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The Pieces of a Military Chessboard – What is the Contemporary Significance of Jomini's Design of a Theater of Operations?

A Monograph
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ABSTRACT

THE PIECES OF A MILITARY CHESSBOARD - WHAT IS THE CONTEMPORARY SIGNIFICANCE OF JOMINI'S DESIGN OF A THEATER OF OPERATIONS? by Major Robin P. Swan, USA, 60 pages.

This monograph examines Jomini's theoretical components of a theater of operations, including decisive points, lines of operations, pivots of maneuver, and pivots of operations, to determine their contemporary significance to operational design. This design involves the dynamics of mass moving through time and space in a prescribed direction to achieve campaign aims. The operational artist's task of orchestrating the employment of force-mass in time and space to achieve his aim has become more difficult in light of the expansion of the military chessboard called the theater of operations.

The ratio of combat forces to space has steadily decreased from the time of Napoleon to the present because of technological advances in warfare, such as mechanization and increases in the range, accuracy, and lethality of weapons. The effect of these advances is the expansion of the theater of operations and a tendency toward nonlinear warfare. Our ability to focus force-mass in time and space will become more important as the space of the theater of operations increases and the ratio of combat forces to space decreases.

The study concludes that in addition to defining the theater of operations in space, Jomini's components of the military chessboard serve to direct the dynamic of force-mass moving through time and space to achieve the aim of the campaign. The major task confronting the operational artist in a nonlinear theater of operations will be determining the vector direction of combat force application required to defeat an enemy center of gravity. Once he determines this vector direction, he can design the theater of operations to support force application in that direction. Jomini's components of a theater of operations, if used, assist with this task.

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I. Introduction

> A game of chess is made up of a series of separate moves, each made with extreme deliberation.
>
> Simpkin, Race to the Swift[1]

The players in a game of chess have as their ultimate aim the capture of the opponent's king. To achieve this end, each player devises a strategy consisting of a series of sequential moves designed to place the opponent in a series of disadvantageous positions from which recovery is difficult or impossible and defeat inevitable. The players execute their strategies using sixteen chessmen. Each chessman is governed by a set of movement rules on a two-dimensional chessboard consisting of sixty-four equal squares. When a player moves a piece on the chessboard, he is, in effect, moving a mass to occupy an area of space at a point in time crucial to the attainment of his aim. The employment of mass in time and space is also important to the practitioner of operational art.

U. S. Army Field Manual 100-5, Operations, defines operational art as "the employment of military

forces to attain strategic goals in a theater of war or theater of operations through the design, organization, and conduct of campaigns and major operations."[2] Additionally, FM 100-5 lists three essential questions which the practitioner of operational art should answer when designing, organizing, and conducting campaigns and major operations:

> 1. What military condition must be produced in the theater of war or operations to achieve the strategic goal?
>
> 2. What sequence of actions is most likely to produce that condition?
>
> 3. How should the resources of the force be applied to accomplish that sequence of actions?[3]

These three questions imply a direct relationship between the physical notions of aim, mass, space, time, and the design of campaigns and major operations: the domain of the operational artist (see table 1, next page). What value does this relationship have to the operational artist?

Military theorist James J. Schneider used the analogy of an artist painting on canvas to describe the relationship of aim, mass, space, and time to operational design. Imagine that the artist had an artistic idea. He tried to convey this idea in words to a friend, but found he had difficulty accurately expressing the vision in his mind. The artist could not fully express his artistic idea until he painted it

OPERATIONAL ART, CHESS, AND THE PHYSICAL DOMAIN

OPERATIONAL ART	THE GAME OF CHESS	PHYSICAL DOMAIN
STRATEGIC GOAL	CAPTURE OF OPPONENT'S KING	AIM
MILITARY FORCES	CHESSMEN	MASS
THEATER OF WAR OR THEATER OF OPERATIONS	CHESSBOARD	SPACE
CAMPAIGNS AND MAJOR OPERATIONS	SEQUENTIAL MOVES	TIME

Table 1. Relationship between operational art, chess, and mass, space, and time.

upon the canvas. In much the same way, the operational artist expresses his operational idea when he "paints" it upon the theater of operations.[4] Instead of using paint brushes and oils, the operational artist uses elements of operational design to translate his aim, the operational idea, onto the canvas, or in the chess analogy, the chessboard of the theater of war or theater of operations. What are theaters of war and operations?

Current joint military doctrine defines the theater of war: "That area of land, sea, and air which is, or may become, directly involved in the operations

of war."[5] The theater of operations is a subset of the theater of war, and is the area designated for the administration and conduct of military operations.[6] Operational artists plan the employment of mass within the space of the theater of operations to achieve their desired aim over time. What aids are available to assist the operational artist with the design of campaigns and major operations within the theater of operations?

In his work, Summary of the Art of War, classical theorist Antoine-Henri Jomini listed four maxims to define the fundamental principle of war:

> 1. To throw by strategic movements the mass of an army, successively, upon the decisive points of a theater of war, and also upon the communications of the enemy as much as possible without compromising one's own.
>
> 2. To maneuver to engage fractions of the hostile army with the bulk of one's forces.
>
> 3. On the battlefield, to throw the mass of the forces upon the decisive point, or upon the portion of the hostile line which it is of the first importance to overthrow.
>
> 4. To so arrange that these masses shall not only be thrown upon the decisive point, but that they shall engage at the proper times and with ample energy.[7]

From these maxims, we learn that the foundation of Jomini's theory of war concerned the employment of mass in time and space within a theater of war.

Jomini defined the theater of war: "all the territory upon which the parties may assail each other, whether it belongs to themselves, their allies, or weaker states who may be drawn into the war through fear or interest."[8] Jomini used this definition as a foundation to describe the components used to design the theater of operations, including decisive points, lines of operations, pivots of maneuver, and pivots of operations. These components of a theater of operations were chosen to answer the question: What contemporary significance do Jomini's components of a military chessboard have for operational artists? The answer will identify those theater design components which direct force-mass in time and space to achieve operational aims. Force-mass, as used throughout this paper, refers to the combat forces located within a theater of operations.

A building block research approach was used to answer the research question. First, aim, mass, space, and time were chosen as criteria to evaluate Jomini's components of a theater of operations. Second, an attempt was made to establish the theoretical validity of the criteria as they related to operational design. Third, the influence of aim, mass, space, and time was reviewed in the campaign designs of Napoleon during the Ulm Campaign and Ullyses S. Grant in the Union campaign

design of 1864. Fourth, Jomini's components were analyzed to determine their ability to organize the functions identified by the criteria. This analysis process led to conclusions which answered the research question. Finally, several implications are suggested regarding operational design to assist operational artists construct the theater of operations.

II. Theory of the Military Chessboard

The purpose of this section is twofold. The first purpose is to discuss the theoretical validity of the evaluation criteria: aim, mass, space, and time. This discussion will draw primarily upon the theoretical writings of Clausewitz. In particular, his concept of the center of gravity will be used to illustrate the employment of mass in time and space. Second, a classification of Jomini's theoretical components of a theater of operations will identify those that organize the mass of the army in time and space to achieve the operational aim.

AIM

Clausewitz viewed war as an act of physical force used to compel our enemy to do our will.[9] To portray

this premise, he used the analogy of two wrestlers. Each wrestler uses physical force as a means to compel the other to do his will. To develop his analogy, Clausewitz identified the immediate aim of each wrestler was to throw his opponent and render him incapable of further resistance.[10] When one of the wrestlers achieved this aim, the loser was left no alternative other than to accept the winner's will. The winner then achieved the object of the fight--victory. In other words, to compel the enemy to do our will is the object of war and physical force is the means used to achieve the object. To Clausewitz, the aim of warfare was the use of physical force in ways that render the enemy powerless.[11] What relationship does aim have to operational art? The answer is found in Clausewitz's discussion of strategy.

Clausewitz defined strategy as "the use of an engagement for the purpose of war."[12] He continued this discussion by defining the threefold role of the strategist when planning engagements. First, the strategist defines the aim for all operations needed to attain the object of the war. Next, he drafts the plan of war that uses the aim to determine the sequence of actions necessary to attain the object. Finally, he shapes individual campaigns, and from these, he organizes individual engagements directed toward the

object.[13] From this example, we can see that Clausewitz's concept of strategy closely parallels our current view of the operational level of war contained in FM 100-5.[14]

This view in FM 100-5 states that at the operational level of war, the aim determines the military condition required in a theater of operations to attain the strategic goal--the object of war. The aim helps the operational artist identify the most likely sequence of actions required to achieve that condition. The mass of the army uses physical force as the means to achieve the aim and is employed to accomplish the appropriate sequence of actions in time and space. The aim provides direction for the force, much like a vector in the physical sense. Like Clausewitz, Jomini's views of strategy parallel our current concept of the operational level of war.

Jomini used two concepts, prescribed aim and system of operations, to discuss strategy in war: "When a war is decided upon, it becomes necessary to prepare not an entire plan of operations--which is always impossible--but a system of operations in reference to a prescribed aim. . . ."[15] Jomini's view of strategy parallels our understanding of the operational level of war. The prescribed aim determines the military condition to be produced within

the theater of operations and is derived directly from the object of war--the strategic goal. The system of operations sequences the actions of the army in time and space to achieve the prescribed aim. The aim shapes and focuses the mass in time and space.

MASS, SPACE, AND TIME

Mass, space, and time provide a conceptual framework for the design of a theater of operations. This design involves the dynamics of mass moving through space and time in a prescribed direction. The use of physical force to achieve the prescribed aim in a theater of operations is the desired result. One way to show the relationship of these conceptual framework elements with physical force is through the use of Newton's 2d law of motion: $F_{net} = ma_{net}$.[16] In this formula, F_{net} (net force) is equal to the mass of an object multiplied by the object's net acceleration. Clausewitz defined these framework elements as the army, the theater of operations, and the campaign.

Clausewitz used the term army, the forces located in a given theater of operations, to convey his meaning of mass.[17] Closely related to the army is the space it occupies and operates in. Clausewitz defined this space as the theater of operations: "a sector of the

total war area [theater of war] which has protected boundaries and so a certain degree of independence."[18] In Clausewitz's view, a key characteristic of a theater of operations is its possible autonomy within the overall theater of war.

Consider a theater of war containing two theaters of operations. Each theater of operations has its own army representing mass, and possibly its own operational aim. An army in one theater of operations may conduct an operational defense in pursuit of its aim, while simultaneously, the army in the second theater of operations conducts an operational offense in pursuit of its aim.[19] To summarize this example, the theater of war includes two autonomous theaters of operations because each theater of operations contains an independent mass with a specific aim. How did Clausewitz define time?

Clausewitz used the concept of the campaign to define time. Specifically, the campaign denotes a series of linked military events occurring in a single theater of war.[20] Force-mass conducting these military events in space do so over the continuum of time.

Before turning the discussion to Jomini's components of a military chessboard, I must discuss a crucial element of the Napoleonic style of warfare which served as a basis for many of Clausewitz and

Jomini's theories. This element is the concentration of force-mass derived from Napoleon's definition of strategy as "the art of making use of time and space."[21] To discuss concentration, I will use Clausewitz's concept of the center of gravity and Jomini's concept of the decisive point.

Clausewitz viewed war as a duel between two opponents, an attacker and a defender, and discussed the dynamic relationship between the attack and defense from the viewpoint of the defender. He introduced the concept of the sphere of influence of victory by comparing the relative masses of the attacker and defender after the collision of their forces in the space of the theater of operations.[22] Regarding the sphere of influence, he wrote:

> The scale of a victory's sphere of influence depends, of course, of the scale of the victory, and that in turn depends on the size [mass] of the defeated force. For this reason, the blow [ma = F] from which the broadest and most favorable repercussions can be expected will be aimed against that area [space] where the greatest concentration of enemy troops can be found; the larger the force with which the blow is struck, the surer its effects will be.[23]

From this relationship, Clausewitz defined the center of gravity as the densest concentration of force-mass in time and space. A center of gravity provides the most effective target for a blow, and the most effective force to deliver a blow.[24] Clausewitz

identified the highest law of strategy as the concentration of forces in time and space, and that the best strategy is "always to be very strong; first in general, and then at the decisive point."[25] Jomini and Clausewitz have similar views regarding the decisive point.

Jomini stressed concentration of force at decisive points within the theater of operations or the battlefield. To Jomini, a decisive point could be a piece of terrain or a portion of the enemy, the seizure or destruction of which would force a decision of the operation.[26] Military theorists James J. Schneider and Lawrence L. Izzo believe that Clausewitz made a similar distinction, but placed greater emphasis on concentration in time and space for the purpose of destroying the enemy masses, thereby winning the decision.[27] Figure 1 (see next page) represents the concentration of force in time and space relative to a decisive point.

Force A represents a mass concentrated in space, but not in time. For example, imagine an armored brigade moving toward the decisive point along a single route of march. At time H-2, the lead battalion will be 20 kilometers from the decisive point. The next battalion in the order of march will not reach the 20 kilometer point until H-4 and so on. Force B

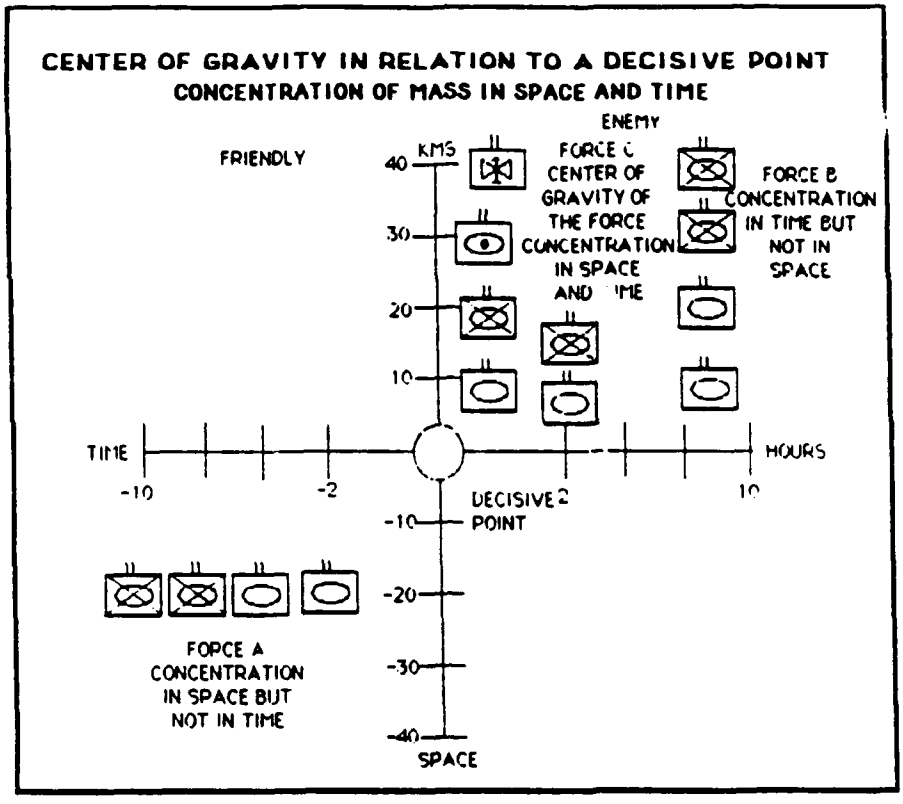


Figure 1. Center of gravity in relation to a decisive point: The concentration of mass in time and space.[28]

represents the opposite case--concentration in time but not in space. In this example, imagine an enemy armored brigade moving toward the decisive point along four routes of march, each of different lengths. At time H+2, the battalion moving along route 1 is 10 kilometers from the decisive point while the battalion moving along route 2 is 20 kilometers away and so on. Force C represents a center of gravity concentrated in time and space. One may ask how this force can be concentrated in time and space when the artillery unit

is 30 kilometers from the decisive point and the aviation unit is 40 kilometers away.

The answer lies in Schneider and Izzo's assertion that Clausewitz's classical definition of the center of gravity must be updated to account for the increased capabilities of weapons systems to project combat power over time and space. They propose the following definition: "The center of gravity is the greatest concentration of combat force."[29] With this definition, the aviation and artillery units of Force C can deliver combat force on the decisive point with attack helicopters and indirect fires at the same time as the ground forces are attacking. This example illustrates the importance of the tenet of synchronization in modern warfare--the arrangement of forces to achieve the concentration of combat force at the decisive point in time and space.[30] With the relationships of aim, mass, space, and time established, discussion will turn to Jomini's components of a military chessboard.

CHESSBOARD COMPONENTS

In his discussion of strategy in Summary of the Art of War, Jomini defined seventeen basic components of a theater of operations. He qualified the

definitions of these components by stating they were independent of the theater's topographical features, and applied to all forces operating within the theater.[31] Space does not permit a definition of each component within this paper. Detailed descriptions and representations of all components are provided in Appendices 1 through 4. For this section, the components are grouped relative to aim, mass, space, and time, and according to the functions they perform as pieces of the military chessboard--the theater of operations.

Table 2 (see next page) provides a classification matrix of Jomini's theater components. This matrix indicates his components perform one or more functions in the design of a theater of operations. First, they can serve to define the theater in space, for example, the base of operations which Jomini defined as an area of a country from which military forces could obtain reinforcements and resources.[32] Next, they relate aim to the definition of the theater in space. A geographic strategic point is one of Jomini's examples: "Every point of the theater of war which is of military importance, whether from its position as a center of communication or from the presence of military establishments or fortifications. . . ."[33] Another use is the relation of aim and mass to the definition of

CLASSIFICATION OF JOMINI'S CHESSBOARD COMPONENTS
COMPONENTS OF A THEATER OF OPERATIONS

COMPONENT	CRITERIA: AIM	MASS	SPACE	TIME	
BASE OF OPERATIONS			X		1
GEOGRAPHICAL STRATEGIC POINT	X		X		2
STRATEGIC POINTS OF MANEUVER	X	X			2
DECISIVE GEOGRAPHIC POINT	X		X		2
DECISIVE STRATEGIC POINT	X	X			2
GEOGRAPHICAL OBJECTIVE POINT	X		X		2
OBJECTIVE POINT OF MANEUVER	X	X	X		2
FRONT OF OPERATIONS	X	X	X	X	3
ZONE OF OPERATIONS	X	X	X	X	3
STRATEGIC FRONT	X	X	X	X	3
PIVOTS OF MANEUVER	X	X	X	X	
PIVOTS OF OPERATIONS	X	X	X	X	
LINES OF COMMUNICATIONS	X	X	X	X	4
LINES OF OPERATIONS	X	X	X	X	4
LINES OF DEFENSE	X	X	X	X	
STRATEGIC POSITIONS	X	X	X	X	

Number at far right refers to Appendix

Table 2. Classification of Jomini's chessboard Components. The components of a theater of operations.

the theater in space. An example is an objective point of maneuver which is defined in space by the relative positions of hostile masses.[34] Finally, they relate aim, mass, and time to the definition of the theater in space. A pivot of maneuver is one of Jomini's examples: "detachments of troops left to guard points which it is essential to hold while the bulk of the army proceeds to the fulfillment of some important

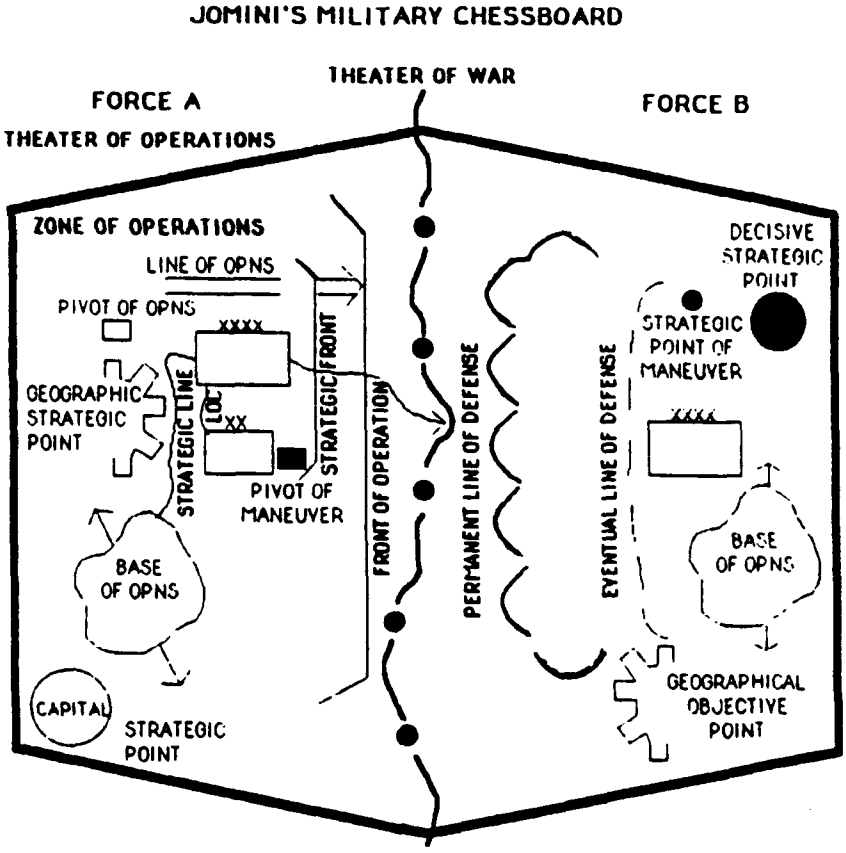


Figure 2. Jomini's military chessboard.[35]

end. . . ."[36] What is the spatial relationship among these various components?

Figure 2 is a graphic depiction of a theoretical theater of war with one theater of operations. Force A has the aim of invading Force B's territory. The commander of Force A designed his theater of operations with a set of components necessary for the movement of mass through time and space to accomplish his aim. His components included a base of operations, lines of communications and operations, a pivot of maneuver, and a strategic front. Conversely, Force B has the

negative aim of defending its territory. The commander of Force B used a different set of components to achieve his aim, including permanent and eventual lines of defense, and a base of operations.

In summary, Jomini's components of a military chessboard help to organize the dynamic of mass moving through time and space. This dynamic, when related to an aim, serves as the foundation of our current concept of the operational level of war. The next section discusses how Napoleon and U. S. Grant incorporated aim, mass, space, and time into their designs of the Ulm Campaign and the Union campaign plan of 1864, respectively.

III. Historical Analysis

Jomini placed importance on the elements of operational design to assist campaign designers in the concentration of mass in time and space to achieve strategic aims. Jomini was a participant in the Napoleonic wars and an interpreter of Napoleon's strategies of warfare. To fully comprehend Jomini's components of the military chessboard, it is important to understand Napoleon's strategies. This section briefly describes Napoleon's strategic designs and discusses an example of their application from his Ulm

Campaign. Finally, a discussion of how Grant's plan of campaign for 1864 through 1865 will determine how he accomplished his strategic and operational aims through the employment of mass in time and space. The historical analysis of these campaigns will also provide vital information for the critical analysis of Jomini's components of the military chessboard.

Historian David Chandler identified three different types of strategical maneuver used by Napoleon: the strategic envelopment, la manoeuvre sur les derrieres; the strategy of the central position; and the strategic penetration. Napoleon used these types of maneuver to achieve his strategic aim--the creation of favorable conditions leading to decisive strategical results.[37] When and how did Napoleon employ these maneuvers?

Napoleon designed la manoeuvre sur les derrieres to destroy an army that, through position in time and space, was outside of the reinforcement range of other friendly forces. To execute this strategy, Napoleon conducted a frontal feint to fix the enemy's attention, then he marched the mass of his main army by the quickest routes to positions on the rear or flank of the enemy. Once the move was complete, he cut the enemy's lines of communications, and severed the army from its depots and possible reinforcement.[38]

Napoleon used the strategy of central position when the French army was numerically inferior to the combined strength of its opponents, but could concentrate a mass superior to that of any of the opponent's parts. To execute this strategy, Napoleon first isolated a selected portion of the enemy's mass. Then, he concentrated a superior force to defeat the isolated section. Finally, he used the advantages of interior lines to turn and concentrate the full strength of his army to destroy the remaining enemy force.[39] Interior lines allowed Napoleon to concentrate the mass of his army at a point in time and space faster than the enemy could concentrate an opposing force at the same point.

Napoleon adopted his third strategy, the strategic penetration, to achieve a favorable position from which to execute one of the two maneuvers just described. The strategic penetration concentrated mass and smashed through an enemy covering an extended line. Once Napoleon achieved a penetration, his army secured a point in the enemy's rear to serve as a pivot of maneuver for subsequent operations.[41] Figure 3 (see next page) is a graphic summary of Napoleon's three strategies. How did Napoleon design his strategic maneuver during the Ulm Campaign of 1805.

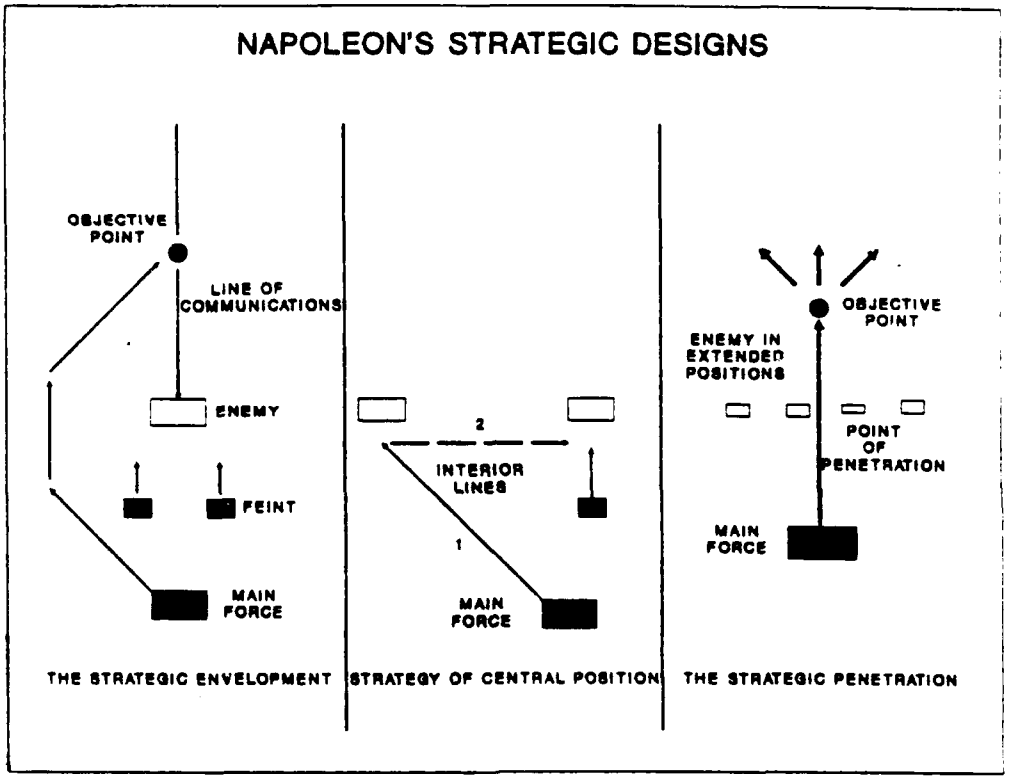


Figure 3. Napolecn's strategic designs.[40]

Napoleon's Ulm Campaign

In 1805, France was at war with Great Britain. Napoleon assembled a 210,000 man force, designated as the Army of England, on the northern French coast in preparation for an invasion of the British Isles. The failure of Napoleon's naval strategy to secure the English Channel, combined with Austria and Russia's entry into the war on the side of Great Britain, forced

Napoleon to abandon his invasion plans and use his army only on the continent of Europe.[42]

Napoleon's grand strategic plan called for the Army of England, redesignated as the Grand Armee, to annihilate Archduke Ferdinand's 70,000 man Austrian army in southern Germany. The defeat of the Austrian army was important for three reasons. First, Napoleon needed to eliminate the immediate threat posed by Ferdinand's army to the French frontier. Next, with Ferdinand quickly defeated, Napoleon could turn his attention to the destruction of the Russian armies, which were moving westward to reinforce the Austrians. Finally, with quick decisive victories over Austria and Russia, Napoleon hoped to knock both of these allied forces out of the war.[43] How did Napoleon plan to defeat Ferdinand?

Napoleon selected his strategy of envelopment, la manoeuvre sur les derrieres, to defeat Ferdinand in the vicinity of Ulm. To achieve the aim of his strategy, Napoleon employed infantry and cavalry formations, under the command of Marshals Lannes and Murat, to conduct feints through the Black Forest to fix Ferdinand's attention. Meanwhile, the remainder of the Grand Armee wheeled southeast from positions on the Rhine to concentrate along the Danube, behind the strategic right flank of Ferdinand's army. After

concentrating his force, Napoleon crossed the Danube and seized the town of Augsburg, severing Ferdinand's lines of communication and reinforcement. Ferdinand and a small portion of his army escaped Napoleon's encircling maneuver. The bulk of the Austrian force, commanded by General Mack, surrendered to Napoleon, after they recognized their numerical inferiority and realized that the Russian Army, commanded by General Kutusov, could not reinforce them.[44]

Figure 4 is a two-dimensional portrayal of Napoleon's Ulm campaign. Napoleon's main force

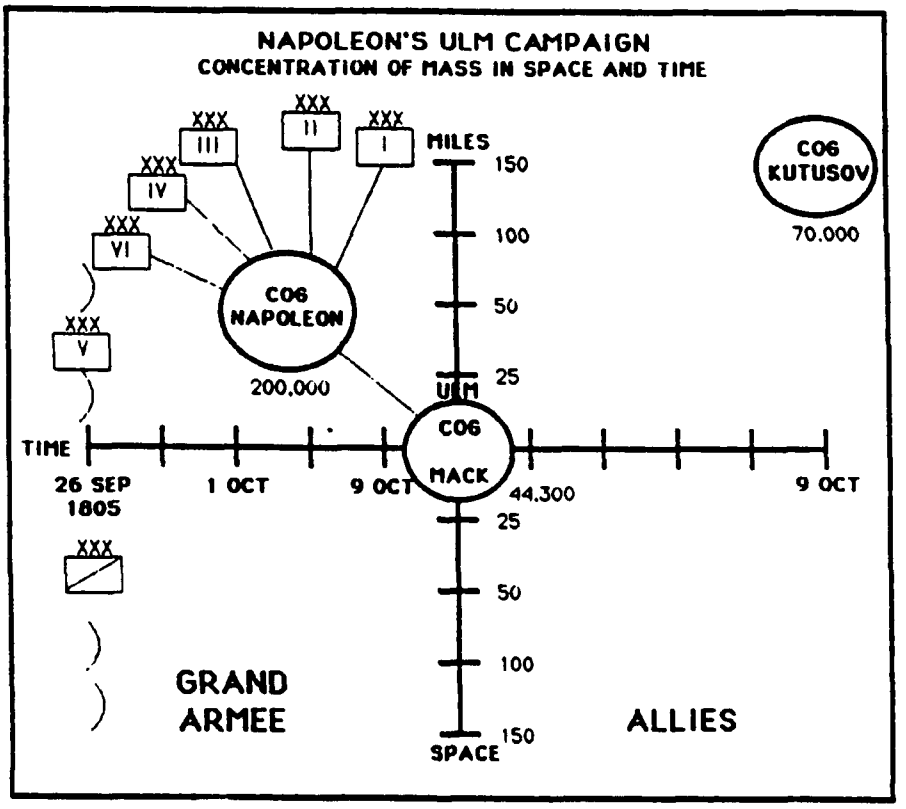


Figure 4. The concentration of mass in time and space during Napoleon's Ulm Campaign.[45]

concentrated to the east of Ulm, was the French center of gravity. Mack's force in the vicinity of Ulm and Kutusov's force moving westward were the allied centers of gravity. Napoleon selected a line of operation from the Rhine to the Danube, which enabled him to compress the separated movement of his corps over time and space into a center of gravity. Crossing sites over the Danube served as pivots of maneuver essential to the attainment of his initial objective point, the town of Augsburg. The design elements, lines of operations, objective points, and pivots of maneuver, were crucial to the successful achievement of Napoleon's aim to destroy the Austrians. Did the commander's ability to concentrate mass in time and space change between the Napoleonic Wars and the American Civil War?

Historian B. H. Liddell Hart noted that the ratio of troops representing force-mass to space drastically declined between these two wars. For example, a defender in the Napoleonic period needed approximately 20,000 troops to hold each mile of front. This ratio was reduced during the American Civil War to approximately 5,000 troops per mile of front.[46] What caused this reduced ratio?

There are two reasons. First, technological advances in weapons design allowed armies to deploy fewer soldiers to deliver the same or greater force

against the enemy. Second, the development of new transportation systems, particularly the railroad, enabled commanders to concentrate mass faster than during the Napoleonic period.[47] How did Grant employ mass in time and space to achieve his strategic aims?

Grant's Campaign Design: March 1864

In March of 1864, Lieutenant General Ulysses S. Grant became General-in-Chief of the 533,000 men of the Union armies.[48] His assessment of the Union's efforts to defeat the Confederacy prior to his assumption of command is contained in his official operations report to Secretary of War E. M. Stanton, dated July 22, 1865:

> The armies in the East and West acted independently and without concert, like a bulky team, no two ever pulling together, enabling the enemy to use to great advantage his interior lines of communication for transporting troops from east to west, re-enforcing the army most vigorously pressed, and to furlough large numbers, during seasons of inactivity on our part, to go to their homes and do the work of producing for the support of their armies.[49]

Grant realized that he needed to synchronize the actions of his armies in time and space to achieve his strategic aim--Lee's defeat. He developed a strategy of exhaustion based on two foundations. First, Grant would deny Lee the advantages of interior lines of

communication by fielding the largest practical force against Lee's armed forces. Second, he would relentlessly attack Lee's armies and the resources of the Confederacy to bring about their ultimate surrender through attrition.[50] How did Grant employ the mass of his forces in time and space to achieve his aim?

In March of 1864, the Union theater of war consisted on nineteen military departments. Grant reorganized his theater of war into two theaters of operations. In the west, Major General W. T. Sherman commanded the Military Division of Mississippi consisting of three armies: The Cumberland, The Ohio, and The Tennessee. These armies included all troops west of the Allegheny Mountains and north of Natchez, Tennessee.[51] What were Grant's strategic aims in the west?

The military strategic aims communicated to Sherman by Grant were threefold. First, Sherman was to move against Joseph E. Johnston's Army of Tennessee and attempt to break it up. Second, he was to penetrate the interior of the Confederacy as far as possible, and destroy its war resources, including industrial bases, agricultural potential, and lines of communication. Finally, he was to prevent any attempt by Johnston to concentrate his forces with Lee's forces which were operating in the eastern theater.[52] The organization

and objectives of the eastern theater of operations differed from that of Sherman's theater.

The Army of the Potomac, commanded by Major General George Meade, formed the center of the eastern theater of operations. Grant did not assign territorial limits to this army. Instead, he designated all forces west of the Army of the Potomac and east of Memphis as the right wing. The Army of the James, commanded by Major General Benjamin F. Butler, formed the left wing.[53] Grant's strategic aims in the east were the destruction of Lee's Army of Northern Virginia and the capture of the Confederate capital of Richmond. Grant communicated these aims to Meade and Butler by assigning them objective points. Meade's objective point was Lee's army, while Butler's was Richmond.[54] Table 3 (see next page) provides a summary of Grant's aims and the application of Union mass in time and space. Column one is a summary of the aims Grant communicated to his subordinate commanders. Column two lists the Union force-mass assigned to each theater. Column three summarizes the space assigned to each theater of operations. Finally, column four expresses time, in chronological sequence, by listing the major campaigns conducted between March 1864 and the end of the war in April 1865.

GRANT'S THEATER DESIGN, MARCH 1864

WESTERN THEATER (SHERMAN)

AIM	MASS	SPACE	TIME
1. Break Johnston's Army of Tennessee 2. Destroy resources of the South 3. Prevent Johnston from joining Lee	Army of the Cumberland Army of the Tennessee Army of the Ohio	1. All troops west of Allegheny Mountains 2. All troops north of Natchez	Chattanooga Atlanta Nashville Savannah Columbia Raleigh

EASTERN THEATER (MEADE AND BUTLER)

AIM	MASS	SPACE	TIME
1. Lee's Army of Northern Virginia 2. Richmond	Army of the Potomac Army of the James Army of the Shenendoah	Center Left wing Right Wing	Wilderness Spottsylvania Petersburg Richmond Pursuit to Appomattox

Table 3. Grant's theater of war, March 1864 through April 1865.

In summary, Napoleon's Ulm Campaign and Grant's campaign design of 1864 provide valuable insights regarding force application within a theater of operations. The employment of mass in time and space to achieve desired operational and strategic aims were essential considerations in the design of Napoleon and Grant's operations. The next section will investigate the contemporary significance and utility of Jomini's operational theater components.

IV. Analysis of Jomini's Components of a Theater of Operations

The application of combat force to achieve a military strategic aim within a theater of operations involves the dynamic of force-mass moving through time and space. Jomini realized the importance of this dynamic when he described the theoretical components of the theater of operations. The chessboard analogy will be used again to illustrate how the space of the theater of operations has expanded since the time of Napoleon. The next step will be an analysis of those components of Jomini's military chessboard which are the most useful to operational designers as they direct force-mass in time and space: decisive points, lines of operations, pivots of maneuver, and pivots of operations. Finally, an analysis summary will provide a conclusion regarding the contemporary significance of Jomini's components of a military chessboard. How has the space of the military chessboard expanded since the time of Napoleon?

Consider Napoleon and Ferdinand during Napoleon's Ulm Campaign as opposing kings in a game of chess. Their chessboard encompassed a relatively small area from the Rhine River and Black Forest in the west to the Danube River and Augsburg in the east. The number of spaces they could move their chessmen was restricted

by the mobility of foot soldiers and horses. In several short moves, using his most powerful corps pieces, Napoleon maneuvered Ferdinand into a series of disadvantageous positions resulting in checkmate.[55] Now consider Grant's campaign design of 1864.

The introduction of the railroad and telegraph, and technological advances in weapons ranges and lethality combined to expand the chessboard playing surface.[56] We cannot consider Grant's campaign design as a single game of chess. Unlike Napoleon's campaign at Ulm, Grant's campaign was two simultaneous games. Grant and Lee were opposing kings in the eastern theater of operations; Sherman and Johnston opposed each other in the western theater. Because of the strategies of the opposing kings and the space available to them, each game was played not on a single chessboard, but on several standard boards laid together. For example, in Grant's eastern theater, the Wilderness represented one chessboard, while Spottsylvania represented another.

The expansion of the chessboard playing surface magnified the difficulty of maneuvering opponents toward a decisive battle resulting in checkmate. Introduction of the railroad enabled Grant to rapidly move chessmen between the adjacent chessboards; however, the speed and range of his chessmen were still

limited to that of foot soldiers and horses. Before Grant's attacking chessmen could move from one board to another, they had to pause for resupply and to move logistics facilities. Meanwhile, Lee's defending chessmen could shorten their lines of communication and avoid decisive battle by simply moving rearward from one chessboard to another. For Grant, expansion of the military chessboard meant that he could not achieve the aim of his overall strategy through one decisive battle as Napoleon did at Ulm. Instead, he fought a series of battles against Confederate forces which Lee arrayed throughout the depth of the theater of operations.

This expansion of the military chessboard has continued from the Napoleonic period to the present for several reasons, including mechanization and increases in range, accuracy, and lethality of weapons. Operational designers must acknowledge this expansion as they plan the application of force-mass in time and space to achieve operational aims throughout the depth of the theater of operations. Jomini's components of a theater of operations can assist with this task. The first of those components is decisive points.

Decisive Points

In his maxims, Jomini stressed the successive concentration of force-mass at the decisive points within a theater of operations. Decisive points then serve to provide direction for the application of mass in time and space. Additionally, they hold an added significance since the seizure or retention of a decisive point may decide the outcome of the battle or campaign.[57] Jomini developed his concept of decisive points by grouping all militarily significant points within a theater of operations into three categories: strategic, decisive, and objective points. In describing these points, he distinguished between space and mass by naming all points dealing with space as geographic points and those concerning the masses of opposing forces as maneuver points.

Jomini divided strategic points into two categories: geographical strategic points and strategic points of maneuver. Geographical strategic points are locations within a country which possess military importance, such as major communication centers, lines of communication, and national capitals. Strategic points of maneuver derive their importance from the relative positions of opposing forces, and may include key avenues of approach and points along the assailable

flanks of the enemy (see appendix 2 for a detailed discussion of each).[58] Decisive points are a subset of strategic points.

The commander selects decisive points after comparing all theater strategic points with his campaign aims. Those strategic points necessary to achieve the aims of the campaign become decisive points. Jomini further divided decisive points into two categories: decisive geographic points and decisive points of maneuver (see appendix 2 for a detailed discussion of each).[59]

In addition to determining the outcome of the battle or campaign, decisive points compel the commander to make a decision. He must decide how much combat power he is willing to expend for the seizure or retention of each decisive point. The decisive points chosen for seizure or retention are called objective points.[60] Jomini identified two types of objective points: geographical objective points and objective points of maneuver.[61] These points identify vital locations in space and key points relative to the positions of opposing masses, respectively. The Jominian components--strategic, decisive, and objective points--serve commanders to focus the force-mass at their disposal in time and space to achieve the aim of their campaign.

Lines of Operations

Lines of operations connect the objective points throughout the depth of the theater of operations. They are, in effect, the operational expression of force direction in time and space. Jomini classified lines of operations by their spatial relationship to opposing masses in time. The major types of lines used to organize the application of force-mass in time and space are interior, exterior, convergent, and divergent lines of operations. The array of forces shown in figure 5 (see next page) illustrates these lines.

Imagine Armies A and B attacking along lines d1, d2, and d3 toward points 1 and 2, with the aim of invading the territory of Armies C and D. Conversely, Armies C and D are defending and have as their aim the defeat of Armies A and B at the same points. The armies are of equal mass and the march rates are constant; Armies C and D can move along lines d4 and d5 to concentrate at point 1 before Armies A and B can arrive at the same point. Even if Army B moves along line d3 toward point 2, Armies C and D can shift and move along lines d6 and d7 to concentrate at point 2 before Army B arrives. In this example, Armies C and D operated on interior lines of operations. They were

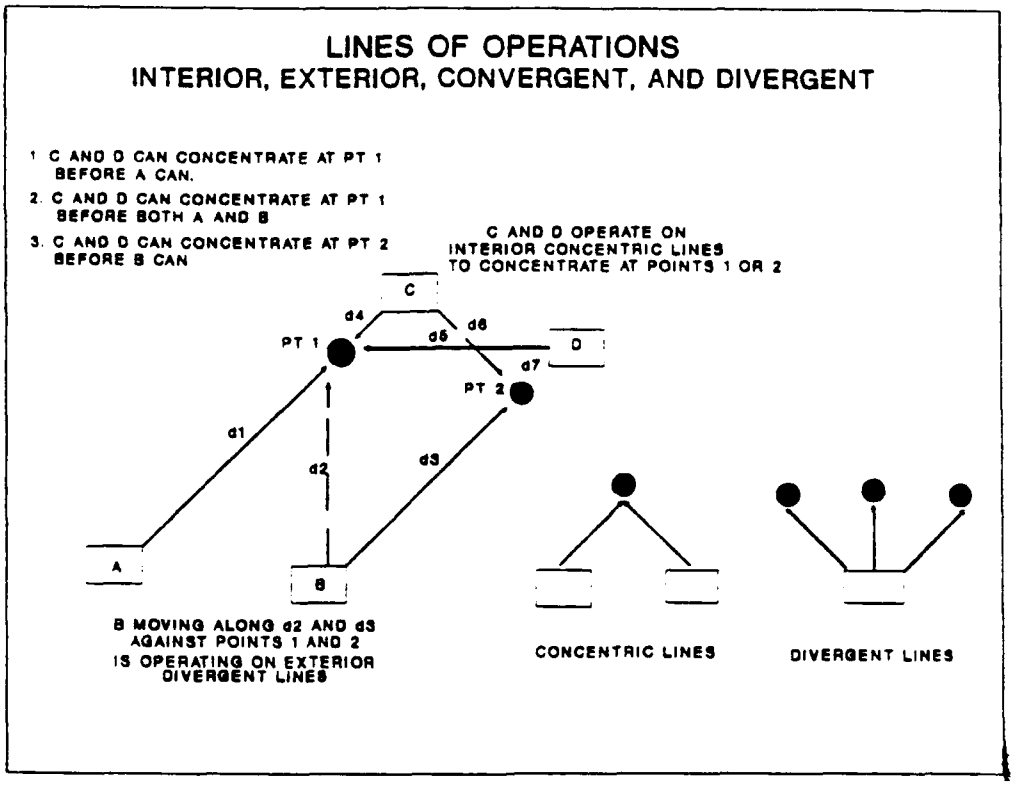


Figure 5. Interior, exterior, convergent, and divergent lines of operations.

able to mass their forces at objective points in space in a shorter time than the enemy. Army C and D's interior lines were also concentric lines, since they departed from spatially separated points and met at the same point.[62] To illustrate exterior and divergent lines, consider the actions of Army B.

Imagine the mass of Army B as considerably greater than the combined masses of Armies C and D. Greater mass allowed the commander of Army B to move along lines d2 and d3 to points 1 and 2, and operate against

two enemy masses simultaneously. In this example, Army B operated on exterior lines of operations. Army B's exterior lines were also divergent lines because they started at the same point and ended at two spatially separated points. What is the significance of these lines of operations?

Lines of operation connect the objective points throughout the depth of the theater of operations. As the military chessboard expands, lines of operations maintain their importance as they provide direction of the force-mass in time and space. The final components, pivots of maneuver and pivots of operations, derive their significance from the expanded military chessboard.

Pivots of Maneuver and Pivots of Operations

To Jomini, pivots of maneuver were forces sent to seize or hold points along lines of operations, and were essential to maintain as the mass of the main force moves on toward an objective point.[63] Consider the actions of Army A shown in figure 6 (see next page). At time t1, Army A sent a force to seize and guard a pivot of maneuver at point s1. For this example, the point at s1 is an important bridge necessary for the unrestricted movement of the bulk of

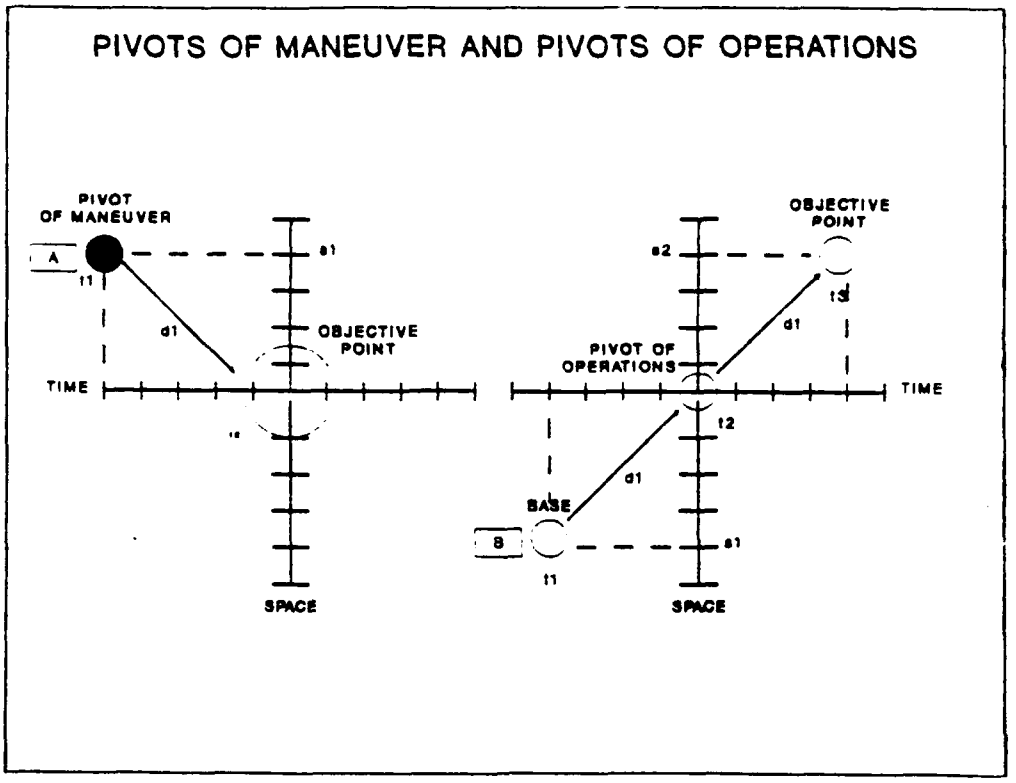


Figure 6. Pivots of Maneuver and Pivots of Operations

Army A's mass along line d1 so that Army A can strike the objective point at time t2. The significance of a pivot of maneuver becomes apparent in light of the expansion of the military chessboard. As space expands, it is more likely that at a line of operations will cross key points which may be interdicted by the enemy. Pivots of maneuver, established at these key points, will help ensure the unrestricted application of force-mass over time. Pivots of operations serve a different function.

Pivots of operations are temporary bases along lines of operations necessary for the sustained application of force-mass.[64] Figure 6 (see preceding page) contains an illustration of a pivot of operations. At time t1, Army B occupies its base at s1. The commander of Army B intends to strike an objective point 1 at time t3. To accomplish his aim, the commander of Army B must move his force-mass along line d1. The distance between s1 and s3 makes support from his initial base impractical. To solve the problem, Army B establishes a pivot of operations at s2. From s2, Army B can more easily continue its advance toward objective point 1 or shift effort to another objective point, if necessary.

As with pivots of maneuver, pivots of operations derive their contemporary significance from the expanded military chessboard. As the length of lines of operations increases, the ability of logistic facilities to sustain force-mass forward decreases. The establishment of pivots of operations alleviates the problem and provides commanders with greater flexibility as objective points and lines of operations change.

Operational designers can select objective points after comparing all militarily significant points within a theater of operations against the aim of the

campaign and available force-mass. Lines of operations connect the objective points throughout the depth of the theater of operations. Selection of interior versus exterior lines of operations is dependent upon the aim of the campaign, available force-mass, and the time and space available for operations. Finally, pivots of maneuver and pivots of operations enable the unrestricted application of force-mass along lines of operations. Conceptually, an operational design incorporating these components is similar to that shown in figure 7. Consider Army A as the friendly center of

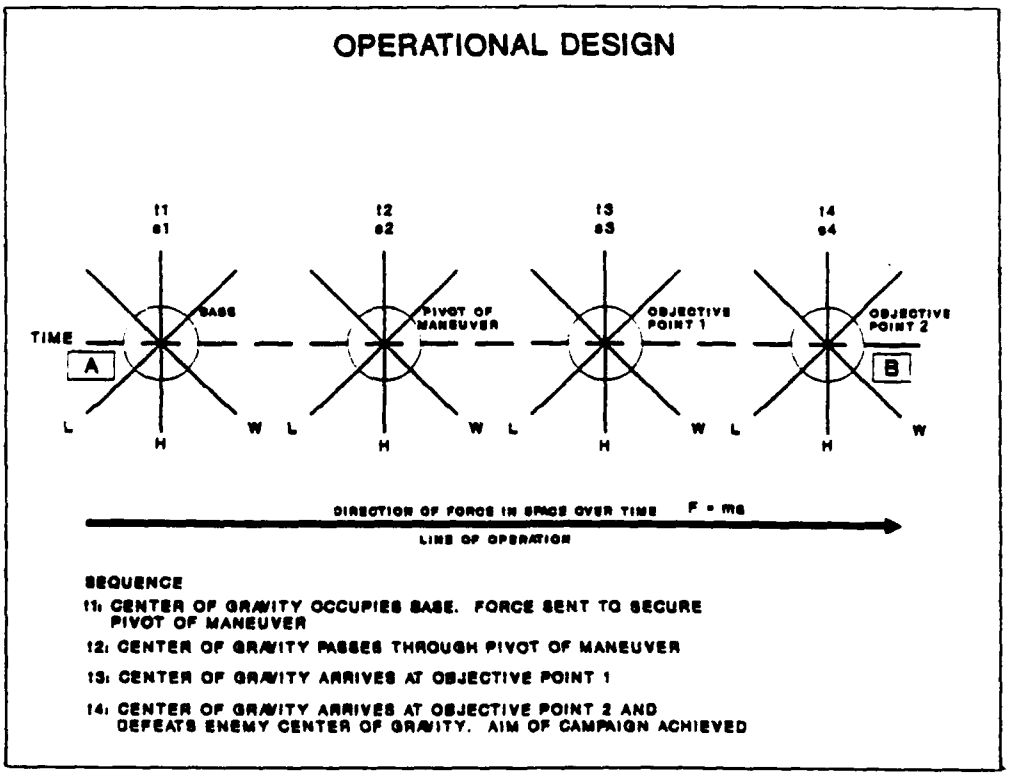


Figure 7. Conceptual operational design.

gravity initially located at its base in space s1 at time t1.

The aim of Army A's commander is to defeat the enemy center of gravity represented by Army B at space s4 and time t4. To achieve this aim, Army A designs a campaign by first selecting objective points 1 and 2 from among the possible decisive points in its theater of operations. Next, Army A's campaign designers select a line of operations connecting these objective points and providing direction to force-mass in space over time. When selecting this line of operations, the designers find several key bridges at space s2. Army A must seize and hold these bridges at time t2 to allow the unrestricted movement of Army A's center of gravity toward the objective points. Army A sends forces from its base at time t1 to act as pivots of maneuver at the bridges at time t2. Eventually, Army A's center of gravity moves from its base along the line of operations and achieves its aim at objective point 2.

This conceptual depiction includes the major design considerations of aim, mass, space, and time essential for operational design. Jomini's military chessboard components assist operational designers with the direction of force-mass in time and space to

achieve the aim of the campaign. These components retain contemporary significance in light of the ongoing expansion of the theater of operations.

In summary, the military chessboard continues to expand because of mechanization and the increased range, accuracy, and lethality of weapons. Because of this expansion, the direction of force-mass in time and space to achieve the aim of the campaign becomes more difficult. Jomini's military chessboard components, including decisive points, lines of operations, pivots of maneuver, and pivots of operations can assist operational designers with the direction of force-mass in time and space.

V. Conclusion

Do Jomini's components of the military chessboard have any contemporary significance for operational designers? The conclusion is that in addition to defining the theater of operations in space, they also serve to direct the dynamic of force-mass moving through time and space to achieve the aim of the campaign. Our ability to focus force-mass in time and space will become more important as the depth of the theater of operations increases and the ratio of troops to space decreases. Historically, this was true from

the time of Napoleon to the time of Grant and occurs today in Europe.

NATO allies face force reductions from a combination of domestic pressures and policies and the Conventional Forces in Europe (CFE) discussions with the Soviets. The Soviets are losing forward bases in former Warsaw Pact nations. Technology continues to provide both sides with weapons of increased range, accuracy, and lethality. The net effect of all these developments is the expansion of potential theaters of operations and a tendency toward nonlinear warfare. The identification and selection of bases of operations, lines of operations, objective points, pivots of maneuver, and pivots of operations will become major design components to focus force-mass in time and space to achieve operational aims.

Recall Newton's second law of motion discussed earlier, $F_{net} = ma_{net}$. In nonlinear theaters of operations, the major task confronting the operational artist will be the determination of the vector direction of combat force application required to defeat an enemy center of gravity. Once he determines the vector direction, he can design the theater of operations to support force application in that direction. Jomini's components of a theater of operations, if used, assist with this task.

Within a theater of operations, the base of operations is the initial location of force-mass. A recent example of a base of operations was the concentration of allied force-mass at Daharan and Riyadh, Saudi Arabia, during Operation DESERT SHIELD. From this location in space, force-mass moves along lines of operations. Lines of operations then serve to provide the vector direction of force-mass in time and space throughout the depth of the theater of operations. During Operation DESERT STORM, allied forces used external lines of operations in a nonlinear fashion to place force-mass in a position to destroy Iraq's operational center of gravity, the Republican Guard. Objective points focus the application of force-mass to achieve the aim of the campaign. Examples of objective points during DESERT STORM include Kuwait City and positions along the flanks of the Republican Guard. Finally, operational artists can add the design elements of pivots of maneuver and pivots of operations to the theater of operations based on mass, time, and space considerations.[65]

Aim, mass, space, and time are important considerations in the design of the theater of operations. Jomini's design components assist operational artists with the task of directing force-mass to achieve the aim of the campaign. This task

will become more difficult in the future as the space of the theater of war expands and operations become nonlinear.

Appendix 1: The Base of Operations and the Definition of the Theater of Operations in Space.

1. Jomini's Definition:

> A base of operations is the portion of country from which the army obtains its reinforcements and resources, from which it starts when it takes the offensive, to which it retreats when necessary, and by which it is supported when it takes position to cover the country defensively.[66]

2. Historical Examples:

A. The Rhine River and Augsburg during Napoleon's Ulm Campaign, 1805.

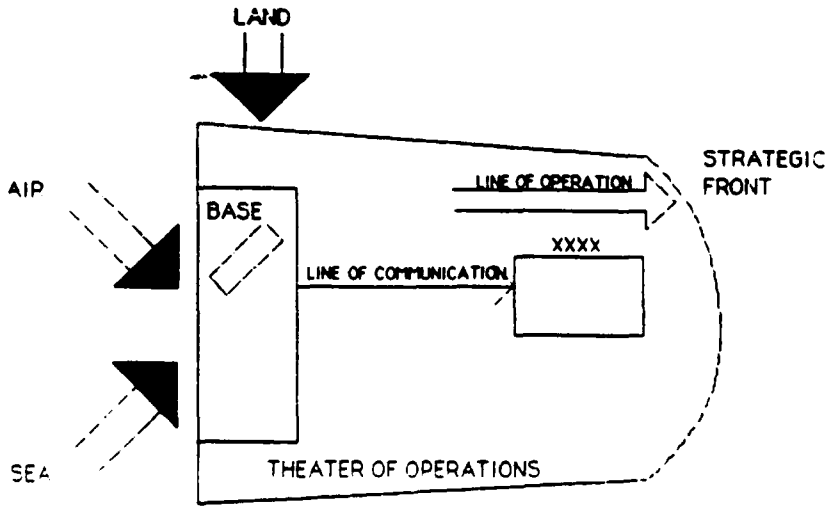
B. Memphis, Chattanooga, and Atlanta in Sherman's western theater of operations, 1864.

C. Daharan and Riyadh, Saudi Arabia, during Operation DESERT SHIELD, 1990-1991.

3. Contemporary Significance:

The base of operations defines the theater of operations in space. It is the locus of air, sea, and land lines of communications. Additionally, the base of operations is the source of sustainment for force-mass.

4. Schematic:



Appendix 2: Strategic, Decisive, and Objective Points.

STRATEGIC POINTS

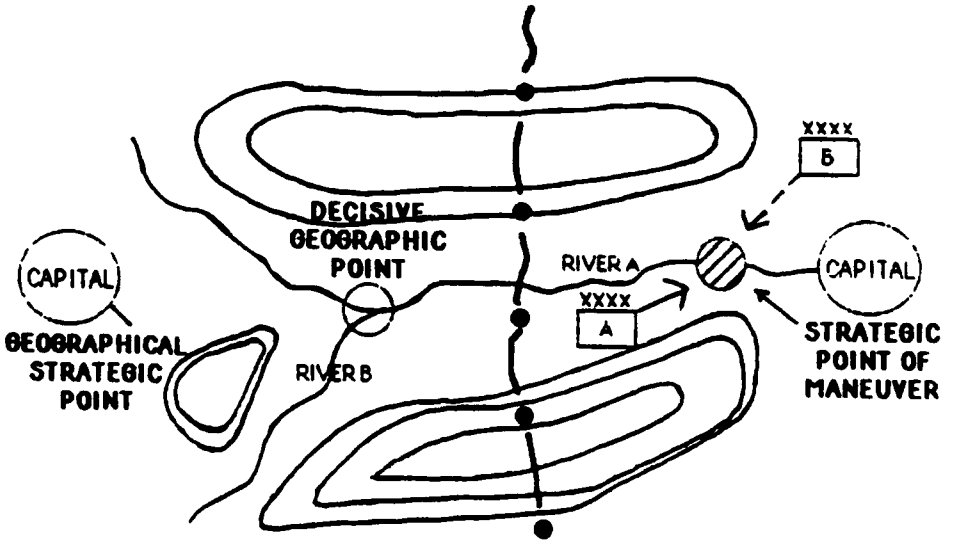
1. Jomini's Definitions:

A. Geographical Strategic Points: "Every point of the theater of war which is of military importance, whether from its position as a center of communications or from the presence of military establishments or fortifications. . . ."[67]

B. Strategic Points of Maneuver: "[those points which] have value from the relations they bear to the positions of the masses of the hostile troops and to the enterprises likely to be conducted against them. . . ."[68]

2. Contemporary Significance: Strategic points derive their contemporary significance from a spatial analysis of the militarily significant points within a theater of operations.

3. Schematic:



Appendix 2: Strategic, Decisive, and Objective Points (Continued).

DECISIVE POINTS

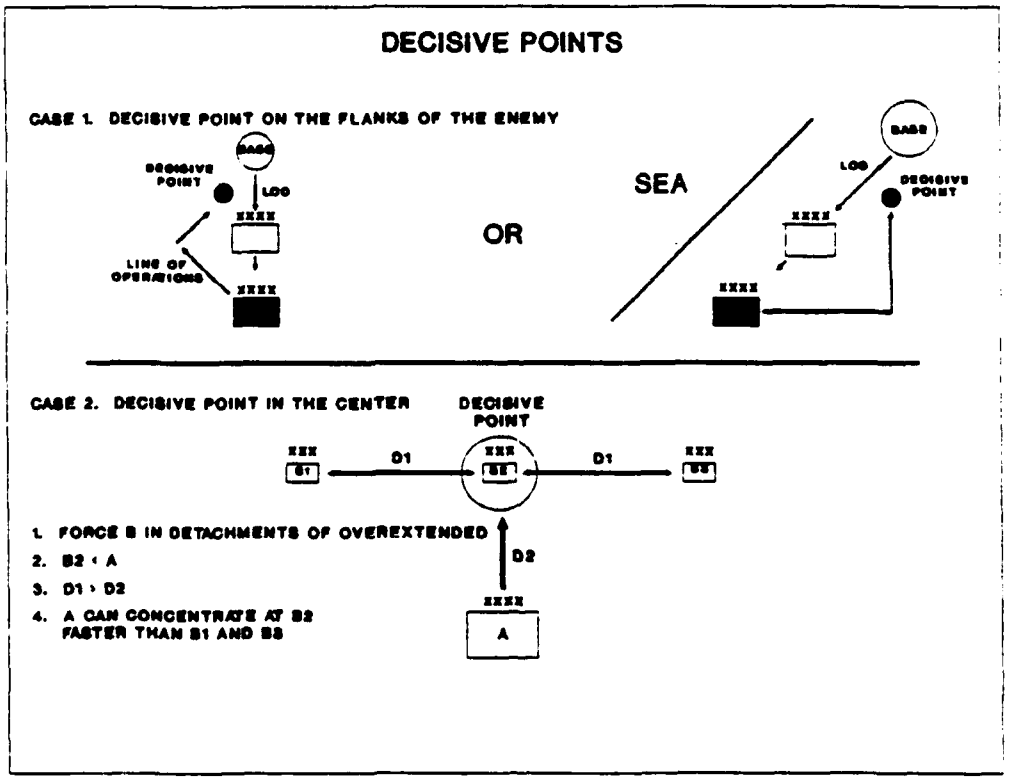
1. Jomini's Definitions:

A. Decisive Geographic Points: "Those points the possession of which would give the control of the junction of several valleys and of the center of the chief lines of communication in a country. . . ."[69]

B. Decisive Strategic Points: "all those which are capable of exercising a marked influence either upon the result of a campaign or upon a single enterprise."[70]

2. Contemporary Significance: Decisive points are a subset of strategic points, and are derived from the ultimate aim of the campaign and the relative positions of the enemy masses.

3. Schematic:



Appendix 2: Strategic, Decisive, and Objective Points (Continued).

OBJECTIVE POINTS

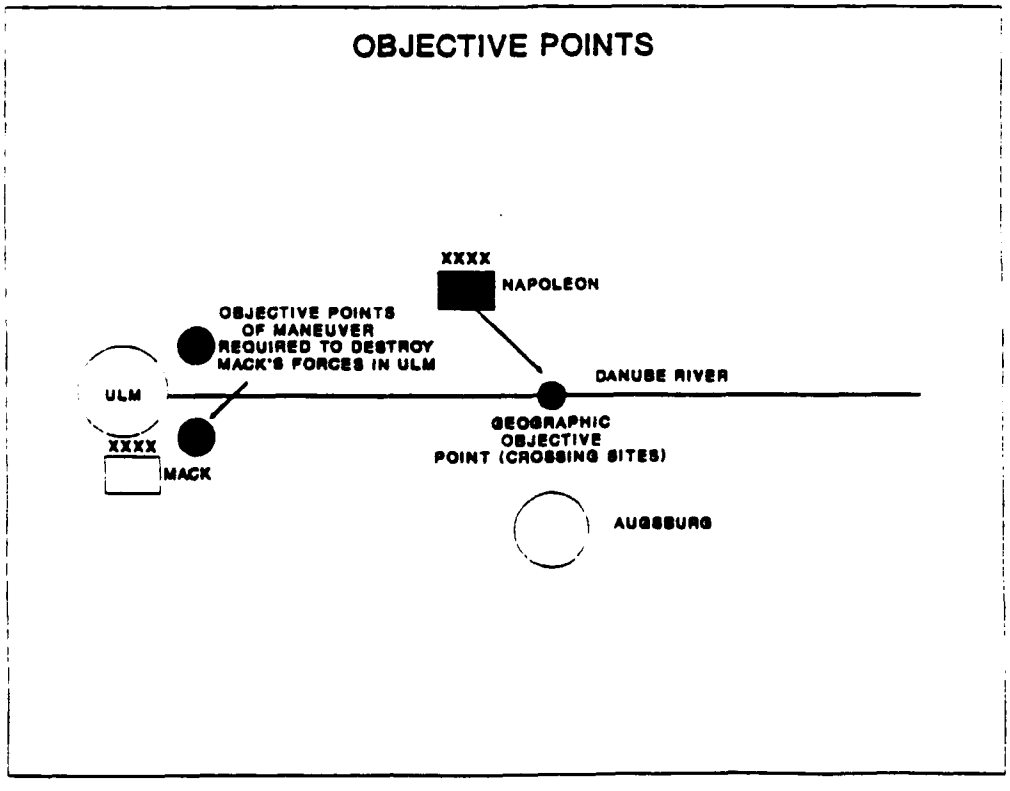
1. Jomini's Definitions:

A. Geographic Objective Points: "may be an important fortress, the line of a river, or a front of operations which affords good lines of defense or good points of support for ulterior enterprises."[71]

B. Objective Points of Maneuver: "those which relate particularly to the destruction or decomposition of the hostile force."[72]

2. Contemporary Significance: Objective points are a subset of decisive points, and are those points the commander decides to commit combat force over time to achieve the aim of his campaign. The seizure or retention of an objective point places the holder in a position of advantage relative to the enemy's center of gravity.

3. Schematic:



Appendix 2: Strategic, Decisive, and Objective Points (Continued).

4. Historical Examples: A point in space may be a strategic, a decisive, and an objective point. The following points are examples where this was the case:

A. Augsburg and points along Mack's lines of communications during Napoleon's Ulm Campaign, 1805.

B. Atlanta and points along Hood's lines of communications during Sherman's Atlanta Campaign, 1864.

C. Kuwait City, Baghdad, and points along the flanks of Iraq's Republican Guard during Operation DESERT STORM, 1991.

Appendix 3: Zones of Operations, Fronts of Operations, and Strategic Fronts.

1. Jomini's Definitions:

A. Zone of Operation: "a certain fraction of the whole war area which may be traversed by an army in the attainment of its object, whether it act singly or in concert with other and secondary armies."[73]

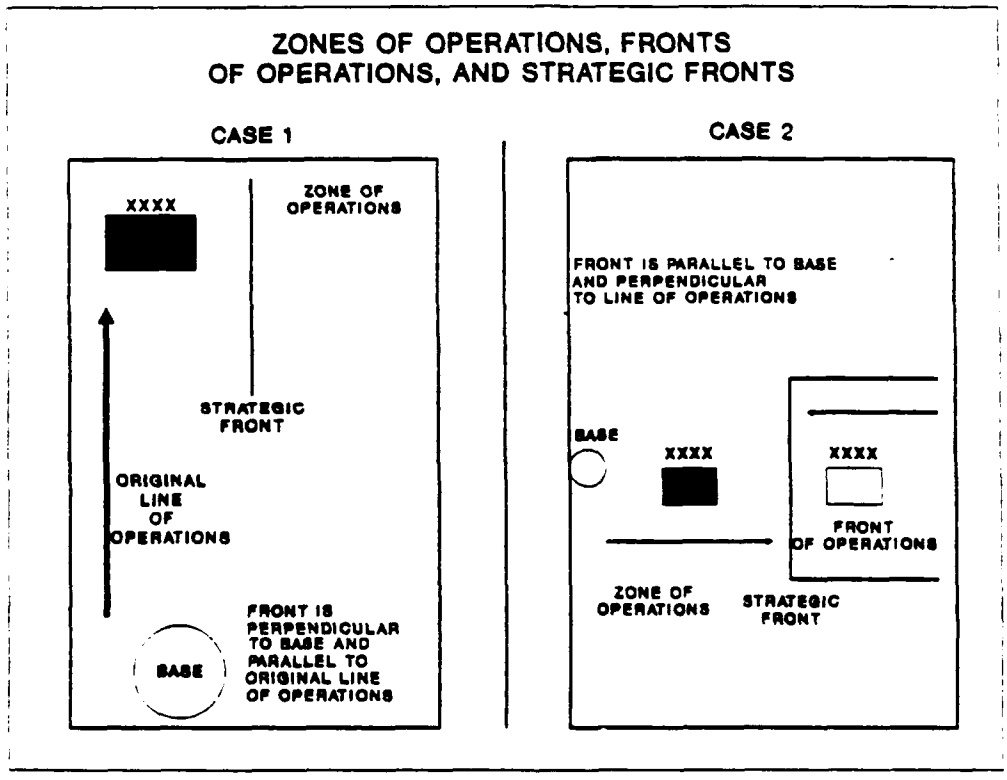
B. Strategic Front: "When the masses of an army are posted in a zone of operations, they generally occupy strategic positions. The extent of the front occupied toward the enemy is called the strategic front."[74]

C. Front of Operations: "The portion of the theater of war from which an enemy can probably reach this [strategic] front in two or three marches. . . ."[75]

2. Contemporary Significance: The zone of operations, strategic front, and front of operations define the theater of operations in time and space relative to the positions of opposing masses. For example, consider Iraq's permanent lines of defense in southern Kuwait during Operation DESERT STORM known as the "Saddam Line". Allied and Iraqi forces faced each other along a strategic front paralleling the "Saddam Line" (roughly along the southern Kuwait border with Saudi Arabia). The allied front of operations within this zone extended from the "Saddam Line" northward through the Kuwait Theater of Operations to the strategic positions of Iraq's Republican Guard.

Appendix 3: Zones of Operations, Fronts of Operations, and Strategic Fronts (Continued).

3. Schematic



Zones of Operations, Fronts of Operations, and Strategic Fronts

Appendix 4: Lines of Operations.

1. Jomini's Definitions:

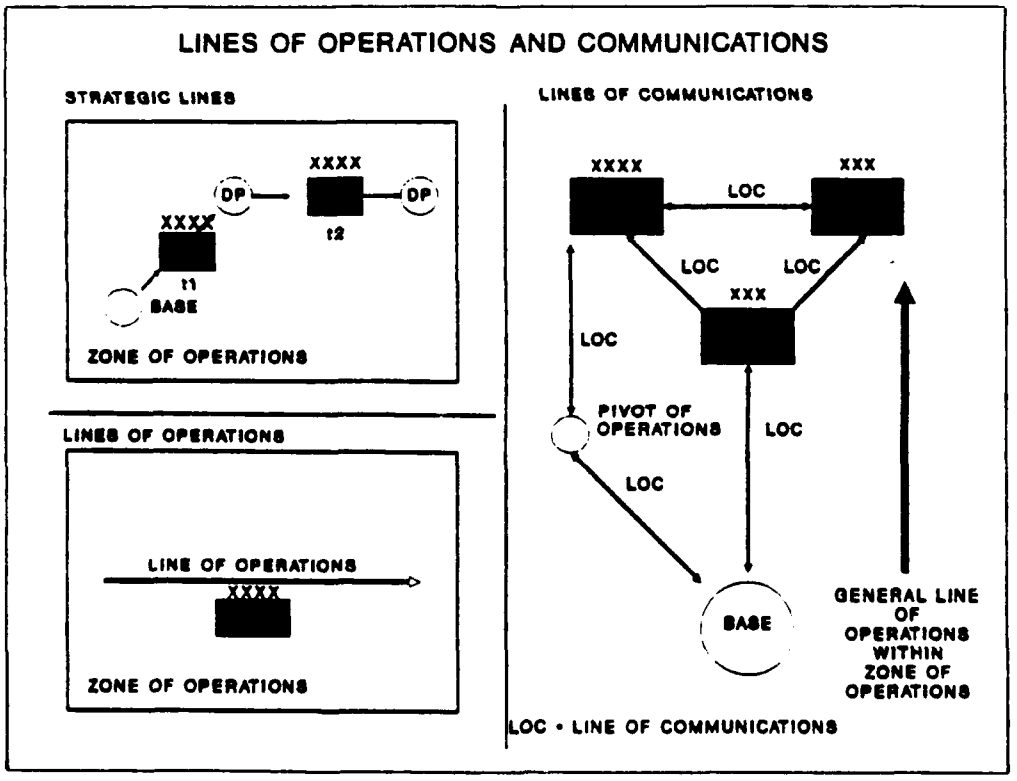
   A. Lines of Operations: "the part of the [zone of operations] embraced by the enterprises of the army."[76]

   B. Strategic Lines: "those important lines which connect the decisive points in the theater of operations wither with each other or with the front of operations."[77]

   C. Lines of Communications: "designate the practicable routes between the different portions of the army occupying positions throughout the zone of operations."[78]

2. Contemporary Significance: Lines of operations connect the decisive and objective points within the theater of operations. In effect, lines of operations serve as the vector direction of force-mass in time and space. Lines of communications serve to sustain force-mass, and normally connect the force-mass with the base of operations.

3. Schematic:



ENDNOTES

[1] Richard E. Simpkin, Race to the Swift: Thoughts on Twenty-First Century Warfare (London: Brassey's Defense Publishers, 1985), 93.

[2] Department of the Army, FM 100-5, Operations (Washington, D.C.: Government Printing Office, 1986), 10.

[3] Ibid.

[4] James J. Schneider, "Theoretical Paper No. 3: The Theory of Operational Art" (Fort Leavenworth: U.S. Army Command and General Staff College School of Advanced Military Studies, 1988), 25.

[5] Department of Defense, JCS Pub. 1, Dictionary of Military and Associated Terms (Washington, D.C.: Government Printing Office, 1987), 34.

[6] Ibid.

[7] Antoine-Henri Jomini, Summary of the Art of War, ed. by J.D. Hittle, Vol. 2, Roots of Strategy (Harrisburg: Stackpole Books, 1987), 461.

[8] Ibid., 464.

[9] Carl von Clausewitz, On War, trans. and ed. by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 77.

[10] Ibid.

[11] Ibid.

[12] Ibid., 177.

[13] Ibid.

[14] Frederic E. Abt, "The Operational End State: Cornerstone of the Operational Level of War", (MMAS monograph, United States Army Command and General Staff College School of Advanced Military Studies, 1988), 4.

[15] Jomini, 453.

[16] Jay Boleman, Physics, An Introduction (Englewood Cliffs: Prentice-Hall, Inc., 1985), 14.

[17] Clausewitz, 280.

[18] Ibid.

[19] Ibid.

[20] Ibid., 281.

[21] David G. Chandler, The Campaigns of Napoleon (New York: MacMillan Publishing Co. Inc., 1966), 161.

[22] James J. Schneider and Lawrence L. Izzo, "Clausewitz's Elusive Center of Gravity", Parameters 14 (September 1987): 49. To discuss Clausewitz's concept of the center of gravity, I think it is important to first realize he developed this concept from his notion of war as a duel between opposing forces. Following this path, Schneider and Izzo summarized Clausewitz's definition of the center of gravity as follows:

> . . .Clausewitz presented war as a duel between two opponents who seek to unbalance and throw one another. Each of the opponents has a certain mass with a center of gravity. On the literal battlefield, it is two armies in collision that seek to throw the other. They, too, each have a certain mass with a center of gravity. (48)

[23] Clausewitz, 485.

[24] Ibid.

[25] Ibid., 204.

[26] Schneider and Izzo, 51.

[27] Ibid.

[28] Although space is three-dimensional, I decided to portray the concentration of mass in space and time in a two-dimensional format for reasons of clarity following the recommendation of James J. Schneider, Professor of Military Theory, School of Advanced Military Studies. Two and three-dimensional portrayals of mass in space and time are contained in Richard E. Simpkin, Race to the Swift (London: Brassey's Defence Publishers, 1985), figure 3, 21.

[29] Schneider and Izzo, 56.

[30] FM 100-5, 17.

[31] Jomini, 464.

[32] Ibid., 465.

[33] Ibid., 466.

[34] Ibid., 468.

[35] The model for this depiction is from my unpublished class notes. The original author is unknown.

[36] Jomini, 474-475.

[37] Chandler, 162.

[38] Ibid., 163.

[39] Ibid., 170.

[40] Ibid., 175.

[41] These sketches are based, in part, on those contained in Chandler, 165-175.

[42] Robert M. Epstein, "The Different Levels of War in the Napoleonic Period - Austerlitz and Friedland", (Fort Leavenworth: United States Army Command and General Staff College School of Advanced Military Studies, 1989), 55-57.

[43] Chandler, 384-385.

[44] Ibid., 390-400.

[45] Dates, distances, and the relative positions of forces were obtained from campaign maps contained in Albert S. Britt, Campaign Atlas to Wars of Napoleon (West Point: Department of History, United States Military Academy, 1973), maps 15-17.

[46] B. H. Liddell Hart, "The Ratio of Troops to Space," Military Review 40 (April 1960): 3-4.

[47] Technological advances and the development of strategic deployment systems have continued to reduce this ratio leading to the phenomenon of the "Empty Battlefield." For a comprehensive discussion of the theory of the empty battlefield see James J. Schneider, "The Theory of the Empty Battlefield," Journal of the Royal United Services Institute for Defense Studies (September 1987): 37-44.

[48] Vincent J. Esposito, ed., The West Point Atlas of American Wars, Vol. 1, 1689-1900 (New York: Praeger Publishers, 1959), map 120.

[49] The War of Rebellion: A Compilation of the Official Records of the Union and Confederate Armies, (Washington, D.C.: Government Printing Office, 1894), excerpt reprinted in Department of the Army, Dwight D. Eisenhower: The Professional Soldier and the Study of History, (Fort Leavenworth: U.S. Army Command and General Staff College, 1990), 27.

[50] Ibid.

[51] Ulysses S. Grant, Memoirs and Selected Letters, ed. by John Y. Simon (New York: Library of America, 1990), 475.

[52] Dwight D. Eisenhower: The Professional Soldier and the Study of History, 29.

[53] Grant, 477.

[54] Dwight D. Eisenhower: The Professional Soldier and the Study of History, 30-31.

[55] James J. Schneider provided the idea for using the analogy of the game of chess to describe the expansion of the theater of operations over time. Additionally, he believes the basic elements of the Napoleonic campaign are the maneuver to contact, the battle, and the pursuit to checkmate. A more detailed discussion of the expansion of the theater of operations over time is contained in James J. Schneider, "Theoretical Paper No. 3: The Theory of Operational Art" (Fort Leavenworth: U.S. Army Command and General Staff College School of Advanced Military Studies, 1988), 11-12.

[56] James J. Schneider, "The Theory of the Empty Battlefield," Journal of the Royal United Services Institute for Defence Studies (September 1987): 38-39. A comprehensive discussion of the effect technology had on the conduct of the American Civil War is contained in Edward Hagerman, The American Civil War and the Origins of Modern Warfare: Ideas, Organization, and Field Command (Bloomington: Indiana University Press, 1988), 34-35.

[57] Schneider, "Theoretical Paper No. 3," 28.

[59] Jomini, 466-467.

[59] Ibid.

[60] Schneider, "Theoretical Paper No. 3," 29.

[61] Jomini, 468.

[62] Ibid., 473-474

[63] Ibid., 471-472.

[64] Ibid.

[65] The analysis of Operations DESERT SHIELD and DESERT STORM are my own. I derived the identification of bases of operations, lines of operations, and objective points from numerous media reports and discussions with my classmates.

[66] Jomini, 465.

[67] Ibid., 467.

[68] Ibid., 466.

[69] Ibid., 467.

[70] Ibid.

[71] Ibid., 468.

[72] Ibid.

[73] Ibid., 472.

[74] Ibid., 469.

[75] Ibid.

[76] Ibid., 472.

[77] Ibid.

[78] Ibid., 472-473.

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