Ancient warfare

Ancient warfare is war as conducted from the beginnings of recorded history to the end of the ancient period. In Europe and the Near East, the end of antiquity is often equated with the Fall of Rome in 476 AD, the wars of the Eastern Roman Empire on its Southwestern Asian and North African borders, and the beginnings of the Muslim conquests in the 7th century. In China, it can also be seen as ending with the growing role of mounted warriors needed to counter the ever-growing threat from the north in the 5th century and the beginning of the Tang Dynasty in 618. In India, the ancient period ends with the decline of the Gupta Empire (6th century) and the beginning of the Muslim conquests therefrom the 8th century. In Japan, the ancient period can be taken to end with the rise of feudalism in the Kamakura period in the 12–13th century.

The difference between prehistoric and ancient warfare is less one of technology than of organization. The development of first city-states, and then empires, allowed warfare to change dramatically. Beginning in Mesopotamia, states produced sufficient agricultural surplus so that full-time ruling elites and military commanders could emerge. While the bulk of military forces were still farmers, the society could support having them campaigning rather than working the land for a portion of each year. Thus, organized armies developed for the first time.

These new armies could help states grow in size and became increasingly centralized. Early ancient armies continued to primarily use bows and spears, the same weapons that had been developed in prehistoric times for hunting. The findings at the site of Nataruk in Turkana, Kenya, have been interpreted as evidence of inter-group conflict and warfare in antiquity,[1] but this interpretation has been challenged.[2] Early armies in Egypt and China followed a similar pattern of using massed infantry armed with bows and spears. Infantry were at this time the dominant form of war, partially because the camel saddle and the stirrup were not yet invented. This infantry would be divided into ranged and shock, with shock infantry either charging to cause penetration of the enemy line or holding their own. These forces would ideally be combined, thus presenting your opponent with a dilemma: group your forces and leave them vulnerable to ranged, or spread them out and make them vulnerable to shock. This balance would eventually change as technology allowed for chariots, cavalry and artillery to play an active role on the field.

No clear line can be drawn between ancient and medieval warfare. The characteristic properties of medieval warfare, notably heavy cavalry and siege engines such as the trebuchet were first introduced in Late Antiquity. The main division within the ancient period is rather at the beginning Iron Age with the introduction of cavalry (resulting in the decline of chariot warfare), of naval warfare (Sea Peoples), and the development of an industry based on ferrous metallurgy which allowed for the mass production of metal weapons and thus the equipment of large standing armies. The first military power to profit from these innovations was the Neo-Assyrian Empire, which achieved a hitherto unseen extent of centralized control, the first "world power" to extend over the entire Fertile Crescent (Mesopotamia, the Levant and Egypt).

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Chariots

As states grew in size, speed of movement became crucial because central power could not hold if rebellions could not be suppressed rapidly. The first solution to this was the chariot which became used in the Middle East from around 1800 BC. First pulled by oxen and donkeys, they allowed rapid traversing of the relatively flat lands of the Middle East. The chariots were light enough that they could easily be floated across rivers. Improvements in the ability to train horses soon allowed them to be used to pull chariots, possibly as early as 2100 BC\(^3\) and their greater speed and power made chariots even more efficient. The major limitation of the use of chariots is terrain; while very mobile on flat, hard, open ground, this is lost on any sort of rough ground, even sparse trees or bushes, small ravines or streams, or marsh, where they are surpassed in maneuverability by common foot soldiers, and later by cavalry.

The power of the chariot as a device both of transportation and of battle became the central weapon of the peoples of the Ancient Near East in the 2nd millennium BC. The typical chariot was worked by two men: one would be a bowman and fire at the enemy forces, while the other would control the vehicle. Over time, chariots carrying up to five warriors were developed. The effectiveness of these vehicles is still somewhat in doubt. In China, their chariots became the central weapon of the Shang dynasty, allowing them to unify a great area.

Although chariots have been compared to modern-day tanks in the role they played on the battlefield, i.e., shock attacks, this is disputed\(^4\)\(^5\) with scholars pointing out that chariots were vulnerable and fragile, required a level terrain while tanks are all-terrain vehicles, and thus not suitable for use in the way modern tanks have been used as a physical shock force\(^6\)\(^7\). The chief advantage of the chariot was the tactical mobility they provided to bowmen. Because tightly packed infantry were the formation of choice, in order for ancient generals to maintain command and control during the battle as well as for mutual protection, a force of chariots could stand off at long range and rain arrows down on the infantrymen's heads. Because of their speed, any attempts to charge the chariots could be easily evaded. If, on the other hand, an infantry unit spread out to minimize the damage from arrows, they would lose the benefit of mutual protection and the charioteers could easily overrun them.

From a tactical standpoint this put any force facing chariots on the horns of dilemma, making chariots indispensable to armies of the day. Chariots, however, were complicated pieces of hardware that required specialized craftsmen to maintain them. Such services, therefore, made chariots expensive to own. When chariots were owned by individuals within a society, it tended to give rise to a warrior class of specialists and a feudal system (an example of which can be seen in Homer's The Iliad). Where chariots were publicly owned, they helped in the maintenance and establishment of a strong central government, e.g., the New Egyptian Kingdom.

Chariot usage peaked in the Battle of Kadesh in 1274 BC, which was probably the largest chariot battle ever fought, involving perhaps 5,000 chariots\(^8\).

Naval warfare

Naval warfare in the ancient world can be traced back to the third millennium BC Mediterranean as evidence of paintings on Cyclades and models of ships were being made across the Aegean\(^9\). Ships in this era have been said to have served as both ordinary transportation and trade vessels as well as having some military and warfare applications. These early sea vessels would have been
propelled by both oar and sail, but since the Mediterranean is known for its inconsistent weather patterns, the oar would have most likely been the primary means of propulsion\(^9\). The first documented, physical evidence of a naval battle is found in the relief painting located in the temple of Medinet Habu, near Luxor, Egypt. This relief painting depicts the victory of Ramses III over the 'Sea-Peoples' at the Nile river delta in the early twelfth century BC\(^{10}\). These 'Sea-Peoples' are originally believed to be of Philistine and Phoenician descent, while there is speculation that there could be some Greek influence in their sea-faring. While the relief painting at the Temple of Medinet Habu is said to be the first physical documentation of naval warfare, there are earlier records that indicate that the concept and practice of sea-faring battles sprouted up as early as 2550 BC under the Egyptian Pharaoh Sahue who reportedly used transport vessels to escort his armies to foreign shores\(^{11}\). There is even further evidence from earlier sources that illustrate sea faring and military action around the Nile Delta during the early dynastic period in Egypt following into the reign of Ramses II\(^{12}\).

Prior to the victory of Ramses III over the 'Sea-Peoples', Egypt, as a sovereign state, did not have access to kind of timber needed to manufacture seafaring vessels and warships alike on a large scale. Instead of importing mass amounts of timber in order to build warships, Egyptian naval architects and early engineers began to convert the common river-going ship by reconfiguring the size of the ship while also adding heavy trees for longitudinal support of the hull on the open sea\(^{13}\).

This newly theorized concept of rearranging and reconfiguring the common Egyptian river boat was held in high esteem and largely contributed to the victory of Ramesses III over the 'Sea-Peoples' in the Nile river delta as depicted in the relief painting at Medinet Habu. The relief shows in great detail how fighting was actually conducted in a naval battle in this time period. The Relief shows Egyptian war ships consisting of over twenty rows of oarsmen along with infantry troops and archers fighting in apparent hand-to-hand combat with the opposing naval force\(^{14}\). This begs the theory that there was no actual naval weaponry developed at this time but rather reliant upon maneuvering tactics and strategy in order to engage with infantry troops.

**The Trireme**

Amongst the great innovations of naval warfare in the Ancient world there are few that can surpass the Trireme style warship in terms of efficiency, strategy, and over all effectiveness. The first depiction of this 'longship' style vessel can be found in Homer's *The Iliad* as means of transport of men armed men and supplies to areas of conflict across the seas\(^{15}\). These ships were said to have consisted of two separate levels that could have help up to 60 men per level all operating oars in unison to propel the ship. The upper level of oarsmen would sit in single-file fashion, pulling their oars through what is called a topwale or some sort of oarport; while the men in the lower rows would sit in the ships' hold also rowing through lower oarports\(^{16}\). It is also said that each oar throughout the ship would be made in length proportionate the physique of an average Greek man\(^{16}\).

Manned crews for these massive warships would have been quite impressive, but accounts vary in actual numbers of men from source to source. Herodotus of Halicarnassus was a Greek historian in the fourth century BC who through his accounts, said that these Triremes would consist of at least two-hundred men manning all positions\(^{17}\). With these massive crews, these ships were able to work at maximum capacity and efficiency in regards to speed, navigation, and transport. While these ships were built for maximum efficiency, there is room for debate about the conditions and space aboard the ship itself. It is estimated that out of the 200 man crew, around 170 of those men would have been oarsmen with respective positions below deck\(^{18}\). These oarsmen below deck would sit on thwarts and kept their personal storage items beneath them, reassuring the theory that these ships would be very crowded with little room for anything other than operational functions.

What exactly these Greek triremes were capable of in battle is debated. There are various different accounts that lay down foundations of what equipment was used and how these ships engaged in combat. The main military applications of Greek Triremes, besides the transport of troops and supplies, would be the advantages of ramming tactics. developments and innovations of the Greek Trireme evolved over time, especially in respects to ramming tactics. Naval architects during this time saw fit to bring about full
effectiveness and damaging power to these ships. By doing this, the amount of manpower would stay consistent, i.e. keeping the same amount of rowing power but shortening the length of the ship to condense the ramming power while keeping speed and agility consistent.[19] This new ideology of warfare and naval tactics would prove to be prudent to the overall military applications of the Trireme, and soon would become the principal combative strategy of the Greek navy and other navies alike.

The Greek Trireme would soon after its appearance in the Aegean, become the standard warship throughout the Mediterranean as sovereign states such as Egypt and even the Persian Empire would adopt the design of these ships and apply them to their own military applications. One major attraction of the Greek design would be its efficient ramming capability but also its ability to travel long distances at fair speeds. One account from Athenian soldier and historian Xenophon, describes the voyage of Athenian fleet commander Iphicrates through unfriendly waters and the strategy he used combined with the sheer sailing power of the Trireme.

"He proceeded with his journey and at the same time made all the necessary preparations for action, at the outset leaving his main sails behind as if he was expecting an engagement. In addition, even if there was a following wind he used his small [boat] sails little, but progressed by oar [instead, presumably, of using main sails and boat sails when the wind was favourable]. Thus he both improved the fitness of his men and achieved a higher speed for his ships".[20]

This primary source account can be interpreted as a functional and efficient use of the Greek Trireme. Maximizing its speed through rugged and unfriendly seas while also utilizing specific military strategy in order to ensure the most prudent and effective outcome was what led to the success of Trireme across all kinds of empires and civilizations throughout the Mediterranean. The Trireme would later become a vital piece of naval weaponry throughout the Persian Wars, for both the Greeks and the Persian Empire, as well as the base standard for the formation of the Roman Navy.

The Persian Wars were the first to feature large-scale naval operations: not only sophisticated fleet engagements with dozens of triremes on each side, but combined land–sea operations. Ships in the ancient world could operate only on the relatively quiet waters of seas and rivers; the oceans were off limits. Navies were almost always used as auxiliaries to land forces, often essential to bringing them supplies. They would rarely strike out on their own. With only limited-range weapons, naval galleys would often attempt to ram their opponents with their reinforced bow to cause damage or sink the enemy warships which often caused the two ships to become joined together, and initiated a boarding battle. Only occasionally was a decisive naval battle fought, such as the Battle of Lade in which a Persian navy destroyed the Greek navy.

**Tactics and weapons**

**Strategy**

Ancient strategy focused broadly on the twin goals of convincing the enemy that continued war was more costly than submitting, and of making the most gain possible from war.

Forcing the enemy to submit generally consisted of defeating their army in the field. Once the enemy force was routed, the threat of siege, civilian deaths, and the like often forced the enemy to the bargaining table. However, this goal could be accomplished by other means. Burning enemy fields would force the choice of surrendering or fighting a pitched battle. Waiting an enemy out until their army had to disband due to the beginning of the harvest season or running out of payment for mercenaries presented an enemy with a similar choice. The exceptional conflicts of the ancient world were when these rules of warfare were violated. The Spartan and Athenian refusal to accept surrender after many years of war and near bankruptcy in the Peloponnesian War is one such exceptional example, as is the Roman refusal to surrender after the Battle of Cannae.

A more personal goal in war was simple profit. This profit was often monetary, as was the case with the raiding culture of the Gallic tribes. But the profit could be political, as great leaders in war were often rewarded with government office after their success. These strategies often contradict modern common sense as they conflict with what would be best for the states involved in the war.
**Tactics**

Effective tactics varied greatly depending on:

1. The army's size
2. Unit types
3. Terrain
4. The weather
5. Positional advantage
6. Skill level
7. Individual battle experience
8. Individual morale
9. Armament (quantity and quality)

**Weapons**

Ancient weapons included the spear, the atlatl with light javelin or similar projectile, the bow and arrow, the sling; polearms such as the spear, falx and javelin; hand-to-hand weapons such as swords, spears, clubs, maces, axes, and knives. Catapults, siege towers, and battering rams were used during sieges.

There were a wide variety and range of weapons used in the wars and battles of times long past and while it is quite easy to identify a sword or shield and know what purpose it served, even more information can be gained from knowing where said weapon comes from and what material it is made of. Ancient Greece is one of the most looked to and studied periods of time in part due the abundance of surviving information and artifacts and this aspect can also be extended to their weaponry and armor. The Mycenaean left behind a great deal of their weapons and armor which was found in their shaft graves, in *Arms and Armour of the Greeks* the swords found within the Mycenaean tombs are quite similar to rapiers being quite slender and measuring in at over three feet in length. It was due to their length and slim design that they were easily broken if struck hard enough. In addition to the rapier swords, smaller yet more durable blades were found along with a few spearheads which often came in at over two feet in length; however, the spearheads were not quite as abundant as other bladed weapons as Snodgrass states that their value and use in war and hunting was too significant to spare for graves. Prior to the Bronze Age the Mycenaean helmets were constructed from crescent shaped sections of wild boar tusk and arranged in horizontal bands that alternated in direction and attached to a soft material.[21] The soldiers’ shields were around four feet tall, if not more, made of ox hide and supported with some type of metal. As we move into the Bronze Age body armor began to appear as the smiths began working with this new metal, bronze helmets also began to make an appearance though the previous helmets made from boars’ tusks still remained in use. It was during this period that two new types of swords made a debut, they were the horned and cruciform swords. The horned sword was dubbed as such from the horn-like appearance of their hand guards and was the preferred weapon for a cutting stroke. The cruciform sword was derived and enhanced from a Minoan dagger with flanges on the hilt with rounded, right angle hand guards is how it is described within *Arms and Armour*. Spears continued to remain as the preferred means for a thrusting weapon, but it was during the Palace Period that they developed a socketed base. In earlier periods of Greek history, the bow and arrow was not a favored weapon for war but used primarily in hunting though in the Palace Period archery began to prosper – the arrowheads of both time periods were made of flint, bronze, or obsidian – while the bows of the Palace Period were made of goats’ horn is how Snodgrass depicts the use of archery. From the Palace Period, we move into the Late Period of Mycenae where the weapons became shorter and more suited for use in a work environment rather than in battle and the metal plated armor was no longer being put to use.

Macedon was known more traditionally for having a strong cavalry rather than infantry and during Alexander's reign the Sarissophori came into being and this was unique Alexander’s time in power. While the cavalry was more prominent the Macedon infantry, made up of the poor and peasant classes, formed into a new and unique branch of the military that was different from the hoplite. These warriors were armed with a huge pike weapon called a sarissa as well as the army being equipped with slings. The slings used almond-shaped bronze bullets that were engraved with either Philip’s or his generals’ name and as for siege warfare the Macedonians used an arrow-firing catapult.[21] For armor, they were equipped with a metal helmet, greaves, and a shield covered with bronze.
In The Archaeology of Weapons a broader account of ancient weaponry is taken into account through the investigation of European weapons. Oakeshott believes that at some point between 1500–100 BC that the sword developed from the knife in both Minoan Crete and Celtic Britain and strongly resembles the rapiers. During the Bronze Age in the same general region several other swords were developed: the Hallstatt first appeared during this Age but did not become widely used until the Iron Age, the Carps Tongues, and the Rhone Valley swords. The Hallstatt swords gained prominence during the Iron Age and were a long sword with a rather curious point that was one of three shapes: rounded, a square shape, or similar to a fishtail, and were the preferred weapon for use in a chariot. The Carps Tongues blade were also rather large swords with the edges running parallel for two-thirds of the blade before narrowing to the usually point. The last sword is that of the Rhone Valley and is generally considered more of small sword or an overly large dagger with each hilt uniquely cast in bronze. The pommel of this type of dagger has the ends drawn out into two thin points that curve in towards the blade. Along with Hallstatt swords there were found to be spears, similar to the spearheads found in Mycenae they were quite large at fifteen inches and having a hollow socket however they were unique in that they had a small collar of bronze near where they attached to the shaft.

Within India’s long history there are several different regimes that produced unique weapons. The list of weapons primarily used in India are the battle axe, the bow and arrow, spears, spike, barbed dart, the sword, iron club, javelin, iron arrow, and the scimitar. One sword type is the katar blade, these are equipped with sword breaking bars and both the shape and size would depend on whether the bearer was cavalry or an infantryman. A curved sword such as the talwar or shamsheer was ideal for a cutting motion delivered from horseback. There were three early iron sword types being the leaf shaped, spoon shaped and the parallel sword each ideal for thrusting and jabbing as opposed to a striking or cutting motion. The Rajputs, Gurkhas, Nagas, and Coorg and Malabar each developed a weapon unique to themselves. The Rajputs wielded the khanda which is a broad and straight sword with a wider point. The Gurkhas had two swords that they preferred to use the kukri, a short sword that angled towards wide tip, and the kora, their historical war sword which was around 60 centimeters with a single edge that was rather narrow near the handle and curving towards the front. The daos had a blade equal to two feet in length that had a wide and square-like tip and the handle was made of either wood or ivory, these were the weapons that came to popularity for the Nagas. The adya katti was a single edged blade also near two feet long but with no handle and wield by the Coorg and Malabar. In Southern India, the Borobudur and the Veragal, either shaped like a hook or a wavy design, were the swords in use. A rather unique weapon used in India is the Baghnakh which are similar to a knuckle duster and were used to slit the opponent throat or belly.

Armor in India can be found dating back to 500 BC and Vedic literature; there are several different types: leather and fabric, scale, brigandine, lamellar, mail, plate, and a combination of mail and plate. In Arms and Armour: Traditional Weapons of India it is read that the wrastrana, a breast plate, has been in use since prehistoric times though the most popular is the char-aina meaning four mirrors is a coat of mail overlaid with four elaborately designed plates. The helmets consisted of a sliding nose guard with a piece of chainmail hanging from it designed to protect the neck and shoulders. Armor was not just limited to human soldiers but extended to their horses and elephants as well. The horse armor was made up of mail and plates or lamellae which covered the neck, chest, and hindquarters underneath which was some form of padding to keep it in place while a face plate protected the animal’s face. The elephants, used as a battering ram or to break and trample enemy lines, were also donned in armor for battle. The elephant’s head was covered by a steel mask and covered half of the trunk while the throat and sides were protected by lamellae armor while the tusks were tipped with sharp metal.

Sieges

Siege warfare of the ancient Near East took place behind walls built of mud bricks, stone, wood or a combination of these materials depending on local availability. The earliest representations of siege warfare date to the Protodynamic Period of Egypt, c. 3000 BC, while the first siege equipment is known from Egyptian tomb reliefs of the 24th century BC showing wheeled siege ladders. Assyrian palace reliefs of the 9th to 7th centuries BC display sieges of several Near Eastern cities. Though a simple battering ram had come into use in the previous millennium, the Assyrians improved siege warfare. The most common practise of siege warfare was, however, to lay siege and wait for the surrender of the enemies inside. Due to the problem of logistics, long lasting sieges involving anything but a minor force could seldom be maintained.
Ancient siege warfare varied from each civilization and how each city was defended differently and had to be approached with different tactics. One way to ensure an army used all its troops in its siege is shown when it explained how a chariot can be used in a siege, saying that, “During the sieges, the chariots, and mostly in the Neo-Assyrian armies, were surely employed to patrol and protect the flanks and the rear of the besiegers’ lines and camp.” (UF 41 p. 5)[4]

This shows that generals had to find new tactics to incorporate parts of their army that wouldn’t work in the siege, as shown with the chariots on patrol duty and ensuring the army was safe from a flank attack from the enemy army. This strategy ensures that all forces are used and contributing to the battle effort and helping gain victory for them and all pulling their weight as well.

By culture

Ancient Near East

Mesopotamia

Egypt

Throughout most of its history, ancient Egypt was unified under one government. The main military concern for the nation was to keep enemies out. The arid plains and deserts surrounding Egypt were inhabited by nomadic tribes who occasionally tried to raid or settle in the fertile Nile river valley. The Egyptians built fortresses and outposts along the borders east and west of the Nile Delta, in the Eastern Desert, and in Nubia to the south. Small garrisons could prevent minor incursions, but if a large force was detected a message was sent for the main army corps. Most Egyptian cities lacked city walls and other defenses.

The first Egyptian soldiers carried a simple armament consisting of a spear with a copper spearhead and a large wooden shield covered by leather hides. A stone mace was also carried in the Archaic period, though later this weapon was probably only in ceremonial use, and was replaced with the bronze battle axe. The spearmen were supported by archers carrying a composite bow and arrows with arrowheads made of flint or copper. No armour was used during the 3rd and early 2nd Millennium BC. As the dynasties expanded and grew upon the last that fell to gain new territory and control new people for the empire of Egypt. One of the ways the dynasties were different were the new technologies used in the later dynasties against the enemy. One example is the armies of Ramesses’ II faced off against the Hittites in the Battle of Qadesh. Both armies have cavalry units supporting their infantry and scouts to get updates on the movements. These advances differ from two groups attacking head on for control of an area and facing losses on both sides.

The major advance in weapons technology and warfare began around 1600 BC when the Egyptians fought and defeated the Hyksos people, who ruled Lower Egypt at the time. It was during this period the horse and chariot were introduced into Egypt. Other new technologies included the sickle sword, body armour and improved bronze casting. In the New Kingdom, the Egyptian military changed from levy troops into a firm organization of professional soldiers. Conquests of foreign territories, like Nubia, required a permanent force to be garrisoned abroad. The Egyptians were mostly used to slowly defeating a much weaker enemy, town by town, until beaten into submission. The preferred tactic was to subdue a weaker city or kingdom one at a time resulting in surrender of each fraction until complete domination was achieved. The encounter with other powerful Near Eastern kingdoms like Mitanni, the Hittites, and later the Assyrians and Babylonians, made it necessary for the Egyptians to conduct campaigns far from home. The next leap forwards came in the Late Period (712–332 BC), when mounted troops and weapons made of iron came into use. After the conquest by Alexander the Great Egypt was heavily Hellenized and the main military force became the infantry phalanx. The ancient Egyptians were not great innovators in weapons technology, and most weapons technology innovation came from Western Asia and the Greek world.
These soldiers were paid with a plot of land for the provision of their families. After fulfilment of their service, the veterans were allowed retirement to these estates. Generals could become quite influential at the court, but unlike other feudal states, the Egyptian military was completely controlled by the king. Foreign mercenaries were also recruited; first Nubians (Medjay), and later also Libyans and Sherdens in the New Kingdom. By the Persian period Greek mercenaries entered service into the armies of the rebellious pharaohs. The Jewish mercenaries at Elephantine served the Persian overlords of Egypt in the 5th century BC. Although, they might also have served the Egyptian Pharaohs of the 6th century BC.

As far as had been seen from the royal propaganda of the time, the king or the crown prince personally headed the Egyptian troops into battle. The army could number tens of thousands of soldiers, so the smaller battalions consisting of 250 men, led by an officer, may have been the key of command. The tactics involved a massive strike by archery followed by an infantry and/or chariots attacking the broken enemy lines. The enemies could, however, try to surprise the large Egyptian force with ambushes and by blocking the road as the Egyptian campaign records informs us.

Within the Nile valley itself, ships and barges were important military elements. Ships were vital for providing supplies for the troops. The Nile river had no fords so barges had to be used for river crossings. Dominating the river often proved necessary for prosecuting sieges, like the Egyptian conquest of the Hyksos capital Avaris. Egypt had no navy to fight naval battles at sea before the Late Period. However, a battle involving ships took place at the Egyptian coast in the 12th century BC between Ramsesses III and seafaring raiders.

**Persia**

Ancient Persia first emerged as a major military power under Cyrus the Great. Its form of warfare was based on massed infantry in light armor to pin the enemy force whilst cavalry dealt the killing blow. Cavalry was used in huge numbers but it is not known whether they were heavily armored or not. Most Greek sources claim the Persians wore no armor, but we do have an example from Herodotus which claims that an unhorsed cavalry Officer wore a gold cuirass under his red robes. Chariots were used in the early days but during the later days of the Persian Empire they were surpassed by horsemen. During the Persian Empire's height, they even possessed war elephants from North Africa and distant India. The elite of the Persian Army were the famous Persian Immortals, a 10,000 strong unit of professional soldiers armed with a spear, a sword and a bow. Archers also formed a major component of the Persian Army.

Persian tactics primarily had four stages involving archers, infantry and cavalry. The archers, which wielded longbows, would fire waves of arrows before the battle, attempting to cut the enemy numbers down prior battle. The cavalry would then attempt to run into the enemy and sever communications between generals and soldiers. Infantry would then proceed to attack the disoriented soldiers, subsequently weakened from the previous attacks.

**India**

During the Vedic period (fl. 1500–500 BC), the Vedas and other associated texts contain references to warfare. The earliest allusions to a specific battle are those to the Battle of the Ten Kings in Mandala 7 of the Rigveda.

The two great ancient epics of India, Ramayana and Mahabharata (c. 1000–500 BC) are centered on conflicts and refer to military formations, theories of warfare and esoteric weaponry. Valmiki's Ramayana describes Ayodhya's military as defensive rather than aggressive. The city, it says, was strongly fortified and was surrounded by a deep moat. Ramayana describes Ayodhya in the following words: "The city abounded in warriors undefeated in battle, fearless and chinskilled in the use of arms, resembling lions guarding their mountain caves". Mahabharata describes various military techniques, including the Chakravyuha.

The world's first recorded military application of war elephants is in the Mahabharatha. From India, war elephants were brought to the Persian Empire where they were used in several campaigns. The Persian king Darius III employed about 50 Indian elephants in the Battle of Gaugamela (331 BC) fought against Alexander the Great. In the Battle of the Hydaspes River, the Indian king Porus, who ruled in Punjab, with his smaller army of 200 war elephants, 2000 cavalry and 20,000 infantry, presented great difficulty for
Alexander the Great's larger army of 4000 cavalry and 50,000 infantry though Porus was eventually defeated. At this time, the Nanda Empire further east in northern and eastern India had an army of 6000 war elephants, 80,000 cavalry, 200,000 infantry and 8000 armed chariots.

Chanakya (c. 350–275 BC) was a professor of political science at Takshashila University, and later the Prime Minister of emperor Chandragupta Maurya, the founder of the Maurya Empire. Chanakya wrote the Arthashastra, which covered various topics on ancient Indian warfare in great detail, including various techniques and strategies relating to war. These included the earliest uses of espionage and assassinations. These techniques and strategies were employed by Chandragupta Maurya, who was a student of Chanakya, and later by Ashoka (304–232 BC).

Chandragupta Maurya conquered the Magadha Empire and expanded to all of northern India, establishing the Maurya Empire, which extended from the Arabian Sea to the Bay of Bengal. In 305 BC, Chandragupta defeated Seleucus I Nicator, who ruled the Seleucid Empire and controlled most of the territories conquered by Alexander the Great. Seleucus eventually lost his territories in Southern Asia, including southern Afghanistan, to Chandragupta. Seleucus exchanged territory west of the Indus for 500 war elephants and offered his daughter to Chandragupta. In this matrimonial alliance the enmity turned into friendship, and Seleucus' dispatched an ambassador, Megasthenes, to the Mauryan court at Pataliputra. As a result of this treaty, the Maurya Empire was recognized as a great power by the Hellenistic World, and the kings of Egypt and Syria sent their own ambassadors to his court. According to Megasthenes, Chandragupta Maurya built an army consisting of 30,000 cavalry, 9000 war elephants, and 600,000 infantry, which was the largest army known in the ancient world. Ashoka went on to expand the Maurya Empire to almost all of South Asia, along with much of Afghanistan and parts of Persia. Ashoka eventually gave up on warfare after converting to Buddhism.

**China**

Ancient China during the Shang Dynasty was a Bronze Age society based on chariot armies. Archaeological study of Shang sites at Anyang have revealed extensive examples of chariots and bronze weapons. The overthrow of the Shang by the Zhou saw the creation of a feudal social order resting militarily on a class of aristocratic chariot warriors.

In the Spring and Autumn period, warfare increased exponentially. Zuo zhuan describes the wars and battles among the feudal lords during the period. Warfare continued to be stylised and ceremonial even as it grew more violent and decisive. The concept of military hegemon (霸) and his "way of force" (霸道) came to dominate Chinese society. Sun Tzu created a book that still applies to today's modern armies.

Formations of the army can be clearly seen from the Terracotta Army of Qin Shi Huang, the first Emperor in the history of China to be successful in unification of different warring states. Light infantry acting as shock troops lead the army, followed by heavy infantry as the main body of the army. Wide usage of cavalry and chariots behind the heavy infantry also gave the Qin army an edge in battles against the other warring states.

Warfare became more intense, ruthless and much more decisive during the Warring States period, in which great social and political change was accompanied by the end of the system of chariot warfare and the adoption of mass infantry armies. Cavalry was also introduced from the northern frontier, despite the cultural challenge it posed for robe-wearing Chinese men. Chinese river valley civilizations would adopt nomadic "pants" for their cavalry units and soldiers.

**Ancient Greece**

In general, most features of the hoplite panoply of classical Greek antiquity, were already known during the Late Bronze Age by Mycenaean Greeks (c. 1600–1100 BC). Mycenaean Greek society invested in the development of military infrastructure, while military production and logistics were supervised directly from the palatial centers.

Infantry did almost all of the fighting in Greek battles. The Greeks did not have any notable cavalry tradition except the Thessalians. Hoplites, Greek infantry, fought with a long spear and a large shield, the hoplon also called aspis. Light infantry (psiloi) peltasts, served as skirmishers.
Despite the fact that most Greek cities were well fortified (with the notable exception of Sparta) and Greek siege technology was not up to the task of breaching these fortifications by force, most land battles were pitched ones fought on flat-open ground. This was because of the limited period of service Greek soldiers could offer before they needed to return to their farms; hence, a decisive battle was needed to settle matters at hand. To draw out a city's defenders, its fields would be threatened with destruction, threatening the defenders with starvation in the winter if they did not surrender or accept battle.

This pattern of warfare was broken during the Peloponnesian War, when Athens' command of the sea allowed the city to ignore the destruction of the Athenian crops by Sparta and her allies by shipping grain into the city from the Crimea. This led to a warfare style in which both sides were forced to engage in repeated raids over several years without reaching a settlement. It also made sea battle a vital part of warfare. Greek naval battles were fought between triremes – long and speedy rowing ships which engaged the enemy by ramming and boarding actions.

**Hellenistic Era**

During the time of Philip II of Macedon and Alexander the Great, the Macedonians were regarded as the most complete well-coordinated military force in the known world. Although they are best known for the achievements of Alexander the Great, his father Philip II of Macedon created and designed the fighting force Alexander used in his conquests. Before this time and for centuries their military prowess was nowhere near that the sarissa phalanx offered.

However prior to the improvements made by Philip II of Macedon armies fought in the traditional manner of the Greeks; that of the hoplite phalanx.

Philip provided his Macedonian soldiers in the phalanx with sarissa, a spear which was 4–6 meters in length. The sarissa, when held upright by the rear ranks of the phalanx (there were usually eight ranks), helped hide maneuvers behind the phalanx from the view of the enemy. When held horizontal by the front ranks of the phalanx, enemies could be run through from far away. The hoplite type troops were not abandoned but were no longer the core of the army.

In 358 BC he met the Illyrians in battle with his reorganized Macedonian phalanx, and utterly defeated them. The Illyrians fled in panic, leaving the majority of their 9,000-strong army dead. The Macedonian army invaded Illyria and conquered the southern Illyrian tribes.

After the defeat of the Illyrians, Macedon's policy became increasingly aggressive. Paonia was already forcefully integrated into Macedon under Philip's rule. In 357 BC Philip broke the treaty with Athens and attacked Amphipolis which promised to surrender to the Athenians in exchange for the fortified town of Pydna, a promise he didn't keep. The city fell back in the hands of Macedonia after an intense siege. Then he secured possession over the gold mines of nearby Mount Pangaeus, which would enable him to finance his future wars.

In 356 the Macedonian army advanced further eastward and captured the town of Crenides (near modern Drama) which was in the hands of the Thracians, and which Philip renamed after himself to Philippi. The Macedonian eastern border with Thrace was now secured at the river Nestus (Mesta).

Philip next marched against his southern enemies. In Thessaly he defeated his enemies and by 352, he was firmly in control of this region. The Macedonian army advanced as far as the pass of Thermopylae which divides Greece in two parts, but it did not attempt to take it because it was strongly guarded by a joint force of Athenians, Spartans, and Achaeans.

Having secured the bordering regions of Macedon, Philip assembled a large Macedonian army and marched deep into Thrace for a long conquering campaign. By 339 after defeating the Thracians in series of battles, most of Thrace was firmly in Macedonian hands save the most eastern Greek coastal cities of Byzantium and Perinthus who successfully withstood the long and difficult sieges. But both Byzantium and Perinthos would have surely fallen had it not been for the help they received from the various Greek city-states, and the Persian king himself, who now viewed the rise of Macedonia and its eastern expansion with concern. Ironically, the Greeks invited and sided with the Persians against the Macedonians, although Persia had been the nation hated the most by Greece for more than a century. The memory of the Persian invasion of Greece some 150 years ago was still alive, but the current politics for the Macedonians had put it aside.
Much greater would be the conquests of his son, Alexander the Great, who would add to the phalanx a powerful cavalry, led by his elite Companions, and flexible, innovative formations and tactics. He advanced Greek style of combat, and was able to muster large bodies of men for long periods of time for his campaigns against Persia.

Iron Age Europe

Roman Empire

The Roman army was the world's first professional army. It had its origins in the citizen army of the Republic, which was staffed by citizens serving mandatory duty for Rome. The reforms of Marius around 100 BC turned the army into a professional structure, still largely filled by citizens, but citizens who served continuously for 20 years before being discharged.

The Romans were also noted for making use of auxiliary troops, non-Romans who served with the legions and filled roles that the traditional Roman military could not fill effectively, such as light skirmish troops and heavy cavalry. Later in the Empire, these auxiliary troops, along with foreign mercenaries, became the core of the Roman military. By the late Empire, tribes such as the Visigoths were bribed to serve as mercenaries.

The Roman navy was traditionally considered less important, although it remained vital for the transportation of supplies and troops, also during the great purge of pirates from the Mediterranean sea by Pompey the Great in the 1st century BC. Most of Rome's battles occurred on land, especially when the Empire was at its height and all the land around the Mediterranean was controlled by Rome.

But there were notable exceptions. The First Punic War, a pivotal war between Rome and Carthage in the 3rd century BC, was largely a naval conflict. And the naval Battle of Actium established the Roman empire under Augustus.

Balkans

The Illyrian king Bardyllis turned part of south Illyria into a formidable local power in the 4th century BC. He managed to become king of the Dardanians[29] and include other tribes under his rule. However their power was weakened by bitter rivalries and jealousy. The army was composed by peltasts with a variety of weapons.

The Thracians fought as peltasts using javelins and crescent or round wicker shields. Missile weapons were favored but close combat weaponry was carried by the Thracians as well. These close combat weapons varied from the dreaded Rhomphaia & Falx to spears and swords. Thracians shunned armor and greaves and fought as light as possible favoring mobility above all other traits and had excellent horsemen.[30]

The Dacian tribes, located on modern-day Romania and Moldova were part of the greater Thracian family of peoples. They established a highly militarized society and, during the periods when the tribes were united under one king (82–44 BC, 86–106) posed a major threat to the Roman provinces of Lower Danube. Dacia was conquered and transformed into a Roman province in 106 after a long, hard war.

Celtic

Tribal warfare appears to have been a regular feature of Celtic societies. While epic literature depicts this as more of a sport focused on raids and hunting rather than organised territorial conquest, the historical record is more of tribes using warfare to exert political control and harass rivals, for economic advantage, and in some instances to conquer territory.

The Celts were described by classical writers such as Strabo, Livy, Pausanias, and Florus as fighting like "wild beasts", and as hordes. Dionysius said that their "manner of fighting, being in large measure that of wild beasts and frenzied, was an erratic procedure, quite lacking in military science. Thus, at one moment they would raise their swords aloft and smite after the manner of wild boars, throwing the whole weight of their bodies into the blow like hewers of wood or men digging with mattocks, and again they would deliver crosswise blows aimed at no target, as if they intended to cut to pieces the entire bodies of their adversaries,
protective armour and all.\[31] Such descriptions have been challenged by contemporary historians.\[32] Caesar himself describes the Gauls as forming phalanxes (likely similar to the medieval shieldwall) and testudos in battle, and using spears as their main weapon, as opposed to swords.

**Germanic**

Historical records of the Germanic tribes in Germania east of the Rhine and west of the Danube do not begin until quite late in the ancient period, so only the period after 100 BC can be examined. What is clear is that the Germanic idea of warfare was quite different from the pitched battles fought by Rome and Greece. Instead the Germanic tribes focused on raids.

The purpose of these was generally not to gain territory, but rather to capture resources and secure prestige. These raids were conducted by irregular troops often formed along family or village lines. Leaders of unusual personal magnetism could gather more soldiers for longer periods, but there was no systematic method of gathering and training men, so the death of a charismatic leader could mean the destruction of an army. Armies also often consisted of more than 50 percent noncombatants, as displaced people would travel with large groups of soldiers, the elderly, women, and children.

Though often defeated by the Romans, the Germanic tribes were remembered in Roman records as fierce combatants, whose main downfall was that they failed to unite successfully into one fighting force, under one command.\[33] After the three Roman legions were ambushed and destroyed by an alliance of Germanic tribes headed by Arminius at the Battle of the Teutoburg Forest in 9 AD, the Roman Empire made no further concentrated attempts at conquering Germany beyond the Rhine. Prolonged warfare against the Romans accustomed the Germanic tribes to improved tactics such as the use of reserves, military discipline and centralised command.\[33] Germanic tribes would eventually overwhelm and conquer the ancient world, giving rise to modern Europe and medieval warfare. For an analysis of Germanic tactics versus the Roman empire see tactical problems in facing the Gauls and the Germanic tribes.

**Japanese**

Horses and bows were very important in Japan, and were used in warfare from very early times, as shown in statues and artifacts found in tombs of early chieftains. Samurai eventually became very skilled in using the horse. Because their main weapon at this time was the bow and arrow, early samurai exploits were spoken of in Japanese war tales as the “Way of the Horse and Bow.” Horse and bow combined was a battlefield advantage to the early samurai. A bunch of arrows made of mainly wood with poison tipped points were worn on a warriot's right side so he could quickly knock and release an arrow mid-gallop.

Although they weren’t as important as the bow, swords of various sizes and types were also part of an early samurai’s armory. They were mostly for close quarters engagements. Many different kinds of spears were also used. One, the naginata, was a curved blade fixed to the end of a pole several feet long. This was known as a ‘woman’s spear’ because samurai girls were taught to use it from an early age. A device called the kumade, which resembled a long-handled garden rake, was used to catch the clothing or helmet of enemy horsemen and unseat them.

Common samurai archers had armor made of lamellae pieces laced together with colorful cords. The lightweight armor allowed for greater freedom of movement, faster speed, and reduced fatigue for horse and rider.

The early Yamato period had seen a continual engagement in the Korean Peninsula until Japan finally withdrew, along with the remaining forces of the Baekje Kingdom. Several battles occurred in these periods as the Emperor's succession gained importance. By the Nara period, Honshū was completely under the control of the Yamato clan. Near the end of the Heian period, samurai became a powerful political force, thus starting the feudal period.
Notable ancient wars

- **Ionian Revolt**

  The **Ionian Revolt** was a series of conflicts between the Ionia and the Persian Empire that began 499 BC and lasted until 493 BC. The revolt begins because of Athens's offensive attack to the city of Sardis and massacring the Persian citizens by burning down the city. This revolt had a major role in starting the Greco-Persian wars.

- **Greco-Persian Wars**

  The **Greco-Persian Wars** were a series of conflicts between the Greek City-States and the Persian Empire that began around 500 BC and lasted until 448 BC.

- **Peloponnesian War**

  The **Peloponnesian War** was begun in 431 BC between the Athenian Empire and the Peloponnesian League which included Sparta and Corinth. The war was documented by Thucydides, an Athenian general, in his work *The History of The Peloponnesian War*. The war lasted 27 years, with a brief truce in the middle.

- **Wars of Alexander the Great**

  King Alexander the III of Macedonia throughout his entire reign from 336 to 321 B.C embarked on a campaign of conquest of the {{Achamednid Empire|Persian Empire]]. Starting from modern day Western Turkey Alexander the Great conquered the entirety of Egypt, the Middle East, Iran and parts of India and Central Asia. Never losing a battle Alexander expanded the boundaries of the known world to the Greek World at the time. With an untimely death his successors fought over the territories they had conquered. However, due to Alexander the Great Greek culture and technology spread into Asia for centuries to come.

- **Kalinga War (265–264 BC)**

  A war fought between the Mauryan Empire under Ashoka and the state of Kalinga, a feudal republic located on the coast of the present-day Indian state of Odisha. Ashoka's response to the Kalinga War is recorded in the Edicts of Ashoka. According to some of these (Rock Edict XIII and Minor Rock Edict I), the Kalinga War prompted Ashoka, already a non-engaged Buddhist, to devote the rest of his life to Ahimsa (non-violence) and to Dhamma-Vijaya (victory through Dhamma).

- **Qin's wars of unification**

  **Qin's wars of unification** were a series of military campaigns launched in the late 3rd century BC by the Qin state against the other six major states – Han, Zhao, Yan, Wei, Chu and Qi – within the territories that formed modern China. By the end of the wars in 221 BC, Qin had unified most of the states and occupied some lands south of the Yangtze River. The territories conquered by Qin served as the foundation of the Qin Empire.

- **Punic Wars**

  The **Punic Wars** were a series of three wars fought between Rome and the city of Carthage (a Phoenician descendant). They are known as the "Punic" Wars because Rome's name for Carthaginians was *Punici* (older *Poeni*, due to their Phoenician ancestry). They determined that the Romans would control the Mediterranean Sea and led to the eventual rise of the greater Roman Empire across Europe, Asia and Africa.

1. The First Punic War was primarily a naval war fought between 264 BC and 241 BC.
2. The Second Punic War is famous for Hannibal's crossing of the Alps and was fought between 218 BC and 202 BC.
3. The Third Punic War resulted in the destruction of Carthage and was fought between 149 BC and 146 BC.
- **Roman-Persian Wars**

  The **Roman–Persian Wars** were a series of conflicts between states of the Greco-Roman world and two successive Iranian empires: the Parthian and the Sassanid. Battles between the Parthian Empire and the Roman Republic began in 92 BC; wars began under the late Republic, and continued through the Roman and Sassanid empires. They were ended by the Arab Muslim invasions, which devastated the Sassanid and Byzantine East Roman empires shortly after the end of the last war between them.

- **Han–Xiongnu War**

  The **Han–Xiongnu War**,\[34\] also known as the **Sino-Xiongnu War**,\[35\] was a series of military battles fought between the Chinese Han empire and the Xiongnu confederated state located in modern day Mongolia from 133 BC to 89 AD. The final wars resulted in the final destruction of the Xiongnu as a political entity in Siberia. China would temporally enjoy peace on its northern frontier before new peoples such as the Xianbei took the role of the Xiongnu.

- **Roman-Germanic Wars**

  The **Germanic Wars** is a name given to a large series of military engagements between the Romans and various Germanic tribes between 113 BC and AD 596. The nature of these wars varied through time between Roman conquest, Germanic uprisings and later Germanic invasions in the Roman Empire that started in the late 2nd century. The series of conflicts which began in the 5th century, under the Western Roman Emperor Honorius, led (along with internal strife) to the ultimate downfall of the Western Roman Empire.

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**Notable ancient battles**

- Battle of Megiddo c. 1457 BC
- Battle of the Ten Kings, c. 1400 BC
- Battle of Kadesh 1274 BC
- Battle of Muye, 1046 BC
- Battle of Qarqar, 853 BC
- Battle of Megiddo, 609 BC
- Battle of Carchemish, 605 BC
- Battle of Pteria, 547 BC
- Battle of Thymbra, 546 BC
- Battle of Lade, 546 BC
- Battle of Marathon, 490 BC
- Battle of Thermopylae, 480 BC
- Battle of Artemision, 480 BC
- Battle of Salamis, 480 BC
- Battle of Platea, 479 BC
- Battle of Mycale, 479 BC
- Battle of Cunaxa, 401 BC
- Battle of the Allia, 387 BC
- Battle of Chaeronea, 338 BC
- Battle of Issus, 333 BC
- Battle of Gaugamela, 331 BC
- Battle of the Persian Gate, 330 BC
- Battle of the Hydaspes River, 326 BC
- Battle of Paraitacene, 317 BC
- Battle of Gabiene, 316 BC
- Battle of Ipsus, 301 BC
- Battle of Corupedium, 281 BC
- Siege of Saguntum, 218 BC
- Battle of Ticinus, 218 BC
- Battle of the Trebia, 218 BC
- Battle of Lake Trasimene, 217 BC
- Battle of Ager Falernus, 217 BC
- Battle of Raphia, 217 BC
- Battle of Geronium, 217 BC
- Battle of Cannae, 216 BC
- Battle of the Metaurus, 207 BC
- Battle of Tao River, 204 BC
- Battle of Wei River, 204 BC
- Battle of Gaixia, 202 BC
- Battle of Zama, 202 BC
- Battle of Pydna, 168 BC
- Battle of Cynoscephalae, 197 BC
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- Sack of Rome, 455

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  - Peltast
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  - Persian Immortal
  - Phalanx
    - Macedonian phalanx
  - Legion

- **Cavalry**
  - Cataphract
  - Clibanarii
  - Horse archer
  - Chariot
  - War elephant

- **Artillery and siege engines**
  - Catapult
  - Onager
  - Ballista
  - Scorpio
  - Siege tower
  - Battering ram
See also

- Ancient Mediterranean piracy
- Horses in warfare
- Women in warfare

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31. Dionysius of Halicarnassus, Roman Antiquities sp. 259 Excerpts from Book XIV
33. Tacitus, The Annals 2.45
34. Wu 2013, 71.

Literature


**External links**

- Evolution of Sling Weapons
- War in ancient Greece : a bibliography
- Ancient and Prehistoric Weapons and Tools


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Medieval warfare is the European warfare of the Middle Ages. Technological, cultural, and social developments had forced a dramatic transformation in the character of warfare from antiquity, changing military tactics and the role of cavalry and artillery. In terms of fortification, the Middle Ages saw the emergence of the castle in Europe, which then spread to Western Asia.

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See also

Notes

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Further reading

### Strategy and tactics

*De re militari*
Publius Flavius Vegetius Renatus wrote *De re militari* (Concerning Military Matters) possibly in the late 4th century. Described by historian Walter Goffart as "the bible of warfare throughout the Middle Ages", *De re militari* was widely distributed through the Latin West. While Western Europe relied on a single text for the basis of its military knowledge, the Byzantine Empire in Southeastern Europe had a succession of military writers. Though Vegetius had no military experience and *De re militari* was derived from the works of Cato and Frontinus, his books were the standard for military discourse in Western Europe from their production until the 16th century.

*De re militari* was divided into five books: who should be a soldier and the skills they needed to learn, the composition and structure of an army, field tactics, how to conduct and withstand sieges, and the role of the navy. According to Vegetius, infantry was the most important element of an army because it was cheap compared to cavalry and could be deployed on any terrain. One of the tenets he put forward was that a general should only engage in battle when he was sure of victory or had no other choice. As archaeologist Robert Liddiard explains, "pitched battles, particularly in the eleventh and twelfth centuries, were rare."

Although his work was widely reproduced, and over 200 copies, translations, and extracts survive today, the extent to which Vegetius affected the actual practice of warfare as opposed to its concept is unclear because of his habit of stating the obvious. Historian Michael Clanchy noted "the medieval axiom that laymen are illiterate and its converse that clergy are literate", so it may be the case that few soldiers read Vegetius' work. While their Roman predecessors were well-educated and had been experienced in warfare, the European nobility of the early Medieval period were not renowned for their education, but from the 12th century, it became more common for them to read.

Some soldiers regarded the experience of warfare as more valuable than reading about it; for example, Geoffroi de Charny, a 14th century knight who wrote about warfare, recommended that his audience should learn by observing and asking advice from their superiors. While it is uncertain to what extent his work was read by the warrior class as opposed to the clergy, Vegetius remained prominent in the literature on warfare in the medieval period. In 1489, King Henry VII of England commissioned the translation of *De re militari* into English, "so every gentleman born to arms and all manner of men of war, captains, soldiers, vituallers and all others would know how they ought to behave in the feats of wars and battles."

**Fortifications**

In Europe, breakdowns in centralized power led to the rise of a number of groups that turned to large-scale pillage as a source of income. Most notably the Vikings (but also Arabs, Mongols, Huns, and Magyars) raided significantly. As these groups were generally small and needed to move quickly, building fortifications was a good way to provide refuge and protection for the people and the wealth in the region.

These fortifications evolved over the course of the Middle Ages, the most important form being the castle, a structure which has become almost synonymous with the Medieval era in the popular eye. The castle served as a protected place for the local elites. Inside a castle they were protected from bands of raiders and could send mounted warriors to drive the enemy from the area, or to disrupt the efforts of larger armies to supply themselves in the region by gaining local superiority over foraging parties that would be impossible against the whole enemy host.

Fortifications were a very important part of warfare because they provided safety to the lord, his family, and his servants. They provided refuge from armies too large to face in open battle. The ability of the heavy cavalry to dominate a battle on an open field was useless against fortifications. Building siege engines was a time-consuming process, and could seldom be effectively done...
without preparations before the campaign. Many sieges could take months, if not years, to weaken or demoralize the defenders sufficiently. Fortifications were an excellent means of ensuring that the elite could not be easily dislodged from their lands – as Count Baldwin of Hainaut commented in 1184 on seeing enemy troops ravage his lands from the safety of his castle, “they can't take the land with them”.[11]

Siege warfare

In the Medieval period besieging armies used a wide variety of siege engines including: scaling ladders; battering rams; siege towers and various types of catapults such as the mangonel, onager, ballista, and trebuchet. Siege techniques also included mining in which tunnels were dug under a section of the wall and then rapidly collapsed to destabilize the wall's foundation. A final technique was to bore into the enemy walls, however this was not nearly as effective as other methods due to the thickness of castle walls. Several of these siege techniques were used by the Romans but experienced a rebirth during the Crusades.

Advances in the prosecution of sieges encouraged the development of a variety of defensive counter-measures. In particular, Medieval fortifications became progressively stronger – for example, the advent of the concentric castle from the period of the Crusades – and more dangerous to attackers – witness the increasing use of machicolations and murder-holes, as well the preparation of hot or incendiary substances. Arrow slits, concealed doors for sallies, and deep water wells were also integral to resisting siege at this time. Designers of castles paid particular attention to defending entrances, protecting gates with drawbridges, portcullises and barbicans. Wet animal skins were often draped over gates to repel fire. Moats and other water defences, whether natural or augmented, were also vital to defenders.

In the Middle Ages, virtually all large cities had city walls – Dubrovnik in Dalmatia is an impressive and well-preserved example – and more important cities had citadels, forts or castles. Great effort was expended to ensure a good water supply inside the city in case of siege. In some cases, long tunnels were constructed to carry water into the city. In other cases, such as the Ottoman siege of Shkodra, Venetian engineers had designed and installed cisterns that were fed by rain water channeled by a system of conduits in the walls and buildings.[12] Complex systems of underground tunnels were used for storage and communications in medieval cities like Tábor in Bohemia. Against these would be matched the mining skills of teams of trained sappers, who were sometimes employed by besieging armies.

Until the invention of gunpowder-based weapons (and the resulting higher-velocity projectiles), the balance of power and logistics definitely favored the defender. With the invention of gunpowder, the traditional methods of defence became less and less effective against a determined siege.

Organization

The medieval knight was usually a mounted and armoured soldier, often connected with nobility or royalty, although (especially in north-eastern Europe) knights could also come from the lower classes, and could even be enslaved persons. The cost of their armour, horses, and weapons was great; this, among other things, helped gradually transform the knight, at least in western Europe, into a distinct social class separate from other warriors. During the crusades, holy orders of Knights fought in the Holy Land (see Knights Templar, the Hospitallers, etc.).
Light cavalry consisted usually of lighter armed and armoured men, who could have lances, javelins or missile weapons, such as bows or crossbows. In much of the Middle Ages light cavalry usually consisted of wealthy commoners. Later in the Middle Ages light cavalry would also include sergeants who were men who had trained as knights but could not afford the costs associated with the title. Light cavalry were used as scouts, skirmishers or outflankers. Many countries developed their own styles of light cavalry, such as Hungarian mounted archers, Spanish jinetes, Italian and German mounted crossbowmen and English currous.

Infantry were recruited and trained in a wide variety of manners in different regions of Europe all through the Middle Ages, and probably always formed the most numerous part of a medieval field army. Many infantrymen in prolonged wars would be mercenaries. Most armies contained significant numbers of spearmen, archers and other unmounted soldiers.

**Recruiting**

In the earliest Middle Ages it was the obligation of every noble to respond to the call to battle with his own equipment, archers, and infantry. This decentralized system was necessary due to the social order of the time, but could lead to motley forces with variable training, equipment and abilities. The more resources the noble had access to, the better his troops would typically be.

Typically the feudal armies consisted of a core of highly skilled knights and their household troops, mercenaries hired for the time of the campaign and feudal levies fulfilling their feudal obligations, who usually were little more than rabble. They could, however, be efficient in disadvantageous terrain. Towns and cities could also field militias.

As central governments grew in power, a return to the citizen and mercenary armies of the classical period also began, as central levies of the peasantry began to be the central recruiting tool. It was estimated that the best infantrymen came from the younger sons of free land-owning yeomen, such as the English archers and Swiss pikemen. England was one of the most centralized states in the Late Middle Ages, and the armies that fought the Hundred Years’ War were mostly paid professionals.

In theory, every Englishman had an obligation to serve for forty days. Forty days was not long enough for a campaign, especially one on the continent. Thus the scutage was introduced, whereby most Englishmen paid to escape their service and this money was used to create a permanent army. However, almost all high medieval armies in Europe were composed of a great deal of paid core troops, and there was a large mercenary market in Europe from at least the early 12th century.

As the Middle Ages progressed in Italy, Italian cities began to rely mostly on mercenaries to do their fighting rather than the militias that had dominated the early and high medieval period in this region. These would be groups of career soldiers who would be paid a set rate. Mercenaries tended to be effective soldiers, especially in combination with standing forces, but in Italy they came to dominate the armies of the city states. This made them problematic; while at war they were considerably more reliable than a standing army; at peacetime they proved a risk to the state itself like the Praetorian Guard had once been.
Mercenary-on-mercenary warfare in Italy led to relatively bloodless campaigns which relied as much on manoeuvre as on battles, since the condottieri recognized it was more efficient to attack the enemy’s ability to wage war rather than his battle forces, discovering the concept of indirect warfare 500 years before Sir Basil Liddell Hart, and attempting to attack the enemy supply lines, his economy and his ability to wage war rather than risking an open battle, and manoeuvre him into a position where risking a battle would have been suicidal. Machiavelli understood this indirect approach as cowardice.

### Equipment

**Weapons** Medieval weapons consisted of many different types of ranged and hand-held objects:

- **Melee**
  - Battleaxe
  - Horseman's pick
  - Blades
  - Arming Sword
  - Dagger
  - Knife
  - Longsword
  - Messer
- **Blunt weapons**
  - Club
  - Mace
  - War Hammer
- **Polearm**
  - Halberd
  - Lance
  - Military fork, the weaponized Pitchfork
  - Pollaxe
  - Spear
- **Ranged**
  - Bow
  - Longbow
  - Crossbow
  - Throwing axe
  - Throwing spear and Javelin
  - Sling

**Armour**

- Body armour
  - Leather
  - Fabric
  - Chainmail
  - Brigandine
  - Plate
- Shield
- Helmet

**Artillery and Siege engine**
- Battering rams
- Catapult
- Trebuchet
- Ballista
- Siege tower

Animals
- Camels in warfare
- Dogs in warfare
- Horses in warfare and Horses in the Middle Ages
- War elephant
- War pigs

Relics
The practice of carrying relics into battle is a feature that distinguishes medieval warfare from its predecessors or from early modern warfare. The presence of relics was believed to be an important source of supernatural power that served both as a spiritual weapon and a form of defence; the relics of martyrs were considered by Saint John Chrysostom much more powerful than "walls, trenches, weapons and hosts of soldiers"[13]

In Italy, the carroccio or carro della guerra, the "war wagon", was an elaboration of this practice that developed during the 13th century. The carro della guerra of Milan was described in detail in 1288 by Bonvesin de la Riva in his book on the "Marvels of Milan". Wrapped in scarlet cloth and drawn by three yoke of oxen that were caparisoned in white with the red cross of Saint Ambrose, the city's patron, it carried a crucifix so massive it took four men to step it in place, like a ship's mast.[14]

Supplies and logistics
Medieval Warfare largely predated the use of supply trains- which meant that armies had to acquire food supplies from whatever territory they were passing through, this meant that large scale looting by soldiers was unavoidable, and was actively encouraged by the 14th century with its emphasis on "Chevaunche" tactics, or use of units of light cavalry who would loot and pillage hostile territory in order to distract and demoralize the enemy while denying them their own supplies.

Through the medieval period, soldiers were responsible for supplying themselves, either through foraging, looting, or purchases. Even so, military commanders often provided their troops with food and supplies, but this would be provided in lieu of the soldiers' wages, or soldiers would be expected to pay for it from their wages, either at cost or even with a profit.[15]

In 1294, the same year John II de Balliol of Scotland refused to support Edward I of England's planned invasion of France, Edward I implemented a system in Wales and Scotland where sheriffs would acquire foodstuffs, horses and carts from merchants with compulsory sales at prices fixed below typical market prices under the Crown's rights of prise and purveyance. These goods would then be transported to Royal Magazines in southern Scotland and along the Scottish border where English conscripts under his command could purchase them. This continued during the First War of Scottish Independence which began in 1296, though the system was unpopular and was ended with Edward I's death in 1307.[15]

Starting under the rule of Edward II in 1307 and ending under the rule of Edward III in 1337, the English instead used a system where merchants would be asked to meet armies with supplies for the conscripts to purchase. This led to discontent as the merchants saw an opportunity to profit on, forcing conscripts to pay well above normal market prices for food.[15]

As Edward III went to war with France in the Hundred Years' War (starting in 1337), the English returned to a practice of foraging and looting to meet their logistical needs. This practice lasted throughout the course of war, extending through the remainder of Edward III's reign into the reign of Henry VI[15]

Naval warfare
The waters surrounding Europe can be grouped into two types which affected the design of craft that travelled and therefore the warfare. The Mediterranean and Black Seas were free of large tides, generally calm, and weather predictable. The seas around the north and west of Europe experienced stronger and less predictable weather. The weather gauge, the advantage of having a following wind, was an important factor in naval battles, particularly to the attackers. Typically westerlies (winds blowing from west to east) dominated Europe, giving naval powers to the west an advantage.\textsuperscript{[16]} Medieval sources on the conduct of medieval naval warfare are less common than those about land-based war. Most medieval chroniclers had no experience of life on the sea, and generally were not well-informed. Maritime archaeology has helped provide information.\textsuperscript{[17]}

Early in the medieval period, ships in the context of warfare were used primarily for transporting troops.\textsuperscript{[18]} In the Mediterranean, naval warfare in the Middle Ages was similar to that under late Roman Empire: fleets of galleys would exchange missile fire and then try to board bow first to allow marines to fight on deck. This mode of naval warfare remained basically the same into the early modern period, as, for example, at the Battle of Lepanto. Famous admirals included Roger of Lauria, Andrea Doria and Hayreddin Barbarossa.

Galleys were not suitable for the colder and more turbulent North Sea and Atlantic Ocean, although they saw occasional use. Bulkier ships were developed which were primarily sail-driven, although the long lowboard Viking-style rowed longship saw use well into the 15th century. Their main purpose in the north remained the transportation of soldiers to fight on the decks of the opposing ship (as, for example, at the Battle of Svolder or the Battle of Sluys).

Late medieval sailing warships resembled floating fortresses, with towers in the bows and at the stern (respectively, the forecastle and aftcastle). The large superstructure made these warships quite unstable, but the decisive defeats that the more mobile but considerably lower boarded longships suffered at the hands of high-boarded cogs in the 15th century ended the issue of which ship type would dominate northern European warfare.

**Introduction of guns**

The introduction of guns was the first steps towards major changes in naval warfare, but it only slowly changed the dynamics of ship-to-ship combat. The first guns on ships were introduced in the 14th century and consisted of small wrought-iron pieces placed on the open decks and in the fighting tops, often requiring only one or two men to handle them. They were designed to injure, kill or simply stun, shock and frighten the enemy prior to boarding.\textsuperscript{[19]}

As guns were made more durable to withstand stronger gunpowder charges, they increased their potential to inflict critical damage to the vessel rather than just their crews. Since these guns were much heavier than the earlier anti-personnel weapons, they had to be placed lower in the ships, and fire from gunports, to avoid ships becoming unstable. In Northern Europe the technique of building ships with clinker planking made it difficult to cut ports in the hull; clinker-built (or clench-built) ships had much of their structural strength in the outer hull. The solution was the gradual adoption of carvel-built ships that relied on an internal skeleton structure to bear the weight of the ship.\textsuperscript{[20]} Gunports cut in the hull of ships were not introduced until 1501, at the very start of the early modern period.\textsuperscript{[21]}
The first ships to actually mount heavy cannon capable of sinking ships were galleys, with large wrought-iron pieces mounted directly on the timbers in the bow. The first example is known from a woodcut of a Venetian galley from 1486. Heavy artillery on galleys was mounted in the bow which fit conveniently with the long-standing tactical tradition of attacking head-on and bow-first. The ordnance on galleys was quite heavy from its introduction in the 1480s, and capable of quickly demolishing medieval-style stone walls that still prevailed until the 16th century. This temporarily upended the strength of older seaside fortresses, which had to be rebuilt to cope with gunpowder weapons. The addition of guns also improved the amphibious abilities of galleys as they could assault supported with heavy firepower, and could be even more effectively defended when beached stern-first. Galleys and similar oared vessels remained uncontested as the most effective gun-armed warships in theory until the 1560s, and in practice for a few decades more, and were actually considered a grave risk to sailing warships.

Rise of infantry

In the Medieval period, the mounted cavalry long held sway on the battlefield. Heavily armoured, mounted knights represented a formidable foe for reluctant peasant draftees and lightly armoured freemen. To defeat mounted cavalry, infantry used swarms of missiles or a tightly packed phalanx of men, techniques honed in antiquity by the Greeks.

Swiss pikemen

The use of long pikes and densely packed foot troops was not uncommon in the Middle Ages. The Flemish footmen at the Battle of the Golden Spurs met and overcame French knights in 1302, and the Scots held their own against heavily armoured English invaders. During the St.Louis crusade, dismounted French knights formed a tight lance-and-shield phalanx to repel Egyptian cavalry. The Swiss used pike tactics in the late medieval period. While pikemen usually grouped together and awaited a mounted attack, the Swiss developed flexible formations and aggressive maneuvering, forcing their opponents to respond. The Swiss won at Morgarten, Laupen, Sempach, Grandson and Murten, and between 1450 and 1550 every leading prince in Europe (except the English and Scottish) hired Swiss pikemen, or emulated their tactics and weapons (e.g., the German Landsknechte).

Welsh and English longbowmen

The Welsh & English longbowman used a single-piece longbow (but some bows later developed a composite design) to deliver arrows that could penetrate contemporary mail and damage/dent plate armour. The longbow was a difficult weapon to master, requiring long years of use and constant practice. A skilled longbowman could shoot about 12 shots per minute. This rate of fire was far superior to competing weapons like the crossbow or early gunpowder weapons. The nearest competitor to the longbow was the much more expensive crossbow, used often by urban militias and mercenary forces. The crossbow had greater penetrating power, and did not require the extended years of training. However, it lacked the rate of fire of the longbow.

At Crécy and Agincourt bowmen unleashed clouds of arrows into the ranks of knights. At Crécy, even 5,000 Genoese crossbowmen could not dislodge them from their hill. At Agincourt, thousands of French knights were brought down by armour-piercing bodkin point arrows and horse-maiming broadheads. Longbowmen decimated an entire generation of the French nobility.

Transition to gunpowder warfare

In 1326 the earliest known European picture of a gun appeared in a manuscript by Walter de Milemete. In 1350, Petrarch wrote that the presence of cannons on the battlefield was 'as common and familiar as other kinds of arms.'
Early artillery played a limited role in the Hundred Years' War, and it became indispensable in the Italian Wars of 1494–1559, marking the beginning of early modern warfare. Charles VIII, during his invasion of Italy, brought with him the first truly mobile siege train: culverins and bombards mounted on wheeled carriages, which could be deployed against an enemy stronghold immediately after arrival.

**Medieval conquerors**

**Arabs**

The initial Muslim conquests began in the 7th century after the death of the Islamic prophet Muhammad, and were marked by a century of rapid Arab expansion beyond the Arabian Peninsula under the Rashidun and Umayyad Caliphates. Under the Rashidun, the Arabs conquered the Persian Empire, along with Roman Syria and Roman Egypt during the Byzantine–Arab Wars, all within just seven years from 633 to 640. Under the Umayyads, the Arabs annexed North Africa and southern Italy from the Romans and the Arab Empire soon stretched from parts of the Indian subcontinent across Central Asia, the Middle East, North Africa, and southern Italy, to the Iberian Peninsula and the Pyrenees.

The early Arab army mainly consisted of camel-mounted infantry, alongside a few Bedouin cavalry. Constantly outnumbered by their opponent, they did however possess the advantage of strategic mobility, their camel-borne nature allowing them to constantly outmaneuver larger Byzantine and Sassanid armies to take prime defensive positions. The Rashidun cavalry, while lacking the number and mounted archery skill of their Roman and Persian counterparts was for the most part skilfully employed, and played a decisive role in many crucial battles such as Battle of Yarmouk.

In contrast, the Roman army and Persian army at the time both had large numbers of heavy infantry and heavy cavalry (cataphracts and clibanarii) that were better equipped, heavily protected, and more experienced and disciplined. The Arab invasions came at a time when both ancient powers were exhausted from the protracted Byzantine–Sassanid Wars, particularly the bitterly fought Byzantine–Sassanid War of 602–628 which had brought both empires close to collapse. Also, the typically multi-ethnic Byzantine force was always racked by dissension and lack of command unity, a similar situation also being encountered among the Sassanids who had been embroiled in a bitter civil war for a decade before the coming of the Arabs. In contrast, the Ridda Wars had forged the Caliphate's army into a united and loyal fighting force.

**Hungarians**

**Vikings**

The Vikings were a feared force in Europe because of their savagery and speed of their attacks. Whilst seaborne raids were nothing new at the time, the Vikings refined the practice to a science through their shipbuilding, tactics and training. Unlike other raiders, the Vikings made a lasting impact on the face of Europe. During the Viking age, their expeditions, frequently combining raiding and
trading, penetrated most of the old Frankish empire, the British Isles, the Baltic region, Russia, and both Muslim and Christian Iberia. Many served as mercenaries, and the famed Varangian Guard, serving the Emperor of Constantinople, was drawn principally of Scandinavian warriors.

Viking longships were swift and easily manoeuvred; they could navigate deep seas or shallow rivers, and could carry warriors that could be rapidly deployed directly onto land due to the longships being able to land directly. The longship was the enabler of the Viking style of warfare that was fast and mobile, relying heavily on the element of surprise, and they tended to capture horses for mobility rather than carry them on their ships. The usual method was to approach a target stealthily, strike with surprise and then retire swiftly. The tactics used were difficult to stop, for the Vikings, like guerrilla-style raiders elsewhere, deployed at a time and place of their own choosing. The fully armoured Viking raider would wear an iron helmet and a maille hauberk, and fight with a combination of axe, sword, shield, spear or great "Danish" two-handed axe, although the typical raider would be unarmoured, carrying only a bow and arrows, a knife "seax", a shield and spear; the swords and the axes were much less common.

Almost by definition, opponents of the Vikings were ill-prepared to fight a force that struck at will, with no warning. European countries with a weak system of government would be unable to organize a suitable response and would naturally suffer the most to Viking raiders. Viking raiders always had the option to fall back in the face of a superior force or stubborn defence and then reappear to attack other locations or retreat to their bases in what is now Sweden, Denmark, Norway and their Atlantic colonies. As time went on, Viking raids became more sophisticated, with coordinated strikes involving multiple forces and large armies, as the "Great Heathen Army" that ravaged Anglo-Saxon England in the 9th century. In time, the Vikings began to hold on to the areas they raided, first wintering and then consolidating footholds for further expansion later.

With the growth of centralized authority in the Scandinavian region, Viking raids, always an expression of "private enterprise", ceased and the raids became pure voyages of conquest. In 1066, King Harald Hardråde of Norway invaded England, only to be defeated by Harold Godwinson, who in turn was defeated by William of Normandy, descendant of the Viking Rollo, who had accepted Normandy as a fief from the Frankish king. The three rulers had their claims to the English crown (Harald probably primarily on the overlord-ship of Northumbria) and it was this that motivated the battles rather than the lure of plunder.

At that point, the Scandinavians had entered their medieval period and consolidated their kingdoms of Denmark, Norway, and Sweden. This period marks the end of significant raider activity both for plunder or conquest. The resurgence of centralized authority throughout Europe limited opportunities for traditional raiding expeditions in the West, whilst the Christianisation of the Scandinavian kingdoms themselves encouraged them to direct their attacks against the still predominantly pagan regions of the eastern Baltic. The Scandinavians started adapting more continental European ways, whilst retaining an emphasis on naval power – the "Viking" clinker-built warship was used in war until the 14th century at least. However, developments in shipbuilding elsewhere removed the advantage the Scandinavian countries had previously enjoyed at sea, whilst castle building throughout frustrated and eventually ended Viking raids. Natural trading and diplomatic links between Scandinavia and Continental Europe ensured that the Scandinavians kept up to date with continental developments in warfare.

The Scandinavian armies of the High Middle Ages followed the usual pattern of the Northern European armies, but with a stronger emphasis on infantry. The terrain of Scandinavia favoured heavy infantry, and whilst the nobles fought mounted in the continental fashion, the Scandinavian peasants formed a well-armed and well-armoured infantry, of which approximately 30% to 50% would be archers or crossbowmen. The crossbow, the flatbow and the longbow were especially popular in Sweden and Finland. The chainmail, lamellar armour and chain of plates were the usual Scandinavian infantry armour before the era of plate armour.

Mongols

By 1241, having conquered large parts of Russia, the Mongols continued the invasion of Europe with a massive three-pronged advance, following the fleeing Cumans, who had established an uncertain alliance with King Bela IV of Hungary. They first invaded Poland, and finally Hungary, culminating in the crushing defeat of the Hungarians in the Battle of Mohi. The Mongol aim seems to have consistently been to defeat the Hungarian-Cuman alliance. The Mongols raided across the borders to Austria and Bohemia in the summer when the Great Khan died, and the Mongol princes returned home to elect a new Great Khan.
The Golden Horde would frequently clash with Hungarians, Lithuanians and Poles in the thirteenth century, with two large raids in the 1260s and 1280s respectively. In 1284 the Hungarians repelled the last major raid into Hungary, and in 1287 the Poles repelled a raid against them. The instability in the Golden Horde seems to have quieted the western front of the Horde. Also, the large scale invasions and raiding that had previously characterized the expansion of the Mongols was cut short probably in some part due to the death of the last great Mongol leader, Tamerlane.

The Hungarians and Poles had responded to the mobile threat by extensive fortification-building, army reform in the form of better armoured cavalry, and refusing battle unless they could control the site of the battlefield to deny the Mongols local superiority. The Lithuanians relied on their forested homelands for defence, and used their cavalry for raiding into Mongol-dominated Russia. When attacking fortresses they would launch dead or diseased animals into fortresses to help spread disease.

**Turks**

An early Turkic group, the Seljuks, were known for their cavalry archers. These fierce nomads were often raiding empires, such as the Byzantine Empire, and they scored several victories using mobility and timing to defeat the heavy cataphracts of the Byzantines.

One notable victory was at Manzikert, where a conflict among the generals of the Byzantines gave the Turks the perfect opportunity to strike. They hit the cataphracts with arrows, and outmaneuvered them, then rode down their less mobile infantry with light cavalry that used scimitars. When gunpowder was introduced, the Ottoman Turks of the Ottoman Empire hired the mercenaries that used the gunpowder weapons and obtained their instruction for the Janissaries.

Out of these Ottoman soldiers rose the Janissaries (yenı ceri; "new soldier"), from which they also recruited many of their heavy infantry. Along with the use of cavalry and early grenades, the Ottomans mounted an offensive in the early Renaissance period and attacked Europe, taking Constantinople by massed infantry assaults.

Like many other nomadic peoples, the Turks featured a core of heavy cavalry from the upper classes. These evolved into the Sipahis (feudal landholders similar to western knights and Byzantine pronoiai) and Qapukulu (door slaves, taken from youth like Janissaries and trained to be royal servants and elite soldiers, mainly cataphracts).

**See also**

- Endemic warfare
- Great Stirrup Controversy
- Horses in warfare
- The Night Attack
- Timeline of women in Medieval warfare

**Notes**
References


7. Liddiard (2005), p. 79
22. Lehmann (1984), p. 31
24. The British naval historian Nicholas Rodger describes this as a "crisis in naval warfare" which eventually led to the development of the galleon, which combined ahead-firing capabilities, heavy broadside guns and a considerable increase in maneuverability by introduction of more advanced sailing rigs; Rodger (2003), p. 245. For more detailed arguments concerning the development of broadside armament, see Rodger (1996).
25. Kelly 2004:29
- Goffart, Walter (1977), "The date and purpose of Vegetius' De Re Militari", Traditio, xxxiii: 65–100, JSTOR 27831025

External links

- Medieval Warfare Siege warfare, open battles, weapons, armour and fighting techniques.

Further reading

- De Re Militari: The Society for Medieval Military History


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Early modern warfare

Early modern warfare is associated with the start of the widespread use of gunpowder and the development of suitable weapons to use the explosive, including artillery and firearms; for this reason the era is also referred to as the age of gunpowder warfare (a concept introduced by Michael Roberts in the 1950s).

This entire period is contained within the Age of Sail, which characteristic dominated the era’s naval tactics, including the use of gunpowder imaval artillery.

All of the Great Powers of Europe and the Middle East were actively fighting numerous wars throughout this period, grouped in rough geographical and chronological terms as:

- The European wars of religion between the 1520s and the 1640s (including the Thirty Years’ War, the Eighty Years’ War and the Wars of the Three Kingdoms) and, the Franco-Spanish War (1635–1659) the Northern Wars, Polish–Swedish wars and Russo-Swedish Wars;
- The Russo-Turkish Wars, Ottoman–Habsburg wars and other Ottoman wars in Europe;
- In the Horn of Africa, the Adal’s conquest of Ethiopia and the involving of the Ottomans, Mamluks and the Portuguese;
- In Asia, the Persia–Portugal war, Nader’s Campaigns, the Mughal conquests, the Chinese Ten Great Campaigns and the Anglo-Mysore Wars;
- Throughout the 18th century the ‘Second Hundred Years’ War”, an umbrella term which includes the Nine Years’ War, Seven Years’ War, War of the Spanish Succession, War of the Austrian Succession and finally the American War of Independence. French Revolutionary Wars and Napoleonic Wars of the late 18th to early 19th centuries which mark the end of this era.

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Use of gunpowder before the 16th century

The earliest existent Chinese formula for gunpowder is recorded in the *Wujing Zongyao* manuscript published by 1044,[3][2] while the fire lance, an early firearm, was used by Song Chinese forces against the Jin during the Siege of De'an in 1132.[3][4][5] The earliest surviving bronze hand cannon dates to 1288, during the Mongol-led Yuan Dynasty of China.[6][7] Gunpowder warfare was used in the Mongol invasions of Japan in 1274 and 1281, specifically in the form of explosive bombs[8] fired from catapults against enemy soldiers. Japanese scrolls contain illustrations of bombs used by the Yuan-Mongol forces against mounted samurai. Archaeological evidence of the use of gunpowder include the discovery of multiple shells of the explosive bombs in an underwater shipwreck off the shore of Japan, with X-rays providing proof that they contained gunpowder.[9]

In 1326 the earliest known European picture of a gun appeared in a manuscript by Walter de Milemete.[10] In 1350, Petrarch wrote that the presence of cannons on the battlefield was "as common and familiar as other kinds of arms".[11]

Early artillery played a limited role in the 100 Years' War, and it became indispensable in the Italian Wars of 1494–1559. Charles VIII, during his invasion of Italy, brought with him the first truly mobile siege train: culverins and bombards mounted on wheeled carriages, which could be deployed against an enemy stronghold immediately after arrival.

Europe

Beginning of polygonal fortifications

The period from 1500–1801 saw a rapid advance in techniques of fortification in Europe. Whereas medieval castles had relied on high walls to keep out attackers, early modern fortifications had to withstand artillery bombardments. To do this, engineers developed a style of fortress known as the *trace italienne* or "Italian style". These had low, thick, sloping walls, that would either absorb or glance off cannon fire.

In addition, they were shaped like stars, with bastions protruding at sharp angles. The reason for this was to ensure that every bastion could be supported with fire from an adjacent bastion, leaving no "dead ground" for an attacker to take cover in. These new fortifications quickly negated the advantages cannon had offered to besiegers.

A polygonal fort is a fortification in the style that evolved around the middle of the 18th century, in response to the development of explosive shells.
The complex and sophisticated designs of star forts that preceded them were highly effective against cannon assault, but proved much less effective against the more accurate fire of rifled guns and the destructive power of explosive shells. The polygonal style of fortification is also described as a "flankless fort". Many such forts were built in the United Kingdom and the British Empire during the government of Lord Palmerston and so they are also often referred to as Palmerston forts. Their low profile makes them easy to overlook.

In response to the vulnerabilities of star forts, military engineers evolved a much simpler but more robust style of fortification.

An example of this style can be seen at Fort McHenry in Baltimore in the United States of America, the home of the famous battle where The Star-Spangled Banner was penned by Francis Scott Key.

Firearms

The power of aristocracies vis-à-vis states diminished throughout Western Europe during this period. Aristocrats' 200- to 400-year-old ancestral castles no longer provided useful defences against artillery. The nobility's importance in warfare also eroded as medieval heavy cavalry lost its central role in battle. The heavy cavalry - made up of armoured knights - had begun to fade in importance in the Late Middle Ages. The English longbow and the Swiss pike had both proven their ability to devastate larger armed forces of mounted knights. However, the proper use of the longbow required the user to be extremely strong, making it impossible to amass very large forces of archers.

The proper use of the pike required complex operations in formation and a great deal of fortitude and cohesion by the pikemen, again making amassing large forces difficult. Starting in the early 14th-century, armourers added plate-armour pieces to the traditional protective linked mail armour of knights and men-at-arms to guard against the arrows of the longbow and crossbow. By 1415 some infantrymen began deploying the first "hand cannons", and the earliest small-bore arquebuses, with burning "match locks", appeared on the battlefield in the later 15th century.

Decline of plate armour

In virtually all major European battles during a period of 250 years (1400 to 1650), many soldiers wore extensive plate armour; this includes infantrymen (usually pikemen) and almost all mounted troops. Plate armour was expected to deflect edged weapons and to stop an arquebus or pistol ball fired from a distance, and it usually did. The use of plate armour as a remedy to firearms tended to work as long as the velocity and weight of the ball remained quite low, but over time the increasing power and effectiveness of firearms overtook the development of defenses to counteract them, such that flintlock muskets (entering use after 1650) could kill an armoured man at a distance of even 100 yards (though with limited accuracy), and the armour necessary to protect against this threat would have been too heavy and unwieldy to be practical.

The flintlock musket, carried by most infantrymen other than pikemen after 1650, fired a heavier charge and ball than the matchlock arquebus. A recruit could be trained to use a musket in a matter of weeks. Since the early muskets lacked accuracy, training in marksmanship was of little benefit. Operating a musket did not require the great physical strength of a pikeman or a longbowman or the fairly rare skills of a horseman. Unlike their arquebus predecessors, flintlock muskets could neutralize even the most heavily armoured cavalry forces.
Since a firearm requires little training to operate, a peasant with a gun could now undermine the order and respect maintained by mounted cavalry in Europe and their Eastern equivalents. Though well-smithed plate-armour could still prevent the penetration of gunpowder-weapons, by 1690 it had become no match for massed firearms in a frontal attack and its use ended, even among the cavalry. By the end of the 17th century, soldiers in the infantry and most cavalry units alike preferred the higher mobility of being completely unarmoured to the slight protection - but greatly lessened mobility - offered by wearing plate armour.

**Transition to flintlock muskets**

The arquebus, in use from 1410, was one of the first hand-held firearms that were relatively light (it still required a stand to balance on) and a single person could operate one. One of these weapons was first recorded as being used in the Battle of Agincourt in 1415, although this was still very much a medieval battle. The term musket originally applied to a heavier form of the arquebus, which fired a shot that could pierce plate armour, though only at close range. In the 16th century it still had to be mounted on a support stick to keep it steady. The caliver was the lighter form of the arquebus. By 1600 armies phased out these firearms in favour of a new lighter matchlock musket. Throughout the 16th century and up until 1690, muskets used the matchlock design.

However, the matchlock design was superseded in the 1690s by the flintlock musket, which was less prone to misfires and had a faster reloading rate. By this time, only light-cavalry scouting units, “the eyes of the army”, continued to wear front and back armour plates to protect themselves from distant or undisciplined musket-equipped troops.

While soldiers armed with firearms could inflict great damage on cavalry at a moderate distance, at close quarters the cavalry could slaughter the musket-armed infantry if they could break their formation and close to engage in melee combat. For many years infantry formations included a mix of troops armed with both firearms to provide striking power and pikes to allow for the defence of the arquebusiers or musketeers from a cavalry charge. The invention of the bayonet allowed the combining of these two weapons into one in the 1690s, which transformed the infantry into the most important branch of the early modern military—one that uniformly made use of flintlock muskets tipped with bayonets.

**Nature of war**

This period saw the size and scale of warfare greatly increase. The number of combatants involved escalated steadily from the mid 16th century and dramatically expanded after the 1660s. For example, the King of France could field around 20,000 men in total for his wars against Spain in the 1550s, but could mobilize up to 500,000 men into the field by 1700 in the War of the Spanish Succession. Moreover, wars became increasingly deadly in this period. This may in part be attributed to improvements in weapons technology and in the techniques of using it (for example infantry volley fire).

However, the main reason was that armies were now much bigger, but logistical support for them was inadequate. This meant that armies tended to devastate civilian areas in an effort to feed themselves, causing famines and population displacement. This was exacerbated by the increasing length of conflicts, such as the Thirty Years’ War and Eighty Years’ War, which fought over areas subjected to repeated devastation. For this reason, the wars of this era were among the most lethal before the modern period.

For example, the Thirty Years’ War and the contemporary Wars of the Three Kingdoms, were the bloodiest conflicts in the history of Germany and Britain respectively before World War I. Another factor adding to bloodshed in war was the lack of a clear set of rules concerning the treatment of prisoners and non-combatants. While prisoners were usually ransomed for money or other prisoners, they were sometimes slaughtered out of hand - as at the battle of Dungans Hill in 1647.
One of the reasons for warfare's increased impact was its indecisiveness. Armies were slow moving in an era before good roads and canals. Battles were relatively rare as armies could manoeuvre for months, with no direct conflict. In addition, battles were often made irrelevant by the proliferation of advanced, bastioned fortifications. To control an area, armies had to take fortified towns, regardless of whether they defeated their enemies' field armies. As a result, by far the most common battles of the era were sieges, hugely time-consuming and expensive affairs. Storming a fortified city could result in massive casualties and cities which did not surrender before an assault were usually brutally sacked -for example Magdeburg in 1631 or Drogheda in 1649. In addition, both garrisons and besiegers often suffered heavily from disease.

The indecisive nature of conflict meant wars were long and endemic. Conflicts stretched on for decades and many states spent more years at war than they did at peace. The Spanish attempt to reconquer the Netherlands after the Dutch Revolt became bogged down in endless siege warfare. The expense caused the Spanish monarchy to declare bankruptcy several times, beginning in 1577.

The changes in warfare eventually made the mercenary forces of the Renaissance and Middle Ages obsolete. However this was a gradual change. As late as the Thirty Years' War (1618–48), most troops were mercenaries. However, after this conflict, most states invested in better disciplined and more ideologically inspired troops. For a time mercenaries became important as trainers and administrators, but soon these tasks were also taken by the state. The massive size of these armies required a large supporting force of administrators. The newly centralized states were forced to set up vast organized bureaucracies to manage these armies, which some historians argue is the basis of the modern bureaucratic state.

The combination of increased taxes and increased centralisation of government functions caused a series of revolts across Europe such as the Fronde in France and the English Civil War. In many countries, the resolution of this conflict was the rise of monarchical absolutism Only in England and the Netherlands did representative government evolve as an alternative. From the late 17th century, states learned how to finance wars through long term low interest loans from national banking institutions like the Bank of England. The first state to master this process was the Dutch Republic.

This transformation in the armies of Europe had great social impact. J. F. C. Fuller famously stated that "the musket made the infantryman and the infantryman made the democrat." This argument states that the defence of the state now rested on the common man, not on the aristocrats, revolts by the underclass, that had routinely been defeated in the Middle Ages, could now conceivably threaten the power of the state. However, aristocrats continued to monopolise the officer corps of almost all early modern armies, including their high command.

Moreover, popular revolts almost always failed unless they had the support and patronage of the noble or gentry classes. The new armies, because of their vast expense, were also dependent on taxation and the commercial classes who also began to demand a greater role in society. The great commercial powers of the Dutch and English matched much larger states in military might. As any man could be quickly trained in the use of a musket, it became far easier to form massive armies. The inaccuracy of the weapons necessitated large groups of massed soldiers. This led to a rapid swelling of the size of armies.
For the first time huge masses of the population could enter combat, rather than just the highly skilled professionals. It has been argued that the drawing of men from across the nation into an organized corps helped breed national unity and patriotism, and during this period the modern notion of the nation state was born. However this would only become apparent after the French Revolutionary Wars. At this time, the levée en masse and conscription would become the defining paradigm of modern warfare.

Before then, however, most national armies were in fact composed of many nationalities. For example, although the Swedish Army under Gustavus Adolphus was originally recruited by a kind of national conscription, the losses of the Thirty Years’ War meant that by 1648 over 80% of its troops were foreign mercenaries. In Spain, armies were recruited from all the Spanish European territories including Spain, Italy, Wallonia and Germany. The French recruited soldiers from Germany, Switzerland and elsewhere as well as from France. Britain recruited Hessian troops until the late 18th century. Irish Catholics made careers for themselves in the armies of many European states (See the Flight of the Wild Geese).

**Infantry**

**Column** - This formation was typically used while marching, although with sufficient will and mass it was effective at breaking through line formations, albeit with heavy casualties.

**Line** - A simple two- or three-rank deep line formation allowed most muskets to be brought to bear and was the most commonly used battle formation. Often the first rank would kneel after firing to allow the second rank to fire.

**Square** - This formation was used against cavalry. Bayonets would be fixed, the first line would kneel with their muskets angled upward (much like a pike.) The second and third lines would fire at the cavalry when it came close. This formation was very ineffective when faced with combined cavalry and infantry or artillery fire in the case of plain squares.

**Skirmishers** - Light infantry would advance and be the first to fire to draw the enemy to attack. Sharpshooters would not target common soldiers, but the officers so that the men were without leadership.

**Cavalry**

The rise of gunpowder reduced the importance of the once-dominant heavy cavalry, but it remained effective in a new role into the 19th century. The cavalry, along with the infantry, became more professional in this period but it retained its greater social and military prestige than the infantry. Light cavalry was introduced for skirmishing and scouting because of its advantage in speed and mobility. The new types of cavalry units introduced in this period were the dragoons or mounted infantry.

Dragoons were intended to travel on horseback but fight on foot and were armed with carbines and pistols. Even orthodox cavalry carried firearms, especially the pistol, which they used in a tactic known as the caracole. Cavalry charges using swords on undisciplined infantry could still be quite decisive, but a frontal charge against well-ordered musketeers and pikemen
was all but futile. Cavalry units, from the 16th century on, were more likely to charge other cavalry on the flanks of an infantry formation and try to work their way behind the enemy infantry. When they achieved this and pursued a fleeing enemy, heavy cavalry could still destroy an enemy army.

However, the power formerly wielded by a heavy cavalry-focused army was at an end. For the first time in millennia, the settled people of the agricultural regions could defeat the horse peoples of the steppe in open combat. The power of the Mongols was broken in Russia and, no longer threatened from the east, Russia began to assert itself as a major force in European affairs. Never again would nomads from the east threaten to overrun Europe or the Middle East. In the Siege of Kazan (1552), Russia had employed cavalry, infantry armed with arquebus (Streltsy), artillery and sappers, while the Khanate of Kazan had only employed cavalry. The use of sappers proved decisive.

The one exception to this was the Ottoman Empire, which had been founded by Turkish horsemen. Arguably the world's greatest power for almost the entirety of the early modern period, the Ottomans were some of the first to embrace gunpowder artillery and firearms and integrated them into their already formidable fighting abilities. As European infantry became better armed and disciplined, by about 1700, the Ottoman forces began to be regularly defeated by the troops of the Austrian Habsburgs and other Western forces.

**Naval warfare**

The spread of European power around the world was closely tied to naval developments in this period. The caravel for the first time made unruly seas like the Atlantic Ocean open to exploration, trade, and military conquest. While in all previous eras, European navies had been largely confined to operations in coastal waters, and were generally used only in a support role for land-based forces, this changed with the introduction of the new vessels like the caravel, carack and galleon and the increasing importance of international waterborne trade in the sixteenth and seventeenth centuries. The new caravels were large enough and powerful enough to be armed with cannons with which they could bombard both shoreline defenses and other vessels.

**Islamic empires**

**Ottoman Empire**

The Ottoman Empire had been one of the first Middle Eastern states to effectively use gunpowder weapons and used them to great effect conquering much of the Middle East, North Africa, and the Balkans. In the 17th century the state began to stagnate as more modern technologies and strategies were not adopted. Specifically, the Ottoman Empire was slow to adopt innovations like boring cannon (rather than casting them in a mold), making the conversion from matchlock firearms to flintlocks, and the lightening of field guns and carriages[12].

In part this was because the military elite had become a powerful force in the empire and change threatened their positions. David Nicolle theorizes that one contributing factor to the Ottoman reluctance to adopt the flintlock musket, despite its superiority
over the matchlock ignition system, was the dusty climate of much of the Middle East which could cause problems with reliability[13]

Overall, the Ottoman Empire between the 15th and 18th centuries has been assessed as a third-tier military producer, that is a producer which copies existing technologies, but does not capture the underlying process of innovation (first-tier producer) or adaption (second-tier producer).[14] Other research, though, complicates that view. A Chinese military manual published in 1644 compared Ottoman and European firearms in the following manner[15]

Firearms have been in use since the beginning of the dynasty, and field armies in battle formation have found them convenient and useful to carry along...Since muskets have been transmitted to China, these weapons have lost their effectiveness...In battle formation, aside from various cannon such as the "three generals", the breech-loading swivel gun, and the "hundred-league thunder", nothing has more range or power than the Ottoman musket. The next best is the European one.

The fact that Ottoman firearms were considered by 17th-century Chinese writers to be superior to European firearms demonstrates that the Ottoman Empire was at least a second tier producer of muskets during this period. However, some claim that the 'European' firearms the Chinese researcher tested were actually Japanese arquebuses based on fifty-year-old Portuguese models. The design of the Ottoman matchlock is substantially different from that of the European variety and it in turn influenced the matchlocks produced in both Safavid Persia and Mughal India.

15th century

The Ottoman Empire was one of the first states to put gunpowder weapons into widespread use. The famous Janissary corps of the Ottoman army began using matchlock muskets as early as the 1440s.[13] The army of Mehmed the Conqueror, which conquered Constantinople in 1453, included both artillery and foot soldiers armed with gunpowder weapons.[16] The Ottomans brought to the siege sixty-nine guns in fifteen separate batteries and trained them at the walls of the city. The barrage of Ottoman cannon fire lasted forty days, and they are estimated to have fired 19,320 times.[17]

16th century

The 16th century saw the first widespread use of the matchlock musket as a decisive weapon on the battlefield with the Turks becoming leaders in this regard. The first of these campaigns was the campaign against the Persians in 1514 under Yavuz Sultan Selim, or Selim the Grim. Armed with gunpowder weapons, his army defeated the Persians at the Battle of Chaldiran.[18] After his victory over the Safavids, Selim turned his attention towards the Mamluk dynasty in Egypt. The decisive battle of his campaign against the Mamluks, and the battle which highlighted the importance of the musket in the Ottoman military, was the Battle of Raydaniyah, fought in 1517. There, Selim outflanked the entrenched Mamluk artillery, and attacked the Mamluk forces with his Janissaries. The Janissaries, armed with firearms, destroyed the Mamluk army armed mostly with traditional swords and javelins.[19]

Reference was made by João de Barros to a sea battle outside Jiddah, in 1517, between Portuguese and Ottoman vessels. The Muslim force under Salman Reis had "three or four basilisks firing balls of thirty palms in circumference".[20] This was estimated to be a cannon of about 90 inch bore "firing cut stone balls of approximately 1,000 pounds (453 kg)."[20]
After the death of Selim, he was succeeded by his son Suleiman the Magnificent. During his reign, gunpowder weapons continued to be used effectively. One important example is the Battle of Mohács in 1526. During this battle, Ottoman artillery, and Janissaries armed with muskets, were able to cut down charging Hungarian cavalry.\[21\]

17th century

Although the cannon and musket were employed by the Ottomans long beforehand, by the 17th century they witnessed how ineffective the traditional cavalry charges were in the face of concentrated musket-fire volleys. In a report given by an Ottoman general in 1602, he confessed that the army was in a distressed position due to the emphasis in European forces for musket-wielding infantry, while the Ottomans relied heavily on cavalry.\[22\] Thereafter it was suggested that the janissaries, who were already trained and equipped with muskets, become more heavily involved in the imperial army while led by the agha.\[22\]

By the middle of the 17th century, the continued reliance of the Ottomans on over-heavy ordnance had been made out by European officers as a liability. Raimondo Montecuccoli, the Habsburg commander who defeated the Ottomans at Battle of Saint Gotthard commented on Ottoman cannon:

*This enormous artillery produces great damage when it hits, but it is awkward to move and it requires too much time to reload and site. Furthermore, it consumes a great amount of powder, besides cracking and breaking the wheels and the carriages and even the ramparts on which it is placed . . . our artillery is more handy and more efficient and here resides our advantage over the cannon of the Turks.*\[23\]

Persia

Soon after the Ottoman Empire, two other Muslim gunpowder empires appeared: the Safavid Empire in Persia and the Mughal Empire in India. They both began in the early 16th century but later collapsed in the 18th century.

The refusal of their Qizilbash forces to use firearms contributed to the Safavid rout at Chaldiran in 1514.\[24\]

Despite this initial reluctance, the Persians very rapidly acquired the art of making and using handguns. A Venetian envoy, Vincenzo di Alessandri, in a report presented to the Council of Ten on 24 September 1572, observes:

"They used for arms, swords, lances, arquebuses, which all the soldiers carry and use; their arms are also superior and better tempered than those of any other nation. The barrels of the arquebuses are generally six spans long, and carry a ball little less than three ounces in weight. They use them with such facility that it does not hinder them drawing their bows nor handling their swords, keeping the latter hung at their saddle bows till occasion requires them. The arquebus is then put away behind the back so that one weapon does not impede the use of the other."

Mughal Empire

Babur, the founder of the Mughal Empire on the Indian subcontinent, employed firearms, gun carts and movable artillery in battle. In particular, he used them at the first Battle of Panipat (1526) to defeat the much larger forces of Ibrahim Lodhi, the last ruler of the Delhi Sultanate. Other battles he fought using gunpowder weapons include the Battle of Khanwa in 1527 against Rana Sanga, and the Battle of Ghaghra in 1529.

His descendants also employed gunpowder weapons in their expansion of the Mughal Empire, such as Akbar the Great at the second Battle of Panipat (1556) against Adil Shah Suri and Hemu of the Sur Dynasty. In 1582, Fathullah Shirazi, a Persian-Indian developed a seventeen-barrelled cannon, fired with a matchlock.\[29\]
Mughal musketeer. Mughal Army artillerymen during the reign of Akbar. Mughal matchlock rifle.

**Kingdom of Mysore**

The first iron rockets were developed by Tipu Sultan, a Muslim ruler of the South Indian Kingdom of Mysore. He successfully used these iron rockets against the larger forces of the British East India Company during the Anglo-Mysore Wars. The Mysore rockets of this period were much more advanced than what the British had seen, chiefly because of the use of iron tubes for holding the propellant; this enabled higher thrust and longer range for the missile (up to 2 km range). After Tipu's eventual defeat in the Fourth Anglo-Mysore War and the capture of the Mysore iron rockets, they were influential in British rocket development and were soon put into use in the Napoleonic Wars.[26]

**Somalia**

The Ethiopian–Adal war was a military conflict between the Ethiopian Empire and the Adal Sultanate from 1529 until 1543. The Imam Ahmad ibn Ibrīḥīm al-Ghażlī (nicknamed Gurey in Somali and Gragn in Amharic (ግራኝ Graññ), both meaning “the left-handed”) came close to extinguishing the ancient realm of Ethiopia, and converting all of its subjects to Islam; the intervention of the European Cristóvão da Gama son of the famous navigator Vasco da Gama helped to prevent this outcome. Many historians trace the origins of hostility between Somalia and Ethiopia to this war. Some historians also argue that this conflict proved, through their use on both sides, the value of firearms such as the matchlock musket, cannons, and the arquebus over traditional weapons. Imam Ahmed was the first African commander to use cannon warfare on the continent during the Adal’s conquest of the Ethiopian Empire under Dawit II.

**East Asia**

**Japan**

In Japan the pattern of military development was somewhat different from that in Europe or the Middle East. Soon after contact with Portuguese traders in the year 1543, firearms were adopted in the nation and an era of gunpowder warfare followed for several decades, culminating at the famous Battle of Nagashino in 1575, where volley fire was introduced. The Japanese under Toyotomi Hideyoshi also used firearms against the Koreans and Chinese during the Imjin War of the 1590s, which proved effective, yet the Chinese and Koreans matched this with farther range cannon fire.
Once the Japanese home islands were unified in the early 17th century, the Tokugawa shogunate launched an effort to solidify the power of the feudal samurai class and banned the use and manufacture of all firearms (as well as repairs to feudal castles). Between the seventeenth and late 19th centuries Japanese warfare remained medieval and its society feudal in nature.

Vietnam

Western arquebuses and matchlocks were imported into Vietnam during the 16th century. The raging and lengthy wars between Le and Mac dynasties, and later Trinh and Nguyen clans invoked an arm race between the opposing factions. Gunnery and marksmanship rapidly spread across the country and soon Vietnamese musketeers became famous within Asia as masters of firearms.

See also

- Early modern period
- Gunpowder
- History of gunpowder
- Gunpowder magazine

Specific:

- Kabinettskriege
- Technology of the Song Dynasty
- Hwacha
- Battle of Caishi
- Battle of Tangdao

Notes

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External links
Industrial warfare

Industrial warfare[1] is a period in the history of warfare ranging roughly from the early 19th century and the start of the Industrial Revolution to the beginning of the Atomic Age, which saw the rise of nation-states, capable of creating and equipping large armies, navies, and air forces, through the process of industrialization.

The era featured mass-conscripted armies, rapid transportation (first on railroads, then by sea and air), telegraph and wireless communications, and the concept of total war. In terms of technology, this era saw the rise of rifled breech-loading infantry weapons capable of high rates of fire, high-velocity breech-loading artillery, chemical weapons, armoured warfare, metal warships, submarines, and aircraft.

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Total war
One of the main features of industrial warfare is the concept of “total war”. The term was coined during World War I by Erich Ludendorff (and again in his 1935 book Total War), which called for the complete mobilization and subordination of all resources, including policy and social systems, to the German war effort. It has also come to mean waging warfare with absolute ruthlessness, and its most identifiable legacy today has been the reintroduction of civilians and civilian infrastructure as targets in destroying the enemy's ability to engage in war.

There are several reasons for the rise of total warfare in the 19th century. The main one is industrialization. As countries' capital and natural resources grew, it became clear that some forms of warfare demanded more resources than others. Consequently, the greater cost of warfare became evident. An industrialized nation could distinguish and then choose the intensity of warfare that it wished to engage in.

Additionally, warfare was becoming more mechanized and required greater infrastructure. Combatants could no longer live off the land, but required an extensive support network of people behind the lines to keep them fed and armed. This required the mobilization of the home front. Modern concepts like propaganda were first used to boost production and maintain morale, while rationing took place to provide more war materiel.

The earliest modern example of total war was the American Civil War. Union generals Ulysses S. Grant and William Tecumseh Sherman were convinced that, if the North was to be victorious, the Confederacy's strategic, economic, and psychological ability to wage war had to be definitively crushed. They believed that to break the backbone of the South, the North had to employ scorched earth tactics, or as Sherman called it, "Hard War". Sherman's advance through Georgia and the Carolinas was characterized by widespread destruction of civilian supplies and infrastructure.[2] In contrast to later conflicts, the damage done by Sherman was almost entirely limited to property destruction. In Georgia alone, Sherman claimed he and his men had caused $100,000,000 in damages.

**Conscription**

Conscription is the compulsory enrollment of civilians into military service. Conscription allowed the French Republic to form La Grande Armée, what Napoleon Bonaparte called "the nation in arms", which successfully battled European professional armies.

Conscription, particularly when the conscripts are being sent to foreign wars that do not directly affect the security of the nation, has historically been highly politically contentious in democracies. For instance, during World War I, bitter political disputes broke out in Canada (see Conscription Crisis of 1917), Newfoundland, Australia and New Zealand (See Compulsory Military Training) over conscription. Canada also had a political dispute over conscription during World War II (see Conscription Crisis of 1944). Both South Africa and Australia put limits on where conscripts could fight in WWII. Similarly, mass protests against conscription to fight the Vietnam War occurred in several countries in the late 1960s.

In developed nations, the increasing emphasis on technological firepower and better-trained fighting forces, the sheer unlikelihood of a conventional military assault on most developed nations, as well as memories of the contentiousness of the Vietnam War experience, make mass conscription unlikely in the foreseeable future.

Russia, as well as many smaller nations such as Switzerland, retain mainly conscript armies.

**Transportation**

**Land**
Prior to the invention of the motorized transport, combatants were transported from by wagons, horses and by marching. With the advent of locomotives, large groups of combatants, supplies, and equipment were able to be transported faster and in larger numbers. To counter this, an opposing force would destroy rail lines to hinder their enemies’ movements. General Sherman’s men during the American Civil War, would destroy tracks, heat the rails, and wrap them around trees.

The mass transportation of combatants was further revolutionized with the advent of the internal combustion engine and the automobile. Combined with the widespread use of the machine gun, the horse, after millennia of use, was finally supplanted in its war time role. During both WWI and WWII, trucks were used to carry combatants and materiel, while cars and jeeps were used to scout enemy positions.

The mechanization of infantry occurred during WWII. The tank, a product of World War I invented by the British to break through trenches while withstanding machine gun fire, while discounted by many, came into its own. Tanks evolved from thin-skinned, lumbering vehicles into fast, powerful war machines of various types that dominated the battlefield and allowed the Germans to conquer most of Europe. As a result of the tank’s evolution, a number of armored transport vehicles appeared, such as armoured personnel carriers and amphibious vehicles.

After the war ended, armored transports continued to evolve. The armored car and train declined in use, largely becoming relegated to military and civilian use as transportation for VIPs. Infantry fighting vehicles rose to prominence with the creation of the Soviet BMP-1. IFVs are a more combat capable version of the APC, with heavier armaments (such as autocannons), while still retaining the ability to transport combatants into and out of battles.

Sea

Sealift is a military logistic term referring to the use of cargo ships for the deployment of military assets, such as weaponry, military personnel, and materiel supplies. It complements other means of transport, such as strategic airlifters, in order to enhance a state’s ability to project power. A state’s sealift capabilities may include civilian-operated ships that normally operate by contract, but which can be chartered or commandeered during times of military necessity to supplement government-owned naval fleets.

During WWI, the United States bought, borrowed or commandeered vessels of various types, ranging from pleasure craft to ocean liners to transport the American Expeditionary Force to Europe. Many of these ships were scrapped, sold or returned to their owners after the war.

Air

There are two different kinds of airlifts in warfare, a strategic airlift and a tactical airlift. A strategic airlift is the use transporting of weapons, supplies and personnel over long distances (from a base in one country to a base in another country for example) using large cargo aircraft. This contrasts with tactical airlifts, which involves transporting the same above items within a theater of operations. This usually involves cargo planes with shorter ranges and slower speeds, but higher maneuverability.

Communications

- Cryptography
- Homing pigeon/War pigeon
- Joint Army/Navy Phonetic Alphabet
- Message precedence
- Semaphore (communication)
- Signal Corps
- Smoke signal
- Telegraphy
Land warfare

Land warfare, as the name implies, takes place on land. The most common type of warfare, it can encompass several modes and locales, including urban, arctic and mountain warfare.

The early part of the 19th century from 1815 to 1848 saw a long period of peace in Europe, accompanied by extraordinary industrial expansion. The industrial age brought about various technological advancements, each with their own implication. Land warfare moved from visual-range and semi person-to-person combat of the previous era, to indiscriminate and impersonal, "beyond visual range" warfare. The Crimean War (1853–1856) saw the introduction of trench warfare, long-range artillery, railroads, the telegraph and the rifle. The mechanized mass-destruction of enemy combatants grew ever more deadly. In WWI (1914–1918) machine-guns, barbed wire, chemical weapons and land-mines entered the battlefield. The deadly stalemated trench-warfare stage was finally passed with the advent of the modern armored tank late in WWI.

One major trend involved the transition away massed infantry fire and human waves to more refined tactics. This became possible with the superseding of earlier weapons like the highly inaccurate musket.

Technological advances

Rifling refers to the act of adding spiral grooves to the inside the barrel of a firearm. The grooves would cause a projectile to spin as it traveled down the barrel, improving range and accuracy. Once rifling became easier and practical, a new type of firearm was introduced, the rifle. It gave combatants the ability to specifically target an enemy combatant, rather than have large numbers of combatants fire in a general direction. It effectively broke up groups of combatants into smaller more maneuverable units.

Artillery are large guns designed to fire large projectiles a great distance. Early artillery pieces were large and cumbersome with slow rates of fire. This reduced their use to sieges, by both defenders and attackers. With the advent of the industrial age and various technological advancements, lighter, yet powerful and accurate artillery pieces were produced. This gave rise to field artillery which were used on a tactical level to support troops.

Machine guns are fully automatic guns. In this era of warfare they only existed as mounted support weapons, as automatic firearms were not yet developed. Early machine guns as invented by Gatling, were hand cranked but evolved into truly automatic machine guns by Maxim at the end of the era. Machine guns were valued for their ability to smash infantry formations, especially attacking enemy formations when they were dense. This, along with effective field artillery changed tactics drastically.

Static defense

Static defenses evolved from the use of permanent fortifications that were direct descendants of medieval castles. As artillery improved in destructive power and penetrative ability, more modern fortifications were developed, using first thicker layers of stone, then concrete and steel. After naval artillery developed the turret – a moving cannon platform – land fortifications started to use this...
method as well. Between the World Wars, France built an “impregnable” underground steel and concrete fortification that ran the length of the German-French border. This Maginot Line failed to stop German tanks in 1940: they bypassed the fortifications by invading through neighboring Belgium.

Temporary fortifications.

As artillery and rifles allowed the killing of enemy personnel at a longer effective range, soldiers started to dig into temporary fortifications. These included massive trenches as used in WWI, and individual soldier-sized “fox holes” which became more common in WWII.

**Maneuver warfare**

Maneuver had existed throughout military history – from soldiers marching on the field to using horses in cavalry formations. It was not until the advent of mechanized transport over unprepared terrain, such as fields and deserts, using tanks and armored vehicles, that “maneuver warfare” became feasible. First used by the German army in Poland and France in WWII, Blitzkrieg or “lightning war” saw whole armies moved rapidly on tracked and armored fighting vehicles. During the war airborne movement was used, with soldiers dropped to the battlefield by parachute by both the Germans and the Allies. After WWII, developments in helicopters brought a more practical way to transport troops by air

- Armoured warfare
- Blitzkrieg
- Deep operations

**Naval operations**

**Ironclads and Dreadnoughts**

The period after the Napoleonic Wars was one of intensive experimentation with new technology; steam power for ships appeared in the 1810s, improved metallurgy and machining technique produced larger and deadlier guns, and the development of explosive shells, capable of demolishing a wooden ship at a single blow, in turn required the addition of iron armor which led to ironclads.

The famous battle of the CSS Virginia and USS Monitor in the American Civil War was the duel of ironclads that symbolized the changing times. Although the battle was inconclusive, nations around the world subsequently raced to convert their fleets to iron, as ironclads had shown themselves to be clearly superior to wooden ships in their ability to withstand enemy fire.

In the late 19th century, naval warfare was revolutionized by Alfred Thayer Mahan’s book *The Influence of Sea Power upon History*. Mahan argued that in the Anglo-French wars of the 18th and 19th centuries, domination of the sea was the deciding factor in the outcome, and therefore control of seaborne commerce was critical to military victory. Mahan argued that the best way to achieve naval domination was through large fleets of concentrated capital ships, as opposed to commerce raiders. His books were closely studied in all the Great Powers, influencing their navahms race in the years prior to WWI.

As the century came to a close, the familiar modern battleship began to emerge; a steel-armed ship, entirely dependent on steam, and sporting a number of large shell guns mounted in turrets arranged along the centerline of the main deck. The ultimate design was reached in 1906 with *HMS Dreadnought* which entirely dispensed with smaller guns, her main guns being sufficient to sink any
existing ship of the time.

The Russo-Japanese War and particularly the Battle of Tsushima in 1905 was the first test of the new concepts, resulting in a stunning Japanese victory and the destruction of dozens of Russian ships. World War I pitted the old Royal Navy against the new navy of Imperial Germany, culminating in the 1916 Battle of Jutland. Following the war many nations agreed to limit the size of their fleets in the Washington Naval Treaty and scrapped many of their battleships and cruisers.

Growing tensions of the 1930s restarted the building programs, with even larger ships than before: the Japanese battleship Yamato, launched in 1941, displaced 72,000 tons and mounted 18-inch (46 cm) guns. This marked the climax of “big gun” warfare, as aircraft would gradually play a larger role in warfare. By the 1960s, battleships had all-but vanished from the fleets of the world.

**Aircraft carriers**

Between the world wars, the first aircraft carriers appeared, initially as a way to circumvent the tonnage limits of the Washington Naval Treaty (many of the first carriers were converted battlecruisers). Though several ships had previously been designed to launch and in some cases, the first true "flat-top" carrier was HMS Argus, launched in December 1917.

By the start of WWII, aircraft carriers typically carried three types of aircraft: torpedo bombers which could also be used for conventional horizontal bombing and reconnaissance; dive bombers, also used for reconnaissance; and fighters for fleet defence and bomber escort duties. Because of the restricted space on aircraft carriers, these aircraft were almost always small, single-engined warplanes. The first true demonstration of naval air power was the victory of the Royal Navy at the Battle of Taranto in 1940, which set the stage for Japan's much larger and more famous attack on Pearl Harbor the following year.

Two days after Pearl Harbor, the sinking of HMS Prince of Wales and HMS Repulse, marked the beginning of the end for the battleship era. Following WWII, aircraft carriers continued to remain key to navies throughout the latter 20th century, moving in the 1950s to jets launched from Supercarriers, behemoths which could displace as much as 100,000 tons.

**Submarines**

Just as important was the development of submarines to travel underneath the sea, at first for short dives, then later to be able to spend weeks or months underwater powered by a nuclear reactor. The first successful submarine attack in wartime was in 1864 by the Confederate submarine H.L. Hunley which sank the frigate USS Housatonic.

In both World Wars, submarines primarily exerted their power by sinking merchant ships using torpedoes, in addition to attacks on warships. All nations practiced unrestricted submarine warfare in which submarines sank merchant ships without warning, but the only successful campaign during this period was America's submarine war against Japan during the Pacific War. In the 1950s the Cold War inspired the development of ballistic missile submarines, each one loaded with dozens of nuclear-armed missiles and with orders to launch them from sea should the other nation attack.

**Aerial warfare**
The first use of airplanes in war was the Italo-Turkish War of 1911, when the Italians carried out several reconnaissance and bombing missions. During WWI both sides made use of balloons and airplanes for reconnaissance and directing artillery fire. To prevent enemy reconnaissance, some airplane pilots began attacking other airplanes and balloons, first with small arms carried in the cockpit, and later with machine guns mounted on the aircraft. Both sides also made use of aircraft for bombing, strafing and dropping of propaganda leaflets.

The German air force carried out the first terror bombing raids, using Zeppelins to drop bombs on Britain. By the end of the war airplanes had become specialised into bombers, fighters, and surveillance aircraft. Most of these airplanes were biplanes with wooden frames, canvas skins, wire rigging and air-cooled engines.

Between 1918 and 1939, aircraft technology developed very rapidly. By 1939 military biplanes were in the process of being replaced with metal framed monoplanes, often with stressed skins and liquid cooled engines. Top speeds had tripled; altitudes doubled (and oxygen masks became commonplace); ranges and payloads of bombers increased enormously.

Some theorists, most famously Hugh Trenchard and Giulio Douhet, believed that aircraft would become the dominant military arm in the future, and argued that future wars would be won entirely by the destruction of the enemy's military and industrial capability from the air. This concept was called strategic bombing. Douhet also argued in The Command of the Air (1921) that future military leaders could avoid falling into bloody World War I-style trench stalemates by using aviation to strike past the enemy's forces directly at their vulnerable civilian population, which Douhet believed would cause these populations to rise up in revolt to stop the bombing.

Others, such as Billy Mitchell, saw the potential of air power to neutralize the striking power of naval surface fleets. Mitchell himself proved the vulnerability of capital ships to aircraft was finally in 1921 when he commanded a squadron of bombers that sank the ex-German battleship SMS Ostfriesland with aerial bombs. (See Industrial warfare#Naval warfare)

During WWII, there was a debate between strategic bombing and tactical bombing. Strategic bombing focused on targets such as factories, railroads, oil refineries, and heavily populated areas such as cities and towns, and required heavy four-engine bombers carrying large payloads of ordnance (or a single heavy four-engine bomber carrying a nuclear weapon) flying deep into enemy territory. Tactical bombing focused on concentration of combatants, command and control centers, airfields, and ammunition dumps, and required attack aircraft, dive bombers, and fighter bombers that could fly low over the battlefield.

In the early years of WWII, the German Luftwaffe focused on tactical bombing, using large numbers of Ju-87 Stukas as "flying artillery" for land offensives. Artillery was slow and required time to set up a firing position, whereas aircraft were better able keep up with the fast advances of the German panzer columns. Close air support greatly assisted in the successes of the German Army in the Battle of France. It was also important in amphibious warfare where aircraft carriers could provide support for soldiers landing on the beaches.

Strategic bombing, by contrast, was unlike anything the world has seen before or since. In 1940, the Germans attempted to force Britain to surrender through attacks on its airfields and factories, and then on its cities in The Blitz in what became the Battle of Britain, the first major battle whose outcome was determined primarily in the air. The campaigns conducted in Europe and Asia could involve thousands of aircraft dropping tens of thousands of tons of munitions over a single city.

Military aviation in the post-war years was dominated by the needs of the Cold War. The postwar years saw a rapid conversion to jet power, which resulted in enormous increases in speeds and altitudes of aircraft. Until the advent of the intercontinental ballistic missile, major powers relied on high-altitude bombers to deliver their newly
developed nuclear deterrent. Each country strove to develop the technology of bombers and the high-altitude fighters that could intercept them. The concept of air superiority began to play a heavy role in aircraft designs for both the United States and the Soviet Union.

The end of industrial warfare

Nuclear warfare
The use of nuclear weapons first came into being during the last months of WWII, with the dropping of atomic bombs on Hiroshima and Nagasaki. This was the only use of nuclear weapons in combat. For a decade after World War II, the United States and later the Soviet Union (and to a lesser extent the United Kingdom and France) developed and maintained a strategic force of bombers that would be able to attack any potential aggressor from bases inside their countries.

Before the development of a capable strategic missile force in the Soviet Union, much of the war-fighting doctrine held by western nations revolved around the use of a large number of smaller nuclear weapons used in a tactical role. It is arguable if such use could be considered "limited" however; because it was believed that the US would use their own strategic weapons (mainly bombers at the time) should the USSR deploy any kind of nuclear weapon against civilian targets.

A revolution in thinking occurred with the introduction of the intercontinental ballistic missile (ICBM), which the Soviet Union first successfully tested in the late 1950s. To deliver a warhead to a target, a missile was far less expensive than a bomber that could do the same job. Moreover, at the time it was impossible to intercept ICBMs due to their high altitude and speed.

In the 1960s, another major shift in nuclear doctrine occurred with the development of the submarine-based nuclear missile (SLBM). It was hailed by military theorists as a weapon that would assure a surprise attack would not destroy the capability to retaliate, and therefore would make nuclear war less likely.

The Cold War
Since the end of WWII, no industrial nations have fought such a large, decisive war, due to the availability of weapons that are so destructive that their use would offset the advantages of victory. The fighting of a total war where nuclear weapons are used is something that instead of taking years and the full mobilisation of a country's resources such as in WWII, would take tens of minutes. Such weapons are developed and maintained with relatively modest peace time defence budgets.

By the end of the 1950s, the ideological stand-off of the Cold War between the Western World and the Soviet Union involved thousands of nuclear weapons being aimed at each side by the other. Strategically, the equal balance of destructive power possessed by each side situation came to be known as Mutually Assured Destruction (MAD), the idea that a nuclear attack by one superpower would result in nuclear counter-strike by the other. This would result in hundreds of millions of deaths in a world where, in words widely attributed to Nikita Khrushchev, "The living will envy the dead"[3]

During the Cold War, the superpowers sought to avoid open conflict between their respective forces, as both sides recognized that such a clash could very easily escalate, and quickly involve nuclear weapons. Instead, the superpowers fought each other through their involvement in proxy wars, military buildups, and diplomatic standoffs.

In the case of proxy wars, each superpower supported its respective allies in conflicts with forces aligned with the other superpower, such as in the Korean War, the Vietnam War, and the Soviet invasion of Afghanistan

Milestones
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<th>Year</th>
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<td>1859</td>
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<td>1861</td>
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<td>1863</td>
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<td>Battle of Verdun</td>
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<td>Bombing of Guernica</td>
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<td>Battle of El Mazuco</td>
<td>Spain, Germany</td>
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<td>1940</td>
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<td>High point of Blitzkrieg warfare. Largest invasion in history.</td>
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<tr>
<td>1942</td>
<td>Battle of the Coral Sea</td>
<td>Japan, United States</td>
<td>First naval battle in which neither side’s ships sighted or fired directly upon each other.</td>
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1942 Battle of Midway. Decisive battle between aircraft carriers.
1942 Battle of Stalingrad. Largest single battle in history. Decisive battle of the Nazi-Soviet War.
1942 Battle of Guadalcanal. First major air-land-sea campaign in history.
1943 Battle of Kursk. Largest tank battle in history.
1944 Battle of Leyte Gulf. Largest naval battle in history.

See also

- Mobilization
- Trench warfare
- Unconditional surrender
- World war

Material aspects:

- Arms race
- Economic warfare
- Home front
- Mass production
- Total war
- War economy
- War effort

Specific:

- Cold war
- Curtis LeMay
- Technology during World War I
- Technology during World War II
- Technological escalation during World War II
- Unrestricted Warfare (China)

References


External links

- Modern Tendencies in Strategy and Tactics as shown in Campaigns in the Far East (1906) by Lieutenant Colonel Yoda, Imperial Japanese Army
Modern warfare

Modern warfare is warfare using the concepts, methods, and military technology that have come into use during and after World Wars I and II. The concepts and methods have assumed more complex forms of the 19th- and early-20th-century antecedents, largely due to the widespread use of highly advanced information technology, and combatants must modernize constantly to preserve their battle worthiness.[1] Although total war was thought to be the form of international conflicts from the experience of the French Revolutionary Wars to World War II, the term no longer describes warfare in which a belligerent use all of its resources to destroy the enemy’s organized ability to engage in war. The practice of total war which had been in use for over a century, as a form of war policy, has been changed dramatically with greater awareness of tactical, operational, and strategic battle information.

War in modern times has been the inclusion of civilians and civilian infrastructure as targets in destroying the enemy’s ability to engage in war. The targeting of civilians developed from two distinct theories. The first theory was that if enough civilians were killed, factories could not function. The second theory was that if civilians were killed, the enemy would be so demoralized that it would have no ability to wage further war. However, UNICEF reports that civilian fatalities are down from 20 percent prior to 1900 AD to less than 5 percent of fatalities in the wars beginning in the 1990s.

With the invention of nuclear weapons, the concept of full-scale war carries the prospect of global annihilation and as such conflicts since WWII have by definition been "low intensity" conflicts,[2] typically in the form of proxy wars fought within local regional confines, using what are now referred to as "conventional weapons" typically combined with the use of asymmetric warfare tactics and applied use of intelligence.

More recently, the US Department of Defense introduced a concept of battlespace as the integrated information management of all significant factors that impact on combat operations by armed forces for the military theatre of operations, including information, air, land, sea, and space. It includes the environment, factors, and conditions that must be understood to successfully apply combat power protect the force, or complete the mission. This includes enemy and friendly forces; facilities, weather and terrain within the operational areas and areas of interest.[3]

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Types

Some argue that the changing forms of third generation warfare represents nothing more than an evolution of earlier technology.[4]

Aerial

Aerial warfare is the use of military aircraft and other flying machines in warfare. Aerial warfare includes bombers attacking enemy concentrations or strategic targets; fighter aircraft battling for control of airspace; attack aircraft engaging in close air support against ground targets; naval aviation flying against sea and nearby land targets; gliders, helicopters and other aircraft to carry airborne forces such as paratroopers; aerial refueling tankers to extend operation time or range; and military transport aircraft to move cargo and personnel.

Asymmetric

A military situation in which two belligerents of unequal strength interact and take advantage of their respective strengths and weaknesses. This interaction often involves strategies and tactics outside the bounds of conventional warfare, often referred to as terrorism.

Biological

Biological warfare, also known as germ warfare, is the use of any organism (bacteria, virus or other disease-causing organism) or toxin found in nature, as a weapon of war. It is meant to incapacitate or kill enemy combatants. It may also be defined as the employment of biological agents to produce casualties in man or animals and damage to plants or material; or defense against such employment.

Chemical

Chemical warfare is warfare (associated military operations) using the toxic properties of chemical substances to incapacitate or kill enemy combatants.

Electronic

Electronic warfare refers to mainly non-violent practices used chiefly to support other areas of warfare. The term was originally coined to encompass the interception and decoding of enemy radio communications, and the communications technologies and cryptography methods used to counter such interception, as well as jamming, radio stealth, and other related areas. Over the later years of the 20th century and early years of the 21st century, this has expanded to cover a wide range of areas: the use of, detection of and avoidance of detection by radar and sonar systems, computer hacking, etc.

Fourth generation

Fourth generation warfare (4GW) is a concept defined by William S. Lind and expanded by Thomas X. Hammes used to describe the decentralized nature of modern warfare. The simplest definition includes any war in which one of the major participants is not a state but rather a violent ideological network. Fourth Generation wars are characterized by a blurring of the lines between war and politics, combatants and civilians, conflicts and peace, battlefields and safety.

While this term is similar to terrorism and asymmetric warfare, it is much narrower. Classical insurgencies and the Indian Wars are examples of pre-modern wars, not 4GW. Fourth generation warfare usually has the insurgency group or non-state side trying to implement their own government or reestablish an old government over the one currently running the territory. The blurring of lines between state and non-state is further complicated in a democracy by the power of the media.
Ground

Ground warfare involves three types of combat units: Infantry, Armor, and Artillery.

Infantry in modern times would consist of Mechanized infantry and Airborne forces. Usually having a type of rifle or sub-machine gun, an infantryman is the basic unit of an army.

Armored warfare in modern times involves a variety of Armored fighting vehicles for the purpose of battle and support. Tanks or other armored vehicles (such as armored personnel carriers or tank destroyers) are slower, yet stronger hunks of metal. They are invulnerable to enemy machine gun fire but prone to rocket inferno, mines, and aircraft so are usually accompanied by infantry. In urban areas, because of smaller space, an armored vehicle is exposed to hidden enemy infantry but as the so-called "Thunder Run" at Baghdad in 2003 showed, armored vehicles can play a critical role in urban combat. In rural areas, an armored vehicle does not have to worry about hidden units though muddy and damp terrain have always been a factor of weakness for Armored tanks and vehicles.

Artillery in contemporary times, is distinguished by its large calibre, firing an explosive shell or rocket, and being of such a size and weight as to require a specialized mount for firing and transport. Weapons covered by this term include "tube" artillery such as the howitzer, cannon, mortar, field gun, and rocket artillery. The term "artillery" has traditionally not been used for projectiles with internal guidance systems even though some artillery units employ surface-to-surface missiles. Recent advances in terminal guidance systems for small munitions has allowed large calibre shells to be fitted with precision guidance fuses, blurring this distinction.

Guerrilla

Guerrilla warfare is defined as fighting by groups of irregular troops (guerrillas) within areas occupied by the enemy. When guerrillas obey the laws and customs of war, they are entitled, if captured, to be treated as ordinary prisoners of war; however, they are often treated by their captors as unlawful combatants and executed. The tactics of guerrilla warfare stress deception and ambush, as opposed to mass confrontation, and succeed best in an irregular, rugged, terrain and with a sympathetic populace, whom guerrillas often seek to win over or dominate by propaganda, reform, and terrorism. Guerrilla warfare has played a significant role in modern history, especially when waged by Communist liberation movements in Southeast Asia (most notably in the Vietnam War) and elsewhere.

Guerrilla fighters gravitate toward weapons which are easily accessible, low in technology, and low in cost. A typical arsenal of the modern guerrilla would include the AK-47, RPGs and Improvised explosive devices. The guerrilla doctrines’ main disadvantage is the inability to access more advanced equipment due to economic, influence, and accessibility issues. They must rely on small unit tactics involving hit and run. This situation leads to low intensity warfare, asymmetrical warfare and war amongst the people. The rules of Guerrilla warfare are to fight a little and then to retreat.

Intelligence

Propaganda

Propaganda is an ancient form of disinformation concerted with sending a set of messages aimed at influencing the opinions or behavior of large numbers of people. Instead of impartially providing information, propaganda in its most basic sense presents information in order to influence its audience. The most effective propaganda is often completely truthful, but usually most modern propaganda presents facts selectively to encourage a particular synthesis, or gives loaded messages in order to produce an emotional rather than rational response to the information presented. The desired result is a change of the cognitive narrative of the subject in the target audience.

Psychological

Psychological warfare had its beginnings during the campaigns of Genghis Khan through the allowance of certain civilians of the nations, cities, and villages to flee said place, spreading terror and fear to neighboring principalities. Psychological actions have the primary purpose of influencing the opinions, emotions, attitudes, and behavior of hostile foreign groups in such a way as to support the achievement of national objectives.
Information

Made possible by the widespread use of the electronic media during World War II, Information warfare is a kind of warfare where information and attacks on information and its system are used as a tool of warfare. Some examples of this type of warfare are electronic “sniffers” which disrupt international fund-transfer networks as well as the signals of television and radio stations. Jamming such signals can allow participants in the war to use the stations for a misinformation campaign.

Naval

Naval warfare takes place on the high seas (blue water navy). Usually, only large, powerful nations have competent blue water or deep water navies. Modern navies primarily use aircraft carriers, submarines, frigates, cruisers, and destroyers for combat. This provides a versatile array of attacks, capable of hitting ground targets, air targets, or other seafaring vessels. Most modern navies also have a large air support contingent, deployed from aircraft carriers. In World War II, small craft (motor torpedo boats variously called PT boats, MTBs, MGBs, Schnellbooten, or MAS-boats) fought near shore. This developed in the Vietnam War into riverine warfare (brown water navy), in intertidal and river areas. Irregular warfare makes this sort of combat more likely in the future.

Network-centric

Network-centric warfare is essentially a new military doctrine made possible by the Information Age. Weapons platforms, sensors, and command and control centers are being connected through high-speed communication networks. The doctrine is related to the Revolution in Military Affairs debate.

The overall network which enables this strategy in the United States military is called the Global Information Grid.

Nuclear

Nuclear war is a type of warfare which relies on nuclear weapons. There are two types of warfare in this category. In a limited nuclear war, a small number of weapons are used in a tactical exchange aimed primarily at enemy combatants. In a full-scale nuclear war, large numbers of weapons are used in an attack aimed at entire countries. This type of warfare would target both combatants and non-combatants.

Space

Space warfare is the hypothetical warfare that occurs outside the Earth’s atmosphere. No wars have been fought here yet. The weapons would include orbital weaponry and space weapons. High value outer space targets would include satellites and weapon platforms. Notably no real weapons exist in space yet, though ground-to-space missiles have been successfully tested against target satellites. As of now, this is purely science fiction.

Modern wars

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