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Firearms: A Primer

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Firearms: A Primer

"And it was a great pity, so it was

That villainous saltpeter should be digg'd

Out of the bowels of the harmless earth,

Which many a good tall fellow had destroyed

So cowardly; and, but for the vile guns,

He would himself have been a soldier."

- Shakespeare, Henry IV, act I, scene ii.

This work is not intended to be THE definitive work on the history and development of firearms. Far too many weapons of importance, large and small, exist for such a claim to be said of a work of this insignificant size. Instead, the following includes enough information to provide the reader with a reasonable road map of the rise of black powder weaponry from its meager, high-mythological beginnings to reach its current prevalent and orthodox worldwide acceptance in modern militaries, citizenry, and entertainment media.

Glossary of Terms

This list of terms is by no means exhaustive, but should provide the reader with enough information to make sense of the materials provided within this article.

Action

The moving parts within a gun involved with the weapon's operation, including loading, unloading, and firing, along with the ejection of the cartridge, if applicable. Weapons without moving, internal parts, such as a hand cannon, have no action.

Action, Automatic

Also known as "fully automatic," such a weapon fires the currently chambered cartridge, ejects the empty cartridge, and loads a new cartridge into the chamber in a continuous cycle so long as the trigger remains pulled.

Action, Bolt

A sliding bolt controls the weapon's action. This bolt has to be manually maneuvered in order to load a round of ammunition and prepare it for firing, as well as to expel the spent casing afterward. The action is of either the turnbolt or push-pull variety. Bolt-action firearms are generally longarms, and are considered among the most accurate of all firearms.

Action, Crank

Turning a crank fires the weapon and also removes a spent cartridge while moving another into alignment with the barrel.

Action, Double

A firearm where squeezing the trigger serves two functions: A) cocking the hammer back in preparation of B) being released when the trigger is squeezed to its full extent, thus firing the weapon.

Action, Lever

Manipulating an external lever, which usually doubles as a trigger-guard for the sake of convenience, performs the mechanics of chambering a new round of ammunition and expelling a spent round. The most famous version of this system is B. Tyler Henry's Volcanic Repeating Arm, the system used in both the Henry and Winchester rifles. Lever-action is generally reserved for longarms, though exotic lever-action handguns have been seen in the hands of legendary gunfighters.

Action, Pump

A sliding pump, usually mounted beneath the barrel, performs the mechanics of chambering a new round of ammunition and expelling a spent round.

Action, Semi-Automatic

Pulling the trigger causes the currently chambered cartridge to be fired, ejects the empty case, and loads a new cartridge into the chamber. This occurs with each pull of the trigger. This mechanic is performed by utilizing the recoil energy of the fired cartridge.

Action, Single

In a single action firearm, squeezing the trigger serves a single function: releasing the hammer in order to fire the weapon. This means that the hammer has to be readied by some other means, almost always manually.

Fans of old westerns are probably familiar with single-action firearms from the many scenes wherein the hero "fans" the hammer of his pistol with the heel of his hand while keeping the trigger depressed, enabling him to fire multiple shots in rapid succession.

Ammunition

Ammunition, also called ammo, is measured in units called rounds. The term may be properly applied, in modern firearms, to the entire cartridge, but the term always includes the projectile itself. Ammunition is required to fire a gun, and the ammunition used must match the firearm.

Anti-Materiel Rifle

A man-portable firearm designed for shooting at hard targets, such as armored personnel characters and structures. Earlier models, especially those of World War II, were called simply "anti-tank guns" because they were designed to kill the far more primitive armored vehicles of that time.

Barrel

The cylinder, containing the bore, through which the projectile travels when the weapon is fired.

Belt-Fed

The weapon fires linked ammunition fed through its chamber one at a time.

Bore

The hollow space *inside* a weapon's barrel. The width of the bore, rather than the term "caliber," was used in early artillery pieces and firearms to describe the size of ammunition used.

Breech

The portion of a gun containing the action, trigger (or other firing mechanism), magazine, and chamber.

Breechloader

A weapon that is loaded from its breech, usually from the rear and directly into the chamber.

Bullet

The generally spherical or cylindrical projectile that, hopefully, strikes the target after being fired from a firearm. Cartridges are often mistakenly called bullets; the bullet, however, is only one component of the cartridge.

Buttstock

More commonly referred to as the "butt" or "stock," this is the part of the weapon that is placed against the shoulder or arm to allow the user's body to absorb the recoil of firing. This innovation greatly improved accuracy.

Caliber

A bore's diameter, typically measured in hundreds or thousands of an inch, e.g. a .50 caliber weapon fires ammunition one-half inch in diameter. Modern calibers are measured in both diameter of the round and the length of the cartridge, such as the 7.62mm x54R (the "R" denotes that the cartridge's base has a rim.)

Carbine

A lightweight firearm with a shortened barrel originally designed with cavalry and naval forces in mind.

Cartridge

A single package containing both the propellant and bullet for a single shot.

The first type of cartridge was merely a paper cylinder that was torn open so that the bullet and powder could be poured into the barrel, requiring an external percussion cap.

Later followed a cartridge of linen or paper that would be placed in the weapon intact. Firing the weapon, which still required a separate percussion cap, would incinerate the linen or paper upon firing. This made for more residue in the barrel, however.

Both of these cartridges were vulnerable to being torn open, or damaged by water.

Next came the metal cartridge still in use today. The bullet is gripped by the cartridge's tip and a percussion cap is built into its rear. Between the percussion cap and bullet is the propellant. Once the round has been fired, however, the cartridge must be ejected or moved so that another round may be readied for firing. These cartridges are also waterproof.

Caseless Ammunition

This unconventional ammunition seals the bullet in a block of solid propellant with a primer rather than within a metal cartridge containing propellant. This innovative design allows all the wasted space of a magazine that is left by round, metal cartridges to be filled by the rectangular, caseless ammunition, thus allowing for more power. This also allows for more rounds per magazine at a lighter weight. What's more, no case is left after firing, a situation that was ideal for special forces operations.

When fired, all elements of the primer and propellant are consumed and, although earlier versions had a problem with "cooking off" within a hot barrel, later improvements to the design reduced this chance, making caseless ammunition less likely to succumb to this malfunction than standard, metal cartridges. There is a tendency for the barrel to be fouled over time by residue from the large quantity of unsealed propellant, however, but regular maintenance makes this problem a non-issue under most conditions.

Because of its superior design, composition, and performance in the weapon's action, caseless ammunition tends to have a flatter trajectory over great distance while still being able to deliver an impressive impact.

Unfortunately, a weapon using caseless ammunition must be specifically designed for its use.

Centerfire

A metal cartridge with the percussion cap is located in the center of the base. The firing pin strikes the percussion cap when the trigger is pulled, firing the weapon.

Chamber

The rear part of the barrel that contains a cartridge and aligns it for firing. When the breech is closed, the cartridge is supported so that its primer aligns with the igniter (usually a firing pin), while the bullet points down the bore towards the muzzle.

Choke

This is an element of a shotgun's construction located near the muzzle. The purpose is to regulate the dispersal of pellets upon leaving the barrel.

Clip

A device that holds the cartridges in place prior to being inserted into the magazine. A clip is not the same as a magazine.

Corned Powder

A process wherein the powder's ingredients are mixed and then wet into clumps to prevent the ingredients from separating, as they were wont to do over time previous from previous methods of mixing gunpowder. The wetted sections are then broken into smaller "kernels", hence the name.

The higher breech pressure created by igniting corned powder meant that most of the arms currently in use when the powder was first introduced could not use it, restricting it to artillery pieces and newer firearms built to accommodate the pressure.

Though no longer called as such, what gunpowder that is still in use today is of the corned variety, though the process has since been much refined.

Cylinder

The rotating magazine of a revolver or similar weapon. The action rotates the cylinder upon its access to allow the next cartridge to be aligned for firing. Cylinder's are usually of two primary varieties: those that are intrinsically built into the weapon and those of the "swing out" variety, with the latter being the type popularized in modern media.

Firearm

A gun. Firearms use a chemical mix, typically gunpowder, to propel a projectile towards the target. Firearms are typically divided into longarms and handguns.

Flash Pan

The reservoir mounted upon the side of the gun where the priming powder is stored. Once ignited, the flash pan's powder would ignite the powder charge within the weapon, firing it.

Flintlock

The mechanism used a piece of flint attached to a spring-loaded arm that would snap forward to strike the flint against a metal striking, producing a spark that would ignite the pan's powder. The primary difference between the flintlock and its predecessor, the snaphaunce, is that the striking plate and the plate covering the flash pan were a single piece, bent in the middle. This meant the device was simpler to make and use and much cheaper.

Fowling Piece

The predecessor of the modern shotgun, this is a light weapon designed for shooting birds and small animals. It is essentially a muzzleloading or breechloading shotgun.

Fully-Automatic

Each pull of the trigger fires a series of bullets commonly referred to as a "burst," rather than just one bullet.

Gunpowder

A chemical mixture or compound that burns rapidly with or without the presence of oxygen to produce pressurized gases capable of propelling a bullet. The earliest gunpowder was called black powder and was made from a mixture of charcoal, sulfur, and potassium nitrate. This powder produced a cloud of smoke and left behind considerable burnt residue that required frequent cleaning of the firearm. Smokeless powder was eventually discovered that burned hotter, with less smoke and residue.

Hammer

Powered by a mainspring, this component rotates upon an axis to drive the firing pin into the primer to ignite the ammunition's propellant.

Handgun

Handguns are designed with a grip that enables the firearm to be held in the hand and fired from an outstretched arms. This includes pistols and revolvers.

Iron Sight

A simple sighting system typically consisting of a foresight and backsight, neither of which contains any lens or other means of magnification.

Longarm

Longarms are designed to be fired while in contact with the shoulder of the shooter. This primarily includes firearms with a buttstock, such as rifles and shotguns.

Machine-gun

A weapon that fires successively at incredible speeds, throwing a volley of ammunition at its target. Because of the amount of ammunition such a weapon can consumer in a short period, machine guns are usually fed from a large reservoir, or "hopper," of ammunition, or by ammunition that has been linked to a string that is then fed into the weapon.

Magazine

The firearm's reserve ammunition store from which ammunition is fed into the weapon's chamber.

Magnum

A cartridge that is deliberately packed with more gunpowder, to propel the bullet with greater force than a similar cartridge of the same caliber.

Matchlock

The Matchlock used a lighted wick in a moveable arm that would move down to ignite the priming powder in the flash pan once the trigger was depressed. Although this increased the chances of a misfire due to sparks blowing around from the lit wick, the matchlock allowed the user to keep both hands on the weapon, thus steadying it for better aim.

Maximum Effective Range

The maximum range at which the firearm will reliably strike the target and deliver the desired effect.

Muzzle

The mouth of the barrel; the hole from which the bullet exits once fired.

Muzzleloader

The weapon is loaded down the front of the barrel and the round and powder rammed down to keep it in place.

Muzzle Velocity

The speed of the bullet as it leave the muzzle of the gun. This is measured in feet or meters per second. The muzzle velocity of a longarm is generally two to four times that of a handgun.

Needlefire

A thin needle is driven forward the through cartridge's base and powder charge and into the primer, which is located directly behind the bullet.

Notch-and-Post Sight

Now more commonly known as the combat sight, this involves a small protrusion at the weapon's rear with a notch in its top,

which is used to line up with a post at the tip of the weapon's barrel in order to aim.

Optical Sight

A sighting system consisting of a means of magnification using a lens and/or other technique for improving visibility.

Percussion Cap

Instead of a flash pan, this mechanism consists of a simple tube that leads directly into the gun barrel. An explosive cap is placed at the tube's opening so that when the hammer strikes it, the small explosion travels down the tube to ignite the barrel's powder, firing the weapon. The cap was almost entirely certain to explode when struck, thus vastly improving the chance of avoiding misfires.

Later weapons would put the percussion cap within the base of the cartridge itself, thus saving the user from having to both load a round of ammunition and place the percussion cap.

Peyton Powder

More commonly known as "smokeless" powder, this propellant is not truly smokeless. As its development progressed, it went through various degrees in the reduction of smoke. However, the primary reason for its development was to reduce the amount of powder residue left in the bore by firing the weapon. This meant that a weapon using Peyton powder would be more accurate and have a higher rate of fire, as the user didn't have to clean the weapon as often.

The powder is comprised of nitrocellulose, nitroglycerin, and ammonium picarate.

Pinfire

A metal cartridge with a metal pin sticking through it. The weapon's hammer strikes the pin, slamming it into the explosive cap within the cartridge, firing the bullet.

Pistol

Strictly speaking, any handgun that is not a revolver.

Primer

A small explosive charge that is sensitive to impact; the percussion cap.

Propellant

The substance that is fitted in the barrel behind the round so that, when it is ignited, the release of its explosive force will propel the round outwards.

Recoil

The sudden rearward push or "kick" of the firearm when it is fired. The heavier the bullet and the higher the muzzle velocity, the more recoil is felt.

Revolver

A handgun that carries its cartridges within a rotating cylinder. The cylinder rotates to bring the next cartridge into alignment with the barrel for firing.

Rifled

Spiral grooves are cut into the bore, making for a tighter fit for the bullet, which is caused to spin when it is fired. Both factors contribute to a more accurate weapon.

Rimfire

A metal cartridge where the priming compound is located inside the rear rim. Pulling the trigger caused the weapon's firing pin to crush the rim, thus exploding the primer and firing the weapon.

Round

A term referring to a single load of ammunition. Initially used because the earliest bullets were round spheres, the term later developed into its current usage, that of including a single, complete cartridge.

Selective Fire

The weapon, usually by means of a switch, may alternate between a semiautomatic or fully-automatic state of firing.

Self-Loader

A firearm that utilizes the energy of its firing to eject the spent cartridge case and load a fresh round.

Semi-Automatic

The weapon contains more than one round of ammunition. Each pull of the trigger fires the currently readied round and readies a new round to be fired at the next pull.

Serpentin

The armature, or "cock," that holds a matchlock's match. When the trigger is pulled, the serpentin (named for its "S" shape) would rotate down to ignite the priming powder in the flash pan once the trigger was depressed. This increased the chances of a misfire due to sparks blowing around from the lit wick, but its advantages outweighed this risk.

Shotgun

A smoothbore weapon originally meant to fire shells containing small pellets, the size of which vary by the ammunition's purpose and the weapon's gauge. Because the pellets disperse when fired, the shotgun is an excellent firearm for shooting small moving targets at close range.

Smoothbore

The bore's inner surface is unmarked and plain (though saying it was smooth would give too much credit to the manufacturing techniques of earlier weapons), resulting in a gap (the windage) between the ammunition and the bore. This results in a less stable shot that tends to tumble, and is thus less accurate than a rifled weapon.

Snapaunce

The snapaunce, the precursor of the flintlock, used a piece of flint attached to a spring-loaded arm that would snap forward to strike the flint against a metal plate, producing a spark that would ignite the pan's powder. The pan was covered with an additional metal plate that would slide aside before the arm would snap forward.

Springel

A dart, based upon the same principles as used in the crossbow bolt, which was fired from a harquebus.

Striker

This is a linearly operating device that uses a mainspring to detonate the primer instead of using a rotating hammer.

Trigger

The mechanism that, when pressed or pulled, releases the hammer or striker to fire the weapon.

Submachine gun

A light, and typically short, fully-automatic weapon. It is usually fired from either the hip or shoulder and is designed with close quarters combat in mind.

Wheel Lock

Pulling the trigger spins a spring-loaded metal wheel, against which is pressed a piece of flint attached to a striker arm that swings the flint into position. As the wheel is spun, the flint would strike it, and the resulting sparks would in turn ignite the powder in the flashpan.



Gunpowder & Firearms Timeline

The discovery of gunpowder is a rather controversial topic, as some believe its origins lie in the east, with China, while other scholars feel that the Arabs of the Middle East. The validity of either claim may be simultaneously disparaged and bolstered by written, anecdotal, and historical proofs that are often as contrary as they are informative.

Here then is a timeline of important events, both proven and supposed, regarding the discovery and development of gunpowder, its components, and the weapons that would be developed to harness this simple powder's destructive potential. Due to the difficulty of finding and keeping such records, some dates are necessarily rough in their estimation of the event, while others vary by source. In the latter case, the general consensus or majority opinion (when it isn't contradictory) is used.

Note: Whenever the composition of gunpowder is given, such as 4/1/1, the composition, by parts, is listed as Potassium Nitrate (saltpeter)/Sulfur/Carbon.

Early History (India & Asia)

Historical accounts tell of "thunderguns" and "fire weapons" being used in these regions for as long as such chronicle. Materials described in the manufacturing of these weapons varied from wood to paper to straw. If these accounts are to be believed, it is entirely possible that Alexander the Great did indeed encounter fire-weapons in India.

275

Julius Africanus mentions the use of "shooting powder."

668

Some sort of explosive powder was used during the siege of Constantinople.

c. 1200 (Middle East)

Saltpeter shows up in the writings of the Arab, Abd Allah.

c. 1233 (Orient)

Evidence of paper (and, in some places, bamboo) tubes being used for explosive missile throwing.

1268 (England)

Friar Roger Bacon describes in his work, *Opus Minus*, an explosive "elixir." The alchemical composition of this elixir was not to be explained for years to come. Bacon's historical claim to be the father of modern gunpowder is largely disputed by all European nations, save England. His listed composition for his elixir is 7/5/5.

c. 1270 (Europe)

Simple mortars began to see use on the battlefield to fire rocks at the enemy. What was learned from these weapons would lead to the principles later employed in firearms.

c. 1275 (Middle East)

Marcus Graecus, in his work, *Liber Ignium* (The Book of Fire), describes the use saltpeter and some manner of incendiary composition other than gunpowder as an explosive and means of propulsion. Speculation circulates as to the authenticity of

the Liber Ignium, and the existence of "Marcus Graecus." It is also possible that the work had been altered by agents of the Catholic Church upon its arrival from the Middle East during the Third Crusade.

This, and other instances of gunpowder being mentioned leads many modern scholars to believe gunpowder is of Arabic, and not Chinese, origin.

1320 (Germany)

Berthold Schwartz, a monk, manufactures gunpowder after studying Friar Bacon's writings. Even though he is but one of the many disputed inventors of gunpowder, it is beyond dispute that Schwartz discovered some previously unknown properties of the mixture.

1325

An illustration of a gun appears in the Oxford manuscript De Officiis Regum

1326

First known illustration of a cannon made.

c. 1335-1375 (Europe)

Simple cannons and mortars are becoming far more common. Military commanders begin to form units and develop tactics that utilize the weapons.

Bellmakers were typically used to make the first cannons and firearms because they possessed the necessary facilities and skills, and gunmaking was not yet a proven industry requiring its own specialists.

1344 (England)

Gunpowder and cannons see use in the country for the first time.

1346 (France)

Battle of Crécy, the first reported use of hand gonnies in battle.

c. 1350 (England)

The English standard composition of gunpowder is altered to 6/1/2.

1354 (Germany)

Berthold Schwartz is said to have invented the first firearm in this year. It is commonly held as fact that Schwartz was the inventor but the year is highly speculative considering that gunpowder mills are known to exist in Germany as early as 1340 and guns showed up earlier than this. A paradox, to be sure, but when where both sides of the matter are held to be true.

1377 (Korea)

Ch'oe Mu-sun, an official in the Korean Koryo court convinces the court to begin the production of gunpowder weapons. Cannons and rockets (more so the latter, especially those meant to be used by cavalry) rather than firearms were the preferred weapons and remained so until the 16th century.

1379 (Venice)

First recorded use of cannons mounted upon ships.

c. 1380-90

The harquebus is invented begins to see use.

1381 (Germany)

First use of a hand cannon in Germany.

1392 (Spain)

The army start issuing hand gonnies whose wooden component ended in a curving knob so that it could be placed against the shoulder rather than the torso. This was the first step to developing the buttstock.

Latter 14th Century

Firearms begin to see use aboard ships.

c. 1410 (China)

Made with hardwood barrels invented by the Vietnamese, the Chinese build and employ arrow-firing firearms.

1411 (Spain)

An early version of the matchlock, the serpentin is introduced.

1412 (China)

The first Chinese book detailing proportions for black powder is written by Huo Lung Ching.

1415 (France)

The Battle of Agincourt, made famous in Shakespeare's play, "King Henry V," occurs. Although the battle is famed for the effect of the English archers, stories concerning the use of English hand gonnies also exist.

1426 (Burgundy)

The first known use of notch-and-post sights. The Burgundians mounted them on their hand gonnies and arbalests.

1427 (Bohemia)

The pistala, meaning "pipes," is developed. These long-barreled handguns are so named because of their resemblance to whistles/pipes.

c. 1429 (Europe)

Corned powder is developed and mentioned in the Fire Book of Conrad von Schongau.

1448 (Kosovo)

After their archers were slaughtered in battle by Hungarian firearms, the Ottoman Janissaries switched from bows to hand cannons and hand gonnies.

c. 1450

Introduction of the matchlock.

c. 1495

The first known rifle is made by William Renwick.

Early 1500s

The breechloader is invented, although several manufacturers claim to be the first and many different designs, all of which have their own unique advantages and flaws, are patented.

c. 1517 (Nuremberg)

Johann Kiefuss invents the wheel lock.

1522

In an effort to reduce the continuing fear surrounding the "black magic" of guns and black powder, a Bavarian necromancer states that rifles are more accurate than smoothbores because the spinning bullet doesn't allow a demon to gain purchase upon it.

c. 1540

The matchlock was improved with the addition of a cover plate over the flash pan. The plate would automatically retract as the trigger was pressed.

1547

The Archbishop of Mainz has two members of a shooting club compete at 200 paces, one using lead balls and the other balls of silver blessed by the Church and etched with cross. The silver balls all missed the target while the lead balls scored hits on 19 out of 20 shots. This "disproved" the theory put forth by the Bavarian of 1522 and caused the Church to declare that round bullets could indeed be controlled by demons.

c. 1570

Invention of the snaphaunce.

1586

Invention of the cartridge.

c. 1612

Invention of the flintlock.

1616 (Italy)

Giuliano Bossi invents the double-barreled gun.

1653 (France)

Considering the early flintlock to be untrustworthy (rightfully so), Louis XIV forbids his troops from employing such weapons. He later made their use by his soldiers punishable by death.

c. 1675 (North America)

First powder mill on the continent is opened in Milton, Massachusetts.

c. 1700

Experiments in using a fulminate to make powders that explode by use of a fulminate rather than needing to be ignited begin. Many early experiments are disastrous (and indeed all such mixtures, including gunpowder, using chlorate of potash and sulfur is allowed in England), and so it is largely left unused. In fact, nobody at this point is even considering it for use with firearms.

1746 (France)

The steel ramrod is introduced.

1774 (France)

The chief army physician to Louis XV discovers fulminate of mercury.

1774 (Prussia)

Composition standard is changed to 8/1/1 in the search for better consistency and, as a result, effectiveness. The result, along with improvements in the metallurgy used to craft the firearms, improves accuracy and ignition reliability, while also lowering the instances of misfires.

1788 (France)

C. L. Berthollet discovers "fulminate of silver" by acting ammonia upon precipitated silver oxide. He begins to write essays on the use of fulminate with firearms.

1789

The first patent for a single trigger for double arms is issued to James Templeman.

Single trigger pistols with side-by-side and over-under style barrels are also introduced.

1795 (USA)

Springfield Armory is established.

c. 1800

The black powder standard now tends to be either 15/3/2 or 15/2/3. This offered two key advantages: being able to use powder from a variety of sources, including those taken from captured enemy weapons and supply caches, and allowing for more standards to be implemented in the manufacturing of firearms, specifically regarding the strength of the weapon's chamber.

Reliable experimentation into ballistics also starts being accepted as valid, allowing for yet more improvements on bullet, powder, and firearm manufacturing and development techniques. Such techniques would lead to, among other things, the development of standardized sights.

The swivel ramrod also appears.

1804 (USA)

Ire'ne'e DuPont (yes, that DuPont) near Wilmington Delaware and endeavors to create a powder that is better than the much-preferred powder imported from Britain.

1807 (Aberdeenshire)

Reverend John Forsyth invents the percussion cap.

1810 (USA)

DuPont becomes the leading producer of gunpowder in the US, laying the foundation for his economic and scientific legacy.

1811 (USA)

John H. Hall files the patent for the first effective breech-loading rifle, which he sells to Harpers Ferry Armory.

c. 1814

Invention of the copper percussion cap. The patent wasn't filed until 1923.

1825

It is learned that varying the size of the corns of black powder produces different effects; some were more appropriate for use in either the lower or heavier caliber weapons, and some for cannons, while other sizes were best used in the priming pan.

1831

Adolph Moser invents the needlefire cartridge.

1835 (France)

Flobert invents the rimfire cartridge.

1836 (USA)

Having filed the patent for the world's first revolving cylinder weapon, Sam Colt opens his first arms factory in Paterson, New Jersey.

c. 1845

The principles that would lead to the expansive cartridge begin to develop.

1847 (France)

The pinfire cartridge is invented by the Parisian gunsmith, Houiller.

c. 1850

The fowling piece, later to be known as the shotgun, begins to be viewed as a separate entity than muskets.

1852

Charles Lancaster invents the centerfire cartridge.

Mid 1800s

The hammerless gun is invented.

1860 (USA)

The Spencer carbine is the first effective magazine repeating rifle.

1861-1865 (USA)

Combined between the Union and Confederate States, several billion cartridges are manufactured for use in the American Civil War.

The centerfire cartridge, as we know it today, is patented by George Henry Daw, although there remains the claim that it was actually invented by M. Pottet of Paris and improved upon by M. Schneider before Daw's patent was filed.

c. 1862

Metal cartridges begin to see wide and accepted use.

1866 (UK)

Pape invents choke boring.

1871 (USA)

The National Rifle Association is founded.

Theophilus Murcott invents the first hammerless firearm.

1874

J. Needham introduces the cartridge ejection system to double guns in the form of a system designed for drop-down style breechloader shotguns.

1879

James Paris Lee patents his box magazine design.

1883 (USA)

The Maxim machinegun is invented by Hiram Maxim, who proceeds to sell the design across Europe. Some of the buyers included Russia and Germany who would go on to make their own versions.

1887 (Germany)

The Maxim machinegun is adopted by the army.

1889

Colt makes its first swing out cylinder revolver.

1893

The first automatic pistol, the Borchardt, appears.

1894 (USA)

In order to increase the efficiency and fighting ability of their soldiers, the US military ceases to use black powder and instead switches to smokeless powder.

1905 (Germany)

The pointed (Spitzer) bullet is introduced, improving long-range performance.

1914 (Europe)

Though the machinegun had already seen use on the battlefield, it wasn't until its mass deployment by German forces in World War I that the world's various militaries began to take it seriously. Machineguns were the primary weapons of the first tanks before light cannons began to see use.

1943 (Germany)

The MP43, the first assault rifle, is made.

1955 (USA)

Dixie gun works begins production on black powder replica firearms.

1969 (Germany)

Caseless ammunition developed by Heckler & Koch.

1970 (USA)

Pyrodex is developed as a possible substitute for black powder as a propellant.

1976 (USA)

The Accelerator cartridge is invented by Remington.

1993 (Austria)

Vores begins selling caseless ammunition that is ignited by an electrical charge.

1999 (USA)

A federal jury finds 9 firearm manufacturers liable in gun related shooting deaths, and 15 manufacturers negligent in their marketing and advertising practices.

The Weapons

Hand Cannon

The earliest form of firearm known, though it would more suitably be known as a small artillery piece, the hand cannon existed in several forms, the most common of which was merely a hollow, iron cylinder fastened to the top of a length of wood that was then held aloft or planted in the ground at an angle towards the target. Like the earliest black powder artillery pieces, lighting a burning ember or wick to the weapon's touch hole would then fire the hand cannon. These weapons were often posed as much danger to the operator as it did the enemy. They had so little power that they had little effect beyond 30 yards or so.

Hand Gonne

A small evolution of the primitive hand cannon, the hand gonne resembled a small cannon built into a supporting length of wood fastened to its rear. The weapon would have to be supported up and braced against the user's chest to fire by touching a flame to its touch hole. A metal spike or hook was driven through the wooden stock's top, allowing it to be braced against an obstacle, such as a wall, in order to absorb the recoil.

Later permutations would see the entire weapon made of a single piece of iron, with the hook or spike attached. Tapering down the end to reduce weight and adding an iron loop at the end for carrying the weapon were also later innovations.

Harquebus

From "arca bouza", meaning "bow with a hole," the harquebus (also seen without the "h") was the first progression from the simple hand gonne. These smoothbore matchlocks used a crossbow stock and trigger with the barrel attached to the top and was the first firearm to be fired from the shoulder. They were usually so heavy that it would be rested in a forked support that would also help absorb some of the recoil once

Name	Date	Action	Type	Caliber
Hand Cannon	c. 1290	NA	Muzzleloader	Various bores
Hand Gonne	c. 1340	NA	Muzzleloader	Various bores
Harquebus	c. 1475	Single	Muzzleloader	Various bores, including springels
Renwick 24 bore rifle	1495	Single	Muzzleloader	24 bore
Puckle Gun	1718	Crank	Magazine	1.2
Brown Bess Musket	1722	Single	Muzzleloader	.75
Kentucky Rifle	c. 1730	Single	Muzzleloader	Various; .32 or .50 common
Nock Volley Gun	1779	Single	Muzzleloader	.52
Baker Rifle	1800	Single	Muzzleloader	0.625
1836 Paterson Colt Revolver	1836	Single	Cylinder	.36
1851 Colt Navy Revolver	1850	Single	Cylinder	.36
Whitworth Rifle	1857	Single	Muzzleloader	.44 (special)
1860 Colt Army Revolver	1860	Single	Cylinder	0.44
Spencer Carbine	1860	Lever	Magazine	.52
Henry Rifle	1862	Lever	Magazine	.44
Gatling Gun	1862, 1866	Crank	Magazine	.58
Winchester Rifle	1866	Lever	Magazine	.44
45-70 Springfield Trapdoor rifle	1868	Single	Breechloader	.45-70
"Mousetrap" Shotgun	1871	Lever	Breechloader	12 gauge
Maxim Machinegun	1883	Automatic	Belt	7.62mm
Borchardt Self-Loading Pistol	1894	Semi-Auto	Magazine	7.65mm
M1894 Krag-Jorgensen rifle	1894	Bolt	Magazine	.30-40
M1895 Lee Pattern	1895	Bolt	Magazine	6mm US Navy M1895
1898 Mauser Automatic Pistol/Carbine	1898	Automatic	Magazine	7.63mm
Model 1911 .45 ACP	1911	Semi-Auto	Magazine	.45 ACP
Thompson Model 1921 Submachine Gun	1920	Automatic	Magazine	.45
Browning HP35	1926	Semi-Auto	Magazine	9mm Parabellum
Maschinenpistole 43	1943	Automatic	Magazine	7.92x33mm Kurz
Kalashnikov AK-47	1946	Automatic	Magazine	7.62x39mm M1943
M16 Rifle	1956	Automatic	Magazine	5.56x45mm
Heckler & Koch Maschinenpistole 5 (MP5)	1966	Automatic	Magazine	9mm Parabellum
HK G11 Caseless Rifle	1978	Automatic	Magazine	4.7x3 mm DE11 Caseless

fired. The harquebus would later be upgraded to wheel locks before the introduction of the musket.

Renwick 24 bore Rifle

This is the earliest firearm known to have used rifling. This, the first known rifle, was made for the Holy Roman Emperor, Maximilian I, by William Renwick. The purpose of rifling the barrel was not meant to improve accuracy, rather it was meant to provide a place for the spent powder ash to gather so that the weapon could be used for longer periods between cleanings. Only by trial and error in later firearms was the

benefit of rifling discovered with concern to the weapon's accuracy.

Puckle Gun

The first weapon to truly address the designs that would lead to the modern machinegun, the brass and iron, tripod-mounted, flintlock Puckle Gun, also known as the "Defense," employed a single barrel fed by a hand-crank that would turn the cylinder magazine and its nine chambers so that each consecutive round could be fired. Once all its rounds were spent, a new cylinder could be fitted. The design never caught on, however.

Originally designed with naval use in mind, for the intention of repelling boarders, the gun's inventor, James Puckle, never truly understood its worth in land warfare. Interestingly, two versions were made: one that fired ball ammunition to be used against Christian foes, and one that fired square ammunition to be used against heathens because it was believed that the square ammunition would cause fiercer wounds and greater pain.

Brown Bess Musket

The most famous musket of the Colonial period, the Long Land Pattern Service Musket (the Brown Bess' official designation) came in both long (62 in.) and carbine (39 in. "Indian Pattern") models. So named for the Dutch word "buss," meaning barrel, which equated to "bess" in English, and for the browning of the barrel, the Brown Bess was a smoothbore flintlock made famous by the British Red Coats. A 14 inch bayonet was standard.

By the time of the American Revolution, the standard Brown Bess was now the Short Land Musket, the 58-inch model introduced in 1768.

Kentucky Rifle

Actually designed by German gunsmiths in Pennsylvania, this weapon acquired its name from the song, "The Hunters of Kentucky" during the War of 1812, despite already having seen heavy use in the Indian and French Wars, as well as the American Revolution.

The Kentucky Rifle is a heavy, long weapon produced in various calibers. The rifle was renowned for its accuracy, even at extreme ranges, but its weight, the weight of its ammunition, and the amount of effort needed to ram the round and its powder home made it better suited for sporting rather than the frontier and military roles that it ended up fulfilling.

A later version, the Pennsylvania Rifle, reduced the weight and slimmed it down, but added another foot to the barrel to maintain the range. This rifle, designed purely to be a workhorse, functional weapon, saw much use in maintaining and expanding the American frontier.

Nock Volley Gun

Invented by James Wilson, this seven-barreled weapon consisted of seven barrels, with six circling one. The outer six had their breeches sealed with a vent from the inner barrel's hollow spigot leading to each. When the powder in the spigot was ignited, it would fire the center barrel and use the vents to fire the other six barrels.

Named for the contracted manufacturer, the volley gun was made primarily for the British Royal Navy so that marines

could fire down on the decks of enemy ships during boarding, peppering the enemy crew. Its weight and the need to load all seven barrels made it an impractical weapon beyond this use. A lighter version was made to make the weapon easier to use, but that further reduced accuracy and range.

Baker Rifle

The Baker Rifle was the first such weapon to be adopted into the British Army. Much shorter and lighter than the standard issue Brown Bess musket, the slow-twist of the Baker's 7 rifle grooves spun the ball faster than its counterparts, providing the Baker with improved accuracy but increased the chance of fouling.

1836 Paterson Colt Revolver

Invented by Samuel Colt, this is the first weapon was the first where cocking the hammer revolved and then locked the cylinder into firing position. The Paterson held 5 rounds and used black powder. Despite the praise that it received, especially after having seen action in the west against the Indians, the weapon was ahead of its time and was not widely produced.

The ball and powder had to be fed into the cylinder from the muzzle-facing end. The cylinder's rear was sealed, unlike the modern revolvers still used today.

1851 Colt Navy Revolver

Far better than the 1846 Dragoon revolver crafted to fulfill the needs of the Mexican War, even though it was first made in 1850 Colt first displayed this weapon at the 1851 Great Exhibition in London where it was extremely well received. In fact, it was one of the best-received and most produced pistols in history. It was a particular favorite with Colt himself, as well as cowboys and gunfighters.

So named for the its intended use by naval forces (although it was also used by the army), this muzzle loading pistol was light enough for easy use but still heavy enough to deliver an impressive kick of firepower. Its design made for a sturdy, durable weapon that carried over and improved upon many of the Dragoon's better features, such as its solid axis pin, the supporting lug, and a chamber that fit the rounds so snugly that neither dampness or flash from previous shots could get into a chamber.

Whitworth Rifle

Widely reputed (and tested) to be the most accurate muzzleloader ever made, the long Whitworth shined in the hands of Confederate sharpshooters during the American Civil War. Requiring special bullets to fit its twisting hexagonal bore, the shape allowed the special round to gain full use of the spin caused by the oddly shaped rifling. The rifle was invented by Sir Joseph Whitworth of England.

Sharpshooters were known to make kills up to 1,000 yards with this weapon, 1,500 yards when equipped with a scope.

This would be considered a masterwork weapon.

1860 Colt Army Revolver

Successor to the Third Model Dragoon, this weapon was the most often used sidearm for both sides during the American Civil War. Essentially, it combines the frame of the 1851 Navy with the .44 chamber of the Dragoon to create a pistol that,

while still heavy, was lighter than the Dragoon but could still deliver an impressive punch. A percussion pistol, the paper cartridges are rammed directly into the cylinder. Because it was so popular amongst the cavalry, the option for a wooden stock was added.

The civilian version of the Colt Army Revolver is the renowned Colt Peacemaker. This weapon was modified from the Army revolver for better balance and had a far shorter barrel. They were also far more ornate. The Peacemaker remained in production until 1941.

Spencer Carbine

The Union staple firearm during the American Civil War, this lever action, breechloader granted the Northern soldiers a distinct advantage over their Confederate counterparts, proving to be a key element in many Northern victories. The simple lever action, combined with the magazine, enabled Spencer-equipped troops to provide a far superior rate of fire. More than 200,000 of these were employed by Union soldiers throughout the war, the less than 100,000 were actually purchased by the Army.

Henry Rifle

About 14,000 of these weapons were constructed by the New Haven Arms Company, utilizing the Volcanic Repeating Arm system and the metal .44 rimfire cartridge the latter being entirely designed by Benjamin Tyler Henry while the former was a perfected version of the defective system designed by Hunt. The lever both expunged the spent cartridge and loaded the next from the tubular magazine under the barrel. Although pricey, the Henry rifle was rapidly accepted by Union troops during the American Civil War, although most had to purchase the weapon themselves.

Gatling Gun

Though other rapid-fire weapons had been used in the past, such as the Ripley "Revolving Battery Gun" and the Ager "Coffee Mill Gun," both of which saw action during the American Civil War, it wasn't until Dr. Richard Jordan Gatling introduced his design that the machinegun was truly born. Far more reliable and accurate than any of the so-called "revolving" weapons, or even the "organ guns" of centuries earlier, the principles used in the Gatling gun would set the ground work for all machineguns that would follow.

The Gatling gun used six barrels rotating around a central shaft by the motive power of a hand crank to produce a rate of fire of 600 rounds per minute. Fed from a gravity fed hopper, the rotating barrels allowed the weapon to cool, and thus keep firing, at a rate that would have fouled a single barrel.

The improved model Gatling gun was adopted by the US Army in 1866.

.45-70 Springfield Trapdoor Rifle

So named for the "trapdoor" opening at the top of breech, through which the cartridge would be loaded, its precursors were actually converted muzzleloaders from the Civil War. The single shot 1868 Trapdoor rifle by Springfield was then manufactured to replace the conversions. The main problem with the Trapdoor was that it still used black powder rather than the newer, smokeless powder.

The 1889 model, which underwent some minor modifications and switched from a triangular bayonet to a rod bayonet, was heavily used during the Spanish-American War.

Winchester Rifle

Based on Henry's patents, the Winchester improved upon the Henry rifle by adding a side gate that allowed cartridges to be fed directly into the tubular magazine, speeding up the reloading process to an incredible degree. The weapon included a number of other improvements over the Henry, making it popular with the Army and Plains Indians alike, placing alongside the Colt Peacemaker as one of the weapons that tamed the Wild West.

"Mousetrap" Shotgun

So named for the noise that the locks made upon being fired, the "Mousetrap" was designed by Theophilus Murcott of London. This hammerless gun was cocked by manipulating a lever that wrapped around the trigger guard. It is the first weapon to utilize this type of action. The Mousetrap was very popular because it was easy to operate and incredibly reliable.

Maxim Machinegun

The Maxim was the first automatic machinegun and was also the first to utilize linked ammunition fed into the weapon upon a "belt." Maxim sold his weapon across Europe, though most nations replaced them as lighter counterparts became available.

Able to reach the believed impossible fire rate of 600 rounds a minute, the Maxim would rapidly become too hot. The temperatures were somewhat regulated by a water-cooling system, and later air-cooling, but temperature remained a problem during prolonged use. In fact, the Maxim underwent various upgrades and alterations, usually concerning its mounting and materials of construction, in effort to improve the design and reduce its weight.

This machinegun was the first airplane-mounted weapon. Some countries continued to use the Maxim long after World War II.

Borchardt Self-Loading Pistol

The precursor to the world recognized Luger, the Borchardt was the first commercial success at the attempt to apply the principles used in the Maxim machinegun to a handgun. The gun's designer, Hugo Borchardt, modeled the ingenious action after the human knee, but the system made the gun too unwieldy and heavy for easy use with one hand. To alleviate the problem somewhat, a wooden stock could be attached so that the pistol could be used as a carbine. Luger would later take Borchardt's toggle action principles, improve upon them, and create the much better Luger pistol.

M1894 Krag-Jorgensen Rifle

Developed Ole Krag and Erik Jorgensen at Norway's Konigsberg Arms Factory, this bolt-action rifle was adopted by the US in 1892 to replace their single-shot Trapdoor rifle. This process had been delayed until the US had learned how to make smokeless powder, a carefully guarded secret kept by the French.

The reasons for changing rifles were: the Krag possessed a 5-round magazine, it fired on a flatter trajectory for greater accuracy, its ammunition was lighter so a soldier could carry

more of it, and it used smokeless powder. On the other hand, the Krag's stopping power was significantly lower.

The rifle would see further improvements, especially to its action and magazine, in 1896, 1898, and 1903.

M1895 Lee Pattern

The first weapon to use Lee's straight-pull bolt action, this proved to be problematic because the action wasn't very easy to work. In fact, working the action threw off the steady aim of the shooter between shots, ruining the military effectiveness of an otherwise acceptable weapon. Still, the M1895 is credited as being the first magazine rifle in the United States not to use clip loading.

Several changes were to appear in later models, but the design was eventually dropped following the M1917 as better weapons were adopted.

Mauser 1898 Automatic Pistol/Carbine

Although initial models first appeared in 1896, it underwent improvements to become the 1898 model. Although the hammer had to be cocked back manually for the first shot, the short recoil system would then automatically cock the hammer and load the next round from the 10-round magazine. When all the rounds were fired, the magazine platform was held open by the bolt to let the operator know that a new magazine was needed. This pistol was the first weapon to use such a system.

A wooden stock, which also served as the holster, could be attached for greater stability, effectively transforming the weapon into a carbine.

Model 1911 .45 ACP

Produced by Colt and employing design improvements over Browning's 1900 automatic pistol, this is one of the most proliferate automatic pistols ever to be produced. It was the main sidearm of the US Army and Navy from its introduction in 1911 until it was replaced by the lighter 9mm in 1992. The pistol underwent several changes between the time it was first introduced in 1905 and the time when it finally settled into the M1911A1 model, after which it remained unchanged.

Thompson Model 1921 Submachine Gun

Designed by General John T. Thompson, the "Tommy Gun" was the first submachine gun, having been granted the new classification for two reasons

it was much lighter than any machinegun being fielded at the time, including similar automatics like the Browning Automatic Rifle, and because it fired the shorter pistol round rather than the long rifle cartridge (though the experimental models used the .22 long cartridge).

Initially designed without a buttstock, one was added to the 1921A model. The experimental models were also comprised of only 11 pieces, a count that rose to 38, screws included, in the production models. The weapon was so simple and its components so few, that practically anyone could unassembled the weapon in 15 minutes without the need for any tools. Tests also showed that it could be reassembled in complete darkness in 30 minutes. The ease of its maintenance, along with its use of the standard .45 pistol cartridge, quickly made the weapon a favorite among North American police forces, and later the US Army and Marine Corps.

Browning HP35

Having undergone constant development between 1914 and 1926, this was the last pistol designed by Browning before his death. It was then manufactured by Fabrique Nationale d'Armes de Guerre (FN) and was sold in limited numbers to several European countries and China until its factories were taken over by German forces during WWII. The design was smuggled out of Belgium and both Canada and Britain began production. It has since become the official sidearm of over 50 nations around the world, including the latter two Commonwealth states.

Besides being known for its reliability and impressive performance, one of the greatest appeals of the HP (High-Powered) 35 was its 13-round magazine.

Maschinenpistole 43 (MP43)

Based off the MKb42(H) model, the MP43 was designed to use the intermediate 7.92mm round. The weapon was initially categorized as a machine pistol (or submachine gun) to bypass Hitler's orders that the development was to stop so that production of machine pistols could be increased to suit the type of combat that tended to befall German forces at that time. The MP43's proved itself on the debacle that was the Eastern front, and so Hitler finally allowed the weapon, after several upgrades, to officially be reclassified as StG44 Sturmgewehr (assault rifle), which began production in 1944.

Kalashnikov AK-47

Variations of this weapon have been the standard assault rifle of Russia since the early 1950s. It is also the most widely sold assault weapon of all time, appearing in the armies of nations of all sizes the world over. The Kalashnikov is especially favored by guerilla forces because of its durability. These weapons are renowned for being able to take punishment such as being buried for years within very little protection and being capable of firing right out of the ground. They are durable, incredibly easy to maintain, and have very few moving parts, all qualities that make up for its comparatively unimpressive range.

M16 Rifle

Based off his AR-10 design, Eugene Stoner sold this the M16 to Colt. The initial design originally used a modified .222 Remington round and went through several changes until its current model, the M16A3, which now uses the standard NATO round. The impressively reliable M16 is one of the most common assault rifles in the world and has an unprecedented number of modifications, both military and civilian.

Heckler & Koch Maschinenpistole 5 (MP5)

Using highly successful design elements of the H&K assault rifle series, the MP5 was first introduced in 1966 and was the descendant of the company's first submachine gun, the HK54. The MP5's size, dependability, performance, and use of pistol bullets make it the weapon of choice with elite law enforcement and military units the world over.

The MP5 has birthed a number of variations that have been refined for specific purposes. These models include, but are not limited to the shortened MP5K, the MP5SD, which employs an integrated silencer, the 10mm MP5/10 and the 40 Smith & Wesson-firing MP5/40.

HK G11 Rifle

Development began in 1969 to create a weapon with impressive accuracy on a 3-shot burst. To do this, Heckler & Koch sought to speed up the weapon's action using caseless ammunition, allowing all three shots to be fired before the weapon was significantly moved off target by the burst's recoil. Despite the problems inherent to the weapon, this goal was achieved with great success.

The weapon is entirely sealed within a composite case. The magazine, which holds 50 rounds of caseless ammunition, slides in horizontally along the top of the barrel; two such magazines could be simultaneously loaded in the final production version. The weapon suffered all manner of problems, such as the original cartridge propellant had a habit of "cooking off" in a hot barrel. By the time these and other problems were solved, however, the fall of the Berlin Wall and other events had dumped HK into receivership and the G11 became little more than an oddity. An oddity that worked incredibly well in its final production version, but an oddity none the less.

This would be considered a masterwork weapon.



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