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Firepower, Maneuver, and the Operational
Level of War

A Monograph
by
Major A. Dwight Raymond
Infantry



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School of Advanced Military Studies
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Fort Leavenworth, Kansas

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ABSTRACT

FIREPOWER, MANEUVER, AND THE OPERATIONAL LEVEL OF WAR by Major A. Dwight Raymond, USA, 77 pages.

American military doctrine and professional literature in the past decade have stressed maneuver warfare and the operational level of war. This monograph traces the evolution of maneuver theory and its conceptual opposite, firepower theory, and concludes that, reflecting the tensions in war's "dual natures," both methods have advantages and disadvantages. Under certain circumstances, the systematic method of firepower warfare is superior to maneuver theory; in many situations, a blend of the two approaches is preferable. Many current conceptions of maneuver warfare, however, are too broad and all-encompassing to offer much specificity.

This monograph also contends that the operational level, at which military forces are used to pursue strategic objectives, is not synonymous with operational art. Instead, the operational level may be fought by either of two ideal methods or, most likely, by a blend of the two approaches. The first, "operational art," is the maneuver warfare style elevated to the operational level, and attacks critical enemy weaknesses via unexpected means to achieve moral disruption of the enemy. Operational art stresses decentralized initiative, improvisation, and distributed maneuver. The second, complementary method is "operational science," which is firepower warfare practiced at the operational level. Operational science orients on the enemy's strength and emphasizes detailed planning, destruction by fires, centralized battlefield grip, and concentration. The monograph summarizes the analysis with a typology reflecting the salient characteristics of operational art and operational science.

Fire without movement is indecisive. Exposed movement without fire is disastrous. There must be effective fire combined with skillful movement.

The Infantry Journal
Infantry in Battle, 1939

That we *henceforth* be no more children, tossed to and fro, and carried about with every wind of doctrine

Ephesians 4:14

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I. The Dual Natures of War

Carl von Clausewitz's *On War* advanced the proposition that war is a duality. While in theory there is no logical limit to the extreme use of force, in reality certain factors limit the level of force employed.¹ This "dual nature of war"² in each conflict creates a synthesis conditioned by a "trinity" of primordial forces, chance, and political aims; these are in turn institutionally manifested in the people, the military, and the government.³

The "dual nature of war" is an important concept that underscores the tensions inherent in decisions to begin or terminate wars. Both the extreme and limiting factors will inevitably be present and both must therefore be understood. Clausewitz noted that "war is never an isolated act;"⁴ political limitations and popular support can interfere with strategies that would be prudent from a strictly military point of view. By inference, nations should also avoid waging wars impetuously, because the natural push toward extremes can escalate conflicts beyond the level originally planned.

The concept of a "dual nature" also serves as a useful model to analyze other tensions that impinge upon strategy, doctrine, or methods used to conduct military operations. Military and strategic literature has often addressed these dualities, either to resolve the inherent tensions by opting for one pole or the other, or to strive for balance between the two poles. While a more exhaustive list of these dualities is contained in the appendix to this study, some of them have included:

offense versus defense
nuclear versus conventional
total war versus limited war
maneuver versus firepower

This study focuses on the duality of *maneuver theory versus firepower theory* and contends that it is manifested at the operational level of war by the complementary methods of *operational art* (maneuver theory) and *operational science* (firepower theory). The late Brigadier Richard Simpkin referred to maneuver theory and attrition (firepower) theory as "the two main theories of war;"⁵ both methods are ideal types, and in practice some sort of blend will normally occur. That there are two approaches indicates that, as with all dualities, choices will have to be made between the two, or that a compromise solution will have to be adopted.

Current American military thought is, or claims to be, heavily oriented on maneuver and high tempo.⁶ As is the case with other fields, military decision-making is most difficult when one must choose between one good approach and another. One problem with a fixation on maneuver warfare is that, if it is indeed distinct from firepower warfare, then it rejects the advantages as well as the disadvantages of this mode of thought. If, however, one's conception of maneuver warfare claims to include the advantages of firepower warfare, then that conception is tautological; it is so broad and encompassing as to avoid the difficult choices that must be made between the two approaches.⁷

As an example of the tautological tendencies of maneuver warfare theorists, the "Maneuver Warfare Symposium" has applauded the World War II British "Parham method" of massing artillery tubes against a single target, claiming the method to be an illustration of maneuver warfare.⁸ This method, also known as the "'U' target system," permitted representatives of the divisional artillery commander to bypass normal

command chains and call upon every available gun.⁹ Whether or not the method was effective then or is suitable now, the important consideration for this debate is that the method relied upon centralization, firepower, and mass. As will be shown in this study, these elements cannot be prominent in a maneuver theory that has any meaningful specificity. They can only be salient characteristics of a maneuver approach that is broad to the point of vagueness, and which implies that "if it worked, it was maneuver theory; if it didn't, then it wasn't."

Field Marshal Bernard Law Montgomery and General George S. Patton, two of the premier Allied field commanders in the European Theater of Operations during World War II, illustrate in large measure the differences between firepower warfare and maneuver warfare. The much-heralded rivalry between the two commanders may have been exaggerated by journalists of the time and historians subsequently,¹⁰ and whatever rivalry that did exist might be explained by an overarching Anglo-American rivalry or simply by the conflict that was bound to exist between two strong-willed, individualistic commanders. Thus, it might be claimed that the two commanders were far more similar than they were different.

In many important respects, however, Montgomery and Patton generally represented two distinct methods of prosecuting the operational level of war. Patton tended to emphasize audacity, the offensive, speed, and the continual adjustment to changing situations. Montgomery stressed balance, prudence, the defender's strength as something to be exploited, and planning. Patton frequently criticized

Montgomery's aversion to taking risk; Montgomery's approach to war was indeed an effort to eliminate as much risk as possible.

Both harshly criticized the so-called "broad-front" strategy, but from slightly different perspectives. Patton wrote that the "momentous error of the war" was not to advance rapidly eastward to cut the Siegfried line before the Germans could regain their balance.¹¹

Montgomery, however, wrote that the major failure after the Normandy campaign was in not supporting a concentrated "major blow"¹² in the north to the Ruhr; this would destroy Germany's vitals as well as the remaining forces that were sure to defend them. Even more glaring, he contended, was the absence of a coherent plan.¹³

Comparing the two commanders leads to the deductive assessment that: (a) Patton and Montgomery were two of the most effective allied commanders of the war; (b) although faced with roughly similar conditions, these two commanders practiced dissimilar methods of war; and (c) therefore, there are at least two effective but dissimilar methods for waging war. In the abstract, Patton practiced "maneuver warfare" while Montgomery was representative of "firepower" warfare.

In its differentiation between maneuver warfare and firepower warfare, this study seeks a balanced distillation of military thought, especially as it applies to the operational level of war. It discusses, in turn, the development and characteristics of maneuver warfare and firepower warfare, and constructs a typology to accentuate the main differences between the two approaches. Additionally, it addresses some approaches that incorporate aspects of both schools of thought. Next, the study discusses the operational level of war, to uncover some of the

definitional and conceptual problems associated with it. Finally, it develops the concepts of operational art and operational science, to explore how maneuver warfare and firepower warfare are reflected at the operational level.

II. Maneuver Warfare

Before considering their manifestation at the operational level, an understanding of the firepower and maneuver schools of thought is necessary. The analyses in this and the next chapter are necessarily generalized, but they should nevertheless sharpen the distinction between two contrasting methods for prosecuting war.

Maneuver warfare attacks with unexpected means the decisive weaknesses of the enemy in order to paralyze his decision-making structures and cause his moral collapse. The contemporary *maneuver versus firepower* debate largely began in 1981 with *Patterns of Conflict*, a study by retired US Air Force Colonel John Boyd. Although not published, the study nevertheless has served as a springboard for other maneuver-oriented writers.¹⁴ As a "point of departure," he used the analogy of a fighter plane that had "fast transient (buttonhook) characteristics" and could turn inside an opponent.¹⁵ From this analogy, Boyd suggested that

in order to win, we should operate at a faster tempo or rhythm than our adversaries--or, better yet, get inside [our] adversary's *observation-orientation-decision-action [OODA] time cycle or loop*

Boyd then turned to Sun Tzu's *cheng* and *ch'i* maneuver patterns¹⁶ and traced the employment of these patterns throughout history, identifying five trends. First, ancient battles such as Marathon, Leuctra, Arbela, and Cannae showed that deploying an unequal

distribution of troops could generate "local superiority and decisive leverage to collapse adversary resistance." Second, the "widely separated strategic maneuvers" of Genghis Khan, coupled with the terror caused by his raiding Mongols, enabled him to "operate inside [his adversary's] observation-orientation-decision-action loops" while avoiding defeat in detail.

A third observation was that, despite his early successes, Napoleon (and Clausewitz and Jomini, his major interpreters) could be faulted for failing to comprehend the

importance of loose, irregular tactical arrangements and activities to mask or distort [one's] own presence and intentions as well as [to] confuse and disorder adversary operations.¹⁷

The major flaw was that "Napoleon, Clausewitz, and Jomini viewed the Conduct of War and related operations in essentially one direction-- from the top down--emphasizing adaptability at the top and regularity at the bottom."

Boyd sharpened his criticism, and faulted Jomini's preoccupation with "form of operations, spatial arrangement of bases, formal orders of battle, and tactical formations." He also argued that Clausewitz "overemphasized decisive battle and underemphasized strategic maneuver;" moreover,

Clausewitz did not see that many non-cooperative, or conflicting, centers of gravity paralyze [the] adversary by denying him the opportunity to operate in a directed fashion, hence they impede vigorous activity and magnify friction. [This leads to the likely result that] operations end in a "bloodbath"--via the well regulated, stereotype tactics and unimaginative battles of attrition suggested by Clausewitz.¹⁸

Boyd's fourth focus was *blitzkrieg*, which he contended was a

synthesis of envelopment, Genghis Khan's flying columns, J.F.C. Fuller's ideas on armored warfare, and the 1918 German infiltration tactics. He concluded that the essence of Blitzkrieg was the employment of "a *Nebenpunkte/Schwerpunkt* [supporting efforts/focus of main effort] philosophy to generate ambiguity, realize deception, and exploit superior mobility."

Fifth, Boyd noted in passing the similarities between blitzkrieg and guerrilla operations. Specifically, he argued that both methods generated crises in the adversary's decision-making process and aimed for moral collapse, rather than physical destruction.

Boyd then separated military conflict into three categories. The first, attrition warfare, relied upon destructive force, protection of friendly forces, and mobility to concentrate one's own forces or to evade the enemy's. The second category, maneuver conflict, used ambiguity, deception, fast transients, and the *cheng-ch'i* (or *Nebenpunkte-Schwerpunkt*) combination to disorient, surprise, shock, disrupt, and overload the enemy. Boyd's third category, moral conflict, was closely related to the second; menace, uncertainty, and mistrust were generated to "destroy moral bonds that permit an organic whole to exist."

Finally, Boyd sought to integrate destructive effort, maneuver, and moral elements into a synthesized method of annihilation which had five parameters: goal, plan, action, support, and command. The unifying goal of Boyd's method was to "deprive the adversary of his capacity to cope with events [and] efforts as they unfold."

With Boyd's method, a plan had seven facets. First, reconnaissance uncovered "the enemy's strengths, weaknesses,

maneuvers, and intentions." Second, deception was used to conceal, magnify, and distort friendly actions. Third, the least expected course of action was selected. Next, the main effort was established along with supporting efforts; the approach chosen should "permit many branches and threaten alternative objectives." Fifth, movement occurred along paths of least resistance "to reinforce and exploit success." Sixth, rather than seek destruction, or even disruption, of enemy forces, forces were to "exploit . . . those differences, frictions, obsessions . . . that interfere with his ability to cope with unfolding circumstances." Finally, Boyd's method planned to

disorient, disrupt, or overload adversary's vulnerable, yet critical, connections, centers, and activities that provide cohesion and permit coherent observation-orientation-decision-action in order to dismember [the] organism and isolate remnants for mop-up or absorption.¹⁹

Action, the cornerstone of Boyd's proposed method, was even more important than planning. It was essential to execute the OODA loop

more inconspicuously, more quickly, and with more irregularity (or fluidity) as [a] basis to keep or gain initiative as well as to repeatedly and unexpectedly focus [the] main effort thru [sic] vulnerabilities and weaknesses exposed by that effort or other effort(s) that tie-up, divert, or drain-away adversary attention (and strength) elsewhere.²⁰

Boyd's method required the support of "superior mobile communications" and was limited to "only essential logistics." Command would be decentralized tactically so that lower level commanders could exercise initiative and capitalize upon favorable circumstances. Strategically, however, command would be centralized "to establish aims, match ambitions with means [and] talent, sketch flexible plans, allocate resources, and shape focus of overall effort."

In summary, Boyd's method was and remains a comprehensive

synopsis of "maneuver theory;" moreover, he achieved a theoretical plateau beyond which subsequent maneuver writers did not far advance. Maneuver warfare, of course, pre-dates Boyd, and can be traced back as far as the historical examples he himself used.

Many precepts of maneuver warfare are rooted in Sun Tzu's *The Art of War*. Boyd placed greatest emphasis on Sun Tzu's notion of *cheng* and *ch'i*, but much more of Sun Tzu's thought is reflected in maneuver theory. He wrote that "an army may be likened to water, for just as flowing water avoids the heights and hastens to the lowlands, so an army avoids strength and strikes weakness,"²¹ and cautioned: "In war, numbers alone confer no advantage. Do not advance relying on sheer military power."²² He further reflected maneuver theory by stating

Speed is the essence of war. Take advantage of the enemy's unpreparedness; travel by unexpected routes and strike him where he has taken no precautions.²³

Of course, there is also his famous dictum that "war is based upon deception."²⁴

More recent antecedents of maneuver warfare were the British military writers Sir Basil Henry Liddell Hart and Major General J.F.C. Fuller. Liddell Hart made several contributions to maneuver theory, although one recent author has argued that Liddell Hart's originality and influence have been greatly exaggerated.²⁵ The first of Liddell Hart's maneuverist ideas was the "expanding torrent" which in his initial construction prescribed the tactical actions of infantry units immediately after conducting penetrations; it was an extension of the so-called "Hutler" infiltration tactics employed by the Germans in 1918.²⁶ Elsewhere, he defined it in terms quite similar to Sun Tzu's

water simile.²⁷

His second and best known contribution was "the indirect approach." Though Liddell Hart's definition of this concept seemed to evolve,²⁸ it generally referred to the dislocation of the enemy by attacking weaknesses with unanticipated methods. Liddell Hart likened it to seduction,²⁹ or a "baited lure."³⁰ This latter concept was in many ways an expansion of Antoine Jomini's "defensive-offensive" in which a defensive posture is adopted, to be followed by a counterattack.³¹ Liddell Hart postulated an "offensive-defensive" pattern as well, in which an offensive move was made which the enemy would have to counter, but after the attacking forces had established strong defensive positions.³² The "baited lure" in both cases was the method of causing the enemy to act as desired.³³

Liddell Hart himself would suggest that a third idea, said to have been inspired by his study of General William Tecumseh Sherman's operations in the South during 1864, was "deep strategic penetration" during the offense.³⁴ The centrality of deep penetration to Liddell Hart's thought is a matter of debate, however; others note his emphasis on the defense during the 1930s which, after the early successes of the German *blitzkrieg*, discredited him for several years.³⁵ Indeed, Liddell Hart emphasized the defender's advantage in his later works, as well.³⁶

Finally, he was an early proponent of mechanization and motorization during the 1920s and to a lesser extent during the 1930s, during which time he placed greater weight on "limited liability" (that is, minimal if any British commitment of ground forces to the continent) and the defender's advantage.³⁷

Fuller and Liddell Hart are often linked to the creation of the German *blitzkrieg*; however, some scholars contend that their actual influence has been exaggerated.³⁸ More important, some suggest, was the personification of *blitzkrieg* in General Heinz Guderian, whose unique background in signals, transportation, and combat forces created the new form of war.³⁹ However influential Liddell Hart and Fuller actually were, the early German World War II successes remain the models of choice for modern maneuver theorists. One of the first and most detailed analyses of the *blitzkrieg* method was published in 1942 by F. O. Miksche, a Czechoslovakian army officer.

While acknowledging the impact of World War I infiltration tactics upon *blitzkrieg's* evolution, he stated that the World War II method was founded upon a more rapid "irruption," or a

brutal breakthrough, carried out by armoured and fast-moving forces, attacking on narrow frontages, and aimed usually at a deep penetration of the area behind the enemy's defensive zone.⁴⁰

This was accomplished with methods of *schwerpunkt* (thrust point) and *aufrollen* (rolling out), which combined to create *Flächen und Lückentaktik* (tactics of space and gap), ultimately leading to exploitation and pursuit.⁴¹

Much of Miksche's work covered the organization, equipment, and combat tactics and techniques of blitzing forces. He wrote that tanks were the "battering ram of modern battle,"⁴² and that a panzer division attacking in massed block formations would provide the *schwerpunkt* for an attack of some eight divisions. It would aim for "gaps" uncovered by reconnaissance, and its irruption would be immediately followed by *aufrollen* conducted by elements of two or three "shock" (specialized

light infantry) divisions. These would infiltrate around and cut off enemy strongpoints ("surfaces"), and open up the penetration points to facilitate the unhindered passage of one or two mechanized divisions which would exploit and pursue. In addition to these forces, one of each type of division would normally be kept in reserve.⁴³

Contending that normal artillery procedures would be unable to keep up with the battle's tempo, Miksche wrote that aircraft would provide most of the direct fire support, protective fire, long-range fires, and counterbattery fire. Additionally, aircraft would be important for reconnaissance and to conduct resupply for ground forces.⁴⁴ Artillery would often be used in the direct-fire mode; it would be most useful in the defense and for clearing bypassed pockets of resistance.⁴⁵

Miksche believed that in modern war the offense was actually stronger than the defense; the 3-to-1 defender's advantage that was valid in World War I no longer held true.⁴⁶ Nevertheless, he advanced a defensive-offensive concept that he claimed was the most practicable against an opposing *blitzkrieg*. First, a "web defense" based upon defense in depth, "invulnerability," and "readiness for action" would "net and delay" the opponent.⁴⁷ Once the enemy forces were separated and slowed, a large scale counterattack would be directed either against the enemy's penetration or deeper into the enemy's own lines.⁴⁸

The defensive framework consisted of two lines separated by a 10 to 20 mile "guerrilla zone." Each of these three belts would have: an outpost zone; a "filter zone" consisting of tank-proof company-sized "islands of resistance;" a reserve zone which included artillery, service support, command posts, and tactical reserves for counter-infiltration;

and rearguard posts. Additionally, at intervals of 25 to 40 miles "transverse barriers" would run perpendicular to the front lines; these would be configured like the defensive lines and were designed to contain penetrations and block *aufrollen*.⁴⁹

Although many of Miksche's ideas and terms are reflected in modern maneuver literature, his name has been virtually forgotten. Instead, the best known modern maneuver proponent is William S. Lind, a former congressional advisor and author of the *Maneuver Warfare Handbook*. Although the work includes "practical exercises" for company commanders, Lind argued for a much broader applicability of his ideas. He contended that "maneuver warfare is more than maneuver,"⁵⁰ and his conception of maneuver warfare was not synonymous either with the "indirect approach" or *blitzkrieg*. Rather, he claimed that Boyd's decision cycle theory "is the theory of maneuver warfare. . . . [T]he object in maneuver warfare is to move through OODA loops faster than the enemy. . . ."⁵¹

Lind wrote that this could be achieved only through decentralized operations; reliance on reports and orders through the chain of command would be too complicated and slow.⁵² A second prerequisite for achieving an OODA advantage would be to accept and generate confusion and disorder; this is both a necessary cost and side-benefit of "reconnaissance pull,"⁵³ in which "the axis of advance is determined by the results of reconnaissance rather than being fixed by command from above."⁵⁴ Third, for a more rapid OODA tempo one should avoid predictable "patterns, recipes and formulas."⁵⁵

Lind's tactical conception of maneuver warfare was largely

conditioned by Liddell Hart's expanding torrent, the elastic defense used by the Germans in the latter part of World War I, and German assault tactics used on the Eastern Front during 1942.⁵⁶ He wrote that tactics is the art of selecting among a repertoire of techniques, for a specific and unique situation, through three "filters," or "mental reference points."⁵⁷ These filters include: mission-type orders (or *auftragstaktik*), with a special emphasis on the intent of the commander two levels above a given unit; the *schwerpunkt*, which he defines as "focus of effort;"⁵⁸ and "surfaces and gaps," which are similar to strengths and weaknesses and which are determined and exploited by "recon-pull."⁵⁹

Another well-known modern writer is Edward Luttwak, a military analyst at the Center for Strategic and International Studies, who is a contemporary advocate of the "relational-maneuver scheme" which seeks "systemic disruption" of the enemy forces or systems.⁶⁰ He noted that this method is "knowledge-dependent;" conversely, "attrition warfare" is "resource-based."⁶¹ His analysis of *blitzkrieg* differed in part from Miksche's, as he identified a breakthrough phase of conventional infantry attacks, a penetration phase featuring mobile columns "intersect[ing] at nodal points deep behind the front," and an exploitation phase along paths of least resistance.⁶² He identified three key elements of *blitzkrieg*: specifically, the avoidance of enemy strength, the criticality of deception, and the importance of intangibles such as momentum.⁶³ Luttwak also discussed "the paradoxical logic" of strategy, which was similar to Liddell Hart's "indirect approach." Luttwak observed that, against a thinking adversary, the "best" course of action may actually prove to be the worst, and *vice-versa*.⁶⁴

In summary, maneuver warfare stresses the initiative and a shorter OODA cycle, and attacks enemy vulnerabilities⁶⁶ via unexpected means to disrupt, demoralize, and paralyze the enemy nervous system. One can debate as to whether maneuver theory is the same as *blitzkrieg*. Lind and Simpkin would claim that *blitzkrieg* is a subset of maneuver theory, while Miksche would probably claim the reverse. Boyd, Luttwak and most other observers would see little difference between the two.

III. Firepower Warfare

Maneuver warfare theorists have often created foils against which to sharpen the distinctiveness of their ideas. Liddell Hart established himself as an antidote to an excessively direct Clausewitzian frame of mind. Most writers on the early German *blitzkrieg* have noted contrasts between the German Army and its opposition; highlighted differences have included doctrine, organization, and mindset. Modern maneuver theorists have typically indicted "attrition" warfare; for example, Boyd, Lind and Luttwak all criticized "attrition" warfare on theoretical and historical grounds. In recent years, American Army maneuverists have tended to embrace AirLand Battle partially as a reaction to the attrition-based "active defense" doctrine introduced in 1976.⁶⁶

Although barbs have occasionally been levied against the proponents of maneuver theory, most of the critiques have attempted to inject some perspective into the debate; consequently, the criticisms have tended to occur at the margins.⁶⁷ With a few possible exceptions, no critic has gone so far as to argue that maneuver theory is as fundamentally misguided today as the "cult of the offensive" was in 1914. Perhaps the closest contemporary assessment along these lines

can be found in the prologue to *Fire-power: British Army Weapons and Theories of War 1904-1945*, written by Shelford Bidwell and Dominick Graham. Their conclusion was that "firepower was still lord of the battlefield, and that in the last analysis its success was not based on weapons and machines but on the application of reason, on the 'still and mental parts.'"68 A corollary to their thesis was that while maneuver may be fashionable in peace, firepower is the preferred ingredient during war.69 This section will develop the case for "firepower warfare" even further.

In his 1941 discussion of the *blitzkrieg*, Miksche wrote that throughout history a pendulum has alternated between defensive dominance and offensive dominance; the former occurred during World War I, and he argued that the latter was in effect during the *blitzkrieg* era.70 In contrast to the prevailing military wisdom of his own time, in 1899 a Polish financier named Jean de Bloch published a technical, economic and political study of war that was chillingly prescient when compared with the actual experiences of World War I.71 Recently, Alvin and Heidi Toffler suggested that warfare has entered a "third wave" characterized by computerized information and communication systems, precision guided munitions, and space-based capabilities.72 Given these lines of thought, one should question whether modern technology fundamentally supports or undermines "maneuver theory," which is after all some fifty to seventy years old.

Although a maneuver advocate, Luttwak acknowledged that attrition-style warfare has the great attractions of predictability and functional simplicity. . . . [T]he optimization of all military activities in peace as in war, whether research and development, procurement, manpower-acquisition, training, staff work, or

command can all be pursued in a systematic fashion--the goal being of course to improve the techniques (target acquisition, force-movement, re-supply, etc.) whose combined effect determines the overall efficiency of attritive action. Thus in seeking to enhance overall capabilities, each resource increment can be unfailingly allocated into the right sub-activity, merely by establishing which of them yields the highest marginal return: manpower or equipment, numbers or quality fire-control or ammunition enhancements, and so on. Under a pure attrition style, all the functions of war and war preparation are therefore governed by a logic analogous to that of microeconomics, and the conduct of warfare at all levels is analogous to the management of a profit-maximizing industrial enterprise.⁷³

Lind's "firepower-attrition" straw man was less charitable, claiming that it

is warfare on the model of the battle of Verdun in World War I, a mutual casualty-inflicting and absorbing contest where the goal is a favorable exchange rate. The conflict is more physical than mental. Questions concerning "what to do" receive greater doctrinal and training attention than questions of "how to think."⁷⁴

"Firepower" warfare is indeed methodical and systematic,⁷⁵ and is characterized by extensive synchronization and planning, centralization, risk minimization, focus on the enemy's main strength, and destruction by fires. Its lineage can be traced back at least as far as Sebastien le Prestre de Vauban, a seventeenth-century military engineer who devised methods to exploit the defender's advantage (fortifications) and also to overcome it (siege methods). Both activities involved meticulous planning and incremental execution, with little or no risk-taking at any specific instant. Vauban lived when the importance and capabilities of technical services (artillery, engineers, logistics, and administration) were increasing. The "scientific revolution" brought new machines and new methods of organization to warfare; this required warfare rooted in intellect with detailed attention to planning.⁷⁶

An early parallel to the firepower-maneuver debate was that between the "formal school" and the "melee school" in the Royal Navy; this controversy emerged in the 1660s and continued until the eventual triumph of the melee school during the Napoleonic wars. The formal, traditionalist approach favored centralized control of the fleet and the maintenance of lines of battle during engagements. The meleelsts favored an early charge against the enemy, resulting in a chaotic, decentralized battle; they believed that superior British gunnery and seamanship supported such an approach. During the first half of the 18th century, the formalist tactics were used by the Royal Navy, having seemed to have been successfully used by the French at the Battle of Beachy Head in 1690 and by the British at the Battle of Barfleurl in 1692. The results of these battles, as well as a successful formalist defense off Gibraltar in 1704, convinced the British Admiralty that the prudent, conservative formalist tactics were superior. It was not until after Admiral Nelson's 1805 victory at Trafalger that the melee school achieved permanent ascendancy.⁷⁷

An underlying premise of the formalist school, and of the firepower method in general, was that "major advantages are to be found in prescribing accepted tactical and operational methods--what the twentieth century was to call doctrine."⁷⁸ Firepower warfare does tend to be doctrinaire, to the extent that doctrine provides "intellectual discipline" or serves "as a substitute for thinking and an alternative to creative, imaginative actions."⁷⁹

Elements of such formalist thinking were reflected on land, as well. Although Frederick the Great and Napoleon have been justifiably

praised as exemplars of maneuver,⁸⁰ they also demonstrated some strains of the firepower school. Frederick's control was extremely centralized, he preferred the use of his cavalry for shock action (rather than reconnaissance), and he did not trust light infantry, which he viewed as too dispersed and individualistic.⁸¹ He wrote: "Battles are won by superiority of fire"⁸² and stressed that forces should be concentrated without detachments.⁸³

Napoleon also displayed some aspects of the firepower school; Liddell Hart, like Boyd's assessment discussed earlier, was critical of Napoleon as well as Clausewitz, whom he referred to as "Napoleon's filter" and the "Mahdi of Mass."⁸⁴ Napoleon focused on the enemy's major army, as opposed to fortresses, capitals, or terrain,⁸⁵ and sought numerical superiority at the decisive point.⁸⁶

To some, it was an obsession with Napoleon, as viewed by Clausewitz, that led to the carnage of World War I. Liddell Hart wrote

The teachings of Clausewitz, taken without understanding, largely influenced both the causation and the character of World War I. Thereby it [sic] led on, all too logically, to World War II.⁸⁷

Liddell Hart's argument was stronger than the mere claim that unimaginative military commanders were incapable of grasping the nuances of Clausewitz's work, though this angle also was part of Liddell Hart's criticism.⁸⁸

Typically, Liddell Hart's books included a well-rehearsed anti-Clausewitzian diatribe that indicted the Prussian's thoughts on the decisive importance of numerical superiority, the inevitable bloodshed that would accompany wars, the identification of the enemy force as the paramount objective, and the absolute nature of war.⁸⁹ Moreover,

Liddell Hart routinely chastised Clausewitz for failing to appreciate the "dual nature of war" (or, in other words, the tensions that inevitably exist with any strategic choice.)⁹⁰

Two judgements exist for assessing the firepower approach and World War I. The first is the popular one, held by Liddell Hart and others, and best illustrated in C.S. Forester's *The General*:

In some ways it was like the debate of a group of savages as to how to extract a screw from a piece of wood. Accustomed only to nails, they had made one effort to pull out the screw by main force, and now that it had failed they were devising methods of applying more force still, of obtaining more efficient pincers, of using levers and fulcrums so that more men could bring their strength to bear. They could hardly be blamed for not guessing that by rotating the screw it would come out after the exertion of far less effort; it would be a notion so different from anything they had ever encountered that they would laugh at the man who suggested it.⁹¹

The second judgement is that the firepower advocates had it exactly right, and that the slaughter on the western front showed the folly of the "high priests of the offensive" who valued *elan* above firepower.⁹² As Clausewitz himself warned,

[N]ot only reason, but hundreds and thousands of examples show that a well-prepared, well-manned, and well-defended entrenchment *must generally be considered as an impregnable point* [emphasis in original] [T]he assault on an entrenched camp is a very difficult and usually an impossible task for the attacker.⁹³

Planning and synchronization are key elements of firepower warfare. Clausewitz wrote that friction permeates the conduct of war, and although he contended that combat experience provided the only "lubricant," another of his concepts can also help--military genius. Genius to overcome friction comes in two forms; the first is contingency planning, while the second is the ability to improvise as necessary. Many military processes are scientific in nature, systematic, detailed,

and quite in the pattern of firepower warfare. Such products as synchronization matrices, templates, estimates, thick orders, and detailed standard operating procedures are usually developed because of the complexity of both the units and their activities, and all are designed in part to overcome friction.

Planning is not, however, as important in pure maneuver theory; a rapid OODA loop that can tackle every unique situation is far more preferable. The elder Moltke, who cautioned against planning past the first day, also stated, "Strategy is a system of stop gaps."⁹⁴ As Patton said, "One does not plan and then try to make circumstances fit those plans."⁹⁵ Even more revealing was his willingness to "change plans to meet opportunities developed by combat or as Napoleon said, 'I attack when I look.'"⁹⁶

Firepower warfare places a lower value on *auftragstaktik* and initiative than does maneuver warfare; more important is Montgomery's concept of centralized "grip,"⁹⁷ together with "regularity, obedience, and bravery."⁹⁸ For example, Frederick the Great's

principal aim was to turn the army into an instrument of a single mind and will. . . . [E]very act 'is the work of a single man No one reasons; everyone executes.'⁹⁹

Napoleon's method, as well, consisted of

central control [emphasis added] . . . rapid movement and the offensive. The result was a new mobility, which made possible the concentration of superior force at the decisive point.¹⁰⁰

Paradoxically, firepower theorists believe that centralized control generates more agility than does *auftragstaktik*; the tighter the commander's control, the easier he can readily manipulate and react to evolving situations.¹⁰¹ The Napoleonic method of command may actually

have good reason for returning if "third wave" technology provides the commander with timely, adequate information and good communications. Centralization, rather than *auftragstaktik*, may prove to be the key to shorter OODA loops in the future.

While maneuver warfare accepts (and even encourages) risk-taking, with firepower warfare risk elimination is a higher virtue; ideally, one should avoid weaknesses that can be exploited by any adversary, whether that adversary practices firepower warfare or maneuver warfare. Certainly, one should not create unnecessary vulnerabilities.

Salient characteristics of maneuver warfare are "initiative" and "shorter Boyd cycles." In firepower warfare, these are not necessarily so critical, and may even have their own disadvantages. It is far more important to have a robust force posture so that the enemy can be defeated *regardless* of how quick his OODA cycle is. Maneuver warfare aims "at the practicable object of paralysing the enemy's action rather than the theoretical object of crushing his forces;"¹⁰² this is only possible if the maneuver force's physical movement is much quicker than the defending force's ability to detect, identify the real threats, communicate, target, and deliver ordinance. The Germans in 1940 were able to achieve this temporal advantage; a more robust French command, control, communications, and intelligence system such as can be achieved with modern technology *might* have resulted in a different outcome.¹⁰³

Montgomery identified "balance" as the key concept that underlies this manner of thought:

My military doctrine was based on unbalancing the enemy while keeping well-balanced myself. I planned always to make the enemy commit his reserves on a wide front in order to plug holes in his defenses; having forced him to do this, I then committed my own reserves on a narrow front in a hard blow. Once I had used my reserves, I always sought to create fresh reserves quickly. I gained the impression that the senior officers at Supreme Headquarters did not understand the doctrine of "balance" in the conduct of operations.¹⁰⁴

It is axiomatic to maneuverists that initiative should be seized; however, the exercise of initiative can generate vulnerabilities, if the initiative can be contained by the defender. It was for this reason that during the German's Ardennes offensive in 1944 General Dwight Eisenhower said that "the enemy has given us the chance to turn his great gamble into his worst defeat. . . ."¹⁰⁵ The German armored forces had emerged out from behind the Siegfried line and were now exposed; they were vulnerable to allied air power, logistical overstretch, and perhaps most significant, delay and attrition by the defending forces who did not succumb to the mass paralysis that is the true objective of maneuver warfare.¹⁰⁶

Even some of the successful *blitzkrieg* operations that are so highly praised by the maneuver theorists courted disaster.¹⁰⁷ One should be wary of putting too much stock in their examples; while history can be scrutinized to find methods to emulate, it can also be reviewed to determine countermethods. Some have suggested that the defeat of the French and British armies in 1940 can be traced to causes other than the absence of a maneuverist orientation; these include air inferiority, the lack of an effective air defense, an extremely poor command, control, and communications system and, ironically, an *offensive* mindset that drew the allied northern wing into Belgium, thus enabling it to be outflanked

by the German thrust through the Ardennes.¹⁰⁸ That the *blitzkrieg* was not so successful after 1940 suggests that the remedying of these and other defects might have undercut the effectiveness of maneuver warfare.¹⁰⁹

While maneuver theorists stress the indirect approach and attacking the enemy's weaknesses, firepower warfare would attach some important caveats to these prescriptions. First, an indirect approach could take too long, it might erode the strength of the force, it could place the force in an exposed posture, or it could leave the rest of the force excessively vulnerable. The indirect approach would seem to be more vulnerable to friction which is one of warfare's most prevalent characteristics. Additionally, a rapid OODA loop could lead to wasted motion as new decisions are frequently made to keep up with changing circumstances; an old US Navy adage cautions, "Order, counterorder, disorder."¹¹⁰

A second reservation is that while the enemy's weakness is being attacked, the enemy's strength must either be fixed, be idle, or its well-being must be tied directly to the weakness being attacked. Otherwise, the indirect approach risks irrelevance or even disaster. The indirect approach itself, moreover, could lead to a strategy of attrition; one could attack an enemy's decisive weakness or, if none really exists, one could sequentially attack a series of non-decisive weaknesses, leading up to a defeat in detail of the enemy. The danger, of course, is that the cumulative cost of going after a series of weaknesses will ultimately prove more costly than a direct attempt to eliminate the enemy's strength.¹¹¹

As its name would suggest, a dominant characteristic of firepower warfare is that the approach relies upon firepower, rather than maneuver, as the decisive element of combat. Lind's maneuver theory held that "*Firepower is very important in maneuver warfare* [emphasis in original]."¹¹² Similarly, maneuver is incorporated into firepower warfare; indeed, firepower makes a surprise maneuver that much more effective.¹¹³ Nevertheless, firepower advocates believe that firepower better achieves the dual principle of defeating the enemy while preserving one's own force.¹¹⁴ Moreover, in recent years the firepower capabilities of weapons systems have made more impressive advances than have the maneuver capabilities.¹¹⁵ Firepower advocates normally would be content to pulverize the enemy as long as necessary prior to embarking on any kind of maneuver, even when the point of diminishing marginal returns from fires has been reached. Consequently, while maneuverists have claimed the 1991 Persian Gulf War as a 100-hour vindication of their thought,¹¹⁶ firepower advocates would point to the decisiveness of the preceding air and bombardment campaign that *systematically shattered virtually every physical and moral aspect of the Iraqi military.*¹¹⁷

Maneuverists embrace the idea of a "nonlinear" battlefield;¹¹⁸ however, firepower advocates would question such a generalization. Armies today still have combat forces and combat service support units; the latter have increased in accordance with the logistical demands required by technology-dependent forces. If anything, the importance of this "longitudinal linearity" from front to rear is greater than ever before.¹¹⁹ While the "latitudinal linearity" (determined by the forward

(line of troops) may or may not be continuous, it nevertheless has existed and will continue to do so. This was clearly the case during the 1991 Gulf War.

Maneuver warfare advocates tend to favor combined arms force structures, so that as unexpected situations unfold any given unit will have the assets at hand to cope.¹²⁰ Sub-optimal task organizations are preferable to the turmoil that occurs when a unit is uprooted from one higher headquarters and grafted onto another. Moreover, such changes are detrimental in a moral sense to the esprit and comradeship that most soldiers value.

However, to fine-tune units for maximum effectiveness, firepower advocates willingly create detailed, unique task organizations, and will frequently change these *ad hoc* groupings. Consequently, combat support assets such as artillery, attack helicopters, reconnaissance, and engineer units will be consolidated, or "pooled," so that they can then be allocated in accordance with a master plan; the same rationale will generally apply for combat service support assets such as truck transportation. Tank, mechanized, and infantry force structures will be pure, with the ability to trade packages of smaller units as situations require.¹²¹ While maneuver warfare prescribes the retention of a third or even a half of the force in reserve, in firepower warfare only small reserves are kept since detailed planning should result in small amounts of uncertainty, and because firepower warfare tries to optimize the employment of all available assets.

Maneuver advocates often stereotype firepower warfare as the collection of all foolish military thought. This tendency does injustice to

the firepower approach, and furthermore damages clear conceptions of what maneuver warfare is. Maneuver warfare might indeed consist merely of broad platitudes and could claim each successful military episode as representative of the approach. To achieve clarity, however, a truthful, pragmatic conception of maneuver warfare must concede the existence of a distinct and useful "firepower warfare" which stresses centralized grip, planning, doctrine, and destruction of the enemy. If one is to stress "maneuver warfare" (as opposed to "prudent warfare," or "effective warfare," or "fighting smart," or some other less specific phrase) one must maintain a clear understanding about maneuver warfare's characteristics. Failure to do so dilutes maneuver theory to the stature of overused slang.

IV. A Typology: Firepower versus Maneuver

To assist in distinguishing between the two ideal forms of warfare, a typology can be abstracted from the preceding discussion. Naturally, any actual scheme of war is certain to incorporate aspects of both forms; nevertheless, the dominant characteristics of the maneuver and firepower schools can be distilled; this analysis is recorded in Table 1. To qualify as a maneuver style, a form of war should be characterized by most of the traits in the right-hand column of Table 1. If a form of war has a balanced mix of characteristics from both columns, or if it is mostly situational in its approach, it cannot be correctly termed "maneuver warfare" if that term is to have any specific meaning. A balanced or situational approach might be prudent; it is not, however, the same as maneuver warfare.

TABLE 1: A Typology: Firepower versus Maneuver

	FIREPOWER	MANEUVER
Preferred Style of War	Defensive	Offensive
Strategy	Central Position	Envelopment
Command	Centralized	Decentralized
Combat Support, Service Support	Centralized	Decentralized
Objective	Enemy Force Destruction	Enemy Paralysis Moral Disruption
Command Style (Genius)	Empiricism Detailed Contingency Planning Doctrine	Intuition Rapid OODA Improvisation
Reserve	Small	Large
Attitude to Risk	Avoid	Accept
Offensive Operations	Preparatory Bombardment Concentrated Main Effort Penetration	Infiltration Deep Attack Envelopment
Defensive Operations	Positional	Active Ambuscade

Some theorists are properly seen as blending the two schools of thought, rather than representing one or the other. J.F.C. Fuller was an early advocate of armored warfare, and clearly deserves the title of a "maneuver theorist." Nevertheless, he also wrote that war was a science,¹²² and skeptically referred to "the indirect approach" as the "strategy of evasion."¹²³ He wrote, "The superior weapon of the future is the gun," and "intuitively grasped that firepower was the key to modern war."¹²⁴ One of his most influential works, *Lectures on F.S.R. III (Operations Between Mechanized Forces)* argued on behalf of two wings: a tank wing for offensive operations and an anti-tank wing for holding

and defensive operations.¹²⁵

Richard Simpkin was another maneuver theorist who held a broader comprehension, contending that "the two main theories of war" were complementary; borrowing a model from the physical sciences, he wrote that maneuver theory dictated the actions of the lever (mobile force), while "attrition" theory provided the foundation for the fulcrum, or holding force.¹²⁶

The evolution of Soviet military thought reflected strong degrees of both maneuver warfare and firepower warfare. Maneuver tendencies were rooted in the early writings of Marshal Mikhail Tukhachevskiy and V.K. Triandafillov which stressed deep operations, deception, combined arms, broad fronts, initiative, and envelopments.¹²⁷ Strains of firepower warfare were reflected in the traditional Russian emphasis on artillery, mass, the development of "scientific" planning norms, centralization, standard operating procedures, and a modern emphasis on rockets and missiles.¹²⁸

V. The Operational Level of War

The US Army's AirLand Battle doctrine advanced two particularly distinctive characteristics. The first of these was a decided tilt towards maneuver warfare as opposed to the firepower-attrition flavor of the Active Defense doctrine, and the second was an emphasis on the "operational" level of war. Long a key component of Soviet military thought, "operational art" has only recently surfaced in the language of the US military; generally speaking, this is seen by most observers as an overwhelmingly positive development, and possibly "the most important change in Army doctrine since World War II."¹²⁹

Questions immediately arise as to what justifies the recent emphasis on the operational level; first, has it really been illustrative of a long-standing vacuum in American military thought, or could the term merely be traced to an attempt to keep up with the Soviets in a terminological arms race? Second, is operational activity really "different enough from tactics to merit separate study";¹³⁰ in other words, are tactics, strategy, and the operational level fundamentally the same or fundamentally different? After all, frameworks such as the principles of war apparently apply at all three levels. Finally, what specifically constitutes "operational level?" It is no exaggeration to suggest that disagreement exists as to what the operational level of war really means.¹³¹

The operational level spans the void between tactics and strategy, to the extent that such a void exists. To some, the operational level is essentially the same as "grand tactics,"¹³² which Jomini defined as "the art of forming good combinations preliminary to battles as well as during their progress."¹³³ Others might find it hard to distinguish between operational warfighting and military or theater strategy. These views suggest that the operational level, however different, is hardly new.

The strategic, operational, and tactical levels all entail the juxtaposition of ends, ways, and means; in this regard, they can be seen as being more similar than they are dissimilar. These elements also provide convenient dimensions around which to analyze some of the different understandings as to what actually constitutes the operational level of war. This section will clarify the differences in interpretations,

and will furthermore argue that the "operational level" is not synonymous with "operational art." Rather, the operational level of war may be prosecuted in two distinct manners; the first of these is with "operational art" and is based upon maneuver theory. The second method is with "operational science," which can be traced to firepower theory.

The US Army's official conception of the operational level is primarily ends-oriented:

Operational art is the employment of military forces to attain strategic goals in a theater of war or theater of operations through the design, organization, conduct of campaigns and major operations.¹³⁴

Presumably, while the operational level may normally be characterized by campaigns involving large forces,¹³⁵ the important consideration is whether or not military forces are used to achieve strategic goals.¹³⁶ For example, during World War II British Commando units conducted a series of raids on German-occupied territory. Even though the British Commando raids during World War II were relatively minor in scope, they might be viewed as operational in that they sought the strategic effect of tying down German forces to defend against similar threats in the future. Two British raids were directed against the battleship *Tirpitz*, a slightly larger sister ship of the *Bismarck*, and were designed to prevent it from sortieing into the Atlantic shipping lanes.¹³⁷ The success of the *Tirpitz* raids certainly had operational, perhaps even strategic consequences. To the extent that politics are entwined with strategy, all of the successful raids had an additional operational dimension because of their contribution to the morale of the British people when news from other fronts was bad.

One inference of this ends-oriented definition is that some large scale operations cannot strictly speaking be considered "operational," if they are relatively insignificant as far as national strategy is concerned, while a minor operation would be operational if national interests were significantly affected by success or failure. An example of this might be the eastern front during World War II; the activities of Soviet armies and German corps were often a miniscule portion of the larger strategic and operational picture. Conversely, during the North African campaign Rommel's effective forces periodically equated to less than an armored battalion and an infantry brigade.

Many conceptions of the "operational level" are means-oriented, rather than ends-oriented, with a common determining factor being the size of the force employed. An example was the original Soviet understanding which held that operational art applies to "the middle of the military structure: the arms of service, theaters of military operations, fronts, and field armies."¹³⁸ Similarly, the American Army understanding is that operational activities occur primarily at the army and army group level,¹³⁹ though corps-level activities are often included as well. British military doctrine, however, views the "operational level" as encompassing those activities conducted by division and higher forces, while the Germans and the Israelis view "operational art" at the brigade and division levels.¹⁴⁰ The latter interpretations appear to see the "operational level" as being closely tied to what the American Army refers to as "combined arms operations."

Other means-oriented conceptions of "operational" stress the spatial and temporal aspects of combat; one of AirLand Battle's main

points of emphasis was the "extended battlefield." Theoretically, conflict is increasingly operational the more it includes deep and rear components¹⁴¹ and the necessity to look two or three days or even longer into the future. That the operational level is often seen as being nearly synonymous with the planning and conduct of campaigns is an example of a means-oriented approach;¹⁴² this also tends to add other criteria for judging the operational level, such as the campaign plan, commander's vision, and the end state. Another means-oriented approach is to view joint operations as the essence of operational art.

Other observers have adopted ways-oriented approaches when describing the operational level. Long a critic of the American military's inability to function operationally, Edward Luttwak viewed "operational art" as virtually synonymous with maneuver or *blitzkrieg* warfare.¹⁴³ In his view, strategy among other things was responsible for bringing military resources to a theater of war, while tactics determined the linear efficiency of these resources. By themselves, strategy and tactics create an attrition-based scheme of warfare that has only rarely been transcended, most notably by the German *blitzkrieg* in the early years of World War II. Luttwak wrote that the *blitzkrieg's* nonlinear results were achieved with "operational art" which included the avoidance of the enemy's strength, deception, and the dominance of intangibles (particularly momentum).¹⁴⁴ The goal of "operational art," or the *blitzkrieg*, is to engender paralysis in the enemy; he can either wait for the situation to clarify (which will not occur), or he can risk an imprudent maneuver against an unclear threat.¹⁴⁵ Since the dominant American approach, in both strategy and tactics, traditionally has been

to concentrate overwhelming material superiority, Luttwak claimed that the American military mindset is essentially oblivious of the operational art.

The US Army's School of Advanced Military Studies teaches a slightly different ways-oriented definition of "operational art;" it is characterized by "distributed free maneuver" (manifested in campaigns) as opposed to the concentration of forces which typified classical strategy.¹⁴⁶ Others might suggest that deep attack constitutes the main feature at the operational level.¹⁴⁷ Although he did not address the "operational level" *per se*, Liddell Hart's emphasis on the "indirect approach" is another ways-oriented example.

A problem with any ways-oriented approach is that, ultimately, if the desired strategic objectives are achieved, the method of attainment would seem to be a second-order concern. Conceivably, "operational art" could actually prove strategically inferior to a "non-artistic" method. For example, Operation Barbarossa seemed to exemplify "distributed free maneuver" with three non-supporting thrusts into the Soviet Union, and with frequent separation of the infantry, armor, air, and logistical portions of the German armed forces. Perhaps a concentrated effort would have been more successful; it could hardly have been more disastrous. A starker example was the decision to drop atomic bombs on Japan in lieu of an artistic invasion campaign.

As at the tactical level, campaigns and major operations that attempt to seize the initiative can expose and overextend the force, leaving it vulnerable to a counteroffensive that leaves the force in worse condition than it was at the beginning. The defensive-offensive

pattern derives its effectiveness precisely because of this possibility.

As has been mentioned, Iraq's defeat in the Gulf War was arguably brought about more by a systematic program of destruction by fires than by adaptive *blitzkrieg*-like maneuver. Indeed, Luttwak himself during the air campaign continually argued *against* any attempt to replicate on the ground the methods he praised so highly in his earlier analysis of the operational art. In other words, obsession with a formulaic approach to operational art can lead to absurdity, if one rejects an efficient, simple, direct approach and instead pursues an elegant operational campaign in order to qualify as "artistic."

A fruitful approach might be to differentiate between the "operational level" and "operational art," and to recall the classical debate as to whether war is an art or a science. The "operational level" may be accepted, in the *FM 100-5* ends-oriented sense, as "the use of military forces to achieve strategic objectives." Furthermore, it is useful to think of "operational art," as does Luttwak and others, as a ways-oriented, maneuver-based subset that is characterized by momentum, opportunism, the indirect approach, and a rapid OODA cycle.

At the tactical level, maneuver warfare implies the existence of an opposite but nevertheless coherent approach to war, proper in certain circumstances; this study refers to it as "firepower warfare". Similarly, a coherent method called "operational art" must imply the existence of another coherent method that reflects the tensions in the dual natures of war. This may be called "operational science" and is the systematic twin to "operational art." It relies upon firepower, detailed planning, logistical effort, and possibly (but not necessarily) quantitative

superiority.¹⁴⁸ At the operational level, as in tactics and strategy, the challenge is still how best to blend ends, ways, and means. Competing solutions can be found with operational art, operational science, or with a skillful combination of both.

V. Operational Art and Operational Science: Two Sides of the Same Coin

Clausewitz ultimately concluded that "the term 'art of war' is more suitable than 'science of war,'"¹⁴⁹ but added that a preferable analogy was commerce or, better still, politics.¹⁵⁰ Nevertheless, he stated that war incorporated aspects of both art and science. "Science" connotes a body of knowledge, method, procedures, regulation, routine, but also exploration and experimentation; these latter two ventures into the unknown are pursued systematically and rigorously. Science also implies a collective consensus as to what should be done to achieve a desired result in a given situation.

"Art" entails imagination, creativity, and intuition. According to Clausewitz, "The point where the logician draws the line, where the premises resulting from perceptions end and where judgment starts, is the point where art begins."¹⁵¹ The nature of art implies that collective agreement as to a proper course of action is not possible.

Practitioners at the operational level can combine, in varying degrees, both operational art and operational science; this can be illustrated by considering how the two methods would fit the U.S. Army's framework for considering the operational level of war, the Operational Operating Systems.

The set of operational operating systems is similar to the Battlefield Operating Systems around which tactical doctrine is

structured; the systems for both levels are shown in Table 2.¹⁵²

TABLE 2: Operational and Battlefield Operating Systems

OPERATIONAL OPERATING SYSTEMS	BATTLEFIELD OPERATING SYSTEMS
Operational Movement and Maneuver	Maneuver
Operational Fires	Fire Support
Operational Protection	Air Defense
Operational Command and Control	Command and Control
Operational Intelligence	Intelligence
Operational Support	Mobility and Survivability Combat Service Support

Operational art is focused primarily upon maneuver, using more than one line of operations, and is directed against critical enemy weaknesses. The use of more than one line creates flexibility, since this generates multiple opportunities for success that can be exploited, either selectively or in combination. The objective is to paralyze the enemy's decision-making ability, and to exploit this paralysis with superior maneuvers. In the extreme cases, battles are nonlinear; ground maneuver forces, helicopters, and special operations forces operate deep in the enemy's rear, though without necessarily converging on some key nodal point. The close battle at the front expands into the deep and rear battles, as the term "front" is increasingly meaningless. The rear battle is characterized by engagements with conventional military forces, as service support elements attempt to support deep-operating maneuver forces, and as our own deep offensive operations employ forces that would otherwise be defending against the enemy's own attacks.

In operational art, fires are directed against vulnerable nodes such as command and control facilities, airfields, supply points, and air

defense sites to support frequent cross-FLOT helicopter operations. Air superiority is primarily acquired by attacks on airfields, rather than by air-to-air engagements. Once accomplished, air superiority is exploited with close air support, interdiction to disrupt enemy movements, and attacks on strategic targets that might have an indirect influence on the theater. Two main reasons compel an emphasis on close air support. First, artillery has difficulty keeping up with and supporting rapid ground maneuvers and air assault operations. Second, air forces can provide critical information to ground forces regarding the actions of enemy forces over the horizon.

In operational art, protection and security are primarily unit responsibilities. Consequently, combat service support activities are expected to maintain their own defenses, particularly as they are forced to operate on a fluid, nonlinear battlefield. They should accordingly be outfitted with a limited measure of combat power, such as combat units and a generous allocation of weaponry in the service support activities themselves. Combat units are combined arms formations with their own air defense and engineer assets for protection. To the extent that protective assets are weighted in operational art, it is towards combat formations, particularly those which operate deep. Since combat service support units are capable of conducting limited protection, they can delay enemy forces until reserves are activated against the threat, as necessary.

Decentralized command and control is a trademark of operational art, both before and during the battle. Subordinate forces are given zones of attack or broad areas of responsibility, and have extensive

latitude to develop, adjust and, if necessary, jettison plans. Since the combined arms formations have at hand the assets required to cope with virtually every contingency, higher echelons do not have to micro-manage and constantly adjust subordinate task organizations. Instead, they are able to focus on sequels, that is, the subsequent operations.

Operational art acknowledges that the intelligence picture will never be clear, and does not hesitate to act in the fog of war.

Commanders do not wait for perfect battle damage assessments (BDA) before taking the initiative, since BDA is imprecise and different analyses will usually conflict. Intelligence efforts at any level tend to focus on the deep and extended enemy picture; information on close enemy formations is the responsibility of units in contact.

Consequently, much of the critical information flow is from the bottom to the top. Cavalry units are seldom employed as massed formations to conduct combat missions (e.g., movements to contact, counterattacks, or advance guards); rather, they are dispersed and focus exclusively on reconnaissance to find enemy units and, more importantly, the gaps between them. Moreover, they normally report to units in proximity, as well as through their normal chain of command. "Security" missions, such as covering forces, guards, and screens, are conducted by regular infantry or armor forces.

Operational art prefers a logistical apparatus that is too austere rather than too cumbersome.¹⁵³ Units operate with expanded basic loads of critical supplies so that they can be separated from lines of supply for limited periods of time.¹⁵⁴ Logistical flow is based upon a "push" system of critical items. Expedient supply measures are routinely employed.

Air resupply is used frequently, and the managing of this is the logistician's most critical task. To the extent possible, foraging is practiced. This was a primary method by which Napoleon's forces were able to prove so mobile, and this "predatory war"¹⁵⁵ has been put to limited use even during the twentieth century; indeed, Fuller presaged its return in his early writings on mechanized warfare.¹⁵⁶ Forage methods include the use of captured supplies and weapons, and the appropriation of civilian resources (host nation support, for example, would fall in this category). If necessary, only a fraction of a force might be supplied in order it might continue moving.¹⁵⁷ The rest of the force could be left wanting, or it might be employed in the logistical effort to support the advancing force. Another key function of logisticians at all levels is the acquisition, accountability, and disbursement of non-standard (that is, enemy and civilian) resources.

Operational science produces different conclusions when examining each dimension of the Operational Operating Systems. With operational science, a single line of operations is clearly designated as the main effort; any other line that may exist is either a fixing operation or part of a deception plan. Deep maneuver operations are avoided because of their risk; attack helicopters, for example, operate either in direct support of ground forces or as a counterattack force against enemy penetrations. They are typically not risked on frequent cross-FLOT missions.

Small stock is placed in the ability of Special Operations Forces to operate deep behind enemy lines; moreover, their operations are not permitted to constrain in any way the ability of air assets or indirect

fire assets to strike the enemy rear at will. In operational science, the defense is exploited until it is certain that the enemy has been sufficiently weakened by a thorough campaign of operational fires.

Operational fires are the core of operational science; it is an elevation of the adage that "artillery destroys, infantry occupies" to the operational level. While operational artists might deride "the technical frame of mind where warfare becomes an exercise in targeting and neutralizing target sets and arrays by massing systems,"¹⁵⁸ operational scientists would reject any categorization of this approach as a vice. Indeed, they contend that the key to success is precisely the systematic employment of fires, with two essential early steps. These are the achievement of air superiority (heavily reliant upon air-to-air engagements) and a successful, centralized "counterbattery" fight. Once these two objectives have been achieved, the defeat of the enemy can be pursued at will, again by relying heavily upon fires. If, as the operational artists claim, paralysis of the enemy's decision-making apparatus is indeed such a desirable goal, this can be achieved by operational fires as well as by maneuver.¹⁵⁹

Operational science mandates that all fixed-wing assets be consolidated under a Joint Force Air Component Commander (JFACC); these would include Marine Corps aviation at an early stage in the campaign. For cost-effectiveness, upon securing air superiority, air support is oriented primarily on interdiction, particularly to destroy the enemy's reserves and subsequent echelons. Close air support is less important; attack helicopters and artillery are better able to provide direct support for ground units, and the threat to aircraft from enemy

anti-aircraft artillery means that close air support from fixed-wing aircraft is not cost-effective. Moreover, close air support has always carried a heavy risk of ground-to-air or air-to-ground fratricide. Occasionally, however, close air support may be used to blow a hole through strong enemy defenses with "carpet bombing."

For operational protection, assets such as engineer and air defense units are allocated based upon the situational calculus. Initially, priority is generally given to hardening weak points against enemy artillery and air. Specialization might even compel that air defense be charged to air forces. Once air and fire superiority have been achieved, emphasis generally shifts to protecting attacking forces. With the importance of specialization in operational science, combat service support units are expected to focus on their primary functions; consequently, their defense and protection is the main responsibility of specially-designated forces whose compositions are situationally determined.¹⁶⁰

Operational science places great emphasis upon the synchronization and control of units, particularly in a large army where numerous specialized units have to be integrated towards a concentrated, coordinated effort. Detailed plans are generated from a meticulous planning process;¹⁶¹ consequently, products such as air tasking orders and target lists include thousands of entries and require significant lead time for the inclusion of a specific target. Operational plans, however simple, take days to develop and disseminate.

Subordinate commands do not independently select divergent axes within broad zones; their plans should mesh and their activities should

coincide in time and space. This responsibility rests with the commander, and should not be delegated to subordinates who might independently arrive at uncooperative judgements. Operational science holds that the best way to achieve a commander's intent is for the commander to take and maintain control, and operational scientists are optimistic that such technological advances as computers, JSTARS, secure and certain communications, and Global Positioning System makes this Napoleonic ideal more attainable than ever before.¹⁶² Operational scientists believe that the prevention of paralysis from *blitzkrieg* lies in a strengthened, cybernetic command hierarchy and an information system that counters uncertainty with certainty.¹⁶³

These same technical breakthroughs that support centralized command and control should elevate operational intelligence to a higher level of precision, resulting in a clearer picture of the enemy's disposition.¹⁶⁴ This, in turn, means that the necessary enemy forces can be targeted selectively with fires, rather than risk losses with excessive ground maneuver. Moreover, the intelligence picture is largely generated at the top and pushed downward. Given the density of combat power in cavalry units, these forces are typically given economy of force missions, covering force missions, or exploitation missions.

A robust, complicated logistical system is critical to operational science. Since the needs of a large army cannot be reduced to a few essential line-items, logistics operates primarily on a pull system; moreover, the maintenance of secure lines of supply is critical. The use of enemy resources or facilities is not expected, given the uncertainty of locating and securing them. Additionally, foreign supplies are only

rarely compatible with American equipment, and using non-standard equipment would create an excessive training burden in the middle of an operation.

This analysis of operational art and operational science is summarized in Table 3, which identifies the main characteristics that apply to the six Operational Operating Systems.

TABLE 3: Operational Art versus Operational Science

	OPERATIONAL ART	OPERATIONAL SCIENCE
OPERATIONAL MOVEMENT & MANEUVER	More than 1 Line of operations Deep Operations SOF, Air Assaults Offense Dominant Nonlinear Battlefield	1 Primary Line of operations Close Operations Defense Dominant Linear Battlefield
OPERATIONAL FIRES	Target key nodes (C'I, ADA) Disruption CAS, Strategic Bombing	Counterbattery Systematic Destruction Interdiction
OPERATIONAL PROTECTION	Decentralized Combined Arms Formations Self-Defense of CSS	Centralized Plan Situational allocation of protective assets Tactical Combat Forces
OPERATIONAL COMMAND & CONTROL	Decentralized Opportunistic Intuitive	Centralized Deliberate Planning Empirical Doctrinaire
OPERATIONAL INTELLIGENCE	Bottom-up flow Uncertainty Expected Cav: Dispersed recon Lightly equipped	Top-down flow Precision Expected Cav: Concentrated—security and counterattack Heavily equipped
OPERATIONAL SUPPORT	Austere "Push" Expedient (Air resupply, foraging)	Robust "Pull" Routinized

Properly understood, the "operational level" is not synonymous with "operational art." The former is the employment of military forces to achieve national strategic objectives, while the latter is one way of achieving this. Operational warfighting may be conducted imaginatively and may be characterized by elegant maneuvers; conversely, it might be fought systematically with a primary reliance upon fires. Usually, it will incorporate some degree of both operational art and operational science; the achievement of the proper blend is the ultimate challenge for the operational warfighter. An austere logistical apparatus should not be planned when a robust one is required; conversely, one should not be tied to a cumbersome logistical apparatus when the situation justifies a logistical shoestring.

The situational nature of war should be self-evident; nevertheless, history suggests that armies have often become enslaved by "tyrannies of fashion," only to be betrayed by these masters when war began. "Maneuver warfare" and "operational art" are currently fashionable, and there indeed is much merit to them. However, it would be the height of folly (and, ironically, counter to the maneuver ethos itself), to be so addicted to operational art that the scientific method is ignored.

APPENDIX: THE DUALITIES OF WAR
(A Partial List)

Theoretical War *versus* Real War (Clausewitz)
Total War *versus* Limited War
Nuclear War *versus* Conventional War
Conventional War *versus* Unconventional War
Maneuver Warfare *versus* Firepower Warfare
Description (Clausewitz) *versus* Prescription (Jomini)
Art *versus* Science
Offense *versus* Defense
Strategy of Annihilation *versus* Exhaustion/Attrition
(*Niederwerfungsstrategie versus Ermattungsstrategie*)
(Hans Delbruck)
Attacking Will *versus* Capability
Counterforce *versus* Countervalue Targeting
Destruction *versus* Disruption
Direct Approach *versus* Indirect Approach (Liddell Hart)
cheng versus ch'i (Sun Tzu)
Holding Force *versus* Maneuver Force (Richard Simpkin)
Hammer *versus* Anvil
Interior Lines *versus* Exterior Lines
Strategy of Central Position *versus* Envelopment
Enemy Destruction *versus* Self-Preservation
Concentration *versus* Dispersion
Planning *versus* Improvisation
Formalist School *versus* Melee School
Bayonet School *versus* Shell School
Foraging *versus* Magazines or Supply Trains
Centralization *versus* Decentralization
Rationality *versus* Emotion
Moral *versus* Physical (Clausewitz)
Maritime *versus* Continental
Air *versus* Surface
Contingency Operations *versus* Forward Presence
Military *versus* Political

ENDNOTES

¹ Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 78.

² Clausewitz himself did not use this phrase; it has instead been employed by others to explain the concepts of absolute war and limited war as he discussed them in Book One. See Michael Howard's introductory essay, "The Influence of Clausewitz" in *On War*, 28 and Peter Paret, "Clausewitz" in Peter Paret, ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 199: "The concept of absolute war and the concept of limited war together form the dual nature of war." Paret's development of the concept in his introductory essay to *On War* is more refined, and is patterned after Clausewitz's own note dated 10 July 1827, in which he writes: "War can be of two kinds, in the sense that either the objective is to *overthrow the enemy*--to render him politically helpless or militarily impotent, thus forcing him to sign whatever peace we please; or *merely to occupy some of his frontier-districts* so that we can annex them for bargaining at the peace negotiations [emphasis in original]." Clausewitz, 69 and Peter Paret, "The Genesis of *On War*" in *On War*, 22.

³ Clausewitz, 89.

⁴ *Ibid.*, 78.

⁵ Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (London: Brassey's Defence Publishers, 1985), 19.

⁶ Michael P.W. Stone and Gordon R. Sullivan, *The United States Army Posture Statement FY93* (Washington, DC: Department of the Army, 1992), 16. Professional military literature in the past decade has also praised maneuver warfare or taken its superiority for granted; a sampling from *Military Review* includes: L.D. Holder, "Maneuver in the Deep Battle" (May 1982), 54-61; Paul T. Devries, "Maneuver and the Operational Level of War" (December 1982), 13-34; Anthony M. Coroalles, "Implementing a Maneuver Style" (December 1982), 20-26; James T. Westwood, "Maneuver: A Broadened Concept" (March 1983), 15-19; Wallace P. Franz, "Maneuver: The Dynamic Element of Combat" (May 1983), 2-12; George A. Higgins, "German and US Operational Art: A Contrast in Maneuver" (October 1985), 22-29; John W. Woodmansee, Jr., "Blitzkrieg and the AirLand Battle" (August 1984), 21-39; Paul Tiberi, "German versus Soviet Blitzkrieg" (September 1985), 63-71; Anthony M. Coroalles, "Maneuver to Win: A Realistic Alternative" (September 1981), 35-46; John G. Heslin, "Mobility: Key to Success on the Extended Battlefield" (August 81), 57-63; Richard D. Hooker, "Redefining Maneuver Warfare" (February 1992), 50-58.

⁷ This dilemma for maneuver warfare is faced by any doctrine. A doctrine risks two criticisms; first, it might be viewed as *too exclusive*, in that it does not prescribe certain methods that are appropriate under specific

circumstances. Second, a doctrine might be viewed as *too inclusive*, in that it is unable to provide meaningful guidance in different situations.

* Maneuver Warfare Symposium, *MWS Newsletter* (West Point, NY: Maneuver Warfare Symposium, April 1991).

* Shelford Bidwell and Dominick Graham, *Fire-power: British Army Weapons and Theories of War 1904-1945* (Boston, MA: George Allen & Unwin, 1982), 200-201 and 250.

¹⁰ The memoirs of both commanders gave very sparse treatment of each other. See Bernard Law Montgomery, *The Memoirs of Field Marshal the Viscount Montgomery* (Cleveland, OH: The World Publishing Co., 1968) and George S. Patton *War as I Knew It* (Boston, MS: Houghton Mifflin Co., 1947). Montgomery was particularly diplomatic when he mentioned Patton; for his part, Patton limited himself to an occasional complaint about Montgomery's undue influence over Eisenhower; Patton, 120. Other sources describe a stronger personal animosity, at least as far as Patton was concerned; his diary was replete with critical comments about Montgomery's cautious nature. See Martin Blumenson, *The Patton Papers 1940-1945* (Boston: Houghton Mifflin Company, 1974). Montgomery seems to have been less obsessed with their "rivalry;" he thought Patton aggressive, but "willfully ignorant" of the "administrative aspects of war. Nigel Hamilton, *Master of the Battlefield: Monty's War Years 1942-1944* (New York: McGraw-Hill Book Company, 1983), 602. Hamilton, Montgomery's official biographer, noted similarities between the two commanders, and cited Bradley to that effect, but concluded that Montgomery was more professional, 338-339.

¹¹ Patton, 120.

¹² Montgomery was careful to distinguish between his conception of a concentrated blow and other misinterpretations of a "pencil-like thrust," "knife-like drive" (Montgomery, 256) or as Bradley phrased it, a "butter-knife thrust" (Patton, 133).

¹³ Montgomery, 255. Montgomery's inevitable focus on planning was due to his experiences in World War I. Seriously wounded himself, he felt that too many casualties occurred because of poor planning at higher echelons. Throughout his career, he stressed the importance of meticulous planning; failure to do so, he believed, constituted professional negligence. Barrie Pitt, *The Crucible of War 3: Montgomery and Alamein* (London: Papermac, 1986; originally 1982), xviii-xx. Pitt and Nigel Hamilton held the prevalent view that Montgomery's leadership was responsible for reversing the string of British defeats in North Africa. For a contrasting interpretation, however, see Corelli Barnett, *The Desert Generals* (Bloomington, IN: Indiana University Press, 1982; originally 1960). Barnett contended that Montgomery's *Memoirs* were misleading, that his predecessors were far more competent than most historians have admitted, and that Montgomery's influence was marginal and in some ways detrimental.

¹⁴ Other maneuver-oriented writings preceded Boyd's study; for example, William Lind discussed maneuver doctrine and attrition-firepower doctrine in "Some Doctrinal Questions for the United States Army," *Military Review* Volume LVII No. 3 (March 1977), 64-65. However, Boyd remains the touchstone for many maneuver writers. See especially William S. Lind, *Maneuver Warfare Handbook* (Boulder CO: Westview Press, 1985), 5; Robert R. Leonhard, *The Art of Maneuver* (Novato, CA: Presidio Press, 1991), 51; and Hooker, "Redefining Maneuver Warfare," 58n, who stated that "references to [*Patterns of Conflict*] exist throughout the body of maneuver warfare literature."

¹⁵ John R. Boyd, *Patterns of Conflict*, unpublished briefing slides, dated September 1981 (no page numbers). All references to Boyd's work are from this source.

¹⁶ *Cheng* and *ch'i* refer to ordinary (fixing, or distracting) forces and extraordinary (winning) forces that are used in conjunction, and which can reverse roles. The closest western parallel is probably "hammer and anvil," though Sun Tzu's conception is much deeper. Sun Tzu, *The Art of War* trans. Samuel B. Griffith (Oxford: Oxford University Press, 1963), 91 and 91n.

¹⁷ Boyd.

¹⁸ *Ibid.*

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ Sun Tzu, *The Art of War*, 101.

²² *Ibid.*, 122.

²³ *Ibid.*, 134.

²⁴ *Ibid.*, 106.

²⁵ John J. Mearsheimer, *Liddell Hart and the Weight of History* (Ithaca, NY: Cornell University Press, 1988). Mearsheimer claimed that Liddell Hart's current reputation is the result of post-WWII machinations by Liddell Hart. He also claimed that Liddell Hart owed most of his important ideas to Fuller, and never publicly acknowledged the debt, 35. For a partial rebuttal to Mearsheimer, see Jay Luvaas "Liddell Hart and the Mearsheimer Critique: A 'Pupil's' Retrospective," *Parameters* Vol. XX No. 1 (March 1990), 9-19.

²⁶ Mearsheimer, 32.

²⁷ Basil Henry Liddell Hart, "The 'Man-in-the-Dark' Theory of Infantry Tactics and the 'Expanding Torrent' System of Attack," *Journal of the RUSI* (February 1921), 13, as cited in Lind, *Maneuver Warfare Handbook*, 9.

²⁸ *Ibid.*, 84-98. Liddell Hart used the "indirect approach" to refer to a peripheral grand strategy, as a concept tied to the *blitzkrieg*, as the attack on population centers to undermine will, as the use of airpower to include chemical munitions, as a Shermanesque attack on population centers, and as maritime blockade. The "indirect approach" is a tautological idea in many respects. As Mearsheimer noted, "[I]t is a vague and therefore elastic theory. At a purely conceptual level, its real meaning is difficult, if not impossible to discern. Virtually every military victory can be ascribed to the indirect approach," 87.

²⁹ Basil Henry Liddell Hart, *The Strategy of the Indirect Approach* (London: Faber and Faber Limited, 1941; originally *The Decisive Wars of History*, 1929), x.

³⁰ See Basil Henry Liddell Hart, *Strategy*, second revised edition (New York: Signet, 1974; originally London: Faber & Faber Ltd., 1954), 334-337. Liddell Hart also alluded to offensive-defensive and defensive-offensive combinations, 146 and 279. Also see Liddell Hart, *The Strategy of the Indirect Approach*. In this earlier book Liddell Hart stressed the importance of "weaken[ing] resistance before attempting to overcome it," page x and 189. In the last chapter he discussed Hitler's pre-war actions as illustrative of psychological and political indirect approaches, 291-309.

³¹ Antoine Henri Jomini, *Summary of the Art of War* ed. J.D. Hittle, in *Roots of Strategy Book 2* (Harrisburg, PA: Stackpole Books, 1987), 463. An historical illustration of the "defensive-offensive" was Field Marshal Erich von Manstein's winter campaign around Kharkov in which the attacking Soviet forces were contained by an elastic defense and set up for "backhand" *ripostes*. Erich von Manstein, *Lost Victories* (Novato, CA: Presidio Press, 1985; original English translation Methuen & Co. Ltd., 1956), 367-442.

³² The "offensive-defensive" was a foundation for the German *kesselschlacht* in which two wings would encircle large pockets of the enemy and establish a line of circumvallation (inner ring) and a line of contravallation (outer ring). The enemy would then be forced to break out of (or break through) the German lines which would have gone over to the defensive. At Gettysburg, Longstreet urged that Lee adopt an "offensive-defensive" by turning Meade's southern flank and establishing a defensive position between Meade's force and Washington, D.C. This would have forced the Union forces into the offensive. Lee rejected this advice and essentially resorted to a series of frontal attacks which lost the battle. Edward Hagerman, *The American Civil War and the Origins of Modern Warfare* (Bloomington, IN: Indiana University Press), 139.

³³ Also see Colmar von der Goltz, *The Conduct of War: A Brief Study of its Most Important Principles and Forms* trans. Joseph T. Dickman (Kansas City, MO: The Franklin Hudson Publishing Co., 1896; reprinted Fort Leavenworth, KS: The Combat Studies Institute, 1990), 32. In a similar vein, von der Goltz addressed the following patterns:

Strategical defensive and tactical defensive
Strategical defensive and tactical offensive
Strategical offensive and tactical defensive
Strategical offensive and tactical offensive

³⁴ It is uncertain when Liddell Hart finally settled on "deep" strategic penetration as a sound method; see Luvaas, "Liddell Hart and the Mearsheimer Critique, 13. Also see Kenneth Macksey *Guderian: Creator of the Blitzkrieg* (New York: Stein and Day, 1976), 62. Macksey noted that on page 20 of the English translation of Heinz Guderian's *Panzer Leader* (London: Futura, 1974; originally Michael Joseph Limited, 1952) the German general wrote "It was Liddell Hart who emphasised the use of armoured forces for long-range strokes, operations against the opposing army's communications, and also proposed a type of armoured division combining panzer and panzer-infantry units. . . . I owe many suggestions of our further development to Captain Liddell Hart." Macksey further commented that this tribute was absent from the original German edition; Macksey, 62. In *Liddell Hart and the Weight of History*, Mearsheimer documented a trail of post-war letters between Liddell Hart and Guderian in which the latter appeared to have been coached as to the accolade desired. Mearsheimer also noted similar "coaching" efforts by Liddell Hart with other German generals, 160-167 and 178-217.

³⁵ Irving M. Gibson, "Maginot and Liddell Hart: The Doctrine of Defense" in *Makers of Modern Strategy: Military Thought from Machiavelli to Hitler*, ed. Edward Mead Earle (Princeton, NJ: Princeton University Press, 1941), 365-387. Also see Brian Bond and Martin Alexander, "Liddell Hart and De Gaulle: The Doctrines of Limited Liability and Mobile Defense" in *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, ed. Peter Paret (Princeton, NJ: Princeton University Press, 1986), 598-623. Gibson noted that Liddell Hart maintained his belief in defensive dominance even after the German defeat of Poland, 384. Mearsheimer's study of Liddell Hart's writings in the late 1930s and in 1940 detected a distinct tilt towards the defense, "making him look like the proverbial general caught preparing for the last war," 126. Though not guilty of the "Maginot Line" mentality, Liddell Hart was a major contributor to the "cult of the defensive" that led to the fall of France.

³⁶ Liddell Hart, *Strategy*, 315. Also see Liddell Hart, *The German Generals Talk* (New York: Quill, 1979), 216. Both sources mention a 6-to-1 defender's advantage; possibly increasing to 12-to-1. The second work attributed these ratios to General Gotthard Heinrici, and mentioned defensive success when facing 18-to-1 odds.

³⁷ See Brian Bond, *Liddell Hart: A Study of his Military Thought* (New Brunswick, NJ: Rutgers University Press, 1977), 88-115 as well as Mearsheimer, *Liddell Hart and the Weight of History*, 107-126.

³⁸ See Charles Messenger, *The Art of Blitzkrieg* second edition (London: Ian Allen Ltd, 1991; first published 1976), 7 and Len Deighton, *Blitzkrieg: From the Rise of Hitler to the Fall of Dunkirk* (New York: Ballantine Books, 1979), 102-103. Bond and Alexander argued that the popular thesis regarding Liddell Hart and Fuller's influence was "greatly oversimplified," 621. However, see Matthew Cooper, *The German Army 1939-1945* (Chelsea, MI: Scarborough House Publishers, 1978), who says that while the British ideas merely "welded" together the blitzkrieg's elements, the Britishers had a significant impact, 139-158.

³⁹ See Macksey, *Guderian: Creator of the Blitzkrieg*. Also see Len Deighton, *Blitzkrieg*, xx and 119.

⁴⁰ Ferdinand Otto Miksche. *Attack: A Study of Blitzkrieg Tactics* (New York: Random House, 1942), xv. Miksche wrote that *blitzkrieg* was "completely different" from the earlier infiltration tactics, since it was quicker and concentrated on narrow frontages (within a twelve-mile zone, a panzer division would spearhead the attack at three points, each with a frontage of one and a half to two miles), 38-41.

⁴¹ *Ibid.*, 42-43.

⁴² *Ibid.*, 108. Fuller also referred to tanks as the "armour-headed battering ram." See Cooper, 114.

⁴³ Miksche, 124-138. Based upon a Soviet model, Richard Simpkin suggested a similar method for penetrations. Termed the "bursting dam," an initial force from the holding element would conduct the rupture of enemy defenses. This would be followed by the main force which would complete the breakthrough and permit the unhindered passage of the third, mobile, breakout force. *Race to the Swift*, 93-98.

⁴⁴ Miksche, 97-99. Miksche referred to aircraft as "flying artillery." Guderian also viewed dive bombers as the *blitzkrieg's* artillery; Deighton, 139.

⁴⁵ *Ibid.*, 169-176.

⁴⁶ *Ibid.*, 191.

⁴⁷ *Ibid.*, 197, 202, and 227.

⁴⁸ *Ibid.*, 244-251.

⁴⁹ *Ibid.*, 228-230.

⁵⁰ Lind, *Maneuver Warfare Handbook*, 4.

⁵¹ *Ibid.*, 5-6.

⁵² *Ibid.*, 6.

⁵³ *Ibid.*, 7.

⁵⁴ *Ibid.*, 18.

⁵⁵ *Ibid.*, 7.

⁵⁶ *Ibid.*, 9-11.

⁵⁷ *Ibid.*, 12-13.

⁵⁸ *Ibid.*, 17-18.

⁵⁹ *Ibid.*, 18.

⁶⁰ Edward Luttwak, "The Operational Level of War" in Steven E. Miller, ed. *Conventional Forces and American Defense Policy* (Princeton, NJ: Princeton University Press, 1986), 214. Also Edward Luttwak, *Strategy: The Logic of War and Peace* (Cambridge, MA: Belknap Press, 1987), 93-94.

⁶¹ Luttwak, "The Operational Level of War," 215.

⁶² *Ibid.*, 217-218.

⁶³ *Ibid.*, 220-223.

⁶⁴ Luttwak, *Strategy*, 3-8. Luttwak wrote that "paradoxical logic" can be contrasted with "linear logic," and he analyzed five strategic levels: technical, tactical, operational, theater strategy, and grand strategy.

⁶⁵ Although many refer to these as "centers of gravity," such terminology can be confusing. Clausewitz, who originated the phrase, used it to refer to strength, not weakness; moreover, he conceived of it in an offensive sense (that is, as something to attack with) as much as he did in a defensive sense. See James J. Schneider and Lawrence L. Izzo, "Clausewitz's Elusive Center of Gravity," *Parameters* Vol. XVII No. 3 (September 1987), 46-66. Also see Clausewitz, 485: "A center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a blow; furthermore, the heaviest blow is that struck by the center of gravity." Maneuver theorists should think instead of "decisive points," "Achilles heels" or, as Liddell Hart phrased it, "decisive joints" (that are both critical and vulnerable). Liddell Hart, *Strategy*, 99. The United States Marine Corps refers to "critical enemy factors" which could be either "critical vulnerabilities" (decisive joints) or critical capabilities (centers of gravity). Department of the Navy, *FMFM 1-1, Campaigning* (Washington, D.C.: United States Marine Corps), 35-38.

⁶⁶See Paul H. Herbert *Deciding What Has to Be Done: General William E. DuPuy and the 1976 Edition of FM 100-5 Operations* (Fort Leavenworth, KS: Combat Studies Institute, 1988), 95-107. Herbert cited several criticisms of the 1976 version of *FM 100-5 Operations*, which advanced what came to be known as "active defense." First, it emphasized defense too much. Second, it highlighted the material rather than the moral and human aspects of war. Third, it essentially ignored contingencies outside of Europe. The manual did not address corps and theater operations, and was too pedantic. For an analysis of how these and other factors resulted in the creation of AirLand Battle, see Jeffrey W. Long, *The Evolution of U. S. Army Doctrine: From Active Defense to AirLand Battle and Beyond* (Fort Leavenworth, KS: Unpublished MMAS thesis, 1991). Long commented that, ironically, it was the 1976 doctrine that was revolutionary; AirLand Battle was a reactionary shift to reclaim organizational preferences for an offensive disposition, 307.

⁶⁷Dissenting views on maneuver warfare are all too rare; probably the best skeptical assessment of maneuver warfare is Mark R. Hamilton, "Maneuver Warfare and All That," *Military Review* Volume LXVII No. 1 (January 1987), 2-13. Among other things, Hamilton questioned the applicability of Boyd's fighter plane analogy for large ground forces. He also expressed concern over the maneuverists' self-proclaimed elitism and the rush to jump on their bandwagon. For examples of more limited criticisms, see the letters to the editor and John R. Dally, "Reform Hell!" *Marine Corps Gazette* Volume 72 No. 10 (October 1988), 28-30 and 25-28 in response to William S. Lind, "The Next Agenda: Military Reform," *Marine Corps Gazette* Volume 72 No. 6 (June 1988), 48-53. The readers object to only small portions of Lind's argument, such as whether or not the M1A1 is a suitable tank for the Marine Corps, or whether the A-10 is a useful close air support weapon. Some of the criticisms of maneuver theorists such as Lind and Luttwak are really *ad hominem* attacks that focus primarily upon their lack of military experience. See Fred Reed, letter to the editor, *Parameters* Volume XVIII No. 1 (March 1988), 115-117.

⁶⁸Bidwell and Graham, *Fire-power*, 4.

⁶⁹*Ibid.*, 13. Another analyst has similarly written, "Whatever the peacetime predilection with movement, soldiers in real war place a premium on firepower." Christopher Bellamy, *The Evolution of Modern Land Warfare*, London: Routledge, 1990), 16.

⁷⁰Miksche, 241.

⁷¹Jean de Bloch, *The Future of War* (Boston, MA: The Athenaeum Press, 1899; reprinted in 1914 in Boston by the World Peace Foundation and in 1989 by the Combat Studies Institute, Fort Leavenworth, KS). Bloch argued that weapons capabilities would create a bloody defensive stalemate, and that the demands of war would destroy national economies.

⁷² Alvin and Heidi Toffler, "War Wealth, and a New Era in History," *World Monitor* (May 1991), 46-52. The Tofflers argued that "first wave war" dominated conflict from ancient times until the industrial revolution, and was characterized by close combat between armies of agrarian societies. The industrial revolution ushered in "second wave war" with the mass production of both war's instruments and war's destructive effects. They suggested that the 1991 Gulf War provides a glimmer of "third wave war" and that "merely to describe the Gulf War as 'high-tech war' or the 'triumph of airpower' is to trivialize what really happened."

⁷³ Luttwak, "The Operational Level of War," 213-214.

⁷⁴ William S. Lind, *The Case for Maneuver Doctrine* in Asa A. Clark et al, eds. *The Defense Reform Debate* (Baltimore, MD: The Johns Hopkins University Press, 1984), 89.

⁷⁵ Other possible names are "methodical war" or systematic war, rather than firepower or attrition. See Robert Allan Doughty, *The Seeds of Disaster: The Development of French Army Doctrine 1919-1939* (Hamden, CT: Archon Books, 1985), 91. Recently, Lind began to refer to "firepower-attrition" warfare as "methodical battle;" see Lind, "The Next Agenda: Military Reform," 49-50. Napoleon wrote "All wars should be systematic;" see *Military Maxims of Napoleon* in T.R. Phillips, ed. *Roots of Strategy* (Harrisburg, PA: Stackpole Books, 1985), 408. Also see Deighton's characterization of Montgomery's "systematic approach to war," *Blitzkrieg*, 152. Martin Van Creveld referred to "timetable war" while discussing World War I. Martin Van Creveld, *Command in War* (Cambridge, MA: Harvard University Press, 1985), 148-188. This was manifested prior to the war with complicated mobilization plans and railroad schedules, as well as during the war itself.

⁷⁶ Henry Guerlac, "Vauban: The Impact of Science on War" in Edward Mead Earle, ed. *Makers of Modern Strategy: Military Thought from Machiavelli to Hitler* (Princeton, NJ: Princeton University Press, 1941), 26-46.

⁷⁷ E.B. Potter, *Sea Power* (Annapolis, MD: Naval Institute Press, 1981), 17-22, 84. Admiral Horatio Nelson's victory at Trafalgar on October 21, 1805 was the turning point in the Royal Navy's formalist-melee debate. Prior to the battle, Nelson's orders to the fleet stressed aggressiveness and delegation of responsibility to subordinates, and stated, "But in case signals can neither be seen or perfectly understood no captain can do very wrong if he places his ship alongside that of an enemy," 78. For the next century-and-a-half, Royal Navy operations were normally characterized by Nelsonian aggressiveness; conservative tactics, such as those practiced during the indecisive Dogger Bank action on January 24, 1915, brought stinging indictments. After Dogger Bank, Admiral John Fisher argued, "He [Rear Admiral Archibald Moore] should have gone on, had he the slightest Nelsonian temperament in him, regardless of signals! . . . In war the first principle is to disobey orders. *Any fool can obey orders!*" Potter, 206 [emphasis in original].

⁷⁰ Russell F. Weigley, *The Age of Battles: The Quest for Decisive Warfare from Breitenfeld to Waterloo* (Bloomington, IN: Indiana University Press, 1991), 146.

⁷¹ Doughty, 12.

⁸⁰ See Elbridge Colby, *Masters of Mobile Warfare* (Princeton, NJ: Princeton University Press, 1943), 65-144. Colby's characterization of the Napoleonic method was far more complimentary than those of Boyd and Liddell Hart.

⁸¹ R. R. Palmer, "Frederick the Great, Guibert, Bulow: From Dynastic to National War" in Peter Paret, ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 99-100. One of Frederick's practical concerns was that dispersed troops of the era were likely to desert.

⁸² Frederick, quoted by T.R. Phillips, Introduction to *The Instruction of Frederick The Great for His Generals, 1747* in T. R. Phillips, ed. *Roots of Strategy* (Harrisburg, PA: Stackpole Books, 1985), 307.

⁸³ *Instruction of Frederick The Great*, 344.

⁸⁴ Basil Henry Liddell Hart, *The Ghost of Napoleon* (Westport, CT: Greenwood Press Publishers, 1980; first published in 1933 by Faber and Faber Limited), 128 and 120.

⁸⁵ Peter Paret, "Napoleon and the Revolution in War" in Peter Paret, ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 131.

⁸⁶ *Ibid*, 138.

⁸⁷ Liddell Hart, *Strategy*, 344.

⁸⁸ Liddell Hart, *Strategy*, 340 and *Foch, The Man of Orleans* (Westport, CT: Greenwood Press, Inc., 1939), 23.

⁸⁹ Liddell Hart developed his assessment comprehensively in *Strategy*, 339-344 and to a lesser extent in pages 208-212. The argument is most developed in *The Ghost of Napoleon*, esp 120-128, and a terse, rote version is contained in Liddell Hart's introduction to Sun Tzu, *The Art of War*, v-vii. Interestingly, in *The Real War 1914-1918* (Boston, MA: Little, Brown and Company, 1930) which was his definitive history of World War I, Liddell Hart made no mention of Clausewitz or his alleged causation of World War I, even though he created a lengthy list of culprits responsible for many of the war's mistakes. Among other factors, Liddell Hart blamed prewar neglect of military matters among civilians, Hiram Maxim's machine gun, propaganda, and strategic

imperatives such as the need to reclaim captured French territory and to relieve pressure on Russia. Even more remarkably, Liddell Hart wrote of World War I operations in ways that were reminiscent of the attitudes he elsewhere condemned in Clausewitz and the World War I generals. His post-mortem of the Somme, for example, read: "... although a military failure, July 1 was an epic of heroism, and, better still, the proof of the moral quality of the new armies of Britain who, in making their supreme sacrifice of the war, passed through the most fiery and bloody of ordeals with their courage unshaken and their fortitude established," 236. The problem at the Somme, according to Liddell Hart's book, was not the offensive frame of the Clausewitzian mind, but rather a combination of poor camouflage, disadvantageous terrain, tired troops, and (an incredible explanation, given the six-day artillery downpour) inadequate munitions that resulted in a diluted preparatory bombardment. In short, he claimed, the battle was one of missed opportunities rather than a misguided theoretical foundation, 227-248. The overall tone of Liddell Hart's book matched precisely the thoughts of World War I commanders: in every failure (which as often as not was a limited success), some problem was evident that merely needed to be rectified before another attempt was made. In most cases, the answer was to get more of something (a longer bombardment, more detailed planning, or additional reserves) and try again. Consequently, Liddell Hart's later criticisms of Clausewitz seem melodramatic and contrived. Others who have examined Liddell Hart's charges against Clausewitz have dismissed them as unfair or as having taken Clausewitz out of context. See: Bond, *Liddell Hart*, 37-51; Howard, "The Influence of Clausewitz," 41; Trevor N. Dupuy, *Understanding War: History and Theory of Combat* (New York: Paragon House Publishers, 1987), 26; and Jay Luvaas, "Clausewitz, Fuller and Liddell Hart" in Michael I. Handel, ed. *Clausewitz and Modern Strategy* (London: Frank Cass and Company Limited, 1986), 208-211.

⁹⁰ Liddell Hart, *Strategy*, 350.

⁹¹ Cecil Scott Forester, *The General* (Annapolis, MD: Nautical & Aviation Publishing Company of America, 1982; originally Boston, MA: Little, Brown and Company, 1947), 195-196.

⁹² Michael Howard, "Men against Fire: The Doctrine of the Offensive in 1914" in Peter Paret ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 510-526. The World War I emphasis on *elan* is often traced to Ardant Du Picq, a French officer who was killed during the Franco-Prussian War and who had stressed the moral element of war in *Battle Studies* trans. John N. Greely and Robert C. Cotton, reproduced in *Roots of Strategy Book 2* (Harrisburg, PA: Stackpole Books, 1987). The emphasis on *elan* was an extension of a "duality" that underlay nineteenth century views of land combat; specifically, *the bayonet school versus the shell school*; see J.F.C Fuller, *A Military History of the Western World Volume Three* (New York, Funk & Wagnalls Company, Inc., 1956), 279. A popular conception is that firepower or attrition warfare leads inevitably to greater

bloodshed; this is not necessarily the case. For example, Vauban's work on siege methods was inspired by the desire to "regularize" the taking of fortresses and to reduce bloodshed; Guerlac, 79. Also, in his *Memoirs* Montgomery frequently pointed out that British and Canadian casualties were far lower than American casualties during the Normandy campaign, even though the British faced the superior German formations.

⁹³ Clausewitz, 536.

⁹⁴ Manstein, *Lost Victories*, 367.

⁹⁵ Patton, *War as I Knew It*, 116.

⁹⁶ George S. Patton, diary entry, February 26 1945, as recorded in Martin Blumenson *The Patton Papers 1940-1945*, 648.

⁹⁷ Montgomery deplored the lack of "grip" that existed in the European theater once Eisenhower assumed the role of land commander; Montgomery, 254. He claimed that the Normandy campaign had a "closely stitched strategy" that became "unstitched" afterwards, 256. The allies should have used "the successes gained in Normandy as a springboard for a hard blow which would finish off the Germans and at the same time give us the ports we needed on the northern flank. To do these things we had to have a plan and concentration of effort; we had neither," 255.

⁹⁸ Frederick the Great identified these traits as the greatest aspects of the Prussian army in *The Instruction of Frederick The Great for His Generals*, 1747, 312.

⁹⁹ R. R. Palmer, "Frederick the Great, Guibert, Bulow: From Dynastic to National War" in Peter Paret, ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 99.

¹⁰⁰ Paret, "Napoleon and the Revolution in War," 127.

¹⁰¹ Even Patton stressed centralized control; "he endeavored with all his might to shape his men into a unit of followers, ... he wished to have an instrument perfectly tuned and available to his direction." Martin Blumenson, "Troop Control by Intuition: The Giants Had It," *Army* Volume XXXVII No. 12 (December 1987), 52-56.

¹⁰² Liddell Hart, *The Strategy of the Indirect Approach*, 202.

¹⁰³ "If Guderian's armoured divisions had been met by more skilful and resolute defenders, by a more carefully contrived strategic deployment, by a well-trained army and a civilian population which did not panic, would this gamble necessarily have come off? A very strong case can be made by those who argue that it could not." Michael Howard, "Military Science in an Age of Peace," *RUSI, Journal of the Royal United Services Institute for Defence Studies* 119 (March 1974), reproduced in *The*

Evolution of Modern Warfare (Fort Leavenworth, KS: Combat Studies Institute, 1990), 261.

¹⁰⁴ Montgomery, *Memoirs*, 235.

¹⁰⁵ Russell F. Weigley, *Eisenhower's Lieutenants*, (Bloomington, IN: Indiana University Press, 1981), 545.

¹⁰⁶ Battlegroup Peiper, for example, was an advance element of the 1st SS Panzer Division during the German assault. Its employment would seem to have been within the spirit of maneuver theory; it was a deep attack (similar to a forward detachment in Soviet doctrine) over unlikely terrain, and it certainly generated much confusion and concern among the Americans. Ultimately, however, it was whittled away, isolated, and virtually annihilated. Of some 5,800 members of the battlegroup, only 800 managed to escape; even these remnants were forced to abandon their vehicles. See Charles B. MacDonald, *A Time For Trumpets: The Untold Story of the Battle of the Bulge* (Toronto: Bantam Books, 1985), 463. See Weigley, *Eisenhower's Lieutenants*, 544-547, for a description of the debate in the Allied high command regarding how best to counter the German Ardennes offensive. Montgomery favored conservative, shallow counterattacks against the flanks and nose of the German penetration, while Patton and Eisenhower preferred a more ambitious counteroffensive across the original German lines. Ultimately, Montgomery's approach was adopted.

¹⁰⁷ See, for example, Brian Bond, "Arras, 21 May 1940: A Case Study in the Counter-Stroke" in Corelli Barnett *et al*, *Old Battles and New Defences: Can We Learn from Military History?* (London: Brassey's Defence Publishers, 1986), 61-84. This study of the British counterattack "shows that even a small and hastily improvised force . . . can deal a powerful counter-offensive stroke against an enemy who has advanced very rapidly and left vulnerable flanks or rear echelons," 82.

¹⁰⁸ Bidwell and Graham emphasized the poor communications, timid generalship, and overall lethargy, page 209. See Deighton, 162 and 169, who discusses French air force command and control problems and inadequacies in French air defenses. Liddell Hart stressed the offensive move into Belgium, calling it an ill-advised response to the German "baited gambit;" Liddell Hart, *Strategy*, 225.

¹⁰⁹ Field Marshal Erwin Rommel's string of successes in North Africa can be viewed as additional evidence to support the efficacy of *blitzkrieg*. However, he relied very heavily upon his anti-tank guns, and until the August 31, 1942 battle of Alam el Halfa (Second Battle of El Alamein) consistently concentrated his forces while the British tended to disperse theirs. According to scholars such as Pitt and Hamilton (though disputed by Barnett, this British habit was not corrected until Montgomery's assumption of command just prior to the battle. After Alam el Halfa, Rommel remained almost exclusively on the defensive, and carried this mindset with him to his later command of Army Group B in France. David

Irving, *The Trail of the Fox* (New York: Avon Books, 1977), 244-316. There, charged with the defense of the continent from the impending allied cross-channel invasion, he opted for positional defenses on the beaches, in marked contrast to von Rundstedt and Guderian who favored the retention of a strong mobile reserve. Catching one of his units practicing mobile warfare in May 1944, Rommel directed, "When they come, don't start maneuvering--just keep shooting!" Irving, 418.

¹¹⁰ Guderian, recalling the campaign in France, complained that his Panzer Group "received every day many mutually contradictory orders," Guderian, 127. This is an inevitable consequence of maneuver warfare.

¹¹¹ In World War II, this was one of the American reservations about the British peripheral strategy in the Mediterranean, particularly as regards the invasion of Italy. See Maurice Matloff "Allied Strategy in Central Europe: 1939-1945" in Peter Paret, ed. *Makers of Modern Strategy: from Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 691.

¹¹² Lind, *Maneuver Warfare Handbook*, 19. Lind further wrote that "firepower/attrition warfare uses firepower mostly . . . to reduce enemy numbers through attrition. Movement serves firepower; you move to get into a better firing position to cause more attrition." This, he argued was inferior to the maneuver conception, in which "the main role of firepower is to help you maneuver. Firepower is used most often to suppress the enemy while you move around or through him." Interestingly, in this regard Patton seems to have had the "firepower" mindset, having written, "The purpose of the movement is to get the fire in a more advantageous place to play on the enemy." Patton, *War As I Knew It*, 340.

¹¹³ Montgomery wrote that this reasoning was at the root of Operation Market Garden, and that despite its failure he remained "its unrepentant advocate" for attempting it. Montgomery, *Memoirs*, 267.

¹¹⁴ See Clausewitz, 98 and Mao Tse Tung, *On Protracted War*, reprinted in *Selected Military Writings of Mao Tse Tung* (Fort Leavenworth, KS: Combat Studies Institute, 1990; originally 1938), 230. Dennis Hart Mahan also stressed the importance of doing "the greatest damage to our enemy with the least possible exposure to ourselves" in *An Elementary Treatise on Advanced-Guard, Out-Post, and Detachment Service of Troops* (New York: Wiley and Putnam, 1847), as cited in Hagerman, 9.

¹¹⁵ This suggestion was made by Dr. Chris Gabel in a lecture at Fort Leavenworth, KS, spring 1992. As an illustration, while the movement capabilities of infantry, artillery, armor have made relatively marginal increases (with the exception of helicopter air mobility) since World War II, the firepower capabilities have changed dramatically.

¹¹⁶ Though with some reservations, Leonhard wrote that Operation Desert Storm was "fought according to classical maneuver-warfare concepts with amazing results" in *The Art of Maneuver*, 267.

¹¹⁷ See Les Aspin and William Dickinson, *Defense for a New Era: Lessons of the Persian Gulf War* (Washington, DC: US House of Representatives Committee on Armed Services, March 30, 1992). This study concluded that air power was "the most significant factor in winning the war. . . . The mass and precision of the air attack induced systemic shock and paralysis from which the political and military leadership never recovered. . . . [T]he air campaign drastically wore down the ability and the will of the Iraqi Army to fight. Iraqi ground forces were so devastated and demoralized by the time the ground war started that they lacked the conviction to fight for their own soil, much less Kuwait," 7. The study estimated that because of destruction and desertions the Iraqis had only 183,000 troops in Kuwait at the start of the ground war, thus giving the coalition forces a 5-to-1 advantage, 34. Another writer termed the ground campaign "an intriguing but essentially meaningless sequel to a fight already won." Daniel P. Bolger, "The Ghosts of Omdurman," *Parameters* Volume XXI No. 3 (Autumn 1991), 36.

¹¹⁸ This term was featured prominently in writings about AirLand Battle-Future and its doctrinal heir, AirLand Operations. See Stephen Silvasy, Jr., "AirLand Battle Future: The Tactical Battlefield," in *Military Review* Volume LXXI No. 2 (February 1991), 2-12 and John Gordon IV, "Operation Crusader: Preview of the Nonlinear Battlefield" in the same issue, 48-61. Also see *TRADOC PAM 525-5 AirLand Operations* (Fort Monroe, VA: Training and Doctrine Command, 1 August 1991) which predicts nonlinear battlefields and claims that nonlinear conditions should be pursued, 12-15. J.F.C. Fuller had discussed this concept in 1932 when he predicted that linear tactics would be replaced by "area tactics." He also predicted that combat on land would become similar to that at sea. J.F.C. Fuller, *Lectures on F.S.R. III (Operations Between Mechanized Forces)* (London: Sifton Praed & Co., Ltd., 1932), 15 and 39. Also reprinted with Fuller's subsequent annotations as *Armored Warfare* (Harrisburg, PA: The Military Service Publishing Company, 1943). Note, however, that even naval battles retain some degree of linearity; in addition to convoys and battle formations, flanks and rears exist, although tactically they may be in a dynamic state of change. Operational and strategic bases of operations, however, tend to be fixed, and this can affect the conduct of engagements. Combat on land as well as at sea involves with varying degrees of uncertainty, the positions of three variables--the unit, friendly units, and the enemy. These variables are superimposed upon a geographical battlefield, whose characteristics are generally more significant in land combat than in battles at sea. Success may favor the side that can determine with greater precision the locations of the three variables and that can first give a linear structure to its operations.

¹¹⁹ Longitudinal linearity is inversely proportional to the tooth-to-tail ratio. As forces become heavier with combat service support, lines of supply become increasingly critical. A possible exception to the trend towards greater longitudinal linearity might be guerrilla forces; nonetheless, even these forces rely on some type of base camp.

¹²⁰ Deighton, *Blitzkrieg*, 153-155 and Miksche's description of the organization of panzer divisions, 100-123. Also see Bidwell and Graham, *Firepower*, who contrasted the German combined arms formations with British tank-pure units, 215.

¹²¹ This force structure controversy was illustrated in the American Army in the 1930s. The Commander of Army Ground Forces, General Lesley McNair, favored the "streamlining" of organizations and the "pooling" of assets that would see only occasional use by a unit. This was opposed by others, notably General Jacob Devers, who favored more robust organizations at lower levels. Lewis I. Jeffries, "A Blueprint for Force Design," *Military Review* Volume LXXI No. 8 (August 1991), 22-23.

¹²² J.F.C. Fuller, *The Reformation of War* (London: Hutchinson & Co., 1932), 25 as cited in Luvaas, "Clausewitz, Fuller and Liddell Hart," 199. See also Messenger, *The Art of Blitzkrieg*, 45.

¹²³ Deighton, 112.

¹²⁴ Bidwell and Graham, 171.

¹²⁵ Fuller, *Lectures on F.S.R. III (Operations Between Mechanized Forces)*, 1943).

¹²⁶ Simpkin, *Race to the Swift*, 19-23; also see 93-115 for a fuller development of "leverage" and the relationship between the holding force and maneuver force. With his concept of a hinge connecting the holding force and the maneuver force, a better analogy might be that of a nutcracker.

¹²⁷ Mikhail Tukhachevskiy, *New Problems in Warfare* (Reprinted Carlisle Barracks, PA: US Army War College, 1983) and V.K. Triandafillov, *Nature of the Operations of Modern Armies* (Moscow: State Publishing House, 1929).

¹²⁸ Department of the Army, *FM 100-2-1 The Soviet Army: Operations and Tactics* (Initial Coordinating Draft) (Fort Monroe, VA: HQ TRADOC, 1989), chapter 2. Soviet military thought crystallized during World War II with an emphasis on echelonment and fire superiority which on occasion reached a 35-to-1 advantage in artillery tubes and rocket launchers; Messenger, *The Art of Blitzkrieg*, 210-214.

¹²⁹ L.D. Holder, "Operational Art in the US Army: New Vigor" in *Essays on Strategy III* (na) (Washington, D.C.: National Defense University Press,

1986), 113. See also the September 1990 issue of *Military Review* which featured nine articles on the operational level of war.

¹³⁰ L. D. Holder, "Training for the Operational Level," *Parameters* (Spring 1986), 7.

¹³¹ For reservations about the uniqueness of operational warfighting and the plethora of terminological conceptions concerning operational art, see Lloyd J. Matthews, "Operationese Mania: Thoughts and Second Thoughts," *Army* Volume XXXVII No. 2 (February 1987), 19-25. Matthews argued that "there are and can be only the two traditional levels of war because these two exhaust the possibilities. There is strategy--the planning, allocation of forces, provisioning of forces and positioning of forces pursuant to the fighting which will achieve national goals; and there is tactics--the application of fire and the maneuver of forces that together comprise the fighting itself. Military strategists *arrange* the war--military tacticians *fight* it. Thus, what *FM 100-5* (1982) calls the 'operational level of war' is not and cannot be a third level of war having its own unique essence. Any purported new level must necessarily be a subset of strategy or tactics or some combination of the two."

¹³² Christopher Bellamy, *The Future of Land Warfare* (New York: St. Martin's Press, 1987), 105.

¹³³ Jomini, *Summary of the Art of War*, 494. J.F.C. Fuller defined grand tactics as "the organization and distribution of the fighting forces themselves in order to accomplish the grand strategic plan [G]rand tactics is concerned more with disorganization and demoralization than with actual destruction, which is the object of tactics. *Grant and Lee: A Study in Personality and Generalship* (London: Eyre and Spottiswoode, 1932), 258-259.

¹³⁴ US Army, *FM 100-5, Operations* (Washington, DC: Headquarters, Department of the Army, 1986), 10. The United States Marine Corps' *FMFM 1-1, Campaigning* similarly states that at the operational level "the results of individual tactical actions are combined to fulfill the needs of strategy," 3.

¹³⁵ Ronald M. D'Amura, "Campaigns: The Essence of Operational Warfare," *Parameters* Volume XVII No 2 (Summer 1987), 42-51.

¹³⁶ Among other criteria, Simpkin stipulated that to qualify as "operational" the mission must be "one remove, and one remove only, from an aim which can be stated in politico-economic terms (in other words from a strategic aim)," *Race to the Swift*, 24.

¹³⁷ In the first raid on March 28 1942, the destroyer *Campbeltown* intentionally rammed the drydock gate in St. Nazaire while commandos debarked from motor launches to conduct raids on shore. Loaded with explosives, the destroyer blew up on the next day and destroyed the

gate. The British deduced that by disabling the only French drydock large enough to accommodate the *Tirpitz*, the ship would remain in its Norwegian port and not attempt to break out to the Atlantic. A year later, the *Tirpitz* was severely damaged when the crews of two midget submarines planted mines under the ship's hull. For a summary of commando operations see Peter Young *Atlas of the Second World War* (New York: Berkley Publishing Corporation), 270-273.

¹³⁸ William P. Baxter, *Soviet AirLand Battle Tactics* (Novato, CA: Presidio Press, 1986), 28.

¹³⁹ FM 100-5, 10.

¹⁴⁰ Bellamy, *The Future of Land Warfare*, 145.

¹⁴¹ Simpkin, for example, mentioned an "operational depth" that existed between 35 and 60 kilometers behind the defender's front lines, *Race to the Swift*, 42.

¹⁴² D'Amura wrote that campaigns are "the indivisible component," 42. Lind, however, wrote that operational art is the "art of using tactical events--battles or refusals to give battle--to strike *directly* at the enemy's strategic center of gravity [emphasis in original]." *Maneuver Warfare Handbook*, 24. This means-oriented conception is less stringent than one which holds that operational art is determined by campaigns. Later, however, he was to write that this conception using tactical events was essentially the same as conducting campaigns; "The Next Agenda: Military Reform," 49. *FMFM 1-1, Campaigning* stressed that the operational level of war is "the discipline of campaigning," 7; the campaign was also described as the operational commander's "principal tool" and "principal weapon," 25 and 33.

¹⁴³ Luttwak, "The Operational Level of War."

¹⁴⁴ *Ibid.*, 220-222.

¹⁴⁵ *Ibid.*, 218.

¹⁴⁶ James J. Schneider, "Theoretical Implications of Operational Art" in *Military Review*, Volume LXX, No. 9 (September 1990), 21.

¹⁴⁷ Although no one to my knowledge has made an explicit argument for this relationship, one might draw this inference from the wealth of articles on the importance of deep attack in *Military Review* in recent years. See Donn A. Starry, "Extending the Battlefield" (March 1981), 31-50; Thomas A. Cardwell, "AirLand Battle Revisited" (September 1985), 4-13; John S. Doerfel, "The Operational Art of the Air Land Battle" (May 1982), 3-10; and Holder, "Maneuver in the Deep Battle" (May 1982), 54-61. Deep attack might best be viewed as an investment that seeks a larger long-term payoff of committed assets, rather than a smaller, short-term payoff. Attack helicopters committed against a second-

echelon unit in march formation could achieve greater destruction than if they were used against deployed first echelon forces; the benefit from this commitment, however, will not be as immediate.

¹⁴⁸ Examples of operational science might include Soviet operations on the eastern front, Montgomery's approach, of which his North African campaign provides the best example, strategic bombing campaigns, the RAF's defense during the Battle of Britain and, to a certain extent, guerrilla warfare because of its systematic, patient method.

¹⁴⁹ Clausewitz, 149

¹⁵⁰ *Ibid.*

¹⁵¹ *Ibid.*, 148.

¹⁵² Department of the Army, *TRADOC PAM 11-9: Blueprint of the Battlefield* (Fort Monroe, VA: Army Training and Doctrine Command, 27 April 1990.)

¹⁵³ Indeed, an overabundance of supplies can be as crippling as scarcity can be if it creates logistical congestion.

¹⁵⁴ German *blitzkrieg* forces typically carried three to five days of supply on hand in order to carry out extended deep penetrations. Deighton, 124.

¹⁵⁵ Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge, England: Cambridge University Press, 1977), 232

¹⁵⁶ Fuller, *Lectures on F.S.R. III*, 48.

¹⁵⁷ In his memoirs, Patton expressed a willingness to drain the fuel from three-quarters of his tanks so that the remaining quarter could continue. He also mentioned the use of captured German supplies and weapons. Patton, *War As I Knew It*, 124 and 176.

¹⁵⁸ Hooker, "Redefining Maneuver Warfare," 52.

¹⁵⁹ See Keith D. Gordon, *Field Artillery: Lending a Touch of Class at the Operational Level* (Fort Leavenworth, KS: SAMS MMAS Monograph, 1989).

¹⁶⁰ These are primarily military police units and "tactical combat forces" (TCFs) which are combat units tasked to provide rear area security.

¹⁶¹ As an example, the framework contained in the *Blueprint of the Battlefield* contains a hierarchy of six Operational Operating Systems, 28 subordinate functions, and 73 sub-functions. To the extent that this framework is applied rigorously, operational science is being employed, rather than operational art.

¹⁶² A logical inconsistency of maneuver theory is that subordinate commanders should be free to operate within an overall "commander's intent," however, in maneuver warfare the commander's intent should be expected to change frequently, based upon unfolding circumstances.

¹⁶³ Bidwell and Graham, *Firepower*, 218 and 248.

¹⁶⁴ As Bidwell and Graham note, the creation of a systematic information flow is the "first step" towards defeating the *blitzkrieg*; *Ibid.*, 220.

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