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IN THE TWENTY-FIRST CENTURY

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

STEVEN D. RUSSELL, MAJ, USA
B.A., Ouachita Baptist University,
Arkadelphia, Arkansas, 1985

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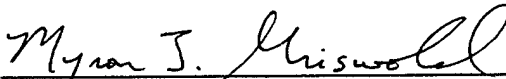
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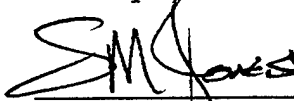
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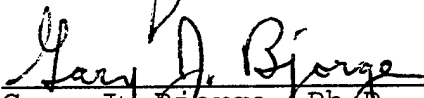
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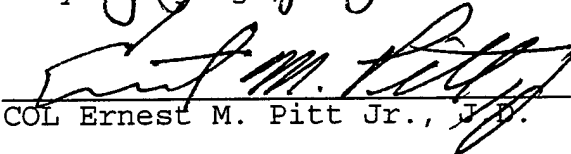
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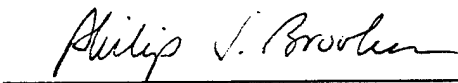

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff college or any other government agency. (References to this study should include the foregoing statement.)

ABSTRACT

PICKING THE RIGHT HORSE? DOMINANT MANEUVER IN THE TWENTY-FIRST CENTURY by MAJ Steven D. Russell, USA, 166 pages.

This study investigates the likelihood of heavy forces being able to conduct dominant maneuver in the twenty-first century. The concept is based upon Army Vision 2010 and establishes the relevance of indirect maneuver to help identify issues facing the U.S. Army today.

The current heavy armored force relies predominately upon the direct maneuver approach. At issue is the appropriateness of future maneuver forces being developed based upon this force and a direct maneuver model. A thorough review of maneuver literature reveals that forces relying on the direct maneuver approach often fail when encountered by forces employing indirect maneuver.

A hypothesis is developed predicting that heavy forces are insufficient to conduct future dominant maneuver. Three historical case studies are used to test the hypothesis. The analysis confirms that mobility, speed differential, and deployability are trends of success. Absent these, even technology and firepower are insufficient to generate success.

A discussion of the implications and an air maneuver alternative is offered, as are suggestions for additional research. The study promotes the development of future forces based upon maneuver principles, and provides an alternative force that theoretically would meet the requirements of future dominant maneuver.

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To my Lord and Savior Jesus Christ, who outmaneuvered them all at Calvary.

TABLE OF CONTENTS

	Page
APPROVAL PAGE	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	iv
LIST OF ILLUSTRATIONS	vii
CHAPTER	
1. INTRODUCTION	1
Maneuver is Affected by Force Structure . .	3
Indirect and Direct Paths to Maneuver . . .	5
Indirect Maneuver and the Heavy Armored Force	11
The Heavy Armored Force's Role in Future Maneuver	13
2. MANEUVER THEORISTS AND IMPLICATIONS FOR THE FUTURE	20
Ancient Western Maneuver Theory	22
Maneuver Theory in the Middle Ages	24
Maneuver Theory in the Age of Reason . . .	25
Napoleonic Era Maneuver Theory	27
Maneuver Theory in the Twentieth Century. .	34
Speculations on Future Maneuver	44
3. MANEUVER VARIABLES AND CASE HISTORIES	58
The Variables	59
Reliability	63

The Case Studies	64
4. ANALYSIS AND NATURE OF AN IDEAL MANEUVER FORCE	69
The Russo-Finnish War	70
The Battle for France	89
The Yom Kippur War	103
Summary of the Analysis	118
5. CONCLUSIONS	123
The Results	124
Ramifications of the Findings	136
The Ideal Maneuver Force	142
An Alternative--The Air Maneuver Brigade .	145
Emerging Research Issues	153
BIBLIOGRAPHY	159
INITIAL DISTRIBUTION LIST	163

ILLUSTRATIONS

Figure	Page
1. Indirect Maneuver at Ai	6
2. Direct Maneuver at Cannae	8
3. Simpkin's Maneuver Model	45
4. 1940 Maneuver Model	47
5. 1990 Maneuver Model	48
6. Soviet Strategy of Attack	72
7. Battles at Suomussalmi	78
8. The Opposing Plans for the Western Campaign . .	91
9. The Opposing Plans, Yom Kippur, 1973	106
10. Relationship of Variables to Success in Battles	118
11. Maneuver Model for 2010	143
12. The Air Maneuver Brigade--Stage One	146
13. The Air Maneuver Brigade--Stage Two	152

CHAPTER 1

INTRODUCTION

Nothing is more difficult than the art of maneuver. What is difficult about maneuver is to make the devious route the most direct and to turn misfortune into advantage.¹

Sun Tzu, *The Art of War*

The concept of maneuver is perhaps the most essential component of military action, yet few concepts have more varied definitions within the profession of arms. Maneuver in the simplest of terms is finding a way to give an opponent a sucker punch that lets the wind out of his sails and leaves him to concede the contest or face even more punishment. In military terms, the issue becomes clouded. The U.S. Department of Defense has no less than four maneuver definitions further refined at three different levels.² The U.S. Army adds another only to explain it in five different forms.³ Over the ages of military thought, maneuver has grown from a concept of the sucker punch to a complex choreography of dancing on the mat, being able to suffer the opponent's blows, and when everything is just so, pinning him against the ropes and delivering the knockout punch directly to the temple.

Taking these definitions of maneuver together, it seems that the U.S. Army has focused on a direct approach

to maneuver. In this line of thinking, a successful outcome of maneuver usually involves the destruction or annihilation of the enemy force. This would be accomplished by first fixing an opponent as the primary means to conduct later maneuvers that place him at a disadvantage.

The possibility that a decision could be obtained by maneuver means other than fixing often appears to have not been explored. Potentially, this focus has caused the retention of organizations and equipment without regard to the fundamentals of maneuver developed over the ages of military thought. Additionally, this focus seems to have disregarded what land forces should look like when applied to those fundamentals.

In a concept moving away from direct maneuver thinking, the Army is mapping out its future direction with a term called "dominant maneuver." At the joint service level, dominant maneuver is defined as the multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space forces to accomplish assigned operational tasks.⁴ The Army's contribution at the operational level is having the capability to force the enemy to give in to its will or to face the threat of total

destruction. Likewise, threatening this use of force in such a precise manner without having to completely destroy the enemy will also cause his collapse. Either way, the enemy becomes convinced that resistance only results in his destruction.⁵

Considering the twenty-first century, it appears solutions to maneuver problems are sought in technology and especially information, rather than in a critical analysis of the maneuver doctrine needed to bring about success against a variety of land forces in a variety of environments. Of particular concern for this research is that, as the U.S. Army experiments with the future force, it seems to have already settled on organizations developed around heavy armored forces that may not be best suited for the Army's future vision or its future maneuver requirements.⁶

Maneuver Is Affected by Force Structure

The idea of adjusting existing forces or creating new ones for the future may be foolish if done without maneuver in mind. Maneuver is arguably the single greatest decisive element in the conduct of warfare and should be the driving force behind new organizations. Yet the U.S. Army's posture statement to Congress for 1998 boldly stated that

"information dominance is the objective of the Army's modernization strategy."⁷ General Dennis J. Reimer confirmed as much when speaking of the Advanced Warfighting Experiment (AWE) at Fort Irwin, California, conducted in March of 1997, "[The AWE] achieved its objective of providing a realistic opportunity to test how our soldiers and available technology can move us toward the next generation of military forces."⁸ Rather than developing a force based on maneuver capabilities enhanced by technology, the Army seems to be focusing on technology alone. Will the Army have heavy equipment and maneuver concepts that sufficient to meet twenty-first century battlefield requirements?

For example, the U.S. Army today has its predominant land power built around heavy forces with three out of every five ground maneuver brigades being armored or mechanized infantry.⁹ While heavy forces once enjoyed advantages in speed, protection, and firepower over conventional infantry-based forces, today these capabilities offer no real advantage over potential opponents. The United States' most significant adversaries possess heavy units as the mainstay of their armed forces. While on the surface this seems to confirm a need for heavy forces to counter enemy armored threats, insignificant

consideration seems to have been given about whether there might not be a better way to wage warfare against such forces at the operational and tactical levels. Of concern is that the U.S. Army may be attempting to maneuver in the next century using organizations and military thought that are likely out of date.

Even though maneuver principles should be timeless, each generation seems to redefine them based on the technologies of the day. Fundamentally, maneuver is about gaining indirect access to an opponent, where he is weak, while at the same time, giving the appearance of attacking directly where he expects the attack to come.¹⁰ As man has perfected warfare throughout the ages, the evidence suggests that the greatest success lies in adherence to this fundamental concept of indirect maneuver. As the U.S. Army assesses the future needs and capabilities of its forces, it would do well to reconsider the basics.

Indirect and Direct Paths to Maneuver

One of the earliest ancient military tacticians to write on the essence of maneuver was Sun Tzu, who lived and wrote in China around 500 B.C. Sun Tzu speaks of maneuver as the "strategy of the indirect and direct."¹¹ The indirect is enhanced by enticing an opponent with bait on

the direct approach. This does not imply the need to fix enemy forces on the direct approach, but rather suggests the positioning of friendly forces in such a way that the enemy is going to willingly take the direct approach, only to be left vulnerable via an indirect means. This can best be done through deception, array of forces, and surprise.

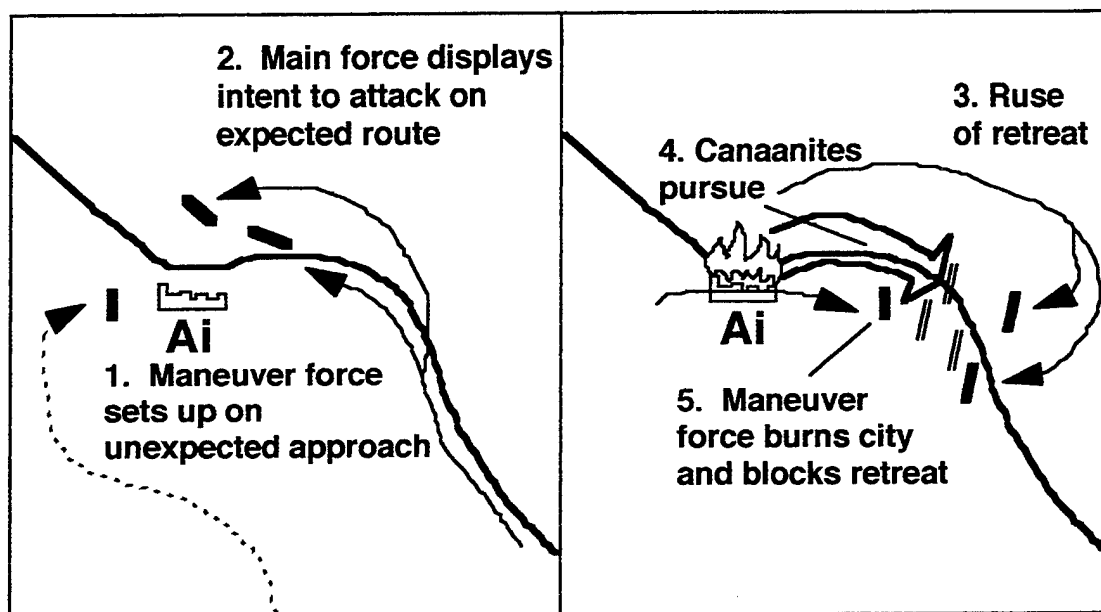


Figure 1. Indirect Maneuver at Ai

Indirect maneuver was demonstrated even before Sun Tzu captured the idea of indirect tactics in *The Art of War*. Joshua, son of Nun, in 1451 B.C., set out to destroy the Canaanite stronghold at the city of Ai. To do so he maneuvered a force on an unlikely route while giving the appearance of battle along the expected route (figure 1,

steps 1 and 2). He tricked the Canaanites with a fake withdrawal (step 3) and when they pursued (step 4), the indirect force entered and burned the city (step 5). Seeing their city in flames and faced with battle in front and rear, they suffered complete moral and physical defeat, leading to their eventual destruction as a people.¹² This is but one example of indirect maneuver. Once the enemy commits to the direct approach, the indirect becomes advantageous for the friendly force.¹³

Unfortunately, the idea of indirect maneuver, while used, was not as popular as the direct maneuver approach in Western military development. Indeed, Sun Tzu's writings were only discovered by military professionals in the twentieth century.¹⁴ Western maneuver thinking had its roots in the Greco-Roman martial arts. The idea of Greeks smashing directly through enemy formations with their heavy infantry phalanx and of the Roman legions that replaced them continues to have considerable influence on Western ideas about maneuver.

To illustrate the point, one of the best examples of the direct approach of maneuver during the ancient Western period is the Battle of Cannae in 216 B.C. Using an inverted V, Hannibal fixed the opposing Roman legions in the center (figure 2, step 1). Then, after intentionally

collapsing under the weight of the enemy's blows (step 2), he unleashed his heavy infantry and cavalry on the flanks and rear (step 3). It was an example of a smaller force fixing frontally to create the desired effect of maneuver on the flanks. Ernest R. Dupuy noted, "The Battle of Cannae was the high-water mark of Hannibal's career; it has provided military theorists with a symbol of tactical perfection."¹⁵ So devastating was the destruction, so complete was the victory, that fixing forces, as at Cannae, seems to have become synonymous with classic maneuver.

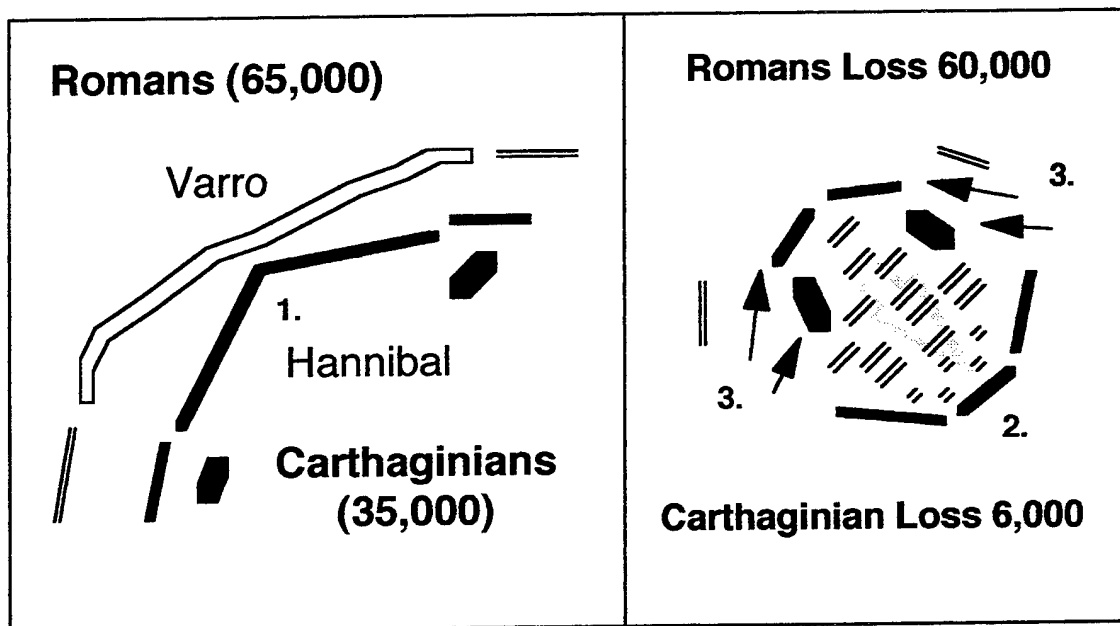


Figure 2. Direct Maneuver at Cannae

Historian Victor D. Hanson contends that "Cannae has exerted an almost narcotic spell on military men for two millennia."¹⁶ Hanson contends that commentators and theorists from Rome's Publius to Prussia's Clausewitz have been mystified to the point of developing treatises and tactics that support the battle of envelopment, largely by the Cannae fixing model.¹⁷

After Napoleon, battles of envelopment grew into battles of annihilation. Strategies of the indirect fell victim to strategies of the direct, with the object being the attrition and eventual annihilation of the enemy force. The influence of Cannae on Western military thought seems to have planted the seeds for Clausewitzian maneuver theory, which emphasized careful fixing movements followed by a battle of annihilation. Basil Liddell Hart argues that because of the late availability of Sun Tzu's work resulting in a lack of indirect thought in Western professional militaries, maneuver thought became skewed on the Clausewitzian principles of annihilation.¹⁸

Civilization might have been spared much of the damage suffered in the world wars of this century if the influence of Clausewitz's monumental tomes *On War*, which moulded European military thought preceding the First World War, had been blended with and balanced by a knowledge of Sun Tzu's exposition on 'The Art of War'....The clarity of Sun Tzu's thought could have corrected the obscurity of Clausewitz's....By the time later translations of Sun Tzu's were produced in the

West, the military world was under the sway of the Clausewitz extremists, and the voice of the Chinese sage had little echo.¹⁹

The results of one hundred years of conflict after Clausewitz seem to bear this out, with such battles as Sevastopol, Sedan, and the Campaign of 1914 coming to mind.

Indeed, maneuver doctrine published in the U.S. Army in 1993 as FM 100-5, *Operations*, is virtually a direct reflection of the Cannae battle. To envelop is to:

Fix the defender's attention forward through a combination of fires and supporting diversionary attacks while [the attacker] maneuvers his main effort to strike the enemy's weak flanks and rear. The attacker needs to be agile enough to concentrate his forces and mass his combat power effects before the enemy can reorient his defense...A direct-pressure force maintains contact with the enemy, preventing his disengagement and reconstitution. It attempts to inflict maximum casualties. Meanwhile, an encircling force maneuvers to envelop the enemy, cutting his escape routes.²⁰

Of the five forms of U.S. Army maneuver (envelopment, turning movement, infiltration, penetration and frontal attack), three are directly related to fixing and destruction through firepower. Penetration is defined as massing "sufficient combat power at the point of penetration to overwhelm the enemy and gain the advantage."²¹ A frontal attack is described as not always advantageous but recommended as "an appropriate form of maneuver to be used by a fixing force as a supporting attack to an envelopment."²² The envelopment, according to

current maneuver doctrine, relies on fixing, firepower, and agility to effectively maneuver.²³

Of the remaining two forms of maneuver, only the turning movement implies that a decision can be reached without the need to fix and overwhelm the enemy with direct maneuver firepower. A force maneuvering this way strikes where the enemy is unprepared. The enemy is forced to "abandon his prepared defense and attack in an undesirable direction and at a time of his opponent's choice."²⁴

From these definitions, one could conclude that U.S. Army doctrine defines maneuver mostly as a battle of fixing, destroying and moving, rather than turning an enemy out of his position without fixing him. Recent U.S. Army symbology even provides specific graphic symbols for fixing and attacking by fire, to further promote clarity in use of direct approach maneuver.²⁵

Indirect Maneuver and the Heavy Armored Force

What is most surprising is that this current direct maneuver approach of fixing, destroying, then moving appears to be associated with the very force that seems to define Sun Tzu's indirect maneuver in action--the armored force. Upon its introduction in the First World War, the armored force was designed for maneuver via the direct

approach using frontal attack and penetrations.²⁶ In its original form, the armored force essentially enabled dismounted maneuver by destroying machine-gun positions and by allowing the infantry to advance through the holes thus created.²⁷ By the 1940s, however, armored forces grew into fast mobile elements designed more for speed and turning movements than fixing and destroying enemy formations.²⁸

The Second World War brought many lessons about the use of heavy armored forces, and few could question the validity of having armored units conduct indirect decisive maneuver.²⁹ This application of indirect maneuver was so shocking to the world that many treated it as if it were something completely new in warfare. Armored forces were fast and hard hitting, could take advantage of breakthroughs, and could collapse an enemy defense through maneuver without getting bogged down in costly, time-consuming attrition battles. Consequently, in the Cold War buildup, numbers of armored units defined predominate land powers. Third World countries at the time demonstrated the viability of armored forces to achieve such amazing, quick victories as those in the Middle East. By the 1970s, the major world powers and their aligned partners built strong forces of armored units, forming the basis of their

decisive maneuver force. This development resulted in many nations having similarly capable maneuver forces.

As major and even Third World powers built predominately heavy units as their armies' primary maneuver force, a change occurred in the maneuver capabilities of that force. Instead of using armored forces in the indirect role, the U.S. response in their use became one that applied overwhelming firepower to destroy the enemy force, thus creating the desired movement for the friendly forces. In other words, the force that was once almost exclusively an indirect maneuver capability in World War II seems today and in the future to have become a very direct capability for fixing and destroying the enemy, then moving. Technological improvements associated with armored vehicles seem to confirm this emphasis on direct maneuver, as shown further in chapter 2. The advancements for future systems that will enable the Army's vision of dominant maneuver are based on the foundation of the present heavy force which is focused on direct maneuver capabilities.

The Heavy Armored Force's Role in Future Maneuver

Doctrinally, tanks and armored fighting vehicles will likely remain the main force for decisive maneuver in the

near future, largely due to replacement realities. The current fielding plans of U.S. Army improved Abrams and Bradleys are scheduled out as far as the year 2010 for the total force, with service expected beyond this date.³⁰

Future use of heavy armored forces appears to be predominately along the direct approach of maneuver. The April 1997 draft of the U.S. Army's operations manual goes so far as to suggest that maneuver cannot be done without fixing.³¹ Even the stated purpose of the U.S. Army's main battle tank stresses less about maneuver and more about closing with and destroying enemy forces through firepower and shock effect.³² Additionally, the U.S. Army has clearly stated that its future organizations will be built around the Force XXI concepts embodied in the experimental heavy force.³³ The minds of those mapping out the future Army seem to be already made up. This maneuver mentality, coupled with a force focused upon direct maneuver, may prove to be the limiting factor in the U.S. Army's dominant maneuver capability of the twenty-first century.

While the Army senior leadership has identified a need to lighten up the heavy forces and heavy up the capabilities of the light forces, the more fundamental issues about how best to enable decisive operations seem to have been overlooked.³⁴ Instead, the focus is on means to

make armored forces deployable for operational level missions and technological advancements that enhance the ability of heavy forces to fix and destroy an enemy. Very little discussion is given about the shortcomings of U.S. Army application of maneuver and what forces would best conduct decisive operations in all environments. The lot of the future force seems to have been prematurely cast on the heavy force and with it, the preference for maneuver along the direct approach. The indirect maneuver approach appears to be drifting further and further from the heavy forces' capability. The question is, Is there a better way?

Can heavy armored forces enable dominant maneuver in the twenty-first century? A recent National Defense Panel cast serious doubt on the issue. The panel stressed that the future force must be more nimble in maneuvering around the battlefield.³⁵ It questioned the continued upgrade of heavy combat vehicles beyond their current capabilities. Most telling were the statements that "lighter, more agile forces will play a key role in future combat. Fewer armored forces will be needed. They are simply too heavy to get into the fight in a timely manner."³⁶

Is there a problem with the disproportionate focus on the direct maneuver approach in the future force? Are

heavy forces incapable of future indirect maneuver? Are there current capabilities which could better meet the requirements of the Army's vision for its future force? These are the questions addressed in the following chapters.

The relationship of the Army's vision of dominant maneuver and indirect maneuver will next be explored. By examining the indirect maneuver capabilities of the present and planned armored force, then comparing that force to findings from a nonstatistical analysis of historical case studies, some surprising conclusions may be revealed. The focus is predominately on the operational level of fighting with strategic and tactical emphasis used only in clarifying the importance of indirect maneuver to the operational level of fighting. The goal of this research is to demonstrate that what the Army expects of its future force may not match the current path taken and as such, what alternatives are available.

¹Samuel B. Griffith, *Sun Tzu: The Art of War* (New York: Oxford University Press, 1963), 102.

²Department of Defense, *JP Pub 1-02* (Washington, DC: Government Printing Office, 1997), 321 states:

maneuver--(DOD, NATO) 1. A movement to place ships or aircraft in a position of advantage over the enemy. 2.

A tactical exercise carried out at sea, in the air, on the ground, or on a map in imitation of war. 3. The operation of a ship, aircraft, or vehicle, to cause it to perform desired movements. 4. Employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage in respect to the enemy in order to accomplish the mission.

³U.S. Army, FM 100-5, *Operations* (Washington, DC: Government Printing Office, 1993), 7-11, states, "**FORMS OF MANEUVER**--The forms of maneuver are envelopment, turning movement, infiltration, penetration, and frontal attack. Commanders use these forms of maneuver to orient on the enemy, not terrain."

⁴U.S. Army, *Army Vision 2010* (Washington, DC: Government Printing Office, 1996), 11.

⁵*Ibid.*, 12-13.

⁶Association of the United States Army, "Washington Report: NDP Calls for 'Lighter, More Agile Forces,'" *Army*, January 1998, 5.

⁷U.S. Army, *United States Army Posture Statement for FY98* (Washington, DC: Government Printing Office, 1997), 40.

⁸Dennis J. Reimer, "Preparing Now to Meet 21st Century Challenges," *Army*, October 1997, 28.

⁹Association of the United States Army, "Command and Staff Directory," *Army*, October, 1997, 193-206.

¹⁰FM 100-5, 1993, 2-2, see discussion on Army Capabilities and Balance.

¹¹Griffith, 102.

¹²Joshua 8:1-29 KJV (King James Version of the Bible); Chaim Herzog and Mordechai Gichon, *Battles of the Bible* (London: Greenhill Books, 1997), 48-53. Herzog was a former president of Israel and is also a renown scholar of ancient military history.

¹³Griffith, 102-110, *passim*.

¹⁴Griffith, vi.

¹⁵Ernest R. Dupuy, and Trevor N. Dupuy, *The Encyclopedia of Military History from 3500 B.C. to the Present* (New York: Harper & Row, 1977), 68.

¹⁶Victor D. Hanson, "Cannae," *Military History Quarterly* 2, no. 4 (1990): 60.

¹⁷Ibid.

¹⁸Griffith, vii.

¹⁹Ibid., vii-viii.

²⁰FM 100-5, 1993, chap. 7, p. 11.

²¹Ibid.

²²Ibid.

²³Ibid., 12.

²⁴Ibid.

²⁵U.S. Army, FM 101-5-1, *Operational Symbols, Terms and Graphics* (Washington, DC: Government Printing Office, 1997), 3-14, 3-31.

²⁶Kenneth Macksey, *Tank versus Tank* (Topsfield: Salem House Publishers, 1988), 14.

²⁷Ibid.

²⁸Ibid., Chapter 3, *passim*.

²⁹Kenneth Macksey, *Tank Force: Allied Armor in World War II* (New York: Ballantine Books, Inc., 1970), 159.

³⁰Johnnie E. Wilson, "AMC: Developing Technology for a Full-Spectrum Force," *Army*, October, 1997, 57-58.

³¹FM 100-5, 1997, III-3-6. April 1997 Draft Version.

³²Association of the United States Army, "Decisive Operations: Army Weapons Equipment and New Technology," *Army*, October, 1997, 259.

³³Togo D. West, Jr., "America's Army Meets the New Millennium," *Army*, October, 1997, 16.

³⁴Association of the United States Army, "Washington Report," 5.

³⁵*Ibid.*

³⁶*Ibid.*

CHAPTER 2

MANEUVER THEORISTS AND IMPLICATIONS FOR THE FUTURE

To see victory only when it is within the ken of the common herd is not the acme of excellence. Nor is it the acme of excellence if you fight and conquer and the whole empire says, "Well done!"¹

Sun Tzu, *The Art of War*

In spite of some generational fads about tactics, maneuver theory over time provides reliable and useful criteria to analyze not only current capabilities, but future potential as well. As alluded to in chapter 1, the writings of maneuver theorists throughout the ages consistently show the inadequacies of forces whose primary capabilities lie in direct maneuver. In the struggle to define future maneuver capabilities, the U.S. Army cannot afford to rely on assurances that the current armored force is adequate because it has performed well in the past. Neither should it accept that merely physical and technological modifications to the armored force will enable better maneuver in the future. The maneuver theorists of two millennia, with a few notable exceptions, seem to substantiate that a direct maneuver force cannot consistently obtain victory.

Take for example Sun Tzu's treatise on the art of war. The object of war is not to destroy the enemy force in

battle but rather to conquer the enemy's will to resist without extensive fighting.² "In the practical art of war," he says, "the best thing of all is to take the enemy's country whole and intact; to shatter and destroy it is not so good. So, too, it is better to capture an army entire than to destroy it, to capture a regiment, a detachment, or a company entire than to destroy them."³ To hasten this enemy collapse, Sun Tzu advocates indirect maneuver to achieve victory.

While Sun Tzu allows that all men can produce individual tactics that may win a battle, few can develop the maneuver necessary to obtain total victory.⁴ "Use maneuvers direct and indirect. In all fighting, the direct method may be used for joining battle, but indirect methods will be needed in order to secure victory."⁵ He likens this application of maneuver to the relationship of water and rocks. As the water flows where the rocks are not, so a force should maneuver around strength, pursuing a course that bypasses resistance.⁶

Sun Tzu believed that victory was obtained by indirect maneuver. Primarily, this involves attacking where the enemy does not expect. To assist in this, the enemy is baited to commit forces to places he is obliged to defend.⁷ When the enemy commits, he can be exploited. Sun Tzu shows

that the enemy commits himself rather than *is held* by the common direct method of fixing. He saw that indirect maneuver had a relationship with direct maneuver but spoke of the direct approach with caution and at times, scorn. Nowhere in his work is direct maneuver advocated to achieve decisive results. Sun Tzu's work is useful today as the principles of indirect maneuver find contemporary application.

Ancient Western Maneuver Theory

To seek application of maneuver principles from western sources during the same period as Sun Tzu is not easy. Very little written record exists from either Greek or Roman maneuver theorists; surprising, when one considers their military successes. While Hannibal has been called the "father of strategy" neither he nor Alexander, that preceded him, wrote down anything on the art of war.⁸ The ancient record of the time does not illustrate any other leaders' perspectives either. Historian R. Ernest Dupuy noted that, "Between the time of Julius Caesar and Julian, no leading soldier wrote about his experiences. Nor did any other first-class historian bother to describe the combat of his times. As a result, the tactical details of operations in the four-century period from 50 B.C. to A.D.

350 are quite obscure."⁹ What military knowledge that was passed down was gleaned from surviving historical works, such as those from Livy and Polybius.

Flavius Vegetius Renatus wrote *Epitoma Rei Militaris*, an early treatise on Roman military theory around the fourth century A.D., but it had little impact on the Roman Empire of his time. In it Vegetius admits to the lack of previous military writings but concedes that much can be drawn from historical works to shape the science of arms.¹⁰

The *Epitoma* addresses in practical terms the recruitment, training, and fielding of the legion. He contends that success of Roman arms was due to compact, well-drilled formations that could force their way through an enemy or survive the enemy's best assault.¹¹ Total victory was achieved only by the open battle.¹² Vegetius was careful to note that the "rule of the legion is neither to flee nor pursue easily."¹³

Vegetius' work expounds on the direct force of arms due to superior training. There is little discussion on achieving a decision by indirect means. His employment of cavalry was to reinforce rather than to exploit.¹⁴ Of significant note, Vegetius believed the only way to beat the barbarian and mercenary tactics was by traditional Roman methods.¹⁵ That his military treatise, the Roman

legions, and empire disappear to the indirect maneuver of barbarians and mercenaries by the fifth century A.D. is not lost to historical judgment. In this case, their defeat by indirect means reinforces Sun Tzu's principles.

Maneuver Theory in the Middle Ages

Vegetius' manual was resurrected in the Middle Ages. The resurrection occurred largely because it was the only work available that discussed infantry and cavalry tactics.¹⁶ By the time of Niccolo Machiavelli, Vegetius' manual was required reading for those who could read, and the influence of the direct Roman methods of battle was still very much in vogue.¹⁷ These methods were in vogue because of problems with the Condottieri. The Condottieri were mercenaries that halfheartedly protected city-states. The problems with their reliability were not unlike some of the problems of controlling barbarians in the late Roman period. As such, Vegetius' impact on Machiavelli is unmistakable.¹⁸

In Machiavelli's work *The Art of War* he argues for the return of the Roman battle techniques with slight modification relating to the introduction of gunpowder and artillery.¹⁹ He outlines the object of battle as the complete defeat of the enemy.²⁰ Accordingly, his preference

is to conduct a direct assault upon the enemy in the spirit of the Greeks and the Romans.²¹ The only allusion to indirect maneuver mentioned is in the form of starving an opponent, so he would not have to be fought.²² This is more aligned with siege warfare.

Machiavelli closes his work with a list of general rules of military discipline which are a word-for-word repetition of Vegetius' general rules of war, further indicative of the influence of the Roman writer.²³ Machiavelli's work stresses the importance of discipline and loyal militias as the means of obtaining victory in battle. He was a sharp critic of chess-like maneuvers and set-piece battles.²⁴ In application, however, his theories met with only mixed results: Florence was lost and the formations trained by Machiavelli were not successful against the armies of Spain and France.²⁵ Nevertheless, Machiavelli's treatise on the general nature of war formed the basis of thought for maneuver theorists during later periods, particularly Clausewitz.²⁶

Maneuver Theory in the Age of Reason

By the time of the seventeenth and eighteenth centuries, set-piece and chess-like maneuver had returned to the battlefield as professional armies overcame the

siege warfare of the Middle Ages. During the eighteenth century, perhaps the most significant works to appear were those of Frederick the Great. "The only purpose in war," he declared, "is to force the enemy to consent to an advantageous peace as soon as possible, and you must never lose sight of this idea."²⁷

To obtain this advantageous peace, Frederick believed in indirect maneuver. "Your movements [must] put him on the wrong scent and induce him to suspect intentions quite different from those you actually have."²⁸ The secret to this "is to upset the enemy dispositions by diversions that force him to abandon his plans."²⁹ The essence was indirect maneuver by creating diversion, making possible a decisive outcome.³⁰

In battle, Frederick not only achieved success by indirect maneuver with linear tactics and formations such as his famous "oblique order," he also understood the operational indirect approach to achieve victory. In his hypothetical battle plans against Austria and France, each made use of indirect movements that placed the enemy capitals at risk, thereby bringing the conflict to conclusion with minimal loss.³¹

Frederick achieved victory in most cases with inferior numbers. This may also explain his aversion to direct

maneuver that required the enemy to be fixed before he could make good his movements.

Not having sufficient forces to force the enemy to follow his lead, the general must procure all the advantages over this enemy by himself, through his cunning and skill....Cunning succeeds where force fails. It is therefore essential to use both, since force is often repulsed by force and on other occasions is obliged to yield to guile.³²

His study of terrain to achieve guile was paramount. "The choice of ground is my first concern; the arrangement for the battle itself is second."³³

That Frederick translated his experience to the written page is most fortunate for serious students of maneuver warfare. Like Sun Tzu, his ideas and principles find many applications in current warfare and help guide any future employment of forces. In his own time, his principles influenced the French Count de Guibert, which in turn shaped the army later used by Napoleon.³⁴ Jomini would use the Seven Years War experiences of Frederick to form the basis of his writings in the nineteenth century.³⁵

Napoleonic Era Maneuver Theory

The works produced during the nineteenth century Napoleonic era had a profound impact on maneuver thought. Even today, U.S. Army doctrine is rooted in these works. Many may be surprised that such common terms as decisive

point, dislocation, objective, mass of forces, zones, theaters, and lines of operation were introduced in the works of theorists during this period.

While Napoleon never recorded his own maneuver theory, others, such as Jomini and Clausewitz, looked to Napoleon's campaigns as the vehicle to prove their maneuver concepts valid. They did not always agree. In fact, their discussions on indirect and direct maneuver methods to achieve decisive results were much different.

The first theorist to gain widespread acclaim during this period was Antoine-Henri Jomini. A contemporary of Napoleon, he began writing about Napoleon's campaigns to express his military theory even while Napoleon was in power. His most popular work was *Summary of the Principles of the Art of War*. He believed the object of war is to achieve the desires of the state and admitted that these could vary from reclamation of rights to outright conquest for conquest's sake.³⁶ To achieve those ends, he stressed that "war is always to be conducted according to the principles of the art."³⁷

To illustrate the maneuver art, Jomini develops some elementary concepts. Each of the opposing forces has a base of operations. Each force has a line of operations in relation to its base. This line of operations is designed

to protect what is important to the friendly force and to threaten what is important to the enemy force. What is determined to be important to the enemy is made an objective. According to Jomini, maneuver was designed to achieve objectives.

To aid in the achievement of objectives, Jomini introduces the concept of the decisive point. The essence is to find a way to cut off an enemy force's line of retreat and communication while protecting the friendly one.³⁸ The means to cut this line becomes the decisive point. It is an indirect approach to get at what is strong without having to fight the strength.³⁹ As to the maneuver methods to obtain it, Jomini states simply that a commander "only has to decide whether to operate by the right, by the left, or by the front."⁴⁰ The indirect approach that avoids enemy strength, exploits his weakness, cuts his lines of communication while protecting the friendly one is the essence of Jomini's maneuver art.

This is not to say that Jomini oversimplifies warfare and maneuver. "After having written the detailed history of thirty campaigns and assisted, in person, in twelve of the most celebrated of them...I have not found a single case where these principles, correctly applied, did not lead to success."⁴¹ That Jomini successfully employed these

principles or perhaps developed them from his successes is historical fact. As a staff officer both to Marshall Ney and Napoleon, he participated in the successes at Ulm, Jena, and Eylau. He fought successfully in the Spanish and Russian campaigns and distinguished himself leading his troops at Bautzen.⁴²

Jomini's work is useful for understanding the ideas of indirect and direct maneuver. Whatever his critics on his oversimplification of strategy and warfare between states, his clarity of thought about the principles of effective maneuver is insightful. He influenced and was admired by French, English, Prussian, and Russian contemporaries.⁴³ He had a profound influence on Dennis Hart Mahan and Alfred Thayer Mahan.⁴⁴ While his work was detested by those in the Clausewitz camp and suffered even more from the maneuver dilemmas of the First World War, it gained favor in the 1920s and 1930s by such notable theorists as Basil Liddell Hart.⁴⁵

There were those in the nineteenth century, however, that thought the principles of maneuver could not be so simply articulated. Chief among them was Carl von Clausewitz. In scrutinizing his famous volume *On War*, there is ample evidence to show his ideas on maneuver

without getting into his discussions on strategy and politics, though arguably they are related.

Clausewitz was a chief critic of Jomini. He believed the object of war was the complete destruction of the enemy force, that is, the enemy force is reduced to such a state as not to be able to prosecute war as the means to obtain the political object.⁴⁶ "Every combat, great or small," he proclaimed, "has its own peculiar object in subordination to the main object. If this is the case then, the destruction and conquest of the enemy is only to be regarded as the means of gaining this object; as it unquestionably is."⁴⁷ He did not believe that maneuver art could achieve the main object of destruction of the enemy force and questioned those who believed it could.⁴⁸

He viewed smaller combats as ancillary to the main object and if not connected to destruction of the enemy, they were fulfilling an unimportant purpose.⁴⁹ "Forgetfulness of this," he cautioned, "led to completely false views before the [Napoleonic] Wars of the last period, and created tendencies, as well as fragmented systems, in which theory thought it raised itself so much the more above handicraft, the less it supposed itself to stand in need of the use of the real instrument, that is the destruction of the enemy force."⁵⁰ Rather than an

advantageous peace, Clausewitz believed the opposing military force must be destroyed as the object of war because it existed to protect the state.⁵¹

It only follows, then, that Clausewitz saw a natural order in the prosecution of battle. First, the enemy force that is protecting its country is destroyed. Second, the country is subdued. And third, the first two being accomplished, a peace is forced upon the enemy.⁵²

Clausewitz allows that this is very hard to achieve and admits that there are ample cases where a peace occurs before the military force is destroyed. He explains this as the difference between conceptual war and real war.⁵³

Nevertheless, destruction of the enemy is prominent in all of his military thinking. As to indirect means to attain victory he asserts:

How shall we manage to combat that extremely subtle idea, which supposes it possible, through the use of a special artificial form, to effect a small direct destruction of the enemy's forces a much greater destruction indirectly, or by means of small but extremely well-directed blows to produce such paralyzation of the enemy's forces, such a command over the enemy's will, that this mode of proceeding is to be viewed as a great shortening of the road?...To deny that is not our intention, but we assert that the direct destruction of the enemy is everywhere predominant; we contend here for the overruling importance of this destructive principle and nothing else.⁵⁴

Clausewitz advocated the direct approach because he believed indirect means were complicated, too time-

consuming, and assumed a cooperative enemy. He believed it better to strike the hammer blow than lose the moment to carefully laid plans.⁵⁵ "By this it appears to us that the advantage of simple and direct results over those that are complicated is conclusively shown."⁵⁶

Clausewitz did not ignore the potential effect of indirect maneuver and even allowed, with some disdain, that it could be successful. "But these effects are of two kinds, direct and indirect; they are of the latter, if other things intrude themselves and become the object of combat--things which cannot be regarded as the destruction of the enemy's force, but only leading up to it, certainly by a circuitous road, but with so much greater effect."⁵⁷ If indirect maneuver occurred, he believed that it should still contribute to the greater direct destruction of the enemy force. Some believe this fascination with direct maneuver stemmed from Prussia's status and geography in Europe and the fact that Prussia was usually on the defensive with limited forces.⁵⁸

What is surprising is that Clausewitz had been defeated by the very indirect means he viewed as absurd. Clausewitz knew defeat firsthand. He had suffered capture and humiliation. After Napoleon, he was viewed with caution in the new Prussian military system and was

relegated to duty at the Berlin War College. John Shy, in a comparison of Clausewitz and Jomini, states, "It should not be surprising that Clausewitz approached war as a complex totality, seeing in it what may be called tragic terms, always threatening to escape human control, and that Jomini saw war largely in personal, heroic terms, controlled by the masterful commander."⁵⁹

Maneuver Theory in the Twentieth Century

The impact of Clausewitz on military thought and maneuver warfare is immeasurable, though many would argue the impact as either favorable or unfavorable. While not taking immediate hold on the Prussian military system, Clausewitz' writings did have a profound effect on the leadership of Germany as embodied in Alfred von Schlieffen. Von Schlieffen found a harmony in Napoleon's campaigns and Clausewitz' writings that also corroborated his views drawn from intense study of military history.⁶⁰ He used Clausewitz' theory to formulate his own ideas on maneuver which resulted in the infamous Schlieffen Plan.⁶¹

The later interpretation of this plan, along with the application of Clausewitz' theory by the German general staff, was seen by many as a chief contributor to the horror of the First World War.⁶² Obsessed with Clausewitz

and Cannae, von Schlieffen declared, "The battle of annihilation alone is the desirable battle."⁶³

Germany was not alone in the belief that this type of direct annihilation warfare was supreme. In speaking of the allied powers in general, Correlli Barnett notes, "There was a too literal acceptance of Napoleon's and Clausewitz' ideas on the supreme power of will and the necessity of striking the enemy's center of gravity. 'Will' came to mean obstinacy, or 'pluck'; the enemy's center of gravity to mean his most powerful defenses."⁶⁴ The result was a generation of military professionals that came to regard indirect maneuver as impossible in light of modern warfare.

Within this generation, however, were some truly gifted thinkers that in their separate spheres of influence, came to similar conclusions about maneuver theory. They scorned the notion that indirect maneuver was no longer viable and provided equal scorn for the advocates of Clausewitz and his direct means of maneuver to fulfill the purpose of destroying an army. Chief among these was Basil Liddell Hart.

A British junior officer in the First World War, Liddell Hart experienced, firsthand, the horrors of the trenches. After coming to the attention of General Ivor

Maxse, Liddell Hart began to formulate his ideas on maneuver. His voluminous writings show a thorough exploration of indirect maneuver: first with infantry tactics, then toward the possibilities of mechanization. By the mid-1920s, he was forced to leave the army due to poor health and was selected with the help of Maxse to the post of military correspondent for *The Daily Telegraph*.⁶⁵

As a young and influential lecturer and writer, Liddell Hart argued conclusively that the next war had to abandon its direct approach principles. In particular, he set about disproving Clausewitz' theory about maneuver and its application by military professionals in the World War. "My wider thinking about war led me to write an article entitled, 'The Napoleonic Fallacy,' which challenged the basic concept of strategy established by Clausewitz a century earlier from the study of Napoleon's conduct of the war."⁶⁶

In two of his most influential works of the period, *The Remaking of Modern Armies* and *The Strategy of Indirect Approach*, Liddell Hart argued that the direct approach of maneuver was deficient. "Decisive results in war have only been reached when the approach has been indirect," he asserted, "In strategy the longest way around is apt to be the shortest way home. More and more clearly has the fact

emerged that a direct approach to one's mental object, or physical objective, along the 'natural line of expectation' for the opponent, has ever tended to, and usually produced negative results."⁶⁷ Liddell Hart showed in a survey of historical analysis that the high proportion of history's decisive campaigns conclusively enforces "that the indirect approach is by far the most hopeful and economic form of strategy."⁶⁸

Liddell Hart believed the essence of the indirect approach of maneuver was to direct operations against a target that would "dislocate" the enemy's mind and disposition of his forces.⁶⁹ To move directly against an opponent allowed him to consolidate and stiffen his "equilibrium," but to move indirectly would cause his equilibrium to be off balance and resistance would slacken.⁷⁰ Hart believed indirect maneuver could be accomplished by tanks and aircraft directed against that which upsets his logistics, cuts his line of retreat and his line of communications. He emphasized the effect that speed had in enabling effective maneuver and was an advocate of a combined arms force with such capabilities. Liddell Hart was applying principles in the twentieth century similar to those of Frederick the Great and Jomini in the eighteenth and nineteenth centuries.

Liddell Hart was not the only one to come to these conclusions, but he did have a profound influence on most of the others who shared similar beliefs. Heinz Guderian read most of what Liddell Hart published and used his work to formulate his own ideas about maneuver warfare.⁷¹ John Frederick Charles Fuller, largely regarded as the father of tank warfare, also had a long and rich association with him.⁷²

Of the forty-five or more books written by J. F. C. Fuller, perhaps none better expresses his maneuver theory than *The Foundations of the Science of War*. An infantryman converted to the tank corps in the First World War, Fuller rose to the rank of major general before retiring in controversy, culminating in his associating with groups attempting to overthrow his government in the late 1930s. Despite the controversy of his life, Fuller's ideas on maneuver theory and warfare are regarded as pivotal and brilliant.

Fuller believed that the military object of war was to secure a better peace.⁷³ He rebuked the idea that the aim was destruction of the enemy force or his land or his people.⁷⁴ In terms of battle, he believed the aim was to overthrow the enemy's plan and destroy his command and

control. In so doing, the enemy force would collapse like a house whose foundation was destroyed.⁷⁵

Fuller saw the reason for the horrible state of affairs in the methods of waging war, much as Liddell Hart saw it.

Brute force now to a large extent replaces the will of the commander as the vital factor in war, and out of this change, Clausewitz in part-and I think in the greater part--misjudging the art of Napoleon, elaborates his theory of "Absolute War," which, though to him is a "struggle for life or death,; to his followers suggests the idea of "destruction." I have gone to this length in the examination of this question because our present-day theory of war [1926] is based on Clausewitz, possibly on a misinterpretation of Clausewitz, who, I consider, misunderstood Napoleon.⁷⁶

Fuller's struggle, then, was to motivate a new generation of leaders to think in more indirect terms.

Part of Fuller's indirect approach was the idea of seizing important ground that the enemy was obliged to recover. As the enemy moves to do so, he is destroyed in the ensuing battle, largely because the friendly force now has the advantage of defense.⁷⁷ This concept of defensive-offensive was used to great effect by such men as Erwin Rommel, Bernard Montgomery, and William Slim.

Fuller believed to destroy a force did not require the total destruction of its members. If the force's organization should be destroyed, that is, its command and control, then the strength of the unit was lost. He called

the method of wearing down a unit by direct means "dissipation." To render an opponent inoperative by destroying its command and control was a method he termed as "unhinging."⁷⁸

Taking a single man as an example, the first method may be compared to a succession of slight wounds which will eventually cause him to bleed to death, and the second to a shot through the head...The fact I wish to accentuate here is that, as our present theory of offensive action is based on the idea of destroying personnel, new means of war, I am convinced, will force us to substitute a theory based on the idea of destroying command--not after the enemy's force has been disorganized, but, when it is possible, before it has been attacked, so that it may be found in a state of disorganization when attacked.⁷⁹

The accuracy of such statements is left to the historical record, largely found in the German application of Liddell Hart's and Fuller's theories.

Chief among those applying these principles in the Second World War is Heinz Guderian. A maneuver theorist and writer in his own right, Guderian had a profound impact on the nature of maneuver warfare. Where Liddell Hart and Fuller could only write about maneuver theory, Guderian could apply it in experiments and exercises, largely because of a more cooperative government. This is not to imply that Guderian's theories were immediately adopted without struggle.

A light infantryman in the First World War, Guderian found himself an inspector of transport troops assigned the task to overcome problems of command and control communications in the post-World War period. He turned to mechanized platforms for mobility and thus, protection. From this he realized a powerful potential. These platforms could communicate by wireless means and form a revolutionary separate arm that could be decisive for maneuver. Influenced by the writings of Liddell Hart and J. F. C. Fuller, Guderian began to fight for a separate panzer force to conduct decisive maneuver within the German army.⁸⁰

Guderian's most significant work during this period was *Achtung-Panzer!*, an assimilation of fifteen years of study on mechanized warfare and maneuver theory. While mostly a historical account of the development of the tank arm, Guderian emphasizes some key points. He believed that a small force could deliver a shock several times its normal potential by relying on its speed to get to the decisive point in a battle.⁸¹ Rather than rely on a shock of force by direct assault to be reinforced before continuing on, Guderian believed that a small force could be devastating to the enemy's rear as long as it was connected to communications and some measure of supply.⁸²

He was not stating that small mobile units should operate without being followed up, but rather they should not wait for the immediate follow-up before penetrating deep into the enemy's vulnerable lines of communication. If they had wireless contact with the follow-on forces, these could be directed to the areas penetrated. Significantly, as the areas penetrated were not always planned for, this should be the practice of maneuver for independent mobile forces so they would not forfeit their advantages of speed and indirect approach.⁸³

Mikhail Tukhachevsky had a similar idea which he termed as "leverage." The Marshall of the Soviet Union, executed in the Stalin purge of 1937, is recognized as the father of Soviet deep operational maneuver. Tukhachevsky also believed in the small mobile force to achieve decisive results, but was less willing to accept that it could operate without some kind of contributing holding force along the main line of resistance.⁸⁴ Noting the work of Liddell Hart and Fuller, he was also not convinced of the ability of maneuver arms operating independent of the other services.⁸⁵

Tukhachevsky's contribution to maneuver doctrine was in seeing a relationship between direct and indirect maneuver. While realizing the impact of indirect maneuver,

he also believed in the value of destroying the enemy by direct force. "Whereas contemporary wars are waged with large numbers of troops and are dragged out over long periods of time it does not signify...that we should disregard the art of destroying the enemy's armed forces."⁸⁶

Tukhachevsky's approach to maneuver at the operational level was to hold the enemy on a broad front, then shatter him at a central point, then expand the point by deep maneuver into his rear areas. While simultaneous action was not possible along this broad front, a "simultaneity" could occur in the effect achieved. In other words, a "maximum contact area" or "broad front" was initially set, followed by a positioning of reserves of sufficient strength to achieve a breakthrough. When the stage was set, the breakthrough would be launched, followed by deep operational maneuver forces. Each event was sequenced rather than simultaneous, but the effect along a broad front produced a "simultaneity," as each component of the enemy force was pinned down.⁸⁷

As British Brigadier Richard E. Simpkin, maneuver theorist and author, noted, "Although [Tukhachevsky's] concept allowed for operational maneuver to achieve decision, it owed a great deal to attrition theory."⁸⁸ The conclusion drawn from Tukhachevsky's writings is that the

best maneuver lies somewhere in between the direct and indirect application. The large, sequential employment of forces was not difficult for Tukhachevsky to grasp, as it was easy for him to visualize his nation having the large forces necessary to maneuver in this fashion, quite contrary to the small mechanized force concepts of Liddell Hart and Fuller.⁸⁹

Speculations on Future Maneuver

Taking the sum total of the indirect and direct theorists, Richard Simpkin attempted to formulate a maneuver theory for the twenty-first century. In his fascinating work *Race to the Swift* Simpkin develops a maneuver model that is worthy of note (figure 3).

In this basic maneuver theory model, Simpkin sees a main line or holding force, a highly mobile maneuver force, and a "hinge" or "fulcrum" that connects the two. The force exerted by the mobile force is many times greater than its relative worth, because, like a lever, it places enormous force on the enemy. The position of the enemy--wherever he lies--gives the maneuver force its power. This is the idea of "leverage." As a lever requires a fulcrum to develop its effect, so too the maneuver force must be tied to a "fulcrum" of communications and supply.

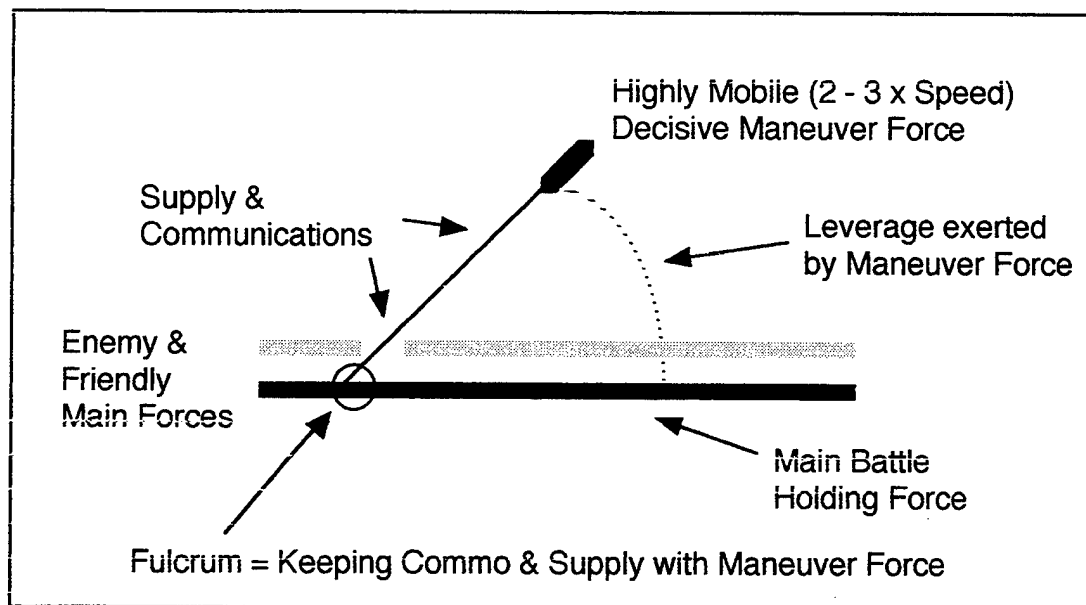


Figure 3. Simpkin's Maneuver Model. Adapted from Richard E. Simpkin, *Race to the Swift* (London: Brassey's, 1985), 21

Like Tukhachevsky, Simpkin sees a relationship between direct and indirect forces. He differs by placing the emphasis on the maneuver element (indirect) rather than the holding element (direct). He terms the direct approach as "attrition theory" and the indirect approach as "maneuver theory."⁹⁰ He further states, "Attrition theory provides maneuver theory with the sheet anchor it needs to stabilize it in the storms of war."⁹¹

Upon this basic framework, Simpkin builds some very interesting and complex scenarios. He sees as essential the idea that that the maneuver force must have a speed differential two-to-three times that of the enemy's main

force to be truly effective. "Maneuver theory draws its power mainly from opportunism--the calculated risk," explains Simpkin, "and the exploitation both of chance circumstances and (to borrow a tennis term) of 'forced and unforced errors' by the opposition; still more on winning the battle of wills by surprise or, failing this, by speed and aptness of response."⁹² Otherwise, the maneuver cannot take place without the complete holding action of the main force.

Taking together all of the thought on maneuver theory, past and present, the Simpkin maneuver model seems to reveal some overlooked problems with the current capabilities and doctrinal employment of heavy forces. Focusing on speed differential and the preference for the direct approach in U.S. Army doctrine, the heavy armored forces do not appear to be able to best perform the role of the indirect decisive maneuver force without a holding force engaging in costly battles (in material or human terms) to provide them freedom of action.

As noted in the previous chapter, the predominant maneuver forces of most nations are heavy forces. When the maneuver force and the main force become one and the same, maneuver is forced into direct approach scenarios. To

illustrate this point, consider the evolution of the heavy force in indirect maneuver.

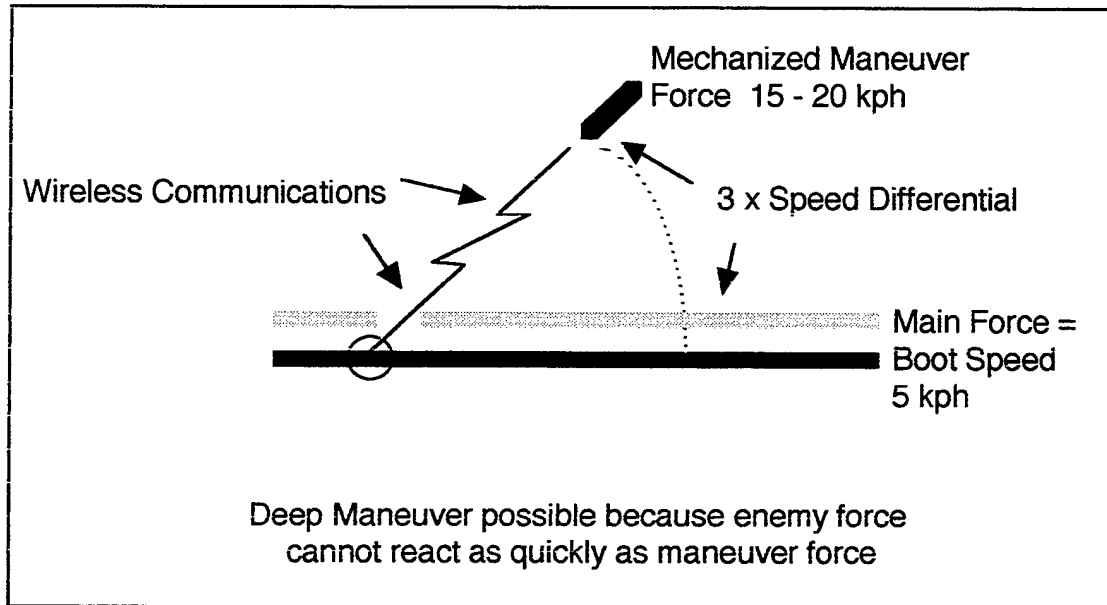


Figure 4. 1940 Maneuver Model

Applying the Simpink maneuver model to forces in 1940 (figure 4), the main forces were limited to the speed of the dismounted infantry (boot speed). The indirect mobile forces were fifteen-to-twenty kilometers per hour. They were connected to the "fulcrum" of wireless communications and mobile supply. The "leverage" exerted by the armored force was far above the actual combat power these forces possessed due to the simple fact that they could not be caught by the reacting enemy force, even if they were not "held" by the holding force. Like a football running back

breaking away from a slower opposing line, the strength of the line is useless if the running back cannot be caught. The 1940 maneuver model, when taken together with the theories of Sun Tzu, Frederick the Great, Jomini, Liddell Hart, and Fuller, seems to confirm the indirect application of armored forces was decisive.

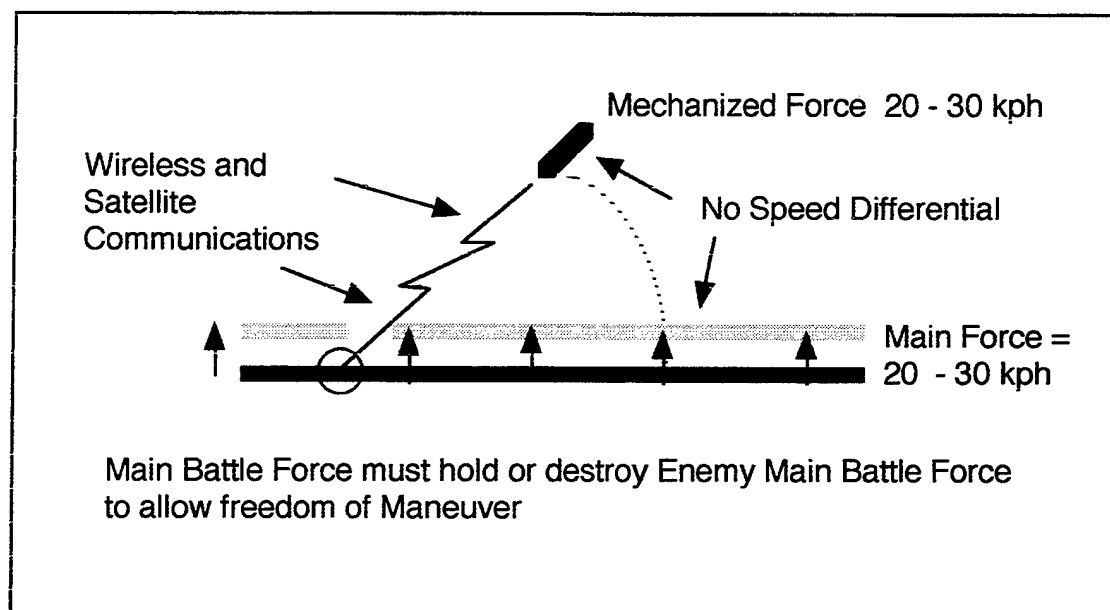


Figure 5. 1990 Maneuver Model

By the end of the century, however, the maneuver model has developed such that opposing armies will likely have armored forces as both their holding and maneuver force (figure 5). While this may not seem like a problem, it actually forces maneuver options along the direct approach

before the indirect is possible. The "running back" is now at the same speed as the opposing line, so that unless the opposing line is blocked or crushed, the running back will not get away. By comparison, the enemy, unless he is completely held along a broad front, a la Tukhachevsky, he has the ability to catch the friendly maneuvering force. Unless the enemy is fixed with overwhelming firepower, the friendly maneuvering force may not have as much freedom to maneuver by indirect means.

An additional problem with the 1990 maneuver model is worth mentioning. As stated by Simpkin above, maneuver theory draws its power mainly from opportunism and the exploitation of chance circumstances. While "forcing errors" upon an opponent is easier to grasp in a direct maneuver mentality, Simpkin notes that surprise and psychological effect are more valuable aspects of maneuver which lead to decisive results. Where surprise is unavailable in the battle of wills, speed and aptness along an indirect approach can create similar psychological effects. In the 1990 maneuver model, this becomes extremely difficult due to no speed differential between the enemy's main force and the friendly decisive maneuver force.

So what does the U.S. Army require in the future in terms of maneuver? Is the Army expecting a force capable of indirect approach at the tactical through strategic levels or is it satisfied with a force capable of predominately direct maneuver options? In the *Army Vision 2010*, the strategic and operational maneuver requirements are defined in the term dominant maneuver. While a joint service term, the Army's role is twofold: power projection for strategic considerations, and decisive operations for operational considerations.⁹³

The Army envisions its decisive force to be "equipped with lighter, more durable, multipurpose warfighting systems, thus reducing the amount of airlift required, as well as the size and complexity of the logistics tail needed to sustain the force."⁹⁴ This force should be capable of rapid tailoring, be CONUS-based but rapidly deployable, and be capable of deploying directly to combat as a part of Joint/Combined/Interagency Force.⁹⁵

Once this force arrives at its destination, its operational role will be to: mass effects, not forces; conduct simultaneous, brief, violent attacks in multiple directions; and attack, disengage, reorganize, reattack. Additionally, this force must be capable of high speed

mobility and agility.⁹⁶ These capabilities seem to argue for an indirect maneuver capability.

This being stated, the U.S. Army will enter the twenty-first century with a heavy armored force as its decisive maneuver arm. Is this arm capable of indirect maneuver? Is it possible that the requirements for indirect maneuver, deemed essential by so many theorists for victory, will be greater than the capabilities of the future heavy force?

In considering the answer, ponder the development of the tank from the 1960s Cold War period to today. Tank design appears to have remained basically the same. While munitions and armor plating have improved, the speed of tanks remains fairly constant with cross-country speed averaging about thirty kilometers per hour when not in contact. The weight of tanks has reached an average of fifty-to-sixty tons although the U.S. Army machines are somewhat heavier. Engines have had to exceed the 1,500 horsepower range with some even being gas-turbine just to propel the seventy-ton tanks to the average mean speed. Range of main guns is still only about three kilometers for largest probability of hit.

While it is foreseeable that tank design in the next three decades may increase speed slightly, gun range a

kilometer or two, firepower some, and protection a little, not much can be done to reduce weight and protection without a complete replacement of the current fielded fleet.

These shortcomings in the current heavy armored force may result in the U.S. Army not seizing the best maneuver means along the indirect approach. It appears the Army is attempting to achieve future decisive maneuver with heavy armored forces, even though their capabilities which have remained fairly constant over time. Upgrading these systems with information technologies may do little to solve the problems of strategic deployability, operational mobility, and speed differential needed for an ideal decisive maneuver force.

Will the current and projected trends regarding the use of heavy forces, coupled with the U.S. Army's penchant for direct maneuver, be sufficient to enable dominant maneuver in the twenty-first century? The hypothesis is that they will not. Heavy forces, while valuable, will not be able to conduct dominant maneuver as stated in *Army Vision 2010*.

¹Samuel B. Griffith, *Sun Tzu: The Art of War* (New York: Oxford University Press, 1963), 19-20.

²Ibid., 15.

³Ibid.

⁴Ibid., 28.

⁵Ibid., 21.

⁶Ibid., 28-29.

⁷Ibid., 25.

⁸R. Ernest Dupuy and Trevor N. Dupuy, *The Encyclopedia of Military History from 3500 B.C. to the Present* (New York: Harper & Row, 1977), 37.

⁹Ibid., 149.

¹⁰Flavius Vegetius, *Epitome of Military Science* (Liverpool: Liverpool University Press, 1993), 9.

¹¹Ibid., 84-85.

¹²Ibid., 86.

¹³Ibid. 50.

¹⁴Ibid., 93-4.

¹⁵Ibid., 2.

¹⁶Dupuy, 137.

¹⁷Ibid., 246.

¹⁸Niccolo Machiavelli, *The Art of War* (New York: De Capo Press, 1990), xx.

¹⁹Ibid., 85-92.

²⁰Peter Paret, *The Makers of Modern Strategy* (Princeton: Princeton University Press, 1986), 24.

²¹Machiavelli, 169, 193.

²²Ibid., 193.

²³Compare Machiavelli, 202-4; and Vegetius, 108-111.

²⁴Paret, 30.

²⁵Machiavelli, xv-xvi.

²⁶Paret, 31.

²⁷Frederick the Great, *The Art of War*, ed. Jay Luvaas (New York: The Free Press, 1966), 310.

²⁸Ibid.

²⁹Ibid., 192.

³⁰Ibid., 334.

³¹Ibid., 313-323.

³²Ibid., 324.

³³Ibid., 176.

³⁴Paret, 105-113.

³⁵Ibid., 154.

³⁶Antoine-Henri Jomini, *Summary of the Principles of the Art of War* (Philadelphia: J.B. Lippencott & Co., 1862; reprint, Westport: Greenwood Press), 12-34.

³⁷Ibid., 13.

³⁸Ibid., 311.

³⁹Ibid., 79.

⁴⁰Ibid., 306.

⁴¹Ibid., 313.

⁴²Paret, 153.

⁴³Ibid., 176-179.

⁴⁴Ibid., 178.

⁴⁵Brian Bond, *Liddell Hart: A Study of his Military Thought* (London: Cassell Ltd., 1979), 80.

⁴⁶Clausewitz, Carl von, *On War* (Baltimore: Penguin Books Inc., 1968), 123.

⁴⁷*Ibid.*, 394.

⁴⁸*Ibid.*, 304-305.

⁴⁹*Ibid.*, 304.

⁵⁰*Ibid.*, 305.

⁵¹*Ibid.*, 124.

⁵²*Ibid.*

⁵³*Ibid.*

⁵⁴*Ibid.*, 305.

⁵⁵*Ibid.* 306.

⁵⁶*Ibid.*

⁵⁷*Ibid.*, 247-248.

⁵⁸Paret, 158.

⁵⁹*Ibid.*

⁶⁰Dupuy, 821.

⁶¹*Ibid.*

⁶²Bond 37-38

⁶³Daniel David, *The 1914 Campaign: August-October 1914* (Bryn Mawr: Combined Books, 1987), 10.

⁶⁴Correlli Barnett, *The Swordbearers: Supreme Command in the First World War* (Bloomington: Indiana University Press, 1975), 204.

⁶⁵Bond, 12-33.

⁶⁶Basil Liddell Hart, *The Memoirs of Captain Liddell Hart*, vol. 1 (London: Cassell Ltd., 1965), 75.; and idem, *Remaking of Modern Armies* (London: J. Murray, 1928; reprint, Westport: Greenwood Press, 1980), 92-93.

⁶⁷Basil Liddell Hart, *The Strategy of Indirect Approach* (London: Faber and Faber Ltd., 1942), 4.

⁶⁸Ibid., 180.

⁶⁹Ibid., 182.

⁷⁰Liddell Hart, *Memoirs*, vol. 1., 162-163.

⁷¹Bond, 221.

⁷²Brian Holden Reid, *J.F.C. Fuller: Military Thinker* (New York: St. Martin's Press, 1987), 66.

⁷³J. F. C. Fuller, *The Foundations of the Science of War* (London: Hutchison & Co., Ltd., 1926), 154.

⁷⁴Ibid.

⁷⁵Ibid., 156-157.

⁷⁶Ibid., 109.

⁷⁷Reid, 67.

⁷⁸Fuller, 291.

⁷⁹Ibid., 292

⁸⁰John Keegan, *Guderian* (New York: Ballentine Books, Inc., 1973), *passim*.

⁸¹Heinz Guderian, *Achtung-Panzer!*, trans. Christopher Duffy (London: Arms & Armour Press, 1992), 140.

⁸²Ibid., 141.

⁸³Ibid., 142-3, 205.

⁸⁴Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (Washington: Brassey's, 1985), 17.

⁸⁵Mikhail Tukhachevsky, "New Problems in Warfare" (Manuscripts, Special Collections, School of Advanced Military Studies, U.S. Army Command & General Staff College, Fort Leavenworth, 1990), 71.

⁸⁶Ibid., 59.

⁸⁷Simpkin, 37-38.

⁸⁸Ibid., 38.

⁸⁹Tukhachevsky, 72.

⁹⁰Simpkin, 23.

⁹¹Ibid.

⁹²Ibid., 22.

⁹³U.S. Army, *Army Vision 2010* (Washington, DC: Government Printing Office, 1996), 11-12.

⁹⁴Ibid., 12.

⁹⁵Ibid.

⁹⁶Ibid., 13.

CHAPTER 3

MANEUVER VARIABLES AND CASE HISTORIES

Neither the geostrategic environment nor technology will break the common threads that tie yesterday's soldiers at Valley Forge to today's soldiers on the demilitarized zone in Korea, or in Bosnia, or elsewhere around the globe, to tomorrow's soldiers in the 21st Century.¹

U.S. Army, *Army Vision 2010*

To test the hypothesis, a nonstatistical, comparative analysis employing case histories was used. The variables of interest which provide the framework for comparison included the following: (1) type of maneuver (direct or indirect), (2) speed differential between each opponent's main and maneuver force, (3) speed differential between opposing maneuver maneuver forces, (4) technological advantages presented by each opponent, (5) mobility, (6) sustainability, (7) firepower able to be employed, and (8) deployability of each force. The three case studies used in the analysis were drawn from a feasible set of prominent battles indicative of maneuver. The analysis of each battle provides the basis for establishing trends, resulting in inferences about maneuver in the twenty-first century.

The Variables

Given the hypothesis as outlined, variables relevant to maneuver in the twenty-first century are germane. Drawing from literature and doctrine, the following five variables from the eight listed above are directly associated with maneuver: type of maneuver, the speed differentials, sustainability and firepower. In *Army Vision 2010*, the following three variables are cited as essential to future battlefield operations: technological advantages, mobility, and deployability.²

Collectively, these variables provide the framework for analyzing and comparing great battles of history and inferring from the analyses the nature of the ideal maneuver force in the next century. The variables are defined and operationalized as follows:

1. Type of Maneuver. Maneuver theorists have classified maneuver as one of two types: direct or indirect. Good indirect maneuver is avoiding an enemy's strength to strike elsewhere, causing the enemy strength to succumb.³ It is the weakening of enemy resistance before attempting to overcome it. It is best attained by drawing the enemy out of his own strength.⁴ Good direct maneuver is attacking the enemy's strength straightaway to cause his collapse. It is best attained by finding the center of

enemy strength and, once taken, forcing the enemy to succumb.⁵

2. Speed Differential of main and maneuver forces within the same force. Simpkin's model brought out the importance of rapid maneuver forces relative to main-line forces. A broad differential is having a maneuver force two-to-three times faster than the main force. A narrow differential is having a maneuver force less than twice, or equal in speed to the main force.⁶

3. Speed Differential between opposing forces. The speed of maneuver leads to tactical agility and often success. A broad differential is having a maneuver force two-to-three times faster than the enemy's main force. A narrow differential is having a maneuver force less than twice, or equal in speed of the opposing main force.⁷

4. Technological Advantage of an opponent. Technological advantages on the battlefield often contribute directly to a force's success. A good technological advantage over an opponent is defined as having three or more advantages in the combat functions. A disadvantage is having three or more weaknesses in the combat functions.⁸

5. Mobility. Having mobility is being able to adapt both physically and doctrinally to multiple climates and environments. Having good mobility is not being restricted

by climates and environments.⁹ Poor mobility indicates environmental or operational restriction against free maneuver.

6. Sustainability. Sustainability is being able to support main and maneuver forces regardless of doctrine, climate or environment.¹⁰ Good sustainability is providing adequate supplies and resources to ensure the outcome of a battle is not affected by a lack of logistical effort. Poor sustainability is having the outcome of a battle decided by a lack of supply rather than the maneuvering of forces.

7. Firepower able to be employed. Firepower is the potential of combat force that can be exerted to force an opponent to submit or face loss. Good employment of firepower is being able to employ, by maneuver, the largest percentage of combat potential available. Poor employment is being unable to employ, by maneuver, the potential firepower to effect a positive outcome that could have otherwise been available.¹¹

8. Deployability. Deployability is being able to provide the forces necessary and in a timely manner to the decisive area of operations. Good deployability is being able to provide the forces necessary for decisive action in a timely manner. Poor deployability is being unable to

employ the forces allocated as necessary to prevent the enemy from gaining the advantage in a decisive area of operations.¹²

Based on the doctrinal and widely-accepted nature of the variables within the Army and the Army's future vision, inferences will be made based on the face validity of each. They will be used as the framework for analyzing three separate case histories. The variables will be used to compare these case histories, forming a collective analysis from which to infer the nature of ideal maneuver forces in the future.

Reliability

Using available resources and in consideration of reliability factors, a total of three case histories was deemed sufficient to test the hypothesis. To enhance the reliability of the findings, a number of steps was taken to assure an appropriate and unbiased breadth of historical cases applied to the analysis. Only in this way would the final sample, though not random, be as representative and unbiased as possible. The method applied to the selection of the three case histories began with determining what factors constituted a feasible set.

The feasible set of battles from which three were to be selected was based upon criteria relating directly to maneuver. First, the case histories had to demonstrate opponents using opposite maneuver techniques. Specifically, one side must have employed direct maneuver and the other side indirect maneuver. This was necessary as the primary means of evaluating the relative effectiveness of the two maneuver approaches.

Second, each case study had to be an example of maneuver in the era of armored warfare. While fairly recent, the historical application of armored forces to direct and indirect maneuver seemed vital to any discussion of their use in the future. For this reason, all battles selected to the feasible set had to involve the use of armored forces. As a part of this requirement, the battles selected had to cover a time period within the era of armored warfare to be recent enough in the past to be relevant, but old enough to have sufficient historical data for any observations and conclusions. Consequently, armored battles which took place between 1939 and 1975 were included in the feasible set.

Third, the battles chosen had to be at the operational level, in scope, to better apply to potential future armored warfare and the stated goals of Army Vision 2010.

The Army Vision equates decisive operations with operational-level maneuver.¹² For this reason, the battles had to at least show the impact of indirect and direct maneuver at the operational level to be relevant for comparison to future needs.

Having established criteria to assure reliability, the next step was to select battles valued for their impact on military and maneuver thought and consistent with the established three criteria. As a consequence of the reliability factors, and upon consultation with the U.S. Army's Combat Studies Institute at Fort Leavenworth, Kansas, nine battles were identified for study as the feasible set. These battles were important not only for their impact upon the course of history, but were also relevant in their impact upon maneuver: The Russo-Finnish War, 1939-40; The Battle for France, 1940; Tobruk, 1942; Malaya, 1942; Burma, 1942; Nancy-Arracourt, 1944; Inchon, 1950; The Six-day War, 1967; and The Yom Kippur War, 1973.

The Case Studies

Once the feasible set was identified, a refining process was applied to narrow the set to three battles. To ensure that the resulting analysis would have the broadest application to maneuver in the future, the impact of the

environment, climate, and variety of nations represented were also considered. If the variables could be applied to battles in light of these refinements, then it follows that the inferences from any analysis would become even more reliable.

Based on this reasoning, environment was deemed an important consideration because what may work perfectly in the open desert may be of little value to forces maneuvering in a forest. As for climate, the same applies. What may work fine in good campaigning weather could be completely unrealistic in sub-zero or extremely hot and arid temperatures.

Additionally, it was decided that reliability would be enhanced by using different nationalities for each example. Warfare is a culturally-biased activity, so steps were taken to eliminate any single nation's manner of maneuver from biasing the analysis. Having all European, or all Allied battles represented, for instance, would be potentially biased. What could appear to be an important trend in maneuver warfare might rather be an example of how a particular nation did or did not perform successfully over time. Since the period in question was likely to cover the career span of many of the armies' professional soldiers, it was important to provide examples that were

not exclusively representative of a particular nation's successful or unsuccessful defense program. If, on the other hand, a trend became apparent in battles involving completely different nations, the analysis could prove more reliable for inferring future needs. The refining process ensured proper evaluation of the applicability of maneuver and its relation to heavy forces in all environments, climates and among various nationalities.

The three battles selected from the feasible set of nine battles were The Russo-Finnish War, the Battle for France, and the Yom Kippur War. Malaya, Burma and Inchon were important maneuver battles but provided insufficient examples of the operational-level use of armor. The Yom Kippur War was chosen over the other two desert examples--Tobruk and the Six-Day War--largely because it was more recent within a twenty-five year time period, and it involved truly unique approaches to the countering of technology.

Of the two battles demonstrating good climates and environments--the Battle for France and the Battle of Nancy-Arracourt--the former was chosen. The Battle for France demonstrates a very balanced force array, with neither side holding any decisive advantage at the onset.

This made it extremely useful in evaluating the impact of maneuver on the eventual outcome.

The Russo-Finnish War provided an example of a difficult environment and a difficult climate. Additionally, it included nationalities not used in any of the other battles from the feasible set.

Collectively, the three case studies chosen demonstrate maneuver in arctic, temperate, and arid climates. They show the ability of forces to maneuver in environments of snow, plains and forests, and deserts. They offer an insight to the maneuver approaches of Finns, Russians, Germans, French, Egyptians, and Israelis. Among these national groups, some are minor states and some are major states.

Having identified three battles for the analysis for the analysis, and a framework of eight variables relating to maneuver and future battlefield operations, the stage was set to test the hypothesis. The procedure was rather straight-forward: outline the factual and relevant elements of each battle, analyze each battle in terms of the selected variables, and then identify trends which emerged from all three.

The application of the variables to such a diverse set of case studies ensures that the analysis and inferences

will be both useful and illustrative. Conclusions and comparisons to future capabilities of heavy forces as compared to the ideal maneuver force will follow. From these comparisons, the answer to whether heavy forces can conduct future dominant maneuver will present itself.

¹U.S. Army, *Army Vision 2010* (Washington DC: Government Printing Office, 1996), 2.

²*Ibid.*, 9,11-14.

³Samuel B.Griffith, *Sun Tzu: The Art of War* (New York: Oxford University Press, 1963), 102.

⁴Basil Liddell Hart, *The Strategy of Indirect Approach* (London: Faber and Faber Ltd., 1942), x.

⁵U.S. Army, FM 100-5, *Operations* (Washington DC: Government Printing Office, 1993), pg. 6-7.

⁶Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (Washington: Brassey's, 1985), 148-151.

⁷*Ibid.*

⁸FM 100-5, 1993, 2-12.

⁹*Ibid.*, 5-3 to 5-4.

¹⁰*Ibid.*, 12-4.

¹¹*Ibid.*, 2-10.

¹²U.S. Army, *Army Vision 2010*, 11.

¹³*Ibid.*, 12.

CHAPTER 4

ANALYSIS AND NATURE OF AN IDEAL MANEUVER FORCE

Throughout the ages decisive results in war have only been reached when the approach has been indirect. In strategy the longest way round is apt to be the shortest way home. More and more clearly has the fact emerged that a direct approach...has ever tended to, and usually produced, negative results.

Basil Liddell Hart,
The Strategy of Indirect Approach

Can heavy armored forces conduct dominant maneuver in the twenty-first century? To explore this question, this chapter presents a survey of three historical campaigns: The Russo-Finnish War of 1939-40, The Battle of France in May 1940, and the Egyptian theater of The Yom Kippur War in October 1973. Each campaign is described using Simpkin's maneuver model as a basis of presentation (see chapter 2). The discussion of each battle includes the aim of each side, identifies the main and maneuver forces, the communication connections between the main and maneuver forces (Simpkin's "fulcrum"), the speed differential between the opposing main force and the attacking maneuver force, and the result of the battle in relatively straightforward terms.

I. The Russo-Finnish War

Of course we tried to attack and open the road forward, but it was like hitting your head against a wall. It was different from what we were used to in our previous battles...It was unbelievable...awesome.²

Soviet 44th Motorized Division,
Regimental Commander, *The Winter War*

During the opening stages of the Second World War, a unique struggle occurred between, what were at the time, non-aligned states. The Soviet Union attempted to secure national objectives by negotiation and threat of force in the Baltic Sea region. When these attempts failed in negotiations with Finland, the Soviets were certain that swift action with armored and air forces would achieve what was unattainable by diplomatic means. What makes this campaign interesting is the relationship of the superior technology, armored and air forces of the Soviet Union, to the application of maneuver by the Finns. The world would be shocked by the ability of a minor state to withstand what appeared to be the clear advantages of their major opponent.

In November 1939, the Soviet Union sought to acquire the Baltic States in an effort to secure their Baltic Sea holdings. Signing agreements with Latvia, Lithuania and Estonia, the Soviets rushed in to protect their gains.

They turned their attention next on Finland. They demanded territory vital to Finnish defense in an effort to strengthen Russian Baltic ports, chiefly Leningrad.³

The Finnish response was full mobilization. The Soviets demanded that Finnish troops be withdrawn from their own borders. The Finns agreed, provided the Soviets also withdrew. The Finnish aim was to fight rather than lose their status as an independent nation. Soviet response came in the form of an undeclared war, when the Soviet air force bombed the Finnish capital of Helsinki on the last day of November.⁴

On 30 November 1939, nearly one million Soviet troops attacked the Finnish army. Numbering only 300,000, the Finnish army was made up of 80 percent reservists. They had nothing in the way of armored forces, little artillery, the air force was hopelessly outnumbered, and their territory was surrounded on three sides by the Soviet Union. Clearly, the Finnish response would likely have been defensive. Nevertheless, the Finns proved more than a match for the Soviets due largely to their offensive, indirect approach to maneuver.

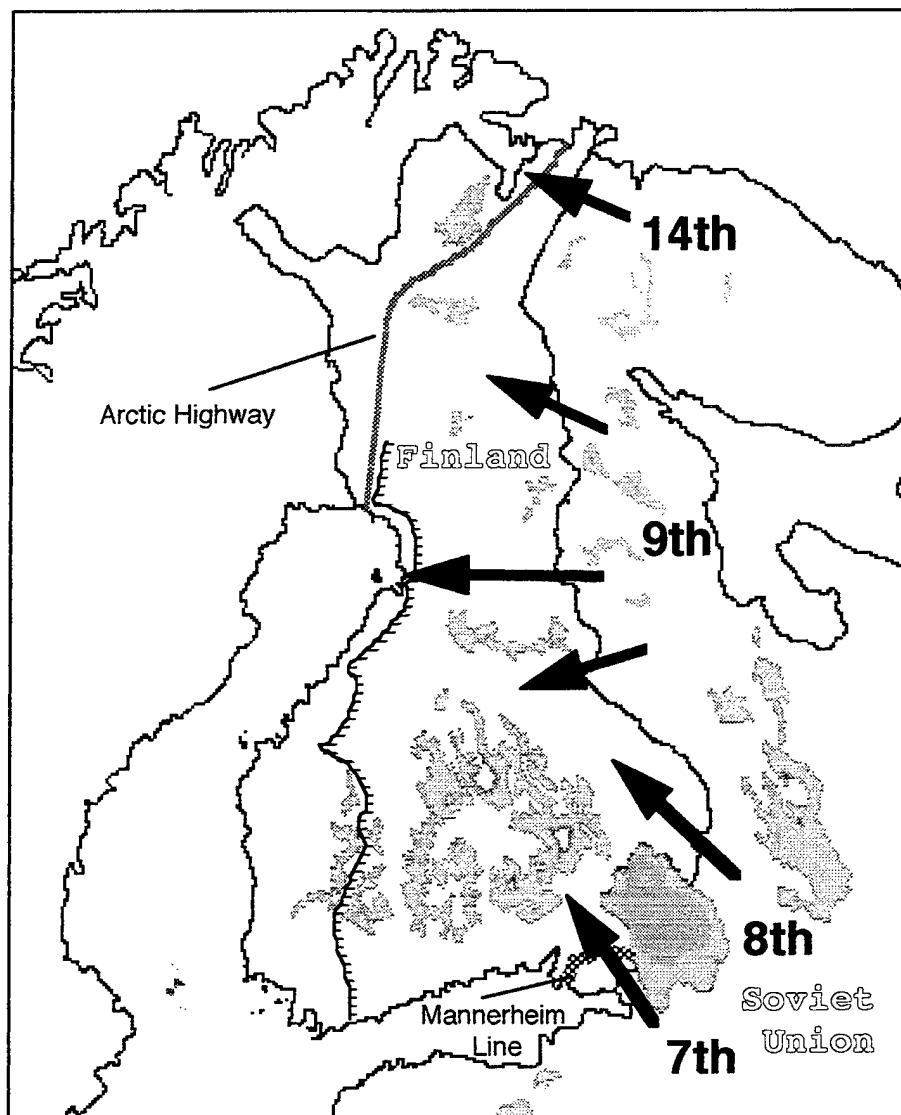


Figure 6. Soviet Strategy of Attack

The Soviet Strategy

The Soviet overall strategy was threefold (figure 6): the 14th Army would conduct a supporting attack in the North to seize the port of Petsamo and the Arctic Highway to prevent foreign aid and reinforcement; the 9th Army would conduct a supporting attack in the East along the

'waist' of Finland to seize the north/south railroad link to sever communications with Sweden; and the 7th and 8th Armies would conduct a main attack along the Mannerheim Line--the main Finnish defense line in southern Finland. The goals were sound and should have been achievable, given the Russian superiority in numbers, air force, armor and equipment.⁵

The Soviet main attack route was selected based on lines of communication and because, if the attack succeeded in breaching the Finnish defenses, it provided the surest means to collapse Finnish resistance. Even so, the Soviets committed half of their infantry and a fourth of their tanks to the flanking operations from Lake Ladoga to the Arctic Ocean, believing that a successful flanking operation would compel the Finns to surrender.⁶

Both sides were to fight in harsh weather with temperatures falling to 40 degrees Fahrenheit below zero in some cases. The winter snows were also falling, affecting movement and air cover. The Soviets believed shock and speed would make short work of the campaign, negating a real need for protracted winter fighting.⁷ They also had the means to feed hot meals through the abundance of mobile field kitchens, an increasingly vital capability as the battle went on. The Finns were well supplied with the

clothing and feeding habits of their native country. They had squad-sized tents and fuel efficient stoves to provide continual protection during the fighting.

The Soviets had better communications than the Finns. Radios were scarce in the Finnish army at the tactical levels.⁸ To make up for this, communication and supply were done by aggressive patrolling and liaison with small groups, each having self-sufficiency and areas of responsibility. Since 80 percent of the Finnish force were reservists, clear initial instructions were vital to developing a cohesive defense. Once the situation was stabilized, these elements could be coordinated for decisive action.

The Soviets assumed that their armored and motorized forces should have the advantage, but this supposed military advantage was largely negated by forests, snow and ice. The Finns, were actually able to move several times faster than the Soviets due to their skis and snowshoes. Russian forces therefore became prey to the superior mobility of the Finns.

The Finnish Response

The Finns expected the main attack along the Karelian Isthmus but the large flanking effort to the East and North

took Finnish Marshall Carl von Mannerheim by surprise.⁹ The Finnish army failed to learn of the Russian road construction efforts along the western border of the Soviet Union. These roads enabled such a sizable force to appear in an unlikely sector. Conceding that he could not hold the port of Petsamo in the North against the Soviet 14th Army, Mannerheim gave it up and ordered the withdrawal of forces to more defensible terrain.¹⁰ In the South, he braced himself for the Soviet main attack at the Mannerheim Line and sent what meager reserves he possessed to the defenseless eastern border in central Finland.

A Frozen Campaign

The Soviet main attack on November 30th, 1939, opened along the Karelian Isthmus. Convinced of their superior numbers, firepower and equipment, the Soviets were sure they would be in Viipuri in a day, or two.¹¹ There was no reason to think otherwise. As Finnish historian Lauri Paananen, himself a veteran of the war, noted, "If ever there were ideal conditions for a Russian frontal attack with heavy equipment, it was here in the open fields of the central Karelian Isthmus. But with the Finns' refusal to come out and fight, thus revealing their weaknesses, the Soviet commanders were faced with the dilemma of trying to

break a line they knew little about."¹² Instead, the Finns chose to fight in unconventional ways. Lacking antitank weapons, Mannerheim ordered the Army in this region to defend in depth.

After fighting through mines, ditches and traps, the Soviet armor would encounter what artillery was available as they negotiated rock and granite barriers. Soviet forces working their way through this resistance encountered fierce infantry attacks with small arms, grenades, explosives and Molotov cocktails. Even the Finnish State Liquor Board ensured an ample supply of bottles for the cocktails, resulting in over 70,000 of these gasoline and tar bombs used against Russian vehicles.¹³ Incredibly, these tactics held the main defensive line as the world watched in wonder.

The real wonder was the Soviet refusal to employ anything other than direct approach, frontal attacks. Operationally they would try to work the flanks, but in each case the Finns were able defeat the direct tactics used to employ operational maneuver. Even at the operational level, the Soviets were unable to negate Finnish advantages in mobility and surprise. Paananen records, "As anticipated by Mannerheim, the Russians stormed across the ice and open country in masses,

stubbornly refusing to change any of the tactics, in spite of weather, terrain, and murderous crossfire."¹⁴ Having stalled along the line of main attack, Soviet attention now turned to the flanking maneuvers in central Finland conducted by the 9th Army.

The Soviet 9th Army had the mission to cut Finland in half, seize the port of Oulu and thereby deny any supplies or reinforcement coming from Norway or Sweden. With two divisions attacking toward Salla, three divisions would be needed for the main attack to overcome Finnish opposition en route to Oulu.

The concept used the 163d and 54th Divisions forward along converging routes and the elite 44th Motorized Division to support. The 163d Division attacked on two wooded routes that converged at Suomussalmi (figure 7). From there, the division intended to drive to Oulu, cutting the vital road and rail network along the way.

The Finns had only a few scattered civil guards and a single regiment in this area, because the bulk of their forces were committed to the main defense of the southern and southeastern borders. The Finns reacted by sending their one regiment from Oulu to defend Suomussalmi. Finnish home guards, numbering approximately fifty, delayed the Soviets from the town of Raate along the wooded routes.

The snow had an additional delaying effect, forcing the Soviets to rely on the roads, their armor being unable to maneuver in deep snow. The same was true of their men, none of whom were equipped with snowshoes or skis.

The delaying action by the Finnish home guards allowed the one Finnish regiment to arrive at Suomussalmi by the time the Soviet columns converged there on the seventh of December. With small arms and no artillery, the Finns immediately attacked their numerically superior foe, who had already taken the town. This bold attack sent the Soviet forces holding Suomussalmi in retreat.

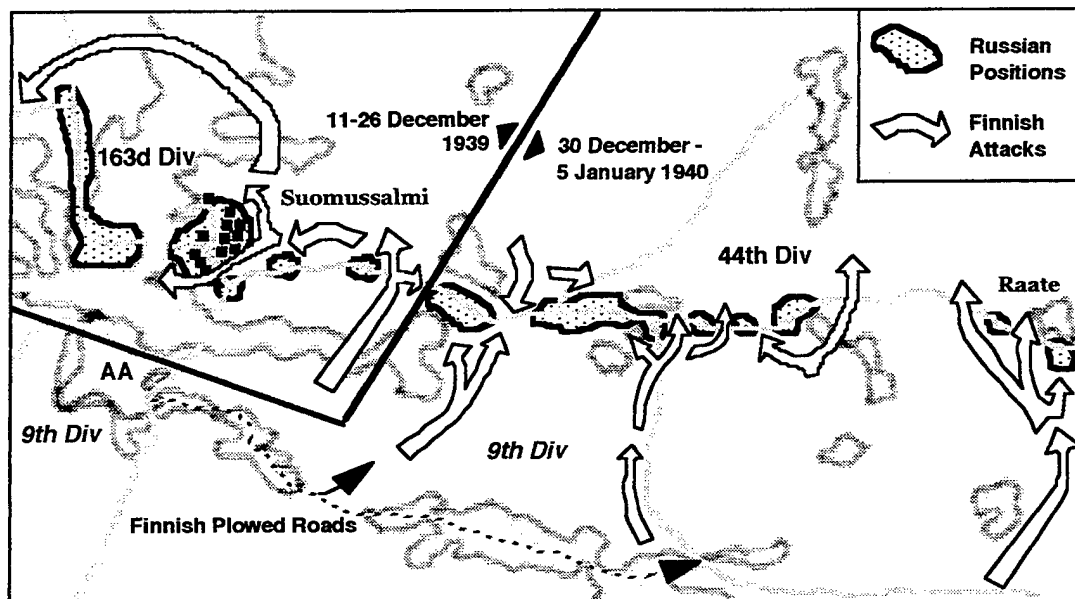


Figure 7. Battles at Suomussalmi

The Soviet main forces were relying on firepower and armor to fight through any resistance encountered en route. This was true in all sectors of Finland. The basic tactics were to lead with an advanced guard, reconnaissance troops and detachments of armored cars. Forward elements of infantry and armor with support followed. Behind this, the main body of armor, infantry and artillery were prepared to attack weakness as the situation developed. The rear guard provided trail security.¹⁵ The forces were ill-prepared for the extreme arctic temperatures and forested terrain. After meeting resistance at Suomussalmi, the 163d Division held its ground. Gaining some momentum, the Finns attacked indirectly with raids to shatter the 163d Division until more troops could be brought to the area.

Targeting radio sets, command posts, isolated gun pits, ammo storage, and especially field kitchens, the Finns wanted to let the environmental elements take as much a toll on the enemy as possible before carefully selecting their attacks on enemy combat elements.¹⁶ After receiving an additional regiment, the Finnish force was now designated as the 9th Division on the 22d of December. The Colonel commanding this force decided to finish what the environment had started.

The basic tactical approach was to cut the route of retreat and then attack the unit in small sections along the road. Critical to this were roadblocks established to prevent enemy escape. If the Soviets ventured off the roads and attempted to maneuver, they were cut down by an ambush in the area attacked. The chopping up of the Soviet units came to be known as Motti tactics, after a foresting term which meant to take a log and cut it into manageable sections.

The Soviet response was one of paralysis. Nothing seemed to work. The Finns attacked mostly at night after careful daylight reconnaissance. If the Soviets tried to keep warm during the day or use the field kitchens for hot meals, mortar rounds appeared. Pleas for air support were answered, but the pilots could find no targets during the day; the forest and effective camouflage hid the Finns. Seeing the 163d Division in trouble, the 9th Army sent the elite 44th Motorized Division to its rescue.

The Finnish commander risked an all out effort to destroy the badly suffering 163d Division before the Soviet 44th could come to its aid. This was effectively done; then the 44th received special attention. The Soviets in each case fought savagely, forcing the Finns to give ground because of firepower and armor. Even so, most of the lost

ground was quickly recaptured within twenty-four hours, usually at night.¹⁷ Historian William R. Trotter notes, "[The 44th Division] was highly rated, but it was heavily mechanized and trained for mobile warfare...Without skis his infantry wallowed uselessly in waist deep snow. For all its vehicles and mechanized training, the 44th Division was now blind, surrounded and virtually paralyzed."¹⁸ The Soviets made desperate counterattacks but these were not coordinated. Their communications were difficult to maintain within their road-bound, separated division. By the 6th of January, the 44th Division commander issued orders for every man to make it out the best he could. It was the end of his division.

In the space of three weeks, the Soviet 9th Army had lost two out of five divisions, and an additional division in the south was rendered combat ineffective. This division was later destroyed by reinforcements from the other battles. In the Suomussalmi-Raate Road battles alone, the Soviets lost 27,500 men killed. Finland lost nine-hundred.¹⁹ The Soviets did eventually recover and force an offensive in the area of the original main attack, at an appalling cost. Finland would negotiate a peace with the Soviets two months later in what turned out to be harsh terms. Even so, Finland was free. Of all the nations

attacked or liberated by the Soviets along their border, only Finland would remain a free state. Finnish indirect means of maneuver had paid off.

Analysis

1. Type of Maneuver. The Soviets used the direct approach of maneuver in an attempt to decide the conflict by penetrating Finland's main southern defensive line.²⁰ While the Soviets attempted turning movements--like those in central Finland--these were supporting attacks, not indirect maneuver. They were never designed to bring about a decision, but rather would support the southern main attack. The supporting attacks tended to go to ground rather than attack Finnish flanks. The direct assaults in the south were against Finnish prepared defenses. The tanks supported the infantry as they attacked bunkers, ditches and fortifications.²¹

The Finns, on the other hand, saw opportunity in the use of indirect maneuver to achieve favorable results for their forces. Operationally, they held their main defensive line along the Karelian Isthmus and attacked with their limited resources against enemy units threatening their eastern and southeastern borders. They believed that defeating weaker enemy forces in the eastern and

southeastern border areas would have a positive effect on morale. Success here could create a situation that would allow more support for defending the south, where the Soviets were so heavily concentrated.²² Additionally, the success of arms against such large forces would strengthen Finnish resolve and allow for a negotiated settlement.²³

Tactically, the Finns did not focus on Soviet strengths but rather capitalized on the weaknesses that reduced the effectiveness of Soviet armor and other enemy force advantages. The idea was to establish a defensive position in rough or forested terrain. Given time, the Finns would establish a second line to fall back to. As the Soviets approached, they would contact the second defense line. The Finns would then encircle the baited Soviets and attack them in the flanks and rear.²⁴ Regarding this variable, advantage goes to the Finns.

2. Speed Differential between maneuver and main or holding force. The Soviets initially had a speed differential of about three to one between their maneuver and main forces. The Soviet armor operated at about eighteen miles per hour. The infantry marched at about three to five miles per hour. When the snow came, the speeds of both were generally reduced to about five miles per hour on roads.²⁵

The Finns had essentially the same speed for their maneuver and main forces due to lack of motorization and armor. The Finns made up for this by using skis for their approach marches and attacks. These were in ample supply. The regular forces were equipped with quick release, custom skis. The reservists brought their own skis, also effective because they were accustomed to the use of them.²⁶ The net result was to increase Finnish mobility to about ten miles per hour. Regarding this variable, advantage goes to the Finns.

3. Speed Differential between Soviet and Finnish maneuver forces. The maneuver potential between the two forces was an advantage for the Soviets, given proper terrain and climate. The Soviets should have enjoyed a three to one advantage over the Finns. The snow, forested terrain, and tactical employment of Soviet troops, however, gave the Finns a greater than two to one advantage. So, overall, the advantage goes to the Finns.

4. Technology. The Soviets had the clear advantage in technology. Their armor was good, their artillery accurate and their air force advanced for its day. In regard to the combat functions, the Soviets should have had the technological and equipment advantage for maneuver. Their superior fire support was also a strength. Command

and control should have been easier for the Soviets, due to their numerous radios as compared to the Finns. Soviet armor also added to the numbers of radios available for command and control. Ineffective but determined reconnaissance, however, caused the Soviets to report attacks all along their columns. While these attacks certainly took place, the Soviets gained the impression that the Finns had far superior numbers to their own.²⁷

The one technological advantage the Finns had was at the lowest tactical level. This was the Suomi submachine gun, which provided effective fire power in restricted terrain. As to Finnish advantages in the combat functions, the Finns possessed few advantages due to technology. Still, Finnish efforts in training and organization were a key part in negating advantages in Soviet technology. The Finns also possessed an advantage in logistics. The Finns had well-supplied and well-fed troops. This was largely due to their being used to the environment and climate of their home country. Overall, advantage goes to the Finns.

5. Mobility. The Soviets possessed the right equipment for mobility but this was largely ineffective in the terrain chosen for battle. Initially, the Soviets gained mobility due to surprise and use of their own communication networks. This quickly changed in favor of

the Finns once the Soviets had to negotiate the forested and rugged terrain. The Finns proved more mobile due to their doctrine and organizations. They also adapted to problems of mobility better than their Soviet counterparts, who were less able to adapt doctrinally to changing circumstances. As Lauri Paananen noted, "Events clearly indicated lack of creative leadership within the Red command; they fought according to the rule books and there seemed to be no deviation even when the situation called for it."²⁸ Finland ultimately held the advantage in mobility.

6. Sustainability. The Soviets had an effective system of supply and provision. Most Soviet soldiers were well supplied with arms and ammunition. While winter clothing could be lacking, the real problems with sustainment were due not so much to the system's organization as to the inability of the Soviets to protect their lines of communication. Once their lines were cut, the Soviet inability to resupply had a devastating effect on units. The Finns capitalized on the road-bound nature of the Soviet sustainment effort and used it against them. The result was entire divisions being cut off and eventually destroyed.

The Finns, on the other hand, enjoyed most of the essential resupply needs. They were less reliant upon heavy equipment. They had tentage, food and fuel organized into small elements, resulting in self-sufficiency for most of the organizations. Their weapons were of the same caliber as the Soviet's, allowing for captured stocks of ammunition to be used. While medical resupply was a problem, most wounded could be evacuated to facilities that had better care. At no point did the Finns lose heart due to lack of sustainment. Advantage goes to the Finns.

7. Firepower. The Soviets had immense capabilities to employ firepower on the Finns. However, the relative firepower that could be brought to bear was limited. The Soviets had a clear advantage in long-range firepower. The strength of Soviet armor and artillery meant that no Finns could go face to face with the Russians in open terrain. But the terrain negated much of the firepower advantages that the Soviets possessed. The road-bound nature of their forces all but prevented what was at the head of a column from being employed against the Finns. If the Soviets tried to deploy around the flanks in support of the head of the column, they were met with devastating close-in firepower from Finnish machine guns, submachine guns, and

grenades. Due to the close-in nature of the fighting, the Finns had the decided advantage.

8. Deployability. The Soviets had the initial advantage when they were working from their own lines of communication within their borders. This changed, however, when the attacks took them from their prepared routes into a dense, forested terrain. The Finns, working on interior lines, were able to ski their reserves to the most critical points in the battle. The Soviets could not do this, being limited to the road networks, frozen lakes and trails. When Soviet forces attempted to reinforce beleaguered units by some other route, they were met with stiff resistance from the less heavily equipped Finns. The Soviets' inability to reinforce allowed for the Finns to cut units into small pockets, later to be destroyed. The Finns' freedom of action resulted in concentration of deployed forces to deal a severe blow to Soviet penetrations and demonstrates their clear advantage in this variable.

Summation

While many reasons could be cited for the failure of Soviet arms and the success of Finnish arms, a few seem to be more salient. The Soviets had an overconfidence in their firepower and equipment. They believed that the

battle would be short. Consequently, their operations were not carefully coordinated in the initial stages of the conflict because of the belief that the Finns would not put up stiff resistance.²⁹

Another major contributor to the failure of the Soviets was their direct maneuver approach. Historian Richard W. Condon writes that the Russian leadership "remained blindly committed to their original plan and failed to alter it under the changed conditions of actual war, apparently believing that more tanks and more men would compensate for lack of foresight."³⁰

Finally, the Soviets lost the ability to maneuver and reinforce. The factors of mobility, deployability, and speed of the Finnish forces placed immense pressure upon the invading army. As a result, Soviet advantages in technology, armor, and abundance of firepower were largely negated.

II. The Battle for France

I ought to cover you. It's absolutely impossible. My right wing corps has collapsed. Between Montmirail and Sézanne, there's a merry-go-round of tanks. I've nothing with which to fend it off.³¹

General Touchon,
Illustrated World War II Encyclopedia

Unlike the Russo-Finnish War, the Battle for France provides an example of major powers fighting with basically equal equipment and capabilities, with the exception of perhaps air power. What was not equal was the approach each used to maneuver. The divergence in maneuver thinking was the chief cause for the failure of modern, well-equipped Allied forces in May and June of 1940.

The Allied Strategy

The French and British plan called for a delay by the Belgian armies to the river Dyle (see figure 8). There, the Allied First Army Group would pivot on the defensive hinge of the Allied Second Army Group in the Maginot Line. Together, these forces would prevent further incursion into Allied territory and prepare for offensive action. A Third Army Group protected the flank in the south.³²

The basic strategy of the Allies was to counterattack with infantry based formations, supported by armor, to achieve objectives. If an enemy breakthrough threatened, armored forces would counter to restore the situation. The aim appeared to be more defensive in nature, relying on prepared defenses with no clear goal in relation to either German territory or German forces.

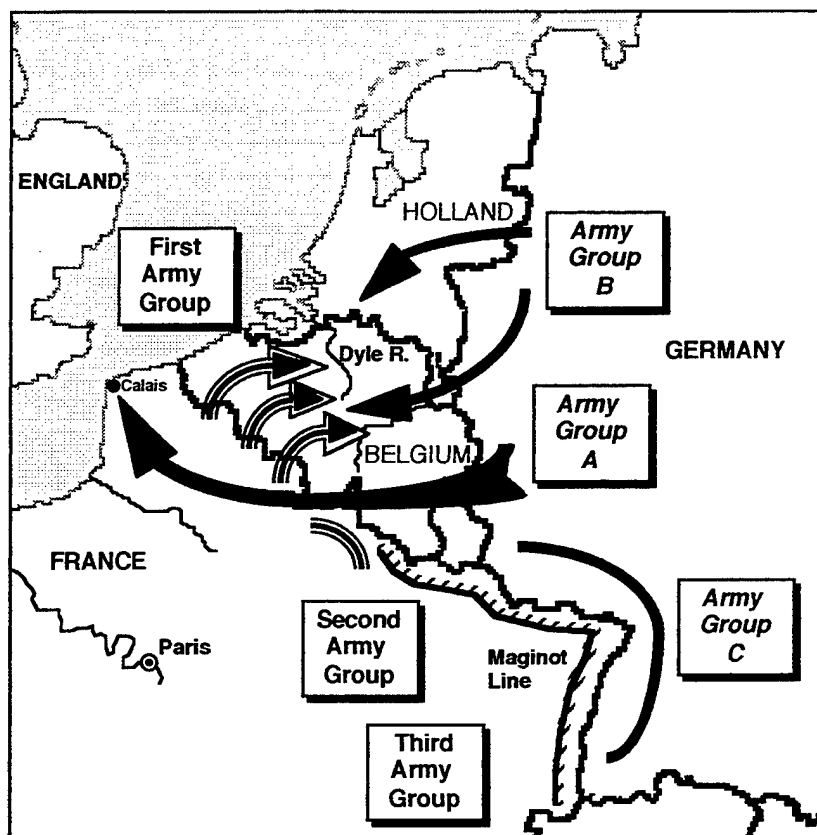


Figure 8. The Opposing Plans for the Western Campaign

The German Solution

The German plan for operations on the Western Front was as follows (see figure 8): After a bombardment of civilian populations, the German Army Group B would secure Holland. Moving at a restrained speed, Army Group B would then enter Belgium in an effort to let the Allies execute their plan to send her main effort into that country. Once the allies moved forward into Belgium, Army Group A would maneuver with armored forces through the Ardennes Forest to

exploit a gap between the Maginot Line and the Allied main effort.

After exploiting the gap, Army Group A would attack toward Calais and split the British and French forces on the continent. The Allied main defense would now be caught between Army Group A and Army Group B, with little in the way of reinforcement to defend her capital and vital industry. Should the armies in the Maginot Line attack north, Army Group C would be waiting along its front. Should it stay, exploitations south would trap it in conjunction with the Army Group C attack.³³

The German strategy had two objectives: the splitting of the enemy main force in the North, and the defeat of the French forces defending the capital in the south. Sir Basil Liddell Hart summarized Germany's strategy shortly after the campaign:

The most significant feature of the Western campaign was Hitler's care to avoid any direct assault, and his continued use of the indirect approach....By his 'baited offensive' against the two small neutrals, Holland and Belgium, he managed to lure the Allies out of their defences on the Belgian frontier. Then, when they had advanced deep into Belgium, their march being deliberately unimpeded by his air force, he struck behind them--with a thrust at the uncovered hinge of the French advance.³⁴

In each objective, armored forces played the leading role, relying on mobility and indirect maneuver to cause the collapse of the Allied armies.

Communications on both sides were modern by standards of the day. The Germans, however, had gained a decided advantage by emplacing radios in each individual tank. This allowed better command and control and made it possible to adapt to changing situations more quickly. The Germans also had an effective centralized communication system which allowed for coordinated operations. Lines of communication were secured by mobile infantry formations.

The French and British, on the other hand, lacked radios in sufficient numbers for their armored vehicles. The command and control structure was set using methods employed in the First World War.³⁵ Lines of communication would be secured by mobile forces.

Both sides enjoyed advantages in terrain and weather, the late spring season being ideal for operations. Mobility was about equal, favoring those that exploited their capabilities, usually the Germans. France possessed what many believed to be the best armor at the time. Although French tanks were designed to support infantry, making them somewhat slower, and had a reduced fuel range (more would fall into German hands due to disrupted logistics rather than direct combat action), they also had many strengths.³⁶

German Panzer General Heinz Guderian, experimenting with a captured French Char B tank in the final stages of the campaign, was astonished to see how resistant it was to solid shot. After the battle, he came to the conclusion that if these machines had been properly employed, the story of the German breakthrough might have been much different.³⁷

A Swift Campaign

The campaign opened on 10 May 1940. With minor exceptions, it went exactly as the Germans had planned. They struck at Holland, which fell on the fourteenth of May. Allied and German advances into Belgium converged at the Dyle River on the fifteenth of May. As the Allied First Army Group and German Army Group B fought a war of position, Army Group A carefully maneuvered its armored divisions along the Meuse River vicinity Stenay and Sedan. This became the decisive action of the campaign.

The French never dreamed that the Germans would make the Ardennes their main effort. All indications to date--the air bombardments, the airborne assaults, the movement of forces--seemed to indicate a German main effort in Belgium. Even so, after securing an infantry bridgehead near Sedan, the German panzers exploited a gap on the thirteenth of May. Just as the French and British main

effort was settling along the Dyle River on the fifteenth, the Germans developed a fifty-mile breach in the Allied defense.

The French leadership called for the reserves, forming the Sixth Army, to plug the gap. It was too late. By the 21st, the Germans had reached the English Channel. The newly formed French 4th Armored Division under Charles DeGaulle did conduct the only successful counterattacks into the southern flank, only to be driven back by superior air power.

In less than a week and a half, the battle had been decided. A week later, the British and French Armies would be annihilated or evacuated in the north. During the next three weeks, the Germans captured Paris, the futile French direct counterattacks were driven back, and the French armies completely collapsed. Thus ended one of the most stunning examples of indirect maneuver ever witnessed in warfare.

While admiring the effectiveness of the German use of maneuver, Basil Liddell Hart lamented that it could have been prevented by the Allied forces who possessed much of the same indirect potential as the Germans. "The fact that it came off," judged Liddell Hart, "was chiefly due to the recklessness, or perilous conventionality, of the French

Command."³⁸ Despite advantages in technology, many in France and Britain believed that their main battle forces could counter any German threat with superior or equal speed, thus preventing decisive maneuver from such forces.

The French further believed synchronization and coordination were the keys to which all successful battle would be achieved. Concentrations of firepower would produce gains and the reasonable, methodical approach assured victory. Armored forces were a vital part of this methodical approach. In French doctrine, "They were just intended to cover the frontage of the field armies. If and when the Maginot Line was outflanked or pierced, having completed that role they were to occupy positions from which they could either be parceled out as mobile pill-boxes or gathered together as a mobile reserve for use as a rupture force if the enemy showed signs of breaking."³⁹

That this strategy was inadequate to counter the speed differential that the German Panzers displayed in May 1940 is best summed up by noted historian Marc Bloch, a staff officer on General Jean-Georges Maurice Blanchard's Staff. Commenting on the tempo of Blanchard's French First Army, he observed, "From beginning to end the metronome at headquarters was always set at too slow a beat."⁴⁰ After

the fall of France, nations around the world began to examine the indirect use of armored forces.

Analysis

1. Type of Maneuver. As shown in the summary of the Battle for France above, the opposing forces had different approaches to maneuver. The Allies, particularly the French, were decidedly direct in their approach to maneuver. They believed that the German strength would not only come, but could also be contained, in Belgium. Penetrations, in general, could be dealt with by mobile forces in decisive counter attacks.

The Germans, on the other hand, employed one of the most classic cases of indirect maneuver in history. By baiting the Allies into Belgium, they concentrated their main effort in a maneuver role against French weakness. It became even more effective because it presented to the Allies what they expected in Belgium on one hand, and provided a surprise attack into an area the French believed to be secure. The advantage clearly goes to the Germans.

2. Speed Differential between maneuver and main or holding force. The Allied and the German maneuver forces potentially had a speed differential of three to five times between their infantry and their armor. The French and

British handicapped this potential in their own forces by making non-motorized infantry organizations their main maneuver forces.

The Germans, on the other hand, used their armor for their main effort. The Germans did not possess a superior number of tanks compared to the Allies. By grouping their armor together, they created a powerful maneuver capability. The panzers were only 8 to 10 percent of their total force, yet the Germans continuously made them their main effort. This gave them a speed advantage over their infantry organizations of about three to one. Advantage goes to the Germans.

3. Speed Differential between Allied and German maneuver forces. Due to the doctrine and organization of the Allied forces, the Germans gained a decided advantage over them. The German panzers, as a maneuver force, were about two to three times faster than the maneuver forces of the Allies. This greatly affected the counter attack capability of Allied forces.

4. Technology. Aside from any numerical advantage on either side, the Allies and the Germans were roughly equal in technology. France had modern armor, artillery and aircraft at their disposal. While their aircraft were numerically lacking compared to the German air force,

Britain somewhat balanced the sheet in both quality and quantity. France possessed superior artillery, which provided an initial edge in fire support.⁴¹ Lack of motor support for the artillery affected this advantage in later stages of the campaign.

Germany had the technological edge in command and control. Their radios provided a vital link to maneuvering forces. The organization of panzers and panzer infantry also gave Germany an advantage in maneuver. In this case, German armored technology was put to better use than that of the Allies.

5. Mobility. France and Belgium provided good terrain for both offensive and defensive operations. The climate in May and June of 1940 was also suitable for operations in most cases. Nevertheless, Germany gained an advantage in mobility largely because of their doctrine. As shown above, France and Britain possessed the necessary elements for decisive mobility, but chose instead to use their mobility to deny enemy penetrations instead of creating them upon the enemy. By the time the orders came for counterattacks upon enemy penetrations, it was generally too late. This paralysis was due largely to faulty doctrine, which held that there would be time to deploy forces to the areas of greatest need.

The Germans also gained an advantage in mobility by adapting their doctrine, organizations and equipment to operate in the Ardennes terrain, which was thought to be unassailable by tanks. The adaptable doctrine of the Germans pitted against the inflexible doctrine of the Allies ensured that the Germans would maintain the clear advantage in mobility.

6. Sustainment. The French had a good system for sustainment, both for her static forces in the Maginot Line and for the forces operating in Belgium. In the 1930s, large investments were made to increase the numbers of trucks for transport and resupply. The French and British also had the advantage of being more defensive, thereby allowing the use of interior lines and established routes. Consequently, the French had a system that was fully capable of resupply, at least at the outset.

The Germans still relied on a great deal of horse transport. They compensated for this by organizing supply vehicles into the organizations requiring them and the horse transport was used for the bulk of the holding or main forces. By weighting their main effort logistically, they were able to overcome many deficiencies. The net result was a sustainment system that became roughly equal in efficiency to that of the Allies.

7. Firepower. On the surface, the French possessed clear advantages in fire power. Their tanks possessed greater caliber guns and the French artillery was numerically superior if not also technologically superior to the that of the Germans. The Germans were able to make up some of this in the use of air power--particularly dive bombers.

8. Deployability. In this domain, the French and British clearly failed. What should have been a shifting of mobile reserves in their doctrine, instead turned into a scenario of arriving too late. Additionally, France employed their forces to conduct counter attacks instead of setting up new lines of defense. By the time the counter attacks began to take shape, the line they were trying to restore was irrelevant. A new line behind them had already been breached.

The Germans were able to deploy forces in the right places at the right times mainly due to the use of indirect maneuver. By avoiding strength and heading deep into weakness, they were able to signal follow-on forces into the gaps created. Sound doctrine, coupled with sound maneuver and communications, allowed the Germans to deploy forces to the decisive action.

Summation

Just what the causes were for France's defeat and Germany's victory has enamored historians since 1940. While divergent reasons are given--ranging from the mastery of the German war machine to the complete ineptness of the Allies--there is one point of consensus involving operational maneuver: Germany clearly outmaneuvered their opponents. By choice of indirect maneuver, as shown above, the Germans were able to collapse the Allied defense in four short days. The campaign would end in little more than a month.

Germany used organizations that stressed indirect maneuver. Bypassing enemy strength and capitalizing on weakness, the Germans were able to move faster than their opponents. Their mobility was increased because their equipment and organizations could readily adapt to the environment that gave them the best advantage. Their panzer leaders created an indirect mind set that would take risks. Their units would use their speed and deployability to great advantage. The net result was victory in the face of excellent equipment, technology, and manpower.

III. The Yom Kippur War

As tanks and APCs withdrew past the observation post, I stopped some of them to talk to the officers and saw something strange on their faces--not fear but bewilderment. Suddenly something was happening to them that had never happened before. These were soldiers that had been brought up on victories--not easy victories maybe, but victories. It was a generation that had never lost. Now they were in a state of shock. How could it be that these Egyptians were crossing the canal right in our faces? How was it that they were moving forward and we were defeated?⁴²

General Ariel Sharon, *Warrior*

After Egypt's humiliating defeat in the 1967 Six Day War, their armed forces underwent a major transformation. Politically, the country had also changed under the able leadership of Anwar Sadat. Israeli occupation of the Sinai and half of the Suez Canal was an unacceptable state of affairs and an injury to Egyptian national pride. But how could Egypt, with an inferior army, air force and weaponry stand up to Israel, a middle eastern strong man?

Sadat wanted his military to seize a strong bridgehead on the Suez Canal. The size of the bridgehead was not as important as holding it. This would serve two purposes. First, Israeli border defenses would be shattered forcing that nation into a more insecure posture on territory closer to Israel proper. Second and more importantly, Sadat wanted the bridgehead to force an international

diplomatic intervention by waking up the superpowers. Through diplomacy, he hoped to secure the return of the territory he had lost--as had happened in the 1956 war with Israel. With these clear aims, Egypt would transform their army to attempt to achieve such purposes.

Israeli Defensive Strategy

Israel enjoyed the advantages of strong borders for the first time since their reestablishment in 1948. The chief aim for the Israeli Defense Force (IDF) was to maintain these borders. Israeli economy and Israeli prestige had flourished in the seven years between the wars. Expensive and well-made fortifications along the canal provided an initial defense. The main strategy of their total defense was based upon three pillars: Intelligence, Air Force and Armor. Israeli leaders expected forty-eight hours advance warning for an attack. Once warned, Israeli reserves could be called and the air force and tanks would be expected to take the decisive battle to the Egyptians and any allies enticed into joining them.

Egypt was not ignorant of the superior weapons and technologies that Israel possessed. They had been on the receiving end of these capabilities before. But Israel had

vulnerabilities. Israel considered their manpower to be its most precious resource. If this could be exploited, the chances for a favorable Egyptian outcome could be increased.⁴³ Israel also had a powerful air force and armored force. These forces would have to be neutralized to hold any bridgehead on the Sinai. If done, Israeli sources of strength would be unable to prevent a successful lodgement on the east bank of the Suez.

The answers to overcoming these enemy advantages were through indirect means. Egypt hoped to solve the problems of crossing the canal by the ingenious use of water cannons that would cause the sand to collapse and the immediate fortifications to crumble. As to the strong points along the canal, Egyptian infantry armed with antitank weapons planned to bypass these. They would then lie in ambush for the Israeli armor that was sure to come to the rescue of the strong points. To prevent the Israeli air force from conducting devastating attacks on the bridgehead, Egypt acquired new and sophisticated surface to air missiles from the Soviet Union.

By understanding Israeli doctrine and vulnerabilities and using them to their own advantage, the Egyptian army hoped to transform itself from one of embarrassment to one of respectability. Even these efforts were designed to

achieve an indirect means to victory through diplomacy. Sadat knew that any Egyptian gains that were not legitimized by the superpowers would be negotiated away by the superpowers at the peace table.⁴⁴

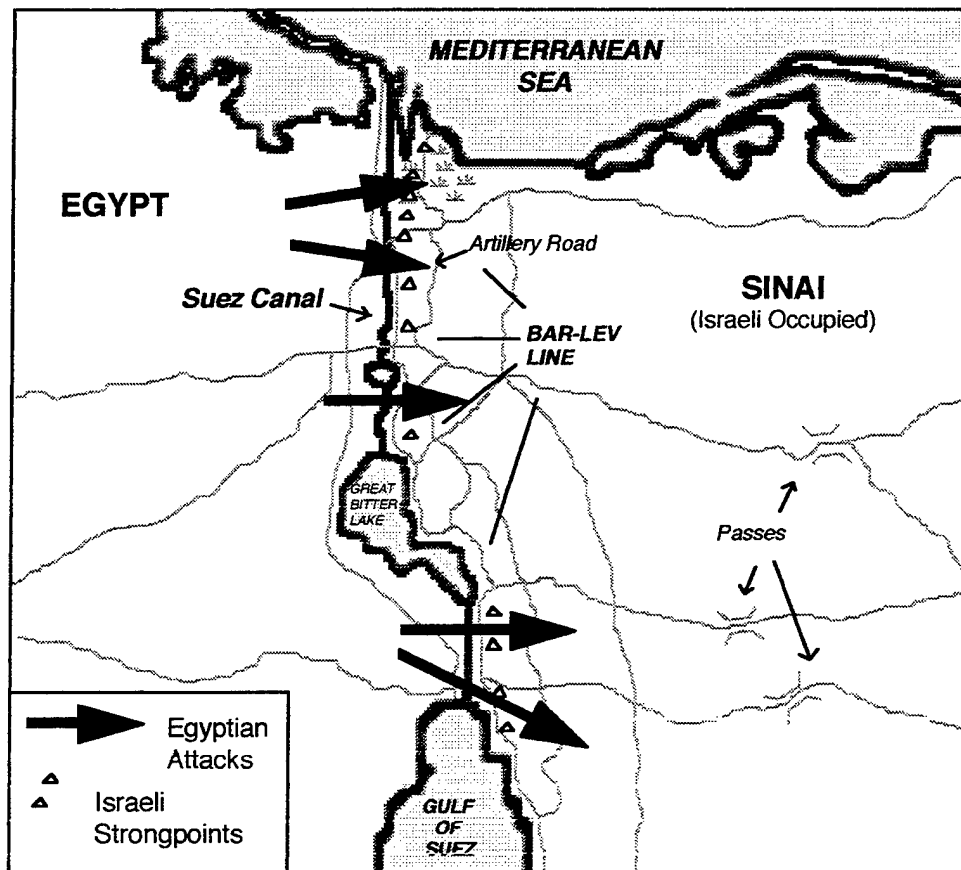


Figure 9. The Opposing Plans, Yom Kippur, 1973

Given this brief outline of the political and military situation, the dispositions of Egyptian and Israeli forces make more sense (see figure 9). Israel had planned to defend their national borders forward along the Bar-Lev

line, a sophisticated system of strong points along the canal at a depth of thirty to forty kilometers. The Suez Canal was, in effect, a giant tank ditch which the Egyptians would have to breach. While the infantry held the strong points, an armored brigade--supported by the Israeli air force--would conduct counterattacks on enemy forces attempting to cross. This initial active defense would buy time to form two divisions of armored reserves. A swift attack would then be launched across the canal into enemy territory to cut-off Egyptian lines of communication. While there were a couple of variations to this plan, the forces available were essentially the same. In all cases, the success of the Israeli plan depended on the success in stopping an Egyptian crossing on the Suez.

The Egyptian Plan of Attack

The Egyptian operational plan was clearly defined based on the government's objectives. These objectives were limited in scope: the penetration into the Sinai was to be no more than twelve to fifteen kilometers. The units could plan an advance to the three passes in the Sinai, but that was not the objective. Authority to attack toward the passes rested with Sadat himself. No air defense umbrella would be available at those distances. In Sadat's mind,

the objective was the humiliation and punishment of the IDF, whose suffering of high casualties would contribute to a favorable peace. The objective was not to gain terrain on the battlefield. That would come through diplomacy.

The Egyptian objectives were to be achieved through three main crossings by infantry divisions supported with armored brigades, so the Israelis would not know the location of the main effort. Enemy counterattacks would be handled by an indirect bypass of Israeli strength. As Israeli armor rushed to the strong points, they would be met in a mismatched ambush of infantry against tanks. Historian George Gawrych writes, "The Egyptians thus approached the war with some confidence in respect to the tactical defensive....The Egyptian Armed Forces had trained to turn Israeli breakthroughs into opportunities. The conduct of a major offensive based on air defense and infantry carrying antitank missiles represented an innovation in modern warfare and caught the IDF off guard."⁴⁵ This novel and indirect maneuver approach to achieve a victory confused many in the early days of the campaign.

The Egyptian divisions' objectives included expanding the bridgehead line to the first main lateral road past the strong points known as the Artillery Road (see figure 9).

Once secure, they would revert to the defense and use their own armor to prevent enemy breakthroughs. The Egyptian air force would support the crossings in the surprise strike, then revert to defense. They knew their planes were no match for the Israeli air force.

Communications for the Israelis depended upon secure routes for their armored counterattacks. For the Egyptians, air defense was essential in preventing the disruption and isolation of their bridgeheads. The Israelis had an advantage in mobility, due to the high number of armored units in her inventory. Egyptian requirements for mobility were less since her objectives were limited. Both sides were accustomed to the desert environment.

A Campaign Full of Surprises

The attack opened on 6 October 1973 after careful diplomacy and deception. Sadat's cooperation with Syria in the north was designed to tie down Israeli reserves closer to their homeland. The Syrian build up was masked by an Israeli patrolling incident in Syrian airspace, which resulted in a Syrian jet being shot down. Many Israeli and Western intel sources read the build up as a Syrian protest to Israeli aggression. The Egyptian build up was announced

long before as a scheduled fall exercise, all designed to fall on the Jewish Holiday of Yom Kippur. This, they hoped, would delay the call up of Israeli reserves. As a result, the surprise was complete.

Egyptian forces crossed the Suez in a matter of hours rather than the one to two days predicted by Israeli intelligence. The water cannon made the huge ramparts simply disappear. By nightfall, the immediate objectives were being secured. Israeli armor rushed to the rescue, only to be hammered by unseen Egyptian infantry firing Sagger antitank missiles. The Israeli losses were appalling. Supporting aircraft were forced to fly a virtually impossible mission through a well-established Egyptian air defense umbrella, with the Israelis losing the equivalent of an entire squadron from their small but sophisticated air force in the first twenty-seven hours.⁴⁶ In the North, the Syrians had nearly gained the Golan heights from the Israelis as desperate fighting ensued.

By the second day, Israeli armor had been gathered in sufficient strength to launch a counterattack and seize the offensive against the Egyptians. It failed miserably. No breakthrough was achieved and the strong points that had not already surrendered to the Egyptians were isolated.

For the first time, hundreds of Israelis were taken prisoner.

On October 8th, a bold Israeli attack was mounted to relieve the strong points and then advance west across the Suez. This attack amounted to one of the worst defeats in IDF history. Israeli armored divisions resembled mere brigades after the action. In the attempts to dislodge Egyptian bridgeheads, Israeli forces launched frontal attacks. Gawrych notes, "Without air support and lacking in sufficient artillery and infantry, Israeli tankers in the Sinai found themselves vulnerable. Israeli doctrine had become too armor heavy, few Israeli artillery pieces were self-propelled, and their mechanized infantry formed a weak link in their maneuver operations."⁴⁷ Perhaps the best assessment of Israeli direct maneuver techniques employed against Egyptian indirect maneuver is summed up by the comment from General Avraham Adan, commander of one of the Israeli armored divisions, "Today, it is easy enough to see that we were prisoners of our own doctrine."⁴⁸

Slowly, the Israelis began to assess the true situation. After initial disbelief, they determined the Egyptians would not budge. An operational pause occurred as Israeli leaders focused their main effort to the north to deal with the ominous Syrian threat in the Golan.

Feeling the effects of this shift, the severely pressured Syrians sent a plea for help to the Egyptians.

After outright rejection of any attempt to attack further into the Sinai, Sadat was compelled to help Syria and ordered an attack toward the passes. Launched on the fourteenth of October, the attack met with disastrous results, due largely to superior Israeli air power and the inability of the Egyptians to extend the air defense umbrella. Seizing the opportunity created from these events, the Israelis regained the initiative and by the sixteenth of October had crossed to the west bank of the Suez Canal. For the next several days, the IDF met with extremely stubborn resistance. Finally, the Israelis were pressured by the West into a cease fire.

The result of the battle may have been a tactical victory for the Israelis, but it was not a clearly decisive one. Egyptian long-term objectives were nearly all realized. Within six months, the Israeli leaders in government lost power. The IDF suffered a severe blow to its prestige. Israel could no longer afford the military option of national defense as the sole means for maintaining national sovereignty. The war proved too costly for the Israeli people to accept purely military options in the future. Israel had suffered 2,800 killed,

7,500 wounded and 500 captured. To put this into perspective, the United States suffering equivalent losses in the Vietnam War would have lost 200,000 in killed alone--four times the actual amount.⁴⁹

Israel would eventually explore negotiation with their neighbors to augment their security. Within a decade, Egypt possessed the Sinai peninsula, had strong ties to the West, and had restored Egyptian national pride. Their indirect war with Israel had been a success.

Analysis

1. Type of Maneuver. The Egyptian approach to maneuver was indirect. Their offensive was designed to bait the Israelis into an area where they could gain an advantage by counter-attack. They used novel and innovative means to negate many of the advantages of Israeli forces. They avoided Israeli strength and found ways to turn Israeli strength into liability.

The Israelis were confident in their direct means. In previous conflicts, Egyptian forces had crumbled easily when they lost their sources of strength. The lessons drawn from the previous conflicts led Israeli leaders into thinking that direct armored assault was the key to any victory. It was their belief that precision attacks by

tank and air forces would eliminate any strength the Egyptians attempted to gather on the eastern bank of the Suez. Additionally, there was no reason to think that superior weapons and equipment could not carry the day. Advantage goes to the Egyptians.

2. Speed Differential between maneuver and main or holding force. Both sides relied on armored formations for their maneuver. The Egyptians used infantry formations to gain their bridgehead, but this was due to the infantry nature of the assault. Modern armor and mechanized infantry in maneuver forces of both sides created a differential from main or holding forces of about three to one. In this respect, no clear advantage was enjoyed by either side.

3. Speed Differential between Egyptian and Israeli maneuver forces. The offensive defense of the Egyptians affected the maneuver use of their armor. While possessing a speed capability equal to the Israelis, their armor was generally used to reinforce or counterattack. The Israelis could not capitalize on the restrictive nature of the Egyptian deployment of maneuver forces. Their armored formations were reduced to immobility by the novel Egyptian employment of infantry. When taken together, the actual

speed correlation between Israeli and Egyptian maneuver forces was about one to one. Advantage to neither.

4. Technology. With a couple of exceptions, the Israelis held the technological edge. Their accurate weapon systems and very modern air force resulted in a clear fire support advantage. Well-equipped armored formations should have given them the technological advantage in maneuver. Israeli command and control capability was also very efficient due to advanced communication systems and modern U.S. equipment. The results of the battle notwithstanding, the Israelis held most of the technological advantages.

The Egyptians did possess a couple of technological strengths, but not enough to make them technologically superior to the Israelis. The Egyptian engineers were very effective. They used innovative methods that proved more than effective. These methods were viable because of modern, off-the-shelf technologies. While not necessarily designed for warfighting, they were nevertheless effective. Egyptian air defense also proved to be very modern and effective. It is interesting to note the few technological advantages that Egypt possessed were used to negate the numerous technological advantages of Israel. Even so, the advantage goes to the Israelis.

5. Mobility. Israel possessed great mobility potential. Their system of reserves was crucial to the survival of Israel. This potential was severely reduced by Egyptian indirect means in intelligence and maneuver. The Egyptians created effective mobility by sound doctrine, new organizations of infantry and air defense, and by setting limited but important operational objectives. The result was an Egyptian advantage in mobility in the crucial events of the battle.

6. Sustainment. Since Egyptian objectives were limited and Israeli forces were fighting on their recently acquired home territory, both sides were able to sustain their force in the environment and climate. As the campaign continued, both sides generally were able to maintain supply in changing situations. The exceptions would be the resupply of Israeli strong points in the opening fight and the sustainment of Egyptian forces cut off in the closing stages of the war. As a whole, sustainment capabilities were about equal, with neither side being able to fully influence the other.

7. Firepower. Israel had a clear advantage in fire power capabilities. The United States supplied Israel with the latest weaponry, not second hand equipment. In one to one duels, Egyptian equipment was no real match for Israeli

weapons. This was one of the main reasons the Egyptians sought indirect means to overcome Israeli combat forces.

8. Deployability. While closely related to mobility, the difference in this case is being able to get necessary forces to the crucial areas of battle. As shown above, the Egyptians were able to do this better. Their interior lines and limited objectives ensured that proper forces were available at the right time and right place. This was reinforced by the elaborate air defense umbrella, largely preventing Israeli interdiction.

The Israeli deployments suffered so severely in the early stages of the war because they could not prevent Egyptian interdiction of their reserves at the crucial points. This situation was intensified by the opening shock gained from surprise, an incomplete mobilization, and the necessity of fighting a two-front war. Advantage to the Egyptians.

Summation

By seeking indirect maneuver means to solve their problems, the Egyptians were able to turn a tactical defeat into a major political and strategic victory. Israel's reliance upon technology and firepower to secure their borders led to costly direct assaults upon Egyptian forces.

There is no question that the Egyptians outmaneuvered the Israelis to secure their objectives. That these objectives were eventually retaken by the Israelis should not overshadow the fact that the initial success of Egyptian indirect maneuver resulted in the regaining of all of these objectives by Egypt at the conference table.

IV. Summary of the Analysis

These three case studies provide a small sample of what can happen when an indirect maneuvering opponent faces a direct one, whether by offense or defense. What becomes clear in these three studies is the importance of certain variables to the outcome of the battles (figure 10): the type of maneuver, the speed differential between the opponents' maneuvering forces, mobility, and deployability.

<u>Variables</u>	<u>Russo-Finnish War</u>	<u>Battle for France</u>	<u>Yom Kippur</u>
Maneuver	Finns	Germans	Egyptians
Speed	Finns	Germans	Both
Mobility	Finns	Germans	Egyptians
Deployability	Finns	Germans	Egyptians
Technology	Russians	French	Israelis
Firepower	Russians	French	Israelis

Figure 10. Relationship of Variables to Success in Battles

Of the four, the type of maneuver proved most essential. This should not be surprising when one considers that advantages in speed, mobility and deployability are readily negated if one impales himself on an enemy strength. In the above studies, advantages in speed, mobility and deployability were shown to be most effective when built on a foundation of indirect maneuver. In all three cases, the victor held advantages in these variables based on the first advantage stated--indirect maneuver.

Less important to the outcomes were the factors of technology and fire power. The losers in the case studies all possessed advantages in firepower potential. They also possessed clear technological advantages. Surprisingly, the technological advantages were often liabilities.

¹Basil Liddell Hart, *The Strategy of Indirect Approach* (London: Faber and Faber Ltd., 1942), 4.

²Lauri Paananen and Eloise Engle, *The Winter War* (New York: Charles Scribner's Sons, 1973), 103.

³R. Ernest Dupuy and Trevor N. Dupuy, *The Encyclopedia of Military History from 3500 B.C. to the Present* (New York: Harper & Row, 1977), 1054.

⁴Ibid.

⁵Allen F. Chew, *The White Death* (Lansing: Michigan State University Press, 1971), 7.

⁶Ibid.

⁷Richard Condon, *The Winter War: Russia Against Finland* (New York: Ballentine Books, Inc., 1972), 39-40.

⁸Ibid., 45.

⁹Ibid., 81.

¹⁰Lauri Paananen and Eloise Engle, *The Winter War* (New York: Charles Scribner's Sons, 1973), 88.

¹¹Condon, 39.

¹²Paananen and Engle, 64.

¹³Ibid., 67.

¹⁴Ibid., 68.

¹⁵William R. Trotter, *A Frozen Hell* (Chapel Hill: Algonquin Books of Chapel Hill, 1991), 148.

¹⁶Ibid., 166.

¹⁷Ibid., 160.

¹⁸Ibid., 163.

¹⁹Ibid., 169.

²⁰Condon, 76-78.

²¹Paananen, 38.

²²Condon, 40.

²³Ibid., 79.

²⁴Paananen, 36.

²⁵Ibid., 38.

²⁶Ibid., 18.

²⁷Condon, 92.

²⁸Paananen, 69.

²⁹Condon, 76.

³⁰Ibid., 78.

³¹Eddy Bauer, *Illustrated World War II Encyclopedia*, vol.2 (United States: H.S. Stuttman, Inc.,1978), 195.

³²Dupuy and Dupuy, 1059.

³³Ibid.

³⁴Basil Liddell Hart, 304.

³⁵John Williams, *France 1940* (New York: Ballentine Books, Inc., 1970), 158.

³⁶Kenneth Macksey, *Tank Force: Allied Armor in World War II* (New York: Ballentine Books, Inc., 1970), 47-48.

³⁷John Keegan, *Guderian* (New York: Ballentine Books, Inc., 1973) 91.

³⁸Liddell Hart, 304.

³⁹Macksey, 32.

⁴⁰Robert Wernick, *Blitzkrieg*, vol. 2 of *World War II*, ed., Charles Osborne (New York: Time-Life Books, Inc., 1976), 123.

⁴¹Williams, 17.

⁴²Ariel Sharon, *Warrior: The Autobiography of Ariel Sharon* (New York: Simon & Schuster, 1989), 295.

⁴³George Gawrych, *The 1973 Arab-Israeli War: The Albatross of Decisive Victory* (Fort Leavenworth: Command & General Staff College, Combat Studies Institute, 1996), 12.

⁴⁴Ibid., 13.

⁴⁵Ibid., 20.

⁴⁶Ibid., 40.

⁴⁷Ibid., 39.

⁴⁸Avraham Adan, *On the Banks of the Suez* (Novato: Presidio Press, 1980), 218.

⁴⁹Gawrych, 75.

CHAPTER 5

CONCLUSIONS

The answer lies in matching our increased firepower with a significant increase in mobility, perceiving now the possibilities tomorrow offered by technology today.¹

General Ferdinand von Senger und Etterlin,
Race to the Swift

The purpose of this thesis has been to assess the ability of heavy forces to conduct dominant maneuver in the twenty-first century. As chapter 2 showed, dominant maneuver is being able to: mass effects, not forces; conduct simultaneous, brief, violent attacks in multiple directions; and attack, disengage, reorganize, reattack. Additionally, dominant maneuver makes use of high-speed mobility and agility. These factors reinforce the relevance of indirect maneuver in warfare, and beyond that, help to identify maneuver issues facing the U.S. Army today.

At issue is the concern that the current heavy armored force of the United States Army relies predominately upon the direct--rather than indirect--maneuver approach. Worse perhaps, is that future maneuver forces are based upon the current heavy armored force using a direct maneuver model. A thorough review of theoretical maneuver literature revealed that forces whose predominant capability relies on

the direct maneuver approach often fail when encountered by forces employing indirect maneuver.

On this basis, a hypothesis was developed predicting that heavy armored forces are insufficient to conduct dominant maneuver as defined by the U.S. Army for the twenty-first century. Three historical case studies were used to test the hypothesis. Among other trends, the analysis confirmed that even inferior nations could obtain great advantages by employing indirect maneuver forces. Absent an indirect maneuver advantage, the other variables can be neutralized and success becomes less certain. A discussion follows of the results, their ramifications, an alternative, and suggestions for additional research.

The Results

To test the ability of the heavy armored force to conduct dominant maneuver, the analysis of trends across three case studies showed that four specific variables are essential to the successful outcome of battle: the type of maneuver, the speed differential between the opponents' maneuvering forces, mobility, and deployability. Of all eight variables examined, the victor held advantages in these four variables across all three case studies.

Maneuver

In regard to the type of maneuver, the Finns, Germans, and Egyptians all used indirect maneuver as the means to successfully achieve their objectives. For the Finns and Egyptians, the use of indirect maneuver was born of necessity, as no other real means were available to achieve success against the enemy on the direct approach. The Germans could have chosen a more direct path, but instead, chose indirect maneuver to overcome strong Allied forces in Belgium and equally strong fortifications along the Franco-German border. As in the past, the choice to use indirect maneuver is essential in future conflict, as well. The Army definition of dominant maneuver aligns itself closely with indirect maneuver; thus, the future heavy armored force is sufficient only to the extent that it can conduct indirect maneuver.

The Russians, French and Israelis chose a direct path for maneuver with a reliance on good equipment and firepower to make their tactics seem unassailable. In each case, superior weapons and technology were believed to be sufficient to enable a direct operational approach in obtaining objectives; but in each case, they failed. As the U.S. Army begins to rely upon technological upgrades to enhance the direct maneuver capabilities of heavy armored

forces, history indicates that this is no guarantee for success. As the analysis illustrated, direct maneuver, regardless of how technological the force conducting them, often falls short against an indirect opponent.

Speed Differential

The speed differential between the maneuvering forces in battle is also of great importance. The analysis revealed that the forces achieving success all had a faster ability to maneuver than their opponents. Surprisingly, the Finns, though technologically inferior to the Russians, were able to maneuver at several times the speed of their Russian counterparts. The Finns were able to regroup and direct forces to the critical places on the battlefield faster. They achieved superior speed by using skis and snowshoes in terrain that was to their advantage by virtue of their experience with and knowledge of it. The motorized Russian forces found themselves completely overcome by Finnish infantry organizations that, under different circumstances, should have been much slower and less effective than their own forces.

The Germans achieved speed superiority in good terrain against the French. The French should have been able to maneuver at the same pace as the Germans. However, like

the Russians in 1939, the French came to rely on doctrine and organizations that reinforced only direct maneuver. Consequently, the French found themselves completely unable to maneuver at the speed of the German forces.

The Egyptian use of infantry ambushes and air defense, and their concentration on limited objectives allowed them to achieve a local superiority in speed over their Israeli counterparts. While not readily appearing to be a method by which to gain a speed advantage, the Egyptian tactic of gaining a limited foothold on the east bank of the Suez can be compared to Sun Tzu's idea of "baiting" the enemy to attack on unfavorable ground, allowing for a swift counter attack. By just such a tactic, the Egyptians were able to negate most of the speed advantages of the Israelis relative to their own ability to maneuver on the battlefield.

While the Egyptians did not achieve a two or three to one advantage in speed over the Israelis, they were able to achieve stunning success in the first days of the campaign. Thereafter, the speed differential was about equal, even though the Israelis possessed the equipment to gain a marked advantage in speed over the Egyptians. The Egyptian use of limited objectives ensured their success. This success was only broken when the decision was made to come

to the aid of the Syrians, resulting in an abandonment of their indirect maneuver techniques.

When considering speed for future forces, the ability to maneuver quicker than an opponent is essential. The heavy armored force of the future will find itself hard-pressed to gain speed advantages over rotor-based maneuver forces, especially, and will rely heavily on its technology and firepower to gain even a slight advantage over like-speed enemy armored forces. Recall that the analysis revealed technology and firepower are not enough. The capabilities of heavy armored forces in twenty-first century warfare regarding speed are inadequate to sufficiently dominate opponents.

Mobility

Perhaps more important than actual speed advantages of maneuvering forces are mobility advantages. The third trend identified in the analysis was that having the mobility advantage was directly related to success. The ability to adapt to the climate and environment proved decisive for the victors in each case study.

The Finnish ability to adapt to both climate and environment was a major factor in their prevention of total capitulation to communist forces. The inability of Russian

forces to adapt to the Finnish climate certainly caused their severe loss. The Finns achieved good mobility with versatile doctrine and organizations focused on indirect maneuver.

The Germans also achieved a marked degree of mobility when taking organizations through terrain not particularly suited for a particular force. Their desire to pursue an indirect approach led them to explore how to adapt their forces to the environment and thus increase their mobility.

The French proved that doctrine and organizations relying on direct maneuver can hinder mobility, even when the potential exists for a much greater capability. Their inability to use maneuver forces in rough terrain only contributed to the German success.

The Egyptians increased their mobility by adapting their units to counter the difficult terrain at the canal. While both sides were generally able to adapt to the desert environment and climate, Egyptian infantry adapted well to the open desert. While not generally thought of as favorable terrain for fighting against armor, Egyptian infantry used the desert for their small-unit, antiarmor ambushes. Exercising flexibility in doctrine, cooperation between these small units and their air defense proved more than a match for the Israelis.

The Israeli reliance upon mobility for a quick response in all of their defense plans only served to maximize the effect the Egyptians were able to achieve by indirect means. When encountering problems at and near the canal, Israeli doctrine and organizations were not suitable enough to allow the IDF to adapt to the new environment.

Future mobility challenges will be no different. As American land forces prepare to be deployed worldwide, will the heavy armored force be adaptable enough to dominate the environments and climates encountered? Recent river crossing operations raise questions about the ability to overcome water obstacles in Europe. Fortunately, speed was not required for the non-hostile situation at the Sava River in Bosnia. Even so, heavy armored forces will face great difficulty in the future when it comes to bridging, built-up areas, and tropical terrain. As history shows, European terrain, extreme climates and even the desert can be a challenge to armored forces--traditionally believed to be capable of good mobility. Heavy armored forces will face a difficult task to dominate mobility in the twenty-first century.

Deployability

Closely related to mobility is the ability of combatants to deploy their forces in a timely and effective manner to the decisive area of operations. While deployability is often associated with moving forces from one continent to another, deployability is more broadly defined as being able to provide, in a timely manner, the forces necessary to conduct decisive action. Whether this is a continent away or along a sovereign border, the principle is the same. Once again, the victors in all three case studies held the "deployability" advantage.

The Finns had freedom of action to deploy reserves in such a manner as to gain local superiority. They obtained this freedom by attacking in areas where the Russians were not able to interdict these forces. The Russians deployed their forces headlong, often reinforcing failure. Because many of their units could not adapt to the environment and climate, they were forced to hold their position and became unavailable for decisive action.

The Germans skillfully deployed their forces to exploit breakthroughs. These forces were available for decisive action through means of effective radio communication, combined arms coordination, and weighting their indirect thrusts with the maximum means available.

Unlike the Germans, the French and their Allies were deploying their forces to a single course of action along the river Dyle. Allied organizational failures further exacerbated the problem, as needed reserves were in precisely the wrong place. The Allied commanders expected an attack on the direct approach. As Allied forces would organize for a counterattack on the approach they expected, the German indirect maneuvering forces had already rendered their counterattacking plans irrelevant. This happened throughout the campaign. The French and British were seldom able to get the right forces at the right place at the right time.

The Egyptians deployed forces properly by effective use of interior lines. These lines were effective because of the limited nature of the Egyptian objectives. Short distances, effective use of engineers, and clear objectives continued to enable the successful deployment of Egyptian forces.

The Israelis found their efforts to get forces to the fight most difficult considering the indirect approach chosen by the Egyptians. The Israelis had to abandon their counterattacking efforts due to losses created by ambushing Egyptian infantry and air defense forces. Israeli doctrine and over reliance on technology and firepower also added to

the deployability problem. Accustomed to roads and an efficient reserve system, the Israelis were severely hindered in the deployment of forces to the critical areas in the opening stages of the fight. The Israelis also had the added dilemma of deploying to both the Egyptian and Syrian fronts.

The ability of maneuver forces to deploy in the future is no less important. While the actual deployment of forces may involve much greater distances, the necessity of dominant maneuver forces to rapidly deploy to the fight is one of the stated objectives of the future force.

Unfortunately, heavy armored forces must still rely on ships and pre-positioned forces to ensure any rapid deployment. Rapid is a term of considerable meaning but should at least convey the idea to deploy needed forces in enough time to decisively affect the outcome of the battle. Unlike the case study battles, which were conducted along the borders of each nation, the U.S. Army will be expected to deploy forces to decisive areas that may be half a globe away.

Deployment of heavy forces by air is still not practical to achieve any decisive role beyond an initial presence. It is not foreseeable that heavy forces will be able to overcome limitations in deployability without pre-

position floats or stocks of vehicles. Even then, up to a week is needed to get an armored brigade ready to fight, and this is assuming there is a friendly port available. Weeks may be too late in the twenty-first century. Further, a problem arises when trying to secure the floating prepos or picking the right theater for prepositioning land-based pre-stocks.

Firepower and Technology

Changing the focus from the victors to the vanquished, it is worth noting that the defeated opponents also had something in common. Each held advantages in firepower and technology. The Russians had superior equipment and firepower potential. The French had the finest artillery and armor available. The French Infantry was supplied with the best general quality of equipment and was resupplied, more than any other nation, by motorized transport. The Israelis had superior technology in air forces and armor. Superior firepower was available at all echelons, reinforced with sophisticated technology from the United States. The general quality of support to the Israeli soldier rivaled that of the Western powers. In all cases, however, the supposed edge provided by firepower and technology was, in fact, no edge at all!

The analysis illustrated that technology and firepower were not essential to battlefield success relative to the other four factors just addressed (indirect maneuver, mobility, speed differential, and deployability). In every case, the defeated force held technology as its greatest assurance for victory in the planning stages before the battle occurred. Firepower was often seen as a sure bet for overcoming difficult situations that their forces might encounter. Frightfully, this is no less true today! The U.S. Army is embarking on a future experiment that assures success for its heavy armored forces on the basis of technology add-ons and precision firepower capabilities. There is no reason to think that our confidence in technology and firepower is any more valid than those nations studied who found themselves defeated by skillful and innovative indirect opponents.

Reflecting on the results of the analysis, there is ample evidence to conclude that indirect maneuver, combined with a favorable speed differential of maneuver forces over an opponent, mobility, and deployability are vital for success in battle. Of less importance, indeed, having little impact on the outcome of the battles studied, are technology and firepower. Logistics and sustainability are important for all combatants and appeared to be somewhat

obvious if success were to be achieved. Direct maneuver is conclusively shown to be both costly and unreliable as a maneuver option for obtaining operational objectives against a skillful and strong-willed opponent. The implications from these results raise considerable concern about the path the U.S. Army has chosen to accomplish dominant maneuver in twenty-first century.

Ramifications of the Findings

Two things have become clear from the analysis: 1) indirect maneuver--with advantages in speed differential, mobility and deployability--is essential to success, and 2) the heavy armored force is inadequate to enable dominant maneuver in the future.

The future heavy force must be able to rapidly tailor to an environment or climate to conduct dominant maneuver, according to *Army Vision 2010*. Dominant maneuver in the twenty-first century lends itself to the indirect maneuver approach. The emphasis on massing of effects and the ability to reorganize and attack in a completely different direction bear this out. The essence of dominant maneuver is speed, mobility and deployability.² When one considers that the heavy armored force would not achieve a speed advantage over a rotor-based force, is limited in mobility

by bridging and rough terrain, and cannot rapidly deploy anywhere with a an airframe accommodation of only one tank to one aircraft, it is easy to see the disadvantages.

When the results of the historical analysis are examined in the context of the twenty-first century requirements outlined by *Army Vision 2010*, the centrality of the heavy armored force seems less and less compatible. Armored forces today focus almost entirely on fixing to enable local maneuver and overwhelming firepower to create the desired freedom of movement. The heavy armored force is relying upon firepower and technology to promise success in the future. These are precisely the variables that led to a false sense of security among the vanquished forces analyzed in the three case studies.

As the analysis illustrated, as certain as a nation relies on its technology and firepower to achieve victory, it follows that a more skillful but less ably equipped opponent will find a way to defeat these advantages. The result in the past has been shock and horror at the ability of the underdog to completely defeat the supposedly "advantaged" force. America's first battles throughout history are an indication that we are not immune to this phenomenon.

Looking to the other variables that emerged as trends in successful maneuver from the analysis, it is easy to see voids in the capabilities of the heavy armored force at every step. Heavy armored forces no longer have a pronounced advantage in speed over armored opponents and are disadvantaged when facing rotor-based forces. As shown earlier, heavy forces today are likely to face opponents of equal speed and capability. This places emerging threat forces on an equal footing, not unlike France versus Germany in 1940. Absent a speed differential, history illustrates we may lose in the future and thus, heavy armored forces, already losing their speed capabilities, are inadequate to enable dominant maneuver in the twenty-first century.

While the use of heavy armored forces along the direct approach may prove successful against the most incapable of opponents, the analysis shows the danger of countering indirect maneuvering forces with technology and firepower, alone. This thinking also lends itself to costly fixing engagements, which, even if they do not cause great loss of life, as in the Russo-Finnish and Yom Kippur examples, certainly limit the ability to achieve a decisive outcome.

Mobility is another area where a void exists between requirements and capabilities for the future heavy armored

force. While heavy forces have proven capable in an open desert environment, the world is, unfortunately, not a desert. Recent operations in Bosnia show the vulnerability of American armored forces when adequate bridging does not exist. Further, sheer weight of vehicles is making mobility difficult in most of the world's terrain even if bridging does exist. Unless heavy forces are employed in modern, Western countries, the supporting bridge infrastructure is unlikely to be able to support heavy maneuver-based combat operations without extensive engineer work. Most of the world's bridges are simply not built/classified to support sixty to seventy ton armored vehicles. It is somewhat ironic that the force that was intended to provide mobility on all types of terrain is now essentially dependent upon roads to provide the exhaustive amounts of fuel and supplies to keep them going. Given these factors, heavy armored forces will severely lack flexibility and versatility in the future.

However, what if the factors of speed differential and mobility are not as important as firepower and technology, even though the evidence shows the contrary? And just suppose that the direct maneuver approach is as capable as the indirect, even though the theorists of the ages mostly disagree. The issue of deployability must still be faced.

Today, and in the first decade or two of the twenty-first century, armored forces will be called upon to deploy rapidly. Recently, multiple deployments to the Persian Gulf region have clearly shown the vulnerabilities of heavy armored forces when meeting a threat unless large pre-stocks are available for the troops to use and the time is available to deploy. Would the army be so fortunate to have its pre-stocks located precisely where it will fight its next war? Unfortunately, the nation's senior leaders have little choice but to hope so.

If pre-stocks become unavailable, the criticality of air and sea lift becomes apparent. Currently, the air force can lift one tank with one airframe. It does not take much to see that air transport of heavy forces to meet contingencies is not very practical. When turning to sea lift, the Army has made improvements in developing fast support ships to aid in deployment. Even so, floating stocks can take weeks to muster when needed. Additionally, if friendly ports are unavailable, the Army must rely on the early entry capabilities of forces more tailored to the air flow. Imagine the United States fighting the Gulf War without the port of Dhahran available. Again, the heavy armored force is unable to enable dominant maneuver in the twenty-first century.

The problem is staring the Army squarely in the face. The Army vision speaks of conducting dominant maneuver in the future, but has not yet had the vision sufficient to develop a force to achieve it. Some may argue that to get the desired force, a transition in the current force needs to occur; that the technological development of armored forces is the starting point for that transition. However, such a transition completely overlooks the inherent shortcomings associated with the heavy armored force.

The leadership of the Army has created and conducted experiments recently, such as the Advanced Warfighting Experiment, and set conditions based around questionable assumptions best-suited for dominant maneuver by the heavy armored force. The experiments and doctrine supporting them also bear out the fact that the Army persists in using direct maneuver techniques. The result of these experiments and this thinking is flawed. The heavy armored force will not meet the Army's future vision. The wrong horse has been picked. In spite of the fact that the Army will have to ride this horse for the next fifteen years because of procurement issues, it is not too late to consider an alternative in time to impact the Army After Next (2020 to 2025).

The Ideal Maneuver Force

When considering what force might best enable dominant maneuver in the next century, the analysis of success in the past reveals that a force that embodies the best indirect capabilities, a speed advantage, mobility in most environments and climates, and is rapidly deployable will achieve dominant maneuver as outlined by the Army's vision.

Ideally, the force must be able to maneuver on the indirect approach but also have the capability to sustain a fight in the most difficult of circumstances. The force must be capable of maneuvering two to three times faster than potential enemies, the world over. Given the type of armored foes envisioned, this would mean a force capable of cross-country maneuver at one hundred to perhaps one hundred and fifty kilometers per hour. This force must also have to be mobile in extreme climates from the Arctic to the Desert. It must adapt to environments from the plains of Europe to the mountains and jungles of Asia or Latin America to the deserts of Africa. Lastly, the force must be able to rapidly deploy and ideally, be able to self-deploy in some cases.

Consistent with the model outlined in chapter 2 (figure 11), this force would: restore the capabilities of indirect maneuver by not requiring a main force to fix in

order to achieve movement; maneuver two to three times faster than the enemy; be unhindered by terrain; be connected at long range with digital communications; and exert immense pressure on the opponent, forcing him to concede or face certain destruction.

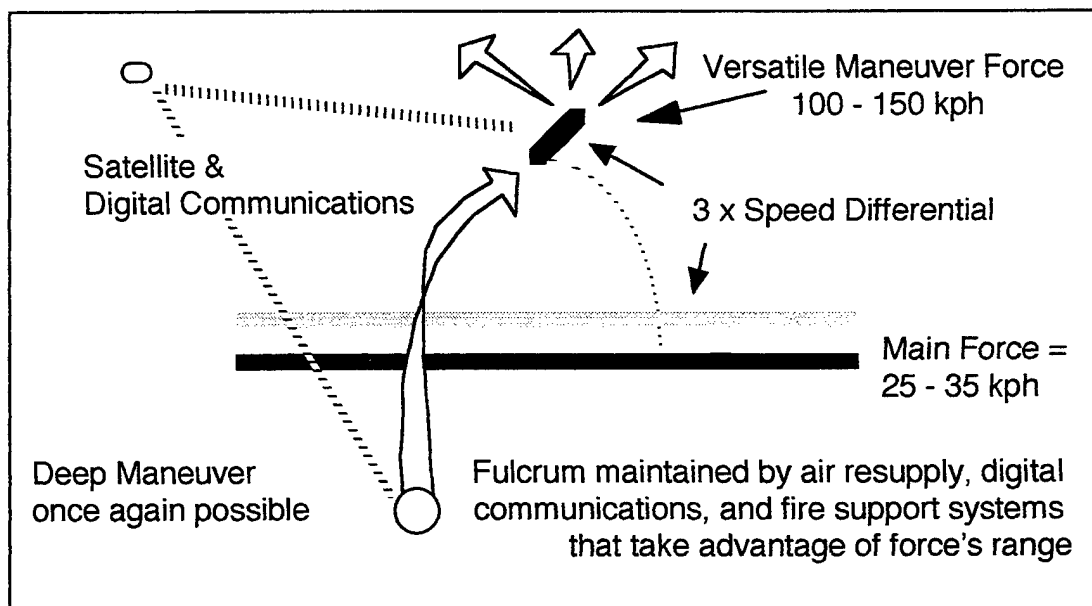


Figure 11. Maneuver Model for 2010

Further, the ideal force must be able to deploy rapidly, without pre-stocks if necessary, but be able to take advantage of them if they were present. If the force could deploy itself, this would be most advantageous. It must also be able to quickly adapt to joint, combined and interagency forces. This should be the driving concept behind the future dominant maneuver force because these are

the capabilities stated for such a force in the future Army vision. The Army today possesses the technology and capability for such a force without making extreme changes to the force structure.

In the last moments of the Soviet Union, great strides were made in the development of rotor capabilities that could fight combined arms warfare. Before his death in 1986, Brigadier Richard E. Simpkin wrote about the capabilities of rotor-equipped forces for maneuver roles. To the U.S. Army, this is controversial. While there may be advocates in the aviation community and among the air assault capable infantry, many in the Army have relegated the rotor force to two roles: aerial truck and aerial artillery. Interestingly, this attitude is strikingly similar to the development phase of Guderian's panzer force in the 1920s. His original mechanized force was assigned merely transport duties and was relegated to menial supporting tasks until he was able to prove the possibilities of a combined arms panzer force.

What is needed today is a vision of a maneuver force that truly meets the requirements outlined by the Army Vision for dominant maneuver. What if a force were developed that combined the incredible freedom of movement enabled by rotor capabilities, the ability to destroy enemy

armored systems at advantageous ranges, and had the terrain capabilities of the infantry? Imagine a force that has two to three times the speed of its opponent, is not hindered by terrain, is capable of self-deployment in certain scenarios, and is more readily deployable by the air force fleet. Such technology is available.

The envisioned maneuver force could be built around a brigade-sized unit, as that is arguably the most robust and practical force for deployment and fighting. The brigade would be developed in two stages: organizationally with off-the-shelf equipment and then organically with transitional equipment. It enables integration into joint warfighting, not just utilization of joint transportation to get to the ground fight. This force would be designed specifically to be used for dominant, operational-level maneuver.

An Alternative--The Air Maneuver Brigade

One proposal for such a force is an Air Maneuver Brigade. Using current and proposed technologies, this force would embody the future vision of dominant maneuver. It would allow for a more practical transition to the type of force needed in 2025. As outlined above, it would use

The Air Maneuver Brigade

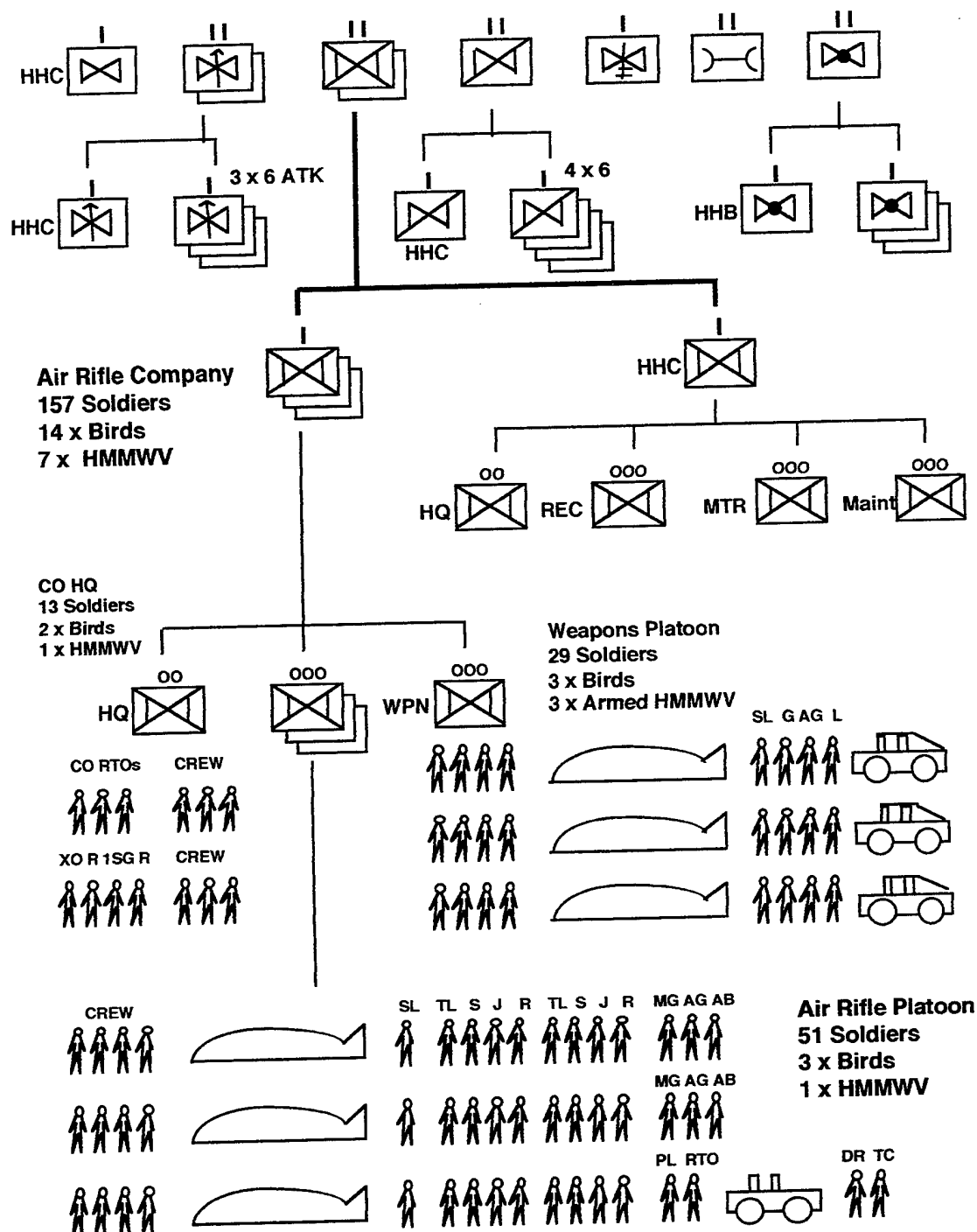


Figure 12. The Air Maneuver Brigade--Stage One

organizational (stage 1) and then organic (stage 2) changes to make the transition from current to future capabilities.

The stage one force would organize into a four battalion brigade (see figure 12). Two of the battalions would be attack helicopter battalions and two would be air rifle battalions. The air rifle battalions are composed of organic infantry and lift aviation. The concept is to use the utility helicopter as an "aerial track" for each squad of infantry. The squad, consisting of nine men and four crew, would be the building block for the air rifle battalions. Three squads form the air rifle platoon. The crew consists of two warrants and two flight crew. There would be no commissioned pilots because the platoon would be led by a commissioned officer.

The platoon would be equipped with two machine gun teams and a troop wheeled vehicle such as a "HUMVEE," which could be sling-loaded when desired. This would provide a measure of mobility for the platoon when they were separated from the aerial tracks. Three platoons would combine to make the air rifle company. In addition, a weapons platoon of three armed "HUMVEEs" and their four-man crews would be added. This platoon would provide an added

measure of firepower for the infantry to operate separate from the helicopters. The armed vehicles would utilize a weapons mix, such as antitank (TOW), grenade launcher and machine gun capabilities.

Three of these companies combine to be the battalion. The battalion would also include a reconnaissance platoon with wheeled capability, and a mortar platoon for separate ground operations. Two of these battalions would provide the brigade with a powerful infantry capability of about nine hundred soldiers. This is currently the number of infantry soldiers in an entire American armored division.

The two air rifle battalions would work in tandem with the air attack battalions. Each attack battalion would have three companies of six attack helicopters. The ratio of air rifle to attack companies would be one to one to assist in a symbiotic relationship during operations. This is not unlike the relationship between heavy armored and heavy infantry companies today.

The brigade would have the necessary support for operations and would include an air artillery battalion. This artillery battalion would consist of three batteries of 105mm howitzers or their equivalent. The brigade would also have one medium lift company to assist in the needs of support.

The stage one force would be capable of numerous tasks, even with its off-the-shelf equipment. It could operate with combined arms at distances of up to one hundred to one hundred fifty kilometers. It could be supported by long range capabilities such as the Army Tactical Missile System (ATACMS) which currently cannot be adequately exploited due to the inability of maneuver forces to operate at those ranges in a timely fashion.

Further, the air maneuver brigade could adapt to virtually any environment: mud, rivers, bridging, mountains, and jungle would not greatly hinder this type of maneuver force. The force's freedom of action is in the third dimension. Its protection is in the combined arms nature of the force. This force could also be capable of self-deployability in certain scenarios. It would be ideally suited for joint, combined and interagency operations, illustrated by the recent deployment of aviation assets on aircraft carriers during operations in Haiti. The possibilities are many. Best of all, this maneuver force could truly achieve the tasks of the Army Vision.

On the surface, it may appear that this force is just an air assault force. However, this is not the case. This force differs in that the mobility for the infantry is

organic. Further, by having an organic rotor vehicle, the cumbersome air mission briefing process and duplicate staffs in both aviation and infantry units could largely be eliminated. Troops would merely fall in on their organic vehicles.

The "aerial track" concept can be likened to the transition that infantry forces underwent with the M59 infantry carrier to the M113 carrier. The M59 was owned by the transportation corps and would be called upon to perform necessary transportation of infantry units. When the M113 was adopted, the carrier and the infantry were assigned together in an all-purpose vehicle. In time, the concept of an organic combat vehicle was developed, becoming the Bradley Fighting Vehicle.

The concept of a rotor-based, infantry fighting vehicle is what would lead to the stage two organization. This would combine the attack capabilities of the helicopter with the troop lift capabilities into a single aircraft. As mentioned before, the Soviets were very close to achieving just such a breakthrough in the use of rotor forces. The development of a helicopter that was armored, could fight enemy tanks and could carry a squad of infantry was realized. It was not used in this role, but one wonders what might have happened if the Soviets had

continued development of their mechanized airborne forces along these lines.

It would be possible to for the U.S. Army to develop a similar helicopter to equip the air maneuver brigade as a part of the Army After Next (2020-2025) initiative. The advantage that a multi-purpose air maneuver brigade would have over an aerial transported mechanized force would be the elimination of cumbersome transport and fighting relationships. This should also be the goal for the stage two air maneuver brigade: an armored helicopter that can carry a squad of infantry and fight enemy armored forces.

Once an aerial vehicle of the type above is developed, the stage two organization (figure 13) will consolidate the two air attack and two air rifle battalions to form three air rifle battalions. The three-battalion brigade would be able to employ each of its battalions in virtually any role. Further, combining these battalions would create 450 additional infantry. The stage two brigade would contain 105 aerial fighting vehicles, sixteen aerial reconnaissance vehicles, and a total of 1,350 riflemen. It would potentially contain the infantry strength and antiarmor firepower of a current U.S. armored division. Unlike the future armored division, however, it would be capable of dominant maneuver.

The Air Maneuver Brigade

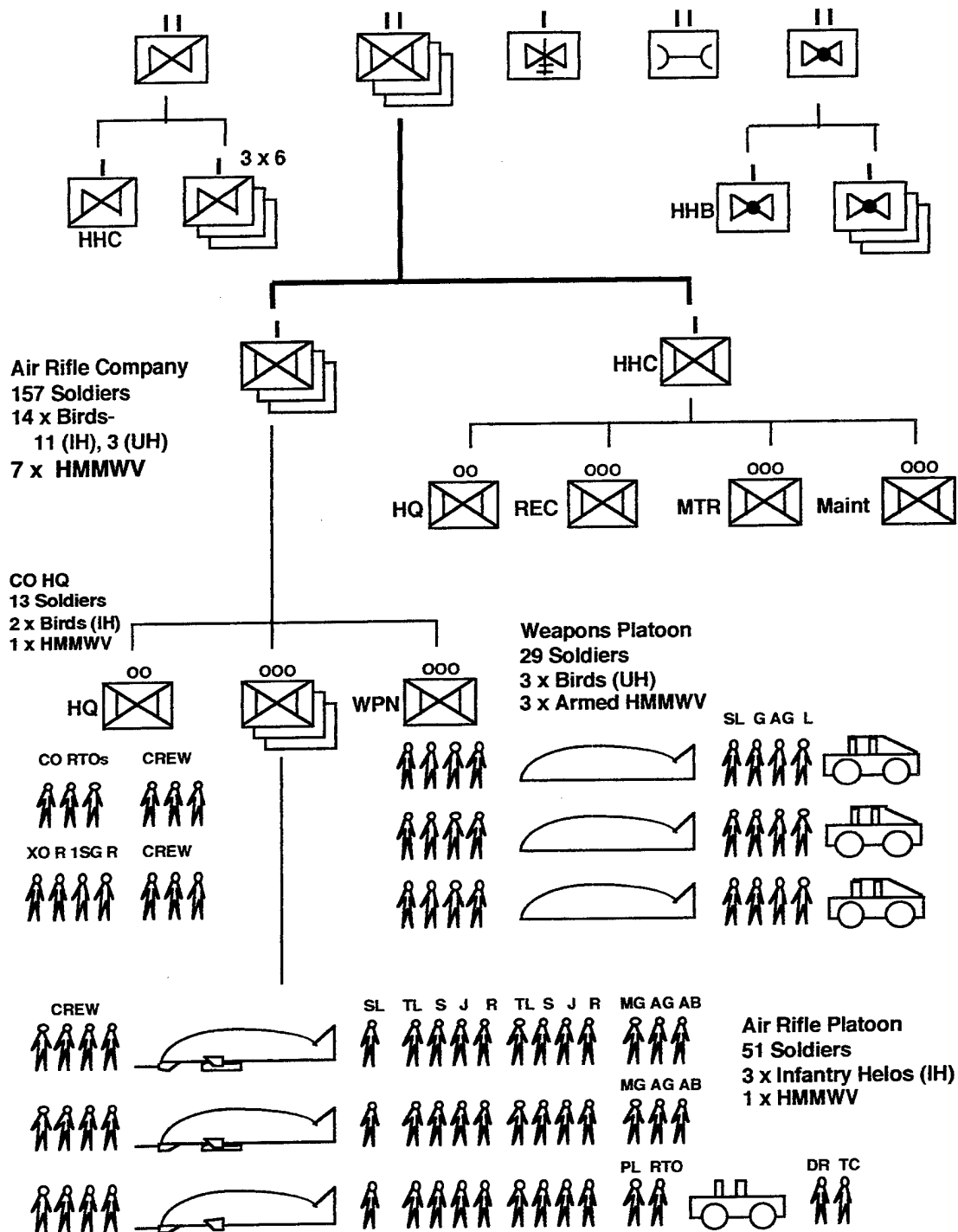


Figure 13. The Air Maneuver Brigade--Stage Two

The longer the Army ignores the possibilities of indirect maneuver and the capabilities of using aviation in a maneuver role--to overcome issues associated with lack of speed differential, mobility, and deployability--the greater the potential for defeat at the hands of someone who will figure out how to counter the heavy armored force. The potential of the air maneuver brigade causes us to think about returning indirect maneuver to the battlefield of the future.

This study has presented evidence showing the heavy armored force as incapable of dominant maneuver as envisioned in *Army Vision 2010*. While time has been lost, it remains possible to capture a true indirect maneuver capability for the Army After Next. To promote further examination of this matter, the following emerging research issues are suggested.

Emerging Research Issues

In regard to heavy armored warfighting, future and current doctrine, and the direction the Army is taking for the future, there is much that needs further development. First, what is the relevance of direct maneuver in warfighting as it relates to indirect maneuver? What role does direct maneuver have, other than to fix or deceive?

Regarding doctrine, we need to explore how we can change the prevailing maneuver ideology from one of direct thinking with technology and firepower, to one of indirect thinking while using our capabilities to their utmost.

The nature of the heavy force must also be explored. What role does the future hold for heavy armored forces? It seems that the heavy armored force may become more suited for force protection roles, including certain types of combat, but also, for a peace keeping or peace enforcement environment. This would be ironic, in that what was once valued for its maneuver capability, will now be valued for its ability to protect an occupying force from mines, mortar attacks, and threat of violence.

As to a purely combat role for heavy armored forces, a comparative analysis of the armored force with the .50 caliber machine gun would be interesting. The heavy machine gun dominated warfare at the beginning of this century. In time, it was no longer the key element to emplace or maneuver on the battlefield, yet it still held great value for its firepower capability. Could it be that the armored vehicle will transition to a more suitable fixing or supporting role, giving dominant maneuver over to rotor-based forces?

As the analysis showed, there are hazards in an overreliance on technology and firepower. How can we instill indirect maneuver thinking without giving up these advantages? How can we change a culture-focus primarily on firepower and technology to one that values maneuver more? It seems that this would be worthy of further research, if for no other reason than to explore how we have come to such assumptions concerning maneuver warfare in the first place.

Another area deserving attention is whether heavy armored forces can overcome their shortcomings associated with speed, mobility, and deployability. Will armored forces radically change or have they culminated as a decisive maneuver force? Will they transition to a force protection role; but what if they do not? What role will future armored forces have?

In regard to the further development of the rotor-based dominant maneuver force, several topics must be examined more closely. Time is critical if the Army After Next team is to incorporate these ideas. If the air maneuver concept is to be fully explored, test cases must illustrate that an indirect maneuver capability in all environments is indeed possible for such a force. It must be shown that this maneuver force will be capable of

certain direct maneuver tasks if mission constraints demand this approach for maneuver. In such a case, the issues of force protection and firepower will become paramount. Nevertheless, it should be recalled that the German panzers in 1940 were small in number, were vulnerable to direct fights, and had many limitations. These facts, however, did not negate their great capability as they were used primarily in the indirect maneuver role.

The issues of cost also need to be explored. A comparison between the cost of maintaining a nine-brigade armored heavy force and a three to six brigade air maneuver force must be made. The cost of converting the light infantry brigades into this structure, while keeping the heavy forces at nine brigades could also be explored. There would also be the issues of dollar for dollar support comparisons, and manpower savings gained by combining infantry and aviation organizations.

Perhaps the most difficult obstacles for further study will be the personnel and force development issues that must be examined. While not critical to the practical aspects of a maneuver force, the political and cultural issues will certainly have to be faced. For example: Who would command such a brigade? Would the pilot and infantry structure eliminate the need for commissioned pilots or

would there be a legal way to integrate command authority of the platoon leader and commander if commissioned pilots were organic to the force, as envisioned? Since the pilots would be organic and there are currently female pilots, would this suggest women in the infantry force structure? How would this affect the non-air maneuver units? How would the number of air maneuver battalions and brigades affect the rest of the infantry force or aviation force? What would become of traditional division lift units and heavy lift units?

Issues such as these might cause some to abandon the air maneuver concept. Adherence to tradition or current organizational structures will also likely lead to opposition. Rather than looking at what force best conducts dominant maneuver, these emotional issues often cloud the real issue--how to best conduct dominant maneuver for the Army in the twenty-first century. It is worth noting that an emotional attachment to the familiar way of doing things was present in periods of transition in the past. Die-hard horsemen in the 1920s refused to even consider the possibility that mechanization would replace traditional cavalry. This is not unlike the argument that aviation will never be a maneuver player, and that the tank will continue to dominate the battlefield.

Change is a constant, but an examination of history shows that amidst change, the ability of forces employing indirect maneuver to overcome the technology and firepower of their opponents has not changed. This has been proven for the last several thousand years of armed conflict. In this present time of a revolution in military affairs and a military technological revolution, the U.S. Army should consider the potential that exists for the future without hanging on to sixty year-old maneuver models. Maneuver theory must enter into any development of the future force. If the U.S. Army will grasp the possibilities of indirect maneuver with rotor-based forces, a major breakthrough could occur similar to that of the 1930s that will leave the nation well prepared for the next hundred years.

¹Richard E. Simpkin, *Race to the Swift: Thoughts on Twenty-First Century Warfare* (Washington: Brassey's, 1985), 117.

²U.S. Army, *Army Vision 2010* (Washington DC: Government Printing Office, 1996), 10-12.

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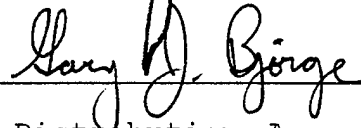
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