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14. ABSTRACT The fog of war is inherent in the nature of war. In whatever form it may take – friction, ambiguity, chaos, uncertainty, or combinations thereof – the fog of war is a central and prevailing characteristic of war. This is well known, as it has been continually espoused, initially by Clausewitz in <i>On War</i> , and subsequently in the U.S. Armed Forces doctrine and each services war colleges. Students and participants of war are schooled and readily aware of its nature. The proponents of network–centric warfare, however, purport the fog of war can be eliminated by gaining total information dominance over an enemy, and by networking information technologies throughout the joint battlespace. The hypothetical transformation of war through technological advances is a prevalent thought in the U.S. military; this type of thinking is wrong and potentially dangerous. This paper argues it is not enough to simply study and recognize the concept and implications of the fog of war, or to incorporate them into doctrine. The ambiguity and uncertainty characterized by the fog of war must be institutionalized and become a central tenet of operational art as well as a driving influence in the U.S. military's preparation and training for war. Nowhere does the associated implications of the fog of war have greater impact and effect than on information processing and decision-making. Therefore, leaders at all levels must be aware of the human aspects of information and be trained to develop an adaptive, flexible, intuitive mind in order to deal with and make decisions in an uncertain, chaotic, dangerous, and fast-moving environment.					
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**NAVAL WAR COLLEGE
Newport, R.I.**

The Fog of War: A Necessary Component of Modern Warfare

By

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**A paper submitted to the Faculty of the Naval War College in partial satisfaction of
the requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily
endorsed by the Naval War College or the Department of the Navy.**

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Abstract

The fog of war is inherent in the nature of war. In whatever form it may take – friction, ambiguity, chaos, uncertainty, or combinations thereof – the fog of war is a central and prevailing characteristic of war. This is well known, as it has been continually espoused, initially by Clausewitz in *On War*, and subsequently in the U.S. Armed Forces doctrine and each services war colleges. Students and participants of war are schooled and readily aware of its nature. The proponents of network-centric warfare, however, purport the fog of war can be eliminated by gaining total information dominance over an enemy, and by networking information technologies throughout the joint battlespace. The hypothetical transformation of war through technological advances is a prevalent thought in the U.S. military; this type of thinking is wrong and potentially dangerous. This paper argues it is not enough to simply study and recognize the concept and implications of the fog of war, or to incorporate them into doctrine. The ambiguity and uncertainty characterized by the fog of war must be institutionalized and become a central tenet of operational art as well as a driving influence in the U.S. military's preparation and training for war. Nowhere do the associated implications of the fog of war have greater impact and effect than on information processing and decision-making. Therefore, leaders at all levels must be aware of the human aspects of information and be trained to develop an adaptive, flexible, intuitive mind in order to deal with and make decisions in an uncertain, chaotic, dangerous, and fast-moving environment.

INTRODUCTION

The fog of war should be institutionalized in U.S. military doctrine and made a tenet of operational art. By “institutionalized” and “tenet” of operational art it is meant that the idea and concept of the fog of war and its associated parts – friction, uncertainty, chance, chaos, and ambiguity – be fully incorporated in how the U.S. military thinks, plans, prepares, and trains for war. This may seem counterintuitive, for, arguably, any attempts to improve or develop a new approach to operational art is effectively an effort to do better than before; to “more effectively pierce the fog of war and to reduce uncertainty.”¹ However, evidence and practice currently show the US military, though well versed in the theoretical concept of the fog of war, does little to actually prepare war fighters for the effects and implications of the fog of war on conducting war. Therefore, it could be said the US military leaders do not think critically enough about the fog of war, its true meaning and what must be done to counter its effects. The confirmation of this assertion resides in the U.S. military’s current infatuation with technology and the belief that the technology of today (computer and information technologies) can actually transcend the nature of war and remove all doubt, friction, and uncertainty – the fog of war – from the battlefield. If the U.S. military truly *believed* in and *understood* the nature and the associated implications of the fog of war, then the U.S. military would not make extreme claims about technology.

In *Lifting the Fog of War*, Admiral Bill Owens, the former Vice Chairman of the Joint Chiefs of Staff, spoke in 2000 of a Revolution in Military Affairs (RMA) in which recent advances in computing, communications, satellite, and other sensor

1. Alex J. Vohr, “Design in the Context of Operational Art”, *Marine Corps Gazette*, January 2010, p. 40.

technologies (combined together to make up the information technology revolution) seek to transform how the military wages war.² These technologies would allow commanders to have an omniscient view of the battlefield and challenge the very notions of the fog and friction of war.³ Despite the realities of the current wars in Iraq and Afghanistan suggesting otherwise,⁴ proponents advocate the central component of RMA - network-centric warfare (NCW) – is the future of war.

The U.S. military's current and prevalent view of the concept and idea of the fog of war is not thorough enough and is potentially dangerous. If the U.S. Armed Forces possessed a true appreciation of this concept it would not continue to assert how technological improvements will inevitably allow military units and commanders to see all things and remove friction, uncertainty, and ambiguity from war. Moreover, military decision-making would not increasingly build reliance on mechanistic and methodical decision-making processes. Research shows the majority of human decisions are made intuitively and heavily influenced by experience. Of course, there is value in mechanistic and methodical decision-making processes (e.g. Joint Operational Planning Process, Marine Corps Planning Process, and other comparative decision-making processes), but, during time-constrained, chaotic, and uncertain situations the human brain defaults to what comes easiest and natural – intuitive or naturalistic decision-making.⁵

Accordingly, despite the heralded capabilities of network-centric warfare and the associated information technologies, the friction and fog of war will remain a

2. Bill Owens, *Lifting the Fog of War*, (New York, NY: Farrar, Strauss and Giroux), p. 9-17.

3. Ibid, p. 15.

4. David A. Fulghum, "Hi Tech Reassessed", *Aviation Week & Space Technology*, 10 Nov 2003, p. 29-30.

5. Gary Klein, *Sources of Power*, (Cambridge, MA: MIT Press), 1999, p. 3-44.

constant characteristic of war. The U.S. military must marry the concept of friction and fog of war into the operational art in order to create a military better able to thrive in an uncertain and chaotic environment.

BACKGROUND

This paper begins by defining the fog of war, the basic concepts of network-centric warfare and arguments in favor of NCW. Since, arguably, Carl von Clausewitz' *On War* has the single greatest influence on U.S. military theory and doctrine, this paper will limit the discussion concerning the fog of war to this work. Additionally, since American military officers today most often refer to Clausewitz' unified concept of a general friction as the "fog and friction" of war,⁶ for the purposes of this paper, the terms friction, uncertainty and chaos will be used interchangeably with fog of war and will be considered together. In the effort to support the central argument, this paper is limited to two topics: the human aspects of information processing and decision-making. The current thinking about the friction and fog of war and its influence on war delves into complexity theory and even evolutionary biology.⁷ These topics will not be addressed, but fascinating insight can be gained into the nature of war for interested readers.

The Fog of War

*War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty.*⁸

6. Barry D. Watts, *Clausewitzian Friction and Future War*, McNair Paper 68, (Washington, D.C: National Defense University Press), 2004, p. 1.

7. Ibid, p. 49-56, 67-78. For additional sources on complexity theory and evolutionary biology see John F. Schmitt, "Command and (Out of) Control: The Military Implications of Complexity Theory", *Marine Corps Gazette*, September 1998; and David L. Smith, *The Most Dangerous Animal*, (New York, NY: St. Martin's Press), 2007.

8. Carl von Clausewitz, *On War*, Michael Howard and Peter Paret ed. and trans. (Princeton, NJ: Princeton University Press), 1976, p. 101.

The term “fog of war” refers to the amalgamation of certain characteristics of war, namely uncertainty, disorder, chance, friction, chaos, and complexity, among others. In simple terms, not everything in war is knowable or foreseen; some measure of ambiguity will always exist. Even though the friction and the fog of war has been a consistent, recurring feature since the wars in the Greek and Persian empires, the earliest known use of the term “friction” occurred in a letter from Carl Von Clausewitz to his wife in September of 1806.⁹ By 1831, the idea of friction and, by extension, the fog of war, had become a central theme of his seminal work *On War*.¹⁰ Friction was unquestionably among the conceptual tools Clausewitz employed to understand the phenomenon of war and it eventually grew into a theoretical concept that lies at the heart of his approach to the theory and conduct of war.¹¹ To be sure, the many obstacles and difficulties to the use of effective military force since Clausewitz’ time are generally acknowledged to be associated with the friction and fog of war. For example, despite the profusion of advanced weaponry in the Gulf War (1991), friction was present at every level of war.¹² The same is true in today’s wars in Afghanistan and Iraq. Nearly two decades removed from the Gulf War, despite the abundance of computer, communication, information, and sensor technologies, the conflicts are fraught with fog and friction.¹³

9. Watts, *Clausewitzian Friction and Future War*, p. 1.

10. Ibid, p. 1.

11. Ibid, p. 8.

12. Ibid, p. 2.

13. David Talbot, “We got nothing until they slammed into us.”, *Technology Review*, November 2004, p. 38; and Milan Vego, *Joint Operational Warfare: Theory and Practice*, (Newport, RI: U.S. Naval War College), p. XIII-6-7.

Taking what Clausewitz wrote of friction and marrying it with the characteristics of subsequent wars, Watts proposed the following taxonomy for Clausewitz' unified concept of general friction:

1. Danger (impact on the ability to think clearly and act effectively in war)
2. Physical exertion (the effects on thought and action of combat's demands)
3. Uncertainties and imperfections in information
4. Friction within one's own forces (interactions between many men and machines)
5. Chance events that cannot be predicted
6. Physical and political limits of military force
7. Unpredictability stemming from interaction with the enemy
8. Disconnects between ends and means of war.¹⁴

Thus, despite immense changes in the means of war since Clausewitz' time, dealing with and understanding the constraints and opportunities chance, friction and uncertainty provide is just as relevant to solving today's military problems and "can be applied directly to illuminate current military dilemmas."¹⁵

Network-Centric Warfare (NCW)

Humans have been preoccupied with the pursuit of information since the written word.¹⁶ Society, the U.S. in particular, likes to believe the world is witnessing an era of unprecedented change; technological innovation is advancing at a rate unmatched in human history.¹⁷ This is certainly true with regard to information technologies. The vast amount of digital information contained in the world is unimaginable and is growing at a phenomenal rate - a tenfold increase every five years.¹⁸ Network-centric warfare is an outgrowth of this phenomenon.

14. Watts, *Clausewitzian Friction and Future War*, p. 19-21.

15. Katherine L. Herbig, *Clausewitz and Modern Strategy*, Michael I. Handel ed. (London, England: Frank Cass & Co. Ltd.), 1986, p. 95-96.

16. Kenneth Cukier, "Handling the cornucopia" (special report), *The Economist*, 27 February 2010, p. 18.

17. Michael Lind, "The Boring Age", *Time*, 23 March 2010, p. 58.

18. Kenneth, Cukier, "Data, data everywhere." (special report), *The Economist*, 27 February 2010, p. 3-4.

The early origins of network-centric warfare actually go back to the combat information centers in warships of the U.S. and British navies in World War II. These centers provided the first tactical air picture which later became the Naval Tactical Data Systems (NTDS) of the 1960's U.S. Navy which, through the introduction of digital tactical computers, provided a *shared* tactical picture.¹⁹ However, "the organizing principle of NCW has its antecedents in the dynamics of growth and competition that emerged in modern society."²⁰ These dynamics are based on a business model of increasing investment returns and competition based on time, and competition between and within enterprises.²¹ Information technology is central to these dynamics and the technology has shifted from platform-centric computing to network-centric computing.²² In other words, it's not about the computer, it's about the computing power resulting from "information-intensive interactions" between huge numbers of computers linked through an equally large number of computational nodes on the network.²³ The idea is the same powerful dynamics produced through network-centric operations in the business world can be used in the U.S. military.²⁴

Today, the RMA, in which NCW is a main element, describes the leap in military effectiveness promised by the application of information technologies to the exercise of military force.²⁵ Simply put, NCW refers to executing warfare by forces sharing

19. Vego, *Joint Operational Warfare: Theory and Practice*, p. XIII-13.

20. Arthur K. Cebrowski, John J Garstka, "Network-centric warfare: Its origin and future," *United States Naval Institute. Proceedings*, January 1998, p. 28.

21. *Ibid*, p. 28.

22. *Ibid*, p. 28-30.

23. *Ibid*, p. 28.

24. *Ibid*, p. 30.

25. William K. Lescher, "Network-centric: Is it worth the risk?", *United States Naval Institute. Proceedings*, July 1999, p. 58.

and acting on information at unprecedented rates via a common network. The idea is to combine new operational concepts with sensors and networking technologies to facilitate a dramatically improved capability to sense and respond. This capability enables focused force application and concentrated combat power, using a netted sensor information grid coupled with agile forces, precision munitions, and the command and control connectivity to enable rapid decision loops keeping the adversary off balance.²⁶

According to proponents, the concept promises to revolutionize warfare and represents not just a new means of war, but also a new theory of war.²⁷ The network consists of sensor, shooter and information grids all geographically dispersed and linked throughout the joint battlespace.²⁸ These linked and networked grids would result in information dominance, shared awareness through a common operating picture allowing for self-synchronization, constant situational awareness, and speed of command and decision superiority due to enhanced decision-making abilities and capabilities by and to the commander.²⁹

Clearly, the concept of NCW has far reaching implications for future war, both good and bad. Properly implemented, NCW offers many advantages, and the netting of forces may considerably increase the effectiveness of a military force in combat. However, as Hoffman asserts, “[i]nformation technologies and systems must be seen for what they are – means to an end, not the end itself... [t]his craving for certainty must be replaced by a mature understanding about the presence, if not prevalence, of

26. Ibid, p. 58.

27. Vego, *Joint Operational Warfare: Theory and Practice*, p. XIII-3.

28. Ibid, p. XIII-3.

29. Ibid, p. XIII-3-12.

uncertainty in war.”³⁰ Comparing what Clausewitz has espoused about the nature of war and the stubborn persistence of friction and the fog of war throughout history with the claims of NCW’s transformative power, one realizes that the juxtaposition between the two beliefs is really an argument between two entirely opposed military philosophies.

DISCUSSION/ANALYSIS

*All actions in war take place in an atmosphere of uncertainty, or the “fog of war.”*³¹

*This new revolution challenges the hoary dictums about the fog and friction of war, and all the tactics, operational concepts, and doctrine pertaining to them.*³²

*Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?*³³

It is interesting that academic, Mackubin Owens, regards the Gulf War as simultaneously the high point of Clausewitz’ influence as well as the beginnings of its rejection, and by extension, the seeds of the transformation of the nature of war.³⁴ The rapid victory, achieved with minimal casualties, led several military leaders to postulate that Clausewitz was no longer valid.³⁵ This is due, in large part, by the fact the U.S. military has not addressed modern war’s impact on Clausewitz’ basic theoretical assumptions.³⁶

Academics argue military theory in the United States is actually immature, as evidenced by the prevalent debate over whether technologies can ultimately eliminate

30. F.G. Hoffman, “An Alternative to the ‘System of Systems’”, *Marine Corps Gazette*, January 2000, p. 20.

31. Marine Corps Doctrinal Publication 1, *Warfighting*, (Washington, D.C.: Headquarters United States Marine Corps), 1997, p. 7.

32. Owens, *Lifting the Fog of War*, p. 15.

33. T.S. Eliot, *The Waste Land and other Poems* (Orlando, FL: Harcourt Brace & Co.), 1952, p. 81.

34. Mackubin T. Owens, “Technology, the RMA, and Future War”, *Strategic Review*, Spring 1998, p. 64.

35. *Ibid.* p. 64.

36. Michael I. Handel, *Clausewitz and Modern Strategy*, p. 58-62.

friction from war.³⁷ Indeed, the larger question is why has not any individual or organization written about a broad theory of war and combat in nearly the last 200 years? In the meantime, as the rate of technological progress accelerates, so does the widening gap between technological progress and U.S. strategic/tactical military doctrine.³⁸ Watts offers the following point:

With regard to achieving a mature and sophisticated theory of war as a whole, however, it is doubtful that [the U.S. military] has reached even the end of the beginning. Again, one must decide whether general friction will persist in future war or can be overcome by technological advances. That genuine disagreement persists on such a basic point suggests how far military theory must advance to achieve a solid empirical grounding.³⁹

The argument essentially comes down to two opposed military philosophies.

Milan Vego challenges the notion that, “[n]etwork-centric warfare has become a new orthodoxy – a set of beliefs that cannot seriously be challenged.”⁴⁰ He argues the human aspects of war have been largely ignored, the Clausewitzian nature of war and the effects of the fog of war and friction are negligible, the art of war is indistinguishable from the science of war, and the enemy is merely a passing nuisance in the information age where “information superiority is assumed absolute, regardless of the opponent.”⁴¹

The most prevalent argument against NCW is that the human has been removed from the picture, particularly in regards to how humans process information. There are fundamental questions about how humans fit into NCW since the vast amounts of literature concerning NCW is concerned about hardware, software, electrons, and

37. Watts, *Clausewitzian Friction and Future War*, p. v.

38. Michael I. Handel, *Clausewitz and Modern Strategy*, p. 72.

39. Watts, *Clausewitzian Friction and Future War*, p. vi.

40. Vego, *Joint Operational Warfare: Theory and Practice*, p. XIII-15.

41. *Ibid*, p. XIII-15.

bandwidths.⁴² In simplest terms network-centric warfare is about information and how to get more of it. The driving concept is if some information is good, more must be better. However, this is an entirely objective view removed from the human dimension or character of information - a view that has reduced information to an engineering concept.⁴³ Information carries with it unique imprints and bias from both the creator and receiver and is only useful to the receiver if the information is consistent with what he or she already believes or understands.⁴⁴ Simply put, shared information does not result in shared awareness or even understanding.⁴⁵ Additionally, since shared awareness is not automatic with shared information this limits the hypothetical self-synchronization of military forces espoused by NCW proponents, which, along with shared awareness, is a central tenet of NCW. Moreover, Kaufman asserts by ignoring the human dimension of the information process, NCW overestimate man's capacity to deal with contradictory information.⁴⁶ Clausewitz offers the following support:

Many intelligence reports in war are contradictory; even more are false, and most are uncertain....In short, most intelligence is false, and the effect of fear is to multiply lies and inaccuracies. As a rule most men would believe bad news than good, and rather tend to exaggerate the bad news. The dangers that are reported may soon...subside; but...they keep recurring, without apparent reason.⁴⁷

Since Clausewitz speaks of the individual's reaction to information and not about information itself, it leads one to believe no amount of networking will change the weight of his observation. Taken further, the importance of the human character of

42. Alan D. Zimm, "Human-centric warfare", *United States Naval Institute. Proceedings*, May 1999, p. 28.

43. Alfred Kaufman, "Caught in the Network: How the doctrine of network-centric warfare allows technology to dictate military strategy", *Armed Forces Journal*, February 2005, p. 21.

44. *Ibid*, p. 21.

45. *Ibid*, p. 20.

46. *Ibid*, p. 21.

47. Clausewitz, *On War*, p. 117.

information boils down to decision-making, specifically how the brain makes decisions.

The first real test of the concepts behind and leading up to network-centric warfare was in a massive war-gaming exercise hosted by Joint Forces Command in 2002 called Millennium Challenge '02. In this exercise the Blue Team was given greater intellectual resources than ever before, including access to unprecedented amounts of information and intelligence, technologies and processes that provided shared awareness through a common operating picture and decision-making constructs which broke down the enemy by military, economic, social, political systems and showed how they were all interrelated and which links were vulnerable.⁴⁸ In short, Millennium Challenge was to prove with the right technologies the fog of war could be lifted.⁴⁹ Marine General Paul Van Riper, whose idea of war was the antithesis of this position, commanded the Red Team. Where Blue Team had databases, matrixes, and methodologies for systematically understanding the intentions and capabilities of the enemy, General Van Riper and the Red Team used decentralized execution, intuitive decision-making, and a wholly unconventional and asymmetrical method of communication and fighting. By the second day of the war game, Red Team had sunk 16 American ships and killed over 20,000 American service men and woman before Blue Team had fired a shot.⁵⁰ Blue Team's revolutionary way of war was a complete failure. What happened? And what does this have to do with decision-making? It turns out everything.

48. Malcolm Gladwell, *Blink: The Power of Thinking Without Thinking*, (New York, NY: Little, Brown & Company), 2005, p. 105.

49. Ibid, p. 106.

50. Gladwell, *Blink: The Power of Thinking Without Thinking*, p. 108-110.

The propensity in the U.S. military is towards a methodical style of decision-making - analytical, mechanistic, and rational. Whether it is the Navy/Marine Corps Planning Process (NPP/MCPP), the Army's Military Decision Making Process (MDMP), or the joint world's Joint Operational Planning Process (JOPP), the decision-making process is the same: a rational, linear, and systematic process of analysis based on the concurrent comparisons (war gaming) of multiple courses of action (COA). The idea is to identify possible options, derive COA's from these options, analyze the COA's against the same set of criteria (assumptions and governing factors), assign a value and choose the optimal solution.⁵¹ The appeal of this "classical" model of decision-making is an assumption that as long as the information is accurate and the analysis is done properly the best possible solution is guaranteed.⁵² Therefore, it is not too much of a stretch to insinuate the appeal of this approach to decision-making is connected to our views of information technologies and the idea of information dominance. If more information is gathered and shared and situational awareness is increased via the networked system, then better solutions will result. Indeed, one of the stated goals of NCW is to collect 90% of available battlefield data.⁵³ This seems an arbitrary number. Does one require 90% of battlefield data in order to make a decision? Research indicates the answer is no. Though there is merit in and situations for the MCPP, JOPP, or similar decision-making processes, the problem is leaders are taught this classical method of military decision-making is the "proper" way and to do otherwise would result in careless

51. John F. Schmitt, "How We Decide", *Marine Corps Gazette*, October 1995, p. 16.

52. Ibid, p. 16.

53. Zimm, "Human-centric warfare", p. 28.

and/or ill-advised choices.⁵⁴ In truth, military decision-making is a dirty, disorganized, and disorderly process. Schmitt states, “uncertainty and ambiguity are pervasive characteristics of practically all military decisionmaking... [and] it is a matter of creating a unique solution out of countless unclear possibilities, based largely on unquantifiable factors.”⁵⁵

Research reveals proficient decision makers rarely make decisions methodically and the classical decision-making model has little in common with how the human brain actually works.⁵⁶ Individuals use their intuition to recognize the essence of a situation and determine what action to take. Scientist Gary Klein concluded, using a model called *recognition primed decision making*, that proficient decision makers rely on their intuition to determine important factors in any given situation, feasible goals, and the likely outcomes of their actions – allowing them to generate a workable, “good-enough,” first solution, and thus eliminating the need for comparative analysis.⁵⁷ Whereas analytical decision-making emphasizes comparative analysis of multiple options, intuitive decision-making emphasized situational awareness or what Napoleon Bonaparte termed “coup d’oeil.”

Coup d’oeil or “power of the glance” refers to “the ability to immediately see and make sense of the battlefield”⁵⁸ and “the quick recognition of the truth.”⁵⁹ Clausewitz asserts that since war is the realm of chance and uncertainty, and all information and assumptions are victim to human bias and doubt, a mind must possess two

54. Schmitt, “How We Decide”, p. 16.

55. Ibid, p. 17.

56. Ibid, p. 17.

57. Gary Klein, *Sources of Power*, (Cambridge, MA: MIT Press), 1999, p.15-44.

58. Gladwell, *Blink: The Power of Thinking Without Thinking*, p. 44.

59. Clausewitz, *On War*, p. 102.

indispensable qualities – coup d’oeil and determination.⁶⁰ Coup d’oeil has a lot in common with intuitive decision-making and the human ability of rapid cognition. This brings us back to General Van Riper and Millennium Challenge. Blue Team’s mistake was the human had been removed from the game. The mechanics and the process was all that mattered. Their system forced the commanders to stop and tear the problem into tangible parts and not look at it holistically. Simply put, Blue Team, inundated with information and focused on their mechanical processes, actually suppressed their ability to see and solve the problem intuitively.⁶¹

The essential factor in intuitive decision-making is experience. Experience is what enables the situation assessment at the heart of intuitive decision-making. It is this experience factor which, more than any other, facilitates pattern recognition skills - or coup d’oeil - that are the hallmark of military geniuses.

The obvious counter argument to this line of thinking is what happens when the combat situation is not familiar and/or the experience base is limited? The answer to the first question is that experts, or those with a broad experience base, are able to identify constraints based on their organized knowledge and determine what are and are not viable solutions.⁶² Moreover, through mental simulation and metaphor, individuals can imagine how a course of action may be carried out and draw on one’s experience to suggest parallels between the unfamiliar situation and other experiences and knowledge.⁶³ In these instances, the individual may not have an intuitive sense for the solution; however, by eliminating options one has increased the potential to

60. Ibid, p. 101-102.

61. Gladwell, *Blink: The Power of Thinking Without Thinking*, p. 124-136.

62. Jose A. Picart, “Expert Warfighters with Battlefield Vision”, *Military Review*, May 1991, p. 54.

63. Klein, *Sources of Power*, p. 45-102, 197-213.

make a suitable solution. If an individual has a limited experience base and is in an unfamiliar combat situation, then this would be a time when the use of a comparative, deliberate, methodical, and rational model of decision-making would be useful. Intuitive decision-making offers two huge advantages with respect to military operations: it is much faster than analytical decision-making, and it copes with uncertainty, ambiguity, and dynamic situations –the fog of war – more effectively.⁶⁴

RECOMMENDATIONS

*The art of war deals with living and with moral forces. Consequently, it cannot attain the absolute, or certainty; it must always leave a margin for uncertainty, in the greatest of things as much as in the smallest.*⁶⁵

Much that is written on the revolution of military affairs and network-centric warfare emphasizes the removal of the fog of war from combat and presumes the revolution is technological in nature. Technology has much to offer in modern warfare, however, the techno-centric view is dangerously disconnected from the human dimension; it does not take into account how humans process and perceive information, make decisions, or even the adversary's capabilities, thoughts and/or desires.⁶⁶ A study of the conflicts in Vietnam and present day Iraq and Afghanistan show the U.S. tends to overestimate its technological superiority and underestimate the ability of opponents to nullify the U.S. advantages. The U.S. can no longer afford to do this. The U.S. military must bring Clausewitzian friction and the fog of war back into the forefront of current military thinking. It must also guide the U.S.

Armed Forces' outlook on just about everything; acquisitions, technologies, and

64. Schmitt, "How We Decide", p. 18.

65. Clausewitz, *On War*, p. 86.

66. Williamson Murray, "Clausewitz Out, Computer In: Military Culture and Technological Hubris", *The National Interest*, Summer 1997, p. 63.

training, in order to create a fighting force that can adjust and better thrive in chaos whether it is generated by the adversary or ourselves.

The U.S. military, as an institution, must recognize intuition is a scientifically researched and documented capability of the human mind and a skill that can exceed even the most powerful analysis to achieve superior results.⁶⁷ Since intuitive decision-making is experienced-based, a broad experience base is vital to achieve the skill for pattern recognition; the basis of recognition-primed decisions.⁶⁸

Clausewitz states the only way to improve this experience base (“lubricant for general friction”) is through combat experience.⁶⁹ Obviously, this is not always possible. Moreover, one would hope military training designed to increase intuitive decision-making would be conducted prior to the outbreak of war or hostilities. This paper suggests four options: improving the experience base through historical and contemporary study, historical case-studies and decision games, war gaming, and realistic “fog of war” training.

Modern warfare requires a very high level of specialized, dedicated professional education. The U.S. military must place greater emphasis on two areas of emphasis: the study of military history and contemporary topics having application to facets of war. The U.S. military services each have a professional reading program that assigns a certain number of books to be read for each specific rank. However, there is currently no incentive or oversight for this program. An acceptable solution is offered by Marine Captain Lucas Wood. Borrowing from the author, each of the services would make each rank’s professional reading program requirement a

67. Schmitt, “How We Decide”, p. 19.

68. Ibid, p. 19.

69. Clausewitz, *On War*, p. 122.

prerequisite for promotion.⁷⁰ Service individuals could take book exams via web-based education sites or in seminars. One or two books could be made pre-requisites for resident and non-resident professional military education schools. Additionally, options would allow substituting books that were specific to an individual's occupational specialty. For instance, an aviator could swap one of the books on the professional reading list with another approved book specific to aviation. Although a sufficient amount of time would be given to individuals to complete the professional reading program requirements for grade, emphasis would be placed on the importance of dedicated study of military history in a leader's development. Incentives and encouragement would be provided to see this study is followed through.

Additionally, study in emerging fields that may offer insight to the nature and character of war, such as complexity theory, non-linearity, and evolutionary biology, for instance, could be encouraged in order to promote and provide new perspectives and out-of-the-box thinking for war fighters. The U.S. should continue to institute policies which encourage, support, and allow service members to pursue advanced degrees in applicable disciplines (e.g. military history, anthropology, regional studies, international relations, strategic studies, etc.) outside of the war colleges, either online or as resident students.

Historical case studies – battle and campaign studies - and decision games could become a regular part of the U.S. military's leadership development. The best way to do this is through the service's professional military education schools, whether resident or non-resident, although this would be conducted extensively within the

70. Lucas M. Wood, "Marine Corps Professional Reading Program (Rein)" *Marine Corps Gazette*, November 2008, p. 71-74.

operating forces as well. The case studies would pay particular attention to decision-making, the effects of friction and fog of war, and how decision-makers dealt with it. The decision games could present scenarios, real or imagined, that span all levels of war, are high-risk, time-constrained, and with insufficient, possibly unreliable, or contradicting information in order to simulate the stress and friction of military decision-making. Additionally, it could be developed to force intuitive decision-making.

Realistic and objective war gaming offers several benefits and advantages to the war fighter in dealing with the fog of war. First, it can test the effectiveness and limitations of new technologies. Technology without associated tactics and operating procedures is ineffective and potentially dangerous. With a dedicated adversary, war gamers may determine the human limitations of a new technology as well as determine the most effective application of the technology. The important step is ensuring the technology has been exposed to the range of military operations.

Second, war gaming develops a broader knowledge base and increases understanding. Participating with and competing against individuals from various services and occupational specialties automatically exposes one to a broader range of expertise and provides various insights to approaching a solution. Since war gaming is an interactive competition, it provides for a higher level of learning, as the users are forced to find new ways of applying their knowledge, thereby increasing the depth of their understanding.

Third, war gaming develops decision-making. Similar to the benefits of studying case studies, a broader experience base facilitates recognition-primed decision-

making and intuition. Similar to chess, by anticipating the countermoves of the adversary, participants not only learn to make better decisions, but also through practice they learn to make decisions faster. In the end, war gaming can be practiced at all levels of warfare and can be as complex and simple as desired or needed.

Last, in order for war fighters and leaders to thrive in a chaotic, disordered, and uncertain environment, intuitive decision-making must be developed through realistic training and war gaming. This would include the type of war gaming and training where communications are lost and not regained (except after considerable time), GPS navigation systems are compromised or destroyed, information and intelligence is insufficient, faulty, suspect, confusing, contradictory, and/or overwhelming, fatigue and exhaustion are present, initiative has been lost, the adversary has achieved surprise, and commanders must make rapid decisions with minimal knowledge. In other words, the U.S military should intentionally create the fog of war in training. Clausewitz, as always, says it best:

Peacetime maneuvers are a feeble substitute for the real thing; but even they can give an army an advantage over others whose training is confined to routine, mechanical drill. To plan maneuvers so that some of the elements of friction are involved, which will train officers' judgment, common sense, and resolution is far more worthwhile than inexperienced people might think. It is immensely important that no soldier, whatever his rank, should wait for war to expose him to those aspects of active service that amaze and confuse him when he first comes across them. If he has met them even once before, they will begin to be familiar to him.⁷¹

In closing, regardless of the approach, “the reality of war as a competitive human endeavor rules against the achievement of perfect understanding and the reduction of friction and uncertainty.”⁷² Those who can better thrive in chaos will prevail. The surest path to success is to put the fog of war back into modern warfare; to take into

71. Clausewitz, *On War*, p. 122.

72. Vohr, “Design in the Context of Operational Art”, p. 42.

account the human limits of processing information and focus on enhancing decision-making abilities and skills of leaders, as opposed to developing new technologically advanced approaches claiming to reduce the fog of war.

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