Military Advantage in History

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13. ABSTRACT *(Maximum 200 Words)*

This paper examines the nature of military advantage by exploring the character of the major hegemonic powers in history and seeks to gain a better understanding of what drives US military advantage; where US vulnerabilities may lie; and how the United States should think about maintaining its military advantage in the future. Case studies of Macedonia under Alexander the Great, Imperial Rome, the Mongols, and Napoleonic France compose the core of the analysis, as they illustrate important themes that remain relevant to the United States' position today. The case studies focus on two key questions:

What were the sources of military advantage in history?

What made military advantage enduring or temporary in nature?

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About IATAC

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Chapter 1

Introduction

The Lord is a man of war.
—Exodus 15:3

The nation state arose from the 30 Years War in 1648 as the dominant political organizational construct. This success was a triumph, not of ideology but of military acumen. [1] Arguably the most important core competency of the nation state is its ability to organize, train, equip, and deploy military power. Historically, true great power status has rested upon a bedrock of military advantage, which economic strength alone cannot confer. [2] Moreover, the duration of great power status is tightly coupled to the duration and robustness of military advantage. [3] If military advantage is a key factor in great power status and its durability, then two key questions should be explored: What elements contribute to military advantage, and what factors determine the duration of military advantage?

This study seeks to answer these questions by using several case studies of the pivotal hegemonic powers in history. The examples of great powers evaluated in this study were selected because of their significant military advantage over their opponents. The Macedonians under Alexander the Great achieved military advantage through combined arms warfare and logistic acumen. The Roman success was rooted in superior tactical doctrine, strategic mobility, and strong strategic political and military institutions that enabled them to adapt and transform their military forces over approximately 600 years. The Mongols under Chenghis Khan and his heirs overwhelmed an entire continent by coupling a tactical weapon system (horse archer) that could not easily be duplicated with a superior organization and operational maneuver doctrine. Finally, Napoleonic France leveraged political, military, and industrial revolutions to create the levee en masse, organizing around innovative operational maneuver concepts to overwhelm its opponents on the battlefield and to achieve a brief period of European hegemony. Based on conclusions drawn from the case studies, inference will be made to suggest how the United States should think about maintaining military advantage in the 21st century.

It should be noted that the case studies were examined and analyzed with a broad aim to answer the two key questions of this study. Any study that tries to examine

a 2,000-year history in a short paper format will leave a few details on the cutting room floor. Literally thousands of books have been written on the subject of each case study. Although the devil is in the details, our synthesis of history has focused on the major trends and issues. Any competent historian can find anecdotal exceptions to any conclusions drawn from our analysis. We are aware of those exceptions and differing perspectives, but we are comfortable that our aggregate characterization of the important trends in the establishment and maintenance of military advantage are accurately drawn from these historical examples.

Key Questions

What Constitutes Military Advantage?

Throughout history, peoples have sought to gain and maintain military advantage over their opponents. Military advantage exists when an opponent must either directly adapt the method of warfare to reflect that of the side with military advantage or develop an asymmetric response that is tailored to defeat the superior adversary. Failure to adopt either of these options has always resulted in the military defeat of the inferior force. It should be noted that military defeat is distinct from political defeat. Military advantage must enable both offensive and defensive advantage; otherwise, the opponent needs only to neutralize its defense character to prevail. When a society achieves recognizable military advantage, it cannot be defeated until the enemy changes its approach to warfare. Some types of military advantage are hard to copy or neutralize and, consequently, the advantage endures for a substantial period of time, potentially over several centuries. Other forms of military advantage are more temporary in nature, as with some aspects of military advantage that have rested upon a military genius whose basic mortality confines the advantage to one lifetime. Once seen, a new form of warfare can be copied or neutralized with an asymmetric response or a new style of warfare.

A society arises from the environment and resources available at its formation. [4] The environment provides the basic foundation and serves as the primary shaping mechanism for the economic, social, and political structures of a given society. Due to the impact of technology, the role of the physical environment in shaping economies and social-political institutions has diminished in the last few centuries. However, the role of the environment on the economy prior to the industrial revolution cannot be overstated. The physical environment directly influenced a culture's economic foundation and shaped the social structures and political processes that formed the character of their military forces.

The basic economic systems of the pre-industrial era were harvesting, herding, and trading. Harvesting societies, based on the domestic cultivation of land, emphasized skills in civil engineering, metallurgy, and animal husbandry. Such societies

tended to develop centralized social and political structures. Classic examples are Mesopotamia, Egypt, and Rome.

Pastoral societies were tuned to the life cycle and maintenance of domesticated animal herds, demanding skills in animal husbandry, hunting, and equestrianism. These societies typically were built around decentralized social structures with locally centralized leadership. Classic examples are the various Asian horse societies such as the Scythians, Parthians, and the Mongols.

The focus of trading societies is on the exchange of specialized products and commodities emphasized skills in shipbuilding, finance, and engineering. These societies tended to develop more pluralistic social and political institutions. Classic examples are Phonecia, Athens, and Carthage. Although there are exceptions to each of these broad characterizations, especially in societies that evolved from hybrid economic roots, such as the Macedonians, the basic distinctions are important insofar as military forces are somewhat predetermined expressions of the economies and strategic institutions that create them. Because a society cannot readily copy a military paradigm requiring capabilities that are weakly developed within its economy, the character and capabilities of forces at the tactical level tend to be direct expressions of their parent economy. The options available at the operational and strategic level of warfare are formed and constrained by the tactical level building blocks and the strategic institutions that control them.

Tactical Warfare

At the tactical level of war, tactics, and material are combined at the point of contact between opposing soldiers, where battles or engagements ensue to accomplish military objectives. The key functions at the tactical layer are command, leadership, and organization. The command function focuses on the ability of a military commander to sense battlefield conditions, determine the most appropriate course of action based on that understanding, and to execute a solution through his soldiers to achieve the combat objectives.

Tactical leadership determines the efficiency, effectiveness, and robustness of the soldier in generating combat power. A force's leadership effectiveness, normally expressed in individual morale and unit cohesion, is concerned with such characteristics as motivation, discipline, skill, trust, adaptability, cooperation, synchronization, and momentum. The leadership function translates tactics and material inputs into capabilities.

The organization function at the tactical layer is concerned with the construction and arming of forces to enable them to kill enemy soldiers and destroy infrastructure. In terms of armaments, an organization must encompass four types of technologies: mobility, engagement, control, and protection. Mobility technologies (e.g., horse carts, trains, trucks, aircraft) bring men and material to the battle space and help to position these resources to best advantage. Engagement technologies are the actual

weapons that provide the strike capabilities against the opponent (e.g., swords, composite bows, guns, missiles). Control technologies are the methods used by leadership to command forces (e.g., voice, flag, drums, radios, networks). Protection technologies provide the resources to protect the force against enemy engagements (e.g., shields, helmets, fortifications, armor, air defense systems).

Integration of command and organizational functions creates tactical systems. A force is usually composed of a variety of tactical systems. Before the gunpowder era, land forces were composed of various types of infantry, cavalry, and artillery tactical systems. Examples of infantry tactical systems were the Phalanx (spear), the Legion (sword), and skirmishers (missile).

A particular tactical system offers advantages against certain types of tactical systems and disadvantaged against others, as in the child's game of "rocks, scissors, paper." The military art has yet to design the perfect tactical system, which is superior to all other tactical systems. Each tactical system typically trades aspects of mobility, engagement, and protection capabilities to achieve some advantageous military characteristic.

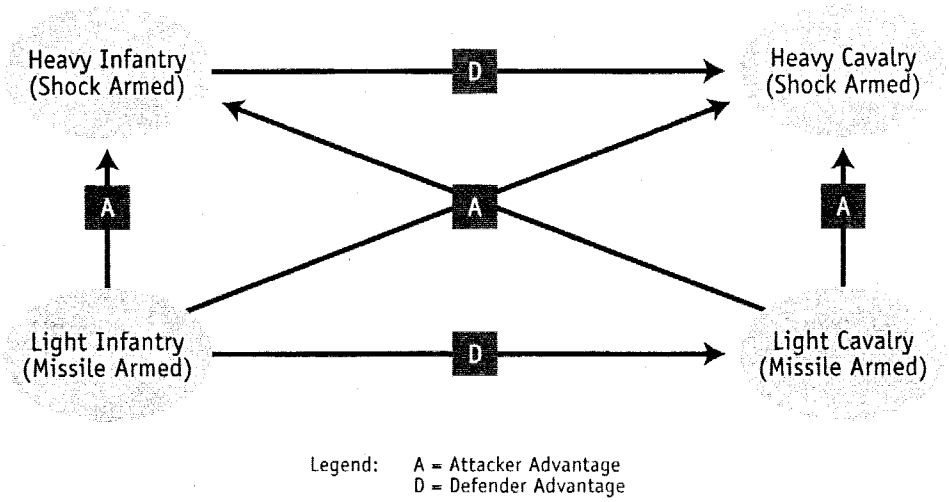


Figure 1: Tactical Capabilities of Weapon Systems Schematic [5]

An analysis of the case studies suggests that military advantage rests on a bedrock of advantage in tactical combat. Tactical combat is defined as the sphere of direct physical interaction between the combatants. Advantage is often a combination of armament (technology) and tactics integrated into a coherent tactical system that decisively defeats an opponent's comparable tactical system. It was the combination of the composite bow, the horse, and herding tactics that spawned the horse archer tactical system, one of the most successful military collaborations in history. This tactical system was superior to heavy cavalry and heavy infantry, which were two pillars of Western military culture. Consequently, when these types of forces clashed, the horse archer system usually came out the winner.

Another critical feature of advantage is the interaction of tactical systems to confer offensive capability upon a force. It is difficult to win a war decisively with a solely defensive advantage. Consequently, during most of World War I, the machine gun did not produce offensive military advantage until it was integrated with infiltration tactics or the mechanized construct of the tank.

Historically, combined arms forces have been broadly more successful than those constructed around one dominant tactical system. This has not always been the case, as the Mongol success demonstrated. Their success was based on superior operational doctrine and the paucity of Western missile capabilities. However, their case is the exception that makes the rule. It was Alexander the Great's ability to counter each tactical problem with the appropriate tactical system that enabled him to prevail, whether he was facing a large multi-tactical system army, a fortified city, light cavalry formations, new tactical systems (elephants), or guerrilla forces. Rome, when faced with a superior combined arms army (Hannibal), gained allies who filled in the missing tactical pieces to ensure victory. The ability to apply a superior tactical system repeatedly against an opposing force is a critical foundation upon which military advantage is built.

Operational Art

Operational art is focused on the maneuver and support of forces in a theater of operations to achieve political and military objectives. The operational level binds strategic decisions [6] and tactical engagements into a coherent, contiguous process. The process is both an art form (maneuver) and a science (logistics).

The goal of operational maneuver is to cause tactical engagements to occur or not occur at the behest of the superior general or admiral. Sun Tzu asserts that,

> *...what is most difficult about maneuver is to make the devious route the most direct...thus, march by an indirect route and divert the enemy by enticing him with bait. So doing, you may set out after he does and arrive before him. One able to do this understands the strategy of the direct and the indirect. [7]*

Sun Tzu also makes the point that the use of time and space factors during a military campaign constitutes an art form that employs deception to alter or blur the enemy's perception of the physical world. It is this integration of physical time and space factors with the manipulation of information that transforms operational maneuver from a science to an art. The art of operational maneuver is the hallmark of the great captains of history, such as Alexander, Chenghis Khan, and Napoleon.

The key to operational maneuver is the ability to control and manipulate information. Due to the relative equality of maneuver velocity prior to the 20th century, a battle could not occur unless by mutual consent or until one side had been maneuvered up against a geographic feature that prevented disengagement. [8] In a case

where both sides were willing to engage, one side was usually proven wrong about its perceived advantage, so it was the ability of one side to manipulate information that deceived the opponent into thinking they had the advantage. Napoleon's operational maneuvers before and during the Battle of Austerlitz (December 1805) represent a textbook example, showing how superior manipulation of information caused the out maneuvered Russian-Austrian army to believe erroneously that it had achieved a winning position, but the final outcome was their decisive defeat.

The other key dimension of operational maneuver is organizational doctrine. Organizing forces so that they are well balanced and able to achieve maximum velocity for sustained periods of time has always been an important element in the operational art. Napoleon was able to leverage the writings of contemporary military theorists [9] to employ the combined arms corps and the division as his primary maneuver elements. When coupled with information superiority upon the dense road network of Central Europe, the French Corps of the La Grande Armee were able to gain significant advantage over their opponents from 1805–1809. The efficacy of this point is borne out by the fact that when Napoleon had to fight in Eastern Europe on its inadequate road network, many of his operational advantages were eroded, resulting in less decisive outcomes. This situation was exacerbated during his Russian Campaign of 1812 where through the loss of his irreplaceable cavalry he lost his information superiority. The loss of French information superiority significantly dissipated Napoleon's former operational maneuver advantage, allowing his more numerous enemies to ultimately bring him to battle and defeat at Leipzig in 1813. Earlier in history, the Mongols' organizational structure achieved similar maneuver advantage with the Touman (10,000-man cavalry division) that could move at a sustained rate of 100 kilometers per day.

An old saying goes, "amateurs talk about strategy while professionals talk about logistics." Logistics represents the science side of the operational level of warfare. How much a force needs to sustain its physical integrity, the amount of transport required to move the material of war, and how long it will take until it arrives where it is needed can all be mathematically calculated. The art of logistics requires the integration of the materiel part of war with the expertise to minimize the impact of logistics on operational maneuver capabilities. Although ancient armies could forage materiel from the enemy as they advanced, this usually handled only the sustenance portion of logistics. Armaments, transport, and medical services still required attention, even when the army could forage. Additionally, the ability to forage depended on local abundance, which was seasonally dependent. Forage was rapidly exhausted if the forces ceased to move, and it required low enemy activity to allow friendly forces to disperse for supply requisition purposes. Consequently, ancient armies still required lines of communication if they were to operate effectively. The Athenian destruction of the Persian fleet at Salamis caused the majority of the Persian army to withdraw because Xerxes, the Persian king, could sustain only a small portion of his army on local resources.

At the operational level, military advantage has been based on the ability to gain maneuver advantage through information superiority, organizational concepts, and logistic expertise. Maneuver superiority allows the advantaged side to dictate when and where tactical engagements can occur. Barring other significant factors, superiority at the operational level of war has resulted in the ability to win wars or avoid defeat.

Strategic Level

At the strategic level, economic strength confers military advantage. The ability to produce trained manpower and materiel are the dominant variables at this level. In his seminal work on Great Powers, Paul Kennedy demonstrates that economic strength is the prerequisite of Great Power status. [10] This has always been true, and no less so prior to the 20th century. Some hegemonic powers of history, such as the Mongols, were not great economic powers before gaining ascendancy over their opponents. But an economic engine must be acquired if military dominance is to be maintained; the Mongols achieved this through the adaptation and absorption of the Chinese bureaucracy.

The Roman political system was supported by a concept of inclusion. Over time, many conquered people were granted Roman citizenship. Unlike conquerors before them, who had become weaker due to the cost and burden of garrisons in newly acquired territory, the Roman Republic and later the Roman Empire grew stronger through the enfranchisement of conquered people under the Roman political umbrella. Hannibal recognized this feature of Roman military strength, and he tried through his campaigns in Southern Italy to detach Rome from its conquered manpower base. Despite some initial successes, his strategy failed because of the steadfastness of most Roman allies, which maintained Rome's manpower reserves. Despite his failure, Hannibal must be given credit for understanding Rome's strategic vulnerability.

The major impact of the strategic level appears not to be singularly focused on military dominance, but on the ability of military dominance to endure. Which leads us to the second key question of this study.

What Factors Determine Whether Military Advantage Is Enduring?

Based on the analysis of the case studies, two dominant factors emerged as key determinants of the durability of military advantage. The first variable is the character and strength of a society's strategic institutions. Rome lasted for roughly a thousand years because of the stability of its political, religious, financial, military, and legal institutions. Rome's strategic institutions had the capacity to evolve over time, allowing for adaptive and enduring strategic stability. The opposite side of the coin is represented by Macedonia. As long as there was a Philip or an Alexander, political succession could be managed; but over the long haul this was an inherently unstable

situation. When Alexander died without an adult heir, his field marshals, known as the Diadochoi (successors), tore the Macedonian Empire apart in a long series of civil wars that sapped the strength and energy of the empire.

The second key factor to the endurance of a particular military advantage is based on a military's ability to continuously transform the source of military power. The Roman Legion transformed its organization, armament, and doctrine many times over the course of its history. Rome underwent approximately five major transformations (Phalanx to Legion to Marian Legion to Cohort Legion to Foederatti to Cataphract), interspersed with numerous minor transformations. The adaptability of their political and military institutions allowed the Romans to prevail over their opponents for 10 centuries. In the end, it was the destabilization of Roman institutions through extensive civil wars, stagnant money supply, loss of manpower reserves, and religious upheaval (Christianity), that made Rome vulnerable to the barbarians at its gates.

End Notes

1. Porter, Bruce D., *War and the Rise of the Nation State*, (The Free Press: New York, 1994) p. 1.

2. Kennedy, Paul, *The Rise and Fall of Great Powers*, (Vintage Books Edition: New York, 1989).

3. Porter, p. 294.

4. Diamond, Jared, *Guns, Germs, and Steel: The Fates of Human Societies*, (W.W. Norton: New York, 1999).

5. Jones, Archer, *The Art of War in the Western World*, (Barnes & Noble Books: New York, 1987) p. 144.

6. Strategy is the determination of political and military objectives, rules of engagement, and resource prioritization to achieve a successful outcome to a conflict.

7. Sun Tzu (translated by Samuel B. Griffith), *The Art of War*, (Oxford University Press: London, 1963) p. 102.

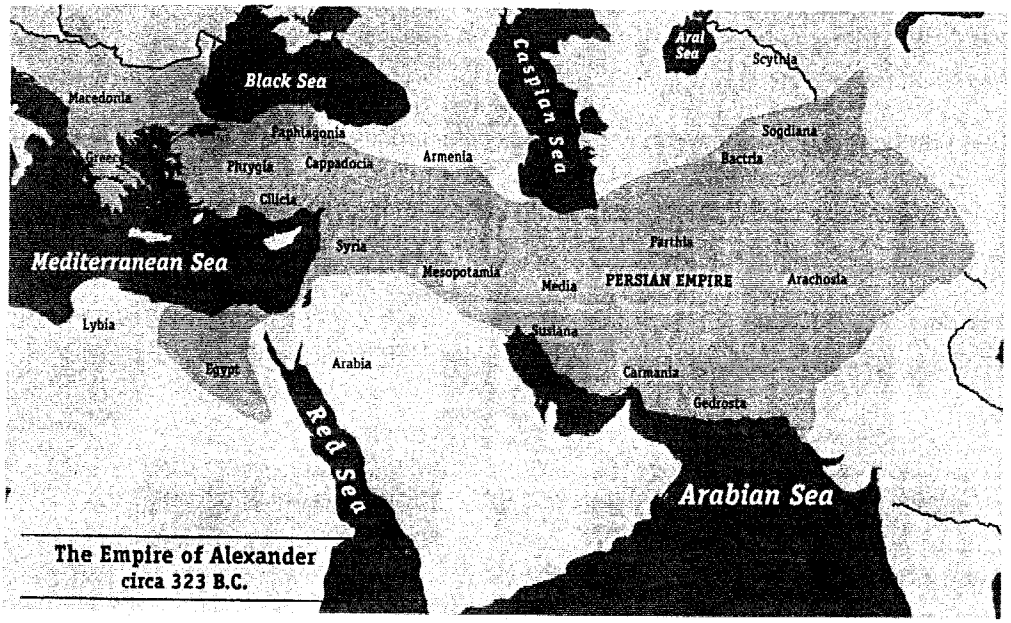
8. There are some examples of battles occurring due to desperation or loss of operational maneuver velocity due to excessive baggage trains, but these are the exceptions, not the rule. In the 20th century the increased size of forces and their operational velocity make it possible for an offensive to force a battle upon a reluctant enemy.

9. Although Napoleon was a voracious reader of the military classics, Marshall Saxe, Frederick the Great, Comte de Guibert, and Pierre de Bourcet are seen as having the most important impacts on his operational concepts.

10. Kennedy, Paul, *The Rise and Fall of Great Powers*, (Vintage Books Edition: New York, 1989).

Chapter 2

The Macedonians



To The Strongest—
Legend holds that this was Alexander the Great's answer when asked who would succeed him.

The Macedonian war machine was arguably the premier army of antiquity. It was created by Philip II and wielded by his son Alexander with such effect that it never lost a battle or a siege. What was the secret of its power? The seeds of Macedonian military doctrine can be traced to the Theban general Epaminondas, who decisively defeated the Spartan's premier army at Leuctra in 371 BC and Mantinea in 368 BC. Epaminondas is credited with developing and employing the tactic of attacking an enemy's center of gravity. His famous victories demonstrated this tactic by focusing on the destruction of the Spartan elite troops. In his youth, Philip II was a guest (hostage) in Thebes, where he was held in Epaminondas' household. Philip applied the knowledge that he gained in Thebes to build the military instrument that Alexander would use to conquer the Persian Empire during the period 333–323 BC.

2 Foundational Factors

The Macedonian socio-economic system was based on a pastoral system (e.g., sheep herding) augmented by subsistence agriculture. This combination generated well-mounted cavalry and stout infantrymen. John Keegan, in his epic work, *A History of Warfare*, identifies the seam between the steppe-horse and the river-plain agricultural societies as the domain that fostered innovation of advanced military technology (e.g., the chariot). [1]

On a smaller scale, Macedonia embodied characteristics of both of these types o societies, creating an innovative dynamic within its society. Northern Macedonian was based on transhumant pastoralism whereby the movement of the population was dictated by the grazing needs of flocks. They primarily used barter in economic transactions vice currency, used few if any slaves, and served personally in the arm In southern Macedonia, populations were largely sedentary and concentrated in citi that relied on agriculture and trade for their livelihood. They used currency for economic transactions, and their agricultural system depended heavily on cheap slave labor. [2] Consequently, the diversity of the Macedonian economy contributed to th diversity of Macedonian military capability.

The political system was based on an autocracy centered on an elected king. Philij and later his son Alexander, were the great leaders sitting astride a minor nobility wh were the backbone of the Macedonian Army. As the central institution in society, the "king's army" or royal army elected the king from the available claimants in the royal house, favoring the eldest male relative. Most Macedonian kings prior to Alexander, including his father Philip, were assassinated or died in battle. Due to the polygamous nature of Macedonian society, there were always numerous potential heirs to the throne. As a result, the succession process tended to be bloody and uncertain. [3]

Due to the role that the military played in selecting the king, leadership skills and acceptance by the army were decisive factors in determining succession to the throne. The king maintained the loyalty of the army with charisma and an ability to follow a successful strategic agenda. [4] Philip II 's rise to the throne illustrated the importance of the military's support. In his case, it took prescedence over blood After his brother died in battle, Philip was named regent over his young nephew, Amyntas IV. Later he was elected king over his nephew because of his success in re-conquering lost territory and strengthening the Macedonian Army. To his credit, Philip raised and protected his nephew, who remained a supporter of Philip until hi untimely death. Alexander, while consolidating his position within the royal succession, had Amyntas assassinated for treason.

Northern Macedonia was in great turmoil when Philip II entered the regency for his young nephew. One of his first military acts was to reconquer the region, after which he incorporated the pastoral segment of Macedonian society into an equal partnership with agricultural/horse breeding southern Macedonia. To support this

integration process, he spent large sums of money on capital improvements and education in the north. As a result, the northerners were given the same privileges and opportunities as their south Macedonian cousins, transforming Macedonia into an integrated society. Alexander benefited greatly from Philip's policies. He inherited a relatively cohesive society from which he could draw the benefits of both the steppe and pastoral traditions.

Macedonia was a polyglot of cultures, religions, and ethnic backgrounds. Macedonian religion was based on a wide variety of pagan religious sects with one officially sponsored religion. In fact, the king made daily sacrifices to a wide range of deities. Consequently, Macedonian culture promoted tolerance for a very wide range of religions within Macedonian society. The engrained tolerance in the culture and a deliberate integration policy provided a high level of cohesion, enabling the Macedonians to undergo a long series of wars with little discernable internal dissent. It was from within this strong integrated society that Philip and later Alexander forged the premier military institution of its day.

Sources of Military Advantage

In an examination of the Macedonian war machine, it rapidly becomes clear that its military advantage existed at the operational and tactical levels of warfare. Philip revolutionized warfare in his period by creating the first occidental combined arms army, which possessed a tactical response for any combination of opposing systems. His concept was that an army required heavy cavalry and heavy infantry for field battles, light cavalry and light infantry for general operations, plus engineers and artillery for sieges. [5] Central to the success of the Macedonian military was this combined arms capability, creating asymmetric tactical advantages across the spectrum of conflict from conventional field battles to counter-insurgency operations to sieges.

The forces that Alexander led into Asia were organized with a very competent staff system, [6] based on the junior nobility, to include a research section of scientists. [7] It was the competence of the Macedonian technical sections that gave the army access to the full range of technical services required by Philip's combined arms doctrine. Whether Alexander was in a set piece battle, counter-insurgency operation, or a siege, the Macedonian Army had the flexibility and expertise to adapt to the military situation. This self-contained, on-call expertise was one of the key sources of Macedonian military advantage over its decade-long expeditionary campaign in Asia.

Tactical Sources of Military Advantage

The core of the Macedonian military advantage lay in its tactical superiority and its combined arms character. The army's center was composed of lightly armored pikemen whose 18-foot sarisa (pike) outreached those of their Greek mercenary

counterparts by a factor of two. A corps of professional light troops who suppressed enemy missile fire offset the pikemen's vulnerability to missile attacks. The heavy infantry center was supported on the flanks by mobile shock cavalry that required a high degree of training due to the primitive nature of the livery (e.g., no stirrups). Following a tactical doctrine exhibited at Chaeronea, the Macedonian Army endeavored to create an interior flank through a weak decoy force or feigned withdrawal. When the enemy advanced unevenly, the shock cavalry drove home a charge into tl enemy's exposed interior flank. The steady advance of the heavy infantry supported the cavalry once the enemy front was pierced. This combination of tactics and full spectrum of tactical systems allowed the Macedonian Army to face and defeat the Persian Empire without losing a battle.

Organization

Philip II created a new system of warfare after he left Thebes. He built a fully coordinated and balanced force that combined the best features of missile, shock, and maneuver tactics. Most perceptions of the Macedonian Army revolve around th Phalanx and the Companion cavalry, both of which are shock combat systems. In fact, the Macedonians matched their opponents missile for missile, while employing all arms as complementary parts of a single lethal whole. The Macedonians wer organized along the lines of a self-contained combined arms expeditionary army tha included its own commissariat, medical, and engineer corps.

Philip organized his army into two components—the Royal Army, consisting of the Companions and the agema; and the Territorial Forces. These two forces represented the two main elements of Macedonian society. Using gold from conquered Thracian mines, he vastly expanded the size of the Royal Army and the Territorial Forces from 600 cavalry to 2,800 and the infantry from 10,000 to 27,000. Additionall he rearmed his Territorial Forces with a 16-foot pike as a replacement for the traditional 8-foot spear. Lightening the armor worn by the Macedonian infantrymen and distributing a new shield that slung over the left arm complemented this innovation This change in the infantrymen's panoply increased his mobility, while significantly reducing the cost to manufacture the equipment.

The Royal Army was grouped into two categories—heavy cavalry and hypastpist The heavy cavalry had a strong tradition in shock combat and were armed with a long cavalry lance as their primary weapon system. In an era that lacked the stirrup the Macedonian heavy cavalry developed the equestrian skills and weapons techniques to deliver a charge without unseating themselves. Most equivalent cavalry of this era were missile-oriented medium cavalry who could fight in close combat, but who were not trained to deliver a shock attack. The Macedonian Companion cavalr and their Thessalian allies, who were trained in the same techniques, would be the dominant offensive variable in all of Alexander's victories.

The Hypastpists armament is still debated, but it appears that they were armed in a more traditional manner with spears and full sized shields. Their overall training and armor enabled them to be more mobile than traditional Greek heavy infantry. They also were trained to fight in a more open formation when necessary. Their role was to maintain the linear connection between the shock cavalry and the pike-armed Territorial Forces that were the backbone of the army. The Hypastpists also retained their original mission of guarding the person of the king. In battle they took on the mission of guarding the flank of the Macedonian pike Phalanx when the cavalry were launched on a shock attack.

The Territorial Forces composed the heart and soul of the Macedonian Army. The early militia levies that they replaced were unreliable, poorly trained local forces. Under Philip these units were paid and trained on an annual basis and ultimately evolved into a standing professional force that Alexander used to conquer Asia. The pike-armed Phalanx had a distinct tactical advantage against spear-armed infantry due to the length of the pike, which allowed the Macedonians to present four spear points for each one of the enemies at the point of contact. This, coupled with their superior mobility on the battlefield, enabled the Macedonian Phalanx to anchor the army's center during field battles. Although the Macedonian infantry were vulnerable to missile fire due to their reduced armor, Philip's combined arms system overcame this deficiency neatly by screening the center from enemy missile fire with light infantry auxiliaries recruited from local tribes.

Philip unleashed his forces on the Hoplites at Chaeronea and carried the day. In this battle, professional Macedonian soldiers, led by intelligent and capable leaders, were able to execute complicated maneuvers, the most notable a feigned withdrawal, that could not be performed by poorly trained levies. This withdrawal caused the enemy to advance at Chaeronea, opening up interior flanks that were exploited by well-timed Macedonian cavalry charges led by the young Alexander. This particular tactic, sometimes characterized by a chess metaphor as a pawn sacrifice, [8] used a feint or a sacrificial unit to draw a portion of the enemy force into an attack. This opened an interior flank that the Macedonian heavy cavalry would quickly exploit. This tactic, which characterized several of Alexander's later set piece battles (e.g., Granicus and Gau Gamela), required exquisite timing to avoid having the army defeated in detail. Only a very well-trained, well-led army could exploit the temporary vulnerability this tactic created in the enemy without suffering potentially dire consequences.

Chaeronea demonstrated the Macedonian advantage at the tactical level of warfare. Pikemen armed with sarisa out-reached their Hoplite-armed opponents. Philip's shock cavalry was able to quickly exploit the interior flank created by the premature advance of the Greek infantry when they thought the Macedonians were retreating. This battle demonstrated the core hammer (cavalry) and anvil (pikemen) tactics of Philip's combined arms army.

2 Leadership

The strength and the weakness of the Macedonian system lay in its reliance on the genius of Alexander. The army was beholden to Alexander personally, as he was the sole source of leadership during his reign. Within the military, Alexander was supported by an able group of field marshals. Parmenion was the deputy commander of the army (until Alexander had him preemptively executed for plotting against him). Parmenion led the left wing, whose role was to pin the enemy and guard the Phalanx center's left flank. The leadership of the Phalanx center rotated over time, with several competent officers holding this post during the duration of Alexander's campaigns. Alexander himself personally led the Companion cavalry on the offensive.

Tactical Doctrine: The Macedonian System

Macedonia's tactical superiority was achieved at the individual unit level, dominating literally the pointed end of the spear—the enemy's tactical systems at the point of contact. The source of Macedonian military advantage lay in its ability to continually use a superior tactical system throughout the course of a battle. While it is true that in most of Alexander's battles he was never as outnumbered as his official press proclaimed, the success of his army was based on its intricate interplay of differing tactical systems.

The base and backbone of the Macedonian army during its conquest of the Persian Empire was its 12,000 Phalangites organized into six Phalanxes upon which the wings maneuvered. Often misperceived as superior Hoplites, the Phalanxes were not equipped to fight a Hoplite-style battle line clash. In the Macedonian system, the Phalanx did not close until after the wings had engaged the opponent. The power of the Macedonian Phalanx stemmed from its defensive dominance over cavalry due to the reluctance of horses to charge into massed men and its offensive dominance over Hoplites due to superior reach (pike versus spear). However, the Phalanx had its vulnerabilities. Light armor increased the Phalanx vulnerability to missile volleys, and the large pikes made it difficult to ward off flank attacks in close combat. It is interesting to note that the famous Swiss pikemen would overcome this latter vulnerability by employing Halberdiers within their formation for close combat.

Although Phalanxes rarely broke in battle, they were fragile, faltering in close combat if their integrity as a unit was broken by a flank attack or disordered by a missile fire. [9] No Phalanx ever fought for more than 2 hours in a battle, and usually less than 1 hour. The Phalanxes were brought into play late in a battle, after the enemy skirmishers had been run off or suppressed and the enemy wings were engaged, allowing a Phalanx to move forward without being subjected to missile volleys and flank attack. Alexander employed very capable skirmishers (Agrianian and Thracian Javelinmen, Cretan and Macedonian Archers, and Thracian Peltasts) to neutralize the enemy skirmishers. However, like all skirmishers, their open formation was vulnerable to cavalry. If the skirmishers failed in their job, the Phalanx

was exposed. For example, at the Battle of Issus, Alexander's Phalanxes were badly disordered when they were caught under missile fire during a river crossing. At this moment of weakness, fresh Greek mercenary Hoplite units were able to inflict heavy casualties on the Macedonians and hold them off. Fortunately for Alexander, the timely collapse of the Persian left flank nullified any tactical advantage Darius gained from the bravery and prowess of the Greek mercenaries.

The offensive power of the Macedonian Army was provided by their shock cavalry: the Companions. This arm was usually on the right flank and was led by Alexander personally. The heavy cavalry would spearhead a combined arms flying column that delivered a crushing oblique attack directly supported by missile troops for fire support and light cavalry for flank protection. Alexander's Companions were armored and possessed lances, which outreached their opponents' javelins. The Companions were superbly trained and could carry a charge home. Since the stirrup had not yet been invented, the rider thrust with his lance at his enemy, as opposed to the medieval knight who bore the brunt of the lance's impact. The history of Alexander's battles shows that the Companion cavalry had no equals in combat.

One of Alexander's key tactics was the creation of an interior flank, using the equivalent of a "poisoned pawn' gambit," [10] whereby a unit would be dangled in front of the enemy in the hopes of provoking an advance. The advancing enemy unit created an interior flank that became the target for a heavy cavalry charge that aimed to break the enemy center. This tactic worked repeatedly against the Persians (e.g., at Granicus, Issus, and Gau Gamela), but failed at the Battle of Hydaspes against the Indians, whose elephants frightened the Macedonian horses, inspiring Alexander to execute a reverse flank maneuver whereby his right flank moved behind his center and launched a flanking attack from the left wing. This maneuver placed the Macedonians in the Indian rear, causing them to break.

Throughout his career, Alexander orchestrated complex tactical operations in which each component of the military performed unique and complementary functions. For example, after the Companion cavalry moved to engage the enemy, the right flank of his Phalanxes was protected by the presence of the Hypaspists (shieldbearers). The Hypaspists maintained the linear connection between Alexander's advancing right cavalry wing and the right flank of the Phalanx center. Since this force was designed to spread out, it was organized into smaller tactical units than a Phalanx.

While the right wing advanced off of its Phalanx base, Thessalian cavalry on the left wing performed a defensive function. The Thessalian cavalry were highly trained, armed with lances, and supported by missile troops. Their main function was to ward off enemy flank attacks and to tie up the enemy's wing to prevent it from harming the Phalanx or reinforcing the other wing.

When Alexander skillfully brought all of these elements into play, it quickly became clear why the size of the respective armies was unimportant in the battle outcomes. Alexander repeatedly defeated militaries larger in size than the

Macedonian military. For example, Alexander defeated Darius' military on several occasions, even though it was much larger than Alexander's. However, Darius was a better general than his two major losses would indicate. For example, his defeat at Issus resulted from a tactical error in failing to take advantage of the terrain that could have neutralized much of the Macedonian maneuver capability. At Gau Gamela (Arbela), Darius picked an open battlefield with an army whose size and composition neutralized some of the Macedonian tactical advantages. However, a timely charge aimed at an interior flank broke the Persian center. In both cases, Alexander's ability to adapt his army to the circumstances of the moment ensured Macedonian victory and his place in history.

Adaptability Across the Spectrum of Conflict

One of the hallmarks of military advantage is the adaptability of the system that confers advantage across the spectrum of conflict. The Macedonian system was supreme across the entire spectrum of ancient conflict, largely due to its combined arms character. In many cases, it was Alexander's military genius that discovered how to reconfigure the Macedonian force structure in unintended ways that led to success under different circumstances. The Macedonian Army's flexibility and generally high level of professionalism allowed Alexander to successfully solve myriad tactical and operational challenges unforeseen by Philip, the Army's architect.

After the collapse of the Persian Army, Alexander relentlessly pursued Darius unt he was killed by his generals. Alexander then moved to subjugate the Persian motherland (i.e., Iran and Afghanistan), where the nature of conflict devolved to counter-insurgency. To prevail in guerrilla warfare, Alexander organized his conventional army to defeat small raiding parties. These raiding parties were led by former Persia generals who were trying to hold onto ancestral lands or were attempting to establis kingdoms of their own.

In Bactria, Alexander attempted to bring rebels to battle by establishing a series fortified posts from which combined arms flying columns of cavalry and light infantry could intercept enemy forces. Not all Macedonian commanders were capable of fighting this type of war without the direct supervision of Alexander, as evidenced during the winter of 330–329 BC, when a Macedonian column was ambushed and destroyed. [11] In the end, Alexander's tactics succeeded in bringing the last of the rebels to ground. With these victories in the hinterlands, he declared the Persian Empire pacified and conquered. The Macedonian success rested on Alexander's abil ity to re-organize his cavalry and infantry units into combined arms mobile column and to utilize his engineering service to configure field fortifications.

Alexander was notorious for his siege craft and his ruthless treatment of captured cities. Traditionally, siege craft is the most difficult and technical of the ancier military arts. Sun Tzu admonished readers in his chapter on offensive strategy that the "worst policy is to attack cities." [12] Alexander avoided sieges when possible,

but was forced to conduct several of them during his campaign against the Persian Empire, most notably at Tyre, an island city off the Levant coast. Alexander combined his military's engineering skills, naval power, and logistic acumen to capture the island fortress after 7 months. He then ruthlessly slaughtered the garrison, sold the citizenry into slavery, and looted the city. The spectacle of the Macedonian army pillaging the city, raping women, and massacring prisoners sent waves of horror throughout the eastern Mediterranean. It was Alexander's demonstrated ability to successfully besiege cities and the psychological shocks caused by the sack of Tyre that prompted many cities to open their gates to receive benevolent treatment instead of suffering defeat and slaughter. Also, in cases where the city surrendered without a fight, Alexander limited looting, treated the population well (although the city elite often suffered if they exhibited the slightest hint of rebellious tendencies), and incorporated the cowed city into his empire.

Embedded within the Macedonian siege train was an extensive suite of ancient artillery systems (e.g., rock and large bolt throwers). Alexander continued to innovate over time and adapted his capabilities to new requirements. For example, the Macedonians deployed some of the first recorded uses of artillery in tactical engagements during river crossing operations. [13]

Finally, Alexander demonstrated his innovation and military adaptability when faced with technical surprises on the battlefield. As Alexander moved to fight the climactic battle against Darius at Gau Gamela, he was confronted with a new weapon—the war elephant. War elephants conferred an unexpected military advantage on the battlefield because their unfamiliar smell caused horses to shy in the elephant's presence. Given that the core of Alexander's offensive potential was invested in his cavalry forces, war elephants represented a significant asymmetric tactical surprise. In his first encounter with elephants, Alexander was fortunate that they were present in small numbers, and so their tactical impact was insufficient to force a change in Macedonian tactics. In a later battle against the Indians at the Hydaspes, the Macedonians faced an army built around this tactical system. Although pressed hard in this battle, Alexander prevailed despite his disadvantage against war elephants. After this near run victory, Macedonian military doctrine incorporated elephant corps into its force structure. Elephants had a useful but very short effect on conflict. Later it was found that horses could be trained to tolerate the smell of elephants, and subsequent actions revealed that elephants were vulnerable to missile fire and loud noises (e.g., horns), negating their effectiveness.

Operational Sources of Military Advantage

Although tactical skill determines the outcome of combat engagements, operational art determines the outcome of campaigns. The Macedonian Army over the period of a decade moved through the Middle East (Turkey, the Levant, and Egypt), and Southwest Asia (Iraq and Iran), and into India. The most operationally mobile army amongst its competitors, the Macedonian Army's maneuver advantage was based on

its superior logistic system. Philip's troops carried their own baggage, significantly cutting down the size of the logistic train. The reduction in numbers of pack animals and the absence of carts enabled the Macedonians to move at twice the rate of the Persians. This significant Macedonian maneuver advantage meant the Persians rarely had the initiative during their confrontations with Alexander's forces.

Mobility and Logistics

Alexander was a consummate logistician. The Macedonian Army was supported by a fleet of transports and forward dumps that were organized to support the army while it was on the march. For most of its campaigns, the Macedonian Army possessed an overall ratio of six to one (infantry to cavalry). This enabled Philip to institute a practice in which Macedonian troops carried their own arms, armor, and camp gear, thereby eliminating the use of servants or carts to carry the soldier's kit. [14] The ability of the Macedonian Army to carry its own implements of war enabled the fast march rates (approximately 10 to 18 miles per day) that were characteristic of the Macedonian offensive into Persia. [15]

The muscle power of the common foot soldier was augmented by an aggressive commissariat that moved in advance of the army, negotiating for goods and services prior to the arrival of the army. When enemy activity or the scarcity of human habitation precluded such arrangements, the army made use of naval transport or rapid marches on half rations to quickly move to a more resource intensive environment. The army could march up to 5 days [16] without logistic resupply, allowing the Macedonians to cross significant geographic features that formerly had limited the size and range of offensive forces.

The combination of minimal baggage train, superior logistic planning, and rapid marches gave Alexander a significant maneuver advantage that he exploited throughout his ten-year campaign against the Persian Empire. There were periods of time when the length of the campaign caused the Macedonian Army to accumulate baggage, but when this affected operational maneuver, the excess baggage was destroyed. [17]

Was the Macedonian Military Advantage Enduring?

The Macedonian political system was vulnerable to issues of succession and strategic focus. When a king died, the successor usually dealt with a period of internal and external unrest while the new regime gained control and legitimacy over the reins of power. Alexander's ascent to the throne was accompanied by several dynastic murders to eliminate the obvious competition. [18] This central feature of the Macedonian political system made it difficult, following Alexander's death, for the empire that Alexander conquered to remain focused as a whole upon the concepts

that he had laid out. Consequently, Macedonia's ability to leave an enduring legacy was subject to the capability of Alexander's successor.

When the political system was unable to produce a leader that the nobility could collectively accept, rumors emerged that Alexander bequeathed his empire to the strongest of his followers.

Civil war ensued for nearly a century as Alexander's surviving field marshals, Diadocchi, declared themselves kings over portions of the Macedonian empire. The civil wars destroyed the empire's continuity and unity, ensuring that the Macedonian military advantage and the Macedonian empire that Alexander had created would not be sustained.

Macedonia's military advantage proved to be temporary. Its military advantage was too dependent on Alexander's leadership and military genius, and it lacked solid strategic (political and military) institutions to preserve, maintain, and improve military advantage beyond his lifetime. The Macedonian political system was capable of supporting Alexander's empire largely because the army was fiercely loyal to him. After his death, the structure of the political system, which lacked clear, institutionalized succession process, could not sustain his vast empire.

The Macedonian system also failed to maintain an advantage because over time it could be easily copied. During the century-long series of civil wars, the Macedonian style army was replicated all throughout the Middle East and Southwest Asia. These armies initially contained a core of Macedonian veterans, but over time these original levies were diluted by new recruits. This military period is characterized by similarly configured and armed combined arms forces clashing in a series of long, inconclusive, and bloody wars. These wars of attrition exhausted the eastern Mediterranean and facilitated the rise of Rome, Carthage, and other powers in the Western Mediterranean. New military innovations, such as the Roman Legion, would eventually neutralize and then eliminate the Macedonian system's tactical advantage. In the end, the Macedonian system endured in various forms for another century, but these successor armies never fought with the effectiveness or impact of the Macedonian Army led by the master, Alexander the Great.

End Notes

1. Keegan, John, *A History of Warfare*, (Alfred A. Knopf: New York, 1994) p. 155-168.

2. Hammond, N.G.L., "The Macedonian Defeat Near Samarkand," (*Ancient World*, 22-2, 1991) p. 11.

3. Hammond, p. 28.

4. Barker, Philip, *Alexander the Great's Campaigns*, (Patrick Stephens: Cambridge, 1979) p. 9.

5. Fuller, General J.F.C., *The Generalship of Alexander the Great*, (Rutgers University Press: New Jersey, 1960) p. 47.

6. Burn, A.R., *Alexander the Great and the Hellenistic World*, (Collier Books: New York, 1947) p. 72.

7. Burn, p. 37.

8. Devine, A. M., "A Pawn-Sacrifice at the Battle of the Granicus: The Origins of A Favorite Stratagem of Alexander the Great," (*Ancient History* 18, 1988), p. 3–19.

9. Later examples of Spanish sword and buckler troops breaking into pike-armed formations demonstrate the weakness this system revealed in close combat.

10. Devine, p. 3–20.

11. Hammond, p. 41–46.

12. Sun Tzu (translated by Samuel B. Griffith), *The Art of War*, (Oxford University Press: London, 1963).

13. Keyser, Paul T., "The Use of Artillery by Philip II and Alexander the Great," (*Ancient World* 25-1, 1994), p. 27–53.

14. Engels, Donald W., *Alexander the Great and the Logistics of the Macedonian Army*, (California University Press: Los Angeles, 1978) p. 12.

15. Engels, p. 153.

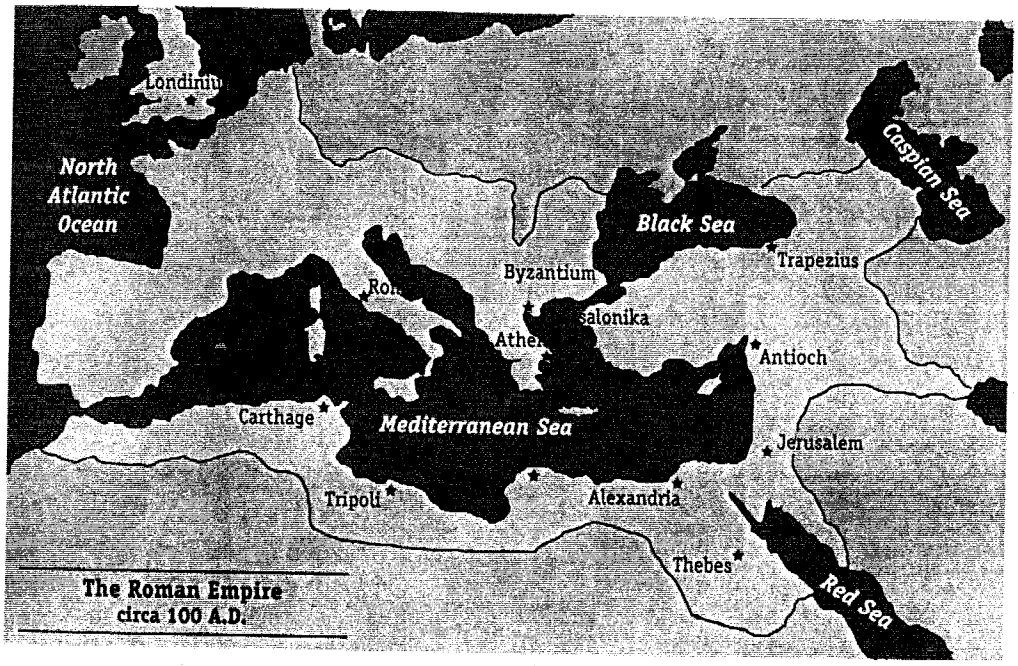
16. Engels, p. 22.

17. Engels, p. 15.

18. Burn, p. 52.

Chapter 3

The Roman Military



A bad peace is even worse than war.
—Tacitus

The Roman military is often referred to as the antecedent of the modern military for its unprecedented structure, professionalism, and training. Rome began as a vulnerable city-state along the Tiber River in the shadow of the Etruscan civilization. Rome relied solely on a citizen army for its protection because its immediate surroundings offered few natural defenses. An inherent vulnerability to direct attack caused the Romans eventually to adopt an aggressive, preemptive military posture after a series of humiliating defeats. [1] With its formidable military, the Romans built an empire that spanned the entire Mediterranean Basin and a substantial portion of Northern Europe. By the end of its expansion, Rome controlled an area approximately two-thirds the size of the United States with a population of 50–60 million. Using even the most conservative reckoning of Rome's rise and fall, the Romans governed this area for a period of six centuries. [2]

3

The underlying sources of enduring Roman military power were its solid political and military institutions. The Romans created a society of warriors based on the citizen-soldier, which permeated all levels of society, fully integrating politics and military force. [3] These institutions were unique in their ability to assimilate the innovations and practices of conquered or coopted civilizations. The Roman military evolved over time into a formidable professional army whose strengths were rooted in its organization, structure, discipline, and engineering prowess. Rome's professional army supplied continuity over centuries, enabling the Romans to build an enduring empire. Unlike earlier empires, Rome's inclusive political institutions and bureaucrac provided the Romans with a code of laws and a mechanism for incorporating subjec peoples into their empire by granting them citizenship. Consequently, the more Rom conquered, the stronger she became.

Foundational Factors

From the earliest stages of the Republic through the final sack of Rome, the army and politics were inexorably intertwined. Over the course of six centuries, Rome we through various political phases, which will be categorized as the Republic, Early Imperium, and Late Imperium. In the time of the Republic, the annual election of two consuls defined both the political and military leadership for the coming year. The consuls, who were expected to lead armies in the field and to fight wars, knew that military success would almost certainly lead to greater political power and prestige. The triumph, a tumultuous parade that celebrated military success, was both a political and military event, granting the warrior-politician who received this honor significant political power and prestige. War was the straightest possible path to political dominance, and the oligarchs who ran the Republic were not shy about using it as such. As the Republic transformed into Empire, the emperors continued this tradition of warrior-politicians, even if, as is alleged about the Emperor Caligula, they ha to invent victories to embellish their reputations.

As the Empire grew, so did the political power of the generals and their Legions. Until the 2nd Punic War, the Roman Republic was able to use political generals to lead its citizen army. Roman military doctrine was simple but effective against tribal and city-state forces, but when confronted by such a military genius as Hannibal, th system failed. Rome then turned to professional generals to win. This change create a long-term problem for the Republic when the soldiers became more loyal to their generals than to the Republic.

Roman tradition forbade generals from bringing their Legions into Italy proper. Th prudent measure was designed to forestall ambitious generals from using their combat troops to influence politics. However, this prohibition failed many times, as in the cas of Julius Caesar, who circumvented this proscription and used the loyalty and power armies to seize power. This act caused a civil war that ultimately ushered in the early Imperium under Augustus and set an unfortunate precedent. For example, during the

Year of the Four Emperors (69 AD), successive provincial commanders "allowed" their Legions to hail them as emperor and marched on Rome. Throughout the Imperium period, Rome was plagued by the specter of audacious men, backed by Legions willing to fight for booty, marching on Rome to claim the seat of Empire.

Under Augustus, the Praetorian Guard (the Guard) was created, which held sway in Rome proper. Originally designed to act as the emperor's bodyguard and to maintain order in the capital, it grew in size and changed from a purely Roman force to one manned by various peoples from the Empire, establishing its importance as an arbiter of power during dynastic successions. No one could overthrow the sitting emperor without the consent and help of the Guard. At times, the Guard took the succession question into its own hands, when it felt threatened by the current occupant of the throne. The Guard, coupled with the propensity of the Legions to identify with their commanders rather than with the central Imperial Government, ensured that the military would be the dominant force arbitrating succession in the Empire.

Another factor in the civilian-military dynamic of Rome was the army's impact on the economy. The Republic's reliance on a citizen army drawn from the small landed working class weakened the agricultural sector. As the Empire grew, manpower requirements rapidly increased. The Republican practice of enlisting and demobilizing militia forces to meet periodic emergencies became unworkable. An innovation to allow the disenfranchised proletariat to enlist, while minimizing the burdens placed on the agricultural sector, created the requirement to pay and maintain a standing army. Professional soldiers, paid for their loyalty, became the norm, and as the army grew, the associated costs became more burdensome. Debasement of the currency, the inability to continue to settle demobilized soldiers in colonies, and the growing requirement for field commanders and emperors to offer the soldiers "gifts" (bribes) for their loyalty created havoc with the economy. Various attempts to reform the military through reorganization, reduction in forces, or redeployments failed due to political or military necessity. At the effective end of the Western Empire, it is estimated that the maintenance of the Imperial Army consumed one-third to one-half of the Imperial revenues. While the army was the instrument by which Rome expanded its wealth and power, it also became a factor in the periodic political and economic collapses that shook the Empire.

Military Transformation

A significant foundational advantage for Rome was its ability to transform the nature of military power. Rome arguably underwent five significant military transformations, the dates of which are approximate because of vagueness in the ancient sources.

In the 6th century BC, Rome was under Etruscan tutelage and their army was organized around the Hoplite heavy infantry, although the signature Roman scutum (rectangular body shield) was in evidence in some units. Roman military failures against the Southern Italian and Greek states in this era created pressure for change.

3

A strong correlation emerged between the Roman military success in the 5th and 4th centuries BC to the new style of heavy infantryman who combined missile power (pilum—a form of javelin) with new close combat skills built around a stabbing sword. Sometime before the Punic Wars of the 3rd century BC, the Romans adopted the famous Roman gladus, or Spanish sword.

A second key transformation occurred during the 1st Punic War (264–241 BC) with the rapid development of a navy as a new and critical source of military power The navy enabled Rome to gain sea control of the waters around Sicily, and its sea control allowed Roman land forces to expel Carthaginian forces from Sicily and invade North Africa. Thus the Roman Navy won the 1st Punic War and during the interwar years secured the acquisition of Corsica and Sardinia.

The third transformation occurred as a consequence of the 2nd Punic War (218–201 BC) when Hannibal revealed the vulnerability of the line-oriented system (Hastati–1st, Principe–2nd, Triari–3rd line) to flank attacks and envelopment. Rome improved its cavalry forces through allies and began the evolution into modular formations built around a cohort of javelin/sword armed heavy infantry to gain increased tactical agility. This is the Legion of the 1st century BC that Julius Caesar used to conquer Gaul and is a representation of the Roman Legion through the early Imperium (140 BC–200 AD).

The fourth transformation occurred during the late Empire when Rome moved into a defensive posture to protect its frontiers from nomadic tribes beyond the empire. During this period, the frontier garrison forces were built around heavy and light infantry, fighting from fortification and supported by mobile forces composed largely of cavalry forces. Over time (200 BC–450 AD), the infantry forces lost their offensive edge and became less reliable in defense while the cavalry forces became the arm of decision in battle.

The final significant transformation occurred after the break-up into eastern and western Empires ruled by separate political structures. The eastern half of the Empire took the heavy cavalry to its ultimate evolution, called the Cataphract. The Cataphract was a heavily armored horse and cavalryman who used a composite bo to generate significant missile capability and lance/sword for shock combat. Local military infantry forces supplemented these mobile heavy forces.

Sources of Military Advantage

Although it is difficult to generalize 600 years, it can be said that the Roman mi tary advantage during the Republic and Early Imperium revolved around a core of highly disciplined and very well trained infantry units called Legions. The dimensic of Rome's military advantage were multifaceted and mutually reinforcing. Roman military organization provides enormous tactical maneuverability and flexibility on

the battlefield. Rome raised the world's first conscript army to be organized into coherent, standardized units. The standardized Roman formations, combined with Rome's ability to raise large numbers of troops, allowed them to build new combat formations as rapidly as others were destroyed, and to deploy Legions from one part of the Empire to the other without loss of military efficiency. On an operational level, Roman military advantage was rooted in their engineering prowess, their extensive road infrastructure, and their ability to adapt to new threats.

Roman military dominance endured because the Romans successfully combined military ruthlessness with political astuteness, enabling them to manage a complex network of alliance relationships. Historian William Harris observes—

> *In many respects [the Romans'] behavior resembles that of many other non-primitive ancient peoples, yet few others are known to have displayed an extreme degree of ferocity in war while reaching a high level of political culture. Roman imperialism was in large part the result of quite rational behavior, but it also had dark and irrational roots. One of the most striking features of Roman warfare is its regularity—almost every year the Romans went out and did massive violence to someone—and this regularity give the phenomenon a pathological character. [4]*

Moreover, Roman institutions were capable of expanding and absorbing foreign innovations. The Roman Empire grew and maintained its dominance because it possessed the institutions to co-opt and romanize its allies, client states, and far-flung provinces. Rome used the incentives of Roman citizenship to recruit Legionnaires and to gain and secure the loyalty of the local leaders. This process slowly increased Roman power and expanded the base from which the Roman military could operate.

Tactical Sources of Military Advantage

The Roman military demonstrated a remarkable ability to innovate and adapt at all levels of warfare, transforming the way armies were raised, organized, and trained, and creating a new model for deploying heavy infantry.

Organization

The Romans raised one of the world's first conscript armies in which the soldiers were regularly recruited, uniformly armed and equipped, and organized into coherent, standardized units called Centuries. 140 BC–200 AD

Abandoning Phalanx warfare when heavily armored, spear-wielding Hoplites organized into dense formations proved ineffective against lighter armed, faster moving foes, the Romans developed a completely rational plan of articulation, creating the antecedent for the modern division. They replaced the phalangeal organization and the

distinctions of each line with a system of homogenous heavy infantry Legions, which by the Early Empire could be deployed in as many or as few lines as required.

The Legion as it was configured during the height of Roman power from the Lat Republican to the Early Empire (140 BC–200 AD) illustrates how Roman military advantage was rooted in organization and training. Each such Legion comprised tac tical sub-units, increasing its maneuverability on the battlefield. The Legion consiste of 10 heavy infantry cohorts of 600 men each; a cohort consisted of three maniples of 200 men; each maniple contained two centuries (see Figure 2). The lines of Legionnaires were positioned in a checkerboard formation to allow the back rows t fill any gaps left by the first two rows. The rows systematically worked together wh they attacked. As each group of engaged combatants grew tired, they were replaced by a fresh group of Legionnaires. This maneuver was repeated until the enemy brok

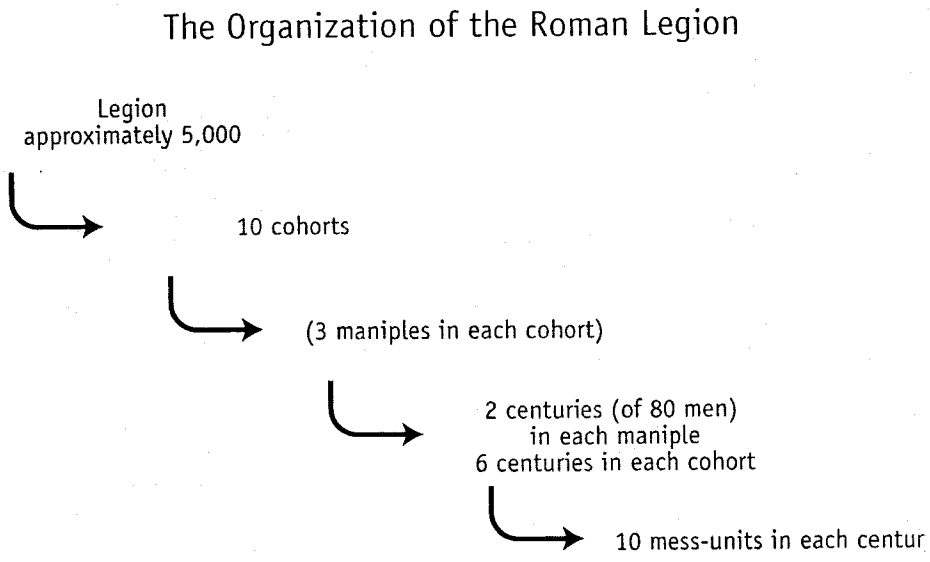


Figure 2: Roman Legion in 140 BC–200 AD

This system combined compactness with flexibility. A commander led each of these units, with full authority over his subordinates. [5] Subordinate units were capable of rapidly responding to the orders of its leaders. Moreover, this organization provided the opportunity for subordinate units to take initiative in battle when required. The organization also empowered parts of the army (e.g., a Legion or cohort) to maneuver to protect a flank without changing the direction of the entire force. As the Romans expanded their army, they added uniformly trained and equipped Legions, allowing the growth of a large field army without a significant decrease in the overall training or proficiency of the force.

Heavy infantry dominated the Roman Army. The infantry fought primarily with short swords and javelins. The short swords were reserved for shock combat. Both

edges of the strong blade cut effectively, making it an excellent short-range attack weapon. For longer range, the Romans designed a throwing spear—referred to as a pilum—to replace the traditional thrusting javelin. The bulk of the infantry carried two pilums. Approximately, 6 feet long half-wood and half iron, the pilum was designed to break its iron point on impact with a hard object, which prevented the enemy from using the weapon against the Romans. The swords and javelins suited Roman tactics that consisted of throwing the javelin and then closing quickly to fight with sword and shield. [6]

The Romans dispensed with the heavy Hoplite armor and adopted much lighter body protection of hooped iron, similar to chain mail. This armor was not effective against the pike-thrust of Phalanx fighting, but it adequately deflected sword-blows and missile points. The armor was augmented by a light oblong shield (the scutum) that replaced the smaller round hoplon shield of the Early Republic era because it gave the soldier more body protection.

Each soldier was equipped with standard equipment and weapons. All Legionnaires wore helmets, breastplates, and leg guards; and each soldier carried swords and thrusting or throwing javelins. Each unit was equipped with standards that enabled the soldiers to recognize their places and units easily, enabling commanders to identify the location of their units on the battlefield.

Leadership

The ultimate strength of the Roman Army lay in the class of professional soldiers that made up the Centurionate. Long-service unit leaders, the Centurions provided leadership and continuity in the Roman military. They were drawn from the best of the enlisted ranks and formed the first body of professional fighting officers known to history. [7] Imbuing the Legions with a backbone of solid tactical leaders, they transmitted from generation to generation the code of discipline and accumulated store of tactical expertise.

Centurions combined the functions and prestige of a modern company commander and sergeant major. [8] Six Centurions led a cohort, each responsible for an 80-man century. In battle, the Centurion, like Legionnaires in his cohort, fought at close range with the enemy, accepting the hazards of life as a soldier. In addition, the Centurion was responsible for tracking his century's arms and equipment, posting guards, conducting inspections, and training the rank and file. The Romans did not possess basic training camps, which made recruit training an essential function of the Legion, led by the Centurion.

Roman Centurions dedicated their lives to soldiering. The Roman professional soldier did not serve for the monetary rewards enlistment brought him. Ideally, his military service was guided by pride in a distinctive way of life, concern to enjoy the good opinion of comrades, satisfaction in the largely symbolic tokens of professional

success, hope of promotion, and expectation of a comfortable and honorable retirement.[9] Historian Livy wrote of a 50-year old Centurion who had undertaken 22 years of service, acted four times as the senior Centurion of his Legion, and had wor 34 decorations during his service in the Roman military. [10]

Centurions harbored no ambitions to rise into the governing class, rather they sought to succeed in their esteemed and self-sufficient military profession. They provided the practical military expertise for the senior military officers—the consuls—who were elected by the Roman people to represent both the sovereign Roma people and the advisory senate. The consuls ranked as state officials, but were often deficient in professional military knowledge and strategy. This political feature changed after the Punic Wars as professional generals appointed by the emperor replaced elected officials.

The institutionalization of the Roman military freed it from dependence on one leader for its success. The Romans benefited from a number of brilliant military leaders, many of whom left their mark on the policies of the Roman military institution. For example, during the 2nd Punic War, Scipio Africanus reestablished Roman dominance in Iberia and defeated Hannibal in North Africa at Zama. Julius Caesar greatly expanded the empire during the Gallic Wars and used this power base to initiate the civil war that ended the Republic. Other great leaders, such as Vespasian, contribute to the expansion of the Empire.

Training

The Roman military operated at a significantly higher level of quality and discipline than its opponents, especially after the civil war between Julius Caesar and Pompey, which destroyed the last vestiges of competing empires in the Mediterranean. The Roman military's traditions, ethos, and rigorous training shaped the Roman Legionnaire into a ruthless and efficient soldier. The Roman system severely punished cowardice and failure and highly commended valor, courage, and victory. This combination produced an army that would fight with an efficiency and ferocity that was not seen again until the Mongols 1,500 years later.

The Roman military trained extensively and demanded perfect discipline from its soldiers. Historian Josephus in his account of the Jewish War commends the discipline and training of the Roman soldiers.

> *They do not sit with folded hands in peace-time only to put them in motion in the hour of need. On the contrary, as though they had been born with weapons in hand, they never have a truce for training, never wait for emergencies to arise. Moreover, peacetime maneuvers are no less strenuous than veritable warfare. Hence the ease with which they sustain the shock of battle. No confusion breaks their customary formation, no panic paralyses, no fatigue exhausts them. [11]*

The soldiers' combat training was designed to bring their natural ferocity to the fore and to inure them against the fear of hand-to-hand combat. They practiced the art of battlefield maneuver through seemingly endless periods of close order drill. They were hardened to the rigors of field living through constant field exercises and route marches. Recruits were incorporated into the Legion through a process of brutal psychological indoctrination, physical hardening, and constant repetition of basic combat drills until they instantly responded to commands. Troops swore allegiance to their Legions, not to their leaders, making the Legion the lynchpins of their lives. This engendered a powerful esprit de corps that often translated into almost unbelievable feats of bravery on the battlefield.

The Romans also perfected the method of using cadence to keep marching troops in step. Using drums to beat time and to send signals, Legions could be effectively maneuvered around the battlefield without loss of cohesion, allowing them to rapidly change direction and formation as need arose.

The Romans placed immense importance on military awards and punishments. Whenever a soldier distinguished himself in battle, he was praised in front of his fellow soldiers and received gifts. At the same time, the Romans severely punished even minor rules infractions. Roman soldiers feared their commanders and the punishments they could mete out more than they feared the enemy. Actions regarded as unmanly or dishonorable could be punished with death. In battle, Roman soldiers were expected to fight to their death unless ordered to retreat. The consequences of cowardice in battle were severe. A soldier who returned from battle without his sword, shield, or any other weapon would suffer disgrace and humiliation. Units that broke in combat were subject to decimation, the process of beating to death every tenth man.

Manpower

The Roman Army exhibited an extraordinary ability to raise new Legions by incorporating recruits from their client states and conquered peoples. They also relied heavily on the manpower supplied by allies and client states in the form of auxiliary forces. The auxiliaries regularly outnumbered Roman Legionnaires on the battlefield. The Roman commanders depended on the skill of the auxiliaries to provide specific war fighting skills, such as cavalry, archers, and slingers. As a result, the Romans focused their resources on developing heavy infantry forces, while the auxiliary forces provided the bulk of the Roman's missile capabilities. The Roman ability to build a multi-ethnic military force strengthened them on the battlefield, but the consequent dilution also became a factor in the eventual collapse of Roman power.

As the demand for manpower increased, the Roman Army began to recruit from provinces that were securely under Roman control. As an incentive to remain loyal, Rome would grant foreign recruits citizenship upon demobilization. Rome's relaxation of the recruitment requirements had several effects on Roman military strength and enduring military advantage. First, the expanded pool of recruits enabled Rome

to tap the service of the great peasant masses year after year, allowing Rome to fiel large and formidable armies on an almost continuous basis and reducing the impor tance of casualty rates in Rome's strategic calculus. [12] Second, by granting citizen ship to foreign recruits, the Roman military became a mechanism for romanizing th provinces. As the empire grew, the military became multinational in character, and its members were united largely by the duty they owed to Rome. [13]

Tactical Doctrine: Infantry Warfare and Siege Warfare

The Roman military excelled at shock combat defined by heavy infantry, and at siege craft, defined by combat engineers. The Romans modified the Alexandrian tac cal scheme of the combined force by depending on a well-articulated, sword-armed infantry and incorporating auxiliary troops for skirmishers and cavalry. Their tacti- cal military advantage was most pronounced against infantry-oriented armies with defined center of gravity. Most Roman generals won by breaking their enemies' bat lines or destroying their center of gravity. If the enemy possessed cities, the Roman engineering prowess prevailed in nearly all siege attacks.

In infantry warfare, Roman tactics were based on well-trained, flexible heavy infantry units (Legions, cohorts, and maniples) to compose the main fighting powe with light infantry, archers, slingers, and cavalry acting as a secondary force. The skill and structure of the infantry reduced its vulnerability to cavalry because the excellent articulation enabled the Legion or a subpart to maneuver to protect a flan and the efficient subdivision permitted the commander to assign units to rapidly guard the flanks. [14]

Roman commanders habitually arrayed their forces with a strong center based on multiple lines of troops whose goal was to penetrate and destroy the enemy's center. For example, during the Roman defeat at the Trebbis, the only survivors we the units that broke through the Carthaginian center and escaped. This emphasis on the enemy center was possible because Roman cavalry, supplied by their allies, concentrated on defending the flanks. Although the Romans were very proficient at these tactics, Hannibal understood Roman doctrine and exploited it repeatedly, mos notably at Cannae by creating a retreating center to draw the Romans in so he coul envelop the Romans with his mercenary cavalry.

At the subunit level (maniple), the Romans used a variety of tactical gambits, suc as the "wedge," which would thrust small groups into the enemy's formation and expand into the enemy's center. Using their shields to push enemy troops into restric ed positions, these insertions made hand-to-hand combat difficult. Such close forma- tions were ideal for the Legionnaires to deploy their short, double-edged swords in lo thrusting motions, while making the use of longer swords impracticable. [15] Anothe tactical ploy was the "saw," or serrated link of battle, which was formed by a body of experienced soldiers lined up behind the front rank. The enemy would be allowed to move in a channel through the Roman formation where mobile groups would take

them in flank, cutting them off from their forces and eliminating them. Additionally, units in the second and third lines were prepared to move forward to any point where a weakness appeared or to thrust forward where the enemy wavered.

These infantry-oriented tactics leveraged the army's flexible structure, training, and ruthless fighting spirit to produce success on the battlefield for most Roman generals. Some generals modified traditional Roman tactics to meet unusual tactical situations. Julius Caesar was one of Rome's most brilliant, yet unconventional, military commanders. He placed great value on highly trained, loyal soldiers who would perform seemingly impossible tasks without question. He increased his soldiers' pay to ensure their loyalty. Julius Caesar demonstrated brilliance for exploiting an enemy's weakness by engaging in psychological warfare, using surprise and speed, and shifting strategies to suit emerging opportunities on the battlefield. For example, Caesar tried to engage the army of the Belgae on the River Aisne in a frontal attack. His troops were backed up against the river, and he constructed artillery posts along the front of his line. His formidable presence persuaded the Belgae to avoid a frontal engagement with him. Instead, the Belgae opted to cross the river Aisne to head off the Romans and attack a bridge to the Roman's main position. Caesar used this opportunity to attack the Belgae with his cavalry and archers while they crossed the River. [16]

Learning from adverse experiences with Hannibal, the Romans modified their doctrine during and after the Punic Wars by having Roman infantry maneuver to cover their flanks against enemy cavalry and to neutralize their attacks. Their own cavalry was often weak, poorly trained, and indifferently led, so an infantry solution to the threat of enemy cavalry was a military necessity. For much of the lifespan of the Republic, cavalry played a minor role in the tactics of the field armies. Allies who supplied the large majority of cavalry in auxiliary units did not have the same level of disciplined training as the Roman Legions. Against regular enemy infantry formations, they played a secondary role by acting as a distraction on the wings, attacking the enemy's rear, or fighting fleeing soldiers by waiting in the flanks. However, their value against the more disorganized barbarian threats was considerable. As the Empire expanded and the army shifted to a more defensive doctrine, the Romans developed an increasingly important role for cavalry as a mobile reserve.

Siege Tactics

Roman Legionnaires were both formidable soldiers and skilled engineers. The army's technical skills and engineering prowess, combined with its character of patience and thoroughness, provided significant components of Rome's military advantage. This potent combination enabled them to win nearly every siege they prosecuted. Even if the enemy could not be drawn out to fight in close combat or outmaneuvered in the field operations, it would still be defeated by the relentless methods of Roman "engineering warfare." [17] The Romans designed siege engines to break walls and shatter gates; they used rams with iron points, and towers equipped with pullies and cranes to swing small parties of attackers onto the

besieged walls. They excavated saps to weaken the foundations of the walls and bring them down, and they used catapults for discharging missiles to damage walls and to target people or animals.

Their patience drove them to engage until they conquered the enemy. For example, during the 47 day siege of the Jewish city of Jatapata, the Romans deployed a battering ram and built three towers, each 15 meters high, to protect the numerous siege engines used to bombard the city. When the Romans finally entered the city, they slew 40,000 people, sold 1,200 women and infants into slavery, and burned the city to the ground. [18]

If the military could not successfully invade a city or if the inhabitants failed to surrender, the Romans surrounded the entire area with defensive walls, ditches, and various other traps. This blockade tactic cut off any supplies and reinforcements from entering the city and prevented any breakouts or sorties. Caesar deployed this blockade tactic in the epic siege of the hilltop village of Alesia. He constructed 26 miles of parallel walls—one set to keep his foe Vercingetorix in and the other to keep Vercingetorix's allies out. [19]

The Roman siege of the desert fortress of Masada in 70–73 AD provides a vivid example of Roman innovation, determination, and technical innovation. The Jewish War had essentially been won, but the Romans were determined to defeat the last handful of Jewish warriors who took refuge in Masada. Although the Romans could have stormed the fortress or waited for the Jews to exhaust their water supply, they chose to besiege the fortress by great works of engineering. They built an assault embankment 675 feet long and 275 feet high, surmounted by a stone platform 75 feet high and equally wide to invade the fortress. They did this in plain view of the defenders, knowing that the Jews could not stop them without leaving their fortifications. When the Romans finally reached the fortress, they discovered that the defenders had committed mass suicide. The slow, inextricable progress of the Roman ramp had convinced the Jews that defeat was inevitable.

Operational Sources of Military Advantage

The Roman Army was defeated numerous times, even as their military dominance grew and the borders of the empire expanded. Losing battles was not an unusual occurrence for the Romans; losing wars was. The Roman military advantage was rooted in the ability to raise and organize a large, well-trained, disciplined army, and in its engineering prowess in siege warfare, road building, and fortification. From this foundation, Roman operational doctrine enabled them to expand and maintain their empire. Rome's extraordinary engineering capabilities contributed to their enduring military advantage on several levels—

- Engineering enabled them to build an infrastructure (e.g., roads) that not only contributed to their military success through strategic and operational mobility, but also provided the foundation for controlling an empire that stretched from England to the Caucasus.

- Roman fortifications, both temporary and permanent, allowed the Roman Army to advance slowly and methodically, and enabled the Romans to endure minor setbacks and prevent defeats from becoming disasters.

- Engineering prowess enabled the Romans to have an enormous psychological impact on their opponents by ensuring that they could secure no refuge from a Roman siege.

Mobility

The construction of roads and fortified camps across the empire was a central component of Roman operational doctrine and integral to their ability to sustain an enduring military advantage over centuries. As the Roman Army defeated the barbarians along their periphery, the military linked the new frontiers and provinces to the Empire by building the communication and transportation infrastructure to the heart of the Empire—Rome. The Roman Army built a comprehensive network of roads that spanned three continents. The roads were systematically and resourcefully distributed, designed, constructed, and drained, with careful adaptation to local materials and conditions. They crossed rivers on strong bridges, and they penetrated mountains with tunnels that aroused admiration for centuries. By the end of the 2nd century AD, the military had built more than 50,000 miles of first-class roads in the Empire and over 200,000 miles of lesser roads. [20] In Rome's province in Africa, which stretched from modern Morocco to the Nile Basin, archaeologists have identified some 10,000 miles of roads. [21]

The road system was known to be an instrument of peace and war, as it facilitated communication and the movement of people, goods, and military units throughout the Empire. For the military, the road network became an effective instrument of imperial power. Reliable roads enabled commanders to calculate marching times and supply needs precisely between military stations and barracks. For example, it took 67 days to travel from Rome to Cologne or 15 days to travel from Rome to Brindisi. [22]

The road network allowed the Roman Army to exploit one of its most powerful advantages against its enemies—its internal lines of communications. Rome's empire around the Mediterranean divided its adversaries, making it difficult for them to coordinate their actions. Moreover, none of the neighboring empires had anything equivalent to the Roman road system. The Roman military could move Legions across the empire rapidly and effectively, sending reinforcements and reserves to battles when necessary.

The infrastructure built by the Roman Army also enabled Rome to establish political control over the new frontiers and provinces. In addition to building a road network, the Roman military routinely built elaborate fortified camps and bases. These fortified bases evolved into towns and centers that showcased the sophistication of the Roman civilization and were used as a mechanism to romanize the barbarians in the provinces. Moreover, these fortifications served strategic purposes, becoming bulwarks from which the Roman Army could launch campaigns for further expansion.

Roman Encampments

Roman generals were noted for their extreme caution, but it was this caution that contributed to the relentless quality of Roman armies on the move, as well as their resilience in adversity. [23] They built camps religiously as a means to prevent the possibility of falling victim to a surprise attack. They preferred to retreat into a fortified position than to accept heavy losses in open warfare. The Roman military's practice of building a fortified camp before they would engage an enemy in battle clearly illustrates an aspect of Roman military advantage at the operational level.

The Romans constructed each camp according to one simple formula, which was adopted at all times and in all places. Effectively, no matter where a Legionnaire was located geographically, he was always in the same place. Josephus observed that each camp was not erected at random but according to an engrained system.

> *They [the Roman soldiers] do not work at once or in disorderly parties. If the ground is uneven, it is first leveled. A site for the camp is then measured out in the form of a square. For this purpose, the army is accompanied by a multitude of workmen and of tools for building. [24]*

This practice reflected a belief that a secure place to prepare for battle or to which to retreat improved the performance of the soldiers on the battlefield. The soldiers would undergo the fatigue of digging trenches and building encampment for the sake of having a consistent and uniform plan for a camp, which was familiar to everyone. The streets o the encampment were marked with flags and spears. The result was increased efficiency as each soldier knew which street and in which part of the street he was situated. Since every soldier invariably occupied the same position in the camp, the process of pitching camp was remarkably like the return of an army to its native city. [25]

Psychological Warfare

Rome's advanced engineering capabilities extended their reach in battle and dro them to overcome all physical obstacles to destroy their enemies. Historian Edward Luttwak argues that Roman's technical skills coupled with their ferocity and persistence had an enormous psychological impact on their adversaries. The Romans

waged not just "engineering" warfare but "psychological warfare." For Luttwak, the siege of Masada exemplified their ability to conduct psychological warfare. Their decision to commit a Legion to besiege Masada sent a stark message to all those tribes who might have been tempted to revolt—the lesson of Masada was that the Romans would pursue rebellion even to mountain tops in remote deserts to destroy the rebellion's last vestiges, regardless of the cost. [26]

Adaptability and Military Transformation

The Roman Army's core strengths lay in its Legions. However, on an operational level, the Romans extended their military dominance beyond their core competencies through their ability to innovate and adapt to new operational requirements and realities. For example, the Romans adapted to new requirements during the 1st Punic War. When it became clear that the only way to defeat the Carthaginians was at sea, Rome built a powerful naval capability. The Romans developed warships whose primary mission was to carry large bodies of marines and Legionnaries. Roman naval tactics were designed to bring the enemy to close quarters and to use the embarked troops to board and capture the opponent's ships. With the help of its Greek allies— seafaring cities such as Tarentum, Locri, Elea, Naples, and Cumae, with centuries of naval experience—Rome finally coerced Carthage to negotiate a peace after the Roman navy sank or captured over half of Carthage's galleys in the final battles of the war. [27]

Rome's success against the greatest and most experienced navy of its day can be attributed to its innovative concept of a warship that played to the strength of the Romans—their prowess in infantry combat—and mitigated their general weakness in seamanship and traditional naval combat. The Romans turned ships into fighting platforms for Roman soldiers by inventing the grapple. The grapple, referred to as the corvus, was a large boarding bridge that was lowered onto the opponent's ship, enabling Roman troops to swarm aboard during the naval battle. By changing the rules of engagement during a naval battle to favor their military strengths, the Romans inflicted several humiliating blows on the Carthaginians. However, the corvus also made the ships top-heavy and difficult to handle in heavy seas. Consequently, Rome's naval achievements were minimized by the inept way the Romans handled their vessels. They suffered severe losses during stormy weather.

Strategic Sources of Military Advantage

The strength of the military and political institutions enabled the Romans to build an enormous empire and sustain it over numerous centuries. The military was an arm of the political leadership and was used to fulfill political objectives. The intertwining of the military and politics created a state with a strong military culture. Rome's institutions provided the foundation for sustained military dominance on a number of levels.

First, Rome had a firmly established and sophisticated code of laws that governed the social and economic interactions in society. The Roman constitution was superior to other systems of the day, and a code of law produced a stable and prosperous civilization that was attractive to other civilizations. Rome was able to attract allies and manage a complex alliance system by using Roman citizenship to woo support and loyalty. Citizenship was granted to all people in Italy and Cisalpine Gaul, making vast new resources and manpower available. The continual use of this process would allow Rome to grow stronger through captive allies rather than weaker due to garrisons.

City-states on the Italian Peninsula were granted Roman citizenship and hospitium publicum, which entitled the citizens of these city-states equality with Roman citizens. Rome carefully co-opted the leaders of these cities by promising to provide defense from external threats or internal uprising and by allowing them to retain their own city organization and self-government. In exchange, the city-states were obligated to remain loyal to Rome, provide soldiers for the Roman military, and agree not to develop political relationships with any other state. In the end, Rome transformed these cities into Roman cities and instilled a common worldview—Pax Romana. Hannibal tested the strength of Rome's relationships with its Latin allies during the 2nd Punic War, and he was unable to turn many of the romanized city-states against Rome.

Second, Rome's strength arose from its ability to embrace new cultures, enabling it to adapt and change over time. The Romans exploited the strengths of their allies and provincial cultures, incorporating their ideas into Roman doctrine and tactics. During the Punic Wars, the Romans, who lacked seafaring skills, relied on their Greek allies to help them build a navy capable of defeating the Carthaginian navy. The Romans also relied on their allies to provide quality cavalry and missile capabilities to complement their superior heavy infantry.

Third, the Roman military was a central institution in the society that allowed Rome to expand and sustain its large empire. The institutionalization of the military made it both an instrument of peace and war supported by a robust bureaucracy. The Roman Army started as a citizen-soldier army and evolved into a professional institution, demanding a minimum of 16 years of service between the ages of 16 and 46. Most citizen-soldiers would spend several years in the field before returning home and would likely be called several times before their term of eligibility expired. After defeating Marc Antony in a ferocious civil war, Augustus replaced the militia army with a smaller permanent army that was paid and received a retirement pension from the state. In this manner, he sought to ensure that the Legionnaires were loyal to Rome and not to their military leader. Augustus also created a highly centralized system to support and manage the professional military, which was designed to ensure that the emperor of Roman maintained control over the legionnary garrisons. An imperial civil service was established to raise the taxes to support the provincial garrisons and to administer funds and supplies.

The Roman Army played an important role in maintaining control over conquered territory. In the frontier provinces, the Roman Army was the main agent for introducing romanization to the barbarian tribes. In provinces with friendly tribes, the military relied on the local kings and chiefs to maintain order, allowing the local government to remain in place. Most of these territories lacked native infrastructure for urban societies; therefore, the military represented the main source of technical skill needed for large-scale engineering projects. The military forts in the provinces gave Rome an established presence.

Fourth, Roman strategic institutions enabled Rome to build and maintain a constellation of allies and client states. The Romans combined ruthlessness with political astuteness to manipulate allies with a variety of incentives and threats. The military power that Rome carefully constructed through alliances gave it the power to defeat the most formidable enemies and enabled its power to grow and expand until the Romans dominated the ancient Mediterranean world. [28]

Rome's relationship with the non-Latin allies (socii) was significantly different from its close relationship with the Latin cities on the Italian Peninsula. The socii did not share a common language, culture, or institutional structures with the Romans, and usually they submitted to the Romans only after bloody battles. Rome demonstrated a unique ability to craft reasonable and generous agreements with the local leaders to accommodate the interests of client states. Some allies enjoyed the "equal treaty" arrangements, which guaranteed that the client state had no formal obligations to fulfill and that Rome would not interfere in their domestic affairs. Therefore, socii could pursue their own forms of government and religion, but Rome required them to pay tribute or accommodate Roman garrisons during wartime. However, Rome implicitly required the client state to bend its foreign policy to suit Rome's will and to supply soldiers for Rome's conquests, and prohibited socii from establishing political relationships with other states. This was the price that Rome exacted for its friendship and for its guarantee of "freedom," and for the favor of protection from outside interference in its client's affairs and threats from sedition. [29] Loyal socii rulers were rewarded by personal honors, Roman citizenship, or territorial rewards.

Fifth, Allied troops were indispensable to Rome's military power and success. For example, Rome relied on its Latin allies during the 2nd Punic War to raise Legion after Legion to fight Hannibal, even after devastating losses. As the Roman Empire expanded, the pool of potential soldiers grew, increasing Roman military power. Some allies, which were granted Roman citizenship, were recruited to serve in the Roman Army and were trained as Roman Legionnaires. As the Empire expanded, the Roman Army became increasingly multi-ethnic in character. Soldiers from more distant client states composed the auxiliary forces. Even early in the rise of the Roman Empire, the pool of auxiliary troops was larger than that of Roman soldiers. In 225 BC, a demographer estimated that there were 640,000 adult male allies, but only about 300,000 Romans available for service.[30] In 67 AD, the three Legions in the east deployed to subdue the Jewish revolt were augmented by 15,000 auxiliaries con-

tributed by Antiochus IV of Commagene, Agrippa II, Sohaemus of Emesa, and the Arab ruler Malchus. [31]

Edward Luttwak argues that socii, or client states, not only served as a source of auxiliaries for the Roman Army, but also provided peripheral security against border infiltration and acted as buffer states. For example, Armenia was a buffer state between Rome and Parthia. If the Empire faced a high intensity threat, the client states contributed geographic depth and absorbed some of the damage until the Roman Army arrived. Therefore, according to Luttwak, the client state system lowered the costs of maintaining security for the Roman Empire. In his analysis, Rome successfully used its military power to manipulate its client states to achieve the political objectives of the Empire. [32]

Was the Roman Military Advantage Enduring?

Rome held the ancient Mediterranean world under its control for about 600 years. Throughout that period, it fought numerous wars, suffering a number of crushing tactical defeats, and yet continued to expand and overcome its setbacks. The Roman military machine could be manhandled by true military geniuses, such as Hannibal, and defeated by armies optimized to fight in a particular environment, such as the Parthians on the plains of modern day Iraq and Iran. The Romans also faced difficulties when fighting enemies with no defined centers of gravity (cities and major towns). The Germanic peoples and the wild tribesmen in the Balkans and Wales proved to be especially difficult for the Romans to bring to ground. Still, the Romans remained the preeminent military power in the Western world for six centuries for several reasons.

First, the Romans had an ethos that equated service in the military as the highest form of duty any man could perform for the state. As has been discussed earlier, rising politicians also had to be successful military leaders, or their political fortunes waned. The common man was also imbued with this ethos, as citizen soldiers serving as militia formed the earlier Legions. Even when the Roman Army became a professional force, the sense of service to the Senatus Populus Que Romanus (SPQR) remained among the ranks. Roman law and tradition buttressed the notion that the soldier was the servant of the state and that military service was the highest form of civil service possible.

Second, the Romans constantly adapted their tactics and organization to meet changing military requirements. Roman Legions evolved as old enemies were absorbed and new enemies arose. The Romans learned from their defeats as well as their victories, and they rapidly recovered from setbacks that would have destroyed less robust empires. The Romans were also able to co-opt the forces of their allies and subject nations, forming them into auxiliary forces and Legions. This enabled them to interweave military technologies from the conquered peoples into their army and to use foreign technology to make up for shortfalls in their own training and equipment.

Third, the Roman military continually transformed itself as the strategic situation evolved. Rome created new sources of military power, most notably during the 1st Punic War, as a way to stay ahead of their opponents.

Fourth, the Romans established a military and political system that made it more advantageous for subject peoples to cooperate with Rome than to fight it. Although the Empire was occasionally plagued by rebellion, these instances normally occurred when the central government was weak or disunited. For the most part, the Roman Army offered subject peoples relative peace and domestic tranquility in exchange for acquiescence to Roman domination. Although they may have resented the presence of Imperial troops and chafed under Roman rule, local rulers knew that, on the whole, Roman rule was preferable to that of the despots or barbarians lurking on the frontier.

Fifth, the Romans were ruthless in suppressing their enemies. Rebellions were stamped out without mercy. External enemies found themselves engaging an enemy that, once mobilized, moved with single-minded determination to win the war. Rome did not hesitate to use force to get its way. Potential enemies and rebels knew that failure in battle would lead to the severest form of Roman punishment and repression.

Finally, Rome possessed the most sophisticated command, control, and communications infrastructure of its time. The Roman roads gave them unprecedented mobility and the ability to pass information rapidly across the Empire. The Roman ability to rapidly shift troops from a quiet sector to a threatened one gave it a decisive advantage over its enemies. The roads also allowed Rome to practice economy of force, as they did not have to be strong everywhere, but could be strong where and when required.

The Collapse of the Roman Empire

The western part of the Roman Empire eventually succumbed to waves of Germanic and Balkan invaders in the 5th century AD. The reasons for the collapse of the Western Empire range from the deleterious effects of plague in the 2nd and 3rd centuries, the debasement of the currency, and the high costs of maintaining a standing army, to the corrosive effects of the new state religion, Christianity. Taken in toto, these reasons, and others, interacted to collapse the Roman Empire in the west. The Eastern Empire lingered for another 900 years, becoming more militarily impotent as time progressed. Finally, battered by constant combat with its Christian and Muslim neighbors, the Eastern Empire fell to Islamic forces in 1453.

The end of the Roman Empire, however, did not mean the end of Roman influence in military thought. After the collapse of Rome, Europe experienced a period where individual mounted soldiers were the preeminent force on the battlefield. Massed infantry, not generally better than armed rabble, could be easily dispersed by charging armored horsemen. When the Europeans reestablished professional standing armies in the 15th century, they used Roman tactical treatises as the basis for their innovations. The development of the standardized battalions in the 16th and 17th

centuries can be traced to the standardized Legion of the Roman Republic. The use of drill, formation marching, and standardized tactical formations were derived from the Romans. Close order drill, uniforms, regimental colors used to identify various formations, personal awards, and all of the paraphernalia of modern military life in the West can be traced to the Romans.

End Notes

1. The Roman losses at Caudine Fork to the Samnites in 321 BC.

2. Bernstein, Alvin H., "The strategy of a warrior-state: Rome and the wars against Carthage, 264–201 BC, in *The Making of Strategy: Rulers, States and War*, Williamson Murray, Macgregor Knox, and Alvin Bernstein, (Cambridge University Press: Cambridge, 1999). p. 56.

3. Hanson, Victor Davis, *Carnage & Culture: Landmark Battles in the Rise of the Western Power*, (New York, 2001).

4. Harris, W., *War and Imperialism in Republican Rome*, (Oxford University Press: Oxford, 1979) p. 54–67.

5. Jones, Archer, p. 34.

6. Polybius, *Histories*, VI, 22.4–23.11 as cited in W.R. Paton, 6 vols. (Cambridge University Press: Cambridge, 1966) p. 3:319–21.

7. Keegan, p. 268

8. Grant, Michael, *The Armies of the Caesars*, (Charles Scribner's Sons: New York, 1974).

9. Keegan, 270

10. Livy XLII (translated by Aubrey De Selincourt), *The War with Hannibal*, (The Penguin Group: London, 1965) p. 34.

11. Grant, 1974, p. xxviii.

12. Bernstein, p. 61.

13. Keegan, p. 270.

14. Keegan, p. 35.

15. Webster, Graham, *The Roman Imperial Army*, Third Edition, (Barnes & Noble Books: New Jersey, 1985) p. 232.

16. Webster, p. 238.

17. Luttwak, Edward N., *The Grand Strategy of the Roman Empire from the 1st Century AD to the Third*, (The John Hopkins University Press: Baltimore, 1976) p. 117.

18. Webster, p. 252–54.

19. Brook, Richard, et al, *The Times History of War*, (Harper Collins Publishers: London, 2000).

20. Grant, 1974, p. 264.

21. Keegan, p. 303.

22. Keegan, p. 303.

23. Luttwak, p. 3.

24. Grant, 1974, p. xxix.

25. Polybius, 1966, p. 324.

26. Luttwak, p. 4.

27. Bernstein, p. 74.

28. Gabba, Emilio, translated by P.J. Cuff: *Republican Rome, The Army, and the Allies*, (University of California Press: Berkeley and Los Angeles, 1977).

29. Bernstein, p. 65.

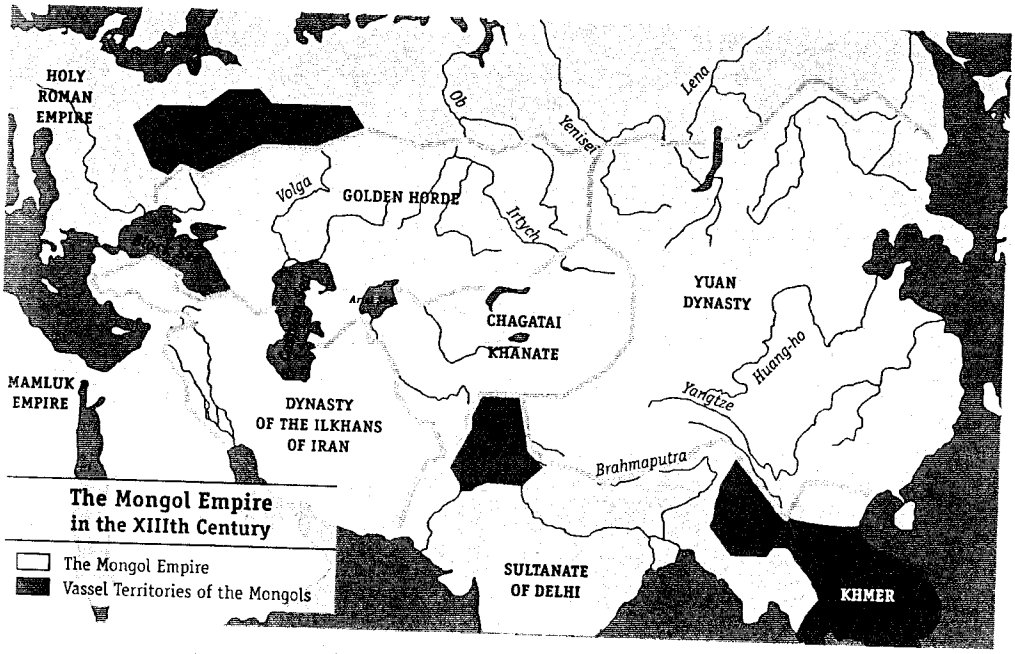
30. Bernstein, p. 67.

31. Luttwak, p. 27.

32. Luttwak, p. 7-49.

Chapter 4

The Mongols



March divided, attack united.
—Mongol maxim

During the 12th and 13th centuries AD, the Mongols built and sustained one of the greatest land empires known to man. The Mongol explosion from Central Asia and their eventual domination over much of Eurasia, were accomplished with relatively small armies, well-known and widespread military technologies, and limited human resources. It would seem unlikely that a nomadic people who possessed neither novel military technologies nor huge populations could achieve such a military advantage over the more technologically advanced civilizations of China, Persia, and Europe. The Mongol tactical military advantage, however, was based on the strength of a nomadic herding society and the skillful combination of tactics, technology, and organization.

Foundational Factors

The Mongol Empire unified much of Eurasia under a new political, military, and economic world system during the 12th century AD. Much of the credit for the consolidation of the various Turko-Mongol tribes and the expansion from Central Asia into China, the Middle East, and Europe belongs to Chenghis Khan (1162–1227). Chenghis Khan, or Temujin, was the son of a chieftain of a tribe that lived on the Onon River in northeastern Mongolia. [1] Chenghis exploited the fluid nature of social and political organization in the steppe, and utilized his strong leadership ability to undertake a series of military campaigns that united the various steppe tribes. After consolidating his power, he was named Supreme Khan by the Mongolia council of nobles in 1206. Between 1207 and 1221 he undertook a series of military campaigns against northern China (1207–1216) and the Muslim state of Khwarezm in Central Asia (1220–1221). Upon his death in 1227, his sons and grandsons expanded into Russia and the Middle East. At its peak in the 13th century, the Mongol empire stretched between Poland and the China Sea, from Siberia to southern China. Mongol forces campaigned in Hungary, launched amphibious assaults against Japan, and fought battles in Southeast Asia, and by the middle of the 13th century, the Mongols seemed unstoppable. It was obvious that the Mongols had forged a decisive military advantage over the scattered neighboring tribes on the Mongolian steppe.

Economic

The economic foundation of the Mongol society was shaped by the immense grasslands of the Eurasian steppe, which stretched like a vast superhighway from the plains of Hungary in the west to the eastern fringes of Mongolia. The grasslands were generally unsuited for agriculture but were ideal for a pastoral economy based on herds of grazing animals such as sheep and horses. Mobility was enabled by herds of horses and portable dwellings called Gers. [2] Paramount in the Mongol economy was the horse, which provided the pastoralists with food, milk, clothing, and transportation. As a consequence, Mongol society was highly fluid and mobile as families and clans migrated seasonally in search of better pastures. Competition with other tribes over grasslands and horses resulted in frequent raids and skirmishes, thus militarizing society.

Another aspect of the Mongolian economy was the need to trade with settled societies in order to obtain carbohydrates to augment their high protein diet, in addition to luxury goods and metals, which the pastoralists generally lacked. The Mongolian economy was more dependent on commerce and trade than their more sedentary neighbors. Tension in times of peace and predatorial behavior in times of war marked the economic relationship between pastoral and settled societies.

Social

Mongolian social structure was based on the individual, the family, the clan (oboq), the tribe, and tribal federations. Families and clans were named after a common male ancestor, while tribes were often named after the strongest clan. Clans and tribes were divided into two groups: subordinate and ruling. In times of tribal consolidation, Khans led the tribal federations. The main tribal federations during the 12th century were the Mongols, Tatars, Merkit, Kerait, and Naiman. [3] All tribal men over the age of 14 were required to perform military service, thus mobilizing a substantial portion of the population and creating one of the first levee en mass.

The decentralized nature and ethnic diversity of Mongolian society during the 12th century led to innovative social institutions such as the anda and the noker. Anda is the Mongolian term for "blood brother," a spiritual brotherhood regarded by Mongols as more significant than kinship or ancestor-based relationships. The anda was the key to the open nature of Mongol society where voluntary bonds were more important than the biological bonds found in Chinese and European feudal societies. Even within the ruling clan, the anda augmented the kinship-based organizational model. The noker (follower, associate) was a means by which an individual could switch clans by declaring allegiance to a new leader. The noker system encouraged social mobility and created a society based on individual merit versus descent. The anda and the noker helped produce the best generals whom Chenghis Khan would later employ in his armies.

Shamanism and a worship of sky gods (Tengri), and earth and fertility deities shaped the Mongol's belief system. The decentralized nature of shamanism (individualistic, lack of temples, etc.), coupled with a practical belief system based on the "here and now" fostered a low religious fervor and a high degree of religious tolerance that allowed the Mongols to absorb neighboring tribes and religions readily into the Empire.

> *Cooperation—One day, at the time of his first rising to power...he drew an arrow from his quiver and gave it to his sons. Clearly it required no great strength to break it. He made the number two and so continued till there were fourteen, and even athletes were unable to break them. "So it is," he said, "with my sons also. So long as they tread the path of regard one for another they shall be secure from the evils of events and shall be free to enjoy the fruits of their kingdom."*

Political

The ad hoc nature of political power before the ascent of Chenghis Khan meant that the political structure in Mongolia was largely decentralized and distributed amongst the various tribes and clans. The quriltai, an assembly of nobles, was the main political organization. During war, the quriltai afforded a chieftain great latitude and pledged their obedience to the supreme ruler; during peacetime, however, the

chieftain's power was curtailed. In this sense, the Mongol Empire was not an autocracy, but rather a system governed by voluntary associations with leaders selected by the assembly in which power flowed upward from voluntary association rather than downward through divine rule. In 1206, after consolidating the various nomadic tribes in Mongolia, the quriltai anointed Chenghis Khan the supreme ruler of the Turko-Mongol tribes.

Much has been made of the Yasa, a code of laws and policies that provided the legal foundation of Mongol political authority. Rather than being the equivalent of Roman statutes, the Yasa was more a collection of the Khan's maxims, regulations, and instructions. Although it is uncertain how strong a role the Yasa played in Mongolia, the unifying political principal for Khans was pragmatism. The Mongols shrewdly adopted the best practices of the lands and the people they occupied, augmenting local bureaucracies with Mongol provincial governors (darughachi). Decisions were seldom arbitrary, but rather were made in consultation with other nobles and in accordance with long-held Mongolian customs.

To govern such a large empire effectively, the Mongols devised an ingenious communication system that played to their basic strengths—the Yam. The Yam was a system of post stations erected every 25–30 miles that supported express couriers with horses and provisions. The Yam was used to transport government officials, orders and decrees, and trading goods. [4] It also served as the strategic backbone for communicating intelligence from around the empire. While normal messages moved at a speed of 25 miles a day, urgent messages and critical intelligence could move at a rate of 200–300 miles per day through a network of express riders. Of all the institutions created by the Mongolians, none were as widely copied as the Yam.

Sources of Military Advantage

Contemporary observers attributed Mongolian military advantage to their overwhelming numbers. The horde, originally from the Turkish word for orda or camp, conjures images of swarming masses descending upon their enemies in a frenzied melee. In reality, however, both Mongolian society and armies were substantially smaller than those of their neighbors in Europe, China, and the Middle East. In 1250 AD, at the height of Mongolian military supremacy, the population of China was 112 million, Europe 57 million, and the Middle East 25 million while the total population of Mongolia was less than 1 million. [5] Quality, not quantity, was the source of Mongolian military superiority.

Some have claimed that Mongolian strength arose from the application of superior military technology, namely, the hardy steppe pony and the composite bow. However both mounted warfare and the composite bow had been in existence almost two millennia before the Mongols burst forth from Central Asia. It is clear that Mongolian military success was not the result of either numerical or technical superiority.

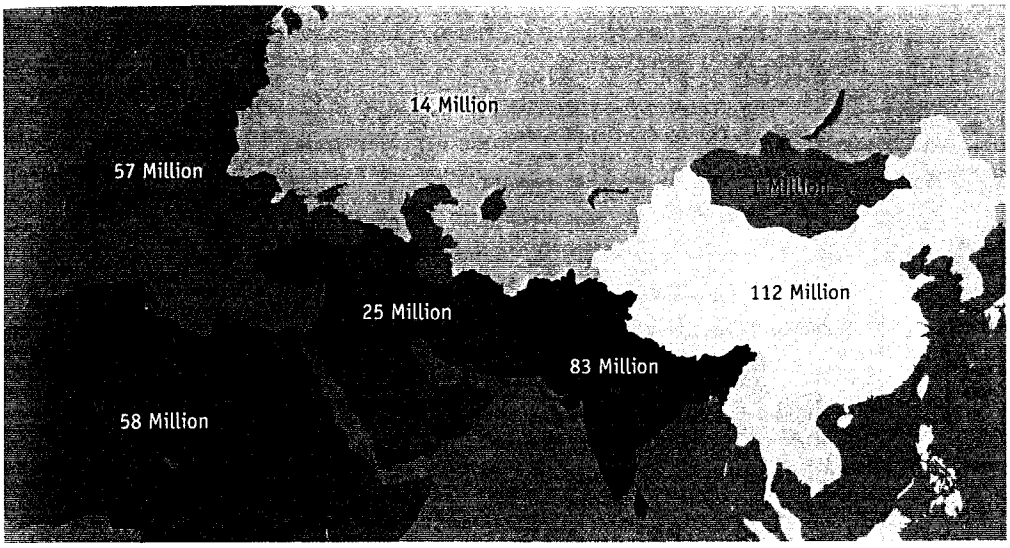


Figure 3: Populations in Eurasia (1250 AD)

Instead, the Mongols forged and maintained one of the largest empires in the history of the world through a skillful combination of tactics, organization, and technology that reflected the political, social, and economic foundation of Mongol society. In this sense, Mongolian military supremacy was unique and could not be readily copied by their competitors. While Chinese armies possessed outstanding archers, the agrarian structure of Chinese society prevented the creation of a horse-based archer strike force that had the level of skills, discipline, and independence of the Mongol cavalry. Likewise, the cultural biases of European armies towards "heroic" or close-in-fighting created a sedentary warfare model with a military force composed largely of slow moving, heavy infantry and a system of territorial fortifications.

The political, social, and economic uniqueness of the Mongols provided the necessary strategic foundation for victory; but it took the brilliant leadership of Chenghis Khan to turn this strategic advantage into an operational capability by uniting the various tribes, developing ingenious doctrine, and harnessing the inherent logistical superiority of the Mongols.

Tactical Sources of Military Advantage

Leadership

The principal factor in the Mongol ability to forge an empire stretching from Hungary to Korea was a combination of the brilliant leadership and organizational skills of Chenghis Khan, his ability to pick the ablest generals to lead, and the Mongol capability to move armies and supplies vast distances.

Chenghis had a remarkable ability to garner friendship and loyalty, and he maintained these ties through a brilliant use of redistribution of people and goods. Although enabled by the social institutions of the anda and noker, Chenghis' political genius in combining all of these factors cannot be overestimated. One of the most enduring legacies associated with Chenghis's rule was his willingness to bypass traditional ties of tribal kinship and replace it with a system based on more symbolic forms of organization—allegiances and loyalties. This more "rational" form of governance established the basis for bureaucratic discipline and rule based on precedence and procedure, instead of individual capriciousness.

Chenghis eradicated the horizontal distance between clans and tribes by a wholesale replacement of tribal organizations as the basis of military might. The objective of the new military system was twofold: first, destroy the kinship-based organizational framework by diminishing the power of the tribes to create a more sound system based on demonstrated capabilities and proven loyalties; and, second, to provide the organizational foundation for a coherent command and control system based on a decimal system (i.e., each level of command had a maximum 1:10 relationship with its subordinates, greatly simplifying the command function). At the operational level, the first objective had the greatest impact. Most tribes and clans were scattered throughout the military system, although some tribes survived intact at the regiment level (i.e., 1,000). Chenghis largely followed this practice by ensuring that few of his own relatives served as the commanders of the 1,000s or 10,000s. In effect, Chenghis' reformed military became the basis of new "virtual" tribal identities, as entire families and pasturelands were allocated according to this system rather than through the traditional tribal structure. This new military organization gave the heterogeneous Mongol society an unprecedented degree of unity and discipline.

In addition to eradicating tribal divisions, Chenghis instituted a policy that forbade any officer—many of whom were chosen by their own men through the institution of noker—from eating different food or receiving different treatment than their men. This policy greatly strengthened command and control and overall unit cohesion, as it erased many of the communication and social barriers between the leaders and the average soldier. Chenghis himself regularly reallocated funds and supplies to tribes in difficulties in order to maintain loyalty.

Although supreme command lay in the hands of the Khan, the Mongol principle of promotion to posts of leadership and authority on the basis of ability alone, introduced and enforced by Chenghis Khan, resulted in an unmatched quality of troops from the ordinary soldiers to the top command. As a consequence, Mongol military leaders could be entrusted with a great deal of authority and independence. This decentralized decision-making was key to the Mongol tactical advantage against their less fluid and agile enemies. The Mongolian leadership and command and control structure presaged to a large degree the German principle of Aufstragstaktik (i.e., mission orders versus detailed command and control) that provided the foundation for the successful blitzkrieg strategy.

Organization and Discipline

A key to the Mongol military advantage was the relative independence and self-sufficiency of each soldier and the leaders of the tactical organization. While the Mongols possessed the best reconnaissance and command, control, and communication in existence at the time, Mongol organizational structure and leadership principles emphasized decentralized command and control. The unique blend of a simple organizational structure, independent leadership, and highly disciplined troops provided the Mongols the adaptability and agility necessary to overwhelm their enemies.

Like the Hsiung-Nu (Huns) over a thousands years before, the Mongol military organization was based on a decimal system with units of 10, 100, 1,000, 10,000. The Khan commanded three armies and had over 123,000 troops at his disposal: the Army of the Right Wing or West (Baraunghar), with 38,000 troops; the Army of the Left Wing or East (Junghar), with 62,000 troops; and the Army of the Center (Khol), with 23,000 troops. A Marshall or Orkhan, who was appointed directly by the Great Khan, commanded each army. The largest tactical unit of the Mongol army was the Tumen with 10,000 men, although Tumens were often much smaller and categorized according to actual strengths (7,000, 5,000, and 3,000). Tumens were also categorized by heavy and light Tumens; heavy were used as shock or bracing troops while the light troops composed the strike force that was used to encircle the enemy. A typical army formation consisted of three Tumens, two light and one heavy. A general or Noyan, who was personally appointed by the Khan, commanded the Tumen.

Each Tumen consisted of 10 Minghan (regiments) with 1,000 troops. The Minghan was led by a Noyan who also was personally selected by the Khan. Ten companies (Jaghun) comprised the Minghan with 100 men each and each Jaghun consisted of 10 squads (Arban). The leadership of the Jaghun was selected by the commanders of each of the 10 Arbans. Likewise, the 10 men of the squad selected the commanders of the Arbans. The Arban was the smallest organization formation in the Mongol Army and normally carried two to three Gher along with additional provisions to support the squad.

In addition to the standard units, each army always had a unit of artillery and engineers for siege warfare along with administrators and surgeons. Allies often provided infantry forces, while additional infantry was created from slaves taken during previous engagements. The slaves were often used as shock forces or decoy troops. The entire army, to include the normal Mongol formations as well as support and slave forces, was referred to as a horde.

Unlike their European or Chinese counterparts, who structured their armies on the basis of regional affiliations and bloodlines, the Mongols removed tribal loyalties from the equation by spreading the different tribes throughout the new organization. The structure also allowed Chenghis to quickly assimilate defeated tribes into the decimal-based army, thus providing an unprecedented ability to scale without a corresponding loss of cohesion. Chenghis handpicked the leaders of the armies, divisions, and regiments, ensuring their loyalty along political instead of tribal lines. At

the lower levels of the Jaghun and Arban, where tactical cohesion mattered most, Chenghis' system of command selection by subordinates ensured that the most competent commander was chosen while providing a strong bond between the commanders and their followers.

The average Mongolian soldier was highly disciplined, fearless, and capable of fighting independently or as a part of a group. In devising his new army, Chenghis struck a balance between structure and fluidity. The decimal-based structure provided a dependable way to coordinate and direct troop movements, while soldiers and commanders capable of highly independent action provided the right amount of adaptability.

The Yassa was also critical to maintaining discipline and unit cohesion. One of the 22 laws of the Yassa set the death penalty for retreat or refusal to follow orders, which would be applied to the entire unit. For example, if one or two of a group of 10 ran away, all of the 10 were put to death. If a squad ran away, the company was put to death. Unless they retreated together, all that took flight were put to death. On the other hand, if 2 out of 10 advanced and the other 8 did not, those 8 were put to death. This set of rules proved to be a substantial force in motivating the average Mongol solider to function as part of a group.

A Mongol leader would fight anywhere in the formation that made the most tactical sense, in contrast to European or Chinese army commanders, who often fought in the front of the battle. This reflected the Mongol maneuver style of warfare that sought to inflict the greatest possible casualties and disorder within the enemy ranks while minimizing the impact on Mongol forces. The sparse population of Mongolia provided no benefit to engage in a "Western-style" campaign of attrition.

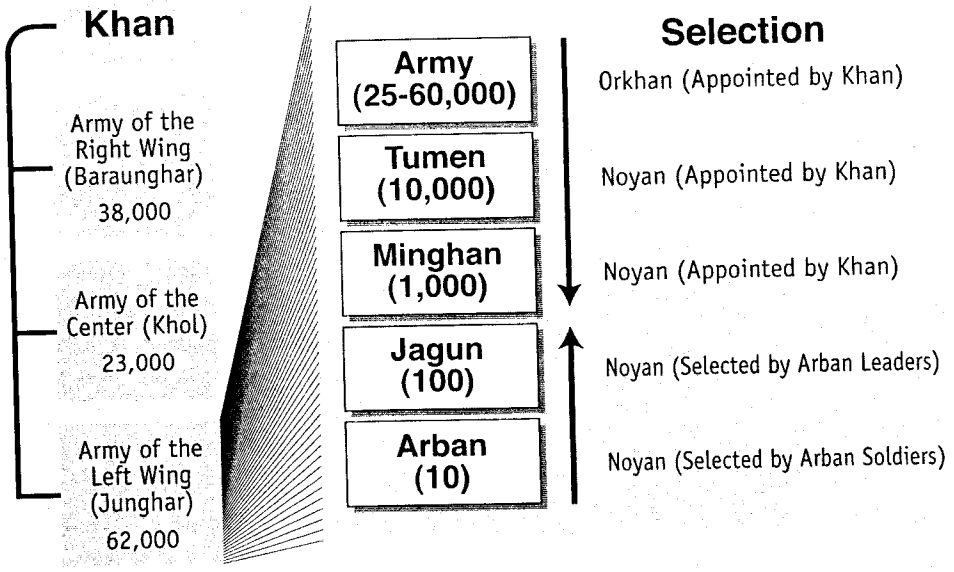


Figure 4: Organization of Mongol Military Structure

After completing an operational encirclement, the Mongols executed a maneuver called a Tulughma or a standard sweep. The Tulughma normally involved a formation of approximately 30 jaguns with a 7:3 mix of light and heavy cavalry. The formation was six jaguns wide and five ranks deep, with the heavy jaguns comprising the first two ranks and the light jaguns in the three rear ranks. The purpose of the heavy jaguns was to hold the enemy advances while the lighter jaguns in the rear performed a sweeping maneuver from both sides and through the columns simultaneously. The light forces would swarm through the front two ranks and release a shower of arrows against the enemy formation and then quickly retreat to the rear. The sweeping process continued until the opposing formation became disorganized, at which time the two heavily armored jaguns in the front of the formation moved forward to deliver the final blow. The remaining light jaguns would continue to encircle the enemy from the sides to prevent an escape.

The Mongols executed these highly synchronized maneuvers through a well-evolved process of kettle drums, pennants, and standards. To the Europeans and Chinese, who were used to yelling battle cries and orders, the eerie silence of the Mongol movements reinforced the perceptions of the Mongol formations as a swarming, disorganized melee. The initial movements were initiated by the pounding of the naccara (kettledrum), after which signals for larger formations were given by banners. The real key to battle field communication was the Mongol ability to sense what was happening and respond quickly without waiting for detailed orders. This ability to operate autonomously but coherently was key to the Mongol tactical success.

The Mongols also perfected the art of tactical deception. They brilliantly employed smoke across the battlefield to degrade the situational awareness of their opponent's leadership. Smoke was also used to separate enemy infantry from the knights, desynchronizing the movements of these two forces and removing the benefits of a combined arms formation. The Mongols often used their spare horses to create the appearance of a much larger force by placing stuffed dummies on the horses or by driving captive enemies towards the center of the enemy's army. The combined effect of smoke and dummies on their enemies was a degraded situational awareness and disrupted command and control. At both the tactical and operational levels, the Mongols almost always maintained information superiority over their opponents.

While their heavily armored adversaries relied on brute strength and force, the Mongols depended on mobility and speed to achieve victory. Mongolian tactics emphasized swift flanking movements and focused on disrupting the enemy's cohesion. Their ability to synchronize firepower and shock forces in space and time was the consequence of an obvious superiority in situational awareness, communication, coordination, discipline, and training. Despite being outnumbered in most battles, the Mongols were able to translate superior tactics and information superiority into a decisive military advantage.

In fact, the Yam was one of the main sources of Mongolian strategic advantage compared with their neighbors who possessed less robust and slower methods of communication. The speed at which the Mongols were able to send messages would be unmatched until the advent of the railways and Pony Express riders in the 19th century.

Mobility, Firepower, and Protection

One of the key factors for the Mongols' military advantage was the horse. For the Mongols, the horse was the backbone of their economy, not merely a means of transportation. Children were trained to ride horses and shoot arrows at a very young age. Horses provided food, milk, and clothing. In extreme situations, a Mongol could live off mare's milk and blood drained from his mounts. Unlike their European counterparts, whose horses were larger and stronger, the Mongol steppe pony was considerably smaller. The steppe pony was bred for endurance and agility.

The average Mongol horseman carried two composite bows with 60 arrows. The light cavalry was equipped with a small sword and a few javelins, while the heavy cavalry carried a scimitar (for cutting down the enemy in close combat), a mace, and a 12-foot lance. However, the key tactical weapon of the Mongols, like most steppe nomads, was the composite bow.[6] A composite bow could shoot an arrow over 300 meters—albeit with reduced accuracy—while the comparable European or Chinese bow had a range of around 230 meters. The Mongols normally fired their arrows at a 45-degree angle to achieve the maximum distance. These shots were intended to strike dense formations from a protected distance in order to disrupt the organizational cohesion of the enemy as much as possible. Once the enemy formation began to disperse, the Mongol horsemen would concentrate on shorter, more accurate shots. Owing to their excellent archery, the Mongols managed high levels of accuracy at 60-80 yards while on horseback. The Mongols' ability to move and shoot simultaneously, even while in full retreat, [7] was a key factor in the tactical military advantage.

In addition to the composite bows used in mobile strike operations against the enemy, the Mongols were also accompanied by artillery troops equipped with javelin-throwers, catapults, and other siege weapons. As was the case with the light infantry, the engineering and siege forces were largely composed of Chinese who had greater expertise in siege warfare. However, the Mongols tried to avoid heavy artillery and siege warfare as it deprived them of their advantage in mobility and stand-off strike.

Protection

Because of their need for mobility and speed, the Mongol soldier dressed very lightly. Unlike their European counterparts who would be covered in armor, the Mongol horseman was normally dressed in a silk undershirt covered by a tunic or kalat. Outside of the kalat, the Mongol wore a protective shield of lacquered leather, which was largely impervious to arrows, swords, and knives while being much lighter than

the chain metal worn by many of their enemies. The horses were often covered with the same lacquered leather. The heavy forces wore armored helmets and breastplates, or shirts of mail, although they constituted a small part of the Mongol force. Both forces carried round wicker and leather shields. However, despite all of this equipment, the Mongols understood that the real key to protection from enemy swords and arrows was speed and dispersion. The Mongols made it difficult for enemies to hit them as they provided no mass against which to fire from a distance, moved too quickly for accurate shots to be taken, and avoided close combat until the enemy had already been psychologically defeated. Their opponents, however, relied on heavy chain mail and large shields to protect them even though it severely hampered their mobility.

Siege Craft

What is often missed when discussing the Mongols is their adeptness at siege craft—a craft they did not develop until the Mongol war against the Chinese Empire (1211–1215 AD). Chenghis Khan's forces were repeatedly frustrated by Chinese fortified cities.[8] Consequently, the Mongols adopted Chinese siege weapons, equipment, and technologies to enable Chenghis Khan to amass a formidable mobile siege train. After this new capability was brought to bear against cities, the Mongols conquered the Chinese. [9]

Mongol siege doctrine entailed a tumen (10,000 men) invading the fortified city while the remainder of the army fought enemy forces in the field. This made it difficult for an opponent to raise a siege without first defeating the Mongol Army. Using the full array of siege artillery (e.g., ballista and catapults) and engines (e.g., battery rams, siege towers, and saps), the dismounted Mongol warriors would aggressively assault the walls.

Whenever possible after a battle, the Mongols would closely pursue a defeated foe right into the city. If this failed, they would rapidly deploy the siege artillery and immediately initiate an assault on the walls. Only if these methods failed would a formal siege occur.

As an adjunct method for conquering a city, the Mongols deployed terror. They would slaughter all inhabitants of a city who resisted them. [10] Once word of the price of failure spread to other cities, resistance often crumbled rapidly.

Operational Sources of Military Advantage

Operational Doctrine

At the operational level, the Mongolian style of warfare blended the elements of information superiority, mobility, and logistics to create a force that seemed invincible to their enemies. The Mongolian style of war was focused on creating disorder in the enemy ranks rather than attempting to attrit individual enemy soldiers. For exam-

ple, the large-scale flanking and encirclement maneuvers designed by the Mongols left an escape route open to encourage the enemy soldiers to flee. This had two purposes: first, to prevent a psychological hardening of the enemy by placing them in a fight or die scenario; second, to encourage a breaking of the ranks by individuals and unit collapse. Once the unit collapsed and the individuals were in full retreat, the Mongols could easily cut down the disorganized and dazed survivors.

Another aspect of Mongol doctrine was the use of the feigned retreat. Often a screening force would engage the enemy and then retreat. This often caused the enemy to break formation to purse the fleeing Mongol force. Once the enemy force was stretched out and lost most of its organizational cohesion, the main Mongol force would engage the pursuing force at a distance with arrows. After the pursuing force was vanquished, the Mongols would begin their encirclement techniques while continuing to strike at the dense formations of the main force.

Although their opponents almost always outnumbered the Mongols, the Mongolian leaders seldom lost military engagements because they enjoyed information superiority over their enemies. This included long-range scouts to provide situational awareness, the vast Yam communications network, and the clever employment of psychological warfare. Chenghis Khan himself had stressed the importance of intelligence gathering. Before opening a campaign, he collected from merchants, travelers, and spies exact information regarding conditions in the enemy's country. Moreover, roads, bridges, and other thoroughfares were kept in constant repair to ensure rapidity of movement and communication. Scouts were sent forward, sometimes as much as a thousand miles away, and sent back regular reports.

In order to soften their enemies or avoid conflict altogether, the Mongols were ruthless against those who refused to surrender and engaged the Mongol Army in battle. If a city surrendered, the inhabitants were generally spared; if the Mongols encountered resistance, the entire population—to include women and children—were slaughtered. The Khans made sure to spread the news of this savagery to the next town in order to spread fear and panic. The effect was that the Mongols won many campaigns against cities without having to resort to conflict.

The Mongols perfected the art of operational maneuver—the positioning of forces to achieve a spatial advantage before the start of the battle. Typically, Mongol forces would travel in a dispersed formation, relying on mobility and speed. Most of the Mongols' opponents traveled in dense formations at a much lower rate of speed because their forces were composed of a mix of heavy infantry and heavy cavalry. [11] The Mongols would send out screening forces to probe the enemy forces. These probes would then retreat, luring the enemy's forces towards the main Mongol force. As the enemy approached, the Mongol forces would spread out to create a giant encircling movement, with heavy cavalry blocking the advance in a holding formation as light cavalry rapidly enveloped the enemy and showered the enemy with arrows.

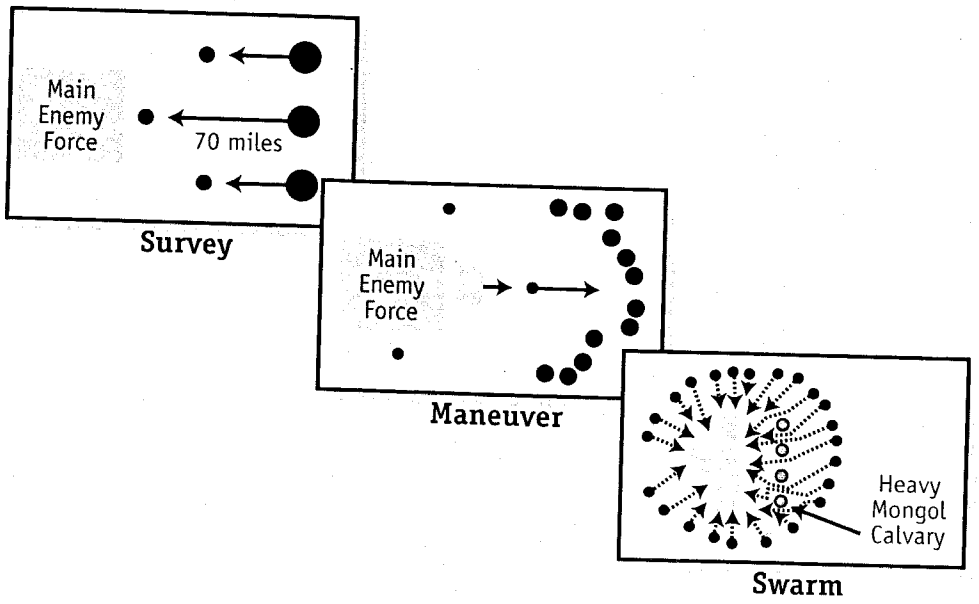


Figure 5: Mongol Operational Doctrine

The operational maneuver perfected by the Mongols was very difficult for their opponents to copy or match. The maneuver had its roots in the Mongol tradition of the great hunt (battue), in which thousands of horsemen created a huge circle, slowly contracting the ring until the game was trapped within the envelopment. Once the prey was within bow range, the Mongols attacked with their arrows, slaying every animal within the envelopment. These great hunts often preceded a major Mongol military campaign. This had the dual effect of providing supplies for the soldiers while serving as a giant war game where the Mongols practiced highly synchronized maneuvers.

The Mongols closed with their enemies only after their opponent's horses and men had been weakened and organizationally disrupted. Their coordination between firepower and maneuver provided the Mongols a significant doctrinal advantage over their slower, heavily armored, less agile enemies. They avoided the close fight where their advantage in strike and mobility would provide little benefit. The Mongols targeted what they perceived to be their enemy's center of gravity—cohesion. The Mongols destroyed the enemy's cohesion through a skillful combination of softening the forces psychologically, disrupting the force through long-range strike, and using encirclement tactics to dislodge enemy formations and encourage retreat. Although Mongol doctrine was well known by many of their enemies, their opponents could not successfully replicate it because of the nature of sedentary societies.

Logistics and Mobility

Owing to its pastoral roots, the Mongol Army had an impressive ability to plan, coordinate, and manage large-scale movements of men and materials. The average Mongol soldier traveled very light, with each man carrying a leather covered wicker

shield, a leather helmet (or iron if higher rank), clothing, and cooking supplies. [12] Each Mongol soldier was largely self-sufficient and brought five horses to carry supplies and for replenishment. During tactical engagements, these extra horses also carried dummies in order to convince the enemy that they were being attacked by a substantially larger force, creating confusion and panic. The net effect was that the Mongols had a substantial advantage over their enemies in terms of mobility, speed, and agility due to the self-sufficiency of the Mongol soldier. This mobile strike force could move as fast as 100 miles per day with reconnaissance forces advancing at 120 miles per day, and communication riders moving up to 200 miles per day.

> ***Organizational Structure and Unit Cohesion***—*...His (commanders) own orders have to be given to 10 persons only...no one having to give orders to more than 10. And everyone in turn is responsible only to the officer immediately over him; and the discipline and order that come from this is marvelous. For they are a people very obedient to their chief.*
> *—Marco Polo*

The Yurtchi, or quartermasters, were special officers responsible for providing logistic support for the advancing Mongol Army. One of their rules was to travel in advance of the main army to ensure that local officers cleared obstructions, built bridges, and provided supplies to the Mongol Army at strategic way-points. The Yurtchi were also responsible for allocating pastureland for each camp (ordu) as well as providing the forces for reconnaissance and intelligence. The Yurtchi managed to coordinate all of this through a complex system of courier networks, signals (smoke and arrows), and logistic trains. The Mongols excelled at this type of movement due to their innate capabilities as nomadic pastoralists to coordinate vast quantities of men and material through space and time.

Mongol operational mobility had a significant vulnerability. The Mongol way of war requires large numbers of horses. Large herds of horses required prodigious amounts of fodder to maintain a high operations tempo. The steppe terrain that spawned the Mongol pastoral economy supplied animal fodder in abundance during the campaigning seasons as long as the Mongol Army did not tarry for long in any one location. When the Mongols advanced out of the steppe into the forested terrain of Central Europe they could no longer sustain their horse army without traditional transport of supplies along extended lines of communication. In the end Western Europe was saved, not by the military prowess of its armies, but by the paucity of fodder for the horses in the forests of Central Europe.

Strategic Sources of Military Advantage

The conquest of the Chinese Empire (northern China) forced the Mongols to face the problem of how to administer and extract value from their conquest. Assisted by Chinese defectors, treated through the concept of noker as Mongolian companions, a

synthesis of military rule and Chinese bureaucratic tradition was implemented. This system, developed by Yeh-lu Ch'u-ts'ai [13] who was a former Chinese official, created a re-feudalization of northern China along Mongol lines.

The adoption of the Chinese bureaucratic model allowed a fundamentally illiterate military elite to create and rule an empire that eventually ran from Eastern Europe through the Middle East to Asia. Although several backlashes against the system occurred, when local Mongol leaders tried to reestablish their freedom of action, the Chinese bureaucratic system enabled Chenghis Khan and his successors to rule for several centuries.

Was the Mongol Military Advantage Enduring?

The Mongols created and sustained a strategic military advantage over their neighbors by leveraging the relative strategic advantages afforded by their pastoral nomadic lifestyle. The concepts of decentralized planning, decentralized execution, autonomous action, self-sufficiency, and mobility were all deeply rooted in the pastoral economic foundation. Although the military technology and tactics of the Mongols could be copied, the horse culture and the brutal conditions that spawned this culture could not. When this steppe culture was married with an effective but conservative Chinese bureaucratic tradition, a new self-perpetuating strategic culture was created that competitors could not master. However, the Mongol way of war, rooted in steppe culture, was limited by topography. Ultimately, it was the inability of the Mongols to sustain their vast horse holdings logistically in Central and Western Europe that spared the European cultures from enduring the Russian Tartar experiences that so powerfully affected the direction of that conquered culture.

End Notes

1. The tribe name "Mongol" originates from the term Onon Ghol—Mongolia for Onon River.

2. Yurt is the name commonly used to refer to the Mongolian felt tent by Russian commentators although Ger (dwelling) is the actual Mongolian word.

3. The Naiman and Kerait tribes were ethnically Turkish and had a mixed economy of agriculture and pastoralism. The Mongols and Tatars were ethnically Mongolian and principally pastoralists. The Merkits were of Paleo-Siberian origin and were hunters and fishermen. These facts demonstrate the ethnic and economic diversity of the Mongolian tribes during Chenghis' Khan's time.

4. Official messengers on the Yam carried a tablet of authority (paiza) designating the rank and importance of the messenger. This earlier communications protocol ensured some level of information integrity of messages transmitted through the Yam.

5. Cavalli-Sforza, L. Luca, Paolo Menozzi, and Alberto Piazza, *The History and Geography of Human Genes* (Princeton University Press: Princeton, 1994) p. 68.

6. A composite bow was made of three pieces: wood, sinew, and bone. This combination made a much stronger material that had a tensile strength four times that of wood. This created a stronger, shorter bow that could fire arrows longer and faster than normal staved bows.

7. The term "parting shot" originates from the term "Parthian shot" from a group of Indo-Iranian nomads who could fire at the pursuing forces while in full retreat. The feigned retreat and firing in full gallop are characteristic of many steppe nomad tribes.

8. Dupuy, R. Ernest and Trevor Dupuy, *The Encyclopedia of Military History from 3500 BC to the Present*, (Harper & Row: New York, 1998) p. 336.

9. Ibid, p. 338.

10. Juvaini, Ata-Malik (translated by J. A. Boyle), *Genghis Khan: The History of the World Conqueror*, (University of Washington University Press: Seattle, 1958) p. 19.

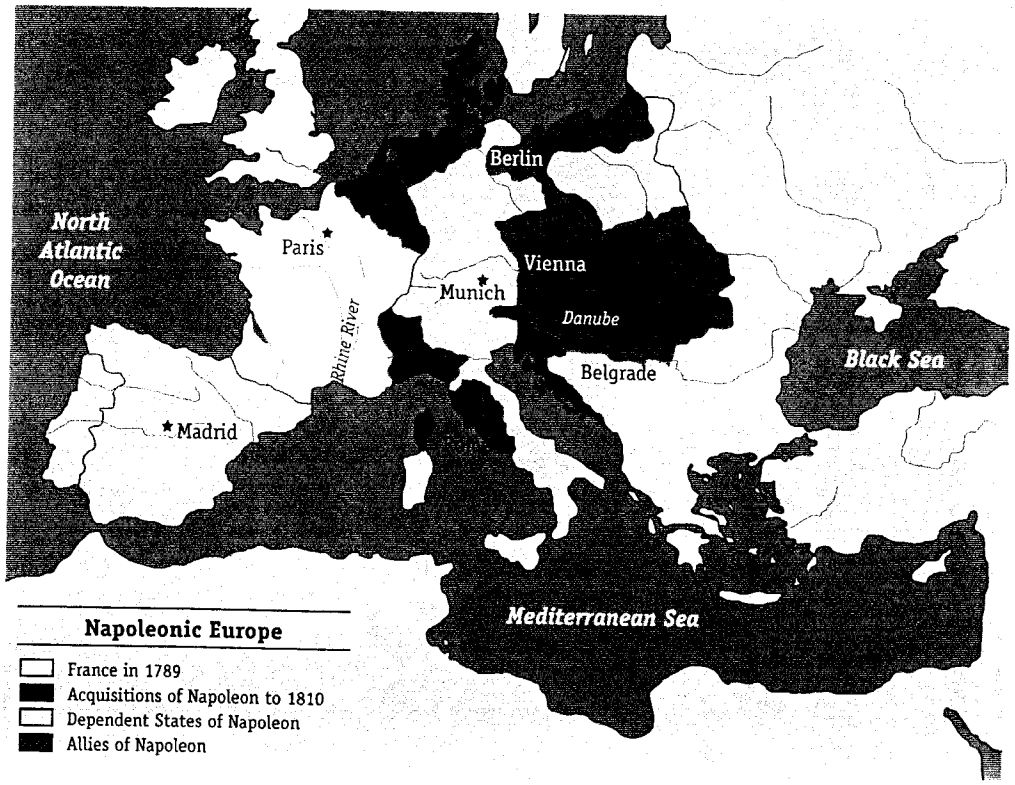
11. The average infantry formation moved at a rate of about 2 miles an hour or 20 miles a day; the Mongols, by contrast, could move at a rate of 10 miles an hour or 100 miles a day.

12. Besides his weapons, each Mongol warrior carried a lasso; needle and thread (sinews); leather storage bag; and a ration of dried meat. The amount that each soldier could carry was strictly regulated, and the Yassa dictated that any item dropped must be recovered by the other soldiers in the squad.

13. Lamb, Harold, *Genghis Khan: Emperor of All Men*, (Bantam Books: New York, 1927) p. 180.

Chapter 5

Napoleon Bonaparte



In war, moral considerations make up three quarters of the game; the relative balance of manpower accounts only for the remaining quarter.
—Napoleon Bonaparte

Napoleon rose to power in a time of exceptional change in the tactics and technology of warfare. The burgeoning industrialization of Europe allowed for rapid development and mass production of lethal, reliable weapons. At the same time, innovations in tactics, some spurred by the changes in weaponry and some by a sense that the old systems did not apply, were altering he way in which future battle would be conducted. By the time Napoleon rose to prominence, the vast majority of the tactical and technical innovations he would use to great effect were already in place. Napoleon was not an innovator; he used what was available to him to the

fullest. In addition, his rise to power was aided by a series of events that he had no control over, but which he used to his own ends.

The French Revolution was the defining moment of the late 1700s. It completely upset the political structure of Europe and set into motion forces that can still be felt today. It allowed ambitious officers like Napoleon to rise beyond where they would have been allowed to under the Old Regime. It shook loose the ossified command structure of the French Army, removed much of the senior leadership, and allowed men of talent rather than well-connected men to assume the reins of command. The Revolution also changed the way in which the soldiers viewed themselves and their relationship to their country. Previously, soldiers fought for pay or because they were forced to fight. They barely identified with the regiment they were assigned to, much less the country under whose colors they served. The king served as the symbol of the state, and the populace identified, if at all, with the king rather than the nation. The Revolutionary soldiers saw themselves as representatives of the state and identified both with their leaders and with France.

With the exception of the ideological factors, all of the European nations had access to the same tactics and equipment that Napoleon used so effectively. Changes to tactics and organizations had been discussed ad infinitum throughout the 1700s. Improvements in arms were well understood by all of the major powers. What set the French, and Napoleon, apart was their willingness to adopt the new measures, to field large mobile armies, and to trust their soldiers to a degree that was not achieved by their enemies.

The French under Napoleon created an army where individual initiative and judgment by the field commander were expected. The French developed a system by which the division and corps commanders fought their individual fights under the general direction of the army commander. Unlike the previously accepted model of combat, which emphasized strict adherence to orders, the French operated under the premise that the on-scene commander was generally the best judge of what he needed to do to win. This tactical flexibility enabled Napoleon to aggressively plan campaigns, bring his enemies to bear and then, as the battle developed, change the scheme of maneuver to meet unexpected opportunities.

Napoleon was the dominant field commander of his time. Although he was defeated on a number of occasions, he continued to hold command, and to hold Europe in thrall, until his death. His passing did not diminish his influence, as the specter of another "man on horseback" haunted the reactionary regimes in Europe for the rest of the century. Equally important, he offered future commanders a model by which they could engage in and win wars of maneuver. His strategic vision was unmatched by any other general of his time and few since his death.

Foundational Factors

The End of Dynastic Warfare

Dynastic warfare had arisen from the tumult caused by the Thirty Years War (1618–1648). This conflict, which was simultaneously a religious and dynastic war, had allowed some formerly fragmented countries to consolidate and had precipitated the rise of strong centralized governments ruled by absolute monarchs. Between the end of the Thirty Years War and the start of the American Revolution, the idea of nationalism did not exist in any meaningful context. Louis XIV of France, the Sun King, personified the ideal ruler of that period. He was the center of the government, making all of the meaningful decisions, bending the French to his will and doing essentially whatever he pleased. His rivals and admirers sought to rule their territories with the same mixture of authoritarianism and divine right that he managed.

Dynastic warfare was characterized by relatively small armies maneuvering against each other in an attempt to place the enemy in an untenable situation. The well-drilled, ornately dressed soldiers were, in many cases, too valuable in and of themselves to risk losing in combat. In reaction to the marauding armies of the Thirty Years War that devastated Central Europe, the dynastic armies were tethered to a series of armories and depots scattered throughout the countryside. These depots held the food, ammunition, and other supplies an army needed to fight a campaign. Carefully placed to ensure that an army was no more than a 5 days march from any one depot, these arsenals effectively tied commanders to limited zones of action. Since most of the armies were filled with mercenaries and other undesirable characters, the methods of tactical and strategic movement were designed to prevent straggling and desertion along the march. Night marches were unusual; quartering troops in large cities was almost unheard of, and then only with extensive safeguards. Also, combat was generally limited to the more moderate months of the year, as winter campaigning proved too stressful on the armies and their rather static supply systems.

Strategy and Tactics

Divisions and Corps—In the mid-1700s, a series of organization innovations were initiated that would have a profound impact on the way future wars were fought. The development of infantry formations equipped solely with muskets with socketed bayonets (replacing pikes), the slow but steady development of more mobile artillery, and the changing role of cavalry caused by these changes brought on a flurry of new thinking that reinvented the Legion. The Marshal de Saxe, a German mercenary in the pay of France, experimented with a unit he called the corps d'armee during the years preceding the War of the Austrian Succession (1740–1748). This formation was an all-arms unit, consisting primarily of infantry supported by cavalry and artillery in a proportion of one gun per 1,000 soldiers. The primary concept of the corps d'armee was to

create uniform, self-contained fighting formations that could be used interchangeably in a campaign. A further refinement of this concept came in 1760 when the Duc de Broglie developed the division, a smaller version of the corps. The division maintained the all-arms nature of the corps, but because of its smaller size, it was more flexible and maneuverable. The creation of the division allowed armies to advance along multiple axes and to rapidly consolidate at a single point on the battlefield. The division proved so tactically flexible and powerful that it became the primary tactical unit during the Napoleonic era. Consisting of regiments of infantry and batteries of artillery, and supported by squadrons of cavalry, the division could hold its own in a smaller fight and be rapidly combined with other divisions to form corps if the action required it. The ability to disperse divisions along multiple axes of advance allowed armies to rapidly march along the dense network of roads in Western Europe.

A debate that raged during this period over the best tactical formation for infantry fighting centered around the virtues of the line versus the column formation. An important doctrinal development occurred in 1766 when the Comte de Guibert presented the French War Ministry with a memorandum introducing a compromise ordre mixte. This memorandum, subsequently refined and published in 1772 as the *Essai General de Tactique*, stressed flexibility and utility. Infantrymen, trained for either line or light infantry duties, deployed in line, column, or a combination of both, depending on the tactical needs of the particular situation. Guibert drew heavily on Gribeauval; artillery supported the infantry by firing on enemy troop formations, preferably from massed batteries. He also postulated that multiple division columns would provide greater flexibility and speed on the battlefield rather than divisions in line. Finally, he evaluated the current state of infantry weaponry versus that of the cavalry and concluded that, with training, infantry could serve as the shock force on the battlefield. He maintained that infantry could live off of the land, drawing everything it needed from the countryside except ammunition and equipment replacements. This innovation freed armies from dependence on fixed depots, and reduced the importance of fixed fortifications. Although the French Army did not formally adopt Guibert's ideas until 1791, war games, particularly ones held in 1778 at Vassieux in Normandy, tested the merits of the different systems and converted many officers to the mixed order.

Skirmishers—The fighting in North America during the Seven Years War precipitated a change in the way armies were organized, moved, and fought. North America in the 1760s and 1770s was heavily wooded, had few roads, and was sparsely populated. The European armies fighting in this environment were often at the end of a long and tenuous supply line, and they had to use closed, winding roads to march on. The Indians, who were allied with both sides, and the European settlers who fought for the French or English had adopted an open form of fighting that suited the terrain. They employed skirmishers and loose lines of battle that took advantage of terrain to mask movement and to capitalize on the difficulties of massed infantry maneuver. Although these open formations could not stand up to a massed charge by trained infantry, they often inflicted heavy casualties on the traditional formations through sniping, flank and rear attacks, and other indirect methods.

European armies began to use skirmishers commonly to develop the tactical situation, while preventing the enemy from doing the same, and to cause the enemy to deploy their formations before they were ready to do so. The open skirmish formations dictated that the men would have to be trained differently from the soldiers in the line. Initiative and independence of maneuver were required of skirmishers, rather than the iron discipline and lock step tactics of the heavy infantry. French Revolutionary doctrine found fertile ground with the light infantry.

Innovations in Weaponry—The second half of the 18th century saw the introduction of two key technological innovations that, when matched with improved tactics and the innovative mind of Napoleon, proved irresistible on the battlefield.

The first innovation was the development of a reliable flintlock musket. This type of weapon, of which the British Brown Bess was the best-known example, gave the infantry a reliable, sturdy weapon that could be fired in nearly all weather. It allowed a trained infantryman to fire three to four rounds per minute to a range of 100 meters. Beyond that range, the weapon was ineffective.

The weapon's relative ease of loading and firing, coupled with the fact that it was pointed rather than aimed, allowed for large numbers of infantry to be rapidly trained in its use. Its inaccuracy was counterbalanced by the weight of shot that a trained regiment of infantry could deliver. In addition, the weapon's rate of fire allowed organization of infantry units into three and two rank formations, increasing maneuverability without sacrificing firepower. The flintlock could be fitted with a bayonet, which enabled the infantry to close with the enemy, while at the same time neutralizing the shock power of cavalry. Trained infantry armed with flintlocks were a fearsome presence on the battlefield. In the American Revolution, the massed formations of the British Army could withstand the fire of their less well-trained American counterparts, deliver a single shocking volley of musket fire, and clear the field with a well-timed bayonet charge. The flintlock turned the infantry into the primary shock force on the battlefield. Its use foretold the decline of cavalry as the arm of decision in 18th century combat. In most cases, when infantry formed into squares, they were invulnerable to charges by horsemen.

The second primary innovation in weaponry encompassed advances in artillery. Prior to the 1700s, cannon were generally large, ponderous field pieces that were laboriously wheeled onto the battlefield and fired from a single position. They were unreliable and dangerous to their crews. French gunners so feared bursting tubes that they adopted Saint Barbara, the patron saint of lightning, as their own. French cannon were adorned with her image in an often-vain attempt to forestall death by an exploding tube.

The French in particular led the development of new methods of cannon manufacture and employment. The introduction of successively lighter cannon and lighter, stronger gun carriages enabled the artillery to move more easily to and across the battlefield. In 1755, the Swiss engineer Maritz developed a barrel-boring technique for the French that reduced the tolerances between the bore and the shot. This

reduced the loss of muzzle velocity caused by "blow-by" or gas leakage and allowed for smaller charges to be used. Smaller propellant charges meant that cannon could be made lighter and therefore more nimble. In the 1780s, Jean Baptiste de Gribeauval created a system that completely revolutionized the French artillery by standardizing field carriages and equipment. Gribeauval reduced the weight of each gun, improved accuracy, and reorganized the artillery into four groups: field, siege, garrison, and coastal. The field artillery, in particular, underwent rapid and important changes that enabled it to become a prolific killer on the 18th and 19th century battlefields.

The development of artillery propellant had progressed to the point where the behavior of the round in flight could be predicted with considerable accuracy. Benjamin Robins, in his *New Principles of Gunnery*, formed the mathematical basis for all subsequent artillery calculations. Robins developed a method of calculating muzzle velocity (Mv) of a cannon by using a ballistic pendulum. This device allowed for the calculation of expected range as a function of the propellant being used and the size and weight of the round being fired. Rollins developed the first accurate range tables and conducted experiments into the phenomena of deflection error (the tendency of the round to spin to the right after being fired).

Cannoneers were equipped with gunner's quadrants to assist them in estimating range to the target, thus allowing for more accurate calculation of elevation. The artillery of that era was direct fire only, as indirect fire techniques were in their infancy. Artillery tactics had evolved throughout the 17th and 18th centuries to the point where massed artillery fires were possible and were considered the primary means of employing that combat arm.

The Levee en Masse—At the time of the Revolution, France's army consisted of approximately 82,000 soldiers, all professionals, whose officers were generally drawn from the nobility and petite bourgeoisies classes. The revolutionaries initially intended to maintain the army at its original strength and organization. However, the loss of many of the royalist officers (including the general in chief, Lafayette), coupled with the rise of foreign coalitions intent on crushing the revolution (and, in the case of Austria and Prussia, partitioning France) placed a larger burden on the army than was originally expected. Therefore, on August 23, 1793, the Committee of Public Safety issued an edict that effectively militarized the entire country and placed France's resources at the disposal of the army. The first provision of the decree stated—

> *From this moment until that in which the enemy shall have been driven from the soil of the Republic, all Frenchmen are in permanent requisition for the service of the armies. The young men shall go to battle; the married men shall forge arms and transport provisions; the women shall make tents and clothing and shall serve in the hospitals; the children shall turn old linen into lint; the aged shall betake themselves to the public places in order to arouse the courage of the warriors and preach the hatred of kings and the unity of the Republic.*

This, the most famous passage of the decree, established the political, military, and ideological framework for the mass conscription of personnel and resources that was to follow. The edict initially called for the conscription of 300,000 soldiers; the levies increased steadily until over 800,000 men were under the colors by 1795. The draft was bitterly resisted by the conservative, pro-loyalist small landowners and tradesmen in the Vende. Their resistance sparked a bloody and vicious civil war that took several years to suppress. Once overt opposition to the levee was suppressed, the drafts commenced and continued throughout the Napoleonic era without serious interruption.

The militarization of an entire nation was unprecedented. Previously, armies had been raised from either the landed classes or from the unemployed lower classes. In 17th and 18th century Europe, every effort had been made to distance the population from the military and to prevent the militarization of the nation as a whole. For example, Frederick the Great's armies consisted of mercenaries and impressed soldiers who were feared and reviled by the Prussian people and mistrusted by the officers who led them. Frederick himself so distrusted his own men that he forbade night tactical marches, for fear of facilitating mass desertion; and he endeavored, whenever possible, to billet his armies away from large cities. The English and Austrian armies were similarly despised by their populace. The American colonists' loathing for the "lobster backs" and their resistance to the quartering of British troops in private homes was a manifestation of a long-standing English abhorrence for the "scum of the Earth" that filled the ranks of the British army.

The levee en masse decree and the actions that stemmed from it turned 18th century warfare on its head. Henceforth, wars would be fought not by dynasties using relatively small armies to settle their differences, but by entire nations. In addition, the tone of war had shifted. Previously, the defeat of an army in a single battle could bring victory to one side or another. Victories were limited in scope, as were the wars themselves. Since the countries fighting the wars had little to do with the dynasties that were locked in battle, the defeat of the nation as a whole was not necessary, or desired. Early 18th century war had limited aims and limited outcomes. Kings fought over strips of land or over which one of their peers would sit on a particular throne. The resources available to a king were limited and combat was, in many cases, avoided due to fear of sustaining heavy casualties. In fact, an entire genre of military literature sprouted in the mid-18th century that presupposed that "modern" combat would be one of maneuver and not fighting. The levee en masse destroyed these illusions forever. France was able to bring huge numbers of soldiers to bear against her enemies, to fight on multiple fronts, and to suffer heavy losses and still win.

The creation of the levee en masse was a critical juncture in the development of modern warfare, and one that was ruthlessly exploited by Napoleon. By 1794, over 800,000 men were under colors. Although their training and equipment were often indifferent, these men offered French generals a vast manpower pool to draw on. When compared with their enemies' armies (which often numbered less than 100,000 men of questionable loyalty), the levee en masse provided the French with large numbers of men who viewed soldiering as the highest form of patriotic duty.

They were indoctrinated with the ideology of the Revolution, devotion to country rather than to king, and the knowledge that defeat would bring on the reinstallation of the hated and discredited monarchy. They carried the "contagion" of revolution as they arched across Europe, infecting the populations with the liberal notions of "liberty, equality, and brotherhood." Taken as a whole, the spread of the revolutionary ideals by the levee en masse caused more damage to the dynastic governments of central Europe than any single defeat on the battlefield.

Sources of Military Advantage

Tactical Sources of Military Advantage

La Grande Armee's sources of tactical advantage lay wholly in the realms of motivation and doctrine. All combatants during the two Napoleonic wars, without exception, had access to the same technological and industrial base. What set France's army apart from its opponents, at least in the beginning, was the revolutionary fervor and psychological motivation of its soldiers. [1] One of the human forces set loose by the revolution was the establishment of a national meritocracy where ability and initiative were not seen as a right of birth, but a goal that any citizen could achieve. The tactical effect was that French skirmishers fighting in open formation were deployed in larger numbers and with greater effectiveness than their opponents due to the French élan.

In an area of inaccurate musketry, clouds of dispersed infantry countered the mainstay of linear volley fire. Additionally, the smoke from the skirmisher fire visually masked the approach by French infantry columns [2] rapidly closing on the enemy position to execute a shock attack, a role traditionally executed by the cavalry.

The French solider was supported by a tactical doctrine, synthesized by Napoleon, that emphasized combined arms warfare. At its peak, the French Army closely coordinated artillery, infantry, and cavalry to maximize the destruction of the enemy through the manipulation of force, space, and time factors. Napoleon was by training a very talented artillerist, as demonstrated by his capture of Toulon from the British, while only a captain. Whenever he could, Napoleon massed his heavy guns (12 pounds each) into a large formation called a grand battery. The grand battery massed its fire on a narrow section of the enemy's front to weaken and disrupt it. Napoleon then threatened this section of the enemy front with cavalry, preventing the enemy infantry from dispersing. While this interplay of force and spatial factors unfolded, the French infantry columns, covered by entire regiments of skirmishers, [3] closed on the devastated sectors. After the effects of artillery and skirmishers fire had reached its zenith, the infantry columns delivered a well-timed shock attack, shattering the enemy front. As the defeated enemy dispersed and retreated, the cavalry delivered the killing blow, destroying the enemy army in pursuit.

When delivered during the apogee of French power (1805–1809), Napoleonic tactical doctrine drove all its enemies from the field and made the "little Corporal" the bane of Europe. In a long series of conflicts in which the enemy nation is not destroyed and prostrated, however, the enemy has time to learn from its defeats. The Austrians, by virtue of their numerous defeats, were able to copy and adopt Napoleonic concepts. By 1809, the Austrians were tactically almost equals of the French as demonstrated at Wagram. The British developed an asymmetric response, using terrain to neutralize French artillery and deploying skirmishers, plus an equivalent combined arms doctrine based on linear firepower. This defensive-orientated doctrine beat the French system every time they met, to include their last encounter at Waterloo when even the vaunted French Imperial Guard was repulsed. The key lesson in the dissolution of the French advantage is that a system that is not based on technological or cultural distinctiveness can be copied. Continual exposure to the French military system revealed its inner logic and, ultimately, its vulnerabilities, thereby providing the opponent to develop asymmetric responses.

Operational Sources of Military Advantage

If one were to look for antecedents to Napoleon's operational art, a close match would be that practiced by the Mongols. Napoleon's goal was to have a portion of his corps, marching on parallel axes of advance, make contact with the enemy, and fix him in position while other elements converged on the battlefield from multiple directions in envelopment or, at least, flanking maneuvers. This was Napoleon's preferred offensive method as exemplified by his 1805/1809 campaigns against Austria and his 1805/1809 campaign against Prussia.

Several critical variables contributed to Napoleon's style of warfare. His offensive style required a dense road network, such as in Central Europe, to enable multiple axes of advance. When Napoleon tried this offensive technique in Eastern Europe (Poland 1807/Russia 1812), the La Grande Armee was far less agile on the attack, forcing a series of frontal assault-style battles with the expected increase in battle casualties.

Another key variable was the information superiority Napoleon achieved through swarms of light cavalry leading the advance of his forces. One unintended consequence of Napoleon's disastrous winter retreat from Moscow in 1812 was the significant casualty rate among French horses. These losses, which were never fully replaceable, considerably degraded the French ability to collect information.

The final key variable was Napoleon himself. He was a genius with an extraordinary memory and cognitive skills. Prior to a campaign, he would absorb all statistics on road networks, food production, and other vital data to inform his actions. More important, Napoleon, in collaboration with his chief of staff, Berthier, achieved a 24-hour command and control cycle—something not achieved again until the advent of the radio in the 20th century. [4] In this manner, Napoleon was able to turn within an opponents' decision

cycle, creating a maneuver advantage that translated into repeated battlefield victories even during his 1813 and 1814 campaigns, when France was outnumbered.

Early and late in his career (e.g., Italy in 1799, France in 1814, and during the Hundred Days campaign), Napoleon fought outnumbered. Under these conditions, Napoleon favored the central position between two enemy forces. Relying on the use of interior lines, Napoleon would screen one enemy force while defeating the other, then quickly turn to defeat the screened enemy force. The key was to drive the two enemy forces apart so they could not mass their forces to overwhelm the outnumbered French, which is what led to Napoleon's defeat at Waterloo. The Prussians, after their defeat at Ligny, eluded Marshall Grouchy's pursuit and joined forces with Wellington. One of the intangibles of that campaign was that Berthier was dead; and his replacement apparently could not interpret and communicate Napoleon's orders with sufficient clarity. Consequently, the French forces displayed confusion and missed opportunities that allowed Blucher and Wellington to bring off a hard-won victory at Waterloo after initial French successes.

In the end, Napoleon and the French displayed the effects of almost two decades of continuous warfare. Losses among key personnel and a decline in the overall quality of soldiers, combined with a military genius past his prime, ultimately dulled the edge required to defeat the combined forces of Europe.

Strategic Sources of Military Advantage

Although Napoleon is usually considered an icon of strategic genius, in fact he had significant strategic blindspots, such as misperceiving the long-term effects of British naval superiority, which the British gained at Trafalgar in 1805. His misperceptions allowed the British to forge a series of coalitions fueled by English pounds (£) that allowed anti-French coalitions to lose most of the battles but to win the war.

Napoleon did not grasp the true importance of naval warfare. He viewed the navy as an adjunct to the army, rather than as a dominant fighting arm in its own right. He misjudged the power inherent to the Royal Navy and its ability to choke off European commerce. He also did not understand that a powerful navy gave his enemies the ability to land and fight where they wished. The navy also allowed the British to marshal men and resources from places beyond his strategic reach. While various British attempts to conduct amphibious operations often came to grief, they caused Napoleon to view his seacoasts as potentially open flanks.

At the same time, the poor performance of Napoleon's own navy at the Battle of the Nile and at Trafalgar ensured that Britain would remain, among all of the other nations of Europe, free from direct attack by the French. Napoleon did not understand the potential of such tactics as commerce raiding and striking at the British colonial holdings. These indirect strikes at the vulnerable sea-lanes of commerce and

communication could have caused England considerable trouble. Instead, the French Navy fought the British on their own terms and lost.

Napoleon's lack of vision in this area caused him to minimize the difficulties inherent in conducting a cross-Channel invasion of Great Britain. Like Hitler 140 years later, Napoleon viewed the Channel as no more than a large river that could be crossed as easily as others. His half-hearted attempts at menacing Britain wasted France's time and resources, emboldened the British to remain in the fight, and ultimately came to naught.

Was Napoleon's Military Legacy Enduring?

Soon after Waterloo, Napoleon was deposed and replaced by a corrupt version of the Bourbon dynasty. Exiled to St. Helena, Napoleon spent his final days under the control of the British. Although he was physically removed from the center of European politics, Napoleon's reputation still haunted the continent. The remaining dynasties vigorously suppressed the rising tide of liberal thought that had been unleashed by the French Revolution and that had been spread, like a contagion, by the advancing French soldiery. The Bourbon King Louis Philippe, whose claim to the throne was tenuous, was especially concerned about the reemergence of the Revolutionary ethos and of another general seizing the reins of power.

Nineteenth and 20th century military tactics were permeated with Napoleonic thought. Napoleon's enemies readily copied the organization and tactics of the *Grande Armee*, although they could not copy his tactical and strategic brilliance. Numerous treatises appeared that attempted to codify Napoleon's often-spontaneous tactical innovations into a series of understandable "maxims" that could be copied by competent officers. *Hardee's Tactics*, which gained a wide audience among American army officers in the 1850s, was one of many examples of this genre of literature. Ulysses S. Grant, who acknowledged having read the book, was unable to carry out the complicated maneuvers and procedures specified by Hardee and attributed to Napoleon. While such works captured the form of Napoleonic warfare, they did not capture its essence.

The primary impact of Napoleon was on the operational conduct of warfare. Napoleon aimed to dislocate his enemy, to confuse him, and to bring him to battle at the time and place most advantageous to the French. Napoleon viewed the destruction or capture of the enemy's army, and not his cities, as the true aim of warfare. The true legacies of Napoleon were his use of extended army frontages, persistent attempts to outflank his enemies, the development of battle plans with multiple "courses of action," and the use of massed firepower to gain local advantage. These tactics form the backbone of modern maneuver warfare, and they have been successfully applied from the American Civil War onwards.

J.F.C. Fuller postulated that Robert E. Lee was the last Napoleonic general and that Ulysses S. Grant was the first modern general. [5] Lee carefully and successfully implemented Napoleonic tactics to thwart individual Union attacks; however, Grant and Sherman employed Napoleon's strategic vision with a vengeance to break the back of the Confederacy. Both generals learned to eschew reliance on fixed supply bases and made living off the land part of their tactical lexicon. Both used wide-ranging flanking maneuvers to force the enemy to fight at a disadvantage. Both used massed firepower, applied at the decisive place and time, to disrupt the enemy and break his lines. Both understood that the capture of terrain and cities was secondary to the elimination of the enemy's field armies. Grant's entire Wilderness campaign was a Napoleonic war of maneuver against an enemy who had tactically reverted to the thinking of Vauban. [6] Lee proved to be more concerned with protecting Richmond at all costs rather than trying to destroy the Union Army. Once Grant understood this, he was able to develop a multi-pronged offensive, constantly probing for the Confederate flank. His wheeling maneuvers down the center of Virginia failed to destroy Lee in the field but resulted in pinning Lee to fixed fortifications outside of Richmond and Petersburg. Once his enemy's army was trapped, Grant could crush it in a siege. Sherman's campaign in the west applied Napoleonic strategy over a wide front. From Chattanooga through Atlanta to Savannah, Sherman conducted a series of wide flanking actions, designed to extract his enemies from their fixed fortifications and cause them to join battle in the open, resulting in the fall of Atlanta, Lincoln's reelection, and ultimate Union victory.

Although many of Napoleon's social reforms endured after he died, his dynasty never really began. Napoleon, like Alexander, created no successor who could carry his vision forward. In both cases, their military successes failed to endure beyond their lifetime.

End Notes

1. Nosworthy, Brent, *With Musket, Cannon, and Sword: Battle Tactics of Napoleon and his Enemies*, (Sarpedon: New York, 1996) p. 35–48.

2. Columns gain tactical mobility at the expense of significantly reduced firepower versus a line formation—the favorite of the British under Moore and Wellington.

3. Chandler, David, *The Campaign of Napoleon*, (MacMillan Co: New York, 1966) p. 344.

4. Van Creveld, Martin, Command in War, (Harvard University Press: Boston, 1987).

5. Fuller, General J.F.C., *The Generalship of Ulysses S. Grant*, (Da Capo Paperback: New York, 1929), page 372–381.

6. Sebastien Le Prestre de Vauban was one of France's most influential military engineers. He is renowned for his skills in both the art of attacking and defending fortified places in the 17th and 18th centuries. He built the most advanced fortifications/fortresses of his time and he also used his engineering prowess to devise innovative siege tactics that led the French to victory on numerous occasions.

Chapter 6

Implications for the United States

Victory at all costs, victory in spite of all terror, victory however long and hard the road may be; for without victory; there is no survival.
—Winston Churchill

Historically, military advantage has been based on a fundamental tactical advantage, enhanced by operational art, and sustained by strategic societal institutions. Decisive military advantage begins with asymmetric tactical advantage, which results from superior leadership or technology. Operational advantage is based on information and control, but it must rest on a bedrock of tactical advantage. Strategic advantage is derived from superior resources; political, economic, and societal organization and infrastructures; and the ability to engage the enemy's center of gravity. The case studies of military advantage in ancient history explored in this study suggest that tactical advantage without strategic advantage tends to be temporary.

In the post-Cold War world, the United States dominates on all three levels—tactical, operational, and strategic. An examination of enduring military advantage in history offers insights into what drives U.S. military advantage, where U.S. vulnerabilities may lie, and how the United States should think about maintaining its military advantage in the future.

Conclusions: Military Advantage

The historical case studies suggest that military advantage proves most enduring if it is based upon a strong political, economic, and social institutional structure at the strategic level. Tactical or operational advantage must be sustained by a strong economic foundation and a system in which stable governance is maintained.

The expansive Roman Empire offers the most telling example of enduring military advantage. The Romans' robust tactical doctrine enabled them to win every significant siege that they attempted and ultimately every war they fought. Their military advantage was maintained over time largely because it was supported and strength-

ened by the Roman ability to create and sustain strong domestic institutions, which were based on a code of law and evoked a strong sense of civil responsibility among the Roman populace. These institutions were designed to incorporate conquered people as the empire grew. Consequently, expansion strengthened Rome's strategic institutions until the empire reached a threshold of over-extension, at which point internal disturbances began to weaken the foundations of Rome's political and economic institutions. When Rome's institutional infrastructure began to decline, its military advantage began to diminish as well.

The Mongol explosion from Central Asia and its eventual domination over much of Eurasia was accomplished with relatively small armies, commonly known military technologies, and limited human resources. The Mongol military advantage rested on tactical and operational superiority, which was deeply rooted in the societal and economic structures of Mongol society. In this sense, Mongolian military supremacy was unique and could not be readily copied by competitors. The Mongols' enduring and unique advantage was based on the strength of a nomadic herding society with innovative operational concepts, superior organization and leadership, and a skillful blend of military technologies that reflected the political, social, and economic foundation of Mongol society. The Mongol dynasty was sustained by incorporating Chinese strategic institutions that enabled their empire to endure. They reached their apogee due to logistical constraints in forested regions of Central Europe that could not sustain the horses required to wage the Mongol style of conflict. The Mongols were finally defeated by enemies who copied their style of warfare after centuries of domination. It can be argued that the strength of the Chinese strategic institutions ultimately was absorbed by the Mongols, demonstrating that building strategic institutions is an essential element to enduring military advantage.

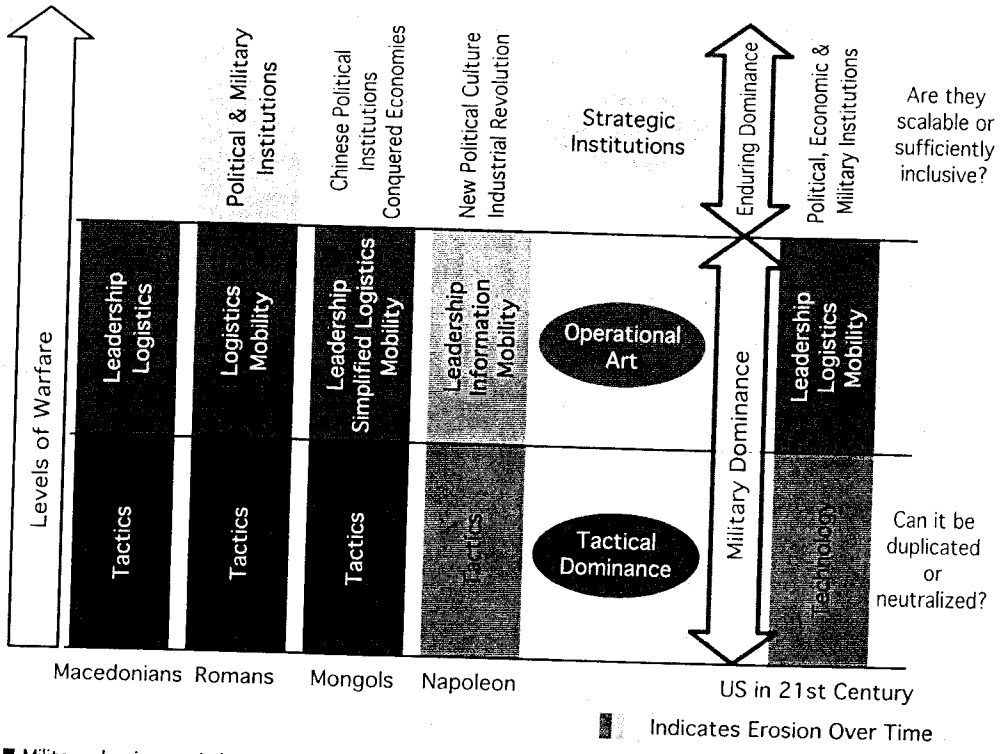
The Macedonians' military advantage was based on their combined arms strategy and the exceptional leadership and military genius of Alexander the Great. He led his army to innumerable tactical and operational victories, but his leadership was based more on a "cult of personality" than on a sustainable institutional structure. This lack of strong institutions made Macedonia's military advantage ephemeral, resulting in a long civil war that exhausted all parties after Alexander's death.

Similarly to the Macedonians, Napoleon's military advantage was temporary. Napoleon was able to develop innovative operational concepts and maintain a sophisticated command and control cycle, which was based on a superior doctrine and information superiority. The political climate in the late 18th century enabled Napoleon to create a large (one million strong), self-motivated military force. But without the support of an inclusive strategic vision, Napoleon's tactical and operational advantages could not be sustained after his death.

Relevance for U.S. Strategy

The elements of military advantage described in these brief case studies remain pertinent for the United States today. In the post-Cold War era, an opponent can counter U.S. military advantage in two ways. First, the opponent can improve upon the U.S. tactical or operational advantage by adopting similar but enhanced technological capabilities or by deploying more robust operational concepts. Second, the opponent can adopt an asymmetric response, which fundamentally changes the playing field. The most effective asymmetric response would target U.S. strategic institutions.

Tactical advantage can be copied or neutralized with improvements in technology. Yet even with the widespread availability of advanced military and commercial technologies, few countries can challenge the U.S. conventional military strength on the tactical and operational levels. An attempt to gain advantage on the tactical level sets off an interactive technology game, in which the enormous U.S. technological advantage makes it highly probable that it will remain one step ahead when challenged. For example, the growing arsenals of advanced cruise and ballistic missiles in countries across Asia are generating the political support and security justification for a national missile defense program in the United States.



- Military dominance is based on asymmetric advantages at the tactical and operational levels
- Enduring military dominance is based on scalable strategic institutions

Figure 6: How the Findings Map to the United States

U.S. power can be challenged on a second level. Since the U.S. conventional and technological advantage is so great, the only effective response for an opponent is to conduct an asymmetric attack on the United States' strategic domain. For the United States, strategic institutions (e.g., its democratic institutions, personal liberties, and market and financial institutions) represent both the source of its military advantage and its largest vulnerability. As U.S. military advantage in the tactical and operational levels grows, U.S. institutions become more vulnerable to an asymmetric attack. In this context, asymmetric attacks must be defined broadly to encompass all attacks on political, economic, and societal infrastructure (e.g., financial institutions, transportation hubs, public buildings, Internet hubs), as was demonstrated by the terrorist attacks on 9/11. Consequently, the U.S. Government and U.S. military are focused on the growing vulnerability and the need to protect a broader spectrum of targets in its efforts to focus on homeland defense.

The real U.S. vulnerability may be revealed by how the United States chooses to react to attacks on its strategic institutions. The lessons drawn from the case studies suggest that the United States' enduring military advantage is based on its sound strategic institutions. Therefore, this advantage could be undermined if confidence in these institutions were shaken. Such attacks could precipitate a closing of U.S. society, which could manifest itself in several ways. For example, the government could severely limit the personal freedoms that Americans take for granted, or it could limit foreign access to economic opportunities and to influence in the U.S. political system. If Americans perceive that they are losing freedom in their daily activities and transactions, they could lose confidence in the government. At the same time, if the U.S. government is perceived to be incapable of protecting the American people from external threats, confidence will also wane. Either scenario suggests that an opponent's ability to conduct asymmetric attacks successfully against U.S. strategic institutions may portend the long-term erosion of the United States' enduring military advantage.

The central question facing the U.S. military and law enforcement officers as they think about maintaining U.S. military superiority and creating a homeland defense strategy may be—How does the United States respond to attacks on its strategic institutions without creating the conditions to undermine its military advantage? The Roman model suggests that it is possible for the United States to maintain its military advantage for centuries if it remains capable of transforming its forces before an opponent can develop counter-capabilities. Transformation coupled with strong strategic institutions is a powerful combination for an adversary to overcome.

Conclusions: Military Transformation

The historical case studies highlight a second important conclusion related to the integral role that military transformation plays in maintaining military advantage. The Romans' ability to maintain military advantage grew out of their ability to transform

the nature of military power over time. The Roman case study provides insights for the issues facing the U.S. military today.

At certain times in history, a great power arises, such as the Roman Empire, whose military power establishes the world standard that all others must exceed or neutralize if they intend to employ military force to gain their political objectives. Since the end of the Cold War in the late 1980s, the United States has been the dominant military power in the world. U.S. military power is multidimensional (land, air, sea, space, and cyberspace dominant), based on advanced weapons, platforms, and munitions; and supported by extensive networks of sensors, information systems, and command and control elements. The U.S. global military capability is not perfect, but it sets the prevailing world standard.

No state with an unchanging paradigm of military power can dominate indefinitely, for two reasons that emerge from the case studies. First, because the dominant power has found a method of war that is highly successful, it tends to stick with it. There are always evolutionary improvements, but the basic source of its military power tends toward the sacrosanct as the state's leaders follow the dictum, "if it ain't broke, don't fix it." The second reason is that potential opponents have a vested interest in overturning the prevailing military standard if they hope to achieve their political objectives backed by military means. The combination of these two factors leads adversaries to focus on the vulnerabilities of the dominant military power in order to defeat or neutralize the key sources of its military advantage. Consequently, the tendency of the dominant military power to codify and only modestly improve its existing military paradigm gives an aspiring adversary a relatively static target to undermine over time.

Since the Gulf War, the core elements of U.S. power projection capabilities have centered on air power (land- and sea-based) supported by precision munitions, information systems, and a vast array of sensors. This capability has been combined, on some occasions, with the timely deployment of ground forces. Although the Gulf War and the recent war in Afghanistan demonstrate the enduring value of ground power, the current U.S. way of war relies heavily on precision strike capabilities. Judging by most of the systems the United States plans to buy over the next decade, the services are largely pursuing programs to reinforce our current precision strike advantage.

This observation means that our potential opponents have already had a decade to observe the platforms, munitions, and end-to-end networked systems that bring U.S. military strength to bear rapidly in any part of the globe. Given that the typical acquisition cycle, from start to finish, for a major platform or command and control system takes from 10 to 20 years, our potential opponents have already begun to procure systems specifically designed to defeat our current military paradigm at a time when the United States continues to procure more of these same kinds of systems. There is strong evidence that one key dimension of adversary response is centered on an anti-access regime designed to keep U.S. forces from successfully deploying into a theater of operations. The anti-access regime is a tailored response to neutralize what are per-

ceived as significant vulnerabilities in the U.S. way of war. This does not mean that U.S. military power is rapidly on the decline; but barring a more innovative approach, the process leading to its substantial erosion has already been set in motion.

A key strategy to arrest this trend is to migrate or transform the sources of U.S. military power even while American military capabilities remain dominant. This will accomplish two things. First, it will defeat our opponent's targeted asymmetric strategies. Just when an adversary's military response threatens to achieve a critical mass against the current American precision strike paradigm, the U.S. military will be transformed into something very different—something that the adversary's tailored systems were not designed to defeat. Second, U.S. military dominance will be maintained through a continuous renewal process that periodically shifts its fundamental sources of power. This continuous transformation process will provide the United States with additional decades of significant military superiority.

Bibliography

1. Barker, Philip, *Alexander the Great's Campaigns*, (Patrick Stephens: Cambridge, 1979).
2. Bernstein, Alvin H., "The strategy of a warrior-state: Rome and the wars against Carthage, 264–201 BC," in *The Making of Strategy: Rulers, States and War*, Williamson Murray, Macgregor Knox, and Alvin Bernstein, (eds.), (Cambridge University Press: Cambridge, 1999).
3. Bohec, Yann, *The Imperial Roman Army*, translated by Raphael Bate, (B.T Batsford, Ltd.: New York: 1994).
4. Brook, Richard, et al, *The Times History of War*, (Harper Collins Publishers: London, 2000).
5. Burn, A.R., *Alexander the Great and the Hellenistic World*, (Collier Books: New York, 1947).
6. Cavalli-Sforza, L. Luca, Paolo Menozzi, and Alberto Piazza, *The History and Geography of Human Genes* (Princeton University Press: Princeton, 1994).
7. Chandler, David, *The Campaign of Napoleon*, (MacMillan Co: New York, 1966).
8. Devine, A.M., "A Pawn-Sacrifice at the Battle of the Granicus: The Origins of A Favorite Stratagem of Alexander the Great," (*Ancient History* 18, 1988).
9. Diamond, Jared, *Guns, Germs, and Steel: The Fates of Human Societies*, (W.W. Norton: New York, 1999).
10. Dupuy, R. Ernest and Trevor Dupuy, *The Encyclopedia of Military History from 3500 BC to the Present*, (Harper & Row: New York, 1998).

11. Engels, Donald W., *Alexander the Great and the Logistics of the Macedonian Army*, (California University Press: Los Angeles, 1978).

12. Fuller, General J.F.C., *The Generalship of Alexander the Great*, (Rutgers University Press: New Jersey, 1960).

13. Fuller, General J.F.C., *The Generalship of Ulysses S. Grant*, (Da Capo Paperback: New York, 1929).

14. Gabba, Emilio, translated by P.J. Cuff: *Republican Rome, The Army, and the Allies*, (University of California Press: Berkeley and Los Angeles, 1977).

15. Gilbert, *A History Of The Twentieth Century: Volume One: 1900-1933*, (Avon Books: New York, 1997).

16. Grant, Michael, *The Armies of the Caesars*, (Charles Scribner's Sons: New York, 1974).

17. Grant, Michael, *The History of Rome*, (Charles Scribner's Sons: New York, 1978).

18. Gruen, Erich S. (ed.), *Imperialism in the Roman Empire*, (Holt, Rinehart, and Winston: New York, 1970).

19. Hackett, General Sir John, (ed.), *Warfare in the Ancient World*, (Facts on File: New York, 1989).

20. Hammond, N.G.L., *The Genius of Alexander the Great*, (University of North Carolina Press: Chapel Hill, 1997).

21. Hammond, N.G.L., "The Macedonian Defeat Near Samarkand," (*Ancient World*, 22-2, 1991).

22. Hanson, Victor Davis, *Carnage & Culture: Landmark Battles in the Rise of the Western Power*, (New York, 2001).

23. Harris, W., *War and Imperialism in Republican Rome*, (Oxford University Press: Oxford, 1979).

24. Jones, Archer, *The Art of War in the Western World*, (Barnes & Noble Books: New York, 1987).

25. Juvaini, Ata-Malik (translated by J. A. Boyle), *Genghis Khan: The History of the World Conqueror*, (University of Washington University Press: Seattle, 1958).

26. Keegan, John, *A History of Warfare*, (Alfred A. Knopf: New York, 1994).

27. Kennedy, Paul, *The Rise and Fall of Great Powers*, (Vintage Books Edition: New York, 1989).

28. Keyser, Paul T., "The Use of Artillery by Philip II and Alexander the Great," (*Ancient World*, 25-1, 1994).

29. Lamb, Harold, *Genghis Khan: Emperor of All Men*, (Bantam Books: New York, 1927).

30. Livy (translated by Aubrey De Selincourt), *The War with Hannibal*, (The Penguin Group: London, 1965).

31. Luttwak, Edward N., *The Grand Strategy of the Roman Empire from the First Century AD to the Third*, (The John Hopkins University Press: Baltimore, 1976).

32. Machiavelli, *The Prince*: translated by Luigi Ricci, revised by E.R.P. Vincent, (Mentor Books: New York, 1952).

33. Nosworthy, Brent, *With Musket, Cannon, and Sword: Battle Tactics of Napoleon and his Enemies*, (Sarpedon: New York, 1996).

34. Polybius (translated by Ian Scott-Kilvert), *The Rise of the Roman Empire*, (The Penguin Group: London, 1979).

35. Polybius, *Histories*, VI, 22.4-23.11 as cited in W.R. Paton, 6 Volumes (Cambridge University Press: Cambridge, 1966).

36. Porter, Bruce, *War And The Rise Of The State*, (The Free Press a division of MacMillan Inc.: New York, 1994).

37. Sun Tzu (translated by Samuel B. Griffith), *The Art of War*, (Oxford University Press: London, 1963).

38. Van Creveld, Martin, *Command in War*, (Harvard University Press: Boston, 1987).

39. Warry, John, *Warfare in the Classical World*, (St. Martins Press: New York, 1980).

40. Webster, Graham, *The Roman Imperial Army*, Third Edition, (Barnes & Noble Books: New Jersey, 1985).