

Since the first caveman in prehistoric times picked up a rock and smashed someone over the head with it, man has used weapons to kill, maim, and wound. The first weapons were intended to make hunting easier, but as people started to transition from a nomadic lifestyle to permanent villages, weapons started to be used against other humans. Civilizations became more sophisticated and the social class system and power hungry leaders emerged. As battles for control of territories broke out in attempts to add to the power and wealth of these leaders, it became clear that the number and effectiveness of weapons would decide which factions would have power. With this realization, and as weaknesses were found within current weapons technology, man sought to make deadlier weapons. The desire for power and the desire to create a weapon with minimal to no weaknesses sparked the evolution of weapons. Materials started changing and with them the process of producing weapons changed. Weapons became more durable, more lethal, and longer range. To increase the number of weapons produced, people looked for the fastest and cheapest way to produce high quality arms. Although those with power wanted to use weapons to increase their own authority and further separate themselves from the lower classes, the quest to create the ultimate weapon and further advance weaponry actually had the effect of empowering the lower classes.

The first weapons used were sticks, rocks, and other natural objects, which were first used in prehistoric times. These were used to hit things or were thrown. These objects increased the power of a blow and when thrown, increased the range of attack, although this was dependent on the ability of the thrower. Throwing natural objects was ineffective due to inaccuracy and because the objects could be dodged fairly easily. In time, the sticks were sharpened to a point which would be hardened using fire, making the basic spear. The spears could be used as to stab or could be thrown and the pointed tip inflicted greater wounds than the blunt force used before. Stones and bone were chipped away with other harder stones to create sharp edges, making the first blades. Flint was popularly used due to its availability and because it chipped well. Later it was discovered that bone and antler, if used to chip away at the blade, would create a better edge. These blades were mounted on hilts and handles which would increase their power and range. Mounted blades resulted in the creation of axes and spears with stone heads. These prehistoric weapons were created in order to make hunting easier and acted as the basis for future weapons.

To increase the range that had been limited in prehistoric weapons, bows were made. The self bow, simply wood, horn, or bone strung with animal sinew or parts of plants, had the well-known D-shape most commonly associated with bows and was the most basic bow. Bows became primarily made of wood as time progressed. Backed bows, which had bone or sinew glued to the back of the bow with sap, increased both the power and durability of bows. Composite bows were shorter than the self-bow and more complex, but offered a boost in power and range. Composite bows have a wood core with sinew on the back and animal horn glued to the ends of the bow. Initially, young unseasoned wood, which was easily available, was used but was eventually replaced by seasoned wood, which made more durable bows and increased the range and force of the bow. Ash, elm, oak, and yew were commonly used woods. At first, arrows were probably sharpened sticks, but evolved similarly to spears. As stone blades were made, arrowheads gained stone heads. The use of metal led to innovations in bows. During the Bronze Age (3500 BC-700 BC), metal arrowheads emerged. Metal tools led to different shapes of bows. The bow is a weapon that is still in use today for recreational purposes, albeit in a much more advanced form. The bow was the most popular ranged weapons before the emergence of effective firearms, which replaced them in combat.

In the third millennium BC, copper weapons such as daggers, sickles (in Asia), and the Khopesh (an Egyptian weapon combining the axe and sword) started being made. Unlike prehistoric weapons, which could be found or made by almost anyone, metal weapons took special skill to craft and sparked the specialized job of a weapons maker. Due to the skill required to produce metal blades, compensation started being received for weapons and the circulation of weaponry began being controlled by those with resources. The sword emerged in the second millennium BC. The sword, at the time a short double-edged blade which offered better range than the dagger, emerged due to the popularity of cavalry warfare as the dagger was too short to use effectively on horseback. As copper is a soft metal, copper blades did not hold a sharp edge well and were not very durable. To create longer-lasting weapons, people sought a harder metal to make weapons from. Around 3000 BC, the start of the Bronze Age, bronze, a compound of copper and tin, was created. Bronze is harder than copper and better for casting. Due to these advantages, bronze quickly replaced copper in weaponry. As casting improved, blades grew longer. Iron, which was cheaper than bronze, and steel, from which better weapons could be made, replaced bronze in metal weaponry.

While not strictly a weapon, the chariot was an innovation that changed warfare. Around 2000 BC in Central Asia, two wheeled chariots with a two-man platform, for a driver and a fighter, pulled by horses emerged. A chariot's speed was dependent on the horses pulling it, but is estimated to be at most 24 miles per hour. The fighter was typically a soldier armed with a spear. The wheels were solid and centered in the chariot. The Egyptians are credited with "perfecting" the chariot. They used spoked wheels placed at the rear of the chariot which improved turning abilities. In place of a spear, the Egyptian fighter was armed with a composite bow. Chariots were expensive and in time became a show of military wealth. More chariots meant more money. In the first millennium BC, using cavalrymen and having archers in the infantry became popular. Cavalrymen can move more freely on complex terrain than chariots, offer increased speed as chariots do, and are cheaper than chariots. Infantry archers were also much cheaper than chariots and also exploited the chariot's vulnerability to arrows. These two tactic changes provided cheaper and more effective alternatives to the chariot and caused the chariot's use in warfare to end.

In the second century BC, the Gladius was developed. Most famously used by Roman legionnaires and gladiators, the Gladius became one of the primary weapons of the Roman Empire. To be a legionnaire or a gladiator, one had to go through extensive training and therefore the Gladius was a weapon limited in use to the highly skilled. The Gladius Hispaniense (Spanish sword) had a blade ranging from 25 to 27 inches long and 1.5 to 2 inches wide, a pommel on the hilt, and a pointed tip. The Mainz/Fulham Gladius was shorter, 20 to 24 inches long, and thicker, 2 to 2.5 inches thick, but shared the sharp tip of the Gladius Hispaniense. These two types of Gladii were replaced by the Pompeian Gladius which was between 16.5 and 21.6 inches long and was very light, weighing only 2.2 lbs. The Gladius was used until the second century AD when the Romans switched to the longer "Spatha" sword.

Perhaps the most recognizable weapon ever used, the Medieval Sword was used in Europe starting around the sixth century AD. From the sixth century to the ninth century, the medieval sword was from 35 to 42 inches long with a double edged blade, a rounded point, a decorative pommel, and cross guards. Medieval swords were made by pattern welding, which is forging several types of metal together, and this created stronger blades with beautiful swirling patterns in the metal. From 1000-1300 AD, the Arming Sword, a one-handed, light blade often used with a shield, was popular among knights. As armor became heavier and more effective,

warriors turned to larger and heavier blades, transitioning from the Arming Sword to the Longsword in the fourteenth century. The longsword was usually around 50 inches in length, weighed from 2 pounds to 4 pounds, and had a pommel and hand guards. The pommel could be used as a blunt weapon and the cross guards could be used to push limbs or swords to create openings to attack. With the increase in length, swords required longer handles. Longswords typically had hand-and-a-half or two hand grips to accommodate their length. As plate armor, against which slashing was less effective, became more frequently used in the thirteenth and fourteenth centuries, the medieval sword evolved to have a diamond shaped blade and a sharper point. This evolution of the medieval sword created a fighting style based around stabbing rather than the cutting and slashing previously used. Medieval swords were very expensive and the upper class essentially controlled circulation, giving them mostly to the highly trained and skilled warriors: the knights. The lower class was limited to using staves, bows, and low quality blades. The medieval sword was a versatile weapon that evolved with improvements in defense technology and was only displaced by firearms.

Developed several centuries after the medieval sword, the Viking axe endured from the eighth century to the fourteenth century. The Vikings had axes of many different sizes and purposes. The smallest of these was the Skeg axe, which had an extended bottom of the axe head purposed to pull down shields. The battle axe had a six inch cutting blade mounted on a two foot long shaft and was light enough to be used with one hand and/or thrown. The Dane axe was a two-handed axe with a shaft that could be as long as five feet. The blade, either iron or steel, had an eighteen inch long cutting edge which was slanted down and back. The Dane axe was a very powerful weapon that could shatter a helmet, split chainmail, remove limbs, and could easily kill horses. The Dane axe spread to England and Ireland, where its usage lasted into the sixteenth century. The pure might of the axe was no match against a sword and polearms proved more versatile and practical, leading to the downfall of the Viking axe.

The chokuto, a single-edged straight sword, was used until the tenth century in Japan. The emergence of the curved blade in Japan caused the chokuto to disappear from use. Perfected in the thirteenth century were the famous curved slashing blades of Japan. The Japanese were trying to create a blade that was both hard enough to keep an edge and flexible enough not to shatter. These are traits of high and low carbon steel respectively. The solution was found by making the center of the sword (shigane) out of low carbon steel and wrapping it with high carbon steel. Every time a layer was added to the outer shell (hadagane), the blade had to be cooled, causing its curved shape. These curved blades required immense skill to craft. By the fifteenth century there were three “Japanese” blades: the tanto, wakizashi, and katana. The tanto was the shortest and was essentially a large dagger. The wakizashi were short swords up to 23.6 inches long. Both the tanto and wakizashi could be used by anyone. The katana, however, was reserved for the samurai and serve as another example of a weapon controlled by the wealthy. Classified as any blade longer than 23.6 inches, the katana was fast, light, and perfectly balanced for one or two hand usage. The Japanese blades were replaced by the firearm, much like any other sword.

In the late 1400's, sword hilts became highly ornamental. Rapiers were introduced as broad two-edged swords in the late fifteenth century before becoming long, thin, and fast blades in the sixteenth century. As thin blades, rapiers were used as thrusting weapons and because of the extremely sharp point left internal injuries that were often fatal. The rapier was used more commonly in street fights.

In the quest for immortality, the Chinese combined potassium nitrate, charcoal, and sulfur in a 75:15:10 ratio. The resulting black powder did not induce immortality; it might actually be the cause of a ridiculously high number of deaths. After discovering the properties of this black powder, the Chinese used it ceremonially to launch fireworks. Eventually black powder was used as a weapon. Even before the twelfth century, before bombs and guns were developed, black powder was thrown over defensive walls with explosive results. In the eleventh century, black powder was put in bamboo tubes and strapped to arrows, resulting in the fire arrow. Basic rocket launchers were made, often launching multiple from boxes or rails, with the potential to launch hundreds of inaccurate missiles at once. These launchers were portable as well as they were usually mounted on carts or were light enough to carry. Although inaccurate, the explosions were loud and psychologically imposing. Basic bombs were also made with black powder by wrapping shrapnel and black powder in a clay, iron, bamboo, or cloth casing. These bombs were fuse activated and were thrown. In the tenth century, another black powder fueled weapon, the fire lance, emerged. The fire lance was comprised of layers of paper with shrapnel in between layers that could shoot flames lasting several seconds and projectiles to a limited range of nine feet or so. While these weapons were simplistic and overall not terribly effective, the discovery of gunpowder changed the nature of weaponry forever.

Gunpowder led to the invention of firearms, which replaced bladed weapons in warfare. Guns offered a potential of much greater power and range compared to blades. Transitioning from blades to firearms made weapons more accessible to the common people as guns are faster, easier, and cheaper to produce. The advantages in production led to cheaper and more affordable weapons. Once the mass production of guns began, they became even cheaper and even more available to the public. The first gun was developed at the end of the fourteenth century in Europe. Called the handgonne, the gun is a metal tube with a venthole. Powder and a lead or iron ball were forced down the chamber with a ramrod and ignited with a match. The size of ammunition was not regulated at first and people made their own bullets. Later, size was standardized which allowed for mass production. The handgonne had a low rate of fire, a 50 yard range, was heavy, and was inaccurate. In 1411, the first mechanical system of firing a gun was introduced. The matchlock system had an s-shaped piece of metal called the serpentine which held the match. Pulling on the other end of the serpentine released the match into a pan with gunpowder in it. Matchlocks made for much steadier aiming than the clumsy handgones and often had bladed sights. In the sixteenth century, the matchlock system became two parts; a spring powered cock and trigger. This system became known as the snapping matchlock. The trigger released the spring which put the match in the powder. The system improved accuracy even more. A long barreled version of the matchlock, called the arquebus, was used by European and Asian armies. Although simple to use, and despite later improvements in accuracy, the matchlock was inaccurate and was replaced by the lighter musket. The musket had a four foot long barrel, could fire bullets with a caliber of .5 to 1.0 inch, had a range of 55 yards, and was used for almost four hundred years. Caliber refers to either the diameter of a bullet or the diameter of a gun barrel. The musket made firearms more valuable than other weapons. Firearms leveled the playing field between the common untrained soldier and the highly trained warrior, as knights could be killed easily by a farmer with a musket.

The wheel lock system used a metal wheel wound with tension from a spring and a cock holding pyrite. The trigger released the wheel from the tension and dropped the pyrite onto the then spinning wheel, creating sparks which ignited the powder. The wheel lock system worked well, but it was very expensive and became popular with the upper classes. The snaphance

system was developed to be a more accessible version of the wheel lock system. A piece of flint was held by a spring loaded cock. The flint was propelled against a steel arm called the frizzen which sparked and ignited the gun. The pan of gunpowder had a hinged or sliding door which was a huge revelation. With the matchlock, damp weather rendered an army useless with wet gunpowder. By providing a pan cover, the powder could be kept dry and ready to use. In the 1620's, the flintlock was introduced. Based heavily off of the snaphance concept, the flintlock had a half-cocked and fully-cocked position. At the half-cocked position, the gun would not fire and this acted as one of the first safeties. The frizzen and the powder pan were combined into one part which made production easier. The flintlock became standard issue for many armies for three hundred years as it was reliable, usable in damp weather, cheap, and mass produced. Prior to firearms, the most effective weapons were expensive and limited to the highly trained or wealthy, often as a result of the difficulties of production. When the process of rifling, or cutting grooves into the barrel of the gun to put spin on and increase the straightness of the flight of the bullet, was developed between the fifteenth and sixteenth centuries, the range of the musket increased heavily and became more accurate. Rifling led to the birth of the marksman or sniper due to increased accuracy, but slowed reload times as the barrels had a tighter fit. In 1650, the bayonet, a long blade extending from the muzzle of a gun, was introduced. Bayonets helped with aiming and provided a close range weapon. Originally, the bayonet blocked discharge, but in the 1670's, this issue was resolved by the French socket bayonet which was attached around the muzzle. In 1836, the bolt action system was introduced. Bullets are loaded directly into the barrel via a sliding door. This system increased the firing rate dramatically and could fire a round every five seconds. Pistols had been in use since the sixteenth century as one shot guns. In 1836, the 1836 Colt Paterson was released. A five shot revolver designed by Samuel Colt with .34 caliber, the cocking of the hammer rotated the cylinder, creating the basis for multiple shot revolvers. In the eighteenth century, the percussion system was introduced to remove the delay with flintlocks between pulling the trigger and the actual shot. The system introduced a percussion cap in the 1820's which contained a fulminate in a crushable copper cap. The hammer crushed the cap and ignited the shot. This system made the flintlock system outdated. The Minié ball was invented in 1847 by a Frenchman. This soft lead bullet had a cone shape with an indent on the bottom and produced better accuracy and faster loading. From the time of the percussion system to modern times, many innovations in firearms have been made. A mechanism for extremely rapid and automatic reloading was developed and resulted in the machine/automatic gun and the sub-machine gun. Guns have become more compact, more powerful, more accurate, more reliable, and cheaper.

The hand grenade had been in use in China as a basic weapon, but in World War I, the hand grenade reached universal usage. Before 1915, hand grenades were not standardized and were makeshift if they existed. In 1915, official models were made. Generally, a hand grenade has a cast iron shell with a serrated surface with a safety pin that holds a spring-loaded lever with a four second delay. The Germans used a version with an explosive head on a wooden handle. The hand grenade did damage with both the shrapnel and the explosion and is still in use today in updated forms.

The bazooka is an American weapon developed in 1942. It is a shoulder-mounted tube that fires a rocket up to a range of four hundred yards. The bazooka was designed as a way to destroy tanks. The downside to the bazooka is its tremendous recoil, a gun's backward movement upon firing, which has been reduced in more modern versions. The Soviet Union's counter to the bazooka was the rocket propelled grenade (RPG) which is a recoilless launcher

tube with a pistol grip trigger and a rear stabilizing grip. The RPG fires a high explosive anti-tank missile (HEAT) which has an initial booster charge followed by a built-in rocket propulsion system that kicks in after twelve yards. The RPG has a range of 164 yards.

The first military drones appeared in the 1940's and '50's as Unmanned Aerial Vehicles (UAV's). They can be remote, radio, or satellite link controlled. At first only scouting vehicles were made but this has progressed to weaponized drones. Drones have also expanded to land based vehicles that are highly armed. Although highly controversial due to morals about killing through a machine, this appears to be a field where military interests may be heavily invested in in the future.

Weapons have progressed from things from nature to mass produced hunks of machinery. This evolution has been heavily pushed by the greed of power-hungry men and women. This greed, however, has led to many technological advances in other fields such as medicine and engineering, along with shaping the world. Weapons may kill, but they push society to advance in many ways. Is it worth it to kill if it saves other lives?

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