind how elements are linked together, and identifying the normative consequences of that common pattern of articulation provides a solid foundation for discursively focused scholars of security to examine critically, and on an ongoing basis, military and security imaginaries-in-the-making. Indeed, there are a number of issues that are in need of further research. First, though it is valuable to understand better the articulation of Western military imaginaries and their relation to trends in how modern, industrial, Western societies have understood and responded to large-scale technological change, more work is needed that examines the articulation of military imaginaries and attitudes about technological change in non-Western contexts. Second, more work is needed that addresses the possibilities and processes of how, why, and by whom

dominant imaginaries can be disarticulated. This could include empirical work that explores the degree to which the recent rise of counterinsurgency doctrine in the United States does or does not constitute a disarticulation and re-articulation of the dominant military imaginary. Finally, more theoretical work is in order that would explore the degree to which military imaginaries that are less totalizing in their vision might also be less likely to result in seemingly never-ending and expensive processes of modernization and more likely to reduce the risk of offensive use of force. Of great assistance in this regard would be work that uncovers the potential fault lines within the dominant US military imaginary by more closely examining the subtle differences in pre- and post-9/11 articulations of network-centric warfare theory alongside differences in the ways that civilians and military professionals in the 1990s deployed lessons gleaned from the non-linear sciences in constructing visions of future warfare (Alberts and Czerwinski, 1997; Lawson, forthcoming). By uncovering paths not taken in the articulation of the post-9/11 US military imaginary dominated by network-centric warfare theory, such work could help to denaturalize that imaginary and point the way to the articulation of other, perhaps more peaceful imaginaries. By adding the concepts of antagonism and intercalation, the expanded form of articulation theory presented here opens the door to both synchronic and diachronic analysis of military imaginaries, providing a solid foundation from which scholars of security can address these important issues.

Notes

1. From the description of the 'NewRuleSets.Project' conducted at the Naval War College by Barnett under the direction of Cebrowski; see http://web.archive.org/web/20080630205302/http://www.thomaspmbarnett.com/projects/newrulesset/nrs_index.html (accessed 23 June 2010).
2. 'From the description of the 'NewRuleSets.Project' (note 1 above).
3. I have chosen here to use the term 'preventive' as opposed to 'preemptive' because it is more in line with the actual goals of network-centric warfare advocates like Cebrowski and Barnett. Rather than seeking to preempt the immanent realization of a clearly identifiable threat, Cebrowski and Barnett, as well as the Bush administration's 2002 *National Security Strategy* (White House, 2002), sought to prevent the emergence of threats in the first place through the use of military force to remake the global system. For more on the differences between preemption and prevention, see Keller and Mitchell (2006).
4. Taken from 'What is transformation?', formerly available at the website of the Office of Force Transformation at http://www.oft.osd.mil/what_is_transformation.cfm (accessed 12 February 2006).

References

Adas M (1989) *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance*. Ithaca, NY: Cornell University Press.

Alberts DS and Czerwinski TJ (eds) (1997) *Complexity, Global Politics, and National Security*. Washington, DC: National Defense University.

Alger JI (1982) *The Quest for Victory: The History of the Principles of War*. Westport, CT: Greenwood.

Arquilla J and Ronfeldt DF (1996) *The Advent of Netwar*. Santa Monica, CA: RAND.

Arthur BW (1988) Self-reinforcing mechanisms in economics. In: Arrow KJ and Anderson P (eds) *The Economy as an Evolving Complex System*. New York: Wiley, 9–33.

Arthur BW (1989) The economy as a complex system. In: Stein D (ed.) *Complex Systems*. New York: Wiley.

Arthur BW (1994) *Increasing Returns and Path Dependence in the Economy*. Ann Arbor, MI: University of Michigan Press.

Arthur BW (1996) Increasing returns and the new world of business. *Harvard Business Review* 73(4): 100–109.

Barnett TPM (2003) The Pentagon's new map. *Esquire*, 1 March. Available at: http://www.esquire.com/ESQ0303-MAR_WARPRIMER?click=main_sr. (accessed 11 November 2010).

Barnett TPM (2004) *The Pentagon's New Map: War and Peace in the Twenty-First Century*. New York: GP Putnam's Sons.

Barnett TPM (2006) NCW Infiltration: Complete. Available at: http://globlogization.wikistrat.com/globlogization/2006/8/27/ncw-infiltration-complete.html (accessed 11 November 2010).

Barnett TPM and Gaffney HH Jr (2002) The global transaction strategy. *Transformation Trends*, 16 December. Available at: http://www.cdi.org/mrp/tt-16dec02.pdf (accessed 11 November 2010).

Barry J and Thomas E (2007) Blame for the top brass. *Newsweek*, 22 January.

Beinhocker ED (1997) Strategy at the edge of chaos. *McKinsey Quarterly* 1: 24–39.

Beinhocker ED (1999a) On the origin of strategies. *McKinsey Quarterly* 4: 46–57.

Beinhocker ED (1999b) Robust adaptive strategies. *MIT Sloan Management Review* 40(3): 95–106.

Bendrath R (2003) The American cyber-angst and the real world – any link? In: Latham R (ed.) *Bombs and Bandwidth: The Emerging Relationship Between Information Technology and Security*. New York: The Free Press, 49–73.

Biddle TD (2002) *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas About Strategic Bombing, 1914–1945*. Princeton, NJ: Princeton University Press.

Bigo D (2002) Security and immigration: Toward a critique of the governmentality of unease. *Alternatives: Global, Local, Political* 27(1): 63–92.

Bousquet A (2009) *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity*. New York: Columbia University Press.

Bradley G and White J (2006) Abizaid credited with popularizing the term 'Long War'. *Washington Post*, 6 February. Available at: http://www.washingtonpost.com/wp-dyn/content/article/2006/02/02/AR2006020202242.html (accessed 11 November 2010).

Brunner E and Cavelty MD (2009) The formation of in-formation by the US military: Articulation and enactment of informatic threat imaginaries on the immaterial battlefield of perception. *Cambridge Review of International Affairs* 22(4): 629–646.

Buzan B, Wæver O and De Wilde J (1998) *Security: A New Framework for Analysis*. Boulder, CO: Lynne Rienner.

c.a.s.e. collective (2006) Critical approaches to security in Europe: A networked manifesto. *Security Dialogue* 37(4): 443–487.

Cebrowski AK (2002) The state of transformation. Presentation to Center for Naval Analyses, Crystal City, VA, 20 November.

Cebrowski AK (2003a) Network centric warfare and transformation. Presentation to IDGA Network Centric Warfare Conference, Arlington, VA, 22 January.

Cebrowski AK (2003b) Speech to the Heritage Foundation. Presentation to The Heritage Foundation, Washington, DC, 13 May.

Cebrowski AK and Barnett TPM (2003) The American way of war. *Proceedings of the U.S. Naval Institute* 129(1): 42–3.

Cebrowski AK and Garstka JJ (1998) Network-centric warfare: Its origin and future. *Proceedings of the U.S. Naval Institute* 124(1): 28–35.

Clarke L (1999) *Mission Improbable: Using Fantasy Documents to Tame Disasters*. Chicago, IL: University of Chicago Press.

Clodfelter M (2010) Aiming to break will: America's World War II bombing of German morale and its ramifications. *Journal of Strategic Studies* 33(3): 401–435.

CSIS Commission on Cybersecurity for the 44th Presidency (2009) *Securing Cyberspace for the 44th Presidency*. Washington, DC: Center for Strategic and International Studies (CSIS).

Dauber CE (2001) The shot seen 'round the world: The impact of the images of Mogadishu on American military operations. *Rhetoric & Public Affairs* 4(4): 653–687.

DeCaro C (1998) Operationalizing softwar: In: Campen AD and Dearth DH (eds) *Cyberwar 2.0: Myths, Mysteries, and Reality*. Fairfax, VA: AFCEA International Press, 199–204.

DeLuca K (1999) Articulation theory: A discursive grounding for rhetorical practice. *Philosophy & Rhetoric* 32(4): 334–348.

Dillon M (2002) Network society, network-centric warfare and the state of emergency. *Theory, Culture & Society* 19(4): 71–79.

DiMascio Jen (2006) Analyst: Rumsfeld's departure may signal end to defense transformation. *Defense Daily*, 9 November.

Doyle R (1997) *On Beyond Living: Rhetorical Transformations of the Life Sciences*. Stanford, CA: Stanford University Press.

Eden L (2004) *Whole World On Fire: Organizations, Knowledge, and Nuclear Weapons Devastation*. Ithaca, NY: Cornell University Press.

Fortun M and Bernstein HJ (1998) *Muddling Through: Pursuing Science and Truths in the 21st Century*. Washington, DC: Counterpoint.

Fortun M and Fortun K (2005) Scientific imaginaries and ethical plateaus in contemporary U.S. toxicology. *American Anthropologist* 107(1): 43–54.

Freedman L (2005) Strategic terror and amateur psychology. *The Political Quarterly* 76(2): 161–170.

Fuller JFC (1920) The development of sea warfare on land and its influence on future naval operations. *Journal of the Royal United Services Institute* 65(428): 281–298.

Fuller JFC (1923) *The Reformation of War*. New York: EP Dutton & Co.

Fuller JFC (1925) *The Foundations of the Science of War*. London: Hutchinson & Co.

Galison PL (1997) *Image and Logic: A Material Culture of Microphysics*. Chicago, IL: University of Chicago Press.

Gat A (1992) *The Development of Military Thought: The Nineteenth Century*. Oxford: Clarendon Press.

Gat A (2001) *A History of Military Thought: From the Enlightenment to the Cold War*. Oxford: Oxford University Press.

Gates RM (2009) A balanced strategy. *Foreign Affairs* 88(1): 28–40.

Goodnight T (1998) Public argument and the study of foreign policy. *American Diplomacy*. Available at: http://www.unc.edu/depts/diplomat/AD_Issues/amdipl_8/goodnight.html (accessed 15 November 2010).

Groh J (2010) Network centric warfare (NCW) never went away. DIME Blog, US Army War College, 5 April. Available at: http://www.carlisle.army.mil/dime/blog/article.cfm?blog=dime&article=97 (accessed 11 November 2010).

Grossberg L (1986) On postmodernism and articulation: An interview with Stuart Hall. *Journal of Communication Inquiry* 10(2): 45–60.

Hacker BC (1982) Imaginations in thrall: The social psychology of military mechanization, 1919–1939. *Parameters* 12: 50–61.

Hammes TX (2004) *The Sling and the Stone: On War in the 21st Century*. St Paul, MN: Zenith.

Hartnett SJ and Stengrim LA (2006) War rhetorics: The National Security Strategy of the United States and President Bush's globalization-through-benevolent-empire. *South Atlantic Quarterly* 105(1): 175–205.

Hirst P (2001) *War and Power in the 21st Century*. Cambridge: Polity.

House National Security Committee (1997a) Information superiority: Prepared statement of Lieutenant General Paul K. Vanriper. Procurement Subcommittee and Research and Development Subcommittee, US House of Representatives, 20 March.

House National Security Committee (1997b) Information superiority: Prepared statement of Vice Admiral AK Cebrowski. Procurement Subcommittee and Research and Development Subcommittee, US House of Representatives, 20 March.

Ivie RL (1980) Images of savagery in American justifications for war. *Communication Monographs* 47(4): 279–294.

Ivie RL (1987) Metaphor and the rhetorical invention of Cold War 'idealists'. *Communication Monographs* 54(2): 165–182.

Jaffe G (2004) At the Pentagon, quirky Powerpoint carries big punch. *Wall Street Journal*, 11 May.

Jones E, Woolven R, Durodié B and Wessely S (2006) Public panic and morale: Second World War civilian responses re-examined in the light of the current anti-terrorist campaign. *Journal of Risk Research* 9(1): 57–73.

Keller WW and Mitchell GR (eds) (2006) *Hitting First: Preventive Force in US Security Strategy*. Pittsburgh, PA: University of Pittsburgh Press.

Krepinevich AF (1992) *The Military-Technical Revolution: A Preliminary Assessment*. Washington, DC: Office of Net Assessment, Department of Defense.

Krepinevich AF (1994) Keeping pace with the military-technological revolution. *Issues in Science and Technology* 10(4): 23–9.

Laclau E and Mouffe C (1985) *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics*. London: Verso.

Lawson S (forthcoming) Surfing on the edge of chaos: Nonlinear science and the emergence of a doctrine of preventive war in the United States. *Social Studies of Science*.

Liddell Hart BH (1925) *Paris, or the Future of War*. New York: EP Dutton & Co.

Lind WS (2001) Fourth-generation warfare's first blow: A quick look. *Marine Corps Gazette* 85(11): 72.

Lind WS, Schmitt JF and Wilson GI (2001) Fourth generation warfare: Another look. *Marine Corps Gazette* 85(11): 69.

Lind WS, Nightengale K, Schmitt JF, Sutton JW and Wilson GI (1989) The changing face of war: Into the fourth generation. *Marine Corps Gazette* (October): 22–6.

McConnell M (2010) Mike McConnell on how to win the cyber-war we're losing. *Washington Post*, 28 February.

McCullagh D (2010) Senators propose granting president emergency Internet power. *CNET News*, 10 June. Available at: http://news.cnet.com/8301-13578_3-20007418-38.html (accessed 11 November 2010).

Makus A (1990) Stuart Hall's theory of ideology: A frame for rhetorical criticism. *Western Journal of Communication* 54(4): 495–514.

Marcus GE (1995) *Technoscientific Imaginaries: Conversations, Profiles, and Memoirs*. Chicago, IL: University of Chicago Press.

Marx L (1994) The idea of 'technology' and postmodern pessimism. In: Smith MR and Marx L (eds) *Does Technology Drive History? The Dilemma of Technological Determinism*. Cambridge: MIT Press, 237–258.

Marx L (1997) Technology: The emergence of a dangerous concept. *Social Research* 64(3): 965–988.

Medhurst MJ (1990) *Cold War Rhetoric: Strategy, Metaphor, and Ideology*. New York: Greenwood.

Mitchell GR (2002) Public argument-driven security studies. *Argumentation and Advocacy* 39: 57–71.

Mitchell GR (2006) Team B intelligence coups. *Quarterly Journal of Speech* 92(2): 144–173.

Mitchell GR (2009) Rhetoric and international relations: More than 'cheap talk'. In: Lunsford AA, Wilson KH and Eberly RA (eds) *The Sage Handbook of Rhetorical Studies*. Thousand Oaks, CA: Sage: 247–263.

Noon DH (2004) Operation Enduring Analogy: World War II, the War on Terror, and the uses of historical memory. *Rhetoric & Public Affairs* 7(3): 339–364.

Pretorius J (2008) The security imaginary: Explaining military isomorphism. *Security Dialogue* 39(1): 99–120.

Robb J (2007) *Brave New War: The Next Stage of Terrorism and the End of Globalization*. Hoboken, NJ: Wiley.

Sherman WC (1926) *Air Warfare*. New York: The Ronald Press Co.

Sieff M (2007) Analysis: Harvey's fall may help U.S. Army. *UPI*, 6 March.
Sikka T (2008) Ballistic missile defense and articulation theory: An analysis of technology using a cultural studies approach. *Journal of Language and Politics* 7(1): 119–135.
Slack JD (2006) Communication as articulation. In: Shepherd GJ, Jeffrey JS and Striphas TG (eds) *Communication As ...: Perspectives on Theory*. Thousand Oaks, CA: Sage.
Stahl R (2008) A clockwork war: Rhetorics of time in a time of terror. *Quarterly Journal of Speech* 94(1): 73–99.
Szafranski R (1997) Neocortical warfare? The acme of skill. In: Arquilla J and Ronfeldt D (eds) *Athena's Camp: Preparing for Conflict in the Information Age*. Santa Monica: RAND, 395–416.
Taylor C (2004) *Modern Social Imaginaries*. Raleigh, NC: Duke University Press.
Toffler A (1984) *The Third Wave*. New York: Bantam.
Toffler A (1993) *War and Anti-War: Survival at the Dawn of the 21st Century*. Boston, MA: Little Brown & Co.
US Department of Defense (2010) *Quadrennial Defense Review Report*. Washington, DC: Department of Defense.
Weldes J (1996) Constructing national interests. *European Journal of International Relations* 2(3): 275–318.
White House, 2002. *The National Security Strategy of the United States of America*. Washington, DC: White House.
Winkler C (2007) Parallels in preemptive war rhetoric: Reagan on Libya; Bush 43 on Iraq. *Rhetoric & Public Affairs* 10(2): 303–334.
Winner L (1977) Autonomous technology: Technics-out-of-control as a theme in political thought. Cambridge, MA: MIT Press.
Zarefsky D (2007) Making the case for war: Colin Powell at the United Nations. *Rhetoric & Public Affairs* 10(2): 275–302.

Sean Lawson is an Assistant Professor in the Department of Communication at the University of Utah. He specializes in the relationships among science, technology, and military theory and discourse, specifically the intersections of national security and military thought with new media, information, and communication technologies. Recent publications include, 'Surfing on the edge of chaos: Nonlinear science and the emergence of a doctrine of preventive war in the United States', *Social Studies of Science* (forthcoming); 'Cold War military systems science and the emergence of a nonlinear view of war in the US military', *Cold War History* (forthcoming); and 'Beyond cyber-doom: Cyberattack scenarios and the evidence of history', Mercatus Center working paper (forthcoming). Email: sean.lawson@utah.edu. Web: seanlawson.net