

Plymouth Colony Livestock

This article, written by Craig S. Chartier, covers the livestock and livestock husbandry practices in Plymouth Colony 1620-1692

This work is the first in a series of studies on the integration of the historical records and the archaeological data on the animals raised and used by the inhabitants of Plymouth Colony, 1620 to 1691, and subsequently the 18th and 19th centuries. What we at the Plymouth Archaeological Rediscovery Project are attempting, is to gather all the historical and archaeological references pertaining to the use of animals in this area. The present study is an introduction to the livestock, and the archaeological deadstock, of Plymouth Colony.

This study begins in England where the livestock and the husbandry practices familiar to the Pilgrims originated. Three authors were reviewed for this project. They are William Harrison, a historian writing in 1587 and Gervase Markham and Barnaby Googe, both agricultural historians writing in 1614.

This historical information was compared to the data collected from a study of the probate records of Plymouth Colony for the period 1633 to 1689. A total of 257 probates were scrutinized. Probate data has limitations though, such as the inconsistency in which the various assessors used identifiers such as male and female or age and conclusions must be viewed with some caution.

The livestock data gathered from these records was compared with the deadstock information provided by the archaeological record from four Plymouth Colony sites. These are the C-14, Edward Winslow site 1630-1650, C-02, Josiah Winslow site 1650-1690, C-21 the Allerton-Cushman Site 1650-1690, and one circa 1676 feature from the Perry site.

When these sources were reviewed as a whole, it was found that Plymouth Colony's livestock practices began somewhat hesitantly but eventually, by the late seventeenth century developed to a point that it was similar to what would have been familiar to yeomen in England. Several trends also became evident through the probates that were born out archaeologically. These include a low occurrence of goat and increases in sheep and cattle raising throughout the century. When the Mayflower arrived at Cape Cod in November of 1620, it has been speculated that she probably carried at least a few livestock with her. These probably included hens and roosters, swine and possibly goats. Hens and swine are prodigious breeders and would not have taken up much space on board the ship. Goats were well known for their hardiness and their use in wild areas and were commonly brought over by fishermen and those who desired a small tough milk producer that could survive in the wilds of New England.

The first mention of livestock in Plymouth Colony was in March of 1623 when Edward Winslow, one of the leading men in Plymouth Colony, desired to make chicken soup for the ailing Native sachem Massasoit. At this time Winslow sent a messenger back to Plymouth to get a bottle of drink and "also for some chickens to make him (Massasoit) broth" But when the messenger returned with the chickens. "he (Massasoit) would not have the chickens killed, but kept them for breed." (Winslow 1623: 34). In September, Emmanuel Altham was visiting the colony and he noted that "here is belonging to the town six goats, about 50 hogs and pigs and diverse hens." (James 1963: 24).

The first cattle did not arrive in Plymouth until the following year when Edward Winslow returned from England with three heifers and a bull (Bradford 1984: 141). It is not known exactly when sheep first arrived in Plymouth, although it is suspected that Myles Standish brought them back from England in 1625. The first reference to sheep is in 1627 in a trade between Standish and Abraham Pierce where Standish traded Pierce two ewe lambs for Pierce's share in a cow (PCR Vol 1 1627: 15). In 1627, the Plymouth Adventure was bought from their Merchant Adventurer backers in London by several of the chief men of the Plantation, afterwards known as the Undertakers. Following this purchase, the colony agreed to stay together for a period of five years to repay the Undertakers. To this end the entire stock of the company was divided. This included the cattle, goats and swine " At a publique court held the 22th of May it was concluded by the whole Companie, that the cattell wch were the Companies, to wit, the Cowes & the Goates should be equall devided to all the psonts of the same company & soe kept untill the expiration of ten yeares after the date above written & that every one should well and sufficiently pvid for there owne pt under penalty of forfeiting the same.

That the old stock with halfe the increase should remaine for comon use to be devided at thend of the said terme

or otherwise as occasion falleth out, & the other halfe to be their owne for ever. " (PCR Vol 1: 9). There were a total of 22 goats and 17 cattle recorded.

The cattle of England were described in very Anglocentric terms by Harrison in 1587 as being the best in all the world with horns that were fairer and larger, spanning three feet tip to tip, than anywhere else. Harrison also stated that the cattle in England were larger than any other with the average ox standing as tall, presumably at the head, as the average man (Harrison 1994: 306). Almost thirty years later, in 1614, Markham echoed these sentiments in a slightly more reserved way when he described the cattle of the seventeenth century. While the concept of "breeds" of cattle was such as the Holsteins, Gurnseys, etc. that we have today was not in use in the seventeenth century, animals from certain areas were noted as being physically different and possessing of different qualities. Markham noted three main types of cattle the black, the red and the pied or spotted. Black cattle were said to be found primarily in Yorke-shire, Darby-shire, Lancashire, and Stafford-shire and it was preferred that the black cow be all black, with only the udder being allowably white (Markham 1614:43). Red cattle were found in Somerset-shire and Gloucester-shire and pied cattle were found only in Lincoln-shire. The areas above noted were identified as the places where the best cattle came from. The ideal milk cow was identified as having a " stately shape, bigge, round, and well buckled together is every member, short joynted, and most comely to the eye" (Markham 1614: 42). Googe added that cows should be "high of stature, and long bodied, having great udders, broad forehead, faire hornes, and smooth" (Googe 1614:: 121). The ideal draught cattle was to be " exceeding tall, long and large, leane, and thin thighed, strong hooved, not apt to surbaite" (Markham 1614:42). Googe elaborated on this and stated that male cattle, whether they were bulls or oxen should be:

"large, (with) well knit, and sound limbs, a long, and large, and deepe sided body, blacke horned, broad foreheaded, great eyed and blacke, his eares rough and hairy, his calves to be large and wide, his hippes blackish, his neck well brauned and thicke, his dewlappe large, hanging downe from his necke to his knees, his shoulders broad, his hide not hard or stubborne in feeling, his belly deepe, his legges well sette, full of sinewes, and straight, rather short then long, the better to sustaine the waight of his bodie, his knees straight and great, his feete one farre from the other, not broad, not runing in, but easily spreading, the hayre on all his body thicke and short, his tayle long, and big hayred." (Googe 1614: 121). Both authors noted that when breeding a heifer or cow that the bull should be of the same color as the cow, so as not to mix the qualities of the types (Markham 1614: 43)

Cows were seen as having two main uses, for dairy and for breed with red cows being known for their high milk production and black cows for their "ability to bring forth the goodliest calves" (Markham 1614: 44). All types of cows were believed to be most productive from age three to 12 years old with the advice being given that one should not breed a heifer under three, that older cows give more milk and that after 12 years old the cows were no longer good for breeding (Googe 1614: 121). Each year the farmer was advised to sort his stock so that the old cows that were bareine or unfit for breeding could be put away, sold or used for the plow in the same way that oxen were (Googe 1614: 121).

Putting the bull to the cows and heifers was recommended to be done in the fall and it was noted that on average the farmer could expect one bull to be able to service 20 cows and heifers with some towns and small communities having one bull that was used communally by all (Googe 1614: 122). After the cows and heifers have calved in the spring, it was recommended that the calves be sorted into those males that would be brought up as bulls and those to be gelded for steer or oxen and the females which would be brought up for breeding stock and milk and those that would be spayed for service or meat (Markham 1614: 44; Googe 1614: 221). It was recommended that any gelding or spaying to be done be done in the spring or fall when the flies were dormant and the calves were about three months old (Googe 1614: 122). Training of the gelded males that were to be raised as oxen began at the earliest when they were about three years old but no later than five years (Googe 1614: 123).

The cattle present in 1627 in Plymouth included black, red, white-backed and white-bellied varieties. The black cattle may have been of a breed or similar to those today called Kerrys. Kerry cattle are descended from ancient Celtic cattle and were originally Native to County Kerry Ireland (Christman, Sponenberg and Bixby 1997: 30). While Kerrys were not imported into England from Ireland until the 1800s, the native English breed of black cow may originated from the same ancient Celtic stock.

The white backed cow and the white bellied calf that were mentioned in the cattle division may be what we consider distinct breeds today, but more likely they are black cattle with white markings. It was once common for black cattle such as the Kerrys to be born with patches. The presence of white on the black cattle is a dominant genetic characteristic and thus shows up fairly regularly. Today for the standardization of the breed, white

markings are not accepted for registration of an animal and as a result the presence of white markings on black cattle such as Kerrys is not encouraged. Black cattle in general were believed to be very hardy types that could survive in low forage areas and were prodigious breeders.

The red cattle were probably from the southwestern section of England in the Devon area and to its immediate east. These probably are of the breed today called Milking Devons. Red cattle were believed to be hardy and excellent milk producers.

As the century progressed, other colors of cattle show up in the probate records such as brown, white, pied, staved, brindled and white faced. Some of these may be genetic variants of the initial stock, such as the brown, staved and white faced, while others may be the result of new stock being transported into the colony from England or other colonies. By far the most common color in the 17th century was the black cattle.

Cattle were very important to the lives of the dairy loving English and within a decade of their initial arrival, they became an important trading commodity with the Massachusetts Bay Colony. It was determined soon after the arrival of these settlers that a good profit could be made selling them cattle and corn. New meadows were laid out to the north of Plymouth at what is now Marshfield and it appears from the dramatic increase in the number and frequency of occurrence of cattle in the probate records, that many people believed that this would soon prove financially beneficial to any who could raise a few cattle. By 1638 livestock prices had risen dramatically in Plymouth Colony with the average cow selling for between 20-28 lb a piece, a cow calf for 10 lb, a milk goat for 3-4 lb and female kids for 30-40 s (Bradford 1984: 302).

Unfortunately, as is always the case, what goes up must come down, and dramatically so for Plymouth Colony. By the 1640s, the Great Migration to the Massachusetts Bay Colony had been reduced to barely a trickle with the threat of civil war looming in England. With a dramatic decrease in the number of people arriving in New England came a dramatic decrease in the number of cattle and kine that were desired by persons in Massachusetts Bay and as a result, a dramatic drop in cattle prices. By 1640 the price for a cow had dropped to an average of 5 lb while goats were now selling for 8-10 shillings instead of 3-4 pounds (Bradford 1984:310). A good example of this was a cow that belonged to Isaac Allerton which the colony was using to settle a debt. The colony valued the cow at 25 lb initially, but by the time agreement was reached concerning the settlement, the cow was worth 4 pounds 15 shillings (Bradford 1984: 312). This dramatic fall in prices is recorded as having a devastating effect on the economy of Plymouth Colony that appears to have thrown itself full force into supplying Massachusetts Bay.

No seventeenth century writer encountered thus far ever took note of any particular area of England as the home of an exceptional or even mentionable breed of swine. It appears that due to their ubiquitous and unexceptional nature, swine specific types of swine deserved no real mention. What were considered worthy of mention were the characteristics of a good swine, their uses and their feeding. Unlike cattle or sheep, swine served on main purpose, to live to die to be eaten.

Markham described the best qualities of the swine as " long and large of body, deepe sided, and deepe bellied, thicke thighes, and short legs, for though the long legged Swine appeare a goodly beast, and is not so profitable to the Butcher: high clawe, thicke necke, a short and strong groyne, and a good thicke chine well set with strong bristles: the colour is best which is all of on peece, as all white, or all sanded, the pyed are the worst and most apt to take the meazels, the blacke is tollerable, but our Kindgome through his coldnesse findeth them seldome." (Markham 1614: 88). Summarizing Markham, a good swine should be short and stout of all one solid color such as white or tan.

Swine were well known for their propensity to devour just about everything and to root up the ground in search of roots, tubers and the like. They were also well known for being " greedy, given much to roote up grounds, and teare downe fences, he is very lecherous, and in that act tedious and brutish: he is subject to much anger." (Markham 1614: 88). This tendency for swine to root up ground and tear down fences would later prove to be one of the grievances that the Natives in New England had against the English, but as can be seen it was a problem for the English as well. This led to laws in England as well as Plymouth stating when swine were required to have a ring placed through their nose which was cinched with a twitcher, making it painful for the swine to push its snout forcefully into the ground. For swine that still were a problem even when ringed, yokes were sometimes required. These yokes fit over the swine's neck much like an oxen yoke and made it difficult for the swine to fit through shall spaces between fence pales or under fences. Ringing seems to have been a common practice from September to January while yoking occurred more often in September and February (Stuart :5). Swine were often fed in the morning then brought out either by families or by a hogmaster who tended a town pack to the either old fields, marshes to feed on sedges, rushes, or berries or in the fall to the mast forests for nuts, during the day and then brought back to the safety of the sty at night (Markham 1614: 89;

Harrison 1587: 312).

Sows were ready to be bred at approximately 1 year old and for up to seven years after she will bring forth one to two litters a year (Markham 1614: 89; Googe 140). Bores were mature enough to service sows at six months, but more commonly they began at one year old (Googe 1614: 140). Boars were kept by individual families, but it was also common practice for towns to have community boars in much the same way as was done with bulls as it was felt that one boar could serve 10 sows (Googe 1614: 122).

After farrowing, males and some females (called spayd-guilts) were gelded or spayed because it was felt that these would "make goodly Hogs, which are excellent Bacon and Porke." (Markham 1614:89). The females were also felt to produce more grease in their bodies. This grease could be processed to make lard which "we make some, though very little, because it is chargeable; neither have we such use thereof as is to be seen in France and other countries, sith we do either bake our meat with sweet suet of beef or mutton and baste all our meat with sweet or salt butter, or suffer the fattest to baste itself by leisure." (Harrison 1994: 312). Young shoates, were felt to make the sweetest porke and were often slaughtered at $\frac{3}{4}$ to one year old (Markham 1614: 89). It was recorded that most slaughtering was started in November and continued through Shrovetide (late February) (Stuart :7).

The meat from slaughtered swine was sometimes eaten green, often smoked and preserved for the rest of the year and, according to Harrison in the late 16th century, was often used to make brawn. Generally tame boars which were fed and cared for up to two years specifically for the purpose, were believed to make the best brawn, but great barrow hogs were also used, producing better meat that was easier to digest (Harrison 1994:312, 314). Brawn was a type of prepared meat that Harrison noted was not generally known to those off the island. It is made with the forepart of the boar which contained a great deal of fat had its bone cut out and each piece was wrapped up with bulrushes or osiers then boiled in a pot or caldron together until tender. Afterwards they were cooled and put it into a closed vessel with ale or beer mixed with verjuice and salt and let lie until used (Harrison 1994:314). This was commonly eaten from November through February, especially at Christmastime (Harrison 1994: 313).

Sheep were considered by many to be the most cherished type of livestock in all of England to the point that it was made illegal to export any without royal permission (Harrison 1994:311). The first offense for exporting sheep out of the country was the forfeiture of all possessions, one year in prison and the severing of the left hand that was summarily nailed up in market place. Punishment for the second offense was death (Harrison 1994: 310). These were multi-purpose animals with their fleece being used once only for cloth and worsteds, but by the late 16th century for mockadoes, a wool cloth, baize, velures, or velvet, and grograines, a coarse fabric of mohair (Harrison 1994: 309).

Other uses for sheep were for meat, for dung to manure the soil and for milk which was often added to cheese made with cow's milk to make it remain moist and crisp longer (Harrison 1994: 310, 311). Googe summed up their utility when he stated that "Sheepe doth both with his fleece apparrell us, and with his milke and wholesome flesh nourish us" (Googe 1614: 130). Raising sheep was considered a business until itself in England with some sheepmasters having over 20, 000 sheep at one time (Harrison 1994: 310).

Like cattle, different regions of England were known for producing different types of sheep. Those with a curious fine wool were found Herefordshire, about Lempster side;

those of very little of bone, blacke faces, and able to beare a very little burthen were to be found in Worstershire, joining upon Shropshire. Sheep of better bone, shape and burthen with a courser and deeper stape were found in the Cotsall hills. Large boned pasture sheep of the best shape and deepest staple wool much courser than others were found in the part of Nottinghamshire, excepting the Forrest of Sherwood. The largest sheep, but ones with not the best Wooll, with long and naked legges and bellies and the coarsest staple were found in Lincolneshire, especially in the Salt Marshes. Reasonably big boned sheep, with a rough and hairy staple were found in Yorkshire and Northward. Finally, sheep with very little and the worst staple were found in Wales, these were praised as the sweetest mutton though (Markham 1614: 64-65)

It was recommended that ewes be selected for breed when they were two years old and that any that are past three years should not be meddled with (Googe 1614: 130). The ewe should have a large body, be deep woolled, and thicke over all the body, especially around the necke and the head, and with a good store upon the belly. It was recommended that the necke be long, the belly large, the legs short, although the sheep of England were known to be long legged, and the tail could be short or very long depending on where they came from. (Googe 1614: :130 Best :6). It was also recommended that the ewes, be dodded or hornless either naturally or through burning, because it was felt that dodded sheep were easier for the shepherd to handle, that they brought forth

the best lambs with the least amount of trouble and that they were less prone to infestations by lice and other pests (Best 1641:6-7; Markham 66-67).

The ideal ram was described as one large of body in every general part, with a long body, and a large belly, a broad, round, and well rising forehead, a cheerful large eye, straight short nostrils, and a very small muzzle (Markham 1614 66-67). Some authors like Markham, felt that rams should be dodded as well, as this made them better breeders, while others like Googe felt that the ram must have his horns great, winding inward, and bending to the face (Markham 1614 66-67; Googe 130). Googe felt that in places that were wet, stormy and wild, rams with the largest horns were able to defend themselves better against the storm or tempest and possibly predators, as a rule of thumb, Googe stated that

therefore in cold and stormy countries, the horned rams were best whereas in mild and gentle climates, the polled or dodded were better (Googe 1614: 130).

Ewes were bred when they reached over the age of two or three and continued to be bred until they reached age eight or ten (Googe 1614: 131; Markham 1624: 68). Rams began their service after four or five years of age and continued to approximately age seven when they were felt to "decay" and their "mouths breake" (Googe 1614: 131; Markham 1624: 68). The usual ratio of rams to ewes in a flock was recommended at either 25, 30 or even 40 ewes to one ram (Best 1641: 4, 27-28).

Goats were another species that was used for multiple purposes Googe stated that they "yeeld commodities with their flesh, their Milke, their Cheese, the Skinnes, and the Hayre" (Googe 1614: 136). Other authors such as Markham were less generous in their estimation of goats stating that they were "not of any generall use in our kingdome, but onely nourished in some wilde and barraine places, where Cattell of better profit can hardly be maintained, as in the mountainous parts of Cornewall and Devonshire, on Malborne hilles, and some few about the Peake" (Markham 1614: 81). He saw the main profits of goats as being their milk, which was used as a restorative medicine that helped the stomach, removed oppilations and stopping of liver and loosened the belly (Markham 1614: 82; Harrison 1587: 311). The other use for goats was for their meat, of which, the kid meat was deemed the best (Markham 1614:82; Harrison 1587: 311). Goats appear to have been viewed as hardy livestock that could live where many other species could not.

Young goats of only one or two years old were known to bring forth kids, but it was generally recommended that one wait until the goat is over three years old to breed her. She goats continued in service until the age of eight after which they tended to be barren (Googe 1614:136-137).

Plymouth Colony Livestock

A comparison of husbandry beliefs and techniques with the references to livestock recorded by William Bradford and in the Plymouth Colony Records was believed to be a good starting place for our examination of Plymouth Colony's use of livestock. But more detailed information regarding the actual raising and slaughtering practices of Plymouth Colony were sought. To this end, the probate, wills and the archaeological record of Plymouth Colony were studied.

Of all of these historical sources, the probates and wills proved to be the most valuable in terms of information that they present regarding the livestock present in the colony. The livestock data that was gathered from these records was then compared with the deadstock information provided by the archaeological record. When these two sources of data were then compared to the English agricultural information discussed above, it was found that Plymouth Colony's livestock practices began somewhat spottily but eventually, by the late seventeenth century had developed to a point that it was similar to what the first settlers had known in England. Several trends also became evident in Plymouth Colony through the probates and wills that were born out archaeologically. These included a low occurrence of goat and an increase in sheep raising throughout the century.

A total of 257 probates and wills were looked at for this survey. the breakdown of the probates and wills by decade is as follows:

1630s 18

1640s 25

1650s 56

1660s 70

1670s 57

1680s 25

These include all of the probates and wills from the period 1633 to 1669 and a random sample of those from the 1670 to 1689. From the probates and wills it was found that throughout the century the occurrence of the different species of livestock could be seen to have changed. As can be seen in the

Table x: Livestock occurrence in the probate record

Species	1630s	1640s	1650s	1660s	1670s	1680s
Cattle	50%	100%	91.1%	97.1%	100%	100%
Swine	88.9%	60%	62.5%	72.3%	100%	72%
Sheep	38.9%	8%	29.5%	18%	73.7%	65.4%
Goat	50%	4%	1.78%	0	1.8%	0
Poultry	5.6%	12%	12.5%	1.4%	1.8%	4%

graph, which begins in the 1630s with the first probates on records, the occurrence of cattle begins at only 50% in the 1630s but within a decade had doubled to 100%. This was due to trading with the Massachusetts Bay Colony in the 1630s and the resulting collapse in the cattle stock market in the early 1640s. Following the 1640s, the occurrence of cattle remained fairly level for the rest of the century, dropping slightly to 97.1% in the 1650s but then returning to close to 100% in the 1660s.

The ratios of male, which includes oxen, steers and bulls, to female cattle in the records indicates that Plymouth Colony, indicates that there was fairly consistent population of 1 male for each 1.4 to 2.2 females present in the probates.

	1620s	1630s	1640s	1650s	1660s	1670s	1680s
Cattle Male: Female	1: 2.2	1:1.8	1: 1.4	1:2.2	1: 1.6	1:1.6	1:1.8
Cattle Bull: Cow/ Heifer	1: 4	1: 24	1: 8	1: 17	1: 21.4	1: 21.2	1: 20.4
Swine Male: Female	?	1: 5.8	0: 6	0: 10	1: 10	1: 4.5	0: 1
Swine Boar: Sow	?	1: 5.8	?: 6	?: 10	1: 10	1: 4.5	?: 1
Sheep Male: Female	0: 2	2: 1	1: 9.3	1: 2.9	1: 4.4	0: 9	0: 0

Sheep Ram: Ewe	2: ?	1: 2	? : 28	1: 6.5	1: 11.5	? : 9	?
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This probably reflects the importance of female cattle for dairy products and possibly for calves as opposed to the use of the males primarily as draft animals. The ratio of bulls to breedable females, both heifers and cows, demonstrates a continuation of the practice back in England of using one bull to service many cows. As the century progressed the ratio recommended by English writers of 1 bull to each 20 females, was achieved in the 1630s, but then dropped in the 1640s to 1 bull for each 7 females but rapidly rose in the 1650s to 1 to 17 and remained steady at 1 to approximately 20 for the rest of the century.

The ages of the cattle represented in the probate records can be estimated by the terminology that was employed when describing them. Calves are cattle under 1 year old, heifers and steer are between one and four years old and adult animals referred to as oxen and cows were assumed to be over 4 years old. The ratios of the various livestock present can help to determine the type of cattle raising being practiced in Plymouth Colony. Generally if cattle are being raised primarily for dairy and draft then the livestock pattern is one that favors the adult individuals and the young replacement stock. If cattle are being raised for veal and milk and for draft then one would see a large number of young, under 1 year old individuals, and a large number of adults and few senile individuals. If cattle are being raised as live animals for sale or for building up a surplus, and for draft and dairy, then the pattern should be similar to that for a veal based pattern except with a larger number of individuals between the ages of 1 and four and less adults.

The ratios of cattle in Plymouth Colony of the ages of under 1 year old to between one and four years old and over four years old show in this table, indicate that Plymouth Colony was initially interested in building up their herds in the 1620s and 1630s, possibly with some 1 to four year old being kept until they reached adulthood and could be sold to Massachusetts Bay for a higher rate. Following the crash of the market in the early 1640s, it can be seen that the ratio of 1 to four years olds to over 4 years olds has shifted with more adult cattle being present, possibly these are cattle that were surplus. The livestock ratio then shifts back to a focus on one to 4 year olds from the 1650s to 1670s, but then shifts to a preference for adults in the 1680s, possibly as a result of Plymouths involvement with shipping cattle and horses to sugar plantations in the Caribbean at this time.

Cattle

under 1 yo: 1yo-4yo:+4 yo

20- 3:7:3 1: 2.3: 1

30- 7:15:9 1: 2.1: 1.3

40- 46:51:69 1: 1.1: 1.5

50- 61:111:96 1: 1.8: 1.6

60- 105:178:171 1: 1.7: 1.6

70- 67:185:4 1: 2.8: .06

80- 24:40:54 1: 1.7: 2.3

Cattle ages in probates

1630-1650 1: 1.6: 1.5 0:2:0

1660-1680 1: 2.1: 1.3 1: 1: 1

1670 1: 2.8: .06 1: .8: .2

Bos taurus

Age	C-14	C-21	ATPM
7-18 months		1	5

18-24 months	1		1
24-36 months	1	1	3
36-48 months			
48+ months		1	1

Archaeologically, the cattle remains show a possible change in the patterns of cattle raising and consumption throughout the century. The remains recovered from the earliest site, C-14 Winslow site indicate that during the period when the site was occupied, circa 1630-1650, the two remains of the two cattle that were recovered were between the ages of 18 and 36 months. During the same period, the probates reveal that this was the most common age for the livestock. No young veal calves were found, nor were any senile individuals.

By the period of 1650-1690, the two sites that have been excavated, the C-02 Winslow site and the C-21 Allerton-Cushman site, reveal a preference for very young and very old animals at C-02 and an emphasis on individuals between 7 and 36 months and over 48 months old, at a ratio of 2:1 at C-21. The final seventeenth century site available for this study is a circa 1675 assemblage from the Aptucxet trading Post Museum Site. In this assemblage, the majority of individuals fell between the ages of 7-18 months (N=5), with one individual present that was aged at 18-36 months. Three individuals were found to be between 36 and 48 months, and one was over 48 months and probably over 8 years old based on the excessive wear from the teeth. The presence of the majority of the individuals from the ATPM site falling in the juvenile 7-36 month range (N=9) as opposed to the adult range (N=1) may be an indicator that by the last quarter of the 17th century cattle were being raised, at least at this site, for meat, possibly for sale, as well as raising cows for dairy purposes.

Neither in England nor New England did swine ever serve any dual purpose. Swine were raised to eat and while some by-products such as bristles and lard were made use of, this does not seem to have occurred on a regular basis. Swine were present in the probate records fairly frequently with the highest incidences being in the 1630s, when they occurred in 88.9% of the probates, and 1670s, when they occurred in 100% of the probates. The years between the 1630s and 1670s saw the occurrence of swine drop sharply to 60% in the 1640s, rise to 72.3% in the 1660s, and then drop from 1670s 100% to 72% in the 1680s. It is not known why there was such fluctuation in the occurrence of swine in the probates.

Unfortunately, either the sexes of the swine were not consistently recorded in the probate records, or there were few boars present in the colony, for it was only in the decades of the 1630s, 1660s and 1670s, that there was any mention of boars. In these decades the ratio of boars to sows only reaches the recommended 1: 10 in the 1660s. The other two decades show a higher occurrence of boars, 1: 5.8 for the 1630s and 1: 4.5 for the 1670s. This may indicate that boars were considered more valuable to maintaining the swine stock in the colony than they were in England, or it may be more likely the result of inconsistent relating of sexes on the part of the inventory takers. Swine were often listed as just that, swine, with no designation of male or female.

The majority of the swine whose ages were either recorded or can be surmised from their designations, such as "shoates", "suckling" or the use of the term "young" in the probates, indicate a preference for pigs under one year old as opposed to those known to be over one year old. This was the case in all decades except the 1630s where older adult individuals occurred at a ratio of 2.2: 1 over 1 year old to under one year old. This may be the result of the early attempts to build up the breeding stock to raise animals for sale to Massachusetts Bay. For the remainder of the seventeenth century, the ratios of under one year to over one year was fairly consistent at 1: .4, except for the decades of the 1650s and 1680s when it rose to 1: .8 and 1: .7 respectively. The occurrence of so many young individuals indicates that the prime age of slaughter was probably over one year old, possibly closer to the ideal of 18 months. Bowen noted that when single farrowing was common in a husbandry system, then the age of slaughter is usually around 9-10 months. When the sows were double farrowing in the spring and fall, the age of slaughter is closer to 18 to 24 months (Bowen 1986: 26).

Archaeologically, the only seventeenth century sites that have yielded swine remains that can be aged are C-02,

C-21 and ATPM site. The swine from C-21 indicate that seven of the individuals were slaughtered between the ages of 0 and 26 months and six were killed that were older than 26 months with at least two being senile individuals. The swine remains from C-02 revealed that all the individuals present here were slaughtered under 30 months of age. The assemblage from the ATPM site revealed this as well with all 10 individuals being under 26 months with the concentration being in the 10-16 month range. The very youngest swine were probably served as suckling pig while those of the 10-26 month range may have been used for any of the purposes described by Harrison such as pork, bacon, brawn or preserved meat.

Age	C-14	C-21	C-2	ATPM
0-10 months		1		2
10-16 months		1		4
16-18 months		3		2
22-26 months		2		2
26+ months		4		
Senile		2		

Sheep occurred in a significantly smaller percentage of the probates than either cattle or swine. Their occurrence appeared rather sporadic throughout the century as well, beginning in the 1630s at 38.9% then dropping to 8% in the 1640s, rebounding to 29.5% in the 1650s, dropping to 18% in the 1660, achieving their highest level of occurrence in the 1670s at 73.7% before dropping slightly in the 1680s to 65.4%. The erratic nature of their occurrence in the records probably has to do with the nature of sheep raising in the early 17th century in Plymouth Colony. The occurrence of sheep in the probates and the overall use of sheep appear to have been the result of selective raising by those that owned them. Less egalitarian in who owned them than cattle or swine, sheep were raised by a smaller percentage of the population. For example, the only sheep known to have existed in Plymouth Colony in the 1620s belonged to Captain Myles Standish, who may have brought them back of his own particular in 1625, and who traded only two to another resident in the 1620s. Judging by the historical references by Markham, Googe and Harrison, sheep were considered important to those in England as a source of wool first, possibly meat second and milk third. In Plymouth Colony where there were no fulling mills before the later part of the century, people who were raising sheep were doing so more for their own benefit as opposed as part of a larger economy. Unlike beef and pork, lamb and mutton was not salted and preserved for the winter, it was eaten green soon after it was slaughtered. As a result, when looking at the culture of Plymouth Colony in the early part of the century, sheep can be seen as a perishable foodstuff raised by relatively few people who used them for themselves or possibly sold them for meat. By the later part of the seventeenth century and especially into the 18th century, the raising of sheep commercially was viewed as a possible source of revenue for towns such as Plymouth. The towns who wanted to begin to develop a wool market in southeastern Massachusetts soon set aside large pasture lots for the use of any in town who wanted to take invest sheep in this venture. Unfortunately, the market never took off and by the end of the 18th century most towns had given up on the idea. The increase in the presence of sheep in the probate record is probably indicative of the beginning of the interest in a wool market.

The distinction of male to female for sheep was sometimes made in the probate records, but it was often more likely that ewes were taken special notice of as opposed to the wethers or rams. In the decades of the 1630s,

40s, 50 and 60s, the distinctions were clear enough for us to be able to estimate the ratios of males to females. During these decades, females outnumbered males for all decades except the 1630s when the ratio was two males to each female. The remaining ratios ranged from one to 2.9 in the 1650s to one to 9.3 in the 1640s. The majority of the males that were reported in the records were wethers, castrated males raised for meat and detectors of heats in a flock of ewes. Unfortunately the numbers of rams present in each decade was not consistently recorded so it is difficult to say with any confidence what the ram to ewe ratio really was. The decades that rams were recorded, it ranged from one ram for each two ewes in the 1630s to one ram for each 11.5 ewes in the 1660s. The ideal in England was one ram for each 20-40 ewes so it appears that in Plymouth Colony there were more rams available per ewe. This may be the result of sporadic distribution of those who were raising sheep. Whereas cattle and swine were raised by the majority of the population, sheep generally were not, as a result people would not have been able to share rams as easily as they would have shared bulls or boars and they would have had to maintain their own rams in their flocks.

The majority of the sheep whose ages were recorded in the probate records appear from the 1630s to 1660s to have been over the age of one year, i.e. past the lamb stage. After one year old young sheep are considered sexually mature and can be bred, although it is recommended that one waited until they were over three years old. From the 1670s to 1680s, the opposite was true with more lambs being recorded than adult sheep. This may indicate that whereas people in the earlier part of the century were raising sheep more for meat and as a result slaughtering more of the lambs whereas in the later part of the century people were raising them more for wool and as a result were keeping more of the lambs to be raised up as wool producers. This proposition appears to be substantiated by the occurrence of all of the wethers, those raised for mutton, appearing before the 1670s.

Age	C-14	C-21	ATPM
0-6 months		1	
6-12 months			
12-24 months			1
24-36 months			1
36-48 months		2	1
48-60 months		1	

Archaeologically, no sheep remains were identified at the C-14 Winslow site, dating from 1630-1650. The two sites dating from 1650 to 1690, C-02 and C-21, yielded sheep remains which indicated that most of the sheep eaten at these sites were older than 36 months at least from C-21 and predominately older individuals at C-02. Both sites also yielded younger individuals for example, one lamb was identified at the C-21 site and at least one from C-02. The circa 1675 ATPM site yielded three individuals aged between 12 and 48 months, with no lambs present. Due to the wide timespan of the C-21 and C-02 assemblages it can not be said with any certainty that they fit the pattern observed in the probate occurrences.

The occurrence of goats can be seen to dramatically drop from the 1630s to 1640s inversely to the increase in cattle. This is probably a result of the position of goats in English society. Goats appear to have been used when

one could not afford cattle or when one lived in a place that initially was too wild for cattle. Interestingly enough, the sparse occurrence of goats in the records in the 1670s was found to be present in probates from Cape Cod, another sparsely populated and "frontier" zone. The ratio of goats to people throughout the century remained fairly low as based on their appearances in the records, beginning at .14 per person in the 1620s, going up to 2% in the 1630s and then never getting above .08 per person throughout the remainder of the century.

In Plymouth goats appear to have primarily served as a source of milk and possibly meat from the kids as at least once when goats were inventoried they were identified as milk goats. This is also supported by the presence predominantly of goats identified as "ewe goats or she goats" in the records and a paucity of kids. No male goats, a.k.a. bucks, were identified in the records as well, possibly indicating that they were used communally with only a small number being maintained. Alternately, the male goats may have been subsumed under the category of generic goat in the records or were considered so economically insignificant that they were not recorded at all. Goat skins, a by product of goat raising, appeared three times in the Plymouth Probates throughout the century, once in the form of a coverlid and the other times as dressed skins or hides and may have been another product. Young goat skin, kid skin was often used for gloves as it was found to be very soft, giving rise to the expression of treating something with "kid gloves".

Unfortunately, even though the standard works used to help distinguish between sheep and goat bones have been consistently employed, those of Boessneck 1970, Payne 1985 and Prummel and Fisch 1986, only two bone definitely identified as goat have been identified archaeologically at any Plymouth colony site, the 1650-1690 Winslow site. This is probably due to the fact that sheep were more common than goats in all but the earliest decades of Plymouth Colony's existence.

Geese, ducks, peacocks of inde, a.k.a. turkeys, and pigeons were common poultry kept about the farmyard in England (Harrison 1994:316). The most common species kept though, were hens and roosters. Roosters in the seventeenth century were described by various contemporary agricultural authors such as Markham as "the most manliest, stately and majesticall, very tame and familiar with the Man, and naturally inclined to live and prosper in habitable houses.." (Markham 1614 1614:110).

The occurrence of poultry, primarily in the form of hens and cocks but also three turkeys and 4 geese, was high in the 1630s but then dramatically dropped off in the succeeding decades. This is probably not the result of a true decrease in the importance of poultry to New England colonists, but is more likely the result of those who were taking the inventory not being concerned with accounting every bit of poultry. They may have been subsumed under the heading "In small things forgotten" which was often used.

Archaeologically, the remains of hens and roosters were recovered at all of the sites used in this survey. Additionally, the remains of turkeys, geese and ducks were also recovered which may reflect either the domestication of Native species or the importation of English domesticates. The earliest reference to the use of domestic birds other than hens and roosters, occurred in 1643 when Thomas Granger was convicted of bestiality. At his trial he was found guilty of committing the act with numerous animals including one turkey. It seems more likely that he had easier access to a domestic turkey as opposed to a wild one. The next reference to other domestic wild fowl was in Margaret Howland of Marshfield's inventory in 1684 where the presence of 4 geese and 2 turkeys were noted.

The English were known for the skill in fowling and their desire for a wide range of fowl on their tables as can be seen when one reads Markham's English Housewife cookbook of 1615. Harrison makes mention of the various types of wildfowl that were commonly taken in England, these include crane, bittern, wild and tame swan, bustard, heron, curlew, snipe, wild goose, wind or dotterel, brant, lark, plover, lapwing, teal, widgeon, mallard, sheldrake, shoveler, pewit, sea mew, barnacle, quail, knot, oilet or oyster catcher, dunbird, woodcock, partridge, pheasant, barnacle found in orkney islands (puffin?) (Harrison 1994: 315). Other fowl were considered unclean to eat including ravens, crows, pies, choughs, rooks, kites, jays, ringtails, starlings, woodspikes, woodnaws (Harrison 1994:318). Crows and ravens were considered such spoilers of poultry, rabbits, lambs and kids, that parliament enacted a law that towns be furnished with nets to catch them and individuals in the town were required to kill a certain number of crows or ravens each year and save the heads as a count (Harrison 1994: 318). In Plymouth Colony it was ordered as early as 1632 that all fishing, fowling, hawking and hunting would be free to all that lived in the colony (PCR Vol 2: 5).

Archaeologically a wide variety of wild fowl have been recovered including scoter, and passenger pigeon from the C-14 site, pigeon, hawk, bald eagle, wood duck and brant from the C-02 site, robin, crow, kill deer, loon, sea gull, bobwhite, passenger pigeon, and American coot from the ATPM site. Wild fowl, excepting turkey, goose and

duck, appears to have moderately contributed to the diet of Plymouth Colony. While none of the species were present in such numbers that they ever made significant contributions to the total meat weights present for any site, the diversity and presence indicates that wild fowl were important species in the English foodways of the period, one which, even though, or because of, the wild nature of the country they were now living in the colonists did not want to do without. Wildfowl made up 21.7% of the total MNI assemblage from the C-14 site, 6.7% at C-02 and 16.1% of the remaining three assemblages. The presence of these wild species should not be taken as an indicator of poverty or starvation, but more properly as an attempt by the colonists to maintain traditional foodways and take advantage of the abundance of familiar foods around them.

Fish, shellfish and various other creatures of the sea were also commonly eaten. These species included salmon, herring, red gurnard, plaice, trout, turbot, mussels, mackerel, cockles, eel, haddock, thornbacke, rays, fluke, sea flounder, dory, dab, lumps, whiting, rochet, sea bream, brill, hake, sea trout, cod, pilchard, sprat, seal, dolphin, porpoise, whale, garfish, octopus, lobster, crayfish, crab and oysters (Harrison 1994 319-323). These fish were eaten by the English and were also salted and shipped to countries such as Spain and France, where due to the fact that Catholicism was the state religion, they ate more fish for Lent and on Fridays.

Archaeologically pike and blue runner were recovered from the C-14 site, cod from the C-02 site, sturgeon, eel and cod from the C-21 site and herring, sunfish and striped bass from the ATPM site. Fish were always important to the colonists whether it be as potential sources of revenue such as the monopolies that were created later in the century regarding fishing on Cape Cod, or just as another part of their traditional English diet. Fish represented 8.7% of the MNI assemblage at the C-14 site, 1 % at C-02, 10% at C-21 and 26% at ATPM site.

The overall occurrence of cattle, swine, sheep and goat relative to each other in the probate record is as follows:

Ratio cow: pig: sheep: goat

30: 1: .7: 3.9: 1.2

40: 1: .2: .4: .004

50: 1: .1: .3: .009

60: 1: .2: .3: 0

70: 1: .8: .4: .004

80: 1: .6: .3: 0

It can be observed that the occurrence of goats dramatically dropped off throughout the century while the occurrence of cattle increased. The ratio of swine and sheep to cattle remained fairly stable until the 1670s when the occurrence of swine quadrupled and sheep remained the same. In order to compare the number of animals in the probates to those recovered archaeologically, the probate counts for the decades of the 1630s to 1650s were combined for comparison to the Minimum Number of Individuals from the C-14 Winslow Site, the counts from the 1650s to the 1680s were combined for comparison with the C-21 and C-02 sites and the counts from the 1670s were compared with those from ATPM.

It can be seen in most comparisons the percentage of occurrence of a species in the probate record was inversely represented archaeologically. For example, cattle made up 53.6% of the species represented in the probates of the period from 1630 to 1650, yet archaeologically they represent only 8.7% of the species present. The opposite was true of the swine represented in the 1650-1680 period. In this case swine was more numerous archaeologically than in the probate record. This is probably due to the fact that the primary reason for raising swine is for food and as a result there may be more represented archaeologically than in the records. Cattle were raised mostly for live uses such as milk and for labor, are more represented. The same can be said for the occurrence of the sheep.

Species	C-14	C-2	C-21	ATPM
Cattle	2/ 8.7%	24/ 26.7%	3/ 10%	9/ 18%
Swine	1/ 4.3%	29/ 32.2%	13/ 43.3%	10/ 20%

Sheep	0	14/ 15.6%	4/ 13.3%	3/ 6%
Wild Mammal	5/ 21.7%	7/ 7.8%	2/ 6.7%	5/ 10%
Chicken	3/ 13%	6/ 6.7%	1/ 3.3%	1/ 2%
Wild Bird	10/ 43.5%	19/ 21.1%	4/ 13.3%	9/ 18%
Fish	2/ 8.7%	1/ 1%	3/ 10%	13/ 26%
Total	23	90	30	50

Species present at Plymouth Archaeological sites 1630-1840

Species	C-14	C-2	C-21	ATPM	C-23	C-4	C-6	C-7
Cattle	2/ 8.7%	24/ 26.7%	3/ 10%	9/ 18%	2/ 3.8%	2/ 18.2%	3/ 23%	3/ 13.6%
Swine	1/ 4.3%	29/ 32.2%	13/ 43.3%	10/ 20%	9/ 17%	2/ 18.2%	3/ 23%	2/ 9.1%
Sheep	0	14/ 15.6%	4/ 13.3%	3/ 6%	2/ 3.8%	3/ 27.3%	2/ 15.4%	4/ 18.2%
Wild Mammal	5/ 21.7%	7/ 7.8%	2/ 6.7%	5/ 10%	2/ 3.8%	0	0	2/ 9.1%
Chicken	3/ 13%	6/ 6.7%	1/ 3.3%	1/ 2%	8/ 15%	1/ 9.1%	2/ 15.4%	3/ 13.6%
Wild Bird	10/ 43.5%	19/ 21.1%	4/ 13.3%	9/ 18%	20/ 37.7%	1/ 9.1%	3/ 23%	7/ 31.8%

Fish	2/ 8.7%	1/ 1%	3/ 10%	13/ 26%	10/ 18.9%	2/ 18.2%	0	1/ 4.5%
Total	23	90	30	50	53	11	13	22

To summarize the use of animals in England it can be stated that in terms of livestock, cattle ranked first, with sheep being a close second, swine were numerous and widespread, goats were raised by those who lived in wild places and could not raise cattle. Cattle were raised for meat, milk and as draught animals. The average or recommended ratio of one bull to 20 cows and a cow could be expected to be bred and produce milk from three to 12 years old. The typical English farm, following these practices, would have possibly one bull, several cows or 3 to 12 years old, several heifer or unbred cows under the age of three, and several oxen over the age of five used for labor and steer under the age of five being trained as oxen or raised for meat.

Swine were raised for meat and some lard with sows being bred from one year old to about seven or eight with one boar servicing ten sows. Young swine under one year old were slaughtered for pork and older hogs above two years old were used for brawn. The typical farm would have some sows aged from one to seven, numerous gelded and spayed barrow hogs raised for meat, possibly one boar, and young shoates under 1 year old raised for pork.

Sheep were multi purpose being raised for wool, milk and meat. Ewes could be bred at two years old, but it recommended that one wait until they were over three. They then continued lambing once a year until age eight or ten. Rams were deemed fit for servicing ewes at four to five years old and continued to about seven years old or until their "mouths broke" with one ram servicing 25-40 ewes. The typical number owned by a sheepmaster could number from just a few to over 20, 000 depending on the reason for raising them. Several rams would be present for breeding and wethers would also be present in the flock to determine when the ewes were in heat and ready to be bred. Sheep under 2 years old may have been eaten as well as older sheep raised for mutton.

Goats were raised for milk, meat, skins and possibly hair with the young kids being slaughtered and the she goats being bred from between one to three years old to eight years old. Primarily the young kids and probably the older individuals were eaten.

Poultry were common especially hens and roosters, with other species such as ducks, geese, pigeons and turkeys being raised. A wide variety of wild fowl ranging from large to small were hunted as well as a wide variety of fish.

This study was not designed as the final word regarding livestock and animal use in the former Plymouth Colony. What it attempted to do was present the current state of research on this neglected topic. The integration of the probate, archaeological and 17th century historic agricultural treatise was designed to present a more complete picture of livestock use in Plymouth Colony. By understanding what was known and common in England and then comparing that to what was found in the probates, the extent to which the colonists were attempting to replicate what they knew and adapt to a new environment can be better understood. It appears that the shaky start reflected in the early decades of settlement soon gave way to patterned purpose in what sorts of livestock were raised.

Goats, a species used when a durable species that can survive in an unfamiliar environment were initially desired, were soon abandoned in favor of cattle. Swine, as represented in the probates, was sporadic in their occurrence with some decades yielding high counts but the subsequent one being fairly low. Yet swine are fairly well represented archaeologically. This is one of the observations made during this study that will continue to be studied. Sheep appear initially to have been raised by a few people for meat and as the century went on, more people began to raise them and their wool became potential economic commodity. Cattle, initially rare and precious in the 1620s, boomed in the 1630s due to the need for them in Massachusetts Bay Colony, only to become surplus with the crash of the market in the 1640s. The cattle economy may have rebounded in the 1670s and 1680s as Plymouth began supplying the West Indies sugar Plantations with beef and livestock.

The research into the livestock of Plymouth Colony will continue as well as investigations into how the husbandry and foodways practices changed in the 18th and 19th century. This will be investigated in a way similar to the 17th century study, through the use of period books, probates and wills and archaeology.

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