

PRE-MODERN SWARMING: HORSE-ARCHER CASES

Many examples of military swarming at the tactical level come from the ancient world and the Middle Ages. The most common swarmer in history has been the horse archer, which was introduced into warfare by the nomadic barbarians of Central Asia. Swarmer-versus-nonswarmer battles usually involved light cavalry armies of nomadic people fighting infantry armies from more-settled agricultural communities.¹ The Eurasian steppe produced most of the well-known mounted archers, including the Scythians, Parthians, Huns, Avars, Bulgars, Magyars, Turks, Mongols, and Cossacks.

The firepower and mobility advantages of the steppe warrior were not surpassed until the invention of gunpowder. Whether their opponent was Persian, Macedonian, Roman, Frank, or Arab, mounted archers usually fared well. Unfortunately, many of the ancient examples of swarming offer little detail because of the remoteness of the events and the lack of accurate and complete accounts. There are few ancient or medieval historical sources on the history of warfare between swarmers, because most swarmer armies were nomadic.² Often, only a brief description of the conflict is available.

¹Very few military systems used combined-arms forces, so it was not uncommon for one type of single-arm force to meet another very different single-arm force in battle.

²Historical matchups between swarming armies (where both sides relied on horse archers) would include the Mongolian campaign in Khwarezm (1219–1221) and the Mongol incursions into the Middle East later in the thirteenth century. The most famous encounter was the Battle of Ayn Jalut in 1260, in which an Egyptian army led by Mamluks halted the Mongols. See Erik Hildinger, *Warriors of the Steppe: A Military History of Central Asia, 500 B.C. to 1700 A.D.*, New York: Sarpedon, 1997, pp. 163–167.

Central Asian Operations of Alexander (329–327 B.C.)

Alexander the Great was one of the first Western military commanders to encounter an enemy who used swarming tactics. The Scythians, a nomadic people who generally fought with horse archers and used swarming tactics, turned out to be the first army to defeat the Macedonian phalanx after it crossed the Hellespont. However, Alexander improvised new tactics to counter the swarming tactics of the Scythian horse archers and eventually defeated them.³

After Alexander successfully defeated the Persian Emperor Darius at the Battle of Gaugamela, he turned his attention to securing the northeastern border of the old Persian empire, especially in the two *satrapies* [provinces] of Bactria and Sogdiana (Figure 3.1), where a revolt had erupted under the leadership of Spitamenes.⁴

While Alexander was building a new fort called Alexandria Eschate on the border near the Jaxartes River (in modern-day Uzbekistan), Asiatic Scythians living on the north side of the river appeared and began to taunt and insult Alexander and his fellow Macedonians.⁵ With bone splinters still working their way out of his leg (from a wound picked up in a previous battle), Alexander was in a foul mood. He decided to cross the river and attack the Scythians.

The Scythians used what were known as “Parthian tactics,” taking advantage of their greater mobility to circle around their enemies and cause their attrition using long-range arrow fire.⁶ Encirclement

³In *The Generalship of Alexander the Great* (Piscataway, NJ: Rutgers University Press, 1960), J.F.C. Fuller offers an excellent analysis of how Alexander improvised his tactics to defeat the Scythians. In his chapter “Alexander’s Small Wars,” Fuller extrapolates from the classical descriptions (by Arrian of Nicomedia and Quintus Curtius Rufus) and details the logical sequence of tactics shown in Figure 3.3.

⁴It would take Alexander two years of guerrilla fighting to subdue these two regions. Largely because of the inhospitable terrain, Alexander adjusted his Macedonian army force structure to include more cavalry and light troops.

⁵The Scythians were also the Massagetae, a nomadic people who inhabited the steppe beyond the Jaxartes River. See Fuller, 1960, p. 118.

⁶All of the horse archers looked at in this study used some variant of the recurved composite bow, made of sinew and horn to withstand tension and compression. Composite bows were superior to the Western “self” bows made of a single straight stave of wood. Given equal draw weights, the composite bow will shoot an arrow faster and further than will a self bow. Composite, recurved bows are also shorter and better for men on horseback. For an excellent discussion of this topic, see Hildinger, 1997, pp. 20–31.



SOURCE: Adapted from J.F.C. Fuller, *The Generalship of Alexander the Great*, Piscataway, NJ: Rutgers University Press, 1960 (reprinted by DaCapo Press, Inc., New York, 1989), p. 110. Copyright© by John Frederick Charles Fuller. Reprinted with permission.

Figure 3.1—Map of Bactria and Sogdiana

maximized the number of targets available to the mounted archers. The general motion of the swarming mass was most likely a slow rotation, which resulted naturally from the individual motion of mounted archers as they continually attacked and retreated (or “pulsed”). Individual riders made short pulses, charging forward from their encircling positions to fire arrows both on the approach and over their shoulders on the withdrawal (where the term “Parthian shot” comes from). See Figure 3.2.

Alexander realized that the best way to come to grips with the more-mobile Scythians was to pin the swarmer against an obstacle, such as a river or a fort. Since a geographic obstacle was not at hand, Alexander used his own men as bait by sending a cavalry force forward before his main army to provoke the hostile horse archers into attacking (see J.F.C. Fuller’s depiction in Figure 3.3). Once the Scythians had swarmed and circled around Alexander’s cavalry bait as expected, Alexander brought forward his light infantry to screen the advance of his main cavalry force. Fuller logically assumes

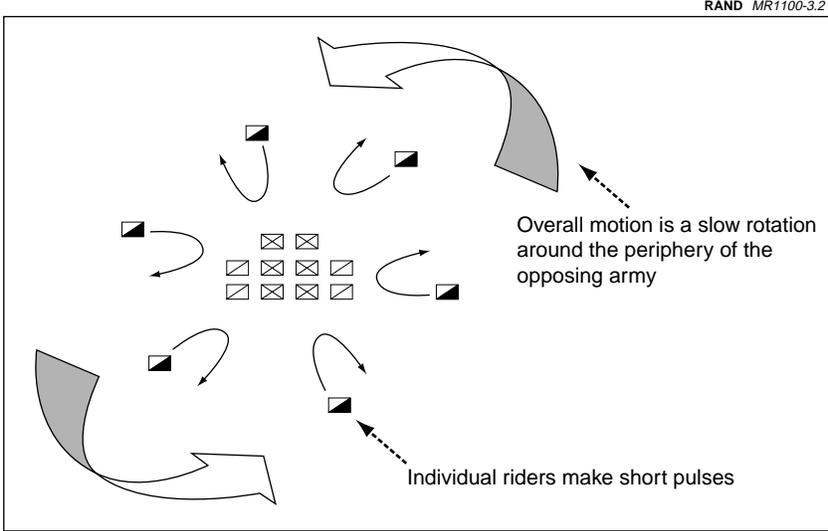
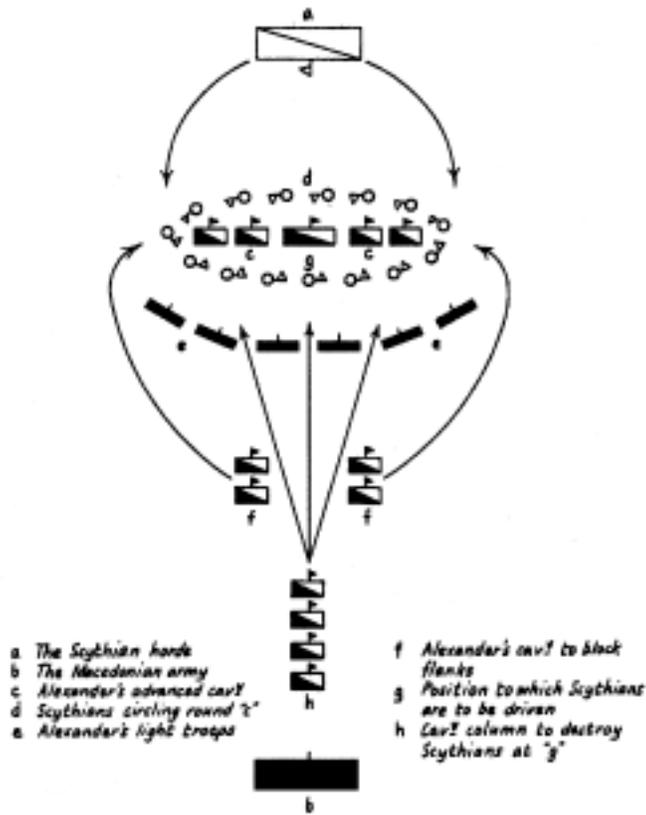


Figure 3.2—The Tactical Motion of Horse Archer Swarming



SOURCE: J.F.C. Fuller, *The Generalship of Alexander the Great*, Piscataway, NJ: Rutgers University Press, 1960 (reprinted by DaCapo Press, Inc., New York, 1989), p. 240. Copyright© by John Frederick Charles Fuller. Reprinted with permission.

Figure 3.3—Alexander's Anti-Swarm "Bait" Tactic

that the subsequent cavalry charge was aimed at the Scythians trapped between the light infantry and the bait force. Over 1,000 Scythians were killed and 150 captured in this battle, although the main part of the horse archer army escaped.⁷ The Scythians sued for peace shortly thereafter.

⁷Fuller, 1960, p. 119.

Without Alexander in charge, the Macedonian phalanx was much more vulnerable to the Scythians. While Alexander was winning his battle at Alexandria Eschate, another Macedonian phalanx was being cut to pieces by a horse-archer army about 150 miles away.

The primary Sogdian rebel, Spitamenes, had laid siege to one of Alexander's outposts at Maracanda (Samarkand). With him were 600 Scythian horse archers. To deal with this threat, Alexander had dispatched a Macedonian relief column under Pharnuches, with 860 cavalry and 1,500 mercenary infantry.⁸ Spitamenes lured the Macedonians into the desert and ambushed them south of the Polytimetus River. In this battle, the Scythian horse-archer tactics worked quite well. They swarmed around the Macedonian phalanx and bombarded it with arrows, looking for any subordinate units that could be isolated and destroyed in detail. A description of a horse archer attack could be taken from any number of battles fought then or later:

The [horse archers] surrounded our men and shot such a great number of arrows and quarrels that rain or hail never darkened the sky so much and many of our men and horses were injured. When the first bands of [horse archers] had emptied their quivers and shot all their arrows, they withdrew but a second band immediately came from behind where there were yet more [horse archers]. These fired even more thickly than the others had done...⁹

The Macedonian phalanx formed into a square and fought a rear-guard action, trying to reach a woody glen and prevent the horse archers from circling. But, in their rush to safety, the troops broke their formation and were annihilated.¹⁰

When Alexander learned of the disaster, he personally led a combined-arms force of infantry, archers, and cavalry on a march of

⁸See Fuller, 1960, p. 242; Peter Green, *Alexander of Macedon, 356–323 B.C.: A Historical Biography*, Berkeley: University of California Press, 1991, p. 357.

⁹Philippe Contamine, *War in the Middle Ages*, translated by Michael Jones, New York: Basil Blackwell, 1984, p. 60.

¹⁰Robert B. Asprey, *The War in the Shadows: The Guerrilla in History*, New York: William Morris and Company, 1994, p. 6.

135 miles in 72 hours to hunt down Spitamenes, but the mounted swarmers easily dispersed out of his reach. At this point, Alexander decided to target the logistics base of the Scythians. He divided his forces into five mobile columns and began establishing a linked system of military outposts, building hill forts throughout the countryside and concentrating villagers into walled towns. This strategy deprived Spitamenes of provisions and horses, and forced him eventually to abandon his elusive tactics. After Spitamenes lost a pitched battle to one of Alexander's lieutenants, his allies decided to betray him. They cut off his head and sent it to Alexander. All resistance collapsed in Bactria and Sogdiana.

The anti-swarm tactics that Alexander used over 23 centuries ago are similar to modern counterinsurgency doctrine. U.S. Army Field Manual (FM) 90-8, *Counterinsurgency Operations*, instructs soldiers to "locate, fix, and engage." Manuals in the 7-series (FMs 7-10, 7-20, 7-30) order soldiers to "find, fix, and finish" the guerrilla.¹¹ Modern guerrillas avoid decisive engagements with larger forces, just as the ancient horse archers avoided close battle with the Macedonian phalanx.

Swarming requires superior mobility, an advantage that cavalry clearly possesses over infantry. Historians are interested in how infantry managed to remain the dominant arm for so long, despite its lack of mobility. Between the fifth century B.C. and the battle of Adrianople¹² in 378 A.D., infantry—that is, the Macedonian Phalanx

¹¹The two techniques to engage elusive foes are either to block positions along likely escape routes or to encircle and cut off all ground escape routes and slowly contract the circle. Variations are possible. One or more units in an encirclement can remain stationary while others drive the guerrilla force against them. This "hammer and anvil" technique was used by Republic of Korea (ROK) forces during Operation *Ratkiller* in the Chiri-san mountains in 1951. See Major Kevin Dougherty, "Fixing the Enemy in Guerrilla Warfare," *Infantry*, March–June 1997, p. 33.

¹²Adrianople (378 A.D.) is generally regarded as the turning point for the decline of infantry as the dominant arm and the ascendancy of cavalry. In this battle, the Roman cavalry on both flanks was routed by the opposing Gothic horsemen, leaving the Roman infantry without cavalry support. With Visigoth infantry attacking the Roman front lines on foot and the Gothic cavalry swarming around the legions in the rear and flanks, the battle became a slaughter (this was not a case of swarming, though).

and the Roman Legion—played the decisive role in warfare;¹³ however, swarming cavalry armies managed to defeat infantry armies several times during this period.

Parthians Versus Romans at the Battle of Carrhae (53 B.C.)

One of the exceptions to the rule of infantry dominance was the Battle of Carrhae in 53 B.C., in which Parthian horse archers defeated Roman infantry legions.¹⁴ In the campaign of 55–53 B.C., Marcus Crassus led a Roman army of 39,000 into Parthia to fight a cavalry army of unknown size under Surena, near the town of Carrhae in what is modern-day Syria.

The Roman army was made up mostly of legionaries, with 4,000 light troops and 4,000 cavalry. Crassus at first marched his army along the Euphrates River for resupply by boat and to prevent the enemy from encircling the legions. Eventually, however, he was persuaded by an Arab scout to march out into the plains in pursuit of the Parthians. The Romans formed a hollow square and were surrounded by the Parthian cavalry. After some skirmishing, the horse archers swarmed around the besieged infantry and began delivering arrows and spears from standoff range. As Plutarch describes it,

The Parthians now placing themselves at distances began to shoot from all sides, not aiming at any particular mark (for, indeed, the order of the Romans was so close, that they could not miss if they would), but simply sent their arrows with great force out of strong bent bows, the strokes from which came with extreme violence. The position of the Romans was a very bad one from the first; for if they kept their ranks, they were wounded, and if they tried to charge, they hurt the enemy none the more, and themselves suffered none the less. For the Parthians threw their darts as they fled, an art in which none but the Scythians excel them, and it is, indeed, a

¹³For an explanation of why infantry dominated, see C.W.C. Oman, *The Art of War in the Middle Ages: A.D. 378–1515*, revised and edited by John Beeler, Ithaca, NY: Cornell University Press: 1953 (first published 1885).

¹⁴The Parni were a nomadic Scythian tribe living between the Caspian and Aral Seas. In 247 B.C., they invaded what is now northern Iran and established the Parthian kingdom. They expanded their domination over all of Iran and Mesopotamia at the expense of the Seleucid Empire.

cunning practice, for while they thus fight to make their escape, they avoid the dishonour of a flight.¹⁵

Once the Romans realized that the Parthians were being resupplied with arrows by camel trains, they knew they could not withstand the missile barrage indefinitely. Crassus sent his son with a picked force of 6,000 legionaries, cavalry, and auxiliary bowmen in an attack designed to pin down the elusive tormentors. The Parthian cavalry feigned retreat, enticing the small column away from the main body; then, cutting it off, they surrounded and annihilated the entire detachment. The harassment of the main body continued until nightfall, when darkness prevented further missile attack. During the night, most of the Romans managed to retreat to the walled town of Carrhae, while others were cut off and annihilated. The next day, the legions continued their retreat toward the relative safety of the nearby hills of Armenia, where it would be difficult for the Parthian cavalry to operate. Surenas caught up with Crassus and offered a parley, which Crassus was forced to accept because his men demanded it. During the parley there was some sort of scuffle and Crassus was killed; after this, the remnants of his army either surrendered or dispersed. About 5,000 eventually returned alive; 10,000 Romans were captured and the rest killed. Legionaries armed with *gladius* [short sword] and javelin were no match for mounted archers.¹⁶

By the beginning of the fourth century A.D., cavalry made up about 25 percent of the strength of the Roman army and much higher percentages in the Persian and Arabian armies. The rise of cavalry was enabled by the invention of the stirrup and the appearance of new, heavier breeds of horses in Persia and the steppes of Central Asia. In the East, new heavy lancers now complemented the standard light and heavy horse archers that the Parthian, Central Asian, and Chinese peoples had used all along. The lancers forced an enemy to

¹⁵See Plutarch, *Selected Lives from the Lives of the Noble Grecians and Romans, Volume One*, Paul Turner, ed., Fontwell: Centaur Press Limited, 1963, p. 270.

¹⁶R. E. Dupuy and T. N. Dupuy, *The Encyclopedia of Military History from 3500 B.C. to the Present*, New York: Harper & Row, 1970, p. 117.

remain in close order, making them more vulnerable to horse archers.¹⁷

The Byzantines and the Battle of Manzikert (1071)

By the sixth century, the Roman legionary was gradually replaced by the cataphract in the Eastern Roman Empire.¹⁸ Cataphracts were heavy cavalymen who carried the lance, sword, and shield, as well as the bow, effectively combining firepower, mobility, and shock action. Except for the Frankish and Lombard knights, no horsemen in the world could stand against the heavy Byzantine cataphract. Most of the time, the cataphract proved to be an even match against the Asian and Arab horse archer.¹⁹

The Byzantine military system deserves a closer look, because its combined-arms armies managed to defeat swarming light cavalry forces many times during its 1,000-year history.²⁰ Using a combination of bow infantry and cataphracts that negated to some extent the standoff capability of horse-archer armies, the Byzantines managed to defend themselves against the attacks of many types of swarmer armies, including Avar, Turk, Bulgar, Slav, and Magyar.

For example, in the tenth century A.D. the Magyars launched numerous raids from the Hungarian steppe into Byzantine territory.²¹ The Magyars did not have a standoff-fire capability: Byzantine

¹⁷Dupuy and Dupuy, 1970, p. 137.

¹⁸Oman, 1953.

¹⁹ Of course, the tactical matchup between military units is just one reason behind Byzantine success. The Byzantines much preferred bribery, diplomacy, and trickery to actual conflict. Byzantine tactics used a flexible approach and organization that provided for a succession of shocks, which is key to victory in a cavalry combat; as many as five different attacks could be made on the enemy before all the momentum of the Byzantine force had been exhausted. They also loved to perform ambushes, including the "Scythian Ambush," a direct copy of the *mangudai* technique of feigned withdrawal. See Oman, 1953, p. 53, and *Maurice's Strategikon: Handbook of Byzantine Military Strategy*, translated by George T. Dennis, Philadelphia: University of Pennsylvania Press, 1984.

²⁰The Byzantine army consisted of heavy and light cavalry, as well as heavy and light infantry.

²¹Magyars fought as the Parthians did against Rome. Armed with javelin, scimitar, and bow, Magyars used superior mobility to harass and wear down their opponents until gaps appeared. They would exploit such gaps to cut off and isolate groups. They

foot archers had a longer range than the Magyar horse archers.²² However, the Byzantines preferred to close with the Magyars rather than exchange missile fire from a distance. Magyar horse archers could not charge the steady infantry of the Byzantines, whose front rank was made up of spearmen carrying long shields that could stop the scimitar-wielding light horsemen. For their part, the Magyar horse archers avoided close combat against heavier opponents, usually settling for long-range harassment to wear down the enemy before coming to grips. Sometimes a decisive result was impossible and the swarming cavalry had to settle for raiding and looting.

The Byzantines studied their various enemies for weaknesses, including the people they called the Scythians, their primary horse archer enemy. *Maurice's Strategikon*, a Byzantine military manual written around 600 A.D., notes that cold weather, rain, and the south wind loosen the bow strings of the horse archer. In the section called "*Dealing with the Scythians, That Is, Avars, Turks, and Others Whose Way of Life Resembles That of the Hunnish People*," the *Strategikon* notes that these enemies preferred surprise and the cutting off of supplies to direct force. "They prefer battles at long range, ambushes, encircling their adversaries, simulated retreats and sudden returns, and wedge-shaped formations, that is, in scattered groups."²³ They could also be hurt by a shortage of fodder, which they needed for their vast herd of horses. *Strategikon* warns Byzantine commanders to make sure a geographic obstacle such as an unfordable river is at their rear to prevent the swarmers from encircling them.

Despite this record of success, the most disastrous defeat in Byzantine history came at the hands of the Seljuk Turks, a horse archer

inhabited the lower Don Basin in the early ninth century, where they were vassals of the Khazar Turks. Driven away from Turkish tribes by eastern pressure, the Magyars migrated to the lower Danube Valley. Eventually, they migrated across the Carpathians into the middle Danube and Theiss valleys to defeat the Slavic and Avar swarmers and establish the Hungarian nation.

²²According to Erik Hildinger, Byzantine cavalry carried recurved composite bows. See Hildinger, 1997, p. 77.

²³*Maurice's Strategikon: Handbook of Byzantine Military Strategy*, translated by George T. Dennis, Philadelphia: University of Pennsylvania Press, 1984, p. 117. The other primary source for Byzantine military tactics is Emperor Leo VI's *Tactica*, written around A.D. 900. For a good discussion of its contents, see C.W.C. Oman, *A History of the Art of War in the Middle Ages, Volume One: 378-1278 AD*, London: Greenhill Books, 1998a (first published in 1924), pp. 187-217.

people: the Battle of Manzikert in 1071. Although the Byzantine capital of Constantinople did not fall until 1453, most historians trace the military decline and eventual defeat of the Byzantine Empire to this one defeat.²⁴ Manzikert led to the loss of rich provinces in Asia Minor, an area that was a source of economic strength and military recruitment. After this battle, the Byzantine defenses were never the same.

Seljuk Turks operating out of Persia had been raiding the eastern provinces of the Byzantine Empire for many years when Emperor Romanus Diogenes decided to do something about it. In 1071, his army of around 30,000 men maneuvered to engage an approximately equal number of Turks near his eastern territory in Armenia.

The battle of Manzikert occurred on excellent horse-archer terrain, open and rolling. It proceeded in the typical swarmer manner, with the Turks hovering about the Byzantine line, shooting arrows but never closing. Byzantine horse archers tried to return arrow fire, but they were too few and suffered heavily.²⁵ The mounted Turkish archers stayed out of reach, refusing to close with the Byzantine heavy cavalrymen, pouring a constant deluge of arrows into the Byzantine ranks. At the end of the day, Romanus directed his tired army to withdraw, back to camp. The Turks harassed the retiring columns so much that Romanus ordered his army to turn around again and head them off. At this point, the Byzantine reserve line did not follow orders and continued on its way back to camp. Without a rear guard, the Byzantines were quickly encircled by the horse archers.²⁶ The horse archers folded in their center and swarmed around the flanks of the Byzantine army, pouring in arrows from three directions. When the Byzantine rear guard deserted, the Turks were able to surround the Byzantine main body and turn an orderly withdrawal into a rout.

Manzikert is another example of the *mangudai* pattern—to pretend to retreat, then encircle and ambush your pursuers from all

²⁴Other factors also contributed, including a continuing decline in training and discipline and the sacking of Constantinople by the Crusaders during the Fourth Crusade.

²⁵Oman, 1998a, p. 220.

²⁶Oman, 1998a, p. 221.

directions. It has been a favorite tactic of horse archers throughout the ages (see Figure 3.4).

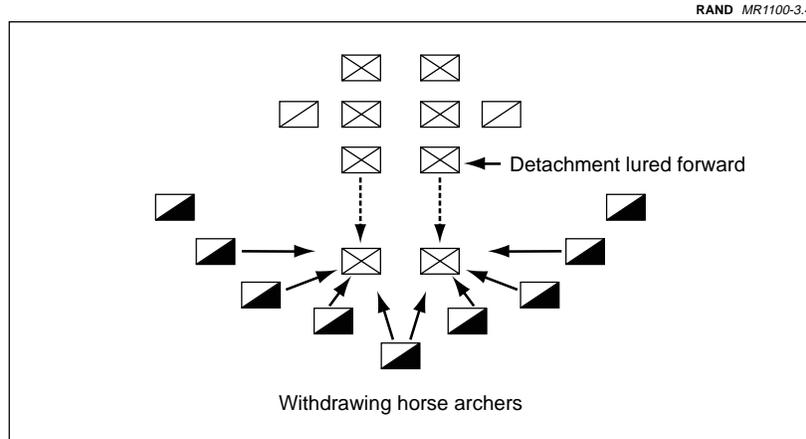


Figure 3.4—The *Mangudai* Technique of Feigned Withdrawal

Again, many reasons can be given for the Byzantine loss to the Turkish horse archers at Manzikert, including the poor leadership of Emperor Romanus Diogenes and some degree of treachery during the battle from one of his reserve commanders. Certainly Byzantine soldiers were not as disciplined as they were during the height of Byzantine power in the sixth and tenth centuries. Byzantine training obviously varied in quality over the course of centuries. But sources indicate that the skillful use of mounted archers and the age-old ploy of the *mangudai* technique by the Turks led directly to the Byzantine defeat.²⁷

The First Crusade and the Battle of Dorylaeum (1097)

The Crusades present another unique historical matchup between a swarming horse-archer opponent and the heavily armored knights of Western Europe. Western knights armed with lance and sword

²⁷Walter Emil Kaegi, Jr., "The Contribution of Archery to the Turkish Conquest of Anatolia," *Speculum*, Vol. 39, No. 1, 1964.

clashed with the Seljuk Turks of Syria and the Holy Land through several Crusades, more often than not suffering at the hands of the horse archers. The First Crusade was the only significant success for the Crusaders—an amazing feat, given their inferior mobility and tactics, which were poorly suited for facing armies of horse archers. Besides a few minor engagements and some siege battles, the Battle of Dorylaeum was the major Crusader victory over the Seljuk Turks. As such, it deserves a closer look.

At the Battle of Dorylaeum (in present-day Turkey) in 1097, two heavy cavalry Crusader detachments caught a swarmer army of Turkish light cavalry in a vise and destroyed it. The following description of the battle shows that even though the Turks had greater tactical mobility man-to-man, their army could still be outmaneuvered and defeated at the tactical-operational level.

During the Dorylaeum campaign, the Crusader army actually marched in separate columns for three days after one of the feudal lords, Bohemond, took his Italo-Norman contingents and separated from it. Bohemond's force probably numbered around 10,000 Crusaders, the majority on foot, along with large numbers of noncombatants. On the evening of June 30, 1097, Bohemond's army made camp in a grassy meadow on the north bank of the River Thymbres, near the ruined town of Dorylaeum.

The next morning, Bohemond's men were attacked by roughly 30,000 Turkish horse archers under the command of Kilij Arslan. The Crusaders had never seen horse-archer tactics before. "The Turks came upon us from all sides, skirmishing, throwing darts and javelins and shooting arrows from an astonishing range."²⁸ The Franks were shocked to see that every Turk was mounted. The Turks rode around the Crusader camp in loose swarms,²⁹ killing so many knights with their arrows that Bohemond's army began to retreat toward the banks of the river.

The Turks captured a good portion of the Crusader camp as they swarmed around the Crusaders, cutting off individuals and small

²⁸Terry L. Gore, "The First Victory of the 1st Crusade: Dorylaeum, 1097 AD," *Military History*, Vol. 15, No. 2, June 1998.

²⁹Oman, 1998a, p. 274, and Gore, 1998.

groups. Bohemond ordered his knights to hold their positions. The Turks had the Crusaders virtually surrounded, and they set up relays to keep their archers provided with a constant supply of arrows. Whenever a small detachment of knights charged the Turks, the elusive horse archers would retire just out of reach, sending volley after volley of arrows into the Christians' ranks. Bohemond could only watch as his army died slowly from the "arrows and javelins . . . falling as thick as hail, the savage, piercing shrieks of the enemy, and the diabolical swiftness of their cavalry, constantly darting in to the attack and then away again" (Gore, 1998). The Crusaders were on the verge of defeat.

At this point, some messengers Bohemond had sent earlier to get help finally located the other Crusader detachment and guided them to the battle, where they quickly launched an attack on the Turkish flank and rear. The charging knights caught the Turkish army by surprise and pinned it enough to turn the fight into a melee. Bohemond's tired troops rallied and charged the Turks when they saw their friends charging into the Turkish rear.³⁰ The battle ended because horse archers were no match for the Western knight in close-quarters battle.³¹ Oman notes that total casualties were less than to be expected, because the Turks themselves suffered only during the last 10 minutes of battle before they fled the field.³²

One of the lessons of the Crusades reinforces the historical pattern: Swarmers must have superior mobility to defeat heavier nonswarmers. If swarmers can be pinned or hemmed in in some manner, they can be defeated.

The Crusaders managed to defeat the swarming army in this battle for two reasons: the failure of the swarmers to keep track of the second Crusader force and the lack of a shock force capable of delivering a knockout blow early on. The victory was due to chance for the most part. Subsequent battles between the Seljuk Turks and

³⁰Oman, 1998a, p. 277.

³¹Gore, 1998.

³²Oman, 1998a, p. 277. Gore, 1998, notes that "the Turks found the Western European knight much tougher to kill than the less-armored foot soldier. The knights (who would later be called "iron people" by the Saracens) took numerous missile hits and still fought on."

the Crusaders in later years—such as the Battle of Hattin in 1187—showed that the mounted archer would usually prevail over the Frankish knight.

THE ULTIMATE SWARMERS: THE MONGOLS AND THEIR INVASION OF EUROPE (1237–1241)

The Mongols are the ultimate exemplars of swarming, because they swarmed at both the tactical and operational levels. They defeated swarming and conventional opponents alike. In the early thirteenth century, Genghis Khan defeated all his neighbors and unified Mongolia around the Gobi Desert. Eventually, Mongol conquests stretched from Korea to Germany, the largest continuous land empire ever.

Mongol success can be attributed to many factors, including a decentralized command system that allowed subordinate commanders a great deal of initiative and decisionmaking power.³³ Also, the successful application of the Mongol swarming concept was at least due in part to superior situational awareness, mobility, and standoff fire. Superior mobility came from an army consisting entirely of cavalry, 60 percent of which was light. Standoff fire was enabled by the composite bow.³⁴

Mongol light cavalry gathered field intelligence, conducted mop-up operations, pursued the enemy after breakthroughs, and provided

³³Oman attributes Mongol success also to iron discipline (execution was a very common punishment) and the fact that in both Asia and Europe the Mongols faced no principality of great size or strength. See Sir Charles Oman, *A History of the Art of War in the Middle Ages, Volume Two: 1278–1485 AD*. London: Greenhill Books, 1998b (first published in 1924), p. 317.

³⁴According to J. Chambers, *The Devil's Horsemen: The Mongol Invasion of Europe* (New York: Atheneum, 1979, p. 57), the Mongol bow compared favorably with its best European counterpart. The English longbow had a pull of 75 pounds and a range of 250 yards; the smaller Mongol recurved composite bow had a pull between 100 and 160 pounds and a range of 350 yards. The Mongols also practiced a technique called the Mongolian thumb lock, whereby an archer used a stone ring on the right thumb to release arrows more suddenly to increase velocity. Hildinger's review of various historical sources and modern experts (1997, pp. 20–31) suggests that the accurate range for shooting the composite bow from horseback is much shorter, between 10 and 80 yards. More inaccurate fire at greater ranges is possible against massed enemies by "shooting in arcade" (shooting at a steep angle of about 45 degrees).

firepower support. Heavy cavalry provided the shock attack option if bow missile fire proved insufficient to destroy the main force. When enemy cohesion was disrupted and gaps appeared during battle, Mongol heavy cavalry armed with 12-foot lances provided the decisive blow.³⁵

At the tactical level, the Mongol horse archers used the same methods as their ancient Turkish and Parthian forebears. By fire and maneuver, the more elusive Mongols could remain at a distance, inflicting damage by missile attack. If the Mongols could not encircle the enemy, they tried other tactics, such as the *mangudai* “feigned withdrawal” ruse.

At the operational level, several Mongol divisions, or *toumens*, usually advanced on a broad front in roughly parallel columns (their Hungarian front was 600 miles wide), with a deployed screen of light cavalry to shield Mongol troop movements from enemy observation. Whenever an enemy force was located, it became the objective of all nearby Mongol units. *Toumens* would converge simultaneously on the enemy from multiple directions.³⁶ The column encountering the enemy’s main force would then hold or retire, depending on the situation.³⁷ Meanwhile, the other *toumens* would continue to advance, approaching the enemy flank or rear. The enemy would naturally fall back to protect its lines of communication and the Mongols would take advantage of any confusion to surround its position.

The Mongol *toumens* avoided defeat in detail by superior mobility and battlefield intelligence. Mongol units were faster because each horseman had several spare mounts to rely upon from the reserve herd of animals that trailed every *toumen* on the march. Riders simply switched mounts repeatedly on the march, as their horses

³⁵The heavy horsemen also used a scimitar, a battle ax, or a mace.

³⁶Separating into *toumens* had two main benefits: It magnified the apparent number of invaders in the panicked eyes of their enemies and it eased the logistics demands, which would be more severe with a concentrated host.

³⁷To buy time for other columns to approach, the first column would either pin the enemy if it was strong enough or feign retreat if not.

became exhausted.³⁸ Despite the vast distances often separating individual *toumens*, the Mongols enjoyed superior situational awareness by using a corps of mounted couriers to relay messages and orders. Tactically, they communicated with signal flags for the most part, but also with horns and flaming arrows. Strategically, Mongol spies were always sent ahead as merchants to the next target region, well before the Mongol *toumens* ever appeared on the horizon.

Mongol success depended on having terrain on which to maneuver.³⁹ Generally, when the horsemen could swarm around the enemy, they won; when they could be channeled, they lost. ⁴⁰ Noted historian Sir Charles Oman argued that there were three types of terrain in which horsemen could not fight effectively: marshes, where horses had to follow trails or get stuck; dense woodlands, where horsemen were channeled onto narrow paths; and very mountainous terrain, where movement was restricted to passes. As Oman states, “the Tartar [Mongol] was essentially a conqueror of the steppe and the plainland, and in Europe it was the lands of the steppes and the plains only that he swept over.”⁴¹

In the early thirteenth century, the Mongol empire steadily expanded west, with Russia falling by 1240. After destroying all the Russian *duschies*, the Mongol commander, Batu Khan, set his sights on Hungary. Before he crossed the Carpathians into Hungary, he detached a force under Baidar to watch his northern flank and take care of the Poles. The speed and coordination of the widely dispersed *toumens*

³⁸Mongol armies could travel 50 or 60 miles a day, several times the distance their European adversaries could travel. See Erik Hildinger, “Mongol Invasion of Europe,” *Military History*, June 1997.

³⁹Terrain affected logistics as well as mobility. Some authors speculate that the Mongols would never have been able to conquer Germany because they needed open areas with plenty of grass for their herds of horses.

⁴⁰For example, the Mongols learned to avoid mountain passes. The *toumens* with their large herds of backup mounts, could not maneuver easily in the mountains. King Vaclav and his Polish-Czech army defeated a Mongol army in the Silesian passes in 1241.

⁴¹Oman, 1998b, p. 323.

that knifed into Hungary and Poland bring to mind the armored breakthroughs of WWII.⁴²

Two Mongol *toumens* under Baidar met about 25,000 Poles and Germans under Duke Henry II of Silesia at Liegnitz on April 5, 1241. Fighting on fairly open terrain, the Mongols were able to execute one of their favorite ruses, the *mangudai* technique. They managed to lure the European heavy cavalry of Teutonic knights and Templars into a trap by deliberately folding back the Mongol center (which was composed of light horsemen). Once King Henry had committed his other elite heavy cavalry into the attack, the Mongol light horse archers sidestepped the charging knights and enveloped them from three sides, showering the Europeans with a deadly hail of arrows. Smoke bombs added to the confusion. And when the moment was ripe, the Mongols delivered the *coup de grâce* with their heavy cavalry.

After their victory, the Mongols under Baidar rejoined their comrades in Hungary and defeated an even larger European force under King Bela at the Battle of the Sajó, a river in northeast Hungary. Hungary was saved from complete destruction only by the death of the Great Khan Ogotai in faraway Karakorum. Batu Khan led his *toumens* back to take part in the contest for the succession, and the Mongols left Hungary as suddenly as they had entered it.

The Europeans were ill-suited to face the horse archers because of their lack of missile-bearing troops and their poor tactics. Western armies relied upon their heavy cavalry as the main striking force. Its primary purpose was to deliver a decisive charge to break up the enemy formation. Infantrymen played a supporting role, protecting the rear while the knights charged, and finishing off any unhorsed enemy cavalymen.⁴³ The Western knights possessed superior armor (plate armor and chain mail), rode stronger horses, and were superbly trained, but they could not close with the faster and lighter Mongol.

⁴²In fact, both Generals Patton and Rommel admired and studied the principles employed by Subotai, the military commander of the Mongol invasion of Europe in 1240. See Chambers, 1979, p. 66.

⁴³Experience and ability varied considerably, from the highly competent detachments of Teutonic knights and Knights Templar from France to the general levy of free peasantry, sometimes armed only with crude farm implements.

INDIAN SWARMING ON THE NORTH AMERICAN FRONTIER: ST. CLAIR'S DEFEAT (1791)

Another historical example of the tactical swarmer is the Native American Indian. In the woodlands of the Ohio Valley territory in the late eighteenth century, Indians possessed superior situational awareness because they knew the lay of the land and used their scouts more effectively than did European-modeled forces. The heavily wooded terrain offered concealment, and the lightly armed Indians were more mobile than the Colonial regular infantry. The Indians used modified swarm tactics to surround the enemy and rush him from all sides. Although they did not have a standoff-fire capability, surprise ambushes based on concealment and superior situational awareness were sufficient to achieve victory.

The worst defeat ever inflicted on a U.S. army by Indians occurred in the Ohio Territory in 1791, at the battle called "St. Clair's Defeat." Nearly 700 American soldiers died in this disaster (three times the number the Sioux would kill 85 years later at Little Big Horn). This example deserves a closer look.⁴⁴

In September 1791, the U.S. commander, Major General Arthur St. Clair, headed north from what is now Cincinnati, Ohio, to establish a string of forts through Indian territory. When his troops were about 50 miles from present-day Ft. Wayne, Indiana, they camped upon some high, defensible ground. A large number of sentries were placed around the bivouac site.

St. Clair received so little intelligence that historians have failed to name the battle in the traditional manner—after the nearest geographic feature—because St. Clair had no idea what river was near his position. As with any historical analysis, many variables affected the outcome. In this case, the Americans were short of horses, their 55-year-old commander had a case of gout, and the attached militia units were poorly disciplined.⁴⁵

⁴⁴See Richard Battin, "Early America's Bloodiest Battle," *The Early America Review*, Summer 1996. See also Leroy V. Eid, "American Indian Military Leadership: St. Clair's 1791 Defeat," *The Journal of Military History*, 1993, pp. 71–88.

⁴⁵It is true that a better-trained and better-equipped American Army gained victory over these Indians three years later at the Battle of Fallen Timbers (1794).

But it would be false to conclude that any ragtag army of Indians could have defeated General St. Clair. The complete surprise of the Indian attack on all sides was more to blame for the defeat than mediocre U.S. leadership.

No one knows for sure who was actually leading the Indians. It was either a single, unidentified leader or a council of leaders.⁴⁶ In this case, all the Indians appeared to be using the same tactics: charging frontiersmen (who were more apt to break and run than the U.S. regulars), shooting at officers, using the “treeing” technique,⁴⁷ and withdrawing and surrounding any U.S. detachments that conducted bayonet charges. As one eyewitness put it, “They could skip out of reach of bayonet and return, as they pleased.”

The Indians initially rushed the militia sentries and sent them flying, then a group rushed the main camp. The Indians stayed hidden as they ran through the underbrush and completely surrounded the U.S. camp in a matter of minutes. St. Clair remarked later that he was “attacked in front and rear, and on both flanks at the same instant, and that attack [was] kept up in every part for four hours without intermission.”⁴⁸ The main weight of the attack was initially in a half-moon shape that overlapped the left flank of the U.S. position, which was the first to collapse.

Individual small-unit leaders followed the same game plan, similar to “the mission-order” of the *Wehrmacht* 150 years later.⁴⁹ The psychological effect of the attack broke U.S. resistance. In the end, in the confusion St. Clair luckily managed to punch a hole through the circle of swarmers and escape with a pathetic remnant of his command.⁵⁰

⁴⁶The leader was either Little Turtle of the Miamis or Blue Jacket of the Shawnees.

⁴⁷The “treeing” technique was to get down on one knee behind a tree and wait for the appearance of the enemy. The Indian hopped from tree to tree after firing, continuously using one position after another.

⁴⁸Eid, 1993, p. 85.

⁴⁹The Indians were led by different grades of chiefs, some of whom led groups of 50, some 100, etc.

⁵⁰The Indians failed to pursue and finish St. Clair off because they fell to looting the abandoned camp.

ULM: A CASE OF OPERATIONAL-LEVEL SWARMING?

The operational-level maneuver of Napoleon's corps in the 1805 Ulm campaign appears to fall under our broad definition of *swarming*. Several independent and dispersed corps converged simultaneously or "swarmed" from different directions to encircle the Austrian army. This case is unique because it was operational-level swarming only. Ulm was not a battle; it was an operational victory so overwhelming that the issue was never seriously contested in tactical combat. At the tactical level, the French army used an improved version of the standard line-and-column tactics of the day. French forces were made up of infantry, field artillery, and cavalry, and they were applied in tactical offense or defense in the same as were opposing forces.

The heart of Napoleon's system was the *corps d'armée*, the self-contained combined-arms units that could move in a diamond formation of four or five corps (see Figure 3.5).⁵¹ Theoretically, each corps could fight and pin an entire opposing army for at least 24 hours, just enough time for sister corps to converge.⁵²

Napoleon sought to assemble rather than concentrate ("assemble" implies a more versatile and flexible stance, one less committed to a particular course of action) major units within marching distance of the intended battlefield on the eve of battle. He then had the flexibility to concentrate mass to whatever degree he chose. His genius lay in being able to balance the requirements of concentration and dispersion to deceive the enemy as to his intentions.⁵³ He avoided piecemeal destruction using maneuver to both pin the enemy main body and materialize a flanking force on its flank or rear. Napoleon loved to cover the final approach to the enemy with incredibly fast forced marches, "pouncing like a cat."

⁵¹These divisions or corps were first envisioned by Marshal Broglie in the Seven Years War. See David Chandler, *The Campaigns of Napoleon*, New York: The Macmillan Co., 1966, p. 159.

⁵²Napoleon liked to scatter sometimes up to a dozen or more major formations, all accessing coordinated roads to converge on the confused opponent. Chandler, 1966, p. 154.

⁵³Chandler, 1966, p. 150.

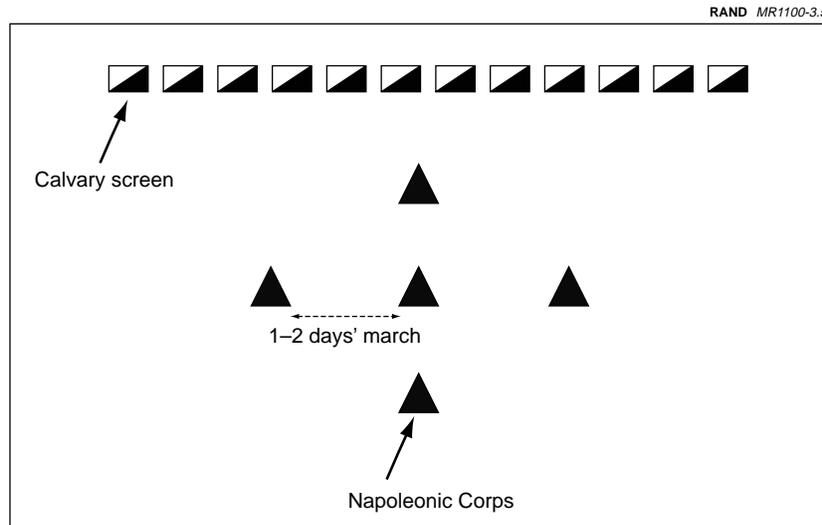


Figure 3.5—Napoleon’s Diamond Formation

Napoleon once said, “Strategy is the art of making use of time and space.”⁵⁴ Superior mobility and situational awareness were the keys to using that time and space effectively.⁵⁵ Averaging 30 kilometers per day on the march, the French army’s speed gave Napoleon the ability to maintain the initiative and stay one step ahead of the enemy. A massive, dense cavalry screen thrown forward would cover

⁵⁴When Napoleon said “strategy,” he really meant “operational art,” a modern term. In those days, the closest equivalent term was strategy.

⁵⁵French units were faster than other armies because they foraged for food on the march and hauled fewer supplies in their siege trains. The social and political changes wrought by the revolution made this possible. The *levee en masse* filled the ranks of the *Grande Armée* with a true cross section of French society. While opposing armies had to rely on mercenaries, conscripts, and general undesirables, the high *esprit de corps* of the French army lowered desertion and granted Napoleon the freedom to spread out his men as much as he wanted. Dispersion allowed them to forage for food and supplies on the move, reducing his need for a logistical tail and increasing his speed. Napoleon’s operational art depended on this speed. Cyril Falls, *The Art of War from the Age of Napoleon to the Present Day*, Oxford, England: Oxford University Press, 1961, p. 19.

all movement and limit the enemy's ability to detect Napoleon's penetrating corps.

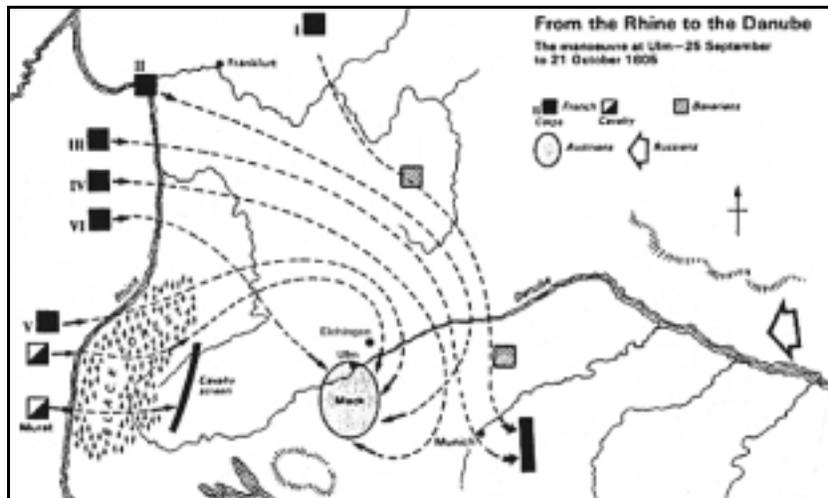
In 1805, an Austrian army of 72,000 men under the command of Archduke Ferdinand d'Este marched south through southern Germany to the area around Ulm to deny supplies to Napoleon and link up with an approaching Russian army. The effective commander of the Austrian army was the Chief of Staff, General Karl Mack Von Lieberich. General Mack's plan was to act as the "anvil" upon which Napoleon's French army might be destroyed, the 100,000 Russians acting as a "hammer." As Napoleon converged his separate corps toward the Austrians, Mack tried to escape the trap by attacking the French VI Army Corps, mauling a component division in the process.

After the Austrians captured a copy of Napoleon's orders, Mack argued for an immediate move to Regensburg, but Ferdinand delayed him. When the Austrian army finally did move east on October 14, Napoleon was able to stop him at the Battle of Elchingen. Mack had no choice but to hole up in Ulm, where he was operationally surrounded, and he later surrendered with nearly 30,000 men. Figure 3.6 shows the routes of the semiautonomous corps approaching Mack's position from multiple directions.⁵⁶

In contrast, Napoleon's Russian campaign of 1812 illustrates how crippling the loss of operational mobility can be.⁵⁷ His final objective was Moscow, which he managed to sack. However, because of logistics problems, he never did manage to get his corps to converge against the opposing Russian army. The Russians adopted a Fabian strategy of scorched-earth withdrawal, avoiding battle when it was advantageous to do so. This strategy deprived the French of even

⁵⁶In the broadest strategic sense, this campaign might be viewed by some as a single envelopment or a turning movement, in the way that Mack's major line of communications was severed. The two opinions are not necessarily separate and distinct.

⁵⁷Other factors obviously contributed to Napoleon's defeat in Russia. Napoleon waited too long in Moscow before beginning his retreat, subjecting his troops to the early Russian winter. He chose to fall back to Smolensk, along the ravaged northern route of the original French invasion.



SOURCE: Gunther E. Rothenberg, *The Art of Warfare in the Age of Napoleon*, London: Batsford, 1977, p. 150. Copyright© by Gunther E. Rothenberg. Reprinted with permission.

Figure 3.6—Capitulation of Ulm, October 17, 1805

rudimentary local supplies, forcing them to rely on a burdensome logistical tail. Unlike Western Europe, where Napoleon's operational system could depend on an excellent road network and rich agriculture, the environment in Russia hampered the *Grande Armée's* operational maneuverability (and its swarming ability). The Russians defeated Napoleon in a war of attrition.⁵⁸ Napoleon invaded Russia in 1812 with about 450,000 men in his central army group. He returned with 25,000 bedraggled survivors.

⁵⁸It is not surprising that the climactic battle of the campaign, Borodino, turned out to be a bloody draw. Over 258,000 men clashed along less than 3 miles. Borodino was a brute-force slugging match with no real maneuver. Both sides used the conventional line-and-attack column as their fundamental tactical deployments.

GUERRILLA OPERATIONS AND SWARMING: MAJUBA HILL (1881)

There may be lessons to learn from looking at swarming examples in the history of guerrilla warfare. In many respects, the tactics used by guerrillas (or insurgents) are characteristic of what a future swarmer might employ. Relying on stealth, surprise, dispersion, and concealment, guerrillas operate without heavy logistical support, move in small groups, and make do without heavy weapons. As to tactics, their favorite offensive approach is the tactical ambush, in which surprise and deception are key. Guerrillas avoid fixed, linear defenses, and they prefer to attack after the opponent has penetrated their defensive area.⁵⁹ Most guerrilla examples in history are Dispersed Swarm cases, the most relevant swarming approach for a future network-based organization.

Guerrilla warfare also presents unique aspects that relate directly to a future application of swarming. Partisans and insurgents operate from regional bases situated among a sympathizing population. Insurgents also usually operate in terrain that is inaccessible to heavy conventional units—mountains, forests, swamps, or deserts.⁶⁰ These aspects complicate a discussion of U.S. swarming. U.S. forces should never have to depend on indigenous support.

Despite these unique characteristics, guerrilla operations are similar enough to swarming to justify a look at guerrilla warfare in history. One example of guerrilla swarming is the tactics used by the Boers

⁵⁹Even the German concept of maneuver warfare recognized the poor ability of linear fixed defense to withstand the concentrated mass of an attacker who chooses his time and place. German maneuver warfare doctrine called for a fluid area defense, characterized by a thin forward defensive screen positioned to detect enemy penetrations and a heavy operational reserve ready to establish strongpoints. Strongpoints halted offensive thrusts by the enemy and set it up for counterattacks on the flanks of its penetration corridor. The Germans always sought to create flanks for the enemy so they could envelop it, just as Hannibal did at the battle of Cannae.

⁶⁰Even as late as World War II, the mountains of Greece and Yugoslavia and the forests of Poland and Russia were sufficiently inaccessible to afford considerable scope for guerrilla attacks against German-used roads, railroads, and communications. By contrast, no guerrilla movement of any significance was able to arise and maintain itself in any of the technologically advanced Western countries overrun by the *Wehrmacht*, crisscrossed as those countries were by modern roads and telecommunications. Martin Van Creveld, *Technology and War: From 2000 BC to the Present*, New York: The Free Press, 1989, p. 302.

during the Anglo-Boer Wars.⁶¹ Even though the Boers recognized the British as their sovereign in the final peace treaty of the Second Anglo-Boer War, the Boers effectively achieved a military stalemate with their swarm tactics.

The Boers adopted swarming tactics after trying to fight the British in conventional head-to-head fights, learning that the British could bring to bear much greater firepower. They organized into geographical units, commandos, which ranged in size from 300 to 3,000 men. Boer swarming tactics followed the essential formula for guerilla tactical victory: Locate, mass, and attack isolated British detachments, then disperse before any relieving force could arrive.⁶²

In general, the Boers usually enjoyed the advantages of mobility, standoff fire, and situational awareness over the British, which allowed them to isolate and attack enemy detachments while avoiding greater concentrations of British Regulars.⁶³ Most Boers were superb horsemen. They used the Mauser rifle, whose 2,200-yard range was greater than its British counterpart.⁶⁴ The loyalty and support of the indigenous population helped the Boers conceal themselves and gather intelligence. The key to their success was to be on the strategic defensive, fighting an enemy on their own territory.

During the major campaign of the First Boer War, Major General George Colley led a small British army into Transvaal territory.⁶⁵ After a couple of unsuccessful attacks, Colley decided to seize Majuba Hill, a 2,000-foot-high extinct volcano on the extreme right

⁶¹*Boer* is a Dutch word meaning farmers. Boers were descended from the few hundred immigrants of Dutch, German, and Huguenot origin who settled at the Cape of Good Hope during the late seventeenth century. These frontiersmen lived in scattered family groups through the vast country of the Orange Free State and the Transvaal.

⁶²Bevin Alexander, *The Future of Warfare*, New York: W. W. Norton & Company, 1995, p.100.

⁶³In the specific case of Majuba Hill analyzed below, the Boers did not have an effective standoff capability.

⁶⁴The Boers had the Mauser in the Second Anglo-Boer War, not in the first. However, even in the First Boer War, the Boers enjoyed a greater effective range because the redcoats were still being trained to fire in volleys in the general direction of the enemy.

⁶⁵This section relies primarily upon Joseph H. Lehmann, *The First Boer War*, London: Jonathan Cape, 1972, and Oliver Ransford, *The Battle of Majuba Hill*, London: John Murray, 1967.

flank of the Boer defense. Majuba was composed of alternate horizontal strata of shale and limestone, deep ravines, masses of rocks and dark mimosa scrub—all of which offered good cover and concealment for attacking troops.

Colley marched out of his main base, Mt. Prospect, with 22 officers and 627 men on the night of February 26, 1881. The British force comprised light infantry from four different regiments, with no machine guns or field artillery. Finding the summit deserted, they moved 354 men into position in and around the summit rim by early morning. The rest dug in at the base of the hill to secure the line of retreat.

The Boers on the laager⁶⁶ below were completely surprised. However, once they determined that the British could not fire artillery down upon them, they quickly organized to retake the enfilading position. Joubert, the overall Boer commander, gave the order to retake the hill, but a Boer general had to raise the call for volunteers.⁶⁷ The first 50 volunteers raced to the base of the hill, and General Smit led a picket around to the south to contain the British force guarding the British line of advance. Other Boer volunteers galloped up the base of the hill in groups of two or three men. Clusters of Boers looked about to see who would lead them, and two more leaders stepped forward.

The Boers had developed their own tactics for assaulting hills in their earlier wars with the native Africans, zigzagging up the hill from cover to cover while marksmen at the base laid down suppressive fire to cover them.⁶⁸ The maneuver elements were led by *burghers*

⁶⁶A *laager* is a fortified Boer encampment, usually made by lashing wagons together in a circle.

⁶⁷The Boers were not disciplined, as were European armies. Boers were free to move to any part of a battlefield where they considered themselves most useful. They provided their own rifles and ponies. They wore ordinary dun-brown civilian clothes. They feared close-quarter bayonet fighting and preferred to defend in an extended line, where they could bring to bear their superb marksmanship. Their morale was high, and they were excellent at sizing up and exploiting the tactical nature of terrain.

⁶⁸The Boers were expert shots, having grown up in the Transvaal where the plains were black with game. Even Boer children thought nothing of hitting a running buck from the saddle at 400 yards' range.

intimately familiar with the terrain.⁶⁹ One of the two main bodies of troops covered the other with flanking fire while the other moved. As other Boers raced up from the surrounding area, they too joined in the attack and caught up with the assaulting forces. A third party of Boers began moving up the east face.

About 150 Boers maneuvered on all sides while a similar number maintained a fusillade of covering fire from the base (see Figure 3.7).⁷⁰ At first, the British were surprised by these bold and aggressive tactics, because the Boers were usually defensive. No one thought the Boers would actually close in for close-quarter battle. The redcoats kept their heads down, but gradually they saw through the smoke that Boers were creeping up right under them. Boer commandos and individual clusters of men advanced slowly and methodically up the slope for about 6 hours.

The forward rim defense under a Lieutenant Hamilton came under attack from the front and rear, and his Scottish Highlander troops starting dropping. British reserves resting in the center were rushed forward. Officers tried to organize firing lines amid all the confusion, noise, and smoke. The British fired in volleys; the Boers fought individually, firing from the shoulder, flopping onto the ground, reloading, and rising up again. Under fire from two sides, the British front line broke ranks and retreated to a new rally point in the middle of the summit plateau. Some Boers melted away from the rear of their main attack and repositioned themselves on the British right flank. Boers also appeared on the left flank along the rim. With bullets flying at them from three sides, the British broke for a final time, with everyone heading straight for the south slope. The Boers pursued them relentlessly, inflicting most British casualties during the headlong flight. All told, British casualties were 96 men killed, 132 wounded, and 56 captured. The Boers suffered one killed and five wounded.

⁶⁹A *burgher* is another term for a man in the freelance Boer army.

⁷⁰Other sources describe as many as 450 Boers on the assault. See Ransford, 1967, p. 90.



SOURCE: Joseph H. Lehmann, *The First Boer War*, London: Jonathan Cape, 1972, p. 225.

Figure 3.7—Map of Majuba Hill

Majuba Hill qualifies as a swarming case because semiautonomous individuals and small units converged on a massed enemy from nearly all sides. Nonswarmer British light infantry fought from a fixed defensive position (although they were not dug in) and were decisively defeated. In this case, the Boers were elusive targets, because they remained concealed as they swarmed on all sides to the top of the hill. They did not have any standoff capability, but they were

more accurate marksmen. The Boers enjoyed a minor situational-awareness edge because they knew the terrain. When the British came under fire from three sides, their will to fight was broken.

NAVAL SWARMING AND THE BATTLE OF THE ATLANTIC

The historical use of swarming tactics is not limited to land. The German use of U-boat “Wolfpack” tactics during the Battle of the Atlantic (1939–1945) is a naval example of swarming. Packs of five or more U-boats would converge on a convoy of transport ships and their destroyer escorts, independently attacking from multiple directions. British destroyers utilized the ASDIC⁷¹ or sonar to locate U-boats under the surface and counterattacked with depth charges.⁷² Whereas in the first half of the war, U-boat Wolfpack tactics proved to be very successful against allied shipping, by 1943 the Allies had perfected a number of technological and tactical countermeasures to Wolfpack swarming. The Germans ultimately failed to win the Battle of the Atlantic. It is important to investigate what caused this reversal.

The Battle of the Atlantic was a battle for superior situational awareness in many respects: Each side was trying to obtain a superior understanding of where the enemy was in relation to its own forces. The vast distances of the Atlantic made this understanding imperative. Strategically, both sides used operation centers that collected and correlated intelligence from all sources worldwide, maintaining great plotting boards. The British tracked German wireless transmissions to try to predict where U-boats were and route convoys clear of them; the Germans did the same in reverse. The U-boat Command in Germany guided U-boats to convoy targets that were located and reported either by electronic espionage, reconnaissance planes, or

⁷¹ASDIC is a British acronym for “Anti-Submarine Detection and Investigation Committee,” an early WWII governmental body.

⁷²The Allies used three means of detecting U-boats: ASDIC, radar, and HF/DF. The ASDIC or sonar (SOund NavigatiOn Ranging) was a piezoelectric echo ranging device that worked by bouncing a sound pulse off the target. If the echo can be picked up by hydrophones (underwater microphones), a rough bearing and range can be obtained. Radar bounces electromagnetic pulses off objects and notes the origin of the echo. “HF/DF” (pronounced “huff duff”), stands for High Frequency Direction Finding, a device that calculates the direction from which radio messages are sent.

pre-stationed U-boats. The great difficulty for the Germans was finding convoys in time to form a U-boat group in position to attack.

Radio communications allowed the Germans to perfect the tactics of the Wolfpack. U-boats ordered to the area of the reported sighting would spread out in a scouting line across the expected convoy route. The first boat to sight the convoy would begin shadowing it over the edge of the horizon by day, closing at dusk. The U-boat Command located in France would then direct all adjacent boats (within hundreds of miles) to rendezvous with the shadowing U-boat. Once assembled near the convoy, U-boat Wolfpacks preferred to attack simultaneously from multiple directions at night.⁷³

Since U-boats could not be detected by ASDIC when they were on the surface and they could outrun all escorts except destroyers, they usually surfaced just before closing with the convoy. After reaching a firing position, most U-boats increased to full speed, fired a salvo of four torpedoes, turned away, fired stern torpedoes if fitted, then retired as rapidly as possible on the surface. After disengaging, U-boats would reload, regain a firing position, and attack again.⁷⁴ During the attack, no senior officer was in tactical command.⁷⁵ Each U-boat CO attacked as best he could without attempting to coordinate his movements with those of any other boats.⁷⁶

The British Anti-Submarine Warfare Division tried to combat these impulse tactics with various tactical countermeasures. Star shells were used to illuminate the area at night and force U-boats underwater, where they could be detected by destroyers using ASDIC and attacked with depth charges. More escorts were assigned to each

⁷³In 1940–1941, a typical Wolfpack numbered five to seven U-boats. At first, only one Wolfpack was operational at a time; by August 1942, there were 50 U-boats on patrol and another 20 on passage (out of 140 that were operational), so several Wolfpacks could operate. By February 1943 100 U-boats were at sea. In March 1943, the largest Wolfpack ever (40 U-boats) attacked convoys HX229 and SC122. Vice Admiral Sir Arthur Hezlet, *The Submarine and Sea Power*, New York: Stein and Day, 1967, p. 182.

⁷⁴Hezlet, 1967, p. 167.

⁷⁵The Germans decided that a command boat on the scene was not a good idea, because it could be driven deep and prevented from receiving signals or sending instructions during the battle. Control could be best exercised ashore.

⁷⁶See Peter Padfield, *War Beneath the Sea: Submarine Conflict During World War II*, New York: John Wiley & Sons, Inc., 1995, p. 93.

convoy. Improved radio telephone communication was installed on surface escorts and aircraft.

Tactical situational awareness varied as each side countered the other's detection systems with a series of counter- and counter-countermeasures.⁷⁷ Exploiting an early weakness of U-boats—their design to operate on the surface and submerge only for evasion or for rare daylight attacks⁷⁸—the radar proved to be the most important anti-submarine device. Radar could detect German surface attacks at night. Late in the war, the Germans added the *Schnorchel* [snorkel], enabling the U-boat to travel faster underwater. But its speed was still limited.⁷⁹ Eventually, Allied aircraft, using radar and depth charges, proved to be a decisive antisubmarine weapon. At first planes did not have the range to cover convoys over the dangerous Middle Atlantic “gap”; ultimately, very long-range aircraft and escort aircraft carriers provided complete air cover across the entire Atlantic Ocean.⁸⁰

U-boats relied on concealment to survive. After 1943, Allied aircraft armed with radar and depth charges seriously constrained the U-boats' ability to remain elusive. Although Allied shipping losses continued to increase until the last year of the war, the Germans were not able to cut the Allied supply line to Europe.

⁷⁷The Allies developed the ASDIC, which was partially countered by the Germans when they started using gas bubbles to produce false alarms. To locate surfaced submarines, the British employed aircraft and ship-based radar, along with high-frequency radio direction finders. The Germans responded with search receivers that warned submariners of such surveillance, and later with *Schnorchels*, allowing them to run submerged on their diesels to avoid search radars.

⁷⁸The reason radar was effective was that early in the war, U-boats had to spend most of their time on the surface while traveling. U-boats used a combination of diesel and battery power. Diesel power was the most efficient propulsion (around twice as fast as battery power), but it required the U-boat to surface to take in air for the engines and vent the exhaust. When submerged, the U-boat ran its electric motors on battery power, which made it much slower and limited the time it could remain submerged. Its batteries were recharged when it was running its diesel engines on the surface.

⁷⁹Later in the war—in early 1945—a new Type XXI electric U-boat was finally deployed with a built-in *Schnorchel* capable of staying under water indefinitely, but it was too late to make an impact on the war. The Type XXI could operate underwater at all times (coming up to use its *Schnorchel* once every 4 days), had a new rubber skin, new search receiver, better speed, and new torpedoes.

⁸⁰See Henry Guerlac and Marie Boas, “The Radar War Against the U-Boat,” *Military Affairs*, Vol. 14, No. 2, Summer 1950.

The early success of U-boat Wolfpacks illustrates how the advantages of concealment and situational awareness alone were sufficient to overwhelm a convoy's defenses. Once U-boats had converged on the target, coordination in the attack was practically unnecessary. However, the airborne radar seriously undermined the U-boats' elusiveness, forcing them underwater where they lost what little mobility they had. Since the U-boats themselves also served as the primary reconnaissance for U-boat Command, German situational awareness was also undermined.

SWARMING IN PEACE OPERATIONS: BATTLE OF THE BLACK SEA (1993)

The end of the Cold War has seen a dramatic increase in deployments for peace operations, humanitarian assistance, disaster relief, and other small-scale contingencies. Between 1945 and 1989, the Army conducted two peace operations: in the Dominican Republic and in Egypt. Since 1989, it has conducted no less than six such operations (Iraq, Somalia, Haiti, Macedonia, Bosnia, and the Sinai).⁸¹ During Operation Restore Hope in Somalia, U.S. forces fought the most intense infantry firefight since the Vietnam War, against an enemy that used swarm tactics.

Somalia is an important case for the Army and the Marine Corps, because it is the most recent battle in the Military Operations in Urbanized Terrain (MOUT) environment. In an increasingly urbanized world populated by Third World armies using unconventional tactics such as swarming, Somalia is a likely prototype for future peacemaking operations. As such, it makes an excellent case study on swarming.

On the night of October 3, 1993, an assault force of 75 U.S. Rangers and 40 Delta Force commandos fast-roped⁸² from 17 helicopters

⁸¹Jennifer Morrison Taw, David Persselin, and Maren Leed, *Meeting Peace Operations' Requirements While Maintaining MTW Readiness*, Santa Monica, CA: RAND, MR-921-A, 1998, p. 5.

⁸²*Fast-roping* involves sliding rapidly down very thick nylon ropes hanging from helicopters, usually about 50-100 feet off the ground.

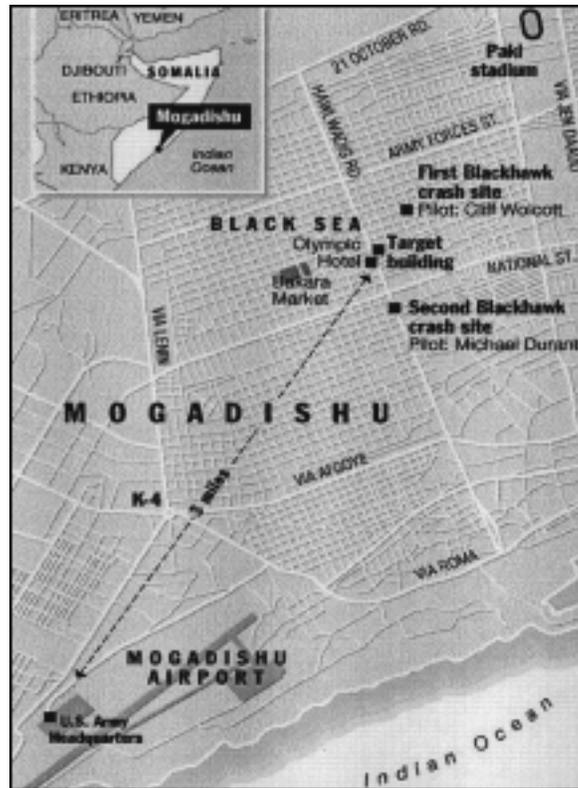
onto a gathering of Habr Gidr clan leaders in the heart of Mogadishu, Somalia.⁸³ The targets were two top lieutenants of warlord Mohamed Farrah Aideed. The plan was to secure any hostages, and transport them 3 miles back to base on a convoy of 12 vehicles. What was supposed to be a hostage snatch mission turned into an 18-hour firefight over two Blackhawk helicopter crash sites (see Figure 3.8). Eighteen Americans were killed in the fighting.

The dismounted light infantry forces were armed with small arms; the relieving convoys had nothing heavier than HMMWV (High Mobility Multi-Purpose Wheeled Vehicle)-mounted 50-caliber machine guns and automatic grenade launchers. Close air support consisted of Blackhawk and Little Bird (AH-6) gunships. Somalis were armed with assault rifles and rocket propelled grenades.

The Somalis anticipated that after the Rangers fast-roped in they would probably not leave via helicopters (the streets were very narrow). This meant a relief convoy would be necessary, so they immediately began setting up roadblocks all over the city.

The mission proceeded well for the Americans at first. Twenty-four Somali prisoners were quickly seized at the target house. Unfortunately, the mission changed dramatically when a Blackhawk helicopter (Super 6-1) was shot down four blocks east of the target house. Soon after, a second Blackhawk (Super 6-4) piloted by Mike Durant was also shot down about a mile away. An airmobile search-and-rescue force was sent to the Super 6-1 crash site and a light infantry force fast-roped down to secure the wounded crew. Task

⁸³The picture of Mogadishu and much of this section is drawn from the series of articles published in the *Philadelphia Inquirer* in November and December 1997 by Mark Bowden and from his book, *Blackhawk Down: A Story of Modern War*, New York: Atlantic Monthly Press, 1999.



SOURCE: Mark Bowden, "Blackhawk Down," *The Philadelphia Inquirer*, November 2, 1998, <http://www.philly.com/packages/somalia/graphics/2nov16asp>, and Matt Ericson, *The Philadelphia Inquirer*, staff artist. Reprinted with permission.

Figure 3.8—Map of Mogadishu

Force Ranger was also ordered to move to Super 6-1's crash site and extract the wounded crew.⁸⁴ No rescue force was available to secure the second site, which was eventually overrun.⁸⁵

⁸⁴Eventually, the Quick Reaction Force of four Pakistani tanks, 28 Malaysian Armored Personnel Carriers (APCs), and elements of the 10th Mountain Division would battle through barricades and ambushes to reach Task Force Ranger at 1:55 a.m. on October 4. See Rick Atkinson, "Night of a Thousand Casualties; Battle Triggered U.S. Decision to Withdraw from Somalia," *Washington Post*, January 31, 1994a, p. A11.

⁸⁵If there was a flaw in the mission planning, it was the lack of a second rescue force. Nobody had taken seriously the prospect of two helicopters going down.

The convoy holding the 24 Somali prisoners was ordered to secure the second crash site, but it never made it. It wandered around, getting chopped to pieces; it eventually aborted the rescue attempt and returned back to base. At one point, after about 45 minutes of meandering, this convoy ended up right back where it started. A second convoy of HMMWVs and three 5-ton flatbed trucks was dispatched from the airport base to attempt a rescue at Durant's downed Blackhawk. But those vehicles were also forced to turn back under heavy fire. Somalis would open fire on any vehicle that crossed an intersection.⁸⁶

For the most part, the commandos followed standard doctrine for city fighting. Using fire and maneuver, teams and squads leapfrogged each other, providing each other fire support in turn. Infantry moved out on foot to cover the convoy from both sides of the street. The main problem was that the convoy kept halting, exposing those vehicles located in the middle of street intersections to concentrated enemy fire.

There was a Somali battle plan of sorts. Aideed's Somali National Army (SNA) militia (between 1,000 and 12,000 men) was organized to defend 18 military sectors throughout Mogadishu. Each sector had a duty officer on alert, connected into a crude radio network.⁸⁷ By the time the U.S. assault team had landed, the Somalis were burning tires to summon all militia groups.

The most likely tactical commander of the October 3–4 fight was Colonel Sharif Hassen Giumale, who was familiar with guerrilla insurgency tactics. Giumale's strategy was to fight the Americans by using barrage rocket-propelled grenade (RPG) fire against the support helicopters, ambushes to isolate pockets of Americans, and large numbers of SNA militiamen to swarm the defenders with sheer numbers.

⁸⁶Fortunately for the Americans, the ambushes were poorly executed. The correct way to ambush is to let the lead vehicle pass and suck in the whole column, then open fire on the unarmored flatbed trucks in the middle. The Somalis usually opened up on the lead vehicle. They also cared little for fratricide. Because Somalis fired from both sides of the street, they certainly sustained friendly-fire casualties.

⁸⁷Rick Atkinson, "The Raid that Went Wrong; How an Elite U.S. Force Failed in Somalia," *Washington Post*, January 30, 1994b.

Somali tactics were to swarm toward the helicopter crashes or the sound of firefights. Out in the streets, militiamen with megaphones shouted, "*Kasoobaxa guryaha oo iska celsa cadowga!*" ["Come out and defend your homes!"]. Neighborhood militia units, organized to stop looters or fight against other enemy clans, were united in their hatred of the Americans. When the first helicopter crashed, militia units from the surrounding area converged on the crash sites, along with a mob of civilians and looters. Autonomous militia squads blended in with the masses of looters and "civilians," concealing their weapons while they converged on the Americans.

Most of the tribesmen were not experienced fighters. Their tactics were primitive. Generally, gunmen ducked behind cars and buildings and jumped out to spray bullets toward the Rangers. Whenever Americans moved, the Somalis opened up from everywhere. Gunmen popped up in windows, in doorways, and around corners, spraying bursts of automatic fire.

The lightly armed Somali tribesmen who rushed toward the downed Blackhawk helicopters enjoyed two distinct advantages: situational awareness and concealment.⁸⁸ They knew where the enemy was, and their approach was concealed.⁸⁹ The guerrillas did not need superior mobility. They were on foot but able to keep up with the U.S. convoys, fighting through roadblock after roadblock.⁹⁰ Mobility and standoff capability were irrelevant in this case.

With the support of the noncombatants and the intimate knowledge that comes from fighting in their own backyard, clan leaders knew more about what was going on than did the Rangers taking cover in their HMMWVs. Somali women and children acted as sensors, walking right up the street toward the Americans and pointing out their positions for hidden gunmen.

⁸⁸They were armed with a mix of Soviet bloc and NATO assault rifles, machine guns, RPG-7s, mines, and demolitions.

⁸⁹The urban terrain limited the effectiveness of close air support.

⁹⁰Gunmen ran along streets parallel to the convoy, keeping up because the two 5-ton trucks and six HMMWVs were stopping and then darting across intersections one at a time. This gave the gunmen time to get to the next street and set up to fire at each vehicle as it came through.

Armed Somali men deliberately used noncombatants, including women and children, for cover and concealment, because they knew the Americans had been issued strict rules of engagement.⁹¹ Rangers were under orders to shoot only at people who pointed weapons at them. Somali soldiers found it easy to blend into gathering onlookers, using noncombatants as cover while they moved toward the crash sites.⁹²

U.S. situational awareness was poor. Although officers circling above in command helicopters had access to real-time video during the firefight, the video did not properly communicate the raw terror and desperation of the situation on the ground. Naval reconnaissance aircraft had no direct line of communication with the convoys on the ground.⁹³ Their attempts to guide the wandering line of vehicles toward the helicopter crash sites failed because of the delay in relaying directions to the ground commander. Pockets of Rangers and “D-boys” [Delta Force soldiers] holed up in adjacent buildings were literally fighting for their lives; oftentimes, they were unaware that friendly units were close by.

From a military viewpoint, the October battle in Mogadishu was a tactical defeat for the Somalis in that the Ranger and Delta commandos were able to complete their mission and extract the hostages. In relative casualties, the mission was also an American military success: Only 18 American soldiers were killed and 73 wounded, while more than 500 Somalis died and at least 1,000 were put in the

⁹¹At one point, a Ranger saw a Somali with a gun prone on the dirt between two kneeling women. He had the barrel of his weapon between the women’s legs, and there were four children actually sitting on him. He was completely shielded by non-combatants.

⁹²It should be noted that *both* sides may have used noncombatants in Somalia. Somali eyewitnesses have charged that Somali women and children were held as “hostages” by the Americans in four houses along Freedom Road during the firefight, which prevented Giumale from using his 60mm mortars to bombard and destroy the American position around the Super 6-1 site during the night. U.S. officers disputed the notion that Somali mortars would have wiped out Task Force Ranger, because U.S. anti-mortar radar and Little Bird gunships loitering overhead would have destroyed any mortar crew after firing one or two rounds. See Atkinson, 1994a, p. A11.

⁹³The Orion pilots were not allowed to communicate directly with the convoy. Their orders were to relay all communications to the Joint Operations Center (JOC) back at the beach. Also, no direct radio communications existed between the Delta Force ground commander and the Ranger ground commander.

hospital—a kill ratio of 27:1.⁹⁴ However, from a strategic or political viewpoint, the battle was a swarmer success because the end result was an American withdrawal from Somalia. On November 19, 1993, President Clinton announced the immediate withdrawal of Task Force Ranger and pledged to have all U.S. troops out of Somalia by March 31, 1994. The casualties incurred were simply too high for the U.S. national interests in Somalia.

In this case, the decisive factors that led to a swarmer victory appear to be elusiveness (based on concealment) and superior knowledge of the terrain. Concealment came from the nature of the urban environment, the support of the indigenous population, and the restrictive rules of engagement for U.S. forces. The absence of Somali standoff capability made no difference because the Somalis did not care about casualties.

In the final analysis, the autonomous Somali militia units were able to swarm around the crash sites and the convoys and inflict politically unacceptable losses on a U.S. light infantry force because they were elusive and they enjoyed equal-to-superior situational awareness.⁹⁵

⁹⁴Atkinson reported the same number of Americans killed but 84 wounded. He also reported 312 Somali dead and 814 wounded. See Atkinson, 1994a, p. A11.

⁹⁵It is difficult to know for sure what difference an AC-130 gunship or several Bradleys would have made on the outcome. With the presence of noncombatants and the danger of surface-to-air missiles, the gunship may have been of limited value. Bradley Infantry Fighting Vehicles certainly would have provided much greater protection from the RPG and small arms fire than the vulnerable HMMWVs did. The question remains whether the Somalis would have been disciplined and organized enough to swarm RPG fire toward selected Bradley targets.