

# Firearms in Plymouth Colony

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The types of firearms used in the early colonies have received an appreciable amount of attention over the years, but until the recent excavations at Jamestown, there has been little attention placed on exactly what we know, don't know and what we can speculate concerning them. Harold Peterson in his work "Arms and Armor in Colonial America" has long been touted as the pioneer of early colonial firearm studies and his work is used by many as the bible of early colonial firearm studies. Peterson's work provides an excellent general framework for which the study of firearms in the early colonies can be placed within, but there still remains a need to delve deeper and more intricately into the study of each colony. This work is designed as a way to begin compiling all the known information on the firearms in use in Plymouth Colony from the years 1620 until the end of the colony in 1692. As a way of doing this, all the written court and primary document records regarding firearms in the colony, as many of the probate inventories as could be found and the archaeological data presently available were compiled, compared and contrasted. The result is a study that moves from the general trends that were identified by Peterson in 1969 to more specific findings of today that support some aspects of his work and modify others. It is hoped that this work can provide a model for the changes in firearm use and how these changes can be seen archaeologically that can be used by others studying firearms specifically from Plymouth Colony. I want to begin this work with a review of the types of firearms that have been identified within Plymouth Colony, then move on to discuss Peterson's trends and what sorts of pieces the historical record indicates were used throughout the century and finally conclude with a comparison of the historical and archaeological record.

Three general types of firearms have been identified in what was once Plymouth colony: matchlock, wheellocks, and flint arms. Within these general categories there are several smaller subdivisions pertaining to specific types of pieces. Matchlocks are characterized as firearms in which a lighted smoldering cord was used to ignite the powder. These are the simplest of firearms that were used in America and were also the least expensive. Their mechanism consisted of a rectangular lock plate on the side of the weapon onto which a curved piece of metal called a serpentine was attached. The serpentine held a piece of cord (matchcord) that had been soaked in saltpeter so that as a result it burned slow and hot. When the trigger, or more oftentimes the lever, on the underside of the weapon was pulled, the serpentine was brought towards the butt of the weapon and the matchcord was touched to the pan attached to the side of the barrel of the weapon. A small amount of gunpowder was contained within the pan which, when ignited by the match, ignited the powder in the barrel. While this firing mechanism had certain advantages, it was simple, and as a result less likely to break and

easier to fix when it did, there were a number of disadvantages that led to its decline in popularity in the colonies. The disadvantages included the fact that the shooter always needed to carry with him a piece of burning matchcord or the piece would not fire. This led to accidents when embers from the match accidentally came in contact with powder and it also led to a situation where unless you were prepared with a burning match, you could be easily surprised and ambushed.

Matchlocks were developed in the late 15<sup>th</sup> and early 16<sup>th</sup> centuries and were often referred to as arquebuses or harquebuses, which described a fairly light weapon with a curved stock (Peterson 2000:18). As the century progressed, matchlocks developed longer barrels for greater range, power and accuracy and as a result, became heavier, to the point that true matchlock muskets required a rest be used to support the weight of the barrel for the shooter. Matchlocks were used for approximately 150 years in America but their use as the primary weapon of choice only lasted about 75 years until about 1620 when was begun to be replaced with flintlocks (Peterson 2000:19). By 1675 they had virtually disappeared.

As a way of eliminating the need for a constant burning fire whenever you wanted to use you piece, the wheelock was developed in the early to middle 16<sup>th</sup> century in Germany. The wheelock eliminated the match and in its place, a spark system was used to ignite the powder. Wheelocks contained springs that were wound up, much like a clock spring, which, when released with the trigger, spun a steel wheel against a piece of iron pyrite, resulting in a spark. Unfortunately, this mechanism was complex and prone to failure and breakage and it was also expensive to produce, so while the wheelock did attain some popularity for hunting pieces and pistols, it never supplanted the matchlock. Wheelocks do show up in colonial records but are generally called firelocks in the early seventeenth century, although this is a term that soon came to refer generically to flint arms as well (Peterson 2000:24).

The breakthrough in firearm technology was achieved as early as 1530 in Germany with the production of a self-striking lock that utilized flint as its sparking agent. While still more expensive than the matchlock, the flint arm became fairly widespread by 1580 and was probably introduced into England by 1575 and the Netherlands by 1600 (Peterson 2000:70). In the Netherlands it was developed into what they referred to as the snapphaan or snaphaunce, literally the snapping cock. Snaphaunces were among the first firearms brought to Plymouth Colony. The snaphaunce can be differentiated from other contemporary locks by the shape of the lock plate and the fact that the cover over the pan that holds the priming powder and the steel or battery which the flint strikes, were forged as separate pieces. It has been generally believed that the snaphaunce as we call it today was widely used in the 17<sup>th</sup> century, but Peterson stated that there are fewer remains of snaphaunces than any other type of firearm used in North America (Peterson 2000:25). He feels that the term snaphaunce was used interchangeably for any type of flint arm and when the word is used in the records, it does not mean that there were actual snaphaunces present, only that there were flint arms. This does

not appear to be the case in Plymouth Colony though where the use of snaphaunce appears to refer more specifically to this type of weapon.

Appearing at the same time and just after the development of the snaphaunce there were five other types of flint locks in use in the colonies. These were the English lock, the English dog lock, the Scandinavian "snaplock", the Spanish Miquelet lock, and the true flintlock developed in France in the later seventeenth century. It is believed that the English lock quickly superseded the snaphaunce and that most of the locks found in the New World up to approximately 1625 are of this variety. The dog lock appears to have succeeded the English lock from 1625 to approximately 1675 and the flintlock supplanted the dog lock after 1675 (Peterson 2000:32).

Seven general types of firearms have been identified as being used in Plymouth Colony through a comparison of the archaeological and historical records, these are the musket, harquebus, caliver or cavalier, fowler, carbine, pistol, and the blunderbus. The musket is described as by the 1630 English Martial Arms list as a piece with a barrel four feet long, an overall length of five feet two inches and a bore of .74 caliber. A musket can be further described as a heavy military gun of the 16<sup>th</sup> to early 17<sup>th</sup> century with a matchlock. Muskets weighed approximately 16 pounds and required a forked rest to support it.

The arquebus or harquebus is a term that has been used in the past to describe a gun lighter than a musket and fired without a rest which by the middle of the 16<sup>th</sup> century became synonymous with the caliver. By the beginning of the 17<sup>th</sup> century, the term began to be used to designate a smaller **wheel lock** weapon as opposed to a matchlock (Peterson 2000:13). Harquebus literally means hooked gun due to the hook like superset on the underside used to absorb recoil, by the early 17<sup>th</sup> century it referred to a long gun that was light enough to use without a forked support and thereby favored by the cavalry (Kelso 1998: 14). The popularity of the arquebus appears to have waned in the first quarter of the seventeenth century as the carbine came into wider use.

The caliver is described as being a firearm that was lighter than a musket and was able to be fired without a rest, in some cases this was synonymous with the arquebus. The distinction between the two being that the caliver was more of a seventeenth century term while the arquebus is more common in the sixteenth to early seventeenth century. A piece of this type may have had a matchlock or flintlock firing mechanism. Calivers were described as being three feet three inches long with a total length of four and one half feet with a bore of .654 caliber

In the seventeenth century, fowlers came in a long and short variety. Long fowlers were described as being five and one half to six feet long with a bore of approximately 65 caliber (Markham 85). Long fowlers, while very useful in hunting the abundant waterfowl in New England, are somewhat cumbersome to carry in militia. This did not stop them from being allowed, but at least in Plymouth, the

barrel had to be less than four feet long.

Carbines were firearms with short, sixteen to 30 inch long barrels of full musket bore with either snaphaunce or wheellock locks. Carbines were usually carried by the cavalry with the ones from the early seventeenth century usually being wheellocks while those produced by the middle part of the century were flint lock (Peterson 2000:40-41). These appear to have been popular weapons in the colonies with many references to them towards the middle part of the century, for example an inventory of the pieces in the arsenal of Maryland included 177 carbines and 613 muskets (Peterson 2000:41).

Pistols are small arms that were usually carried in pairs by cavalry. These pieces never occurred in a matchlock variety, but both wheellock and flint arms were popular in all of the English colonies. In the days before repeating arms, these weapons often provided a soldier either on foot or in the saddle the advantage of two extra shots during the course of a battle.

The blunderbus is a weapon that has often been erroneously associated with the Pilgrims. The image of the black clad buckles on the hat and shoes wearing colonists carrying a turkey on one shoulder and a ridiculously wide mouth musket on the other has been a recurring misnomer for generations. The blunderbuss is a short arm of large caliber with a wide flaring muzzle. They were first introduced into England in the middle of the seventeenth century and were predominately equipped with flint locks. The blunderbus was used essentially in the same way as a modern shotgun by being loaded not with one large shot, but with a number of small bird or goose shot. When fired, these shot spread out in a wide spray wounding and incapacitating any enemies in front of it. This would have been a weapon well suited to the guerrilla warfare that occurred in New England during King Philips War in the 1670s. Previous researchers have stated that these arms were not used in this country before the 1700s, but they were identified in the Plymouth records.

Peterson's study of the change in firearm frequency in the seventeenth century noted several trends that appear to have occurred as the transition from matchlock to flintlock was made. In Jamestown the settlers appear to have brought mostly matchlocks with them with some wheellocks and snaphaunces. By 1624-25 the matchlocks were on their way out with a total of 47 being identified out of the 1089 arms listed at the time (Peterson 2000:43). Peterson found a similar transition in New England where he identified most of the arms that the first settlers at Plymouth as being matchlock as well with some flint locks and possibly wheellocks (Peterson 2000:44). This situation had begun to change significantly by the 1640s when William Bradford, governor of the colony and chronicler of Plimoth Plantation, noted that all Plymouth's troops were able to muster with flint arms. In 1677 the Plymouth Courts ordered that the use of matchlocks were outlawed for use in the militia. According to Peterson's work, the transition from matchlock to flint arms appeared to have been relatively gradual throughout the seventeenth century in Plymouth. The present study hints at the possibility that the transition from match

to flint may have been more dramatic than was previously thought. It is believed that the settlers at Plymouth realized the failings of the matchlock and as a result, if they could afford it, they chose to bring as many flint arms as possible.

It is believed that Plymouth may have been closer to Massachusetts Bay in their preparation for settling in New England as opposed to having been more like the Virginia colonists. When the Massachusetts Bay Colony was founded in 1630, it was noted that they provided the settlers with the following arms :

80 bastard or short muskets with snaphaunces 4 foot in the barrel without rests

6 long fowling pieces

4 long fowling pieces with bastard bore

10 full muskets 4 in barrel with matchlocks and rests

The colonists in Mass. Bay specifically equipped themselves with more flintlocks than matchlocks, probably with the limitations of the matchlocks in the New World in the fore of their minds. The English colonial experience was almost a generation old by the time Boston was settled and those settling and organizing the venture surely must have read and heard about the use of various types of pieces against the Natives in Virginia and elsewhere. The predominance of more expensive flint arms in Mass. bay may be the result of the fact that because this venture was financially well-backed they could afford better arms, but the probability that even the less well off settlers at Plymouth chose as many flint arms as opposed to matchlocks has to be considered.

To begin the reanalysis of the role of various types of firearms in Plymouth colony, we need to first look at what the written records tell us about them.

The first recorded mention of firearms in the writing and records of Plymouth Colony was in 1620 while the Mayflower was at anchor in Provincetown harbor. At this time one Francis, son of passenger John Billington, took his fathers fowling piece that was stored charged in their cabin, and shot it off. This subsequently set fire to the cabin and there were many "flints and iron things about the cabin" but the fire was extinguished (Mourts Relations). The fact that Francis was able to shoot his fathers fowling piece indicated the possibility that this piece was equipped with a flint and steel ignition system as opposed to a matchlock. This suspicion was confirmed by the report that there were many flints in the cabin, presumably for the piece. The type of lock that Billington probably had was a snaphaunce, as this incident occurred in 1620 and the English dog locks were not invented yet. From this report we know that at least one snaphaunce fowler was among the pieces carried to Plymouth Colony.

A second incident in 1620 also illustrated the types of pieces that were present.

This incident occurred on Cape Cod early one morning when an exploring party searching for a place to settle was beset by a group of Nauset Natives. At about five o'clock in the morning the party began to stir, and two or three who doubted whether their pieces would go off or not, fired them. Soon after a group of Natives attacked the group. As they did the men ran to recover their arms that they had brought down to the boat. In the meantime, Captain Miles Standish, had his snaphance ready and made a shot, which was afterwards followed by another who presumably also had a snaphance. The others who were recovering their arms heard three of the pieces go off, possibly indicating that there were three snaphances, and then they heard someone call for a firebrand to light the matches for the rest of the pieces. This incidence indicates that there were at least two and possibly three snaphances carried by the group of eight with the remainder being matchlocks.

It appears that the colonists at Plymouth may have learned from their brethren in Virginia that matchlocks had limited application and usefulness in the New World. Perhaps they were advised that, if they could afford it, they should try to arm themselves with flint arms instead of matchlocks. If this is true, then there should be a noticeable paucity of matchlocks as opposed to flint arms in the court orders, probates and archaeological record.

A 1633 order that every household be furnished with firearms was further clarified in 1643 when the court ordered that "It is agreed upon that all householders within the Township shall forthwith provide sufficient armes according to the act of the court for themselves and their servants able to beare arms within month after the 5<sup>th</sup> June next on wch day they are to trayne viz **Muskett** either wth **snaphance** or **matchlocks** with match **callivers** and **carbines** wch are allowed and also **fowling peeces** not above foure foote and a half long and reasonable bore." The term snaphance appears in Plymouth Colony to have been synonymous with the term firelock which is used in other colonies to describe a wheelock type of firing mechanism because on October 10, 1643 it was ordered that each person in the militia be equipped with "A **muskett, either firelock or matchlock**, so that they provide match with all. a paire of bandeliers, or a pouch for powder and bullets, a sword and a belt, a worrne & scowrer, a rest & a knapsack." (PCR 1: 1643:65)

Further evidence for the types of pieces used by the Colony and the general populace is provided by a 1661 order that stated that the guns belonging to the town were disposed to various persons. These guns included one short gun, one long gun (possibly a fowler), one generic gun, one musket, one of the longer sorts of guns (possibly a fowler), and one matchlock gun that had been upgraded to a firelock, a.k.a. a snaphance (PCR 1, 1661:1661). This account gives a good idea of the various types of terms that were used to describe firearms in the seventeenth century. While it appears that some words such as musket referred to specific types of pieces, other such as gun appear to have been used interchangeably for a variety of firearm types. This was one of the problems that was encountered when the probate inventories were looked at. it was found that

probates from the same decade even from the same year often contained multiple ways of referring to firearms being recorded.

Table 1 illustrates all of the firearm references that were identified in Plymouth Colony probate records from the years 1633 to 1689. A total of 309 probate inventories were looked at for this work and a total of 33 different firearm distinctions were identified. These distinctions ranged from the generic piece, arm and gun to the specific such as double pistol or a great fowling piece with the lock and barrel of a birding piece. By combining the more descriptive listings under a more general category, table 2 was created, reflecting the more general trends of the period.

As can be seen in table 2, an appreciable percentage of firearm listings for all the periods except the 1640s were lumped under very general categories. The categories with consistently the highest percentages were the musket, fowler and pistols. The references to muskets can be seen to rise from the 1630s to 1640s, hold steady through the 1650s to 1660s and dramatically fall in the 1670s. This is likely due to the weight and cumbersome quality of this large firearm. These were not the type of firearms that soldiers would want to bring to a war such as King Philips, one that involved stealth and snap shooting as opposed to regimented in-line volleys as was characteristic of European warfare.

The same may be true of fowlers. Fowlers were generally long barreled weapons designed more for hunting birds than for fighting wars. They appear very common in the 1630s and then dropped off in occurrence from the 1640s to 1650s, dramatically dropped in the 1660s and experienced a slight increase in the 1670s. The increase in the 1670s may have been due to their use in the war or to the fact that many households owned multiple weapons with fowlers as one, but not the main one used for fighting.

Pistols always appeared relatively popular weapons in the colony, averaging between 15 and 18 % with only a slight drop in occurrences in the 1650s to 1660s. These light weapons appear to have been popular with both Natives and colonist alike due to their ability to add extra firepower with little additional weight.

One of the interesting occurrences is the identification of matchlocks in the inventories. Matchlocks are not identified as such until the 1650s when they account for almost 10% of the total number of firearms present in the inventories. Their occurrence then drops significantly in the 1660s and rises slightly in the 1670s. Their identification first in the 1650s may be due to a desire on the part of people at this time to make clear that these older types of firearms were identified in the probates to distinguish them from the better flint arms. In the earlier decades matchlocks were assumable lumped under either the musket or piece category and not identified as matchlocks. It is also interesting to note that matches to go along with the matchlocks were not noted in any probate except two in the 1650s. This may be more of a result of the recorders not noting such small things like matches or flints but just lumping them under the heading of small things forgotten or some

such title.

Firelocks, presumably flint arms as they were identified in the Plymouth records, become common in the 1670 inventories after being essentially absent in earlier decades. The same can be said for blunderbusses, two of which were identified in the 1670s, which would probably be the earliest that one would expect to find them here.

Interestingly, carbines appear throughout the seventeenth century, but only in limited quantities with 4 being the maximum in the 1650s. The general trends that appear in the probate analysis is that large arms such as muskets and fowlers may have eventually given way to the use of smaller arms as the century progressed including the use of pistols. Generally the use of arms that were equipped with flint locks or less likely wheellocks, such as pistols, fowlers and carbines appears to have increased throughout the century, but all these non-matchlock arms also appear to have been fairly abundant in the colony from the earliest days. Unfortunately, the use of the terms gun, piece and arm, masks the nature of exactly what types of weapons these were. There is also the likelihood that some of the muskets recorded were initially equipped with matchlocks but the locks were replaced during the course of the century with flintlocks, so while the term musket in the early seventeenth century referred most often to pieces with matchlocks, it can not be identified for certain what types of locks were on these pieces. The archaeological evidence recovered from Plymouth Colony does help to clarify some of the trends identified during the document analysis.

The archaeological evidence for the types of firearms that were used during the Colony Period is somewhat limited. This is mostly due to the fact that not many Colony Period sites have been excavated. The sites that have yielded evidence of the types of firearms used are the Standish site, home of Plymouth Colonys military Captain Myles Standish, occupied from circa 1630 to 1700, the Clarke site home of merchant Thomas Clarke and subsequently his son William, occupied from circa 1635 until it was destroyed in 1676 during King Philips War, the Josiah Winslow site home of the son of First Comer Edward Winslow, occupied circa 1660 to circa 1700, the Alden site home of the Mayflowers cooper turned Pilgrim, John Alden, occupied circa 1630 to circa 1690, Cushnoc, the site of the Colonys trading house in Augusta Maine, used from 1628 to approximately 1680, and the John Howland site, home of Mayflower passenger John Howland from circa 1650 to 1676. One ancillary site that may or may not represent one in which the firearms fragments present came from Plymouth Colony is the Burrs Hill Wampanoag Indian burial ground in Bristol Rhode Island. This burial ground was used by several generations of the people who lived in the community from which Massasoit, the Native leader who made the first treaty with the Pilgrims, came from. The firearms present here may have come from either the colonists at Plymouth, the Dutch to the south in the New Netherlands, or from English or Dutch traders in the area. The evidence for the types of firearms used in the colony is not limited to actual parts of pieces, but is also represented by gunflints and lead shot. All of these types of

artifacts can be used to help identify the types of firearms in use in the Colony.

The only evidence of matchlocks that has been recovered was found at the Burrs Hill site. Here, in one of the graves dug in the nineteenth century, the plate and serpentine from one circa 1630 English martial pattern matchlock was recovered (Burrs Hill 67). The martial pattern matchlock basically is a matchlock of the pattern used by the standing army or militia in England. The paucity of matchlock remains may be the result either of the waning popularity in the seventeenth century with the introduction of flintlocks or of their conversion to flintlocks during the century. Obviously from the Plymouth Colony records, matchlocks were used in the colony, but because of disadvantages these weapons probably were readily replaced. It may also be a result of few sites dating to the first three decades of the Colonys existence having been excavated.

The earliest form of flint firearm, the snaphaunce is fairly well represented in the collections of Plymouth Colony. One mainspring from a snaphaunce musket was recovered from the Standish and from the Winslow sites and one almost complete lock consisting of a lock plate, a jaw screw, a battery and pan cover were recovered from the Alden site. The snaphaunce parts from the Alden site have been dated by noted authority Harold Peterson as having come from a Dutch snaphaunce from the 1590-1610 period (Robbins 1969: 35). One gun rest was also recovered from the Alden site indicating that judging by the size of the lock and the presence of the gun rest, that the size of the piece was probably a musket. The recovery of a number of snaphaunce parts from sites in Plymouth Colony is interesting because of the fact that they were once believed to have had limited use here. What we are finding in the collections from Plymouth Colony is that they do not appear to have been as common as the later English lock flintlocks, but we do not find them as rare as Peterson believed. The conversion of snaphaunce locks to English dog locks in the later seventeenth century may also account for the low occurrence of snaphaunces in the archaeological record. Fragments of possible converted snaphaunces were recovered from the Winslow site, and the lock that was used on the gun that killed Wampanoag leader "King Philip" in 1676 was a snaphaunce converted to an English lock.

A rarer type of firearm is the wheellock. From Plymouth Colony sites, only 2 fragments of one French made wheellock pistol dating from 1620 to 1650 have been recovered. The paucity of wheellock remains probably has to do with their complicated mechanisms and expensive price tags. The site that these parts were recovered from, the Josiah Winslow house, was the home of a man who served as governor of the colony and appears to have been fairly well off.

Evidence of the widespread use of pistols was recovered from two other sites, Burrs Hill and the Howland site. At Burrs Hill, a brass pistol barrel which appears to be of a Ripolli type dating to circa 1687 was recovered, while at the Howland site the barrel and a screw from a what was probably a cavalry pistol was found.

Evidence for muskets with English locks or dog locks was recovered from three

sites, Burrs Hill, the Winslow and the Howland sites. At Burrs Hill one lock plate possibly from an English dog lock, one definite English lock and one barrel fragment possibly from piece with an English lock were found (Burrs Hill 68, 135). At the Winslow site the sear spring from an English dog lock and the musket battery from either an English dog lock or a converted snaphaunce were recovered. The Howland site yielded the flash pan from an English dog lock and the barrel tang screw from a large English dog lock musket.

Cavaliers, poorly represented in the probate records and with only one reference in the court records, are also fairly rare archaeologically. At Burrs Hill, one gun barrel was recovered that was 39 inches long, which is the length that the English Council of War set a cavalier barrel at in 1630 (Burrs Hill: 135). The same can be said of fowlers, they occur regularly in the records but evidence for them is scarce. One gun barrel fragment from the Winslow site has been sawn, possibly representing a long fowler sawn down to meet the 4 foot length for the militia. The paucity of cavaliers and fowlers archaeologically may be a result of their use of the same locks for these pieces as for other such as muskets and carbines.

The lead shot that has been recovered at archaeological sites in Plymouth Colony can also help to determine the types of pieces that were used. Although there was not much standardization in gun bore sizes until the later part of the seventeenth century, even in the early part of the century the need for shot to at least roughly fit the bore of the piece was known. In fact, as early as 1540, it was stated by the Italian metal worker Vannoccio Biringuccio to "Take care that (the shot) is of such a kind that it may fill the space exactly and move easily through the whole bore." (Biringuccion 1990:418). If a ball was put in that was of the wrong size then it would either jam in the barrel if it was too large or, if it was too small, then it would let too much of the gasses escape around its edges, causing it to not fly true or to travel as far as it could. Even in the seventeenth century, people understood this principle and as a result it is believed that they tended to use balls that matched their barrels bore as closely as possible. The standard bore for a musket was set at 10 gauge but the shot was 12 gauge because this was thought to minimize the effects of fouling and permit the musketeer to load without worrying about continually cleaning it (Peterson 2000:14).

It is believed that by looking at the size of the shot that has been recovered that because the bore of a piece is directly reflective of the type of piece then the size of the shot should reflect the size of the bore and essentially the type of piece used. Some have said that people used whatever shot they could find to stuff in their bore and that it did not matter if it was close to the right size or not. If this was the case, then one should find a narrow range of shot sizes archaeologically, basically it is believed that if the size of the ball did not matter, then people would cast a small number of different size balls. What was in fact found to be the case was that a wide variety of ball sizes were recovered and that these fit well with the types of pieces used in the period.

By looking at the barrel bore sizes of a wide variety of seventeenth century firearms, the following bore size ranges were arrived at:

Pistol .40-.60 caliber

Arquebus .55-.75 caliber

Fowler .71-.80 caliber

Wall gun .85 caliber

Musket .70-.87 caliber

Carbine .62-.67 caliber

As can be seen, although there is some overlap, bore sizes for different types of firearms are fairly distinct. Looking at the table 3, which shows sizes of the lead shot recovered, you can see that the four sites used for this survey, the Cushnoc trading house in Augusta, Maine, the Clarke site in Plymouth, Massachusetts, the Winslow site in Marshfield Massachusetts and the Burrs Hill cemetery, revealed a couple of distinct patterns. The first is that there was a high occurrence of shot that measured in the range of what is called birdshot, gooseshot or swanshot. This small shot was either cast in multiple or gang molds or was produced through a process called the Rupert shot process where molten lead is poured through a colander from a specific height above a barrel or pail of water, as the lead falls, natural surface tension causes it to form a sphere or teardrop which solidifies when it hits the water. The presence of a high occurrence of small shot indicates either that this shot was easily lost because of its small size, or that a significant amount of fowling was occurring or that small shot was being loaded with a single large shot in a buck and ball fashion used by hunters today. All of sites except Cushnoc had an appreciable amount of small shot present with Burrs Hill having the highest. This may indicate a variation in the use of firearms more for hunting by Natives versus Europeans or it may be indicative of the buck and ball style of hunting or battle.

The use of buck and ball style warfare in the seventeenth century is known from Virginia where, in 1607, a group of 60 to 70 Natives armed with clubs, targets, bows and arrows was repulsed by Captain John Smith and his party of 6 men with "muskets loaded with pistoll shot." (Kelso 1998:50). It is not know for sure if this technique was used here in New England, but judging from the guerrilla style warfare that was waged during King Philips War, it must be thought of as a possibility.

Table 4 shows that the remainder of the lead shot fits broadly into four categories: pistol, Arquebus, carbine, musket and fowler. The larger sized pistol shot overlaps with the smaller sized arquebus shot while all of the possible carbine shot lies

within the possible range for the arquebus, as does the musket and fowler shot. Because the arquebus was an antiquated weapon by the time of the settling of Plymouth, it is not believed that these weapons or the shot was used in them was ever a common occurrence in Plymouth Colony. If we do not consider that a significant amount of the lead shot is attributable to arquebuses, and subsequently we cut them out of the discussion, we are left with a rather clear three way distribution of the lead shot. This is pistol, carbine and musket/ fowler shot. Of the three, the pistol shot appears to have been the most common on all of the sites looked at except the Cushnoc site where carbine shot out numbered pistol shot. The next commonest shot was the carbine shot that occurred in all assemblages except Burrs Hill. The musket/ fowler shot was the least common possibly due to a decline in peoples desire to use these pieces that required a rest to support when firing. It appears that there is the possibility that by the later part of the 17<sup>th</sup> century, people began to show more of a preference for smaller, lighter arms such as pistols and carbines over the older larger muskets and fowlers. It may also be that people were not as picky in their choice of the size of shot to use in their pieces and as a result there is no real rhyme or reason to it.

Gunflints were also specific to the size of the piece that they were being used on, with larger flints used for larger pieces and smaller flints used for smaller ones. The gunflints recovered from one site, the Clarke house, appear to represent the large scale manufacture of flints possibly for sale by the merchant William Clarke to the colony. The flints from this site are of four varieties spanning the range of possible ways to produce gunflints. These are bifacially flaked flints, spall type gunflints, blade flints and what I am calling advantageous flints.

There are three main types of gunflints that have been reported in the literature. The first is the bifacial gunflint that has also been called the Nordic gunflint. This is a form that was also used by New World Natives when first producing gunflints.

The second type of gunflint is called the gunspall or Dutch flint. Gunspalls result when short flakes are struck either from the concave or convex surface of a flint core. They are bulbous near the point of impact, taper to a feather edge, and have been described as wedge shaped. The flake is usually trimmed about the sides and near the bulb forming a rounded heel while the termination is usually left thin and square. The thin termination strikes the battery. These were felt to have replaced the bifacial gunflints as lithic technology became more time efficient in producing a working gunflint in the shortest amount of time.

The final type of gunflint is the blade or French gunflint. These were in production by 1643 in France, and it is felt that the English adopted the technology in the later part of the 18th century. This technique produces a superior product with less waste than the spall gunflints. The blades are long, prismatic flakes, triangular or trapezoidal in cross-section, which have been struck from a polyhedral core with a hammer. Generally they have one facet on their ventral side and two or three on the dorsal side. They are believed to have replaced the gunspalls by 1750.

Advantageous flints result when the knapper working the flint core was most interested in producing quantities of serviceable flints as opposed to quality or "classic" spall gunflints. The production of advantageous flints can result from either a conscious effort on the part of the knapper to produce as many gunflints as possible from a limited supply of raw material, they may be the result of the inexperience of knapper in producing gunflints, or they may be a combination of the two factors. The advantageous flints from the Clarke site exhibit fine chipping along the match and often the sides although it is not always present. This chipping is a result of pliers being used to trim the edges to a roughly rectangular shape and to bevel the match. Some of these gunflints appear to be nothing more than a single relatively thin flake struck off the core and trimmed while others are thicker and the and exhibit a trapezoidal shape in cross-section.

Table 5 shows that from the Clarke site, advantageous flints make up the largest percentage of the gunflints, 77.9 %. These occur in all of the firearm types used in the analysis. The greatest percentage overall for all of the gunflints was of the flints that would have fit carbines, 60.3%, followed by pistol flints at 25 % and then musket flints at 8.8% and Large arms like fowlers and wall guns at 5.9%. It is believed that the majority of this assemblage dates from the time of King Philips War and as a result represents the types of weapons in use at this time. Judging by the flints it would appear that carbines and pistols were the most popular types of arms in use with some muskets and larger pieces as well. This correlates well with the lead shot data and the probate data.

The combined analysis of the historical and archaeological evidence relating to firearms in Plymouth Colony has resulted in a more detailed understanding of the types of pieces initially brought to the colony in 1620 and how the types and quantities of pieces changed throughout the century. The earliest references indicate that the First Settlers were equipped with snaphaunces and matchlocks in both musket and fowler types. While a large number of early period sites have not been excavated, those that have been indicate that from early on, flint lock or wheellock arms may have been favored over matchlocks, with only one matchlock part and several snaphaunce pieces. As the century progressed, flint arms appear to have eventually replaced matchlocks, although the occurrence of an appreciable number of matchlocks do appear in the probate records in the later part of the century. It may be a case a larger number of some people who either could not afford flint arms or those that curated their fathers and grandfathers pieces, died during the later part of the century. It may also be a case that some people continued to use matchlocks in Plymouth Colony longer than they did elsewhere, which led to them trying to use them during King Philips War, resulting in the Colony outlawing their use in the militia after this time. Obviously people were trying to use them or else they would not have had to make this law.

The other trend that was noticed is the general decrease in piece size throughout the century. This is reflected in the historical records as well as archaeologically. Historically in the 1640 Plymouth Colony indicated that only fowlers under 4 and one half feet long were allowed as well as calivers and carbines. Archaeologically,

pieces from pistols, muskets, one caliver and one fowler have been recovered. More indirect archaeological evidence was provided by the recovery of a predominance of pistol and carbine size lead shot and flints that would fit pistols and carbines. While pistol or carbine size lead shot may have been used in a musket or fowler, the flints recovered are fairly specific to weapons of specific sizes. Because not a great number of carbines were identified in the probate records, it may be a case that they were more numerous than was noted but occur under the heading of gun during the later part of the century.

Work on the arms and armor of Plymouth Colony is currently being reevaluated. It is hoped that by combining the archaeological with the historical data to a degree that it has not been done before, will allow a new, more detailed exploration of the role of these items in the lives of those living in what was once Plymouth Colony.

Table 1: Arms noted in Plymouth Colony probates

Piece Type	1630s	1640s	1650s	1660s	1670s	1680s	Totals
Gun		1	13	42	44	14	114
Old gun					1		1
Small gun (carbine?)			4	1	2		7
Shorter gun (carbine?)					1		1
Long Gun (Fowler?)					1		1
Great Gun (Fowler or Wall gun?)					1		1
Piece	3		3				6
Old Piece		1	3				4
Small Piece (carbine?)			1				1
Piece for Service	1						1
Arms			2	4			6
Musket	3	12	16	16	4		51
Old Musket				2			2
Short musket (carbine?)					1		1

Large Musket					1		1
Matchlock			7	2	7		16
Firelock				1	12		13
Snaphaunce			1				1
Carbine	1	2	4		3		10
Harquebus			1		1		2
Blunderbus					2		2
Fowler	12	6	11	4	1		34
Long Fowler					2		2
Small fowler					3		3
Short Fowling Piece		1					1
Large fowler					2		2
Great Fowling Piece				1			1
Small Fowling Piece with the lock and barrel of a birding piece				1			1
Birding Piece	1		2		4		7

Little Birding Piece	1		1				2
Pistol	3	4	5	9	21		42
Pistolo (Spanish?)		1					1
Double Pistol	1						1
<b>Totals</b>	26	28	74	83	113	14	339

Table 2: General terms of arms noted in Plymouth Colony probates

Piece Type	1630s	1640s	1650s	1660s	1670s	1680s
Gun		1/ 3.6%	17/ 23%	43/ 51.8%	50/ 43.8%	14/ 100%
Piece	4/ 15.4%	1/ 3.6%	7/ 9.5%			
Arms			2/ 2.7%	4/ 4.8%		
Musket	<b>3/ 11.5%</b>	<b>12/ 42.9%</b>	<b>16/ 21.6%</b>	<b>18/ 21.7%</b>	6/ 5.3%	
Fowler	<b>14/ 53.9%</b>	<b>7/ 25%</b>	<b>15/ 20.3%</b>	6/ 7.2%	<b>12/ 10.5%</b>	
Pistol	<b>4/ 15.4%</b>	<b>5/ 17.9%</b>	5/ 6.8%	<b>9/ 10.8%</b>	<b>21/ 18.4%</b>	
Matchlock			7/ 9.5%	2/ 2.4%	7/ 6.1%	
Firelock				1/ 1.2%	<b>12/ 10.5%</b>	
Snaphaunce			1/ 1.4%			
Carbine	1/ 3.9%	2/ 7.1%	4/ 5.4%		3/ 2.6%	
Harquebus			1/ 1.4%		1/ .9%	
Blunderbus					2/ 1.75%	
<b>Totals</b>	26	28	74	83	114	14

Table 3. Lead shot recovered from Plymouth Colony sites

Shot Size	Cushnoc	RM Site	Winslow	Burrs Hill
.70-.75	5	1		
.65-.69	14	1	2	
.60-.64	39	3	1	
.55-.59	18	3	1	
.50-.54	24			5
.45-.49	1		1	
.40-.44	3	14	8	1
.35-.39		52	23	38
.30-.34		7	9	
.25-.29		98	16	
>.25		111	118	
Totals	104	290	179	44

Table 4. Lead shot from Plymouth Colony Sites

<b>Piece Type</b>	<b>Cushnoc</b>	<b>Clark</b>	<b>Winslow</b>	<b>Burrs Hill</b>	<b>Totals</b>
Pistol	46 (44.2 %)	17 (77.3 %)	10 (76.9 %)	6 (100%)	79 (54.5%)
Carbine/ Arquebus	53 (51 %)	4 (18.2 %)	3 (23.1 %)	0	60 (41.4%)
Musket/ Fowler	5 (4.8 %)	1 (4.6 %)	0	0	6 (4.1%)
<b>Totals</b>	104 71.7%	22 15.1%	13 9%	6 4.1%	145

Table 5: Gunflints Recovered from the Clarke Site

<b>Flint Type</b>	<b>Pistol</b>	<b>Carbine</b>	<b>Musket</b>	<b>Large Arm</b>	<b>Totals</b>
Bifacial	1 ( 5.9 %)	2 ( 4.8 %)	0	1 ( 25 %)	4 ( 5.9 %)
Spall	0	4 (9.8 %)	0	0	4 ( 5.9 %)
Blade	5( 29.4 %)	2( 4.8 %)	0	0	7( 10.3 %)
Adventageous	11(64.7 %)	33( 80.5 %)	6( 100 %)	3( 75 %)	53( 77.9 %)
<b>Totals</b>	17/ 25%	41/ 60.3%	6/ 8.8 %	4 / 5.9 %	68

Percentage outside ( ) represent percentage of total within each firearm class

Percentage inside of ( ) represnts percentages of totals within the overall artifact class

