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**Does the Culminating Point
Exist at the Tactical Level?**

**A Monograph
by**

**Major Charles O. Hammond
Field Artillery**

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United States Army Command and General Staff College
Fort Leavenworth, Kansas**

Second Term, AY 89/90

Approved for Public Release; Distribution is Unlimited

90-3176

90 08 20 057

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited	
3. DECLASSIFICATION / DOWNGRADING SCHEDULE		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		7a. NAME OF MONITORING ORGANIZATION	
4a. NAME OF PERFORMING ORGANIZATION School of Advanced Military Studies, USAC&GSC	6b. OFFICE SYMBOL (If applicable) ATZL-SWV	7b. ADDRESS (City, State, and ZIP Code)	
4b. ADDRESS (City, State, and ZIP Code) Fort Leavenworth, Kansas 66027-6900		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
5a. NAME OF FUNDING / SPONSORING ORGANIZATION	5b. OFFICE SYMBOL (If applicable)	10. SOURCE OF FUNDING NUMBERS	
5b. ADDRESS (City, State, and ZIP Code)		PROGRAM ELEMENT NO.	PROJECT NO.
		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) DOES THE CULMINATING POINT EXIST AT THE TACTICAL LEVEL ? (U) -TRADING SPACE FOR TIME - NOT ALWAYS AN OPTION (Examining the Concept of the Culminating Point) - (U)			
12. PERSONAL AUTHOR(S) MAJ Charles O. Hammond, USA			
13a. TYPE OF REPORT Monograph	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 89/12/22	15. PAGE COUNT 44
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		culminating point fixed battle positions	
		Battle of Alam Halfa	
		Defense of Golan Heights 1973	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
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20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL MAJ Charles O. Hammond		22b. TELEPHONE (Include Area Code) (913) 684-3345	22c. OFFICE SYMBOL ATZL-SWV

Item 19 cont.

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The purpose of this monograph is to explain the concept of the culminating point at the tactical level, illustrate the concept by using historical examples, and specifically address implications for the tactical commander who must defend from fixed battle positions. KEYWORD: BATTLE
TACTICAL COMMANDER (10P)✓

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

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Title of Monograph: Does the Culminating Point Exist at
the Tactical Level

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Accepted this 26th day of March 1990

ABSTRACT

TRADING SPACE FOR TIME - NOT ALWAYS AN OPTION
(Examining the Concept of the Culminating Point)
by MAJ Charles O. Hammond, USA, 44 pages.

The concept of the culminating point has great utility for the tactical commander. It is one of three concepts fundamental to the design and execution of major operations. Our doctrine addresses the culminating point in operational terms but its impact at the tactical level cannot be neglected.

Field Marshal Erwin Rommel's attack of Montgomery's British Eighth Army at Alam Halfa showed a numerically inferior, logistically weak force opposed by a superior defender. His defeat was as much a product of British abilities to cause combat losses as it was of his own lack of ability to support himself logistically across the vast expanse of North African desert.

The Israeli defense of the Golan Heights in 1973 presents the case of a numerically inferior defender unable to trade space for time facing an overwhelmingly superior attacker. Threatened with a two front war, Israel chose to quickly defeat Syria on its northern border before turning south to defeat Egypt in the Sinai. An analysis of both historical examples yields many lessons for the tactical commander.

The purpose of this monograph is to explain the concept of the culminating point at the tactical level, illustrate the concept by using historical examples, and specifically address implications for the tactical commander who must defend from fixed battle positions.

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Availability Codes	
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I. INTRODUCTION

" . . . every offensive operation will sooner or later reach a point where the strength of the attacker no longer significantly exceeds that of the defender, and beyond which continued offensive operations therefore risk overextension, counterattack, and defeat."

FM 100-5, Operations¹

The concept of the culminating point is not new. The trend to incorporate lessons from history into our warfighting doctrine may be. Gen-Maj Karl von Clausewitz introduced the idea of culminating points in his classic work On War first published in 1832. Though the instruments and environment of warfare have changed drastically since the time of Clausewitz's writing, his thoughts on the conduct of war are as valid today as they were in the time of Napoleon.

Field Manual (FM) 100-5, Operations states that three concepts are central to the design and execution of campaigns and major operations.² These three concepts are the center of gravity, lines of operations, and the culminating point. If these concepts are so important, as our capstone doctrinal manual would have us believe, then a common understanding of these terms is essential. This common understanding may, however, be lacking in today's Army.

James J. Schneider and Lawrence L. Izzo propose in their article "Clausewitz's Elusive Center of Gravity" that we may be closer to mutual confusion than to common understanding because of a casual use of theoretical terminology.³ BG Huba Wass de Czege, a principal author of the 1986 FM 100-5, aptly points out that " . . . quoting Clausewitz or any authority without understanding the content or the context of the quote may be foolish or harmful."⁴ To simply parrot theoretical maxims without a basic understanding is foolish. To thoughtlessly and

mistakenly apply theoretical principles in combat is unforgivable.

Drawing upon his experience, Clausewitz wrote of war in the Napoleonic era. His ideas are invaluable to the military theorist. When placed in the modern context of war, his ideas have great utility for the military practitioner.

FM 100-5, Operations refers to the culminating point in terms of offensive operations. It is presented from the attacker's point of view. The classic explanation would have us believe that as the attacker gains ground, his strength wanes and the defender, falling back upon his own lines of communication, gains strength. When seeking to bring about the attacker's culmination FM 100-5 goes on to say "the more readily the defender can trade space for time without unacceptable operational or strategic loss, the easier this will be."⁵ This dynamic is unsatisfactory, however, when the defender must fight from fixed battle positions and has neither the terrain nor time to give up. He must determine how to cause culmination when he cannot trade space for time.

Understanding and applying the concept of the culminating point is important to the tactical commander because recognizing when, where, and why this point occurs will influence his subsequent action. This, after all, is the ultimate test of theory - can it be used to the commander's advantage and lead to success in battle?

The definition of the culminating point from FM 100-5 appears at the beginning of this introduction. It is important to realize that the culminating point is not a fixed, clearly measurable point in time and space. Rather, it is a dynamic point of balance between the attacker and defender. One normally thinks of the culminating point as that point which defines the limit of the attacker's successful advance. To proceed further would be to risk failure because he no longer enjoys a strength advantage over the defender. The goal of any offensive operation is

to achieve the objective before reaching one's culminating point. The defender's task, on the other hand, is to force the attacker to expend his resources, reach his culminating point, and quickly go over to the offense. The defender may trigger his counterattack or counteroffensive when he identifies that the attacker has overextended himself. The concept, therefore, is just as valid for the defender as it is for the attacker.

Does the concept apply at the tactical level? One must again turn to doctrine. FM 100-5 defines military strategy, operational art, and tactics as the "broad divisions of activity in preparing for and conducting war."⁶ The differences between these three levels are significant.

Strategy looks to secure policy objectives at the national level. Application of force or the threat to use an armed force is a strategic decision. Strategy establishes goals in theaters of war and theaters of operations, and sets the conditions on the use of force.⁷

Operational art is the employment of military forces in a theater of operations to attain strategic goals. The design, organization, and conduct of campaigns is the hallmark of operational art. Unlike the conduct of a single battle, operational art involves the sequencing of a series of battles and engagements leading towards the attainment of strategic goals in theater. Determining when and where to fight and whether to accept or reject battle are decisions for the operational commander. The operational artist is concerned with the military condition to be produced in theater, the sequence of actions to produce that condition, and the resources to accomplish that sequence of actions.⁸

Tactics transforms combat power into victory in battle. Battles can be a series of engagements. Engagements are individual conflicts of short duration between maneuver forces.⁹ The maneuver of combat forces, the synchronization of combat support systems, and the integration of combat

service support assets to fight the close battle make up the tactical level of war.

Stated quite simply, strategy sets national political aims. Operational art turns those aims into military operations and campaigns. Tactics determines success in winning battles and engagements. This brief attempt to differentiate between the levels of war is necessary because discussion without a definition of terms is futile.

The purpose of this paper is to explain the concept of the culminating point at the tactical level, illustrate the concept with historical examples, and draw conclusions. I will specifically address implications for the tactical commander who must defend from fixed battle positions.

II. DEFINITION OF THE CULMINATING POINT

In Chapter Five, Book Seven of On War Clausewitz spells out very clearly what he means by the culminating point of the attack.

Success in attack results from the availability of superior strength, including of course both physical and moral. The attacker is purchasing advantages that may become valuable at the peace table, but he must pay for them on the spot with his fighting forces. If the superior strength of the attack - which diminishes day by day - leads to peace, the object will have been attained. There are strategic attacks that have led directly to peace, but these are the minority. Most of them only lead up to the point where their remaining strength is just enough to maintain a defense and wait for peace. Beyond that point the scale turns and the reaction follows with a force that is usually much stronger than that of the original attack. This is what we mean by the culminating point of the attack.¹⁰

In Chapter Twenty-Two, Book Seven Clausewitz writes of the culminating point of victory.

Only with the rise of Bonaparte have there been campaigns between civilized states where superiority has consistently led to the enemy's collapse. Before his time, every campaign had ended with the winning side attempting to reach a state of balance in which it could maintain itself. At

that point, the progress of victory stopped, and a retreat might even be called for. This culminating point in victory is bound to recur in every future war in which the destruction of the enemy cannot be the military aim, and this will presumably be true of most wars. The natural goal of all campaign plans, therefore, is the turning point at which attack becomes defense.¹¹

The difference between the culminating point of the attack and the culminating point of victory may simply be a matter off scale. I have drawn the distinction between the tactical and operational levels of war. This distinction may apply here. The culminating point of attack addresses the contest of strength - physical and moral - between attacker and defender. Clausewitz's reference to success being paid for "on the spot" with fighting forces indicates a focus at the tactical level. His explanation is appropriate for battles and engagements.

The culminating point of victory addresses a conflict between states and introduces the idea of military aims. This more neatly fits, by contemporary definitions, the realm of operational art. More important than any artificial separation between the tactical and operational level is the underlying concept of culmination. It is this fundamental concept that has the greatest utility at any level of war.

At the heart of this concept is the notion that the attacker's relative combat strength decreases over time. The issues of time and space are central to Clausewitz's writings. The superiority of the defense is more a function of time than tactics or technology.¹² Time accrues in favor of the defender. The defender's purpose is one of denial. The attacker's purpose is to take something he doesn't presently control. Therefore, any delay in offensive operations that postpones the attainment of the attacker's goal is, by definition, success for the defender.

Clausewitz lists several reasons for the decreasing strength of the attacking force. Combat forces may be lost

to the establishment of garrisons in occupied enemy territory. As the attacker gains ground, forces must be dedicated to protecting his lines of communication. As the LOCs are extended, the effort to support the forward units logistically from established rear bases becomes more difficult. Losses may be incurred from enemy action or sickness. Strength is depleted as the distance from the source of replacements increases. Troops may be devoted to sieges and the investment of fortresses. As attacking forces become physically exhausted, their desire to push on may diminish. The defection or loss of allies will result in a loss of strength for the attacker. The degree of enemy resistance is the primary concern of the tactical commander. His overall strength may be quickly depleted as he suffers combat losses when facing a determined enemy.¹³

Simply knowing that a culminating point exists is of little practical value. Understanding the implications of what happens when the culminating point is reached may make the difference between success and failure in one's mission.

Successful offensive operation must ultimately revert to the defense in order to hold that which was achieved. The defense is never passive. It can be viewed not just as a shield, but as a shield of blows.¹⁴ More importantly, the ultimate goal of the defender is to regain the offensive to seek decisive victory. The difficult question, of course, is when and where does this transition take place? The key to solving this riddle comes with an understanding of the culminating point.

As FM 100-5 explains "the art of attack at all levels is to achieve decisive objectives before the culminating point is reached."¹⁵ Risk is inherent in any operation. When exceeding one's culminating point, however, risk may climb to an unacceptable level. Making a decision based on the culminating point presumes that one can see it. It is exceedingly difficult to measure, but as the 1920-1921 General Service Schools, Fort Leavenworth text Principles of

Strategy states "the assumption of the defensive because distances and exertion are too great is an indication that there has been neglect in the preparation of the details."¹⁶

The commander must evaluate his own capabilities, estimate enemy capabilities, factor time and distance accordingly, and execute his plan. He should not force his unit past the point of exhaustion and should assume the defense voluntarily before his combat power is spent. Waiting until circumstances dictate a defensive posture may be a mistake. With the advantages of time and knowledge of terrain, the defender can select and prepare strong positions. The attacker who fails to plan may be no better than a blind man stumbling into any position available when forced to revert to the defense at a time and place not of his own choosing.¹⁷

The commander must himself select the proper moment for the change and must possess sufficient force of character to relinquish a continuation of the offensive voluntarily, if he desires to retain what he has already won.¹⁸

Defensive tactics are used to retain ground, gain time, deny enemy access to an area, destroy attacking forces, and to hold or control key terrain. Again, FM 100-5 states "the art of defense is to hasten the culmination of the attack, recognize its advent, and be prepared to go over to the offense when it arrives."¹⁹ A successful defense is predicated on an effective counterattack. While defense can deny enemy success, it cannot assure victory.

Our current doctrine calls for defense in two forms - mobile defense and area defense. The mobile defense keys on the destruction of the enemy force by a large, mobile counterattack in depth. The area defense is designed to hold terrain and defeat the enemy primarily by fire from interlocking positions well forward. Smaller, local counterattacks may be a feature of the area defense.

The tactical commander must decide whether to defeat the advancing enemy from fixed positions well forward or

draw him deep into the main battle area and strike him from his flank and rear. The commander organizes the defensive battlefield by assigning sectors, battle positions, strong points, or a combination of these to subordinate unit commanders.

Fixed battle positions present a unique challenge. The tactical defender cannot rely on the attacker's own exertions to bring about defeat. The attacker must be defeated by the sword.²⁰ The defender must bring all battlefield systems to bear early to force the quick culmination of the attack.

Selection of positions is critical. Clausewitz again provides guidance.

. . . a defensive position approaches the ideal the more its strength is masked, and the more it lends itself to taking the enemy by surprise in the course of the action. One always attempts to deceive the enemy as to the true numerical strength of one's fighting forces and their true direction. By the same token, then, one should not let him see how one intends to take advantage of the terrain.²¹

Maximum use is made of natural obstacles, man-made obstacles, field fortifications, and camouflage. When occupying a fixed forward position, consideration must be given to security in the rear, the enemy's ability to reduce the position by fire or maneuver, and one's own ability to be resupplied or relieved as necessary.

Regardless of the form of defense chosen, the principal question for the defender will be when to transition to the offense. A quick transition is essential to prevent the attacker from consolidating and preparing his own defense. Primary consideration should be given to committing those forces not in contact (reserves) before committing MBA units in the offensive role.

Harold W. Nelson in his "Space and Time in On War" appearing in Clausewitz and Modern Strategy accurately describes the dynamic of the culminating point.

The attacking commander who resists the forces that dissipate and erode his army will move the culminating point forward in time and space. The defender who can will his exhausted forces to counter-attack an even more exhausted attacker who has passed the culminating point should reap the fruits of decisive victory.²²

Because this dynamic involves the comparison of relative strengths, it is necessary for me to comment briefly on the elements of combat power.

Any system for quantifying combat power that takes into account only the physical properties of an army, i.e. numbers of tanks, soldiers, etc. is fundamentally flawed and of little value in judging the outcome of battle. Clausewitz, himself, in Chapter Three, Book Five lists several factors that determine relative strength. Superior numbers, courage and morale, superior organization and equipment, superior mobility, novel tactics, and the advantages of terrain all must figure into any calculation of combat power. Given that these factors may be very similar for both the attacker and defender, the one single element that most influences combat power is the talent of the commander. His genius for war may spell the difference between ultimate success or failure. Victory results from the greatest "aggregate of physical and psychological strength."²³

General Donn A. Starry writing the forward to Brigadier General Avigdor Kahalani's The Heights of Courage states:

The history of battle is rich with examples in which the few have overcome the many, and in so doing, defied the calculus of numbers that so distorts our ability to both predict battle outcomes beforehand and understand battle outcomes after the battle.²⁴

The tank is not a unit of measurement of combat power. Until that piece of equipment can be manned, fueled, armed, and employed by capable leadership it represents only potential.

BG Wass de Czege in his article "Understanding and Developing Combat Power" outlines a new approach to determining relative combat power. Historically, we have made this determination in one of two ways. Commanders relied on their intuition ("gut feel") or simply added numbers of soldiers and gun tubes opposing one another ("bean count"). Both approaches are severely lacking. The first method requires a level of experience and skill that not all contemporary commanders possess. The second method fails to account for those factors affecting combat power that cannot be quantified.²⁵

BG Wass de Czege's better analytical approach brings together many military functions. Raw numbers indicate potential. Only when resources are combined with such intangible factors as leadership, training, and motivation can potential be brought to bear against an enemy and transformed into power. Combat power is not absolute and may not easily be quantified. It is relative and fleeting. Superior combat power at the decisive place and time yields victory in battle. Maneuver, firepower, protection, and leadership are the major components in the Wass de Czege model (Appendix A) and are the principal elements of combat power outlined in FM 100-5.

Now that the definition of the culminating point has been established, a look at history will further promote an understanding of the concept. Rommel's attack at Alam Halfa in August 1942 and the Israeli defense of the Golan Heights in October 1973 are two examples that illustrate the concept at the tactical level.

Analysis of these two scenarios reveals causes of culmination, provides insight to the tactical defender who cannot trade space for time, addresses who causes culmination - the attacker or defender, refutes the idea of a defensive culminating point, and finally addresses whether or not the culminating point can be seen ahead of time.

III. HISTORICAL EXAMPLES

Alam Halfa, North Africa 1942

An examination of Field Marshal Erwin Rommel's experience in North Africa from 1941 to 1943 illustrates the concept of the culminating point at the operational level. A detailed look at one battle will better serve the student of tactics. I have chosen the battle of Alam Halfa because it represents the limit of Rommel's advance and set the stage for the decisive second battle of El Alamein.

By June 1942, Rommel had pushed 1500 miles across North Africa. Since his arrival in Tripoli the year before, his objective had been the capture of Northern Egypt. Now one hundred miles from Alexandria and the Nile River, Rommel would launch one last attempt to take his objective. He planned to strike the Eighth Army under the command of General Sir Bernard Law Montgomery at Alam Halfa on 31 August.

The 21st Panzer and 15th Panzer Divisions (Afrika Korps) were to strike the British 7th Armored Division in the south. The Ariete and Littorio Armored Divisions (Italian XX Corps) along with the 90th Light Division were to attack on the Afrika Korps' left flank. This main effort was to penetrate between the 2nd New Zealand Division and the British Division occupying the Alam Halfa Ridge. Combined German and Italian reconnaissance battalions would secure the Afrika Korps' right flank. The 9th Australian Division, 1st South African Division, and 5th Indian Division in the north were to be fixed in place by supporting attacks from the Italian XXI Corps (Trento, Bologna Divisions), Rommel's 164th Infantry Division, and 22nd Parachute Brigade.²⁴

This encirclement from the south was to be completed at night so that by morning Bismarck's 21st Panzer Division and

Vaerst's 15th Panzer with the 90th Light Division would be positioned east of the Alam Halfa Ridge poised to strike towards Alexandria and Cairo. Italian forces would protect the rear of the Afrika Korps as it pushed to the east.

Rommel could not simply bypass British defenses as he had done at Gazala three months prior. Instead of open desert, Montgomery's left flank was anchored on the impassable escarpment of the Qattara Depression. His right flank was anchored on the Mediterranean coast northwest of El Alamein. Montgomery's forces were spread across this forty mile front. Rommel first had to penetrate before rolling up the British rear.

Rommel's plans were based on surprise and speed. As he himself said:

We placed particular reliance in this plan on the slow reaction of the British command and troops, for experience had shown us that it always took them some time to reach decisions and put them into effect. We hoped, therefore, to be in a position to present the operation to the British as an accomplished fact.²⁷

He planned a quick penetration of the eight mile sector between the New Zealand Division and Qaret el Himeimat. His intelligence estimate told him that this area was only held by "weakly mined defenses."²⁸

Rommel had assembled 200 panzers, of which 26 were the Mark IV Specials fitted with the improved 75mm gun. He had 243 Italian medium tanks of questionable value. Montgomery had amassed 767 tanks and hundreds of new six pound antitank guns.²⁹

At 2200 hours, 30 August German engineers led the first units of the Afrika Korps through the gaps in their own minefields. Rommel's attack had begun. The error of his intelligence report would soon become apparent.

What was initially thought to be a weakly defended area was in fact a wide, dense minefield covered by heavy infantry weapons, mortars, and artillery. British

reconnaissance aircraft pointed the way for Wellington bombers. Artillery units from the 7th Armored Division and 2nd New Zealand Division brought effective fire on German engineers and infantry attempting to breach the obstacle. Parachute flares silhouetted the attacking forces making them vulnerable to machinegun, rifle, and antitank fires. British aircraft bombed German armored formations as they massed to pass through lanes the engineers were so desperately trying to clear.³⁰

Daylight found Rommel's forces not thirty miles east of the British defenses as planned, but still fighting to get clear of the minefield. It was not until 0930 hours that the majority of the armor passed this initial obstacle. Rommel paid a price for poor intelligence. His 21st Panzer Division commander, Major General Georg von Bismarck, was killed and Lieutenant General Walther Nehring, Commander Afrika Korps, was wounded. His timetable for the attack was terribly behind schedule. The two key elements of his plan - surprise and speed - were now missing.³¹

Rommel briefly considered calling off the attack. He decided to continue, however, after conferring with Colonel Fritz Bayerlein, Chief of Staff Afrika Korps, who had assumed temporary command from the wounded Nehring. He would pursue a less ambitious drive to the east. Lacking surprise, a wide thrust east of the Alam Halfa Ridge would be vulnerable to flank attacks from the British 10th Armored Division from the north and the 7th Armored Division from the south. Rommel decided the attack the Alam Halfa Ridge directly. This is exactly what Montgomery expected.³²

British forces occupied prepared battle positions along the ridge. The 10th Armored Division occupied the ridge itself. The 22nd Armored Brigade was at a point just southwest of the ridge. The 23rd Armored Brigade was on the right flank of the 22nd. Additionally, the 8th Armored Brigade occupied positions to the southeast of the ridge ready to attack Rommel's flank. Montgomery waited for

Rommel's forces in prepared defensive positions. These defensive tactics of concealed antitank guns and dug in tanks had been used with great success by Rommel and would now be turned against him. Montgomery enjoyed the advantage of not only prepared positions but also complete air superiority.³³

The firepower of the 75mm gun on the British Grant tank was a key feature of this defense. Battle positions were selected to compensate for the unique design of the Grant. It's main gun was mounted relatively low on the side of the vehicle rather than in a turret. Much of the vehicle had to remain exposed to fire the main gun. Positions were chosen in hilly terrain or in emplacements prepared by bulldozers. Tank commanders would hide in defilade and expose their vehicle only when it was time to fire.³⁴

Montgomery planned a defensive armored battle. As Lieutenant General Oliver Leese, XXX Corps Commander, stated:

Monty's handling of armour was very different from the old British tactics - there was no swanning, but proper cooperation of armour and artillery, and close in with infantry in attacks on fixed positions. We never, never advanced with our armour - always slowly, supported by our guns. We tried to get the Germans to attack us.³⁵

British tank commanders were under specific orders to hold their positions. Charging the enemy was a tactic that in the past resulted in needless losses.

By 1100 hours on 31 August, Montgomery knew that Rommel's German divisions were committed in the south.³⁶ The 21st and 15th Panzer Divisions were pressing for the center of the Alam Halfa Ridge. Littorio and Ariete were advancing toward the area occupied by Montgomery's 23rd Armored Brigade. The 90th Light Division guarded the Italian left flank as planned. The 22nd Parachute Brigade commanded by Major General Hermann Ramcke had destroyed a New Zealand company. Major General Carl-Hans

Lungershausen's 164th Infantry Division attacked the Australian Division in the north. Trento and Bologna occupied the South Africans and Indians in the center.

Advancing under cover of an afternoon sandstorm, Bayerlein's divisions approached the British positions at Alam Halfa. Brigadier G. P. B. Roberts, Commander 22nd Armored Brigade, had sent two light squadrons several miles south of the ridge to provide early warning. Their report of German tanks moving northeast came in at 1530 hours.

Roberts' brigade position was held by three regiments - the 1st Royal Tanks on the right, 4th County of London Yeomanry in the center, and 5th Royal Tanks on the left. His fourth regiment - the Royal Scots Greys - was held in reserve two miles behind the ridge.³⁷ Antitank guns manned by infantry and preplanned artillery support strengthened this defense.

Roberts ordered his tankers over the radio not to fire until the enemy was within 1,000 yards. The greatest concentration of tanks from the 21st Panzer Division appeared in front of Roberts' center regiment. The Grant squadron of the County of London Yeomanry opened fire against the Mark IVs. The new German 75mm gun took a heavy toll. Twelve Grants were destroyed very quickly creating a gap in the 22nd Regiment's defense.

As the Germans moved forward, they were taken under fire from the antitank guns of the Rifle Brigade. Roberts called his reserve regiment to come forward to plug the gap. Final protective fires temporarily halted the German advance.

As the Royal Scots Greys entered the fight, the German attackers retreated to the cover of their own antitank guns believing that the British reserves would pursue them into their kill zone. This did not take place. Roberts' reserve regiment took up defensive positions in the gap and waited out of range of the German 88mm's.

By 1730 hours, the German attack was halted. British losses were 21 tanks. The Germans lost 22. Action for the 1st Royal Tank Regiment on the right of the 22nd Brigade's position halted at 1930 hours. Thirteen German tanks were destroyed with no British tanks lost. A British tank company commander attributed this success to well selected positions, accurate fires, and the fact that the Germans were firing mostly armor piercing rounds and very little high explosive.³⁸

On 1 September, a German convoy of 300 trucks was attacked east of Himeimat by light tanks of the 7th Armored Division. Fifty seven supply vehicles were destroyed. Only the 15th Panzer Division had sufficient fuel remaining to continue the assault on the Alam Halfa Ridge.³⁹

To prepare for this assault, Montgomery strengthened his defense by ordering the 23rd and 8th Armored Brigades to close with the 22nd. His forces on the ridge now totalled 500 tanks prepared to meet any further attempts by Rommel. His disciplined defenders held their positions and again refused to pursue the panzers as they fell back under the cover of their 88mm's.

Rommel's repeated attempts to take the Alam Halfa Ridge failed. In addition to Montgomery's superior firepower, Rommel's forces had been subjected to constant bombardment by the Royal Air Force. On 3 September, Rommel called off the attack and prepared to withdraw. He would not give up easily. Attempts by two brigades of the New Zealand Division with an attached British brigade to destroy Rommel's retreating forces were unsuccessful and came under strong German counterattacks for the next 36 hours.⁴⁰ Rommel completed an orderly withdrawal to the high ground between Muhassib and Himeimat about five miles forward of his original position south of the Alamein line.

The battle of Alam Halfa lasted six days and cost Rommel 2,940 killed, wounded, and captured, 51 tanks and 700

vehicles destroyed. Montgomery lost 1,640 personnel and 67 tanks.⁴¹

Alam Halfa was General Montgomery's baptism of fire in North Africa. This was the first encounter between the untried commander of the British Eighth Army and the seasoned desert veteran. Sitting in defensive positions of his own choosing, with adequate supplies, superior numbers, and with complete air superiority, the odds were clearly in Montgomery's favor. Analysis of this battle will illustrate key points about tactical culmination.

FM 100-5 cites many reasons for tactical offensives reaching their culminating point. Attacks lose momentum when confronted with heavily defended areas that cannot be bypassed. A culminating point is reached when fuel and ammunition is exhausted and not available for immediate resupply. The culminating point approaches as attacking troops become physically exhausted, casualties increase, and equipment is lost. Tactical offensives culminate when reserves are not available to continue the attack and as the defender is reinforced with fresh troops.⁴²

Rommel's attack stalled at the base of the Alam Halfa Ridge when facing Montgomery's determined resistance. For fear of exposing his flanks and lacking sufficient fuel, Rommel could not bypass this defense in a wide sweep to the east. His repeated attempts to take the Alam Halfa Ridge were made by the 15th Panzer Division alone because adequate fuel was not available for both divisions of his Afrika Korps.

To argue whether the culminating point is caused by the attacker or defender is to argue a moot point. It is a relative concept combining the defender's ability to resist and the attacker's ability to continue his offensive momentum. In the absence of enemy resistance where the attacker could seemingly advance at will, the culminating point is brought about by the attacker's ability to sustain his forces - specifically to move fuel, ammunition, food,

and supplies forward. Even if Montgomery's defense of the Alam Halfa Ridge had not been so strong, Rommel's ability to continue to the east was in jeopardy because of critical fuel shortages.

The culminating point is a dynamic point relative to the strengths and weaknesses of the attacker and defender subject to the environment of war and both enemy and friendly action. Rommel reached his tactical culminating point at the base of the Alam Halfa Ridge.

Montgomery's failure to destroy Rommel at Alam Halfa may be an example of the overly cautious commander who failed to seize the opportunity presented by the culminating point. He was successful as a defender but did not quickly transition to the offense to gain a decisive victory. Rommel's forces were able to withdraw to the high ground at Himeimat and present a viable defense. Montgomery would later conduct a methodical, set piece counterattack at the second battle of El Alamein.

A weakening attack may indicate the approach of the culminating point. When the defender has been able to inflict heavy casualties and cause wholesale destruction of combat vehicles the culminating point of the attack may be near. Targeting the attacker's base of support and interdicting his lines of communications will speed the arrival of the culminating point. Montgomery's 7th Armored Division destroyed Rommel's supply column east of Himeimat compounding an already critical logistical situation.

The culminating point does not necessarily signal the end of offensive action. It is only that point where the attacker no longer enjoys a superior advantage. A commander may well exceed his culminating point and be successful but must recognize that he is proceeding under conditions of great risk. This willingness to take risk may be the mark of great commanders. Rommel certainly fits this bill as a tactical commander. Despite great odds and tremendous risk,

he was able to engage the British forces for two years in a campaign stretching over two thousand miles.

The next historical example will be a more recent desert confrontation. The successful Israeli defense of the Golan Heights in 1973 provides an additional illustration of culmination at the tactical level with specific application to the defender who cannot trade space for time.

Golan Heights 1973

The Arab operations in October 1973 involved clashes between Egyptian and Israeli forces in the Sinai and Syrian and Israeli forces in the Golan Heights. This case study will look specifically at the latter confrontation.

The Yom Kippur War (1973) was the fifth in a series of Arab - Israeli wars dating from the formation of the state of Israel in 1948. The specific causes of the 1973 war can be tied directly to the outcome of the 1967 Six Day War. The Arab nations lost not only prestige after their humiliating defeat, but lost territory as well.⁴³ As the victor, Israel took control of the Sinai from Egypt, the West Bank from Jordan, and the Golan Heights from Syria.

The Golan Heights form the forty mile long common border between Israel and Syria. This rugged, volcanic, unforgiving terrain is just seventeen miles from the fertile heartland of northern Israel and provides a commanding view over the approaches to the Syrian capital of Damascus.

After occupation and annexation of this area in 1967, Israel took steps to provide for its defense. Arab communities were left deserted. Jewish occupied fortified settlements were established to deter guerillas. A network of antitank obstacles, minefields, concrete bunkers, and fixed tank emplacements were constructed.⁴⁴

With a small standing army, Israel has long been dependent on early warning, rapid mobilization of reserves,

and rapid deployment to the front as a national defensive strategy. A strategy based on preemptive strikes as existed in 1967 was no longer a viable defensive option for Israel given world political pressure.⁴⁵ Faced with the very real threat of a two front war with hostile neighbors on its borders, Israel had neither the space nor time to trade in causing an attacker's culmination. Israel's very survival as a nation depended on a quick, decisive victory.

On 6 October 1973 Egyptian forces attacked across the Suez Canal opposite Israel's Bar Lev line. Simultaneously, Syrian forces in the north attacked the Golan Heights. Syrian forces consisted of the 7th Infantry Division, 9th Infantry Division, and the 5th Infantry Division followed by the 1st and 3rd Armored Divisions. This force of 1,500 tanks, 1,000 guns, and sophisticated surface-to-air missile systems was opposed by the Israeli's 7th Armored Brigade in the north and the 188th Armored Brigade in the south with a total of 176 tanks and 60 artillery pieces. Arab losses from the 1967 war had been replaced with modern Soviet T-55 and T-62 tanks. Israeli units were equipped with U.S. M60 and British Centurion tanks.⁴⁶

The Syrian plan called for the quick isolation of the Golan from reinforcements, the disruption of support and command facilities, and destruction of Israeli combat units deployed in the Golan. Military goals were to capture the Golan Heights, assume the defense to hold the Jordan River and Sea of Galilee, and if possible seize eastern Galilee. Arab intentions were to recapture land lost in 1967. All this was to be completed in thirty hours. Unlike previous Syrian operations, this was planned in exact detail to include airmobile assaults, artillery preparations, and tactical air support.⁴⁷

At 1400 hours Syrian forces launched their attack under cover of massive artillery preparations and supporting air attacks against Israeli forward positions. A helicopter assault by Syrian commandos was conducted simultaneously to

capture the Israeli fortified observation post on Mount Hermon. This site was vital to the Israelis because it housed radars and electronic surveillance equipment watching the approaches to Damascus.

The Israeli 7th Armored Brigade was attacked by the Syrian 7th Infantry Division supported by the 3rd Armored Division. The Syrian main effort was launched by their 5th and 9th Infantry Divisions against the Israeli 188th Armored Brigade. The Syrian 1st Armored Division followed this main effort.

Col Ben Shoham's 188th Brigade consisted of four battalions. His 17th Infantry and 50th Parachute Battalions manned fixed positions along the border. To their flanks and rear were the 74th and 53rd Tank Battalions with a combined total of 76 tanks. In the center of his sector was the Rafid Gap which, along with the Kuneitra Gap, formed the most likely avenues of approach through the Golan.

An elaborate system of prepared positions maximized the capability of the tank in the defense. A three tiered platform provided excellent cover, observation, and fields of fire for individual tanks along Israel's defensive line. At the lowest level, the tank could remain behind protective berms hidden from Syrian observers. The second step provided a hull down position with only the turret exposed. The top level provided minimum protection for the tank but from there it could depress its main gun to engage Syrian tanks or infantry at close range. The steep front slope of the position minimized the threat of a direct assault. Israeli tank gunnery was emphasized to compensate for the Syrian numerical advantage.⁴⁸

The attacker outnumbered Shoham's brigade by five to one.⁴⁹ An Australian UN observer reported seeing 300 Syrian tanks rolling towards him in four columns, two on each side of the road. With hatches open and the tank commanders standing tall, it appeared to him as a parade ground demonstration not an attack. In total the first wave of the

Syrian attack across the Golan consisted of more than 700 tanks followed by bulldozers, mine clearing equipment, and personnel carriers.⁵⁰

The Syrians suffered heavy losses as they breached the Israeli minefields and antitank ditch. The well trained Israeli gunners engaged in "target practice" firing down lanes that covered the most likely approaches. In one engagement, all Syrian tanks were destroyed as they sat thirteen abreast in their deployed formation.⁵¹

Despite these initial successes, Israeli defenders were simply overwhelmed by the massive number of Syrian tanks. Running low on ammunition, and threatening to be outflanked, the Israeli defenders had to pull back. Israeli losses mounted as they left their defensive positions and exposed themselves to Syrian direct fire.

Within twenty-four hours the 188th Brigade was almost destroyed. Ninety percent of the brigade's officers were casualties. Col Shoham, himself, was killed about noon on 7 October. Syrian forces had penetrated to the village of Ramat Magshimim in the south, had reached the division headquarters of Major General Rafel Eitan at Nafekh, and were only minutes from the Jordan River.⁵²

In the north, the Israeli 7th Brigade was holding its position between Mas'ada and Kuneitra and would fight continuously for four days. The mounded lava beds north of the Kuneitra Gap presented ideal defensive terrain for Col Janos Avigdor's 77th and 82nd Tank Battalions and 75th Armored Infantry Battalion. Natural cover was augmented by earth ramparts constructed by Avigdor's squad of bulldozers. He was also successful in employing limited mobile tactics.

Col Avigdor split his force into two combat teams and moved into the rocky terrain off the roads from where he could engage the advancing Syrians. After inflicting damage from the flank, the Israeli force would disappear. One lone tank would remain to lure the pursuing Syrian tanks into an ambush. By concentrating their advance along the road

network, Syrian forces set a predictable pattern of movement. This enabled Israeli units to move through formations at times and locations of their choosing.⁵³

By 9 October, only seven of the Brigade's 100 tanks remained and they were critically short ammunition. Before them were the remains of 500 Syrian armored vehicles destroyed in the "Valley of Tears".⁵⁴ Augmented by a force of thirteen damaged tanks that had been repaired and manned by wounded crew members released from the hospital, the 7th Brigade counterattacked. The Syrian attack had been blunted and now this bold Israeli counterstroke caught them by surprise. Syrian forces broke and withdrew to the original cease fire line.

In the south, the Israeli reserve of one armored division under the command of Major General Moshe Peled was committed on the night of 7 October. Counterattacking along the El Al road, Peled's division pushed the Syrian 9th Infantry Division back to Rafid. By 1200 hours on 8 October, the Israeli 20th Brigade on Peled's right flank defeated the Syrian 46th Tank Brigade and reached Tel Faris. Syrian forces continued to move in from the east and by 9 October the situation was critical.

Peled ordered his brigades to push forward in the direction of Hushniya. His 14th Brigade attacked in the center of the divisional front gaining the high ground on Tel Faris that provided excellent artillery observation points. Peled's 19th Brigade supported by close air attacked the 40th Mechanized Brigade of Syria's second echelon 1st Armored Division. Syria's 15th Mechanized Brigade of the 3rd Armored Division was attempting to relieve units cut off in the vicinity of Hushniya.⁵⁵

Peled ordered his forces to seize Tel Kudne on 10 October. This was the location of the Syrian forward headquarters. Simultaneously, Israel's 79th and 17th Brigades were being committed from the north to reduce the Syrian forces in the Hushniya pocket. Israeli infantry

reinforcements began firing SS-11 antitank missiles and the Israeli Air Force struck Syrian armor to strengthen the defense in the southern Golan sector.⁵⁶

By 10 October all Syrian tanks west of the original cease fire line had been destroyed or withdrawn. In the Hushniya pocket alone, two Syrian brigades had been completely destroyed. Syria left behind the remains of 867 tanks along with countless guns, antitank, and supply vehicles.⁵⁷ Israel now faced the decision of whether or not to continue the attack into Syria. A direct threat to Damascus might bring Soviet intervention.⁵⁸ The Israelis decided to push on.

At 1100 hours on 11 October Israeli units crossed the "Purple Line" into Syria. Syrian forces offered stiff resistance along the approaches to Damascus. The Israeli Air Force had been successful in defeating the Syrian surface to air missile defenses and now opened a whole new dimension to the conflict. Employing evasive tactics and targeting the command and control centers for the air defense systems, the IAF gained freedom to maneuver. These new tactics involved flying over Jordanian territory to strike Syrian forces in the flank without passing over surface to air missiles deployed well forward in the attacking columns.⁵⁹ Additionally, the IAF conducted deep strikes into the heart of Syria forcing the withdrawal of missile batteries from forward locations to defensive positions around Damascus. The Israelis could now fight in accordance with their doctrine - armored ground forces against ground forces with unchallenged air superiority.⁶⁰

As Israeli forces pushed to within indirect fire range of Damascus, the Syrian government pleaded with Egypt to increase their operations along the Suez to divert Israeli combat power away from the Golan-Damascus front. The Soviet Union made it known through diplomatic channels that it would not tolerate a continued Israeli threat to Syria. Israel recognized the impact that seizing Damascus would

have on the Arab world, the costs involved in taking a city of one million hostile inhabitants, and the danger of squandering her limited combat forces in the open expanse of Syrian territory.⁴¹ Israel made the decision to stop its forces short of a direct threat on the Syrian capital.

Coming to the aid of Syria, Iraq and Jordan joined the struggle on 12 and 13 October respectively. The Iraqi 3rd Armored Division was moved to the southern flank. Jordan's 40th Armored Brigade moved northward towards Sheikh Meskin. The counterattacks by Syria's Arab allies were uncoordinated and largely ineffective. An Iraqi brigade was totally destroyed in the early morning hours on 13 October when the 3rd Armored Division stumbled into an engagement area ringed by four Israeli brigades in prepared defensive positions. Eighty Iraqi tanks were destroyed in a matter of minutes with no Israeli tanks lost.⁴² The Jordanians fared no better. By 16 October, remaining Iraqi forces occupied Nasej. Remnants of the Jordanian brigade halted at Jasim.

Recapturing the Israeli position on Mount Hermon that had been lost on the first day of the war would be the last engagement of significance before the cease fire. Israeli paratroopers and soldiers of the "Golani" Brigade fought from 20-22 October to retake the key terrain. By 1000 hours on 22 October with 52 killed and 100 wounded, Israel again controlled the high ground.

The United Nations Security Council cease fire ending the Yom Kippur War took effect at 1700 hours on 24 October. Losses in the Golan alone totalled 1,150 Syrian tanks, 100 Iraqi tanks, 50 Jordanian tanks, 3,500 Syrian dead, and 370 taken prisoner. Israel lost 250 tanks, 772 dead, 2,453 wounded, and 65 prisoners.⁴³

As Maj Gen George S. Patton III states in his introduction to Frank Aker's October 1973: The Arab-Israeli War,

This was conventional, nonnuclear war, conducted with a very high degree of intensity. In nineteen days of heavy

fighting, over seven thousand men lost their lives. Four hundred and eighty five aircraft and over sixteen hundred tanks were destroyed. These losses are double those sustained by the Axis and British forces during the El Alamein battles of November 1942.⁴⁴

The Israeli - Syrian confrontation in the Golan Heights in 1973 showed a numerically inferior defender facing an overwhelmingly superior, well equipped, well organized attacker. The survival of Israel depended on halting the Syrian advance. Trading space for time was not an option.

Syrian attackers confronted a determined Israeli defense by two understrength brigades that could not be bypassed. Limited penetrations were made in both the 7th and 188th Armored Brigade sectors but at a heavy cost.

Combat losses caused the culmination of the Syrian offensive. The skill of Israeli tank crews, improved defensive positions in the south, mobile tactics in the north, and IAF superiority exacted a demanding price from the Syrian attackers.

Fresh troops from Major General Peled's reserve division committed behind the 188th Brigade in the south signalled the culmination of the Syrian attack. Their second echelon forces (1st, 3rd Armored Divisions) had been committed to the Hushniya pocket with little success. On a smaller scale in the north, Lt Col Yossi's counterattack for the 7th Brigade with his reconstituted force of thirteen tanks marked the turning point in that engagement.

The Israeli defense successfully forced the culmination of the Syrian attack before the Syrians were able to achieve their desired objective of capturing the Golan. In addition, the Syrians were unable to conduct a viable defense and were rapidly pushed back to Damascus.

The Israeli example provides many lessons to the tactical defender who must fight from fixed battle positions. There are several reasons why such a defense may be undertaken. Terrain may not be available to conduct a defense in depth. Time may be lacking. Israel, faced with

a two front war, chose to defeat Syria quickly then turn her efforts south against Egypt in the Sinai. Political reasons may drive a defense well forward. If the defender lacks mobility, he may have no choice but to fight from fixed positions.

It is imperative that the defender cause the attacker's culmination quickly and as far forward as possible. He does this by synchronizing all elements of combat power.

Protection of his own position was key. The Israelis supplemented natural obstacles with extensive man made obstacles. Field fortifications were constructed and weapons were emplaced to maximize their killing potential at the greatest range. Camouflage was imperative.

Small, local counterattacks proved to be decisive as shown by the 7th Brigade after blunting the Syrian attack at the Valley of Tears. The unexpected counterattack by only thirteen additional tanks routed the Syrians.

Gaining air superiority was key to Israel's successful defense. The Israelis learned how to strip the air defense coverage away from the ground maneuver forces and were able to defeat them in the kind of battle in which they excelled.

Initiative and leadership at the lowest level were key factors in the Israeli success. Countless times an individual tank commander or small unit leader turned the tide of battle.

Clausewitz writes of the defensive culminating point as that point when the defender ceases to gain any additional advantage over the attacker by waiting.⁴⁹ As with multiple centers of gravity, too many culminating points confuse rather than clarify the issue. It has been argued that the purpose of the defense is not simply to hasten the attacker's culmination but to cause him to reach his culminating point before you, as the defender, reach yours. This statement overlooks the fact that both points are one in the same.

There are not two separate points. Because combat power is relative, a decline in the attacker's is an increase in the defender's. As the Syrian advance lost strength and approached culmination two days into the attack, Israeli strength grew. At the time Gen Peled's reserve division was committed to the counterattack, the IDF would have gained no additional advantage by waiting. A swift, violently executed counterattack before the enemy can consolidate and reorganize is the ideal culmination of the defense.

The culminating point of the defense is not the point where a beaten defender can no longer offer resistance. That point is simply the point of failure.

Can you see the culminating point ahead of time? This is the key question for both the planner and executor. Clausewitz recognized the difficulty in measuring this point because so many factors are involved. He therefore advised commanders to approach the culminating point with "discriminative judgement".⁴⁴ Judging one's own capability is difficult. Judging the enemy's capability is more difficult still, and judging his intentions is almost impossible.

Committing the reserve may indicate the approach of the culminating point. This action is the attacker's most decisive way to influence the ratio of combat power for units in contact. If the reserve helps the attacker reach his objective then any discussion of the culminating point is irrelevant. If, on the other hand, the attack fails then the attacker has no further means to significantly tip the balance of combat power.

The defender must also make certain decisions at the culminating point. He must decide when and where to counterattack. The Syrians committed their second echelon divisions on 9 October to penetrate the Hushniya pocket. The Israeli counterattack was directed against this force and was successful in destroying two Syrian brigades. This

quick and decisive action opened the way for the Israeli thrust into Syria on 11 October and marked the turning point of the battle. As such, it also marked the culminating point of the Syrian attack.

IV. CONCLUSION

The concept of the culminating point has great utility for the tactical commander. It is one of three concepts fundamental to the design and execution of major operations. Because strategy, operational art, and tactics must be linked to insure success, tactics must necessarily flow from operational decisions. Our doctrine addresses the concept of the culminating point in operational terms but its impact on tactics cannot be neglected.

The culminating point is important to both the attacker and defender. The attacker must take his objective before reaching the culminating point. Because the attacker no longer enjoys superior strength relative to the defender, going beyond the culminating point risks overextension, counterattack, and defeat. The defender, on the other hand, seeks to cause an early culmination of the attack. He forces the attacker to expend his resources, fights him to a point of equilibrium, then counterattacks for a decisive victory.

The tactical commander who cannot trade space for time may have no choice but to defend from fixed battle positions. He cannot maneuver in depth and must cause the attacker's culmination well in front of his position. The short duration and relatively short distance travelled in a tactical engagement or battle make the tactical defender's task that much more difficult. He cannot rely on the attacker's own exertions to logistically support himself to cause depletion of combat power. He must tip the balance to

his favor through violent blows at the attacker's combat forces.

This balance defined by the culminating point involves a comparison of combat power. Combat power is more than simply the mathematical sum of all weapons systems at the point of contact. Combat power must also include factors that cannot be easily quantified such as leadership and morale. There are many cases in history where the smaller force won but it was not necessarily the weaker force. True combat power results from the combined effects of maneuver, firepower, protection, and leadership.

Field Marshal Erwin Rommel's attack of Montgomery's Eighth Army at Alam Halfa showed a numerically inferior, logistically weak force opposed by a superior defender. The Israeli defense of the Golan Heights in 1973 presented the case of a numerically inferior defender unable to trade space for time. An analysis of both actions yields many lessons for the tactical commander in causing his opponent's culmination.

Selection of battle positions was critical. Direct fire weapons were emplaced to make maximum use of range from the heights of the Alam Halfa Ridge and the Golan. Natural obstacles were enhanced with man made barriers and obstacles. Hardened field fortifications were constructed well in advance. Montgomery's insistence that tank crews not advance beyond their prepared positions kept them from falling into traps the Afrika Korps had been so successful in setting in the past. Skilled Israeli tank crews were able to knock out a superior number of Syrian combat vehicles. The Royal Air Force pounded Rommel's forces incessantly, further tipping the scale to Montgomery's favor. The Israeli Air Force, after first being surprised by the extensive Syrian air defense coverage, was able to target the command and control centers to defeat this threat. Additionally, deep strikes to Damascus caused the Syrians to pull back their air defense batteries leaving

forward ground forces unprotected. Immediate local counter-attacks violently executed with only a few vehicles turned the tide in many engagements. The Royal Scots Greys Regiment quickly filled the gap in the 22nd Armored Brigade's defense. Lt Col Yossi's counterattack for the 7th Armored Brigade in the Golan routed the Syrian advance. This was possible because of a sound plan and outstanding leadership abilities of individual soldiers.

V. IMPLICATIONS

At the tactical level, culmination is a function of synchronizing combat power. In the defense, bringing superior combat power to bear at the decisive point and time will force culmination of the attack. This has implications for the tactical commander.

The commander operating as part of a contingency force may be severely constrained in the conduct of his tactical operations if he is operating at the end of a long, vulnerable line of support. Although his focus will be on the tactical battle, he cannot forget that he is dependent on the operational commander to provide him with supplies, personnel, and equipment.

The concept of the culminating point is critical. The tactical commander's actions will be driven in large part by the operational commander's ability to sustain him. Careful and detailed planning weighing threat capabilities against friendly courses of action should allow the commander to execute his mission and not overshoot the mark.

The culminating point as I have presented it has implications for the contemporary NATO scenario. Thirty percent of the population and twenty five percent of West Germany's industrial capacity lies within sixty miles of the inter German border. The German strategy of a cohesive forward defense preventing the loss of any ground is a

political reality. This strategy, in effect, confines the commander to a forward tactical area. Trading space for time is not an option. The tactical commander of our forward deployed forces may find himself fighting from fixed battle positions.

Col William H. Janes in writing the "Operational Art in NATO" references the 1985 Federal Minister of Defense White Paper that expresses the German concern very clearly:

The strategy of Flexible Response requires in particular that our conventional forces be able to initiate defense early and conduct it close to the border.

Limitations of objectives means that our military options are tailored to the purpose of defense . . . The objective of NATO strategy is to maintain or restore the integrity and security of the North Atlantic area. This requires a capability for cohesive forward defense near the border.

The principle of limitation of objectives laid down in the NATO strategy rules out any kind of aggressive defense by ground operations in the opponent's territory. Neither a preemptive war, nor offensive and preventive thrusts into the opponent's territory aimed at gaining space for our defense are politically conceivable or militarily practicable concepts for NATO.⁶⁷

The limitations placed on the commander by the strategy of forward defense and restrictions of the IGB are very real.

The tactical commander operating in this theater can learn from the Israeli example. Also precluded from making preemptive attacks for political reasons, the Israelis were able to fight successfully from fixed positions well forward. Even though outnumbered, the Israeli defenders generated superior combat power and forced the culmination of the Syrian attack.

Field Marshal General Ritter Von Leeb wrote of defense in 1938:

. . . coordination of all arms and means is a basic condition for full utilization of every defense possibility. In our war experience, 1914-1918, we learned the meaning of close cooperation amongst all infantry arms and between artillery and infantry. But before an enemy equipped with

strong armored forces, this cooperation is no longer sufficient. It now must be augmented by a uniform plan of anti tank defense; employment of all means of reconnaissance, use of artificial obstacles of all kinds, combined use of all offensive arms, the preparation and use of reserves, armored units, and aviation. Not one arm alone nor one method by itself brings the decision. Cooperation amongst all of them is necessary.⁶⁸

These words ring true for Montgomery's defense of the Alam Halfa Ridge in 1942 and the Israeli defense of the Golan Heights in 1973. They certainly apply to the tactical commander defending Western Europe today.

THE COMBAT POWER MODEL

COMBAT POWER IS A FUNCTION OF:

1. FIREPOWER EFFECT: (which is a function of)

VOLUME OF FIRE: (which is a function of)

- Number of delivery means
- Supply capability
- Rate of fire of weapons systems

LETHALITY OF MUNITIONS:

- Design characteristics
- Explosive energy

ACCURACY OF FIRES:

- Weapon and munition design characteristics
- Crew proficiency
- Terrain effects
- Visibility

TARGET ACQUISITION:

- Intelligence and intelligence analysis
- Location and functioning of observers and sensors
- Transmission of target data

FLEXIBILITY OF EMPLOYMENT:

- Weapons ranges
- Mobility
- Signature effects
- Fire control systems
- Tactical employment doctrine

2. MANEUVER EFFECT:

UNIT MOBILITY

- Physical fitness and health of individuals
- Unit teamwork and esprit
- Unit equipment capabilities
- Unit equipment maintenance
- Unit mobility skills

TACTICAL ANALYSIS

- Intelligence and knowledge of enemy tactics
- Understanding of terrain effects
- Understanding of own unit capabilities

MANAGEMENT OF RESOURCES:

- Equipment utilization
- Supplies utilization
- Personnel utilization
- Time utilization
- Utilization of energies of subordinates

COMMAND, CONTROL AND COMMUNICATIONS:

- Span of control
- SOP's and doctrine
- Staff efficiency
- Communications efficiency

3. PROTECTION EFFECT:

CONCEALMENT:

- Camouflage
- Stealth
- Equipment design
- Counter enemy intelligence acquisition means

EXPOSURE LIMITATION:

- Minimize potential target size
- Minimize potential target exposure time
- Complicate potential target tracking

DAMAGE LIMITATION:

- Individual protective equipment design and use
- Use of natural cover
- Use of artificial cover (incl field fortifications)
- Combat vehicle design
- Medical treatment and evacuation system
- Combat equipment cannibalization and repair
- Alternate command and control arrangements
- Providing personnel and materiel replacements
- Misc. efforts to maintain continued combat effectiveness of units

4. LEADERSHIP EFFECT:

TECHNICAL PROFICIENCY:

- Training
- Experience

UNDERSTANDING OF UNIT CAPABILITIES:

- Training
- Experience

ANALYTICAL SKILLS:

- Selection
- Training
- Experience

COMMUNICATION SKILLS:

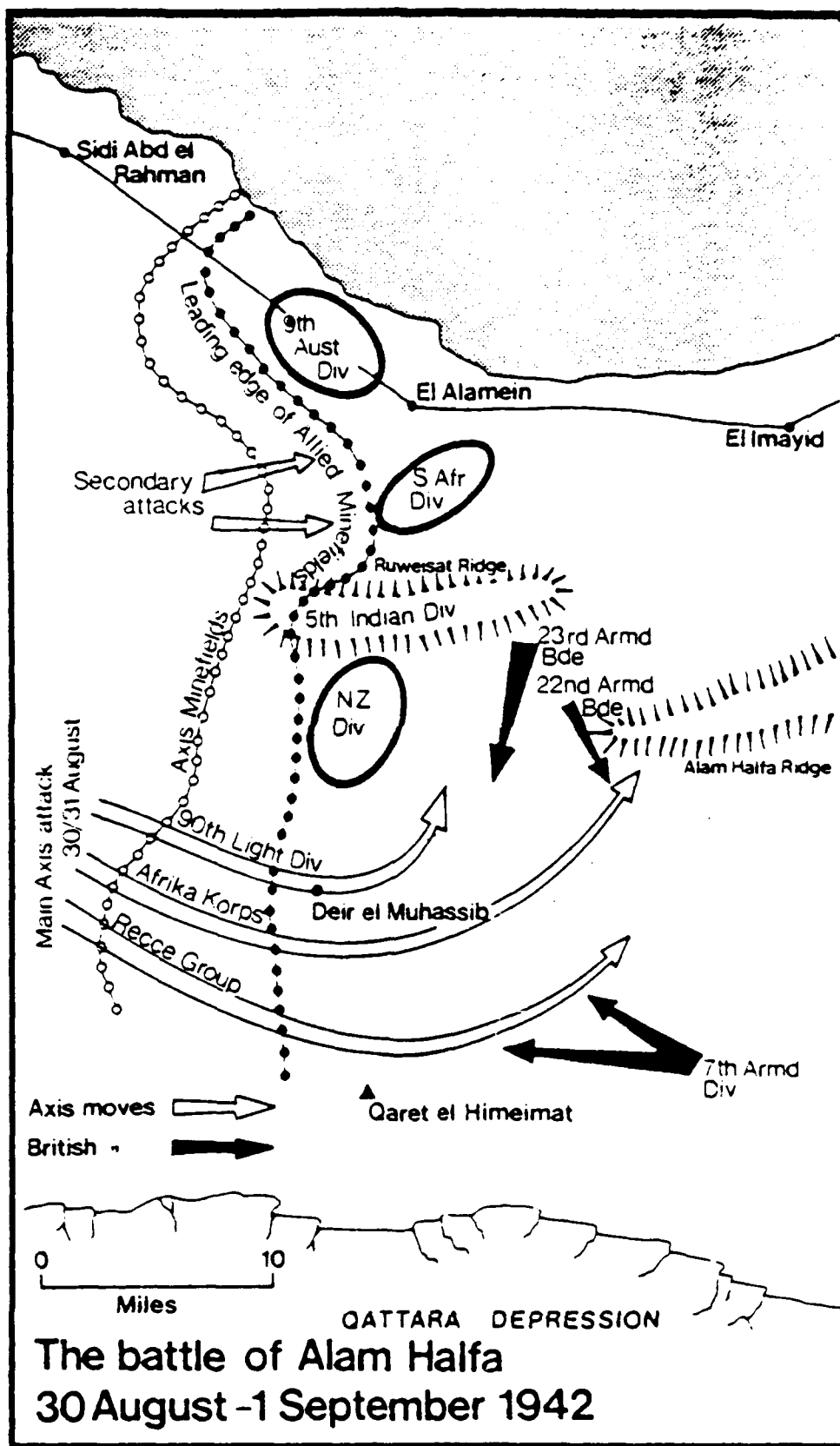
- Selection
- Training

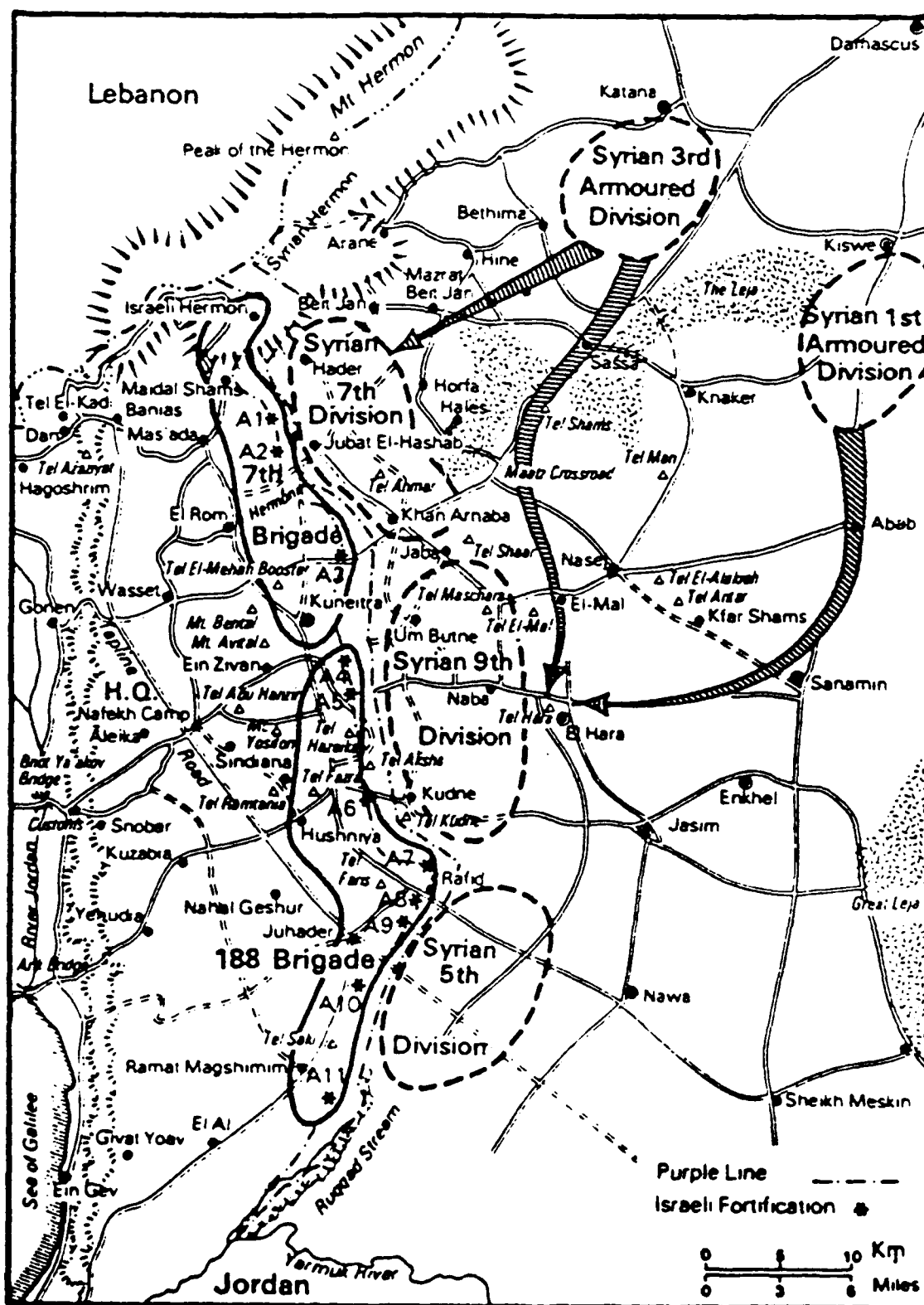
DEDICATION, COMMITMENT, AND MORAL FORCE:

- Selection

Motivation
Training

UNDERSTANDING OF BATTLEFIELD EFFECTS:
Combat experience
Training





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