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THE RELEVANCE OF CLASSICAL MILITARY THEORISTS ON CYBER WARFARE

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JCSP 46 – PCEMI 46
2019 – 2020

SOLO FLIGHT

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INTRODUCTION

The contributions made by Sun Tzu, Clausewitz, and Jomini to the study of warfare have impacted the conduct of warfare for the generations succeeding them. In essence, the nature of war has not evolved, but the means of warfare has changed due to modernization of tools and technologies used on the battlefield. Due to the advent and progression of technical advances, it is not plausible for military theory, concepts, and principles of prior generations to be relevant in their entirety; however, there remains significant relevance seen in classical military theory. This paper examines the relevance of classical military theorists and their concepts on modern warfare, specifically cyber warfare. The scope of the analysis applied is primarily of the strategy applied to warfare. Conventional warfare fought against known adversaries in designated geographical locations has been largely replaced by unconventional warfare, which is the more popular and appropriate response to current security threats and conflicts. Moreover, the cyber domain is the landscape of the modern battlefield on which cyber warfare, unconventional, and information warfare are conducted.

Cyber warfare requires strategies that differ in some aspects from conventional warfare. However, the conviction of this paper's thesis is that modern warfare, to include cyber warfare, is definitively benefited by the application of concepts taken from theorists to include Sun Tzu, Clausewitz, and Jomini. These names are among those considered the greatest military theorists throughout history. The main reason their respective concepts have resonated throughout history is seen in the baseline relevance to the nature of war and how that relates to strategy. Each of these classical theorists offers a perspective in theory and strategy that is still in practical use today. The interesting spin put on the analysis of the relevance of classical military theory is the

discovery of which of these theorists may prove to be more relevant or applicable to the modern battlefield and to cyber warfare.

CYBER

In order to effectively analyze military theory and strategy, it is necessary to first discuss the landscape applicable to present warfare. The onset of information warfare and terrorism within the scope of cyber has widened the cycle of conflict. Since geographical space and time are irrelevant to the cyber realm, it is not necessary to launch attacks from a fixed position or base. The attack can be effectively launched from any point and directed to a target at any location regardless of distance. As observed by John Kemeny, co-creator of the BASIC computer language, "Modern war has become too complex to be entrusted to the intuition of even the most experienced military commander. Only our giant brains can calculate all the possibilities."[1] This statement, made in 1961, is a reflection on America's growing reliance on computers as a tool for the military. The Cold War initiated an international foot race towards technological advancements with potential for military applications. In fact, computers were at first developed for and funded by the U.S. Government specifically for the military.[2] The main stakeholders in this race being the United States of America and the Soviet Union. At the finish line was the computerization and cybernetisation of the American military.

Cybernetic concepts and technologies impacted transformations in theories and practices of warfare and served as the precursor to the current cyber domain. Cybernetic warfare held the promise to gain control and predictability over the unpredictable nature of war. Cybernetic warfare also spurred the ambitions of achieving an automated dominance of the battlefield. For

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[1] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 143-186.
[2] Ibid.

example, General William Westmoreland, Commander-in-Chief of US forces in Vietnam theorized that future wars would be fought with frictionless battles in a fully cybernetised arena.[3] His vision at that time included the capability to instantaneously locate, track, and target through use of data links, computer assisted intelligence, and automated fire control. He further proposed battlefields under 24/7 real-time surveillance. In truth, General Westmoreland's vision of the future battlefield aligned with theorist Paul Edwards conception of a "Closed World" scenario of cybernetic warfare. While there has been no totality of the closed world concept in modern warfare, many elements of General Westmoreland's vision seem as though he had access to a looking glass into the future of modern warfare in the cyber domain.

If you were to look at cyber as a map, the topography would not appear entirely different than that of battlefields of the past. That is, there are always the constant variables to include: threats, attackers, attack methodology, defense methodology, tools and techniques, security, risk management, infrastructure, and targets. The divergence in cyber warfare from the traditional battlefield is the lack of physical boundaries. There is no set battlefield with formal rank or structure. In cyberspace, boundaries do not exist. Cyber is defined by the U.S. Department of Defense in Joint Publications 3-13 as "the notional environment in which digitized information is communicated over computer networks."[4] This definition is expanded by the National Military Strategy for Cyberspace Operation in its explanation that the cyber domain is used to "store, modify, exchange data via networked systems and associated physical infrastructures."[5] Within this cyber realm, warfare is executed through the mediums of the Internet and other information

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[3] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

[4] Andress, Jason, and Winterfeld, Steve. *The Basics of Cyber Warfare (*Waltham, MA: Elsevier, 2013), 16.

[5] Ibid.

technology infrastructures. Operations are conducted by means of cyber capabilities to achieve objectives in cyber.

INFORMATION WARFARE

Operations conducted in the cyber domain involve the transmittal, encryption, and capture of information.[6] Ultimately, the security of information in the cyber domain is of utmost importance to all nations. When engaged in intelligence gathering or directly deploying cyber warfare, information warfare is used in tandem. Information warfare is the act of exploiting the security of the information transmitted or stored by a target source, with the purpose of achieving a superior edge over an adversary.[7] This is achieved covertly, without the knowledge of the opponent. The advantage gained over the adversary is gained by disrupting or destroying information the adversary needs in order to ascertain its own position and its enemies' positions. It is by these means it is possible to gain knowledge about the adversary, or to "know your enemy", while at the same time keeping your enemy from knowing you.

The assumption of military research and experience is that information warfare will continue to be used and exploited by non-state actors. This analysis of information warfare can be attributed to its structure and also the mobility limitations faced by these non-state actors, or terrorist groups. Without the limitations of infrastructure, such groups are enabled to employ an adaptive strategy using information warfare, or a more network-centric warfare. Aspects of information warfare operations focus on tactical information that can be used to undermine the adversary. For example, this information can be used to launch propaganda campaigns, which although based on the actual information are slanted and peppered with disinformation. The

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[6] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

[7] Ibid.

result is effectively demoralizing the adversary and decreasing public favor of the adversary. If one were to consider both Cold-war and post-Cold-war operations, it would seem the practice of taking actions against the enemy through its own population is typical.[8] In the simplest of terms, strategy for information warfare is using information as a weapon. Examples of information warfare as a weapon include jamming, deceiving, overloading, intruding, and electronic blinding.[9]

PHASES OF WAR & STRATEGY

Operations within cyber warfare are reflective of the phases of wars of traditional and conventional warfare in that the four major phases remain consistent, those being: Phase 1, Deterrence; Phase 2, Seizing Initiative; Phase 3, Dominating; and Phase 4, Stabilizing.[10] Phase 0 is necessary for all warfare, but is conducted quite differently for cyber warfare. Phase 0 is the strategic planning period.[11] It is this phase that proves to be the great equalizer for all subsequent phases. In order to establish and maintain the vital link to the objectives, phases of war are essential. Additionally, Phase 0 helps military strategy to dispel the myth of a static state of either war or peace. During this critical planning and shaping phase it is also possible to plan for maneuvers which do not require force with violence. This aspect of Phase 0 is necessary to manage national security and sovereignty.

Security and sovereignty have long been the backbone of military strategy.[12] Sovereignty is not singular to the interests of any one nation, but is the hub of national strategy. Considering

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[8] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

[9] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 779-863.

[10] Ibid.

[11] Ibid.

[12] Handel, Michael. *Masters of War* (Taylor & Francis e-Library, 2005), 54-55.

the root meaning of national strategy along with the meaning associated with the classical

military school of thought, this element of strategy is derived within the scope of force

capabilities and those of the opposing forces. Further, national strategy seeks to ascertain

political advantages, projecting win outcomes, and justification for use of military force.[13] As this

relates specifically to military strategy employed in American forces, reference is succinctly

made by contemporary military theorist Russell Weighly. Russell explains the overarching theme

in American military strategy conducted since the American Revolutionary War has been

"emphasis on less restraint in the conduct of war in both means and ends," or emphasis on Phase

3 of warfare.[14] Of course conclusions can be drawn about the newly formed America's departure

from its old sovereign's battlefield methodologies, if not in entirety, enough to propose strategy

also focusing on Phase 2 with the benefit of adding an element of surprise to the opposing

European forces.

Unfortunately, history shows us that there are instances when American military strategy

leaned too heavily into Phase 3 objectives for warfare and the result was a blind ambition devoid

of regard for the safety and security of civilians and non-military properties and targets. Aside

from the Revolutionary War, America's own Civil war serves as a stark example. Since that

time, military strategy has seen a development of methodologies branching out of and departing

from conventional warfare. This is due to asymmetrical warfare, global geopolitical factors, and

the Digital Revolution.[15] Cyber warfare has quickly shifted from the battlefield of the future to

today's venue for military operations. In keeping with the rapidly changing landscape in cyber,

military strategy harkens back to classical theory and compiles lessons learned through

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[13] Ibid.

[14] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 779-863.

[15] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 3-9.

contemporary wars and conflicts to create an adaptive and flexible strategy. Theories proposed by Sun Tzu, Clausewitz, and Jomini were based on their experiences and environments; however, examination of each theorist's concepts and principles reveals how much of these ideas are still infused in modern warfare.

SUN TZU

Theories of warfare created by Sun Tzu emerged from China's cultural and political revolution and evolved from the country's primitive war posture.[16] His renown book the *Art of War* is still studied for its relevance in modern warfare. Among Sun Tzu's theories of war, his concept of overcoming the enemy by wisdom and not force alone remains a staple of military theory and strategy.[17] According to Sun Tzu's concepts, overcoming the enemy by wisdom is achieved by using the tools of analysis and strategy. Mainly, Sun Tzu proposed to apply analysis as a predictive tool in measuring the feasibility of the outcome of a battle with an adversary. Sun Tzu has been quoted throughout the generations since his book the *Art of War* was published. One of his most famous quotes mirrors his belief in studying one's opponent, "Know the enemy and know yourself; in a hundred battles you will never be defeated."[18]

At the time of Sun Tzu's revelations about warfare, his teachings about analysis and strategy were innovative. His teachings about information gathering were specific to considerations of his era and to land battle. For example, the five elements used to filter down information about the adversary and potential battle were the climate, terrain, mission, command, and methods.[19] However, aspects of these elements do still relate to modern warfare. Modern

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[16] Kaufman, Stephen. *The Art of War, Definitive Interpretation of Sun Tzu's Classic Book of Strategy for the Martial Artist* (Vermont, USA: Tuttle Publishing, 1996), 1-33.
[17] Cleary, Thomas. *The Art of War* (Boston & London: Shambhala Publications, 1988), 8-13.
[18] Ibid.
[19] Kaufman, Stephen. *The Art of War, Definitive Interpretation of Sun Tzu's Classic Book of Strategy for the Martial Artist* (Vermont, USA: Tuttle Publishing, 1996), 1-33.

warfare is still shaped by planning and strategy, although technologies and tools have greatly changed tactics and techniques. The concept of analysis and strategy is still seen in gathering information relevant to the adversary and the conflict. Consider the role intelligence plays in modern warfare, to include the cyber domain. Of course the information gathered for the modern battlefield varies from Sun Tzu's era, but more poignantly is the fact that the means and methods for gathering intelligence has changed. In cyber, intelligence and information gathered is analyzed on a strategic, operational, and tactical level and the result is cyber threat intelligence.

Finally, Sun Tzu's premise about the indicator for a great leader, subduing the adversary without fighting, gives guidance to disrupt the adversary's alliances through espionage, propaganda and/or diplomacy. In the *Art of War*, there is an entire chapter outlining the use of spies, wherein terms such as Inside Agents, Double Agents, and Expendable Spies are used to describe the varying ways to use espionage and propaganda as a tool against the adversary.[20] Sun Tzu explains that "all warfare is based on deception…"[21] and accordingly, the appropriate strategy to use is one in which you conceal your points of weakness and if possible your correct location. Thoughts of spies harken thoughts back to Cold War era operations, but such operations are still conducted by and in most developed nations.

CARL VON CLAUSEWITZ

In contrast to Sun Tzu's principles of subduing the enemy without attack, Clausewitz made the statement that war is "an act of violence to compel an enemy to fulfill our will."[22]Moreover, he theorized that war was a continuation of political activity by other means. Clausewitz's theories became widely known through his book *On War*. Although his theories

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[20] Griffith, Samuel. *Sun Tzu, The Art of War* (Oxford University Press, 1963), 72-144.
[21] Ibid.
[22] Clausewitz, Carl. *On War* (Princeton, New Jersey: Princeton University Press), 1976, 27-45.

were the result of his analysis of the wars of the early eighteenth and nineteenth centuries, these concepts are still seen in modern thought on war and warfare. Reflective of the four phases of war, Clausewitz instructs that "The act of attack, particularly in strategy, is thus a constant alternation and combination of attack and defense."[23] In his famous publication *On War*, Clausewitz points to the importance of the Government, people, and military in a state of harmony.[24] He proposes that if there is a lack of support from one, the others would be weakened and not able to succeed. This is not surprising since his scope included in *On War* comprises every topic remotely relevant to military strategy and warfare: history, philosophy, epistemology, psychology, social science, and military tactics.[25] It was his belief that the study of war could not be narrowly focused. The result of Clausewitz's comprehensive approach to military theory is a more encompassing view of the broad reaching arm of war into many aspects of human activity, and the warfare employed.

Clausewitz's ideology and theories on war were influenced by the great conflicts of his time, the Napoleonic War and French Revolution. The best evidence of this influence is seen in his theories on war from the viewpoint of a zero-sum game, in which each side continues without interruption until one has conquered the other.[26] Clausewitz also recognized that there is rarely, if ever, a final result in war. As far as the zero-sum game and purely logical concepts theorized by Clausewitz, he wisely considered the following factors as impacts on warfare: political influence, asymmetry of superiority of defense, quality of information, human nature and the tendency to make assumptions about the enemy, the impossibility to focus the full scope of military forces in

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[23] Otto, Gustav. *The End of Operational Phases*, Interagency Journal Vol. 8, Issue 3.
[24] Ibid.
[25] Echevarria II, Antulio. *Clausewitz & Contemporary War* (Oxford University Press, 2007), 133-171.
[26] Handel, Michael. *Clausewitz and Modern Strategy* (Abingdon, Oxon: Frank Cass and Company Limited, 1986), 96-99.

a single space and time.[27] However, his theories on center of gravity suggest an increase in effective military operations with the full use of forces aimed at that center. The center of gravity is found where the mass is concentrated, thus becomes the most effective target.[28] Therefore, the heaviest blow should be targeted at the center of gravity. Clausewitz explains that a major battle is a collision between two centers of gravity.[29] The more forces are concentrated in a center of gravity, the more certain and massive the effect. Clausewitz further instructs against use of partial forces instead of full forces at the center of gravity.[30] The consequence is a risk to victory by reducing the severity of the attack launched at the center of gravity. This line of reasoning echoes Jomini's operational concept, the single line approach which emphasizes a unified army focused inside and in between enemy lines to force a division of enemy forces.

At the core of Clausewitz's theories about war and warfare was his examination of the nature of war. In his study of the nature of war, he gained insights into the principles governing major wars of which he theorized were dependent on the different types of war. In every era there occur different types of war with different conditions and biases. There is no singular pattern. In essence, war was wrought with uncertainty. He theorized that one should understand and operate within the parameters of that uncertainty.[31] His concepts borne out of his studies of the nature of war were tension and rest, point of victory, maneuvers, and the psychology of offense and defense.[32] The cornerstone of Clausewitz's theories on the nature of war is the revelation that the nature of war influences how war is conducted and how strategy, doctrine, and

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[27] Handel, Michael. *Masters of War* (Taylor & Francis e-Library, 2005), 40-46.
[28] Clausewitz, Carl. *On War* (Princeton, New Jersey: Princeton University Press,1976), 177-184.
[29] Ibid.
[30] Ibid.
[31] Handel, Michael. *Clausewitz and Modern Strategy* (Abingdon, Oxon: Frank Cass and Company Limited, 1986), 117-125.
[32] Handel, Michael. *Masters of War* (Taylor & Francis e-Library, 2005), 54-55.

concepts are developed and how troops are trained and equipped.[33] From these elements, policy

is derived. Many who followed Clausewitz's theories highlighted the role of policy, coining the

term primacy of policy.[34] Primacy of policy was loudly touted by western military theorists in the

decades following the 1950's.[35] Robert Osgood makes heavy reference to On War in his assertion

that primacy of policy in war means that military operations should be conducted to achieve

concrete, limited, and attainable security objectives.[36] Further, military operations should be

conducted as a means to an end of national policy.[37] Considering Robert Osgood posed these

ideas during the time of the Cold War era when American power was at its height and served to

deter violence from outside the country and ensure stability within the country.

ANTOINE-HENRI, BARON JOMINI

It is important to emphasize up front that military thought and concepts presented by Jomini

served as the foundation for American military doctrine and strategies for over two centuries.[38]

Having himself served as a career soldier in Napoleon's Army from 1805-1813 and also for

Russia in 1813-1814, Jomini drew upon firsthand knowledge and experience.[39] A prolific author,

he was most noted for his books *Treatise on Grand Tactics* and *Treatise of Major Military*

Operations. However, his work published in the *Summary of the Art of War* made his theories

and concepts famous, with the book being widely translated into many languages.[40] Jomini's

principles of war as published in his writings are objective, offensive, mass, economy of force,

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[33] Handel, Michael. *Masters of War* (Taylor & Francis e-Library, 2005), 2-10.

[34] Ibid.

[35] Handel, Michael. *Clausewitz and Modern Strategy* (Abingdon, Oxon: Frank Cass and Company Limited, 1986), 96-99.

[36] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 143-186.

[37] Ibid.

[38] Handel, Michael. *Masters of War* (Taylor & Francis e-Library, 2005), 21-29.

[39] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 143-186.

[40] Ibid.

movement (maneuver), cooperation (unity of command), security, surprise, and simplicity.[41] These are the same principles used in the United States military, after being introduced through military academies by John Michael O'Connor in 1817 and are considered the bedrock of American military doctrine.[42] Ironically, Jomini never intended his principles to be set as a guidebook, but instead he instructed that the principles of war are not like a checklist since these principles cannot be statically applied to every given situation in the same manner. Nevertheless, Jomini's principles remain a valid foundation for operations.

Jomini's approach was to make warfare more scientific, with strategy being sharply focused throughout his studies and theories. Jomini believed that concepts of operational lines in combination of tactics lay the foundation for the science of war.[43] With the basic concept of strategy being the key to warfare, Jomini also proposed that strategy is controlled by invariable scientific principles.[44] Examination of Jomini's nine principles reveal their respective value for operations. First, objectives enable clarity of requirements and the end-state for missions, which is vital to victory in war.[45] Second, gaining the advantage and maintaining momentum within a conflict is key to operational success.[46] Third, the principle of economy of force highlights the need to strategically target strikes, in relation to achieving objectives.[47] Conversely, the principle of maneuvering is based on positioning the adversary at the point of disadvantage.[48] Next, the principle of unity of command seeks to align unity of effort in which military forces mass

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[41] Baron de Jomini, Antoine-Henri. *The Art of War* (Mineola, NY: Dover Publications, 2007), 9-10.
[42] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 143-186.
[43] Baron de Jomini, Antoine-Henri. *The Art of War* (Mineola, NY: Dover Publications, 2007), 75-213.
[44] Ibid.
[45] Ibid.
[46] Ibid.
[47] Ibid.
[48] Ibid.

combat power towards the objectives. Last, the principle of security involves taking actions to reduce vulnerability, at times these actions are prescribed to an element of surprise wherein the adversary is caught unaware and not prepared.[49]

Jomini's theories were influenced by the scientific advancements of his era. Military advancements were seen in improvements on weaponry, to include muskets, flintlocks and bayonets.[50] All of which increased infantry firepower. Ultimately, these advancements culminated into a scientific revolution, first seen in France, and resulted in the adoption of the machine. With the machine came increased calculating and precision, which improved the use of projectiles.[51] Efficient and effective range and targeting proved to serve as milestones in ballistics and the use of firearms and projectile weaponry. Since the initial conception of projectiles and ballistics, through the machine and microelectronics, military technology has continued its course of evolution. This is the lens through which Jomini, more so than other theorists of his era, viewed military strategy. While it is true that Jomini's viewpoints were taken from the standpoint of progression and advancement, the historical capsule containing Jomini's viewpoints is also housed in the study of past campaigns to gain insights into successful strategy for warfare.

THEORY ANALYSIS

When analyzing the relevance of classical military theorists, it is most effective to view their respective concepts and principles with the understanding of the conditions, environment, and limitations of their era. That being stated, each of these theorists contributed greatly to

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[49] Ibid.
[50] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 143-186.
[51] Ibid.

military theory and strategy and in such a way that still resonates on the modern battlefield. Considering relevance with modifications to accommodate modern conditions, environments, and limitations, the following points favor relevancy of each theorist: technological advancements that were not present in their time; increased complexity of problem sets impacting strategy, policy making, military intelligence; and causes of war.[52]

Sun Tzu's approach in the Art of War obviously gives more focus to Phase 0, planning and strategy. What makes this obvious is the theorist's assertion that strategic superiority is the key to success in defeating the enemy. Principles governing Sun Tzu's concepts of warfare include adaptive planning and intelligence, with an emphasis on the use of spies. As explained by Sun Tzu, knowledge of the adversary can only be obtained from other men.[53] Sun Tzu understood that force mobility is an important element of success in war. At the time of his writings, Sun Tzu would have no knowledge or use of HUMINT, thus his ideology regarding spies is restricted to the use of human spies. In current times, the concept of spying is much more complex and methodologies for gathering intelligence vast, in comparison. It is anticipated that technologies will continue to advance and improve upon current capabilities.[54] Therefore, among the principles and concepts learned from Sun Tzu's writings, his emphasis on the nature of intelligence and warfare are most valuable.

The authority of Clausewitz's ideologies on the nature of war is still respected in the modern western military.[55] However, there is a duality of relevance seen in Clausewitz'

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[52] Bousquet, Antoine. *The Scientific Way of Warfare* (New York: Columbia University Press, 2009), 93-235.

[53] Cleary, Thomas. *The Art of War* (Boston & London: Shambhala Publications,1988), 8-13.

[54] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

[55] Handel, Michael. *Clausewitz and Modern Strategy* (Abingdon, Oxon: Frank Cass and Company Limited, 1986), 117-125.

statement about war being the continuation of politics. This statement implies a total separation

of peace and war time which we do not always experience in the modern age. This statement also

assumes the role of leadership is constant through both war and peace times. In our modern age

of technologies, leadership shifts heavily towards research and development of technology based

tools and solutions.[56] The result is cascading impact to future leadership from the aspect of

allocation of resources and management of end products from prior leadership whose research

and development project come to fruition after the fact of turnover of leadership.

A less convoluted connection between Clausewitz's theories and modern warfare is his

simplistic view of strategy in and of itself, that being strategy as a countermeasure against lack of

resources.[57] Even as a world superpower, America does not hold unlimited resources, thus it

follows that planning for use of resources and resource replenishment is a key component of

military strategy. Following this aspect, Clausewitz focus on situational awareness is a close

second, if not of equal importance in military strategy.[58] Similarly to other theorists, Clausewitz

instructs on the decision point to enter conflict.[59] Of course, whether or not to go to war is always

a decision point, but Clausewitz proposes to use information gathered to help shape that choice.

Therefore, this component of his concepts remains relevant to modern military strategy, which is

more reliant than ever on intelligence and information about opposing forces.

Comparisons between Jomini's principles and concepts and the contemporaries of his

own era, such as Clausewitz and Napoleon, can easily be drawn. However, in studying the lines

of parallel between Jomini and Sun Tzu, the similarities in theories are also apparent. First,

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[56] Bousquet, Antoine. *The Scientific Way of Warfare* (New York: Columbia University Press, 2009), 93-235.

[57] Handel, Michael. *Clausewitz and Modern Strategy* (Abingdon, Oxon: Frank Cass and Company Limited, 1986), 117-125.

[58] Ibid.

[59] Clausewitz, Carl. *On War* (Princeton, New Jersey: Princeton University Press),1976, 27-45.

Jomini's expression of lines of operations are reminiscent of Sun Tzu's own principles in that Jomini also recognizes both natural and strategic elements.[60] Jomini proposes that in battle planning the physical elements of the battlefield must be considered; be that rivers, mountains, and/or oceans.[61] Also, the strategic pre-war choices must be considered; those being the reasons to fight, which forces to fight, and which forces to use in the fight. Sun Tzu also instructs on the necessity to factor terrain and deliberate on war by means of analyzing the reason and means of the war. Both theorists agree the second element of operations, the deliberation and determination to go to war, strategic choice is the most difficult. According to Jomini, the best way to meet the challenge of strategic choice is to weigh risks, benefits, and probabilities to reach the best conclusions.[62] Again, Sun Tzu also promulgated the application of analysis to military strategy. Strategic choice remains difficult even with the inception and use of microelectronics, nuclear energy, and other modern advances used in the modern military.

Jomini's principles resonate relevance throughout history and into the current era of warfare. Considering his nine main principles of warfare, the conclusion is easily drawn that objective, offensive, economy of force, maneuver and unity of command remain relevant principles.[63] The complexities of the modern battlefield mandate a clear understanding of tactical objectives.[64] Moreover, it is vital to understand and plan for second and third order effects of each objective and determine how this impacts the outcome of a strategic initiative. This paper

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[60] Kaufman, Stephen. *The Art of War, Definitive Interpretation of Sun Tzu's Classic Book of Strategy for the Martial Artist* (Vermont, USA: Tuttle Publishing, 1996), 1-33.
[61] Baron de Jomini, Antoine-Henri. *The Art of War* (Mineola, NY: Dover Publications, 2007), 75-213.
[62] Baron de Jomini, Antoine-Henri. *The Art of War* (Mineola, NY: Dover Publications, 2007), 75-213.
[63] Ibid.
[64] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

has established the matter of mobility as it stands for modern war fighters in the age of information, taking the fight to the cyber domain. With adversaries gaining advantage with mobility, it has never been more important to present an impenetrable offensive. Likewise, economy of force is applicable not only for the concept of attacking the mass, but in modern warfare the full spectrum of force capabilities to include cyber and information warfare must often be at the planning table for strategic adaptive planning. Along with the principle of economy of force, the principle of maneuver is relevant and applicable to modern era operations. Adhering to this principle enables the force to achieve the upper hand in a battle and keep the adversary off balance. Finally, the landscape of the modern battlefield is not as concrete in physical terms as in battles of prior eras. Since adversary and ally forces are more geographically dispersed and possess differing levels of infrastructure and command, it is beneficial to shape forces to be more networked with its allies and conduct more operations by means of multinational coalitions.[65] This concept is relevant to Jomini's principle of unity of command.

Viewing each of these classical military theorist's principles and concepts, it is seen that Sun Tzu, Clausewitz, and Jomini have points of relevance to the culture and conditions of modern warfare. Clausewitz's concepts placed emphasis on strategy and intelligence for conventional warfare. Likewise, Jomini and Sun Tzu highlight the vital importance of intelligence in military strategy. Jomini contributed greatly to the foundation of military operations with his nine principles, many of which are still relevant to modern era warfare.

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[65] Klein, John, J. *Space Warfare: Strategies, Principles, and Policy* (Abingdon, OX: Routledge, 2006), 35-146.

However, the analysis of the principles and concepts of these classical military theorists was focused on strategy for the modern era.

The conclusion, based on the research and analysis for this paper, is that Sun Tzu's principles and concepts bear the greatest relevance for the future warfighter. Sun Tzu, just as Clausewitz and Jomini, based his ideologies on standing or mobile forces and traditional conventional warfare. However, the difference revealed within Sun Tzu's principles for war is the adaptive nature expressed in his concepts for military strategy. Recognizing that in warfare there are no constant conditions, Sun Tzu explains the necessity to modify tactics according to the adversary and conditions of the conflict. This paper has described cyber as the battlefield of the future in which agile operations must be supported by adaptive planning and strategy. The principles of Sun Tzu are determined to provide the greatest relevance based on this criterion for adaptability and agility. Based on this determination, it is proposed that study and application of Sun Tzu's concepts for cyber and information warfare can benefit planning and execution of tactics to include network swarming and network-centric warfare.

CONCLUSION

Historical examples of strategy used in battles serve as case studies, lessons learned, and even models for metrics to measure current tactics and techniques. Leaders charged with the responsibility of making hard and fast decisions need such examples to study and inform these decisions. Many of the theories, principles, and concepts of Sun Tzu, Clausewitz, and Jomini are focused on the elements of strategy for warfare. These elements consider politics, diplomacy, morality of actions and morale of the population, and economy. These considerations were valid during the era of classical military theorists such as those analyzed in this paper and remain

relevant today. Such considerations remain within the scope of leaders during phase 0, the planning and shaping phase all the way through the final phase and execution of warfare.

Prior to the events of 11 September 2001, President George W. Bush promulgated the necessity to redefine war in America's own terms.[66] Instead of the standing armies of conventional warfare, we are faced with adversarial forces structured in such a way that strategies and tactics have evolved and must continue to do so. Human activity has made the greatest impact on our world as a whole, but specifically to this topic material and technological advances and these have influenced if and how war is conducted. To our collective advantage, the principles of Jomini that laid the foundation for military operations continue to serve as a framework for executing military strategy. Further, military strategy to meet current and future events can be shaped by the principles instructed by Sun Tzu, with the result of forces gaining and maintaining the advantage in the cyber realm as well as all other modern battlefields.

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[66] Paret, Peter. *Makers of Modern Strategy, from Machiavelli to the Nuclear Age* (Princeton, New Jersey: Princeton University Press, 1986), 779-863.

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