

# A History of Siege Weapons

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## Table of Contents

Introduction.....	1
History.....	1
Ballista.....	3
Mangonel.....	5
Trebuchet.....	6
Cannon.....	9
Appendix.....	15
Bibliography.....	21

## **Introduction**

An interesting fact about siege engines is that many of them were invented in much earlier times than many people would expect. Many were invented at around the same time. It is believed that mangonels were invented in 800 BC, but used in war around the 4<sup>th</sup> century BC. Direct reference to trebuchets were found as early as 400 BC even though they closely resemble the Egyptian shadouf that has been around since the beginning of history. Ballistas and Cannons came 100 years later in the 300's, as did primitive hand-held flamethrowers. This report will cover all of the engines mentioned above, but cannons are only followed up through the civil war. The cannon is a full-length topic that could easily fill up a report the size of this one.

## **Ballista**

When we think of the word catapult, we usually generalize into thinking of a specific

kind of catapult referred to sometimes as the 'mangonel'. In reality, the word specifically means 'something that hurls a projectile through the air.' So, by definition, the ballista is a catapult. The ballista was used and developed in 400 BC by Dionysus of Syracuse, but it is still unlikely that it was the first kind of catapult. But what is true is that it the first to ever be used in a war.

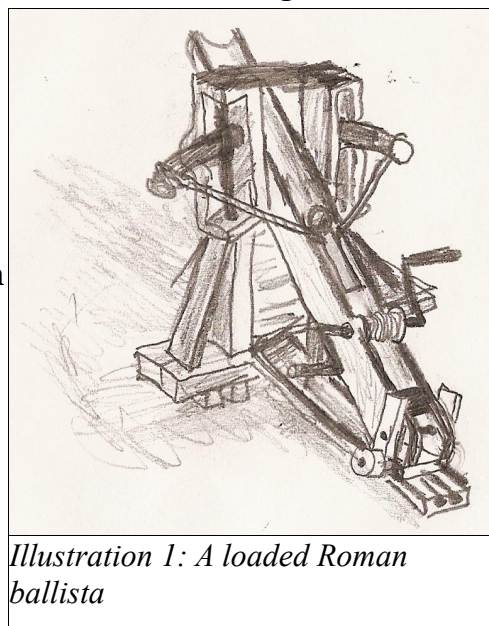
Essentially, it is a gigantic, mounted version of the crossbow, even though the 'real crossbow' was 'invented' much later, into the middle ages. Archimedes referred to the similarity between it and another kind of primitive crossbow called the 'gastraphetes'. The principle was undoubtedly used several times in different inventions.

The ballista was evidently an extremely popular weapon in Greece, however the power from the spring pressure with the stick it used was not very forceful. At least not powerful enough to kill soldiers on foot with bolts and rocks. Probably it threw flaming arrows instead.

With more recent developments on the spring device it used, the power, accuracy and range of the machine increased. Along with the new mechanism came a larger class of ballistae, called oxybelles. A lot of other lookalikes and variations started to appear also, like the smaller, and more portable 'Scorpion' weapon. At first, the ballista was used as a battlefield engine, but gained recognition as a siege engine that shot incendiary missiles at and over walls. Sometimes it was even mounted on ships.

After the Romans conquered Greece, the popularity of the ballista made it a major 'inheritance' for the roman military. They reduced it into a much

simpler but more portable weapon. The accuracy, surprisingly, was also increased with the

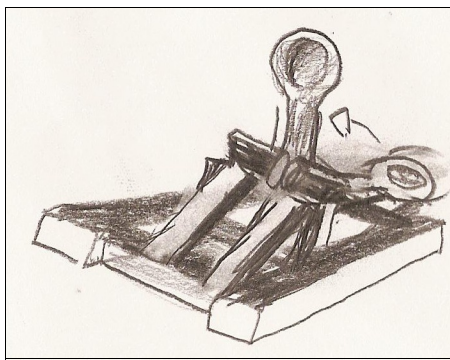


*Illustration 1: A loaded Roman ballista*

downgrade. The light bolts the new version fired did not carry as much momentum as the old 'revamped' Greek ballistae, but proved to be effective enough to continue its development. With the fall of Rome, the popularity of the ballista dropped. Resources and the ability to maintain the ballista became very rare. Upkeep was impractical. It was soon dumped and made obsolete by the much more popular 'mangonel' that took its place. The mangonel was much simpler and a lot cheaper to build than any make of ballistae. It didn't require half as much knowledge as the older, more cumbersome weapon.

### **The Mangonel**

The mangonel was mentioned earlier as the kind of catapult that we think about when we hear the word. More specifically than the above description, the word 'catapult' derives from the words 'KATA' (Latin for 'downwards, into and against' ) and 'PALLO' (Latin for 'sway a missile before throwing it' ) The reason we think of the mangonel when we hear the word is because of the wideness of its usage during the middle ages. Despite its low accuracy, cumbersome maneuverability and unwieldiness, it was still remarkably popular. The only reason it was used, really, was because it was cheap and powerful. While the ballista had been used more to kill individual people at short range with very high precision, the mangonel was used for the opposite; mangonels were used against larger targets that were far away.



*Illustration 2: Simplified Mangonel*

A mangonel has many different names like onager. It's nickname became 'gonnel, then it was eventually shortened to 'gonne and finally gun. By this time people were using it for things like culverins or cannons. The name just stuck.

While the mangonel hit its peak in the middle ages, its first recorded use was much before that by Alexander the

Great around the 4th century BC. (Around some time the ballista was invented) The mangonel itself, however, is believed to have been invented around 800 BC.

The mangonel, like the ballista, was powered by a spring. Unlike the ballista, it was made out of a twisted rope, as opposed to a flexed pole. It made it more powerful and cheaper. The old kind that the romans used had a sling, that made it much more powerful. In order to save money, it was reduced to just a bowl shape cut directly into the firing arm. The change happened around 1200 AD, the same time when they got their 'mangonel' nickname. The word 'mangonel' really just means 'gun'. The bigger ones were also called 'onagers' because when they were fired, the long arm resembled the kick of a wild donkey.

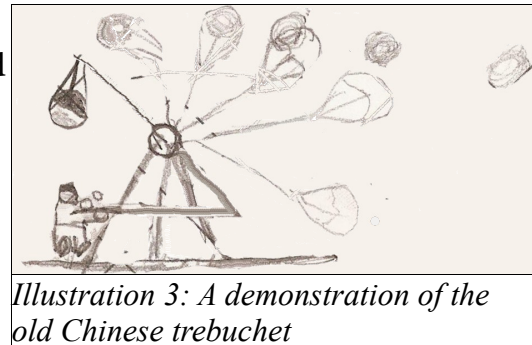
Mangonels and onagers usually shots stones, but were also known to shoot clay balls that had been previously prepared by being fired in a hot clay oven. Sometimes people even used carcasses and corpses of diseased animals and humans resulting in a form of biological warfare. But the donkey-like firing method of the mangonel was better used to fire AT things and not over them, so the effectiveness of this is unknown.

### **Trebuchet**

The trebuchet (or 'trebucket' as some people spell it) was a siege engine that was used mainly in the Middle Ages shortly before the invention of gunpowder. It is interesting to note that the trebuchet did not lose popularity when gunpowder was invented. Not until the 1521 did it become almost totally obsolete at a particular siege of the Aztec capital Tenochtitlan. Cortez, the last to use the trebuchet aggressively in battle, decided to use one because he hadn't enough money for a cannon. The first shot the trebuchet fired went too far up and landed right on top of itself.

Trebuchets were much more accurate than other medieval siege weapons like mangonels or onagers. Even though it peaked in usage around the Middle Ages, it was invented much

before that, predating almost all other siege weapons if you note its resemblance between the ancient Egyptian device called the 'shadouf'. Others say that it came from a kind of sling that used a small beam of wood to extend the length of the arm. It was probably invented in China some time around the 4<sup>th</sup> Century BC, because that was the earliest record we have found of one yet. It could throw 250 pounds of rock 200 feet off. The particular machine they found did not contain a counterweight like the medieval kind we usually see. Instead it had ropes that people pulled to serve as the force needed to fling the load. Usually villagers, defending, or besieging a city did this work. Lots of them were needed-- up to 45 people per trebuchet and 2 per rope, meaning around 22 ropes per machine. Even so, these kinds of siege engines were relatively small and portable. The modern world refers to these trebuchets as 'traction trebuchets'. They were recorded to have been used in war for the first time around the 4<sup>th</sup> century BC.



*Illustration 3: A demonstration of the old Chinese trebuchet*

The trebuchet later appeared in Byzantium in the strategikon of Maurice in the 6<sup>th</sup> century AD, saying something about 'ballistae revolving on both directions'. A more direct blurb about it would be later written in the book called 'Miracles of St. Demetrius';

Hanging from the back sides of these pieces of timber were slings and from the front strong ropes, by which, pulling down and releasing the sling, they propel the stones up high and with a loud noise.

Another clear statement appeared in 1187 in a military manual written to Mansa Musa by an Islamic scholar named Mafri bin ali al tarsirsik. It describes the transition between traction trebuchets and counterweight trebuchets. Although 'counterweight' and 'traction' mean the same thing, counterweight trebuchets refer to ones using a weight as opposed to people pulling a rope.

The scholar also wrote something else about a trebuchet 'being pulled by a constant force' we assume that 'constant force' that he was talking about is gravity. He went on to write: 'Trebuchets were invented by unbelieving devils,' this suggests that they knew about them, but didn't invent them. Around that time, the Islamic Empire was fighting with the Holy Roman Empire. This probably means that the Byzantine learned how to make them and was using them against the Islamic Empire.

Castles walls thickened as the powerful trebuchets got more popular. Saladin, the Islamic leader started making a line of these new siege engines 'pulled by a constant force and invented by unbelieving devils' to mount onto walls, giving us some proof of the transition from Islamic to Christian.

Although the trebuchet was popular and effective in siege, sieges were extremely expensive, often costing much more than the spoils inside the besieged castle. The price of the siege could sometimes cost several orders of magnitude more than the real worth of the city. This made siege a worthwhile option only if the castle was in easy to attack position or was large with few resources stored in it, and generally, the larger the castle, the more resources it had. Even if those problems were factored in, that did not stop the expensive trebuchet from being used in expensive battles. A few extraordinary example uses of the siege engines to the extreme are listed below:

Edward Longshanks of Stirling Castle built a gigantic trebuchet called warwolf, thought to be the most powerful and famous trebuchet built, and various legends say that it leveled one entire section of a castle wall in a single firing. He used it in the siege of Danda in 1299.

Edward also ordered a trebuchet to be built that could hurl ~765 pounds but that, evidently, wasn't any kind of record for the time, since in 1188, trebuchets were around that could fire stones of 1500 kg, even though the average around the time for them was around



200 pounds with a 1000 foot range.

Rate of fire could also be an issue. The long and sometimes dangerous rate of ~ one minute was common. However, one trebuchet that was made for the siege of Lisbon was capable of firing once every 15 seconds.

The trebuchet was a huge siege engine. It required lots of wood and knowledge to build one correctly and efficiently. Louis IX of France built a stockade, out of 24 captured and disassembled Egyptian siege engines.

The trebuchet, like the mangonel, was also used in biological warfare in 1422 when a Hussite military commander named Prince Korybut threw dead people and feces over city walls to scare and successfully spread diseases around the defenders inside the besieged city in Karlstein.

The last use of the trebuchet in defense was in 1779, and was a success. British forces defending Gibraltar found that cannons couldn't fire far enough for some purposes.

There isn't much of a reason to use any traditional kind of trebuchet in the modern world, other than to learn about their physics or just for fun. Models can still be made from scratch for hobbies, or purchased in Renaissance Fairs. Competitions are sometimes held also.

We also have a modern military version called a Floating Arm Trebuchet or 'FAT'. The main difference between the old ones and our new one is that the weight is dropped from a higher distance and the entire arm is mounted onto wheels. It results in an increase of energy in the fling, even with a low mechanical advantage.

## **Cannon**

The word 'cannon' comes from many different languages, but the actual definitions can be traced from the Italian 'cannone' ( meaning 'large tube' ) to the Latin 'canna' to the Greek 'kanna' (meaning 'cane' or 'reed') and finally, to the Akkadian word 'kannu'. It must be noted

that cannons are not catapults because they use a form of combustion to propel their ammunition.

The cannon was first used in China in the Song dynasty, but not invented there, and eventually replaced other siege engines. The workings of the cannon, like many other siege machines, were invented around the 3<sup>rd</sup> century BC. Ctesibus of Alexandria is responsible for the concept but, sadly, we don't know much about it. It was quite primitive in comparison to the ones that came after it. Most of his other works were completely lost. Philo of Byzantium noted that it operated with compressed air. The oldest gun that we have of this kind came from 1288 and bore a muzzle one inch in diameter. The second oldest was probably much stranger looking; its muzzle was 4 inches in diameter.

The Chinese were the first to use the cannon in battle. Even then it appeared to be a kind of handheld contraption. Usually referred to as the 'fire lance,' it was a hollow, gunpowder-filled stick of bamboo attached to the end of a spear. It was used as a flamethrower. The only reason it might be called a cannon is because sometimes, sharp objects and shrapnel were pushed in along with the primitive black-powder. It shot out along with the scary flames and thick smoke. The bamboo was eventually replaced by strong metals like bronze and iron. The first metal cannon ever was called "pet-de'frer" which shot an arrow-looking bolt, sometimes wrapped in leather for greater power. It was shot off with a hot wire that was pushed through a hole in the back.

China was also the first place in which the cannon was used in a siege and where the cannons were loaded with shells. They manufactured 3,000 metal cannons and mounted them onto the Great Wall of China to protect against the Mongol hordes. The Mongols learned about them there and used cannons to later take over Korea. But the cannon really proved itself in 1593 in the Siege of Pyongyang when 40,000 Ming warriors made cannons to battle

an equally large Japanese army. The Japanese were defeated in one day because their lack of firepower.

The concept of 'hand cannons' and 'fire lances' spread fast. They were used in a battle in 1260 with the Mongols against Egypt in the battle of Ain Jalut. With their growing popularity, they improved greatly. Manuscripts in the 1300s contain the three main recipes used to make gunpowder for use in the new weapon. One of them (Containing 74% Saltpeter, 11% Sulfur, and 5% carbon), was extremely near to our modern mixture of 75% Saltpeter, 10% Sulfur, and 5% carbon. This was much more efficient than the original recipe used in China for their infamous, but outdated 'fire lance' invention.

The first mention of gunpowder in medieval Europe was around 1216 in Roger Bacon's 'De Nullitate Magiae' but its first use was in a siege. A Moorish cannon was used in Spain in the siege of Seville in 1248.

Cannons continued to develop in Europe, but did not really catch on until the 100 years war. Even then it was still pretty rare to see one on a battlefield, but the very first real non-handheld 'cannon' was used by the defenders in a siege in Russia circa 1380.

A Turkish engineer called Urban is credited for making the gigantic cannons that were used to capture Constantinople in 1453. They were humongous. They could fire 1200 pounds of solid rock one mile and be heard from ten miles away. They were frightening as well as destructive. Called the 'Great Turkish Bombard,' the machine itself weighed a total of 16 tonnes and contained only two separate parts for construction. One being the 'pedestal' part (Case) and the other being the actual shooting 'muzzle' part (Breech). The aging trebuchets were starting to lose some of their popularity as the siege engine of choice at this point.

A weapon in the middle east was being fashioned in the 16<sup>th</sup> century and was probably the first autocannon. It was invented by a Persian-Indian mechanical engineer. Autocannons

are versions of cannons that are smaller and much more portable than full-sized artillery. Their purpose was to kill people as opposed to destroy buildings or larger targets. The concept he used on this was entirely new; he didn't simply put the repeating crossbow process onto a cannon.

In the 1400s, people were working on the mobility of cannons, after an obvious improvement in the 1380s that put the cannon on wheels. Field artillery got itself a big spike of usage because of a battle in Flodden in 1513. A Scottish army with huge, powerful cannons with low rate of fire were used against an array of very light English artillery, which went on to win the battle. Trunnions and wheeled carriages became popular.

By 1600, cannons were huge, cumbersome, and extremely inefficient despite their development over 200 years ago. The rule of thumb by then was 'the bigger the barrel, the further they fire.' The cannons got ridiculously heavy, at up to 20,000 pounds. Some big cannons required about 15 horses to move at even a slow walking pace. These cannons needed a LOT of gunpowder. Even though it was very cheap, it was difficult to handle. As a result, people started to use much coarser gunpowder as opposed to the powdery substance they had used before. The pockets of air between the particles in grainy mixture helped the cannon to fire off faster and ignite the gunpowder more evenly. This, however did not solve the weight problem.

This led many countries to develop a system of common 'sizes': 6-pound, 8-pound, 9-pound, 12-pound, 18-pound, 24-pound, 32-pound, and 42-pound etc. The 'pound' did not, of course, represent the weight of the cannon itself. Rather, it was the weight of the shell that it fired. Many cannons were less than 6 pounds, but were not included in the list. Around this time, also, England started putting some small demi-cannons on their 'Ships-of-the-line'. Generally, the larger the ship, the larger the cannon.

This was around when the 'Age-of-Sail' came. The Age of Sail is the period from 1571 to

1863 when huge, wooden, wind-powered ships were used. All makes of cannons were mounted onto them some time or another. Firing these cannons on land took a lot of effort. It was even harder on a ship. A wet swab was forced down the barrel of a gun to clean it out and cool it down from the previous firings. This prevented the heat from the previous charge to fire the gun prematurely. Then, gunpowder was loaded, either in a sack, or from one by a 'powder boy' which was just some hired kid from the age of 10 to 14. Sometimes the projectile included its own propellant. A wad of cloth or old rope was then rammed in. The shot was shoved in next, followed by another wad of flammable mass. The wads prevented the projectile from rolling out. It was then ignited through a hole (called the 'touch') in the back with the aid of a metal 'pricker'. After the cannon was fired, the buck and the noise, and the heat were intense. In fact, one of the reasons that cannons had to be timed to fire on ships was because if they all fired at once, the entire craft would capsize. Because of this, a typical ship in the late 18<sup>th</sup> century from the Royal Navy would fire about 2-3 times a minute. The cannons were chained to the wall to prevent them from rolling away.

The chain came with its own problems; most guns were long, because the rule still generally said 'the longer the gun the bigger the range'. Many cannons were still muzzle-loaders, so the muzzle had to be within the interior of the ship to be able to load them. The ship was only so wide. This led to some very strange and interesting designs, like the 'Long Nine' or the 'Carronade'.

The cannon developed rapidly, but so did defenses against it. Cannons were usually used for siege now, so castle walls thickened as they grew more and more powerful. They were eventually made curved to help their stability. When the walls thickened, so did their popularity grow. Cannons were good enough to be the siege engines of choice, while the other more outdated siege engines, like a 'battery tower', slowly faded out. It was written that there was '...no wall, whatever its thickness that artillery could not destroy given a few days.' The result was that the

usage of castles themselves declined. As opposed to the tall and majestic towering fortresses that they used to be, they became shorter and thicker with slanting walls.

New defenses were being used to replace the castle. A notable one was called the 'star fort' due to its characteristic form, which had almost nothing to do with appearance. These effective forts replaced the castles in America as well as the ones in Europe.



*Image 1: Star Fort*

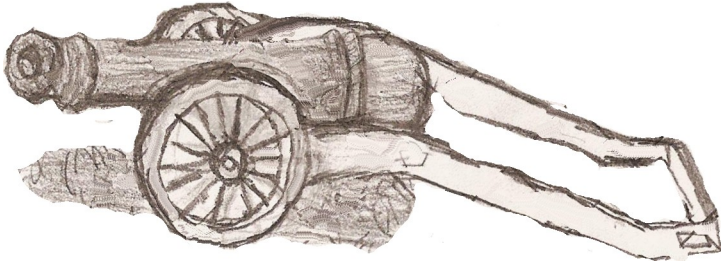
Aiming was largely guesswork up till the second half on the 17<sup>th</sup> century. Even with some good scientific tools, it was quite inaccurate. A French engineer called Vauban changed this. He introduced a new way of doing it that was more systematic. It required digging a hole in front of the cannon and the performance of various other calculations. His ideas remained in use until the mid-19<sup>th</sup> century, and it was not until only a few years before World War I that they began to drift largely away from his original ideas.

Something discovered around that era was the concept of 'rifling' a cannon, or putting spiraled lines in the cannons barrel. This started to be used around 1855 and reduced the 'gyroscopic instability' which made cannons much more accurate. Reported to actually allow cannonballs to pass through walls before exploding. It also wrecked things much more thoroughly. Unfortunately, though, it was also quite a bit more expensive.

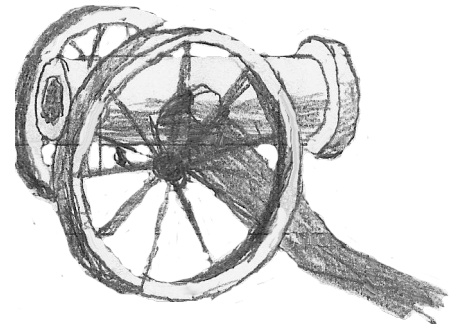
Although we don't notice it as much, cannons are still used in the modern military. They just got longer and were mounted onto ships and are pulled by trucks and tanks.

## APPENDIX

The appendix includes all of the pictures in the report that do not seem to have a place anywhere else in this report.

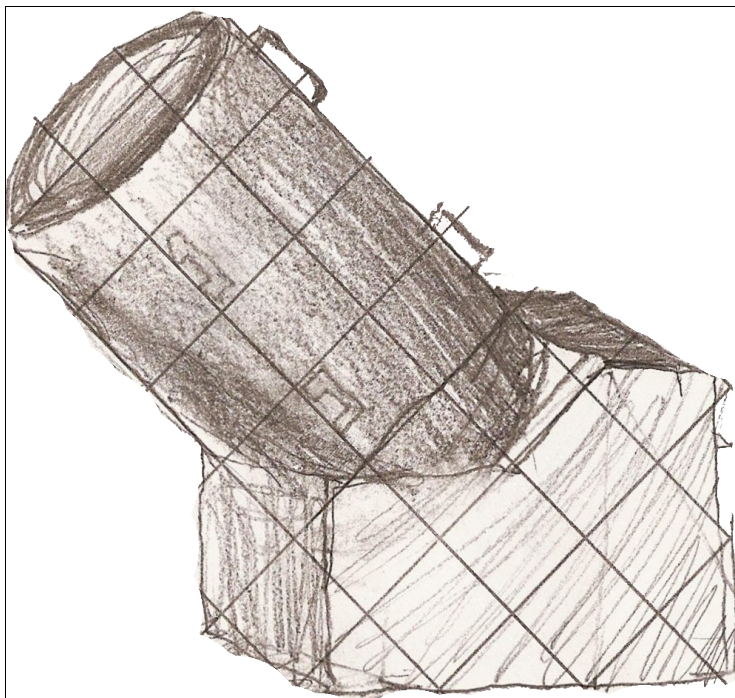


*Illustration 5: Falconet*

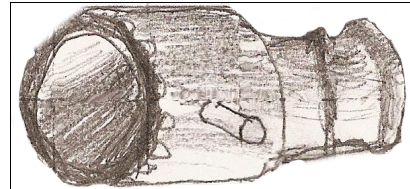


*Illustration 4: HOWITZER*

FALCONET - Light cannon developed some time in the middle ages. It had a slightly larger derivative called 'falcon'. Barrel was 4 feet long, with a caliber of 2 inches. Weighed only 500 pounds, and used a very small amount of black powder ( $\frac{1}{2}$  lb.) to fire roundshot, but was usually used to fire grapeshot. Used largely in the navy during the 1600's on small vessels. Used in the American Revolution also.



*Illustration 7: MONSTER MORTAR - Largest mortar ever made.*



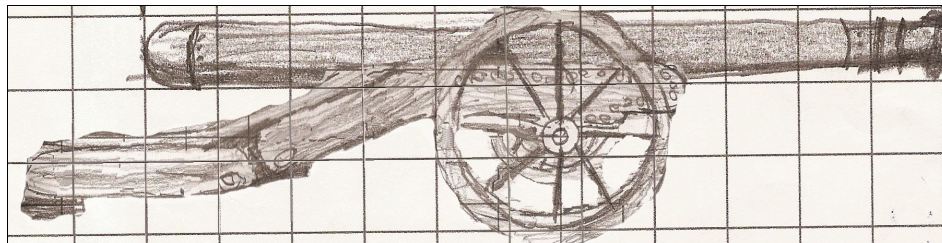
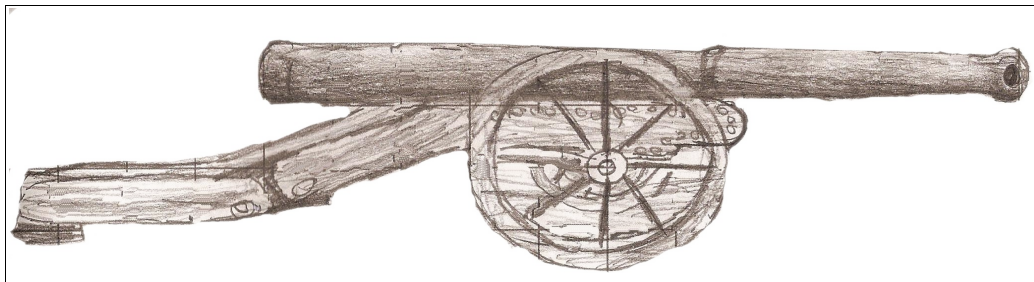
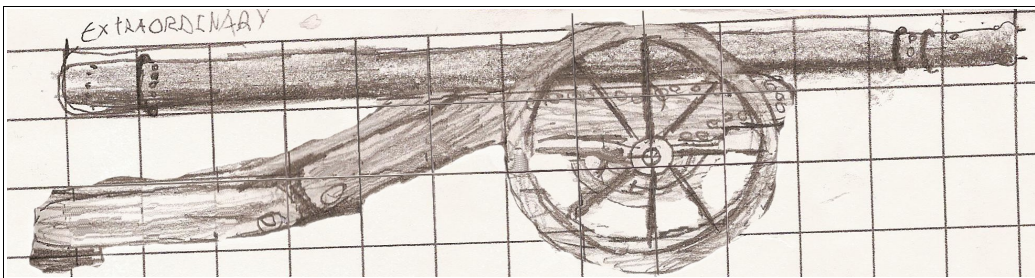
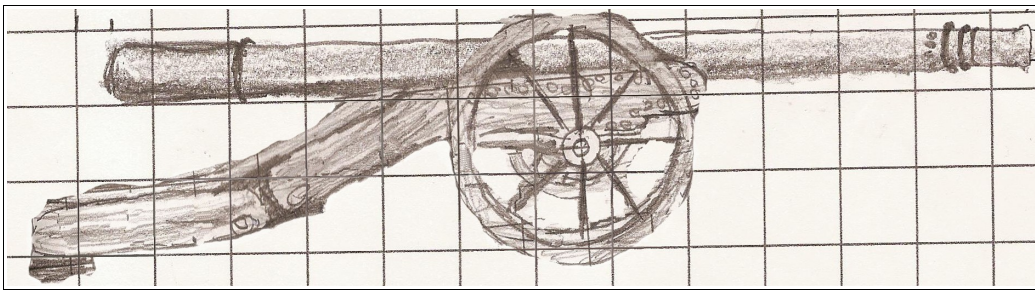
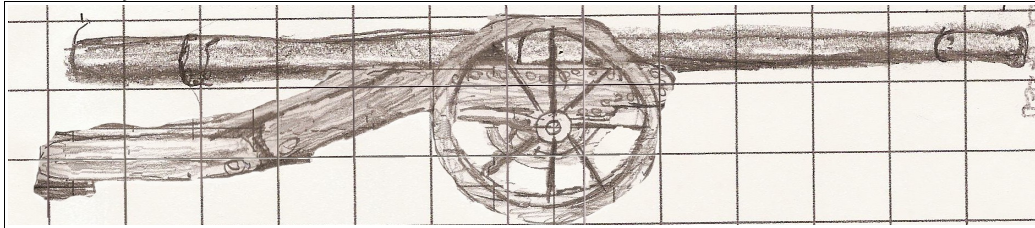
*Illustration 6: Regular Mortar*

HOWITZER - The howitzer is a cannon with a relatively short barrel that doesn't use very much charge. Projects shots with a steep angle, (but not as steep as the mortar) European gun scales in the 1700's - 1800's categorized it half way between 'mortar' and 'gun'. Modern versions are still used today. Their invention was intended to be siege warfare, but were later used also for field-battles. They threw dangerous cast-iron shells filled with flammable materials. Used greatly in the American Civil War also. One kind of modern howitzer is mounted on an armoured vehicle so that it mistakenly resembles a tank. Usually not rifled.



## CULVERIN

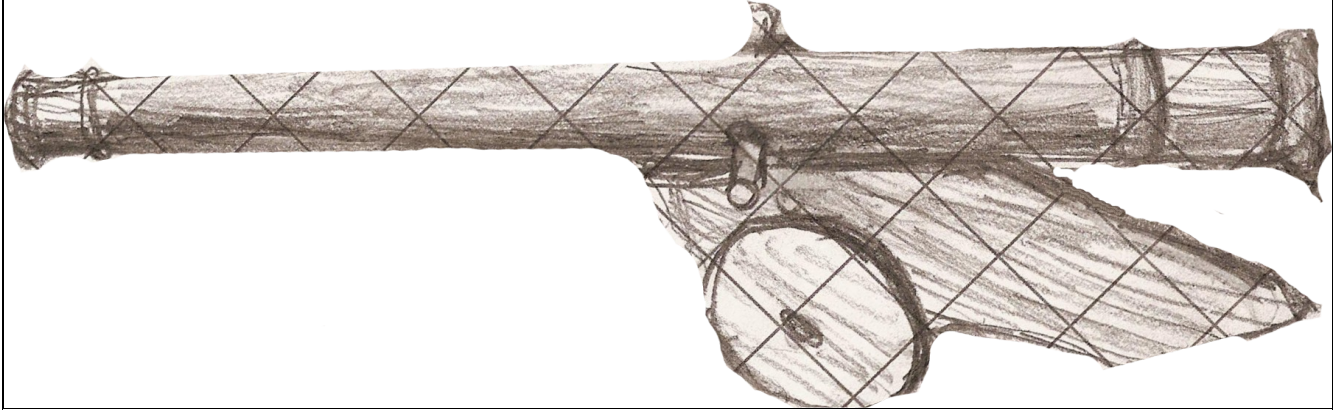
Culverins come in many shapes and sizes, with a few main ones; (from bottom of page) Extraordinary, Ordinary, Least-Sized, Demi-Culverin etc. The culverin, at first, was a rudimentary derivative of the early musket, and later grew into a full sized gonne. (The word 'gun' traditionally means a cannon-sized weapon, and in our military, it still does. ) Culverins have been used by the french since the 15<sup>th</sup> century, later by the english in the 1500's. It was used for range. The culverin was significantly better than the ballista. It fired balls of solid iron and used gunpowder. This gave the shots more stability and better range. Culverins were eventually replaced by field guns once cannonballs became explosive. Culverins were mainly used for land battles.



*Illustration 8: Demi-Cannon, not to be confused with the Demi-Culverin*



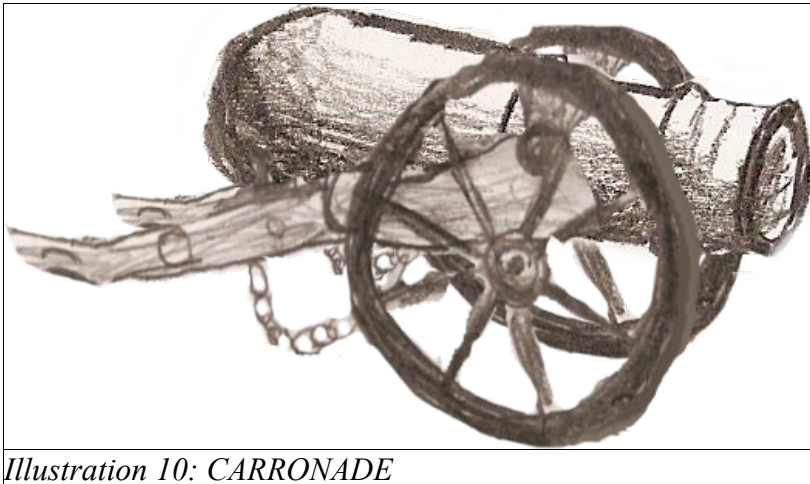
SAKER - The saker is a medium-sized cannon, developed in the early 15th century, slightly shorter than a culverin, with a barrel of ~9.5 feet long, and a caliber of 3.65 inches. Fired roundshot 5 ¼ pounds 7400



*Illustration 9: SAKER*

feet away using 4 pounds of black powder. Usually weighed 1900 lb. A french variation called the 'moyenne' (means 'middle-sized') was used mainly in the sea.

CARRONADE - The carronade was a widely used cannon, utilized on both land and sea. Despite it's rather stout build, it was popular on ships because they needed to fire heavy ammo, and to do so required a long cannon that wouldn't fit in the ship's skinny hull. The size came with consequences, though. It's short barrel and wide muzzle made it fire slow shots with low range and momentum.



*Illustration 10: CARRONADE*

#### BREECHLOADER

A breechloader is the kind of gun, opposite to the muzzleloader, that is loaded from the back. Most modern guns are breechloaders, with the exception of the mortar which is almost always muzzleloaded. Most old cannons were generally muzzleloaders as well.

#### MUZZLE LOADER

A muzzleloader is any kind of gun in which the propellant and projectile are loaded in from the muzzle of the gun. Many cannons are muzzleloaders, notably the mortar. Typically they are loaded as the diagram shows with the propellant in the very back, some padding, the projectile and then some more padding. The wadding used would be many different kinds of flammable and mouldable material, such as cloth.

Rifled cannon

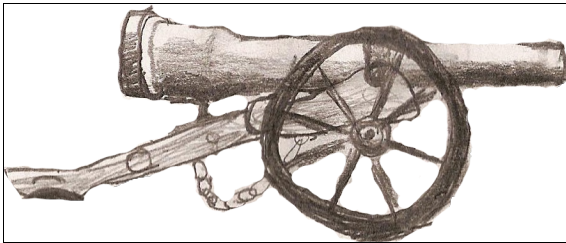
A rifled cannon had spiraling ridges along the inside of it to make their load spin as it flew out. They were quite expensive. But also much more accurate than a smoothbore. It also increased range and accuracy a bit.

#### WHITWORTH

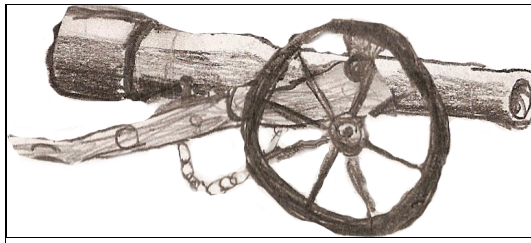
Was a rifled gun designed by Joseph Whitworth. It was made in England, so it was only seen on a battlefield during rare occasions. It was a weird gun for the time, because it was a breechloader, unlike most of the other models of the time. It was extremely accurate, reported to be able to fire 10 shots with no more than 5 inches difference with every one. It was also noted to make a different sound, distinguishing it from many other models. Even with this accuracy, however, it was unpopular as an anti-personnel rifle.

#### ORDINANCE RIFLE

Was the largest-used rifled gun in the civil war. It was made by the Phoenix Iron Company with wrought iron. It was reasonably reliable, although occasionally the tube exploded because of its brittle construction. The good accuracy made of for it, though.



*Illustration 11: WHITWORTH*



*Illustration 12: PARROTT RIFLE*

#### Smoothbore

A smoothbore is a cannon that doesn't have any rifling on the inside; as the name implies, it is bored smoothly and the inside edges are round and flat. They usually shot solid shots at high speeds at low angles. Remarkably cheaper than a rifled cannon.

#### 12-POUNDER NAPOLEON

Despite its fairly limiting name, it was the most popular of the smoothbore cannons during the American Civil War. It was the last bronze cannon that any American army ever used. Named after Napoleon III of France. It was very safe, reliable, and deadly at a close range, however, America didn't use it until it got there in 1857. Interestingly, the confederate version of the gun had swelled muzzles, but others didn't.

#### PROJECTILES

#### ROUNDSHOT / BOLT

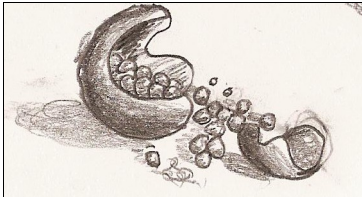
Round-shot is the 'classic' cannonball that people used. It's just a big, solid ball of iron. Heavy and effective. If it was used in a rifled gun, it was referred to as a bolt.



*Illustration 13:  
Roundshot*

## SHRAPNEL

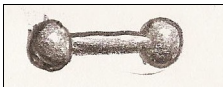
Hollow roundshot full of musketballs and explosive. Modern variations are still used.



*Illustration 14: Shrapnel*

## CHAINSHOT / BARSHOT

Two half-size balls chained together, or stuck together by a solid rod. Often used on ships cannons to cut through masts. Due to its 'tumbling' flight through the air, it was unpredictable and sometimes inaccurate.



*Illustration 16:  
Barshot*



*Illustration 15:  
Chainshot*

## SHELLS

The earliest shells appeared in the 16<sup>th</sup> century. They were just hollow spheres (sometimes) with the appearance of roundshot, but full of black-powder. The problem with old shells was that they exploded into only a few fragments, whereas, when used as field artillery, you needed it to explode into lots of dangerous shards to kill people. For this reason, the popularity of this ammunition in field battles yeilded to the 'shrapnel shell' . Modern variations are still used. ( a lot. )



*Illustration 17: Shell*

## HOTSHOT

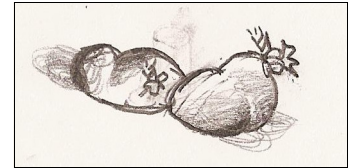
Hotshot was roundshot that was heated to a red-hot temprature, and fired when it was still glowing. Used to burn the target. It could be expensive in awkward situations, but it was effective.



*Illustration  
18: Hotshot*

### GRAPESHOT

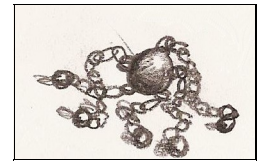
Canvas bags filled loosely with nails, shrapnel, glass, explosives, and other dangerous things. Cost effective and useful against mobs of angry people. This is where Napoleon's famous 'whiff of grapeshot' line came from. He used it to control riots, which, ironically made him more popular later on.



*Illustration 19:  
Grapeshot*

### SPIDERSHOT

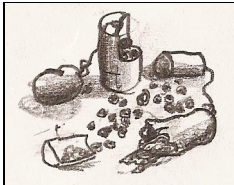
Chainshot with one or two ½ size balls and more than just one chain. Not very useful unless you were on a ship. It could cut through masts and rip through thick cloth quite easily. Not often used.



*Illustration 20:  
Spidershot*

### CANISTERSHOT

Long tin or iron cans with skinny walls, full of lead bullets or sharp metal, packed tightly with sawdust. They were dipped in fluid to prevent their oxidation. They also featured a bag of gunpowder tied to them for firing. Used a lot in the American Civil War and the Napoleonic Wars. Very deadly; could easily kill 9 or 10 people with one single shot. Even worse was the 'double canister' which was just two canistershots fired simultaneously.



*Illustration 21:  
Canistershot*

### CARCASS

Carcass shells were hollow roundshots full of explosive with an external coating of flammable material. Usually there were holes bored in the shells to let the internal explosives to burn out. Shot from howitzers and mortars to set fire to buildings and ships.



*Illustration 22:  
Carcass*

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