(2)

AD-A234 218

Balance: The Essence of Operational Art

A Monograph
by

Major Dennis C. Dimengo
Infantry

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

Second Term AY 89/90

UNCLASSIFIED
CURITY CLASSIFICATION OF THIS PAGE

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
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION School of Advanced Military Studies, USAC&GSC 6b. OFFICE SYMBOL (If applicable) ATZL-SWV	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) Fort Leavenworth, Kansas 66027-6900	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
Balance: The Essence of Operational Art (U)

12. PERSONAL AUTHOR(S)
MAJ Dennis C. Dimengo, USA

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Monograph	FROM _____ TO _____	90/04/30	56

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	balance; center of gravity; operational art; military theory; operational level of war; risk

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

In historical and contemporary practice of operational art the concept of balance appears to be of significant consideration. Yet, there does not appear to be a definition of balance that is useful at the operational level of war nor is there an adequate description of the role of balance in operational art. The purpose of this monograph is to determine the operational definition of balance as well as to examine the role of balance in operational art.

The monograph first surveys classical and contemporary military theorists for a theoretical basis for the concept of balance. Next, it examines the concept of balance from the view of a practitioner--Field Marshal Bernard L. Montgomery. From the theoretical basis and practical example, the monograph then proposes an operational definition of balance. This definition is then tested by analyzing three campaigns in light of the proposed definition.

The monograph concludes that balance is a useful concept for both the design and

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL MAJ Dennis C. Dimengo	22b. TELEPHONE (Include Area Code) (913) 684-2138 22c. OFFICE SYMBOL ATZL-SWV

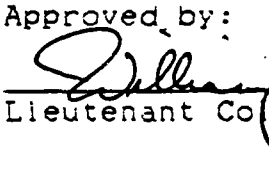
DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

analysis of campaigns and major operations. Balance provides a useful link among the other elements of operational design. Finally, it provides the commander a method to assess risk.

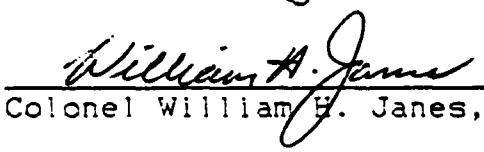
School of Advanced Military Studies
Monograph Approval

Name of Student: Major Dennis C. Dimengo
Title of Monograph: Balance: The Essence of Operational Art

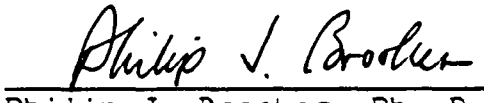
Approved by:



Lieutenant Colonel William J. Rice, M. B. A., M. S. — Monograph Director

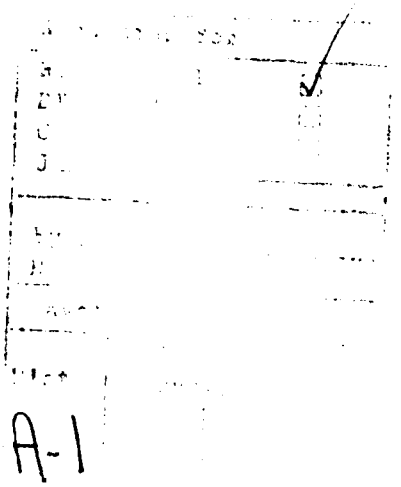


Colonel William H. Janes, M. A. — Director, School of Advanced Military Studies



Philip J. Brookes, Ph. D. — Director, Graduate Degree Programs

Accepted this 19th day of June 1990



A-1

ABSTRACT

BALANCE: THE ESSENCE OF OPERATIONAL ART by MAJ Dennis C. Dimengo, USA, 56 pages.

In both historical and contemporary practice of operational art the concept of balance appears to be of significant consideration. We are instructed in FM 100-5, for instance, to "...throw the enemy off balance...." (p. 27) The histories of innumerable campaigns are replete with comments to the effect that this or that commander was caught "off balance" and that was the root of his failure. Yet, there does not appear to be a definition of balance that is useful at the operational level of war nor is there an adequate description of the role of balance in operational art. The single published military definition of balance emphasizes organizational considerations and nuclear arms control aspects only (JCS Pub 1). This approach appears to be inconsistent with the broader implications of balance in doctrinal and historical publications. The purpose of this monograph is to determine the operational definition of balance as well as to examine the role of balance in operational art.

The monograph first surveys classical and contemporary military theorists for a theoretical basis for the concept of balance. Next, it examines the concept of balance from the view of a practitioner--Field Marshal Bernard L. Montgomery. From the theoretical basis and practical example, the monograph then proposes an operational definition of balance. This definition is then tested by analyzing three campaigns in light of the proposed definition.

The monograph concludes that balance is a useful concept for both the design and analysis of campaigns and major operations. Balance provides a useful link between the other elements of operational design. Finally, it provides the commander a method for assessing risk.

TABLE OF CONTENTS

SECTION I: INTRODUCTION
OPERATIONAL TOOL OR LITERARY DEVICE?

> "The object of all operations is to impose our will upon the enemy....To do this we must throw the enemy off balance....
>
> FM 100-5, Operations[1]

Balance, as the above quotation from FM 100-5 seems to indicate, is a key element of military operations. Yet, if one attempts to discover a definition for balance, one is rapidly disappointed. The only published definition of balance in an American military source is in JCS Publication 1, Dictionary of Military and Associated Terms. This dictionary defines balance in terms of arms control and balance of power theories. The only operational view accorded the term is that associated with combined arms organization. It states, for example, that "...the term 'balance' implies that the ratio of the various elements of this [combined arms] team is such that the force is best constituted to execute its assigned mission effectively and efficiently."[2] Certainly, this is not the context in which FM 100-5 uses the term.

But could this use of the term balance in an operational context be merely a literary device or ploy? Certainly, its use conveys a simple analogy to the reader that expedites understanding of complicated ideas. One need not go far to find numerous examples of this literary ploy particularly in the field of military history. The histories of the German campaign in France in 1940, for

example, are replete with the term.[3] In this case, its use seems to be a way to explain in a concise manner the complex reasons for French defeat. Yet this explanation appears inadequate for the importance FM 100-5 places on the term.

The term appears, however, in the writings of Napoleon from whom modern military thought has largely developed. Indeed, Liddell Hart, as well as the preeminent Napoleonic scholar today, David Chandler, have asserted that military writers subsequent to Napoleon erred in concentrating on lines and points rather than balance in describing Napoleonic military thought.[4] Drawing extensively on Napoleon in his development of the "strategy of the indirect approach," Liddell Hart makes significant use of the concept of balance, but he also fails to define the term.

This failure among doctrine writers, historians and theorists to define what appears to be a crucial concept extends to practitioners of operational art, as well. Field Marshal Bernard L. Montgomery uses the term extensively to describe his conduct of operations.[5] But even though he describes in some detail how balance is achieved on the battlefield, he neglects to take the final step--that is putting his concept of balance into some theoretical framework from which operations can be evaluated or analyzed.

It appears, therefore, that a concept of balance is useful for operational art. But since the published

definition is inadequate and the theorists' and practitioners' writings on the subject are imprecise or overly prescriptive, a definition of balance needs to be developed. To be useful, the definition must generate a concept that can be related to the elements of operational design.

The purpose of this monograph is to develop a definition and operational concept of balance. The paper will begin with a survey of the theoretical basis for balance as a military concept. The classical theorists' concepts of balance will be surveyed concentrating on the ideas of Carl von Clausewitz. Modern theorists' concepts will be examined using the theories of Sir Basil H. Liddell Hart, Major General J. F. C. Fuller, and Brigadier Richard E. Simpkin. Field Marshal Montgomery's concept will then be analyzed to determine its relevancy to the theory. Next, a definition and operational concept of balance will be proposed. This definition and operational concept will then be analyzed using several historical examples and the elements of operational design: center of gravity, culminating point, lines of operations and support and operational pauses.

This paper will be limited in two respects. First, it will examine balance in conventional mid- to high-intensity warfare only. Second, it will accept as its analytical basis James J. Schneider's and LTC Lawrence J. Izzo's

definition of the center of gravity being the mass of an army from their article "Clausewitz's Elusive Center of Gravity".[6]

SECTION II
BALANCE AND THE CLASSICAL MILITARY THEORISTS

Use of the term or concept of balance is not prominent among the classical military theorists. The term balance does not appear at all in the writings of Sun Tzu although in some respects balance is implied when he uses the "cheng and ch'i" to describe the combination of a fixing force and a maneuver force in warfare.[7] Baron Jomini does not use the term balance in his works although he does use the term "equilibrium" in passing and in a fashion that will be of some consequence later as well.[8] Of the classical military theorists, only Carl von Clausewitz uses the term balance to describe some military effect. Since Clausewitz was to a large degree an interpreter of Napoleon, it is necessary to analyze what Clausewitz says about balance in terms of the Napoleonic battlefield. However, it is useful first to briefly review the thoughts of several soldiers and theorists who preceded Napoleon and influenced his military practice in order to understand what Clausewitz said.

Of the theorists who influenced Napoleon in the art of war, three contributed to a concept of balance. Marshal de Saxe employs the idea of balance to describe the effect achieved by surprise. Saxe's concept is distinguished by

some unusual move designed to upset the enemy commanders mental balance. According to Saxe, this is achieved by subtle use of the ground that renders the enemy dispositions irrelevant. Saxe then proposes concentrating against a portion of the enemy army which has thus been isolated by this surprise opening move. Although he does not explain what the mental balance is, his description of the effect leaves no doubt that it is the enemy commander's ability to react to his opponent's maneuvering which in turn is dependent on his initial dispositions.[9]

The other two influences on Napoleon's art of war were J. A. H. de Guibert and Pierre Bourcet. Bourcet's contribution to the concept of Napoleonic balance was the idea that each plan should have several branches. In this regard, he taught that a scheme of maneuver with several planned branches would reduce the chance that a commander would have to react to the enemy by providing a previously conceived and easily executed alternative to each of the enemy's possible responses.[10] To this Guibert added the concept of attacking across an enemy's flank and into his rear. The object of this was to deny the enemy the advantages of the ground he had chosen to rely upon.[11] In reality, Bourcet's and Guibert's concepts were refinements upon de Saxe's original idea. The thought was that an army had a certain "balance" that existed in the commander's mental state and was manifested in his dispositions. Render

those dispositions untenable and the commander's mental balance was upset, forcing him to react and accept battle at a disadvantage. The way to avoid this was to adopt a plan with branches. Napoleon would, of course, apply these principles to their utmost and would, in the process, provide a few of his own.

In describing the Napoleonic system of warfare, Clausewitz would continue the earlier theorists' use of balance to describe what occurred on the Napoleonic battlefield. Clausewitz first alludes to balance in his analogy of war as a match between two wrestlers. Implicit in this analogy is a physical concept of balance.[12] A wrestler's balance is a function of the position of his center of mass relative to the base his feet provide. A wrestler throws his opponent by knocking him off balance. This is done when one wrestler forces his opponent's center of mass off center to the point that the balance achieved by the positioning of his feet is overcome. The wrestler who throws his opponent does this by propelling his own center of mass against his opponent's all the while shifting his feet to maintain his own balance. The idea of striking one center of mass with another in the hopes of knocking an opponent off balance and the concurrent readjustment of both centers of mass to regain balance will form a linchpin to Clausewitz's theory of operations.

Clausewitz uses the term balance explicitly just once. He uses it in his description of the center of gravity in Book Eight, War Plans, of On War. It is used in a discussion of the military objective to describe how the enemy is defeated. In this discussion, Clausewitz asserts that the objective is the enemy center of gravity and that once the enemy is thrown off balance, he must not be allowed to recover. He states that blow after blow must be directed at the enemy center of gravity. As between wrestlers, multiple blows achieve the purpose of knocking the enemy off balance and keeping him from recovering.[13] This discussion of the center of gravity is a continuation of his earlier discussion of the center of gravity which is related to the same concept in Newtonian Physics.

Clausewitz introduces the idea of the center of gravity in his book on defense. In it he first says that a center of gravity forms in any object where its mass is most dense. Unconsciously referring back to his wrestler analogy, he then says that the most effective blow against an object is struck at its center of gravity and is struck by another object's center of gravity. He goes on to say that the same is true of armies-that they will have a center of gravity and it will be where they are most concentrated.[14] Clausewitz's assertion that a center of gravity exists in an army where the mass is most dense must be reconciled first

with the type warfare he is describing; then, with the Newtonian Physics that it is derived from.

Clausewitz was describing what was later to be called the "strategy of the single point."[15] His use of the terms center of gravity and balance are limited to what occurs on the actual Napoleonic battlefield and not the maneuvering that occurs before and after the actual battle. Consequently, his use of the terms center of gravity and balance must be examined in this respect.[16] The battle he describes is the classic Napoleonic clash of arms. In it, the opposing armies generally form a linear front (Figure 1). The opposing lines were normally of a uniform density. The French, for example, often arrayed their divisions abreast all along the front. At some point in the line, Napoleon would execute a decisive breakthrough attack. For this attack, he would normally use one corps in column formation followed by a second, reserve corps. The attack would be supplemented by the fires of a "grand battery" of massed artillery. Once successful, the breakthrough attack would be exploited by massed cavalry through the hole created in the enemy line by this "grand column." Although this formation was used in a frontal attack, it was most effective when it included an envelopment: either a flank attack or a turning movement.[17]

In order to reconcile what Clausewitz said about center of gravity and balance with the Napoleonic battlefield, it

is necessary to explore the Newtonian concept of balance or equilibrium. In Newtonian Physics, every object or group of objects has a specific mass. The distribution of weight in an object determines its center of mass. The gravitational forces operating on an object are equal to the effects of a single force that is equal to the total weight of the object and acting at its center of mass. The point of application of the gravitational force is the center of gravity. In a uniform field of gravity (such as the earth's over short distances) the center of mass coincides with the center of gravity.[18] A symmetrical body has its center of gravity at its geometric center. A uniformly constructed and shaped steel bar, for example, has a center of mass exactly midway between both ends. A cone's center of mass is located one-third up from its base along the centerline (Figure 2).[19] The location of the center of gravity for a nonuniformly shaped object will be governed by where the mass of that object is most concentrated. An "L" shaped object, for instance, whose weight is concentrated in the upper stem will have a center of gravity located close to the vortex of the "L." Changing an object's mass alters its center of gravity.

How an object's center of gravity moves when force is applied determines the object's state of equilibrium or balance. If an object is tipped by a horizontal force and its center of gravity is raised in the process, the object

is said to be in stable equilibrium (Figure 3). If the center of gravity is lowered, the object is said to be in unstable equilibrium. If the center of gravity neither raises or lowers when force is applied, the object is in stable equilibrium.[20]

Returning to the Napoleonic battlefield, it appears that the point Clausewitz was trying to make is that by destroying or dispersing an enemy army where it was most dense, a commander would alter the enemy army's center of gravity. Typically, in a Napoleonic linear formation, the mass would be most concentrated at that portion of the line where the reserves were assembled for the breakthrough. Destroying that mass would move the center of gravity of the enemy army to a point somewhere along the less dense portion of the line. This "lowering" of the center of gravity of the enemy formation places it in a state of unstable equilibrium--the enemy formation is unbalanced. The horizontal force being applied along the line outside the breakthrough area is therefore able to cause the collapse of the entire enemy army (Figure 4).

This, then, seems to be the theoretical explanation of Napoleon's statement that "[t]he principles of war are the same as those of a seige. Fire must be concentrated on a single point and as soon as the breach is made the equilibrium is broken and the rest is nothing."[21] Returning to Clausewitz's theory we can see that destroying or

dispersing the enemy mass causes the center of gravity to change. This, in turn, disturbs the equilibrium of the enemy's formation. The loss of equilibrium either collapses the entire enemy army or forces the enemy to reestablish his center of gravity or mass elsewhere.

This theoretical construct held up well for warfare that culminated in a single climactic battle. Unfortunately, it would not suit, without modification, the distributed battlefield that would evolve in the late 19th century. The idea of balance would remain essential but would be adjusted by modern theorists to accommodate modern conditions. Interestingly, it would be a return to the words of Napoleon quoted above, that would spark the change.

SECTION III
BALANCE AND THE CONTEMPORARY MILITARY THEORISTS

Of the contemporary military theorists, only Sir Basil Liddell Hart uses a concept of balance both to explain Napoleonic military thought and to describe his own approach to modern warfare. It was Liddell Hart's conviction that the key to Napoleonic success lay in the articulation of an army in such a manner that it placed the enemy in a position from which his dispositions were useless. According to Liddell Hart, the destruction of Napoleonic warfare clouded the real key to victory. He declared that Clausewitz and Jomini overly concerned themselves with the "single point" Napoleon described in the quote cited above. Liddell Hart,

on the other hand, would concentrate on the word "equilibrium" in Napoleon's quote. To Liddell Hart, victory was owed the enemy's loss of equilibrium caused by his dispositions being made irrelevant.

Liddell Hart attributes the success of Napoleon to the articulation of his army. He traces the eventual organization of the French Army into combined arms corps to the influences again of Bourcet and Guibert. Liddell Hart credits Bourcet with the idea of dividing an army into several columns. The army would march divided then unite to fight. To this, Guibert standardized the columns by forming combined arms divisions. From this the Napoleonic "corps d'armees" developed.[22]

The corps system divided the French Army into several combined arms corps. Each corps consisted of "...two to four infantry divisions, a brigade or division of light cavalry, several artillery batteries, and a small number of engineer and support troops."[23] The corps were self-contained organizations. As a rule, they marched separately at one day's marching distance from each other. On campaign, contact with the enemy was to be made initially by one corps. Each corps was expected to fight on its own for up to 24 hours for this purpose. While one corps was thus engaged, the others would maneuver to (1) join the corps first making contact; or (2) fall on the flank or rear of the enemy fighting the lead corps. A number of corps

formations were used, dependent on the terrain and enemy situation, that permitted concentration of the army in any direction (Figure 5).[24]

This system gave Napoleon several advantages. First, it allowed him to move much faster than other armies. Second, it allowed him to conduct "strategic" maneuver. That is, it gave him the means to move his entire army to a position that threatened the destruction of the entire enemy army. Third, it provided Napoleon the means to maneuver on the battlefield itself by employing a late arriving corps on the flank or rear of an engaged enemy. While Clausewitz would concentrate on what happened in the actual battle to develop a concept for balance, Liddell Hart would seize on the maneuvering prior to the battle to develop his.

Liddell Hart's concept of warfare is generally termed the "strategy of the indirect approach." Balance is a prominent feature of this strategy. Liddell Hart divides balance into two components: physical and psychological.[25]

According to Liddell Hart the aim of strategy is dislocation of the enemy. By dislocation, he means putting the enemy in such a disadvantageous position that he will be compelled to surrender without a fight, or, if the enemy does choose to fight, he will be in a decidedly inferior position. Dislocation of the enemy is achieved in two spheres: physical and psychological. In the physical sphere dislocation is achieved by a move that flanks the enemy's

dispositions, separates his force, endangers his supplies or menaces his route of retreat. The object in the physical sphere is to force the enemy to change his front or the organization of his forces or to threaten the enemy's total destruction through cutting him off from his base of support.

Dislocation in the physical sphere results in an impression being made on the commander's mind of the effects of the action in the physical sphere. This impression in the psychological sphere is the result of the commander feeling that he cannot counter the enemy's move and thus is trapped. The commander is placed in a position in which he doubts the efficacy of his own dispositions to defeat the enemy's move. Concurrently, the threat to his force is extreme since, in its current dispositions, it is subject to being isolated and defeated in detail. The commander's mind is thereby put in a condition of self-doubt. He responds with either inaction or a series of orders and counter-orders. Either response deepens the crisis in his army and exacerbates the irrelevance of its dispositions.

Balance is introduced in this theoretical construct when Liddell Hart explains the results of an indirect strategy. The combined effects, physical and psychological, most frequently follow a move on the enemy's rear. The effect is accentuated if it is sudden. As the enemy army turns to face the new threat, it becomes unbalanced as would

a man when quickly turning around. The army's logistics structure, for example, would be in a position from which it could not support a new line of operations to the rear. Consequently, a period of instability would ensue in which the logistics organization would adjust and the army regain its balance as a man would shift his feet in order not to fall while turning around. During the period of instability, an army, like a man, is subject to a blow that would completely destroy it. The longer the period of instability, the greater the chance for destruction and the deeper is the psychological defeat of the enemy commander.

In a similar vein, J. F. C. Fuller uses the idea of stability to engender the idea of physical balance obtained from the dispositions of a force. Although Fuller does not use the term balance explicitly, he describes a condition of stability that is related to it. Stability is one part of a three-part system he uses to describe the basis for tactical power.

Fuller begins by describing war as being analogous to two men fighting. If trained, he says, a fighter protects himself with one arm while hitting out with the other. He further says that the relationship between protecting and hitting out is the mobility afforded by the fighter's legs. The fighter can move either forward, towards his opponent, or backward, away from his opponent. Using this analogy

Fuller divides the tactical power of an army into three parts: stability, activity and mobility.[26]

In Fuller's system, stability consists of the protective element of an army that resists the enemy's blows. Activity is the hitting or pressure component of an army. Mobility is the movement capabilities of an army analogous to the fighter's legs. Stability, activity and mobility operate synergistically to create tactical power. Stability forms a base from which activity can take place. Mobility links stability to activity by permitting concentration of force in the required sphere. Stability and activity, therefore, can be thought of respectively as the defensive (in Fuller's words--security) and offensive components of an operation. Mobility allows the concentration of forces to shift between defensive and offensive tasks as the situation requires.[27]

Fuller relates offensive action and security through distribution of force and concentration. Concentration is effected by first holding the enemy, then hitting him. Concentration accentuates offensive power under the conditions of a stable base and a stopped enemy. Proper distribution of force creates a stable base of operations that permits offensive action while protecting the offensive itself.[28] What Fuller seems to be getting at in terms of balance is that defeat of the enemy is dependent on an army being balanced in allocation of force. Part must be

distributed to stop the enemy, while part must be available to attack the stopped enemy. A base of operations must exist that will support the creation, protection, and sustainment of the offensive component.

While J. F. C. Fuller develops a theory of balance based upon the allocation of force for tactical power, Richard Simpkin develops balance as the concept of "keeping one's options open."[29] In this regard, Simpkin sees balance as the allocation of troops and tasks in such a manner as to be a safeguard against the commander or planner being wrong. He alludes that for a force to be balanced, sufficient troops should be allocated to cover any contingency that might arise, and all tasks should be completed that are prerequisites to accomplishing the mission.

In developing this line of thought, Simpkin equates balance with the condition that exists when forces and tasks coincide exactly with the mission assigned. Usually this will require perfect intelligence. Since such intelligence is rarely, if ever, available, balance can only be achieved by blending favorable and worst-case assumptions so that the allocation of troops and tasks can be reasonably supported by the nation or army, and yet, is adequate to meet most possible enemy scenarios.[30]

Simpkin asserts that the degree of acceptable imbalance diminishes as one goes from the tactical up through the operational to the strategic level. At the strategic level,

the allocation of troops and tasks cannot be too far off without significant detriment. This is so because of the extreme amount of time required to raise new formations, manufacture equipment, obtain supplies and re-allocate existing assets. At the operational and tactical levels, however, a greater degree of imbalance is acceptable. In order to achieve operational concentration, for example, a high degree of imbalance in allocation of troops to tasks may be desirable (to achieve economy of force). As long as the basic assumptions over the length and scope of the campaign hold true, a misallocation may not be disastrous. However, as Simpkin points out, the German operation against the Soviet Union in 1941 shows that imbalance in allocation of troops resulting from an assumption of a short campaign may result in consequences that are irreversible.[31]

In order to achieve the right balance of troops and tasks allocated, Simpkin relates this idea to information and risk. The commander and planner make their decisions based in part upon a set of assumptions. Some of these assumptions will be worst case while others will be favorable to the commander or planner. A blend of favorable and worst case assumptions will be adopted which will be deemed "reasonable." Balance comes into play in this aspect because the allocation of troops and tasks must be made such that there is a hedge against the "reasonable" assumptions being too far wrong. The goal is to balance the allocation

of troops and tasks so that acceptable options remain open to the commander if the mix of favorable and worst case assumptions proves incorrect.[32]

Simpkin calls this balancing of troops and tasks within a framework of reasonable assumptions "keeping one's options open." He attributes this concept to Field Marshal Bernard L. Montgomery.[33]

SECTION IV: THE PRACTITIONER
B. L. MONTGOMERY AND THE CONCEPT OF BALANCE

The concept of balance forms a central theme in Field Marshal Bernard L. Montgomery's conduct of operations.[34] Montgomery's concept of balance originated during World War I. The first references to balance appear in a series of tactical instructions he wrote in the summer and fall of 1918 while serving consecutively as Chief of Training for 9th British Corps and Chief of Staff of 47th British Division on the Western Front. Although not specifically so articulated in the instructions, it is clear that Montgomery uses the term balance to indicate actions to be taken to preclude being surprised by the Germans.[35] Montgomery's concept of balance is fully developed, however, while he is in command of Eighth Army in North Africa.

In North Africa, Montgomery's concept of balance was refined to focus less on not being surprised and more on not being forced by the Germans into reacting. His object was to be so disposed and organized that regardless what the

enemy ... d, his own plan would not be upset. Montgomery's concept of balance involved using dispositions and regroupings to keep from reacting to the enemy while setting the conditions for the next operation.

The goal of balanced dispositions was to prevent enemy interference with one's own plan. By balanced dispositions, Montgomery meant positioning formations on the battlefield in such a manner that enemy attacks could be handled without disrupting one's own plan. In "Some Brief Notes for Senior Officers on the Conduct of Battle", Montgomery describes this concept for defensive battles:

> The general lay-out (sic) of dispositions must be carefully thought out, and be such that enemy thrusts can be dealt with without difficulty and will have no repercussions on your own plan. Never re-act (sic) to enemy thrusts or moves. A commander must pursue his own object and work continuously on his own plan; once he has to react to enemy thrusts he will begin to dance to the enemy tune, and once this happens he will be in trouble. The answer is balanced dispositions, so thought out that you can wrest the initiative from the enemy very soon after he has attacked.[36]

Although the above concept is oriented on the defense, Montgomery's use of balance applies to the offense as well. In the offense, Montgomery's idea is to develop a series of thrusts against the enemy in such a way that he believes that the main attack will be in a particular area. Once the enemy is committed to that area, the actual main attack is delivered elsewhere. The enemy is thus forced to react to this new and dangerous move with the bulk of his forces

committed elsewhere. In this fashion the enemy is forced off balance. To achieve this, regrouping of the attacking force is required. The goal of regrouping is to provide the forces necessary to knock the enemy off balance while retaining one's own balance. As Montgomery said in the same notes quoted above:

> In order to operate this way, the army must be re-grouped (sic) after the initial "break-in", and subsequently as necessary, so as to have reserves available for developing new axes of operations. It is not possible to develop a new thrust quickly unless reserves are available....[37]

Montgomery's planning and conduct of the Battle of Alam Halfa illustrates his concept. This battle was his first in North Africa and followed the previously successful German offensive during the late spring and early summer of 1942. Montgomery's aim for the battle itself was to defend El Alamein; his aim for the subsequent battle was to destroy the German army in place.[38]

Upon his arrival in North Africa, Montgomery found two major shortcomings in the British plan. First, preparations already made for the defense would result in British reaction to a German attack that would inevitably become a mobile battle that favored the Germans. Second, the battle subsequent to Alam Halfa was expected to be a defense further within the depth of Egypt. He began immediately to correct both of these deficiencies. First, he added additional depth to the defense and positioned his

formations so that he would not have to react to the variety of possible German thrusts. Second, he orchestrated the battle of Alam Halfa so that the German army would not withdraw, but remain in western Egypt to fight a decisive defense at El Alamein.

Montgomery's initial examination of the defensive positions of Eighth Army revealed them as similar to those used by the British prior to his assumption of command (Figure 6). Commonwealth infantry divisions, organized into two corps held an extended front. British armored divisions were held in reserve behind the infantry divisions in dispersed positions. Montgomery's assessment was that these dispositions were unbalanced for two reasons. First, the Germans could attack anywhere along the defensive line and the British would have to concentrate their armor, move to the threatened sector and fight a mobile battle against the German armor. British armored divisions would have to be controlled by either the infantry corps or by Eighth Army. From this point of view, Montgomery adjusted the dispositions at Alam Halfa to achieve balance and thus avoid reacting to a German attack (Figure 7).[39]

First, he requested and received an additional division from the theater. This division was positioned on Alam Halfa Ridge. This position was selected because its occupation would reduce the need to react to German moves. If the Germans penetrated in the south, subsequent progress

depended on securing the ridge because it blocked German movement north to encircle the Eighth Army and cut the German axis to the Nile River. If the Germans penetrated in the north, the ridge must be cleared to permit movement east to the Nile River or south to encircle the Eighth Army. By positioning a division on Alam Halfa Ridge, the defense becomes balanced since regardless which course of action the enemy adopts, the defensive layout will not have to be adjusted.[40]

Second, he began the formation of a British "Afrika Corps" in which he would concentrate the British armored divisions. Eventually to become 10th Corps, it would add balance to the Eighth Army by providing a major formation that would be perennially in reserve. This reserve corps would never hold part of a static line but would spearhead British offensive action. Unfortunately, formation of the corps would not be complete at the time of the German attack.[41]

The German attack that signaled the start of the Battle of Alam Halfa began at about midnight on 30 August 1942. During the battle, Montgomery executed a series of "regroupings" that forced the British plan on the Germans by seizing the initiative and setting the terms for the next battle-the decisive defeat of the Italo-German army in the Battle of El Alamein. The German plan was to conduct holding attacks in the center and northern portions of the

British defense while the German Afrika Corps and the Italian Armored Corps enveloped the British southern flank (Figure 8).[42] The German goal was to drive past Alam Halfa Ridge on the east and then continue north to the coast.[43]

Once the German plan became clear to Montgomery, he first "regrouped" his formations to strengthen the balanced dispositions that began the battle (Figure 9).[44] The positions along Alam Halfa Ridge were reinforced with an armored division to block the German thrust. An additional infantry brigade reinforced the British formation on Ruweisat Ridge, the German objective. Concurrently, the northern corps' front, which was lightly attacked, was thinned to create new reserves and an additional brigade was released from theater reserve to replace the armored division moved to Alam Halfa Ridge. With these "regroupings" in effect by 2 September, Montgomery then prepared a corps counterattack for 3-4 September. This corps executed a limited counterattack to seal off the German penetration.[45]

These "regroupings" allowed seizure of the initiative from the Germans by wearing down their attack, then clearing them from the British defensive position. But after achieving a victory in this battle, Montgomery did not order pursuit of the defeated Germans and Italians. Although severely criticized for not doing so, Montgomery elected not to pursue because the terms for decisive defeat of the

Italo-German army--the next battle in Montgomery's plan--were not yet set. Montgomery's second aim, it will be recalled, was destruction of the Italo-German army in place. He recognized that by setting the conditions for a deliberate attack in the El Alamein positions, the Germans would fight at the end of an extremely long line of communications. Additionally, he understood that without retraining the Eighth Army in offensive operations, reorganizing it to include a "reserve" armored corps, and bringing additional supplies forward, any pursuit of the defeated Italo-German army would merely degenerate into a replay of previously indecisive British offensives. In short, the enemy would withdraw into prepared positions around El Agheila unhindered by a British army that was ill-organized and ill-trained for trapping a fleeing enemy. Furthermore, once at El Agheila, the supply situation would shift to favor the Germans, necessitating a pause by the British to bring up additional supplies to permit continuation of the offensive.[46]

This then is the essence of Montgomery's concept of balance. It embodies dispositions selected to preclude reacting to the enemy plan and regrouping to seize or maintain the initiative. But these two physical manifestations of balance hide its true essence in Montgomery's method of warfare. Montgomery used dispositions and regroupings to force his plan on the enemy.

They permitted him to fight the current battle in a manner that set the terms for the next battle. Balanced dispositions were to Montgomery as the wrestler's legs were to Clausewitz; they formed the base from which to shift the center of gravity. Regroupings during the battle were the reconcentration of the center of gravity within the minor fluctuations permitted by the initial dispositions. If balanced, the initial dispositions precluded the concentration of a center of gravity that necessitated significant reorganization or reorientaion--moving the wrestler's legs. By maintaining the original dispositions, making additional regroupings, always retaining a reserve, and possessing a solid logistical base though, the army could easily transition from one operation to another-the next battle.

SECTION V: ANALYSIS
TOWARD A DEFINITION OF BALANCE

To summarize to this point, an operational concept of balance appears to have two components. There is a physical component, related to the center of gravity, which describes how masses interact with each other, as in Newtonian Physics, to cause one side to enter a state of unbalanced equilibrium. The physical component includes the creation, recreation, and regeneration of centers of gravity to account for the distributed nature of modern warfare. There is a moral component, relating to the attitude of the

commander, in which unexpected enemy action places him at psychological disadvantage because of the presumed effects of the unexpected activity. Furthermore, balance appears to be manifested in four facets of operational design.

Balance involves use of an indirect approach that both places the enemy in a reactive mode while selecting a point of main effort such that its effect reduces the enemy center of gravity and precludes its reestablishment by reinforcement or regeneration. It requires conduct of current operations in such a fashion that they prepare the way for subsequent operations. It demands dispositions that preclude reacting to enemy activities. It permits smooth and rapid shifting of the friendly center of gravity both within the current battle as well as to support the subsequent operation. In this regard, planning and conducting operations with an eye toward balance is a method for the commander to reduce risk.

Additionally, balance is a relative concept. Both opponents in war are capable of achieving a state of balance or imbalance. Imbalance, however, is most often forced upon one side by the other by the nature or direction of an attack, by the nature of the defense, or by the facility of either side to sustain its operations. Balance on the battlefield is analogous to Clausewitz's wrestlers; it is not an absolute quality as one would see in a gymnast.[47]

Balance, therefore, is defined as follows:

> The disposition and organization of a military force and the planning and conduct of operations so that (1) enemy activity, even if a surprise, will not cause a reaction to the point that the friendly plan will be disrupted; (2) the current battle sets the conditions for the next battle; and (3) transition from the current battle to the next battle is timely and effective. Several actions contribute to attaining balance in a formation or plan. In the defense, balance is achieved by disposing forces laterally and in depth, continually recreating reserves, and seizing the initiative from the attacker through offensive action. In the offense, balance is obtained by attacking the enemy center of gravity in a manner that isolates it from reinforcement or regeneration and disposing attacking forces so that enemy counterattacks can be met without derailing the attacker's plan. In either operation, forces are marshalled and resources are husbanded so that transition to branches and sequels are smooth and effective both between and among battles.

SECTION VI: TESTING THE DEFINITION
HISTORICAL ANALYSES OF ALLENBY'S 1918 OFFENSIVE, THE 1941 CRUSADER OFFENSIVE AND THE GERMAN 1944 ARDENNES OFFENSIVE

The three campaigns in the title of this section have been the object of considerable study. Regardless of changes in weaponry, tactics and locale, they remain excellent vehicles for analysis of operational art. Consequently, examining each in light of the definition of balance posited above should reveal the accuracy and utility of the definition. If the definition has some usefulness in explaining the success or failure in these operations then it should be worthy of adoption as an element of operational design.

ALLENBY'S 1918 OFFENSIVE

September 1917 found the British and Turkish armies in Palestine facing each other along a line occupied since January. The line was anchored in the east on the Jordan River near its confluence with the Dead Sea (Figure 10).[48] It ran generally westward approximately 60 miles to the Mediterranean Sea. Along its path, the line ran across the Judean Hills--a range of rugged mountains with virtually no lateral communications routes. The Judean Hills would effectively divide the sector into halves. The eastern half covered the Jordan River Valley--the most direct route to Deraa, a key rail and road junction, whose possession controlled the single line of communication from Damascus. West of the Judean Hills was a coastal plain that would offer good trafficability into the rear of the Turkish positions and also lead to Deraa, albeit by a more indirect route.[49]

The Turkish Army under the German General Liman von Sanders was organized into three armies. The Eighth Army, comprising five Ottoman divisions and three German battalions organized into two corps, defended the coastal plain. The Seventh Army, of two corps with two divisions each, defended the Judean Hills themselves and the Jordan River Valley up to the west bank of the river. The Fourth Army also of two corps but with four Ottoman divisions and a

separate German infantry regiment defended the Jordan River Valley to the Dead Sea.[50]

Opposing this General Edmund Allenby arrayed his mostly British Commonwealth force in three corps. The XXI Corps of five divisions would attack along the coastal plain concentrated against one corps of the Eighth Turkish Army. This attack would be exploited by the Cavalry Corps of three divisions that would attack into the depth of the Turkish position. The XX Corps comprising two divisions and some miscellaneous separate brigades and battalions would attack across the rest of the front of the Eighth, Seventh and Fourth Turkish Armies to prevent them from moving to the coast and to portray an attack towards Amman. Concurrently, an Arab army was to raid Turkish communications from the inland desert.[51]

The British offensive began on 19 September 1918 and acheived dramatic results. The British center of gravity of the eight divisions of XXI Corps and the Cavalry Corps pierced a Turkish corps of three weak divisions and rapidly drove into the Turkish rear. The remainder of the Eighth and all of the Seventh Turkish Armies were unable to respond to the British attack due to the intervening terrain of the Judean Hills. Meanwhile in the east, a scratch British force of mounted and regular infantry demonstrated before the Fourth Turkish Army, freezing them in position. Shortly after the XXI Corps' success was assured, the remainder of

XX Corps attacked, further denying the Turkish forces in the Jordan River Valley the chance to intervene. The bulk of the Eighth and Seventh Turkish Armies were isolated in the Judean Hills while the Fourth Army was cut off behind the Jordan River.[52] By 21 September the Eighth and Seventh Turkish had been destroyed with the loss of 25,000 prisoners. The Fourth Army disintegrated between 22 and 30 September under the combined effects of cavalry, air power and Arab irregulars. Damascus fell on 2 October.[53]

In the context of the definition of balance presented above, the Turkish defeat can be attributed, in part, to the unbalanced dispositions of its army. The effects of the terrain and British deception efforts combined to create the Turkish imbalance. The bulk of the Turkish army was located in the Judean Hills or east where they were divided by the Jordan River. When the British attack opened on the coastal plain, the Turkish army was at first frozen in its initial positions by British deception activities. Once the British main effort was identified, the intervening terrain of the Judean Hills prevented the Turkish army from moving to the coastal plain and opposing the British attack. The Turks could not shift their weight to the west to counter the British blow. This campaign was, in many respects, a Napoleonic battle, writ large. As such, those portions of the definition of balance that are attributable to Clausewitz largely apply. As mechanization and increased

lethality further expanded the distances between formations on the battlefield, one sees the later theorists' concepts of balance begin to assert themselves. No place was this more evident than in the Western Desert in World War II.

THE 1941 CRUSADER OFFENSIVE

When General Claude Auchinleck began his Crusader offensive against the Italo-German Army under General Erwin Rommel in North Africa in November 1941, he found himself in much the same position as Montgomery would find himself a year later at Alam Halfa. Although starting about 200 miles farther west, along the Libya-Egypt frontier, Auchinleck would be faced by the same enemy who had prepared positions to his rear at Gazala and El Agheila (Figure 11).[54] The British attack began on 18 November 1941. For over two weeks, the battle was fought in a series of back and forth actions from the frontier to Tobruk. Finally, on 4 December, Rommel's armored formations suffered a major defeat just west of Tobruk. Unlike at Alam Halfa, however, the British Eighth Army pursued.[55]

The Germans and Italians were obliged to withdraw first to their Gazala positions and by 31 December were back at El Agheila. There, the Eighth Army did not have the strength to prepare to continue its offensive to a decisive defeat of the Axis army and concurrently prepare for the inevitable German counterattack. Auchinleck elected to gamble on

preparing to continue his attack before Rommel could conduct his counterattack. The Germans beat the British to the start and as a result caught them with widely separated forces, many refitting as rapidly as possible for offensive action as opposed to disposed for the defense.[56] The result was another Italo-German offensive that drove the British entirely from Libya and into Egypt where the battles of Alam Halfa and El Alamein were to take place.

Using the proposed definition of balance, the British Crusader Offensive failed because its sustainment design rendered the Eighth Army unbalanced. Following the British defeat of the Italo-German army in late November and early December 1941, Auchinleck elected to pursue before he was logistically able. As a result, he was unable to assemble sufficient troops and supplies in a condition to recreate a center of gravity that could defeat a German counterattack and continue the offensive to complete the destruction of Rommel's army. The bases of support and operation needed to ensure shifting of the weight of Eighth Army first into a solid defense, then over to the offense did not exist. Consequently, Rommel's January 1942 offensive caught Auchinleck like a wrestler standing on one foot. In this example one can clearly see the the concepts of Fuller and Montgomery come to the fore. But as mobility combined with mass, the contributions of each theorist and practitioner

began to meld together. The German 1944 Ardennes Offensive is a case in point.

THE GERMAN 1944 ARDENNES OFFENSIVE

The final plan for the 1944 German Ardennes Offensive had three armies totalling 29 divisions attacking along a front of about 65 miles to an objective almost 125 miles distant (Figure 12).[57] The German main effort was with the northern army-the 6th Panzer Army. This army was assigned 11 1/3 divisions plus a very strong complement of army troops to accomplish its mission which was seizure of the overall objective: Antwerp. The 5th Panzer Army with 9 1/3 divisions and a less robust contingent of army troops was to attack in the center to support the 6th Panzer Army by anchoring itself along a line from the Schelde Estuary through Brussels to Givet. The 7th Army with 8 1/3 divisions and limited supporting arms was to protect the southern flank of the 5th Panzer Army.[58]

The German center of gravity was intended to lie in the 6th Panzer Army. This army was given the primary objective of the offensive and was afforded the most and strongest formations. However, the 6th Panzer Army's zone was the least trafficable. Additionally, its zone was, for the most part, opposite the V US Corps which was defending a relatively narrow sector. The 5th Panzer Army, on the other hand, attacked with fewer divisions but in the best terrain

and fully against the extended sector held by the weakened VIII US Corps.[59] These faulty dispositions were further exacerbated by an inter-army boundary that failed to assign sufficient space around the key town of St. Vith to allow either the 5th or 6th Panzer Armies to rapidly seize this critical communications junction.[60]

The German counteroffensive began at 0530 hours on 16 December 1944. The 6th Panzer Army's attack began to stall on the second day of the offensive. By 20 December, it had ground to a halt. In the center, on the other hand, the 5th Panzer Army made reasonably good progress. Hitler, however, forbade reinforcement of 5th Panzer Army and even directed reinforcements be sent to the already halted 6th Panzer Army. Consequently, the German center of gravity continued to be frittered away with 6th Panzer Army in the north. By 20 December, though, Hitler finally conceded to switching German reserves to the 5th Panzer Army. Two divisions from OKW Reserve were thereupon transferred to 5th Panzer Army. However, these divisions were unable to arrive at 5th Panzer Army until 25 December because of lack of fuel and traffic jams along the routes into the battle area. Consequently, the switching of the main effort to 5th Panzer Army proved too late to have any decisive effect on the outcome of the battle.[61]

Using the definition of balance presented above then, it can be seen that from the outset, the German attack was

unbalanced because of the initial dispositions of German forces; the refusal of Hitler to shift the main effort; and the inability of the Germans to shift the main effort once Hitler so decided. The initial German disposition, like a scythe cutting to the northwest with its weight on the inside, gave the force that had to move the furthest and fastest (5th Panzer Army) an appreciably smaller force. With insufficient force, 5th Panzer Army could not extend its power to the distances required. Although this became clear as early as 18 December, Hitler's disinclination to reinforce the 5th Panzer Army at the expense of denigrating 6th Panzer Army and its SS formations, pitted strength against strength and squandered reserves in what had become, in everything but name, a secondary effort. Once Hitler made the decision to shift the German center of gravity to 5th Panzer Army, however, lack of prior preparation for such an eventuality withheld any chance for success. Failure to account for the significance of St. Vith and lack of sufficient reserves of fuel delayed the arrival of OKW Reserve divisions at 5th Panzer Army for five critical days. Imbalance manifested in poor initial dispositions, an inflexible commander, and unimaginative preparations resulted in the German Army being unable to shift its weight from north to center and from center ahead.

SECTION VII: CONCLUSION
THE ESSENCE OF OPERATIONAL ART

As can be seen from the historical analysis, the proposed definition of balance appears to be an eminently useful concept in operational art. Used as an element of operational design, the concept of balance links several other elements of operational design together. First, it amplifies Clausewitz's concept of the center of gravity and ties it to his concept of the culminating point. In this regard, considering an army's balance throughout a campaign in planning can aid in identifying the culminating point and avoiding it as well.

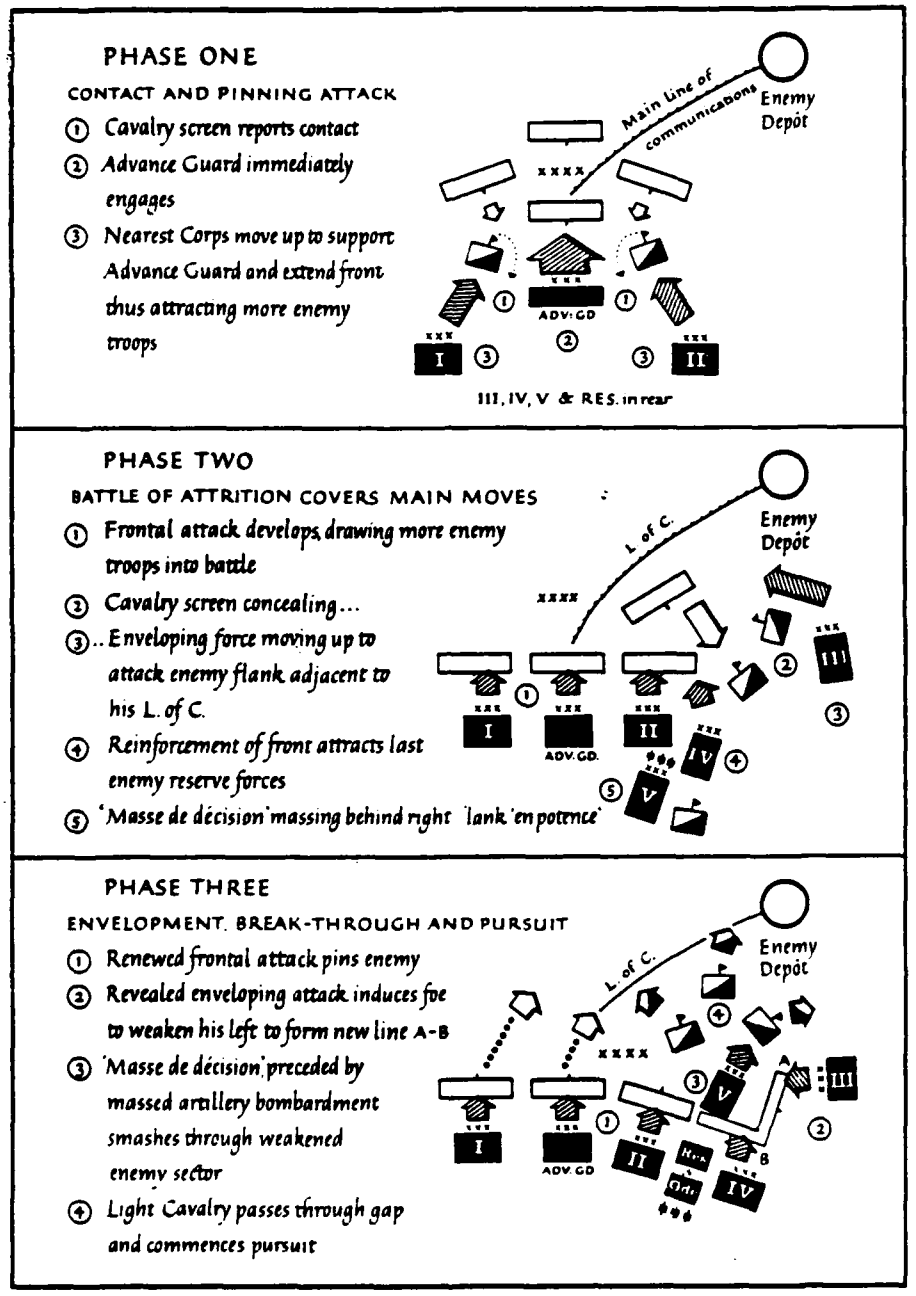
Second, using the idea of balance furnishes a method to exploit the offensive component of the defense and vice versa. By disposing formations and conducting the current battle in preparation for the next battle, a commander is better able to take advantage of opportunities as they present themselves on the battlefield. Additionally, by using balance as the framework for dispositions and conduct of battle, the commander is better able to transition rapidly from offense to defense and vice versa.

Third, employing the idea of balance forces commanders to prepare for branches and sequels to their operations. Because ensuring balance within an operation requires positioning forces and preparing responses in advance, considering it while planning branches and sequels makes

feasibility analysis essential. This means that in contemplating a branch or sequel, a series of conditions necessary to that branch's or sequel's successful execution will be identified or prepared.

Finally, balance provides a sound method for the commander to assess and cover risk. Denoting unbalanced aspects of dispositions or plans should identify places or situations in which the commander is taking risk. The greater the imbalance identified, the greater the risk being taken by the commander. Achieving a greater balance, in turn, reduces that risk.

In summary, then, balance provides a sound method of ends-ways-means design and relates the current operation to setting the conditions for the next operation. In light of these two qualifications, balance is, indeed, the essence of operational art.

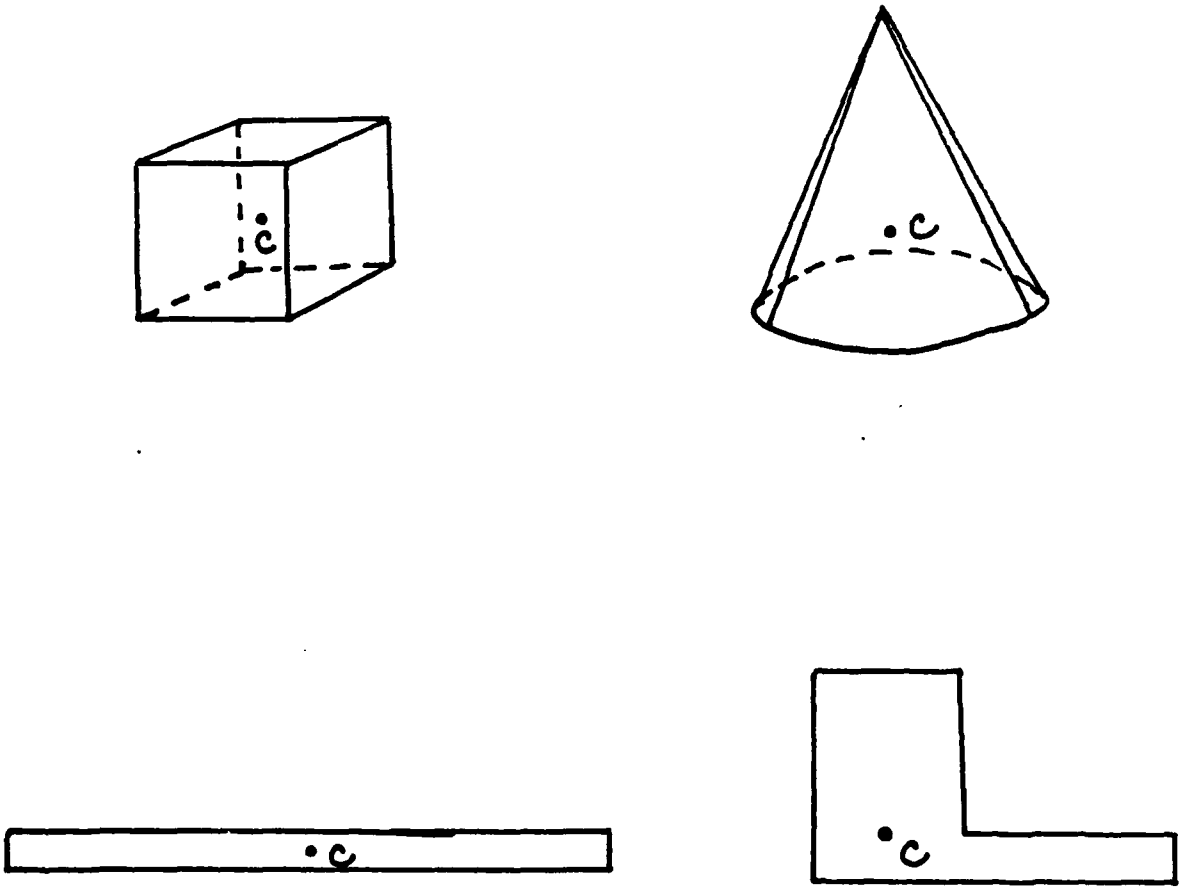


Grand tactics: Napoleon's basic battle plan (the Strategic Battle by phases); schematic

*

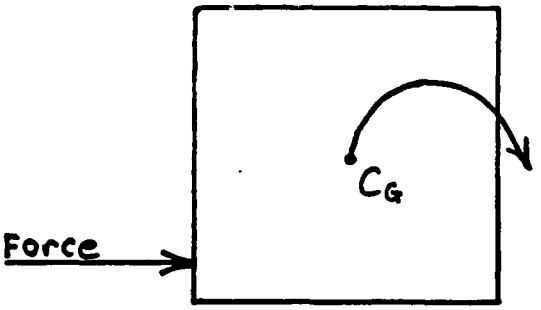
*From Chandler, Campaigns of Napoleon, p. 187.

Figure 1



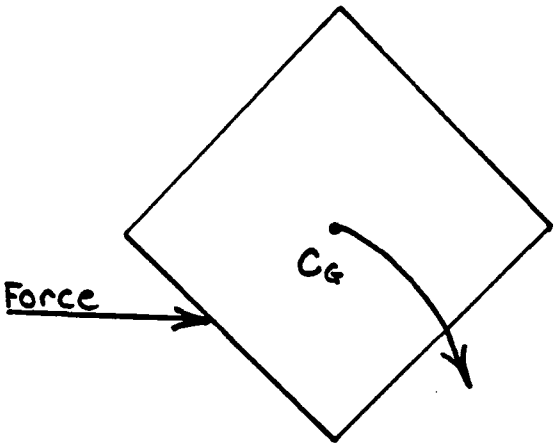
C = CENTER OF MASS
= CENTER OF GRAVITY

Figure 2



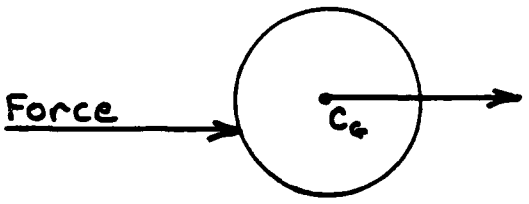
a.

a. Cube in stable equilibrium. When a horizontal force is applied, center of gravity (C_G) must raise for the cube to tip over.



b.

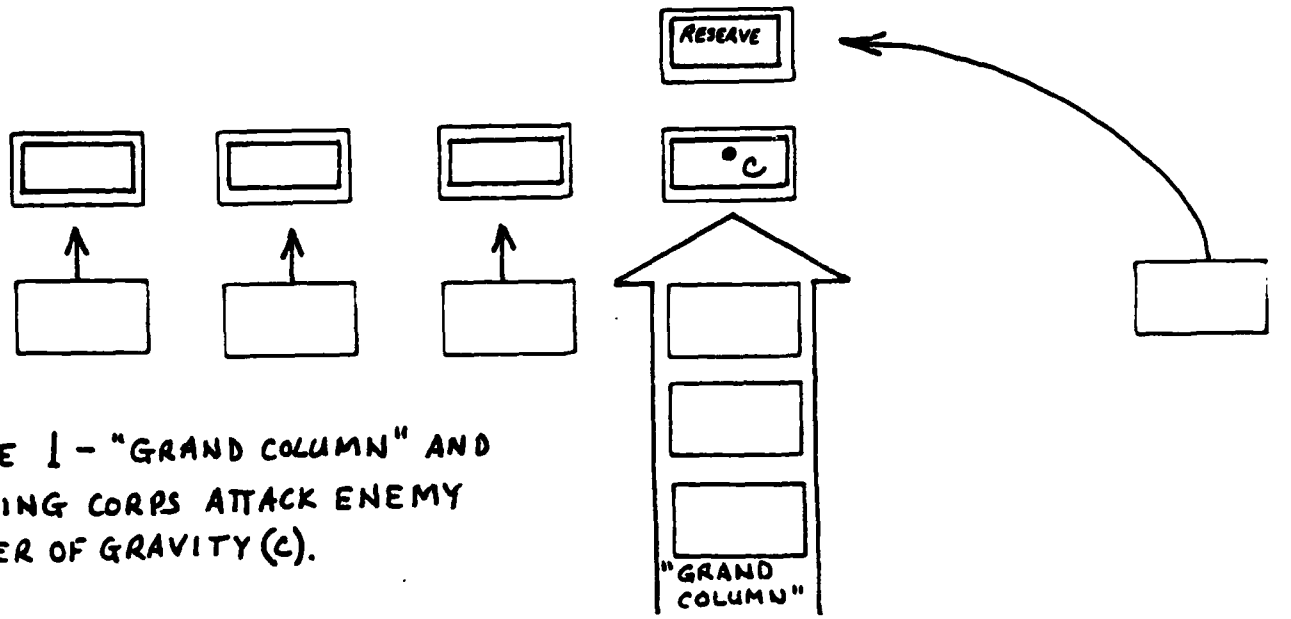
b. Cube in unstable equilibrium. When a horizontal force is applied, center of gravity (C_G) lowers for the cube to tip over.



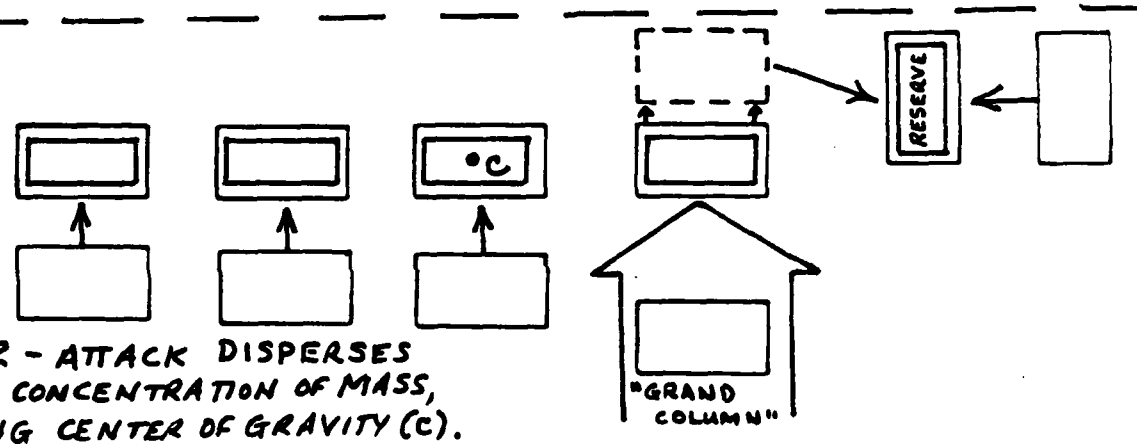
c.

c. Ball in neutral equilibrium. When a horizontal force is applied, center of gravity (C_G) remains level.

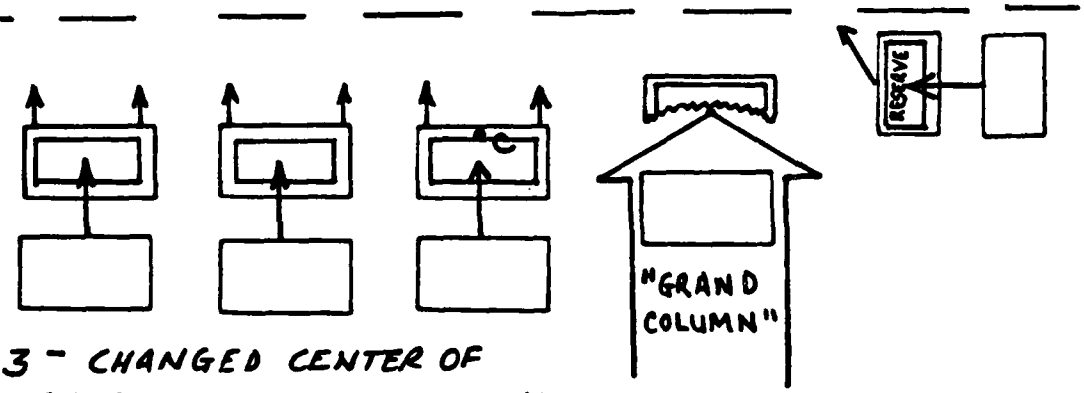
Figure 3



PHASE 1 - "GRAND COLUMN" AND FLANKING CORPS ATTACK ENEMY CENTER OF GRAVITY (C).

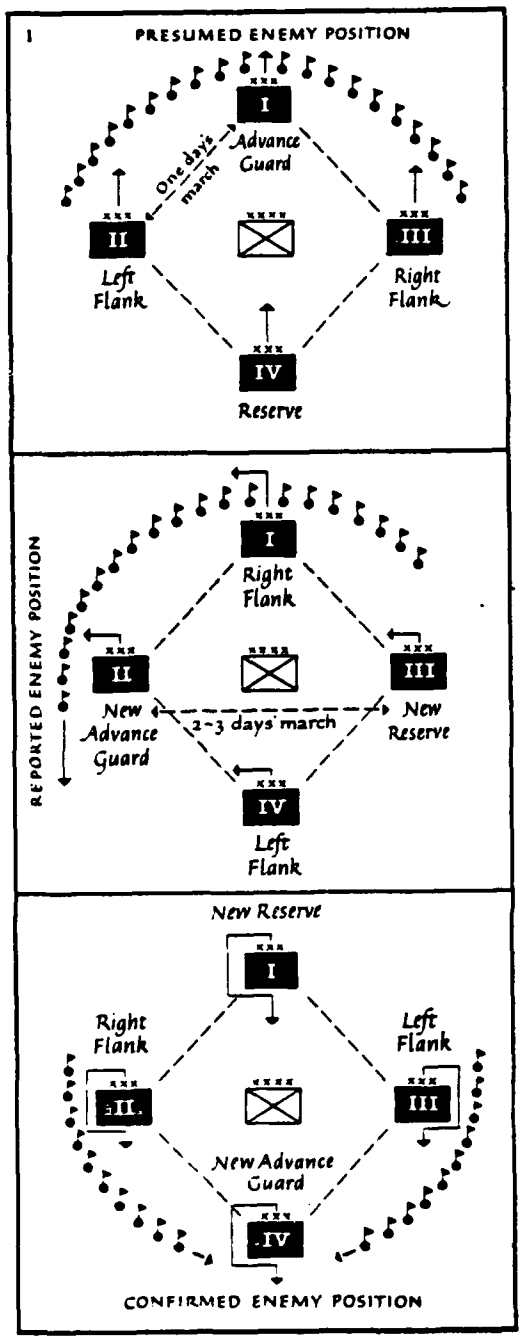


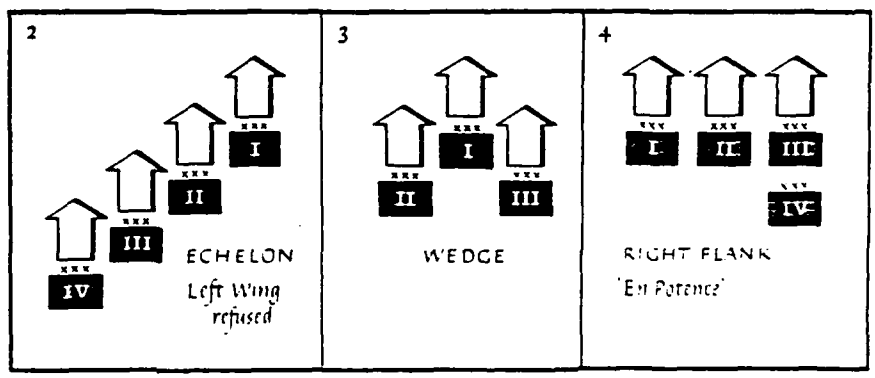
PHASE 2 - ATTACK DISPERSES ENEMY CONCENTRATION OF MASS, ALTERING CENTER OF GRAVITY (C).



PHASE 3 - CHANGED CENTER OF GRAVITY (C) RESULTS IN FORCE BEING APPLIED BY REST OF ARMY COLLAPSING THE ENEMY ALL ALONG THE LINE.

Figure 4





Strategical formations for the advance; four variations *

*From Chandler, Campaigns of Napoleon, pp. 152-153.

Figure 5

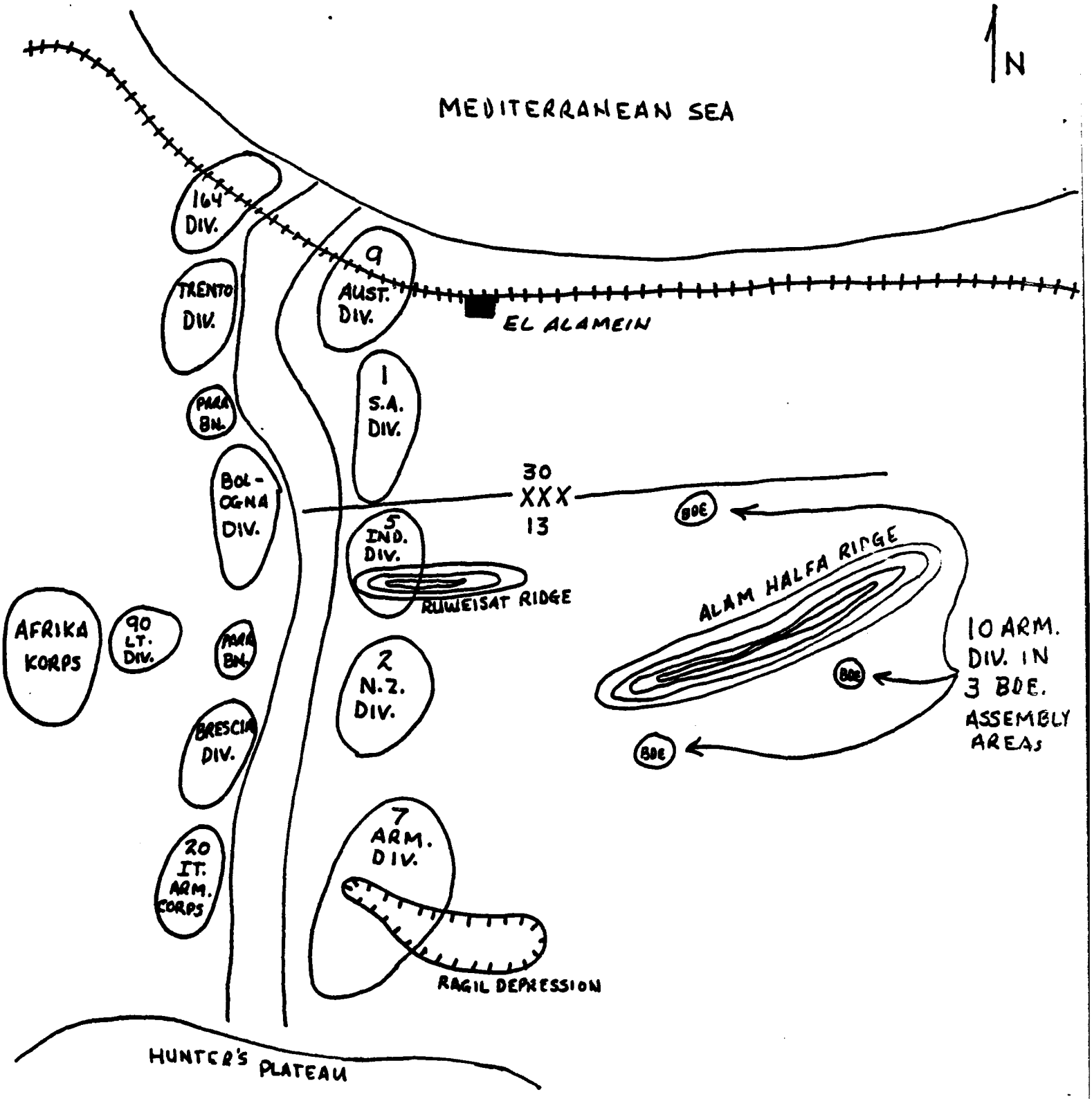

N
MEDITERRANEAN SEA
164 DIV.
TRENTO DIV.
9 AUST. DIV.
EL ALAMEIN
1 S.A. DIV.
PARA BN.
BOL-OGNA DIV.
30 XXX 13
5 IND. DIV.
BDE
ALAM HALFA RIDGE
RUWEISAT RIDGE
10 ARM. DIV. IN 3 BDE. ASSEMBLY AREAS
AFRIKA KORPS
90 LT. DIV.
PARA BN.
2 N.Z. DIV.
BRESCIA DIV.
7 ARM. DIV.
20 IT. ARM. CORPS
RAGIL DEPRESSION
HUNTER'S PLATEAU

Figure 6

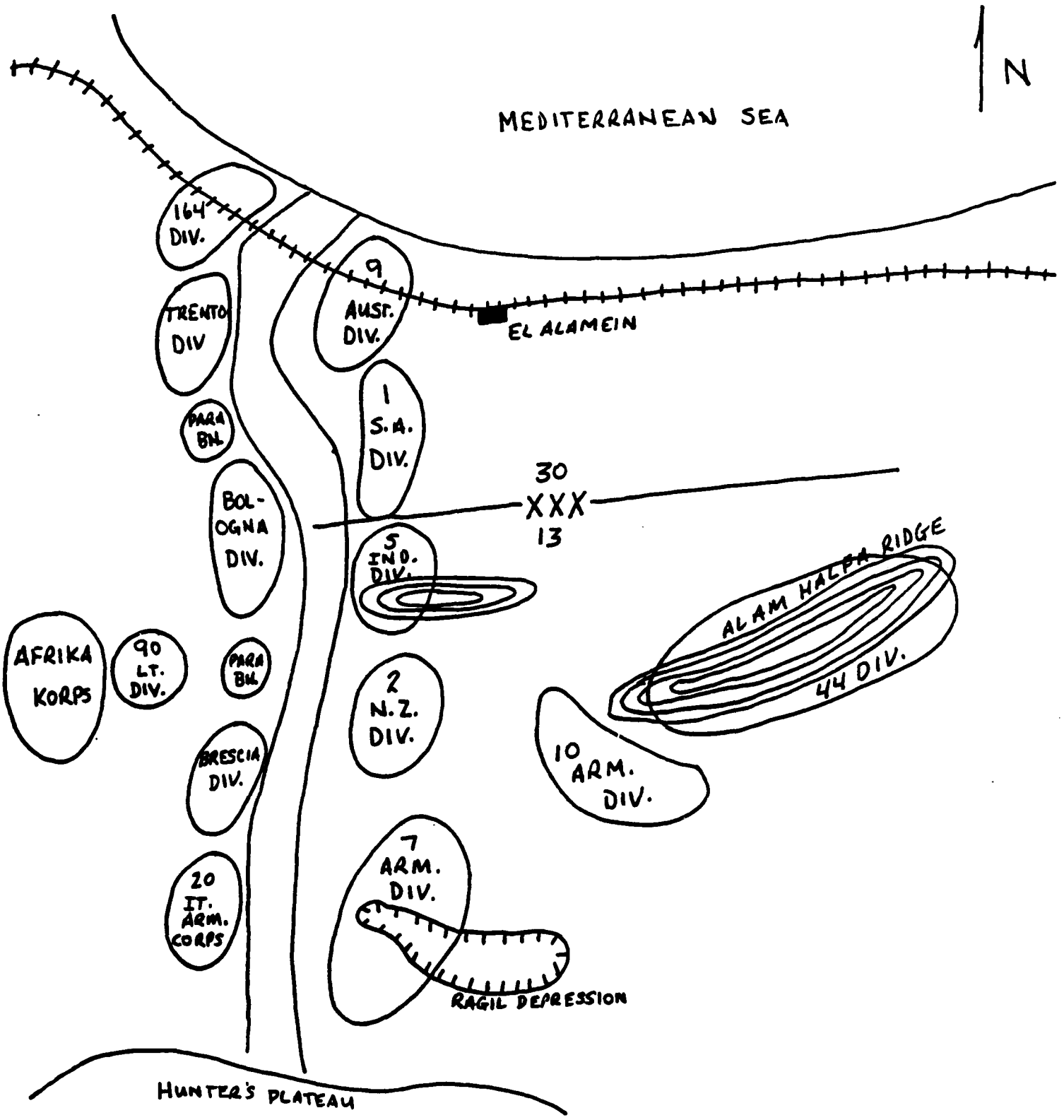

N
MEDITERRANEAN SEA
164 DIV.
TRENTO DIV
9 AUST. DIV.
EL ALAMEIN
PARA BDE
1 S.A. DIV.
30 XXX 13
BOL-OGNA DIV.
5 IND. DIV.
ALAM HALFA RIDGE
44 DIV.
AFRIKA KORPS
90 LT. DIV.
PARA BDE
2 N.Z. DIV.
10 ARM. DIV.
BRESCIA DIV.
7 ARM. DIV.
20 IT. ARM. CORPS
RAGIL DEPRESSION
HUNTER'S PLATEAU

Figure 7

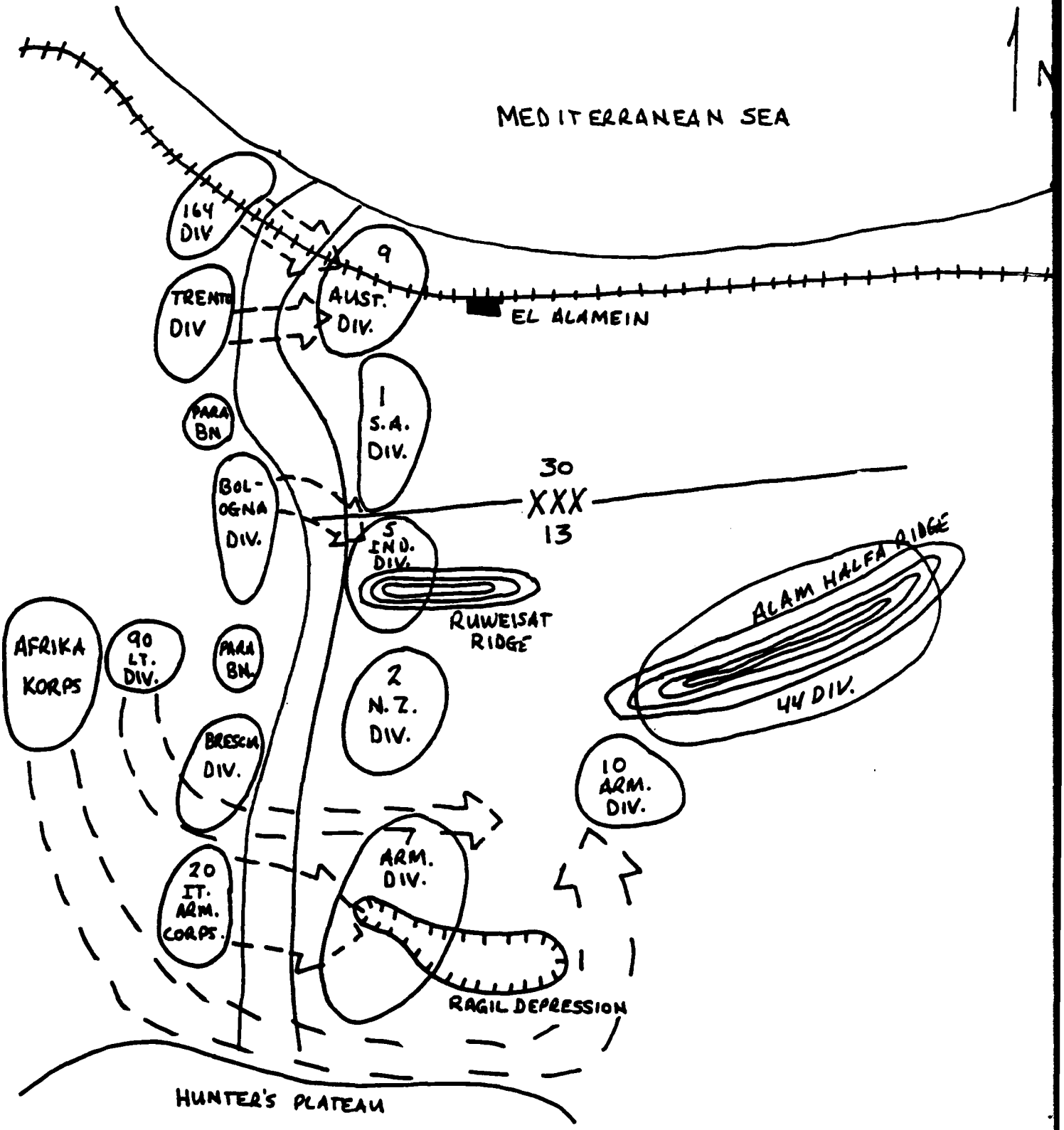

MEDITERRANEAN SEA
164 DIV
9 AUST. DIV.
TRENTO DIV
EL ALAMEIN
PARA BN
1 S.A. DIV.
30 XXX 13
BOL-OGNA DIV.
5 IND. DIV.
RUWEISAT RIDGE
ALAM HALFA RIDGE
44 DIV.
AFRIKA KORPS
90 LT. DIV.
PARA BN.
2 N.Z. DIV.
BRESCIA DIV.
10 ARM. DIV.
ARM. DIV.
20 IT. ARM. CORPS.
RAGIL DEPRESSION
HUNTER'S PLATEAU

Figure 8

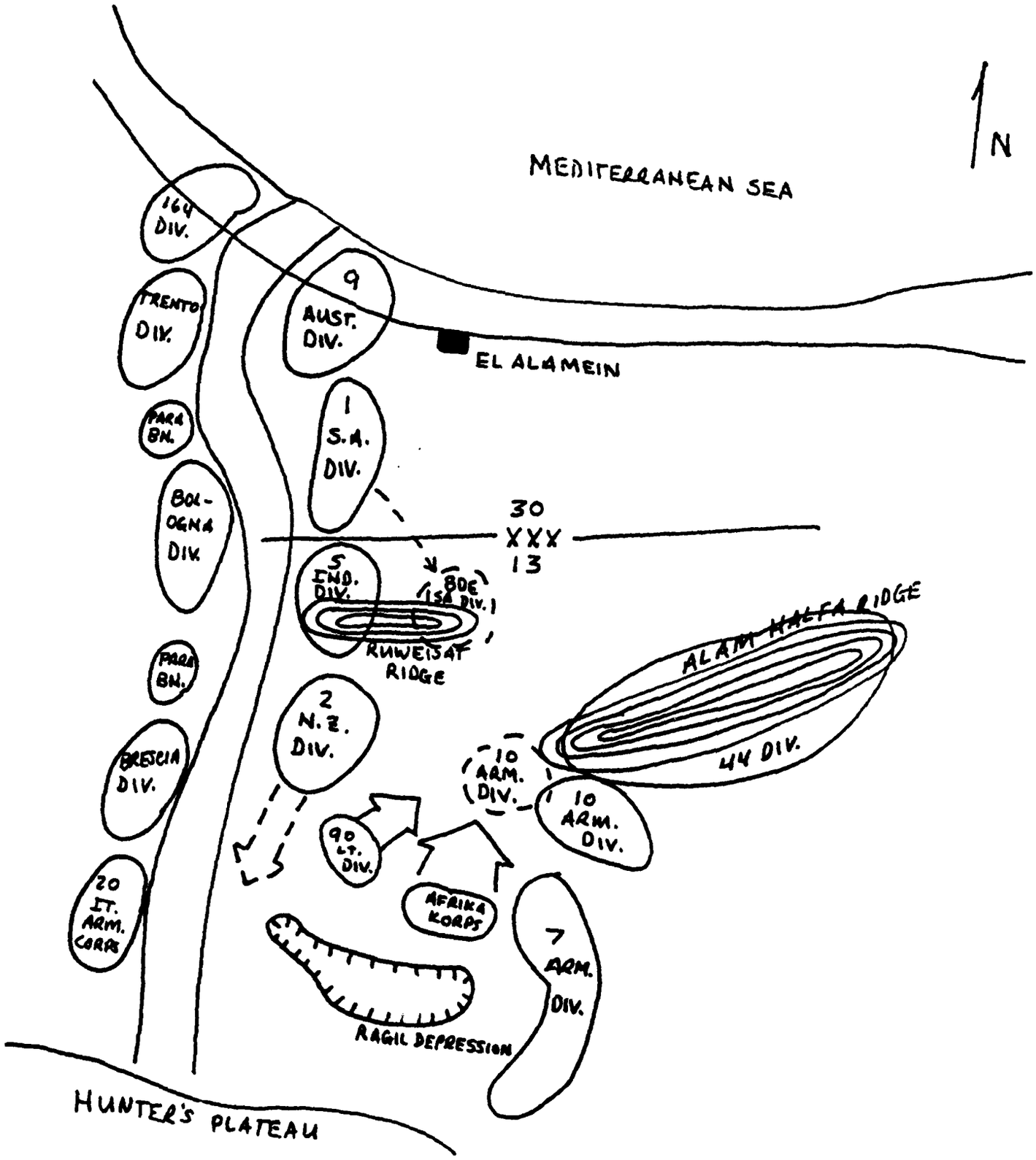

N
MEDITERRANEAN SEA
164 DIV.
TRENTO DIV.
9 AUST. DIV.
EL ALAMEIN
PARA BN.
1 S.A. DIV.
BOLOGNA DIV.
30 XXX 13
5 IND. DIV.
BDE
ISE DIV. 1
RUWEISAT RIDGE
ALAM HALFA RIDGE
PARA BN.
2 N.Z. DIV.
44 DIV.
10 ARM. DIV.
10 ARM. DIV.
BRESCIA DIV.
90 LT. DIV.
AFRIKA KORPS
20 IT. ARM. CORPS
7 ARM. DIV.
RAGIL DEPRESSION
HUNTER'S PLATEAU

Figure 9

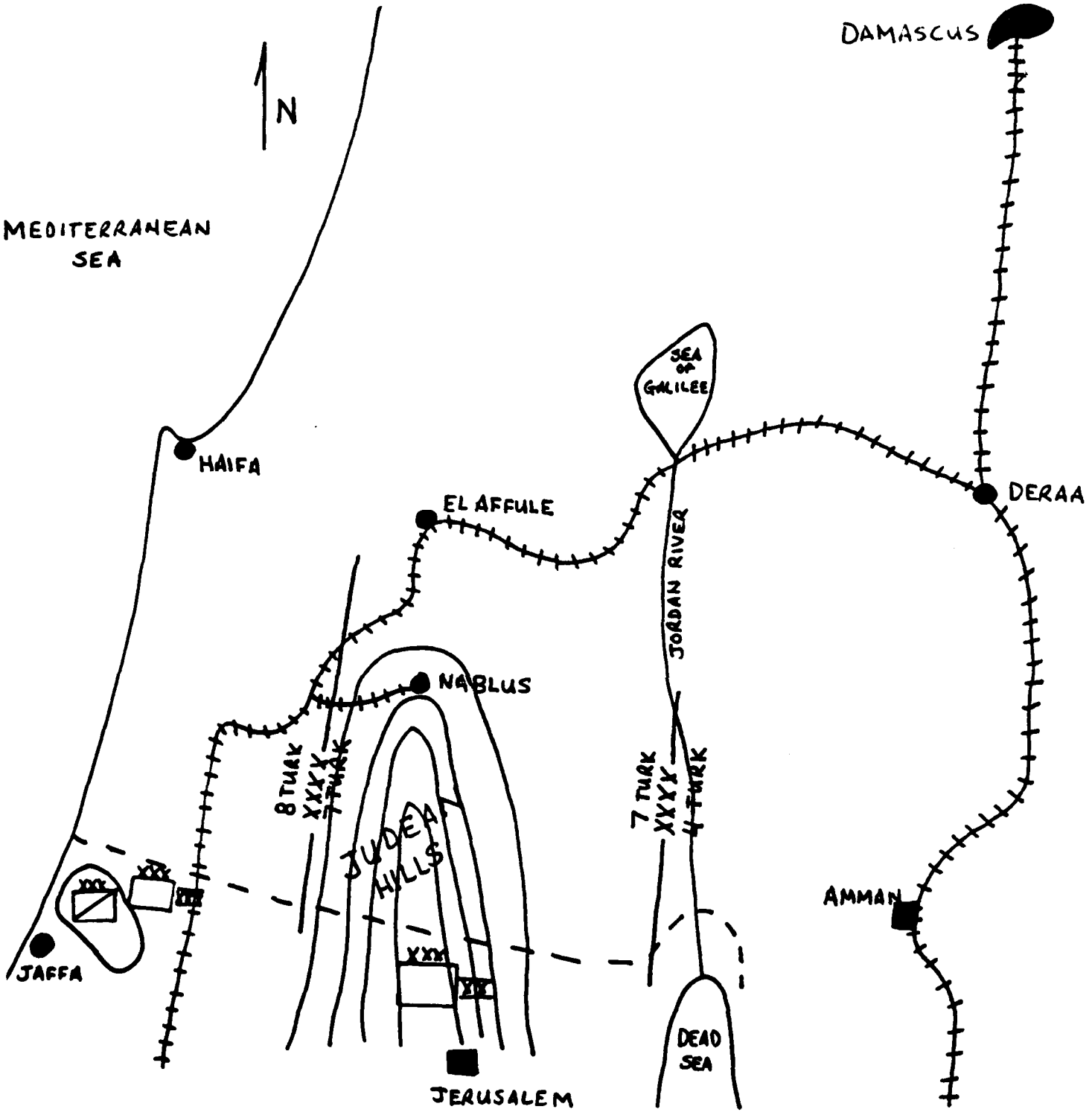

DAMASCUS
N
MEDITERRANEAN SEA
SEA OF GALILEE
HAIFA
EL AFFULE
DERAA
JORDAN RIVER
NABLUS
8 TURK
7 TURK
4 TURK
JUDEA HILLS
AMMAN
JAFFA
DEAD SEA
JERUSALEM

Figure 10

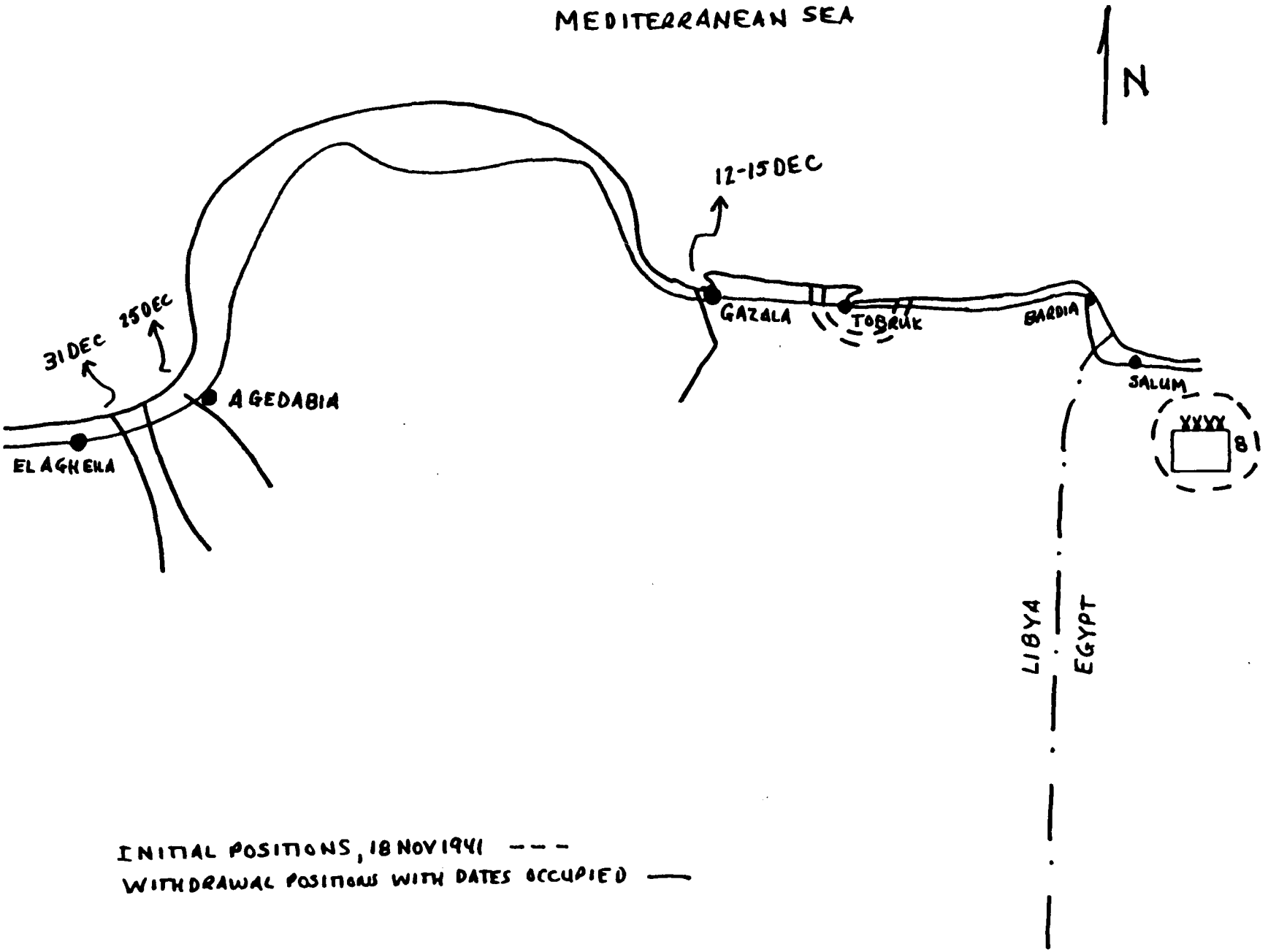

MEDITERRANEAN SEA
N
12-15 DEC
GAZALA
TOBRUK
BARDIA
SALUM
XXXX
B
31 DEC
25 DEC
AGEDABIA
EL AGHEILA
LIBYA
EGYPT
INITIAL POSITIONS, 18 NOV 1941 - - -
WITHDRAWAL POSITIONS WITH DATES OCCUPIED ——

Figure 11

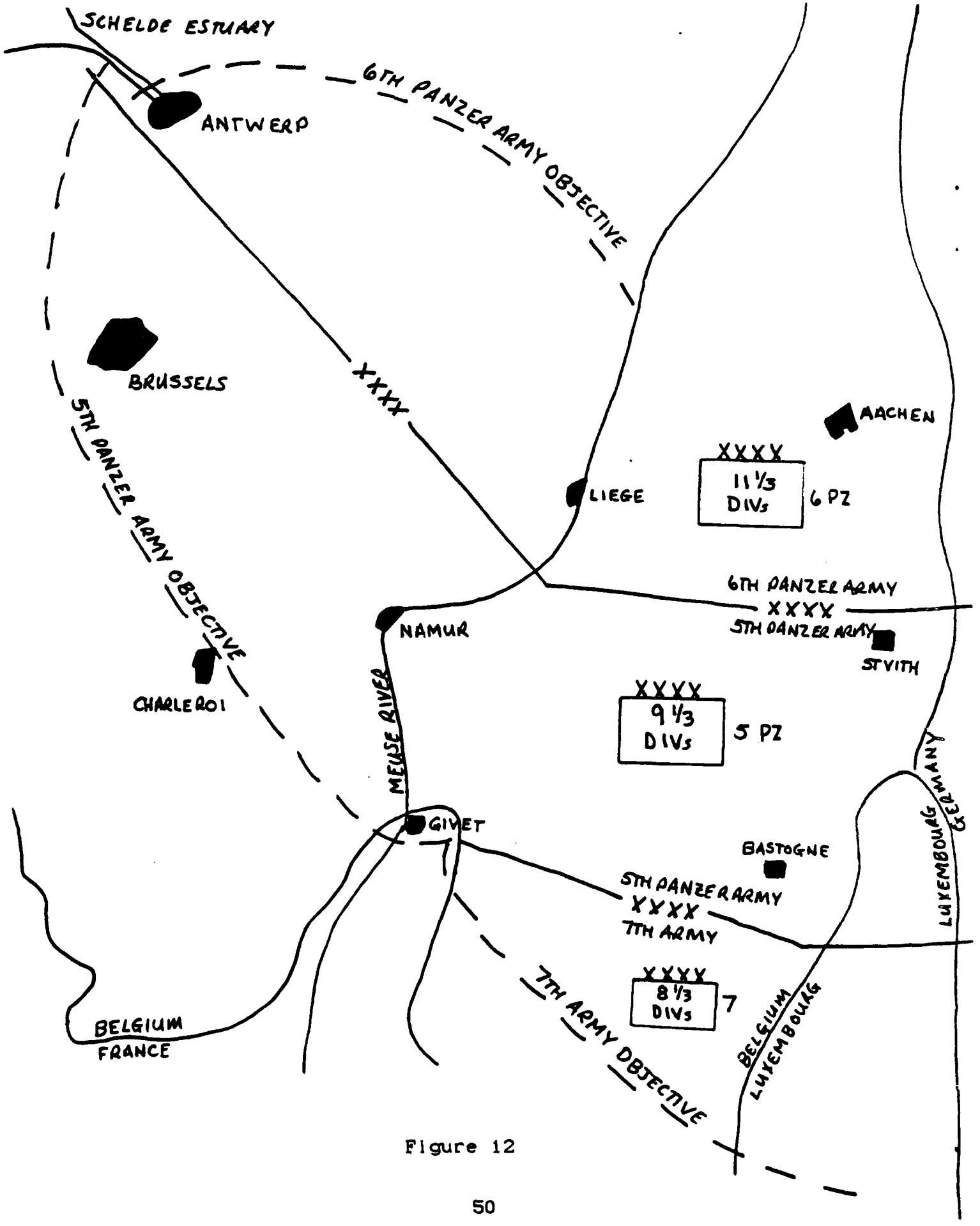

SCHELDE ESTUARY
ANTWERP
6TH PANZER ARMY OBJECTIVE
BRUSSELS
XXXX
5TH PANZER ARMY OBJECTIVE
AACHEN
XXXX
11 1/3
DIVs
6 PZ
LIEGE
6TH PANZER ARMY
XXXX
5TH PANZER ARMY
NAMUR
STVITH
CHARLEROI
XXXX
9 1/3
DIVs
5 PZ
MEUSE RIVER
GIVET
BASTOGNE
5TH PANZER ARMY
XXXX
7TH ARMY
LUXEMBOURG
GERMANY
XXXX
8 1/3
DIVs
7
BELGIUM
FRANCE
7TH ARMY OBJECTIVE
BELGIUM
LUXEMBOURG

Figure 12

ENDNOTES

1 Department of the Army, FM 100-5 Operations (Washington, D. C.: US Government Printing Office, 1986), p. 14.

2 Department of Defense, JCS Publication 1 Dictionary of Military and Associated Terms (Washington, D. C.: US Government Printing Office, 1987), p. 45.

3 See, for example, Mathew Cooper, The German Army 1933-1945: Its Political and Military Failure (New York: Bonanza Books, 1978), p. 219; Alistair Horne, To Lose a Battle: France 1940 (New York: Penguin Books, 1969); Charles Messenger, The Blitzkrieg Story (New York: Charles Scribner's Sons, 1976), P. 174.

4 David G. Chandler, The Campaigns of Napoleon (New York: MacMillan, 1966), p. 135.

5 Field Marshal Bernard L. Montgomery, The Memoirs of Field Marshal the Viscount Montgomery of Alamein, K. G. (Cleveland: The World Publishing Company, 1958), p 81.

6 James J. Schneider and LTC Lawrence J. Izzo, "Clausewitz's Elusive Center of Gravity," Parameters, September, 1987, pp. 46-57.

7 Sun Tzu, The Art of War, ed. and trans. by Samuel B. Griffith (Oxford: Oxford University Press, 1963), pp. 34-35.

8 In his discussion of strategic defense, Jomini prescribes the response of the defender to a reverse or notable inferiority as reestablishment of an "equilibrium" of chances. This theme of options is most prevalent in his concept of combinations, especially for offensive operations and counterattacks. He also advances the proposition that sudden dispositions during combat are more successful in dislodging an enemy than maneuver combined in advance of contact. All these propositions will become more relevant as the concept of balance matures. See Baron Antoine Henri Jomini, Summary of the Art of War, trans. by MAJ O. F. Winship and LT E. E. McLean (New York: G. P. Putnam, 1854), PP. 76, 78, 84, 114 and 207.

9 Sir Basil H. Liddell Hart, The Ghost of Napoleon (Westport, CT: Greenwood Press, 1980), pp. 46-47.

10 Ibid., p. 56.

11 Ibid., pp. 84-85.

12 Carl von Clausewitz, On War, ed. and trans. by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), p. 75.

13 Ibid., p. 596.

14 Ibid., pp. 485-486.

15 James J. Schneider, "The Loose Marble--and the Origins of the Operational Art," Parameters, March, 1989, pp. 86-87.

16 Schneider and Izzo, "Clausewitz's Elusive Center of Gravity", pp. 49-50. It may be that this is the point Schneider and Izzo are making when they say that Clausewitz stretches his center of gravity too far by including in it the capital, alliances, etc., in it. It appears plausible to this author that Clausewitz was grasping at a way to extend his analogy to the embryonic distributed maneuver that appeared during his lifetime.

17 Chandler, Campaigns, pp. 181-191; and Gunter E. Rothenberg, The Art of War in the Age of Napoleon (Bloomington: Indiana University Press, 1980), pp. 126-163.

18 David Halliday and Robert Resnick, Physics: Parts I and II (New York: John Wiley and Sons, 1966), p. 323-325.

19 Germaine and Arthur Beiser, Physics for Everybody (New York: E. P. Dutton. 1956), p. 23.

20 Halliday and Resnick, Physics, pp. 334-335.

21 Chandler, Campaigns, p. 135.

22 Liddell Hart, Ghost, pp. 51-100.

23 Rothenberg, Art of War, p. 128.

24 Chandler, Campaigns. pp. 144-155.

25 This and the following three paragraphs are summarized from Basil H. Liddell Hart, Strategy (New York: Praeger, 1967), pp. 339-342.

26 J. F. C. Fuller, The Foundations of the Science of War (London: Hutchinson and Co., undated), pp. 81-82.

27 Ibid., pp. 82-83.

28 Ibid., pp. 266-267 and 285.

29 Richard E. Simpkin, Race to the Swift: Thoughts on Twenty-First Century Warfare (London: Brassey's Defence Publishers, 1985), p. 136.

30 Ibid., p. 136

31 Ibid., pp. 136-137.

32 Ibid., pp. 199-201.

33 Ibid., pp. 136, 201.

34 Montgomery, Memoirs, pp. 80-81.

35 Nigel Hamilton, Monty: The Making of a General (New York: McGraw-Hill, 1981), p. 145.

36 GEN Bernard L. Montgomery, Some Brief Notes for Senior Officers on the Conduct of Battle (Headquarters, Eighth Army, December, 1942), p. 12.

37 Ibid., p. 8.

38 Field Marshal Bernard L. Montgomery, El Alamein to the River Sangro (Germany: Printing and Stationary Services, British Army of the Rhine, 1946), pp. 2-3.

39 Ibid., pp. 3-4 and map 1.

40 Ibid., p. 3.

41 Ibid., p. 2.

42 BG Vincent J. Esposito, ed., The West Point Atlas of American Wars, Volume II: 1900-1953 (New York: Praeger, 1972), Map 77 and Montgomery, Sangro, map 1.

43 Ibid., Map 77.

44 Montgomery, Sangro, map 1.

45 Ibid., p. 9.

36 Montgomery, Memoirs, p. 110.

47 The author is indebted to LTC William Rice for his ideas on the relative nature of balance that are used in this paragraph.

48 Esposito, Atlas, map 57.

49 COL A. P. Wavell, The Palestine Campaigns (London: Constable & Co., 1928), pp. 5-14.

50 Ibid., p. 194.

51 Ibid., p. 198.

52 Ibid., pp. 198-200.

53 Esposito, Atlas, map 57.

54 Esposito, Atlas, map 75.

55 Ibid., map 75.

56 Correlli Barnett, The Desert Generals (Bloomington: Indiana University Press, 1976), pp. 129-133.

57 Hugh M. Cole, The Ardennes: Battle of the Bulge (Washington, D. C.: US Government Printing Office, 1965) Map I.

58 Charles B. MacDonald, A Time for Trumpets: The Untold Story of the Battle of the Bulge (New York: Bantam Books, 1985), pp. 644-655.

59 Matthew Cooper, The German Army 1933-1945: Its Political and Military Failure (New York: Bonanza Books, 1984), p. 523.

60 Russell Weigley, Eisenhower's Lieutenants: The Campaign in France and Germany, 1944-1945 (Bloomington: Indiana University Press, 1981), pp. 487-488.

61 Cooper, German Army, pp. 523-524.

BIBLIOGRAPHY

PRIMARY SOURCES

Beiser, Germaine and Arthur. Physics for Everybody. New York: E. P. Dutton. 1956.

Clausewitz, Carl von. On War. edited and translated by Michael Howard and Peter Paret. Princeton: Princeton University Press, 1976.

Department of the Army. FM 100-5, Operations. Washington, D. C.: US Government Printing Office, 1986.

Department of Defense. JCS Publication 1, Dictionary of Military and Associated Terms. Washington, D. C.: US Government Printing Office, 1987.

Esposito, BG Vincent J.. ed. The West Point Atlas of American Wars, Volume II: 1900-1953 New York: Praeger, 1972.

Fuller, J. F. C. The Foundations of the Science of War. London: Hutchinson and Co., undated.

Halliday, David and Resnick, Robert. Physics: Parts I and II. New York: John Wiley and Sons, 1966.

Jomini, Baron Antoine Henri. Summary of the Art of War. translated by MAJ O. F. Winship and LT E. E. McLean. New York: G. P. Putnam, 1854.

Liddell Hart, Sir Basil H. Strategy. New York: Praeger, 1967.

Montgomery, GEN Bernard L. Some Brief Notes for Senior Officers on the Conduct of Battle. Headquarters, Eighth Army, December, 1942.

_____. El Alamein to the River Sangro. Germany: Printing and Stationary Services, British Army of the Rhine, 1946.

_____. The Memoirs of Field Marshal the Viscount Montgomery of Alamein, K. G. Cleveland: The World Publishing Company, 1958.

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

Sun Tzu. The Art of War. Translated and edited by Samuel B. Griffith. Oxford: Oxford University Press, 1963.

SECONDARY SOURCES

Barnett, Correlli. The Desert Generals. Bloomington: Indiana University Press, 1976.

Chandler, David G. The Campaigns of Napoleon. New York: MacMillan, 1966.

Cole, Hugh M. The Ardennes: Battle of the Bulge. Washington, D. C.: US Government Printing Office, 1965.

Cooper, Mathew. The German Army 1933-1945: Its Political and Military Failure. New York: Bonanza Books, 1978.

Hamilton, Nigel. Monty: The Making of a General. New York: McGraw-Hill, 1981.

Horne, Alistair. To Lose a Battle: France 1940. New York: Penguin Books, 1969.

Liddell Hart, Sir Basil H. The Ghost of Napoleon. Westport, CT: Greenwood Press, 1980.

MacDonald, Charles B. A Time for Trumpets: The Untold Story of the Battle of the Bulge. New York: Bantam Books, 1985.

Messenger, Charles. The Blitzkrieg Story. New York: Charles Scribner's Sons, 1976.

Rothenburg, Gunter E. The Art of War in the Age of Napoleon. Bloomington: Indiana University Press, 1980.

Schneider, James J. "The Loose Marble--and the Origins of the Operational Art." Parameters, March, 1989, pp. 85-99.

Schneider, James J. and Izzo, LTC Lawrence J. "Clausewitz's Elusive Center of Gravity." Parameters, September, 1987, pp. 46-57.

Wavell, COL A. P. The Palestine Campaigns. London: Constable & Co., 1928.

Weigley, Russell. Eisenhower's Lieutenants: The Campaign in France and Germany, 1944-1945. Bloomington: Indiana University Press, 1981.