

FINAL REPORT
ANALYSIS OF ARTIFACTS
RECOVERED FROM BENEATH A HOUSE
IN BUTTERMILK BAY,
BOURNE, MASSACHUSETTS

By

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I. INTRODUCTION

Renovation work in the spring of 2010 in Buzzards Bay, Massachusetts, resulted in the identification of a post-in-ground house partially located beneath the hall of an extant house. The site was initially identified by David Wheelock, architectural restoration specialist, archaeologist and curator at the Wing Old Fort House in Sandwich, Massachusetts. During the course of restoration at the house, purported to have been built ca. 1690, Mr. Wheelock noticed a concentration of what appeared to be the remains of a wattle and daub wall beneath the hall when the floor boards were removed. Excavations were carried out and it was determined that the clay represented the puddled/ melted remains of what was likely a wattle and daub wall and that it was associated with two post molds from a post-in-ground house that had stood on the site prior to the construction of the current extant house. Prehistoric remains consisting of lithic debitage, the remains of stone pieces that were removed during the course of the manufacture of stone tools by Native Americans, shellfish remains from a thin shell midden, and a post mold from a Native house, were also discovered in the same area. Much of the soil from around the interior of the foundation had previously been removed by other contractors and had been deposited in a pile on the front, south, side of the house. This backdirt pile was screened and the following report documents the analysis of the artifacts from this backdirt pile. Analysis indicates that the soil that was excavated accumulated after the original post-in-ground house had been removed and possibly during a subsequent period of remodeling in the early nineteenth century when the floor of the hall had been removed and the ground beneath it was open and available for the deposition of the artifacts. Artifacts recovered included eighteenth to nineteenth century ceramics and glass, abundant faunal remains representing both animals that were consumed and those that lived commensally with the inhabitants of the house, several shoes, a limited amount of architectural material, and three coins.

The house where the backdirt pile was excavated is located on the north side of Old Head of the Bay Road in Buzzards Bay, Massachusetts on the eastern shore of Little Buttermilk Bay. It is situated on a knoll of Carver coarse sand (soil survey type 252C) and is approximately 15 meters from the edge of the bay where the fish species and some of the avian species were probably caught. Soils of the Carver series make up the majority of those in Wareham and all the other archaeological sites in the town except one are located on this type of soil. Carver soils consist of very deep extremely drained sandy soils that are ill suited for agricultural use, due to their permeability. Rocks found in this series range from fine gravel size to stones and generally average less than 10% of the composition of the soil. These are part of the Wareham pitted outwash plain, a triangular shaped area of sand extending from Plymouth to West Wareham. This sand was formed between the Narragansett Bay, Buzzards Bay and Cape Cod ice lobes at the end of the last ice age (Skehan 2001: 169).

II. PREHISTORIC CONTEXT

An interesting, but somewhat small, assemblage of prehistoric artifacts were recovered from the project area. It appears that the knoll where the later colonial house was built, formerly had been used by the local Native people as both a habitation area, hence the post mold, pottery and lithics, and a food processing area, as evidenced by the shell midden. The site appears to have been occupied during the Late Woodland Period (1,200-500 BP) but evidence of earlier occupation could be expected to be found across the entire property. One other probable prehistoric artifact that was recovered was a fragment of worked animal bone that may have been part of a fishing spear (**Figure 1**). This section of the report puts the prehistoric artifacts within a wider context of the Native occupation of the Northeast.



Figure 1. Fragment of possible native bone spear recovered showing possible reconstructed length and style

New England's prehistory is poorly understood relative to that of other regions in North America. Throughout the majority of the region's prehistory, river drainages defined physiographic units within which human communities operated. This pattern follows from the longitudinal diversity of habitats that occur along drainages, forming ecologically unique wetland habitats, together with the transportation routes afforded by their watercourses. In the clearest examples, rivers provide access to maritime and upland resources at each end of the drainage, and to the diverse habitats in between. The exploitation of those habitats can be integrated into a seasonal round that differs at various historical moments.

The prehistory of southern New England is divided into seven periods, each identified by characteristic projectile points, pottery and other artifacts. These periods are the Paleo-Indian (13,000-10,000 BP), Early Archaic (10,000-8,000 BP), Middle Archaic (8,000-6,000 BP), Late Archaic (6,000-3,000 BP), Early Woodland (3,000-2,000 BP), Middle Woodland (2,000-1,000 BP) and Late Woodland (1,000-350 BP). These cultural periods also are distinguishable on the basis of changing patterns of site location, activities, and size.

Paleo-Indian Period 13,000-10,000 BP

Although there is new research being conducted all the time, the present theory is that the people who first settled in New England arrived in the New World during the end of the Wisconsin ice age, approximately 13,000 years ago. Before this time, New England and much of the northern half of the United States was covered by a mile and a half thick sheets of ice called glaciers. Ice ages are part of the Earth's natural warming and cooling cycle. Approximately 60,000 years ago for some unknown reason, the temperature dropped on Earth a few degrees, just enough to cause the glaciers and ice caps located at the north and south poles to begin removing water from the oceans and growing. By approximately 20,000 years ago the edges of the northern ice sheet had reached its maximum extent, present day Martha's Vineyard and Nantucket, and began to recede. As the glaciers melted, they dropped millions of tons of sand, gravel and boulders that had accumulated during their journey southward. All this material, the moraine and outwash soils, became the sandy hills, the drumlins, eskers and kames, and basically all the lower layers of soil that make up our landscape today. Mixed in with the moraine and outwash were glacial erratics, these are the large boulders, like Plymouth Rock, that dot our landscape today.

Following the retreat of the glaciers, the climate in southern New England was a southern tundra. It was cold, windy and barren and covered with large areas of wetlands. Scattered intermittently across the landscape were patches of grasses, shrubs such as sedge, alder and willow, and small stunted trees including spruce followed by birch and pine. There was also a lot more landscape at that time because the oceans were approximately 300-400' feet lower than they are today. In New England, this meant that the coastline was up to 50 miles to the east of its present position. This left exposed large portions of land, such as George's Banks, that are today underwater. The islands that we now see in many coastal harbors, were at this time hills on a barren landscape and many of the rivers that we know today were nothing more than springs or small streams.

The types of animals that were found at this time included some of the smaller species such as foxes and rabbits, but megafauna were also present. Megafauna is a term that describes the large breeds of animals that were available in New England after the last ice age. These included mammoth, which existed on the tundra, mastodon, which lived in the early forests, horse, which later became extinct and was reintroduced by the Spanish in the 1500s, bears like the large Kodiak variety, beavers up to 6' long, bison, elk, caribou and musk ox, which disappeared fairly early.

In Southeastern Massachusetts, sites that date to this period have been encountered in Plymouth on the Eel River and on the coast in Marshfield. At these sites, the evidence of people living here after the last ice age has consisted predominantly of stone projectile points of a variety called the Paleo or fluted point. These points were generally made from exotic materials that were carried in by the inhabitants as they traveled from the west. These materials were predominantly very fine grained stones including cherts from New York and Maine and jaspers from Pennsylvania. Population densities have been estimated at approximately 5-12 people per 100 square kilometers. These people made their living by hunting and possibly scavenging the carcasses of the megafauna. They also hunted smaller game such as rabbits and may have fished on the coast. The populations in New England at this time may have numbered no more than a few hundred. These people lived in small groups and traveled seasonally. They probably were not nomadic, but were following seasonally migrating herds. Paleo sites are often located on hilltops overlooking plains or were high on the shores of glacial lakes.

Archaeologically there is little evidence of the Paleo-Indian period on the Outer Cape. One of the reasons for the paucity of finds may be related to the fact that during this period the coastline was approximately 100 miles to the east and south of today's George's Banks with the result being that more attractive sites may have been located near the paleo-shore and are now flooded. No Paleo-Indian materials have been recovered *in situ* on the Outer Cape. One fluted point was surface collected in Eastham and this constitutes the total evidence of Paleo-Indian occupation on the Outer Cape (Johnson 1997: 17). On the shore of the Bass River in Yarmouth, a cache of possible Paleo-Indian Eden blades of Mt. Kineo felsite from Maine was recovered from a tree fall (Dunford 1997: 32). It is more likely that these blades date to the Middle Woodland period and are not, in fact, Eden points.

By the end of the Paleo Period the environment in New England was stabilizing and life ways were becoming fairly distinct. The megafauna were extinct by 10,000 years ago, probably due to a combination of hunting by the first settlers and climactic change. The forests were beginning to change to more pine and nut bearing hardwoods which created new habitats for animals and new food sources for people. While the Paleo Period can be seen as a time of initial colonization, the next period, the Early Archaic, can be viewed as a time of settling in and accommodation to life in New England.

Early Archaic 10,000-8,000 BP

The extinction of the megafauna and the changing climate led to a revamping of the Paleo-Native way of life around 10,000 years ago. The environment in the Early Archaic had warmed slightly and as a result, trees such as oak, pitch pine, beech and hazel began to flourish. It was during this time that the major rivers that are around today began to form as well and into these rivers anadromous fish species like salmon and herring began to run. This would have provided another food source for the inhabitants of New England. As New England began to become more forested, new mammalian species also would have moved into the area. These species would have included black bear, deer and moose.

The Early Archaic is one of the little understood periods of New England prehistory. Early Archaic sites tend to occur on a wide range of settings including hills sides with slopes over 15 degrees and hill tops. Some sites are situated on the same locations as Paleo sites while others appear alone in the landscape. Homes at this time have been theorized as being either of a longhouse shaped, as have been identified in Taunton, Massachusetts at the Titicut site, or as small pits dug into the sides of hills as have been identified in Connecticut and northern Massachusetts. It is unknown if the two forms of houses occurred simultaneously, were seasonally determined or represent different building traditions by different populations.

Evidence of the Early Archaic peoples' process of "settling in" is found in their use of local volcanic materials such as rhyolite and felsite for tools and projectile points and their possible use of quartz for quick, expendable tools. Hunting during this period may have taken the form of spear throwing with the use of the atl-atl, a weighted stick that was held in the hand onto which a long spears was placed and launched from. The atl-atl was basically an extension of the throwers arm and it effectively increased the distance, force and accuracy of the throw. While atl-atl use is postulated, no definitive evidence of this technology has been recovered for this period.

Like the preceding Paleo-Indian period, little evidence exists for occupation on Cape Cod during the

Early Archaic. One bifurcate base point was recovered from the Chase Farm site in Eastham and a bifurcate base point base was recovered from the Nauset trail on the Cape Cod National Seashore (Dimmick 2006: 2). During the Early Archaic the sea levels were still approximately 25 meters below their present level but the Cape was covered by a mixture of oak and pine forest.

Middle Archaic 8,000-6,000 BP

While the Early Archaic was a time of transition from the Paleo-Indian nomadic way of life to a more sedentary and permanent situation, the Middle Archaic can be seen as a time of more normality and permanency. However, it still was a time of many changes. Oceans remained approximately 10 meters (10 m) lower than they are today but the rate of rise had slowed enough for estuaries to begin forming, leading to the establishment and proliferation of shellfish beds. Shellfish first settled in the warmer southern waters and eventually moved northward as rising sea levels slowed and waters warmed.

By 7,000 years ago, forests with the same basic composition as today began to be established. The use of heavy stone woodworking tools such as axes, adzes and gouges increased during this period, possibly indicating the construction of log canoes or at least an increase in woodworking. Evidence for hunting using atl-atls first appears at this time as well. In fact, the oldest burial in New England, 7,500 years ago, was located in Carver, Massachusetts and contained two atl-atl weights of the whale-tail variety. Sites from this period are fairly common, indicating that people had begun to spread out over larger areas and that there may have been more people in Massachusetts than before.

No Middle Archaic sites are known from the Outer Cape. On the Lower Cape, the Upper Mill Pond Site in Brewster's Stony Brook Valley yielded specialized tools, points, scrapers, and hammerstones possibly used to harvest and process the more seasonally available resources of this time. The site lies on a kettle pond approximately 50 feet above sea level. Three Middle Archaic sites (19-PL-277, 19-PL-562 and 19-PL-564) have been identified in nearby Wareham. Site 19-PL-277, encountered during an archaeological survey for Route 25, is located on the Agawam River and is identified as a findspot of a Neville style point. Site 19-PL-562 is located at the confluence of the Wareham and Agawam rivers in Wareham Harbor. It appears to represent a multi-component campsite where at least two Stark style points were recovered from an eroding bank. Site 19-PL-564 was tested to the data recovery level and is located on Broad Marsh. This site represents a short term limited activity area where lithic reduction was carried out.

Late Archaic 6,000-3,000 BP

The Late Archaic represents the period with the most identified and recorded archaeological sites in Massachusetts. This has been interpreted by many as indicating a very large number of people living in our area during this period, although archaeologists are not sure why this happened. The case may also be made that this proliferation of stone tools and sites may be related to a wider variety of stone tools being manufactures for specific purposes and a wide variety of habitats being exploited as opposed to a population boom. The Late Archaic is also a time of greater diversification and specialization than was evident in the earlier periods. The tool kits of the people living on the south coast and its coastal forests differed from that of the people in Maine and further north. This in turn was similar, but distinct, from the inhabitants of the strictly boreal forests such as those in New York and inland Massachusetts.

Along coastal Massachusetts, the combination of stabilizing sea levels and estuary formation led to

significant runs of anadromous fish by the Late Archaic. As a way of taking maximum advantage of these fish runs, Native people began using weirs in the rivers, streams and bays. In fact, one of the largest weirs found anywhere in the world was encountered in what was once Boston Harbor. It is believed that the weir was constructed approximately 5,000 years ago and covered several acres. Weirs of a smaller scale were undoubtedly employed in most of the bays, rivers and larger streams in Southeastern Massachusetts.

Unlike the preceding periods, the Late Archaic is well represented on the Outer Cape, as is the situation everywhere in Southeastern Massachusetts. A number of Late Archaic shell midden sites were identified in the High Head section of Truro during McManamon's archaeological survey of the Cape Cod National Seashore, possibly indicating a greater use of shellfish during this period (McManamon 1984: 348). Other Late Archaic sites include a single Otter Creek projectile point, representing the Laurentian tradition, recovered during McManamon's Cape Cod National Seashore survey from site 19-BN-274 and another from Nickerson's Neck in Chatham (Mcmanamon 1984). Small Stemmed tradition sites are better represented on the Outer Cape, with 20 of the sites identified by McManamon, yielding Squibnocket Triangle and Small Stemmed points. Small Stemmed tradition sites occur in a wide variety of environmental settings. Susquehanna tradition sites, characteristic of the Transitional Archaic, have been identified in Orleans (the Coburn site), and one possible Atlantic point, seven Susquehanna/ Wayland Notched projectile points, and two Orient Fishtail points were recovered from McManamon's survey of the Outer Cape (McManamon 1984).

Four sites dating to the Late Archaic have been identified in Wareham (19-PL-188, 287, 562 and 564). Site 19-PL-188 is located on the Agawam River at a point where the river narrows to only four to five meters wide, making this a possible location for a fish weir. Activities that took place here may have included lithic reduction and habitation. Site 19-PL-562 is a multi-component site at the confluence of the Wareham and Agawam rivers where several Late Archaic style points were recovered. Site 19-PL-564 is a multi-component site on Broad Marsh where lithic reduction and possibly wetlands resource collection was carried out. Site 19-PL-287 is a findspot of a Small Stem style point on Rose Brook, a small interior water way.

Early Woodland 3,000-2,000 BP

Following the Terminal Archaic is an ill-defined time labeled the Early Woodland by New England archaeologists. Some archaeologists, like Snow (1980), do not view the designation of Early Woodland as a valid one. This is due to the fact that the start of pottery production, one of the long standing hallmarks of the Early Woodland Period, has been dated back into the Late to Terminal Archaic. They see no real change occurring that could be used to differentiate the Terminal Archaic and the next 1,000 years. They merely see a continuation of tumultuous times that began after 3,000 to 4,000 years ago. In the words of Filios "... the chronological picture (for the Early Woodland) is more murky than previously suspected. ...the horizon markers (of this period) need to be reevaluated." (Filios 1989:87). Traditional horizon markers for the Early Woodland have included Vinette I pottery, which has been shown to have been produced before the Early Woodland, an absence of Small Stemmed points, which have been shown to have continued in use into the Early Woodland, an increased sedentism, which appears to have begun before the Early Woodland, and horticulture, which in New England was not intensively practiced until after 1000 A.D.

Some of the trends identified above, the decreased population and fragmentation, are based on the small number of Early Woodland sites that have been identified. This may be more a product of the

criteria used to identify the sites, such as the presence of pottery and absence of Small Stemmed points. If one includes sites yielding Small Stemmed points but no pottery, as these may represent special purpose floral or faunal resource procurement task camps and not residential locations, the number of sites possibly attributable to the Early Woodland increases. Due to the increasingly long temporal use range for Small Stemmed points, their presence or absence can no longer be used as valid "datable" criteria to assign the site to one period or another. What is needed are more radiocarbon dates associated with specific materials. Until this occurs the Early Woodland will remain obscure and ill-defined.

A dramatic population collapse has traditionally been one of the defining characteristics of the Early Woodland. Filios (1989) came to a similar conclusion although her data shows a break in radiocarbon dates from 2,700-2,400 years B.P. possibly showing a population decline after 3,800 years B.P. and a greater decline after 2,800 years B.P. If there was in fact a population collapse, reasons for it have included climatic and environmental change, epidemics, the effects of plant and animal die-offs and socio-cultural factors. One of the main causes may have been if nut bearing trees, already in decline in the Terminal Archaic, were hit hard by plant disease or environmental change, then this may have caused a population reliant on this resource to die off. This would account for the drop in inland sites in the period. Alternately the populations living on the coast that focused their procurement strategies on river valley, estuarine and inshore resources may have remained relatively unscathed. These would be the Rossville and Lagoon point users, point styles that show a high concentration in coastal areas especially Cape Cod.

One of the most important Early to Middle Woodland sites excavated on the Outer Cape is the Carns Site on Coast Guard Beach in Eastham (Bradley 2005). This site yielded abundant evidence of Fox Creek phase occupation which were similar to sites in New York's Hudson Valley (Dimmick 2006: 11). Seven other sites have been identified on the Cape Cod National Seashore dating to this period as well. Only two sites with Early Woodland components have been identified in Wareham, 19-PL-188 and 564. Activities that took place during the Early Woodland at 19-PL-188 included pottery manufacture and processing of deer. At 19-PL-564, the Early Woodland was only tentatively identified by projectile point styles that have been found to continue in use from the Late Archaic into the Early Woodland period.

Middle Woodland 2,000-1,200 BP

This period is marked by a decrease in the number of exotic finished goods indicative of long-distance trade, and by changes in mortuary practice (increase in secondary interments, less use of ocher, fewer grave goods, and more variation in preparation of the dead). While the roots of ceramic and lithic variability are found in the preceding periods, more rapid variation in sequence through time and more regional variation characterize this period. Ceramics vary more in decoration and form. Lithic projectile points are less important in the tool kit, and bone and antler tools are preserved at some sites where matrix conditions are appropriate (Shaw 1996:84-87). By the end of the period there is evidence of maize horticulture (Thorbahn 1982).

Fox Creek and Steubenville bifaces characterize this part of the period. There is some overlap in time between the Fox Creek and Jack's Reef points during this part of the Middle Woodland. Fox Creek points are relatively rare in Eastern Massachusetts with few known from the Outer Cape (Truro and Wellfleet) and Martha's Vineyard. These points are diagnostic of the Middle Woodland Period, occurring from 400-700 A.D., and they are often found on multi-component sites (sites with multiple time periods represented) and area associated with the growing of corn and decorated ceramics. On Martha's Vineyard, they have been found in association with postmolds outlining an oval-shaped house measuring 16' in diameter (Towle 1986: 30). The people who used the Fox Creek points are believed to have been seasonally migrational, spending the summers on the coast and the winters further inland. They also show many of the cultural characteristics evident with Southeastern Massachusetts' Native people at the time of Contact. Other types of artifacts commonly found associated with Fox Creek points include exotic lithics like New York State cherts and Pennsylvania jaspers, Saugus jasper, Blue Hills hornfels and Great Lakes' copper.

Jack's Reef points continue to be used into the Late Woodland. Exotic lithic materials increase in the Middle Woodland, except in the Champlain drainage. Jack's Reef points are often made of non-local chert (Shaw 1996:92-93). Some lithic tool types, such as Rossville (Shaw 1996:90) and Small Stemmed (Hasenstab et al. 1990) continue into the Middle Woodland.

The Carns site, previously mentioned, contained a significant Middle Woodland component while three sites identified during McManamon's survey contained diagnostic Middle Woodland points and four sites contained diagnostic Middle Woodland pottery. Occupation of the Outer Cape appears to have had a significant coastal orientation to it, with most sites being located within one half kilometer of the ocean (Ingham 2004:20). This presumed coastal focus could also be a result of the other factors as well: much of the Outer Cape is coastal and thus more sites would be expected to be identified in coastal settings, the highest yield of natural resources are in coastal areas, and the collection/ survey bias caused by the Cape Cod National Seashore survey, which of course, was located in a coastal environment. Only a limited amount of archaeological fieldwork has been conducted on non-coastal sites on Cape Cod. Three sites have been identified in Wareham as having Middle Woodland components, 19-PL- 188, 564, and 587. Middle Woodland pottery, shellfish processing and herring fishery areas have been identified at 19-PL-188 and 587, the former being located on the Agawam River and the later on Red Brook. Site 19-PL-564 yielded no artifacts datable to the Middle Woodland but have several radiocarbon dates associated with small pit features that were from this time.

Late Woodland Period 1,200-500 BP

This is the period just prior to European contact and as a result, many of the historical reports written by the early explorers to New England (Verrazanno, Gosnold, Pring, Smith) present one way of understanding the late Late Woodland period. Some of their observations may be able to be extrapolated back into the Pre-Contact past through the use of ethnographic analogy. These analogies can be created with more confidence as pertaining to the culture of the Late Woodland period than any earlier one.

The ceramics of the Late Woodland period are often shell-tempered or made with fine grit temper and have thinner bodies and a more globular form than the earlier ceramics. The diagnostic projectile point of the Late Woodland period is the triangular Levanna points and occasionally the Madison. This period is marked by an increasing importance in food production (maize, beans, squash, sunflower and other vegetables) in coastal or riverine zones, which begins by ca. 1,100 BP on Martha's Vineyard (Ritchie 1969).

The decrease in projectile point styles and the increase in the reliance on horticultural crops, may be attributed to increasing numbers and densities of population at larger sites. While the occurrence of the "village" in Southeastern Massachusetts continues to be debated, the affect of an increased reliance on corn, beans, squash and to a lesser extent gourds, sunflowers and tobacco, definitely led to a degree of sedentism not seen prior to this time (Hasenstab 1999; Kerber 1988).

These changes in assemblage, and by implication, adaptation, are attributed to increasing numbers and densities of population at larger sites. Research issues include the extent of permanency in Late Woodland settlements, the nature of such settlements (i.e., whether such settlements were villages; see Hasenstab 1999; Kerber 1988), the identification of horticulture with non-native plants and definition of the effects on humans. In addition, researchers might ask about the use of different ecozones, the reality of population growth, and whether or not climate change (e.g., the Little Ice Age), affected settlement and subsistence. There is some evidence of the development of long-distance exchange again, and some workers have suggested that a Native beaver trade was developed before Contact. Regional differences are visible. In Vermont, there are fewer late Late Woodland sites than early Late Woodland. This may be a response to Iroquois settlement changes. In southern New England, horticulture did not replace existing gathering and hunting strategies, and large settlements did not replace small seasonal sites. Differential dependence on horticulture is likely to have affected society and politics. Cultural differentiation of the Iroquois from the Algonquin also presents research opportunities (Shaw 1996).

Numerous Late Woodland sites occur on the Outer Cape with the best known and most extensively studied being the shell middens identified during McManamon's survey (McManamon 1984). The shores of Salt Pond are known to have been the focus of Late Woodland to Contact Period Native settlement as well. A significant archaeological site was identified at Sandy's Point in Yarmouth in 1992 by the Public Archaeology Laboratory and was further investigated by Dr. Stephen Mrozowski of the University of Massachusetts at Boston. At this site, a Native planting field dating to the Late Woodland into the Contact Periods was buried under drifting sand, preserving the actual mounds that formed the support base for the corn stalks. Adjacent to the third of an acre field was the outline of two Native wetus, one superimposed on the other indicating likely rebuilding. Unfortunately, while this site was excavated in 1992, a final report has never been completed for it and the available data is limited to one Masters thesis and one short published preliminary article (Mrozowski 1994).

Two sites have been identified with components dating to the Late Woodland period in Wareham, 19-PL-188 and 587. Site 19-PL-188, located on the Agawam River, revealed evidence of herring fishery in the late Late Woodland, as well as pottery manufacture and oyster collection. Site 19-PL-587, located on Red Brook, was primarily a shellfish processing and possible habitation area.

Known Prehistoric Sites

A total of 14 prehistoric archaeological sites are recorded in the MHC site files within two kilometers of the two project areas (Table 1).

Table 1. Known prehistoric sites within 2 km of project areas.

Site	Water	Type	Date	Finds
19-BN-870	Unnamed Stream	Find Spot	Unknown	single quartz flake
19-BN-821	Swamp	Find Spot	Unknown	single quartz flake, charcoal
19-BN-690	Monument River	Base Camp?	Late Woodland	Levanna point, debitage, feature
19-BN-685	Herring River	Debitage Conc.	Unknown	Rhyolite debitage
19-BN-656	Monument River	Find Spot	Late Archaic	Possible Quartz Small Stemmed point fragment
19-BN-655	Monument River	Find Spot	Late Archaic	Possible Quartz Small Stemmed point fragment
19-BN-654	Monument River	Find Spot	Late Archaic	Possible Quartz Small Stemmed point fragment
19-BN-653	Monument River	Find Spot	Unknown	one piece quartz shatter
19-BN-650	Monument River	Find Spot	Late Archaic	Possible Quartz Small Stemmed point fragment
19-BN-620	Monument River	Findspot	Unknown	2 quartz flakes
19-PL-345	Swamp	Rockshelter/ Burial?	Unknown	Quartz, quartzite debitage, Burial (?)
19-BN-244	Nightingale Pond	Debitage Conc.	Unknown	Unknown
19-BN-224	Monument River	Base Camp?	Late Woodland	Unknown
19-BN-221	Monument River	Burial Ground	Late Woodland to Contact Period?	Unknown

Decima and Edens (1992) found that of the 32 sites located within five kilometers of the Bournedale Village/ Water Pipe Subdivision project area, a significant distribution of site types was apparent (Decima and Edens 1992: 7). Nine of the sites were located on the margins of large bodies of inland water, six were located on major streams, nine were coastal (four on the shores of Buttermilk Bay and five on the Atlantic Coast), while eight were located farther away from ponds, streams or shores. Cultural material recovered from nine of these sites consisted single flakes, point fragments, and a few pieces of worked stone indicating a high rate of extremely thin sites with low visibility but high focus. These sites were often associated with kettle holes and extant or extinct small wetlands (Decima and Edens 1992: 7). The patterns identified by Decima and Edens for the Bourne area are broadly similar to what has been noticed elsewhere in Southeastern Massachusetts: large multi-component camps near large bodies of water on lower ground and on higher ground along streams, and thin, usually single-component sites on lower ground near wetlands (Decima and Edens 1992: 8). Unlike other areas in Southeastern Massachusetts, Bourne has a more varied topography with more uplands and less extensive wetlands, possibly resulting in a less intense occupation, or a more focused in a smaller

number of locations, occupation pattern than elsewhere. The small, sometimes isolated wetlands, provided resources that were analogous to (if less abundant than) those available in neighboring areas with the topographically varied uplands providing resources (deer, and turkey for example) less available elsewhere in the Bourne area. Added to this the varied resources of the coastal sites and a potential settlement pattern emerges where the average Inner Cape community territory may have been geographically larger than in other areas. Due to the water resource limitations of the uplands, community territory may have included a wider variety of geographic setting (stream-side, coastal, upland, pond-side) in order to provide all the community's needs (food, shelter, fresh water, firewood, lithic, floral and faunal raw materials) while in other areas a community would be able to exist within a smaller area due to its richer diversity. In a settlement system such as this, sites that would be found in upland setting would be limited to hunting and task specific extraction camps- sites that would be small, thin, and very focused due to short-term occupation by a small number of people.

III. HISTORIC CONTEXT

Bourne was originally part of the Town of Sandwich until it was incorporated separately in 1883. The area that became Bourne, occupied an important position during the Contact Period (1500-1620). Red Brook, to the west of the project area between Wareham and Bourne, likely formed the boundary between the Agawam community, whose principle area of residence may have been at Brandy Hill in East Wareham and the Manamet community, which had the present day Bournedale and Great Herring Pond as their main community location. Red Brook would have been a peripheral resource procurement and possible habitation locale during this period with families moving from the central winter community, likely centered around Great Herring Pond for the Manamet and the inland portions of the Agawam River for the Agawam, to the Red Brook valley where planting, fishing and shellfish occurred. The present-day Red Brook/ Head of the Bay Road was a Contact period Native trail leading from Agawam to Manamet. Other Native trails in Bourne included the Cape Cod Bay Trail, which followed Brody Road to Scusset River at Sagamore, the County Road which ran east, Bourne Road and a trail from Herring Pond to Monument/ Manamet River, both of which ran from Plymouth to Bourne. All the trails converged at the community of Manamet, where today's Bournedale is situated. While much of the mainland Native population was devastated by European disease prior to the arrival of the settlers at Plymouth, the Agawam and Manamet areas appeared relatively unscathed.

The first reference during the **Plantation Period (1620-1675)** to the area that later became Bourne was a voyage that the Plimoth colonists made to Manamet near the end of July in 1621. At this time a young boy, by the name of John Billington, became lost in the woods outside of the plantation and eventually ended up at Manamet. Both Bradford and Winslow relate these events (Morrison 1984: 87, Young 1974: 217). Canacum, the sachem of Manamet, sent the boy to Aspinet, the sachem of Nauset (present day Eastham). From this trip, Winslow described Manamet thus:

"This town lieth from us south, well near twenty miles and stands upon a fresh river...It will bear a boat of eight or ten tons to this place. Hither the Dutch or French or both use to come. It is from hence to the bay of Cape Cod eight miles out of which bay it floweth into a creek some six miles almost direct to the town. The heads of the river and the creek are not far distant." (Young 1974:307).

This report fully supports the idea that the town lay between the two rivers at Bournedale. If the distances given by Winslow are compared to a modern map, then the present location is very near the present day Sagamore Bridge and Bournedale. The fresh river referred to by Winslow was the Manamet River and the creek that flowed to the town was the Monoscusset (Scusset).

Following this voyage, the sachem of Manamet, Caunacum, and several other Natives from the Southeastern Massachusetts area, signed a document dated September 13, 1621, making themselves subjects to King James of England (Morton 1855: 29)

A second, more extended, trading visit to Cape Cod began in October of 1622. At this time Myles Standish and Tisquantum were to lead a party of men on a trading mission to Cape Cod, but Standish fell sick and Bradford took his place. Unfortunately, Tisquantum fell sick and died and with no one else able to navigate the shoals, they decided to trade on the northern side of the Cape at Manamet. There he traded for corn and left it there in the charge of the leader, or sachem, of the community,

Canacum, who had signed the subjugation treaty in 1621 (Young 1974:305).

Standish and some others went to fetch the corn from Canacum in March of 1623 after he was fully recovered. This party probably traveled as far up the Monoscusset River, at the northern entrance to the present day Cape Cod Canal, as they could and then walked overland to Manamet. It was here that Standish found out that the Natives of Cape Cod, including those of Agawam and Manamet, were in confederacy with those of Wessagusset (Weymouth, Massachusetts) where some other English colonists were abusing Natives and provoking them. Later that March, Standish led a force against the Natives at Wessagussett and slew several. Those Natives on Cape Cod, fearful due to the fact that the English knew that they were in a confederacy with Wessagussett:

"... forsook their houses, running to and fro like men distracted, living in swamps and other desert places, and so brought manifold diseases amongst themselves, where of very many are dead; as Canacum, the sachim of Manamet, Aspinet, the sachim of Nauset, and Iyanough, sachim of Mattachiest...certainly it is strange how many of late have, and still daily die amongst them....because the fear they set little or no corn, which is the staff of life, and without which the cannot long preserve health and strength.... none of them dare to come amongst us." (Young 1974: 345)

The first European settlers in the area were servants set out from the Plymouth Plantation who were charged with manning a house established within the Native territory of Manamet. This trading house, also called the house at Aptucxet, was likely located near the mouth of the present day Cape Cod Canal (Chartier 1995). This initial settlement was likely short lived and no further settlement occurred until the 1638 settlement of Sandwich by families from Saugus. During the Plantation Period (1620-1675) settlement loci were located at Manamet and Pocasset with the first meetinghouse being in need of repairs in 1644 and the first gristmill in 1648 (Keene 1975 :29, 31). Two missionaries, Thomas Tupper and Richard Bourne, preached to the Natives of Sandwich. Bourne's work focused on the Natives living at what was left of the Contact Period community of Manamet around Great Herring Pond in present day Bournedale. Bourne established a meetinghouse here on the south side of Great Herring Pond in the early seventeenth century (MHC 1981: 4).

Red Brook and Buttermilk Bay are identified in the 1666 laying out of the bounds of the Agawam purchase " and on the east side with a great salt water cove or river (Buttermilk Bay) and so bounded up along with the brook (Red Brook) unto the head thereof..." (Tritsch 2003: 3-5). Red Brook Road, also called County Road, was laid out in 1684 (MHC 1981: 5). It followed a traditional Native trail that was called comassakumkanet, which has been translated as "the trail going south" (Lovell 1984:21). Buttermilk Bay is believed to have been called wayquonset (Lovell 1984:371). By 1695 it is believed that there was a grist mill built by Elisha Bourne somewhere in the vicinity of Head of the Bay or Bournedale, possibly on the Manamet River (Lovell 1984: 259). In 1678, a deed from a Christian Native named Nanumett from either the Herring Pond or Breakhart Hill, to his son Ralph (Aspuhchaumake/ Aspackanuck): "Beginning at the great rocke near unto the brooke and from this great rocke upon a strait line unto the Red Brooke and running northerly on this side Partriches Marsh" (Pulsifer 1861: 231). This rock has been identified as the "eyestone", a stone on the eastern shore of Red Brook, but it is probably a rock closer to Herring Pond such as Wampsett or Chamber Rock. Red Brook is also identified by William Bradford Jr. In 1688 as "red alias Gravely brooke" (Konig 1978:

132). The first known European settler in the Red Brook area is believed to have been Israel Fearing who died in 1754. In his will he stated that he left to his son John "my house at Red Brook also ½ of the fruit of the orchard the south half of my little barn" (MSA 1754: 297). Fearing's homesite likely was along Red Brook Road.

A plantation for the praying Indians at Herring Pond was established in 1655 being described as lying at a place called commquessakumkanet, a name translated as "at the rock that stands erect" (Shaw and Merrick 1982: 9). This plantation was described in 1674 as being "...a tract of land preserved for them and their forever...which is near ten miles in length and five in breadth." (Chase 1883: 92). This description would extend from Sagamore to the present location of Route 25 in Bourne.

The western portion of Sandwich was settled during the **Colonial Period (1675-1775)** and County Road, running along Buzzards Bay, was laid out in 1684 while other overland routes were also improved (MHC 1981: 5). Buzzards Bay harbors at Buttermilk Bay and Pocasset became important during this period. As early as 1676 the Monoscusset-Herring-Monument River drainage was explored as a possible location for a cross-isthmus canal linking Cape Cod bay to Buzzards Bay. The Native community at Herring Pond was said to number 226 people over the age of 10 years in 1693, and this population was recorded as close to the same in 1764 (Shaw and Merrick 1982: 11). Overall in Sandwich, 136 heads of households (exclusive of Quakers) were recorded in 1730 and by 1765, 245 households and 1,449 individuals were recorded (MHC 1981: 6). Grist mills were established in North Sandwich by 1695 (Elijah Bourne) and at Monument (Elijah Perry 1739) with corn being the main crop grown and ground (MHC 1981: 6). While herring were caught in the Herring River and sheep were increasingly becoming the most important livestock, the most significant industry for the town was wood exportation. Both Natives and non-Natives engaged in this trade which harvested wood for lumber as well as pine pitch for turpentine, tar and pitch (MHC 1981: 6). A meeting house for the Christian Natives at Bournedale was built in 1765, eventually being moved to Cataumet and used as a Methodist church.

The Herring Pond reservation was created by the Plymouth Colony government for the protection of the Native people who remained neutral during King Philip's War. It is recorded to have had a population of 120 individuals in 1685, all of whom lived in scattered small family units on the bands 3,000 acres. Additional hamlets were located at Kitteaumet (aka Monimant [Manomet Ponds]) in Plymouth and at Mannamett in Sandwich (Mandell 1996: 51). John Cotton was their first preacher during the 1670s to 1680s but by 1685 he had been replaced by Captain Thomas Tupper, a man with no scholarly background but who preached to the Wampanoag in their own language (Mandell 1996: 52). Judge Samuel Sewall financed the construction of the congregation's first meeting house in 1688 at Mannamett. By 1693 a total of 226 above the age of 10 from four different communities, including Herring Pond, worshiped at this meeting house and by 1698 a total of 348 people were preached to by Tupper and two Native preachers (Mandell 1996: 52). One of these preachers was possibly John Neesnumin who was a Sandwich Native minister who later went to preach in Natick by 1717 (Mandell 1996: 58).

Thomas Tupper's son Elisha followed in his father's footsteps and became the preacher to the Natives at Mannamett by 1751, reporting ten years later that the people to whom he ministered were exceedingly poor with 10 individuals between 75 to 90 years of age and unable to labor (Mandell 1996: 124). Tupper's congregation was the largest mainland Native congregation at the time, numbering over 100 families spread across Herring Pond's 300 acres, 12 families at Kitteaumet and 10 at Mannamett (Mandell 1996: 123). The reservation's population grew at a time when, due to epidemics and colonial

wars, most other Native communities were shrinking. This was due in part to the community's isolation and their custom of accepting members from other dissolving communities. The economy of the population of the reservation at this time was focused on the harvesting of the seasonal runs of alewives from the Herring River, a right that they legally fought to defend in 1762 from poaching by non-Native neighbors (and which they received no recorded reply about from the courts) (Mandell 1996: 138). At Herring Pond, the population was scattered across the 300 acres, possibly as a result of the generally poor, sandy soils and possibly reflecting pre-Contact settlement patterns, while in the adjacent communities populations tended to cluster more (Mandell 1996: 178).

Herring Pond received a new meeting house in 1767 as this area had eventually become the core of the Christian Native population in Southeastern Massachusetts (Mandell 1996: 178). The population of Herring Pond in 1779 numbered 108 persons as a result of natural increase and continued in migration from dissolving communities.

The **Federal Period (1775-1830)**, saw an increase in the role of shipping with a route for what would one day become the Cape Cod Canal being surveyed in 1824 and wharves being constructed at Buttermilk Bay and Red Brook Harbor (MHC 1981: 7). The population, as well as the role of industry grew at this time. Salt making gained in importance and a woolen mill and trip hammer were built on the Herring River (MHC 1981: 8). The population of Herring Pond had been halved by 1792 when it was reported that only 120 people lived there (Chase 1883: 93). In 1814 the non-Native overseers of the Herring Pond community petitioned the Massachusetts Legislature to sell 100 acres of the tribe's cleared land in order to repay expenses incurred by the tribe during an epidemic of contagious disease in 1813 (Shaw and Merrick 1982: 11). The legislature agreed to the sale. The population of the tribe numbered 40 persons by 1825. At the time, the Natives of Herring Pond's economic base was focused on the harvesting of wood from their reservation. Similar sales occurred from the late eighteenth century into the early nineteenth century, resulting in a loss of up to 2/3 of their reservation land (Shaw and Merrick 1982: 12).

The **Early Industrial Period (1830-1870)**, was one of rapid growth in the area. The population increased to 4,496 people in Sandwich, the highway network was improved and in 1848 the Cape Cod Branch of the railroad arrived in Bourne and Sandwich (MHC 1914: 9). Industries in the Bourne area of Sandwich included a nail factory at Bournedale in the 1830s, a woolen mill at Sagamore in 1831, shoe making, which began in 1853, cranberry production in the middle part of the century, and the export of wood. The wood industry was begun by the Perrys of Monument in the 18th century, and was expanded in the 19th century into the Head of the Bay area (Keene 1975: 64). From the heavily timbered Head of the Bay, large amounts of wood were shipped out along the Manamet River. Wood was piled at Skunk Hole, the northerly most cove of Buttermilk Bay and there was a wharf and landing at Gibbs Narrows near Red Brook Harbor (Keene 1975: 65). The year 1850 saw the breaking up of the Herring Pond Reservation with each family and adult over 18 receiving 15 acres (Shaw and Merrick 1982: 12). The 1,600 acres that remained by this point were divided in 1859 among 67 individuals and 19 families with 1,200 acres held in common (Shaw and Merrick 1982: 12).

During the **Late Industrial Period (1870-1915)**, the town of Bourne became a separate entity. The town proper did not exist until 1883 and before that date, it was considered the western village of the town of Sandwich and shared in the growth of the town. The economic base of Cape Cod as a whole and of Sandwich in particular blossomed in the early to mid nineteenth century. The growth of Sandwich began with the founding of the Sandwich Glass Company in 1825 (Lovell 1984:279). The

economy in the next 25 years was further bolstered by the whaling industry, the arrival of the railroad in 1835, the flourishing of brick kilns and the establishment and growth of mills .

The peak of this economic growth was in the 1850s when the population reached 4,479 persons with most of them working in the glass production, mills and maritime industries (Lovell 1984:319). The population began to decline in the 1860s foreshadowing the stagnation of the economy of the town. By 1870 the population had decreased to 3,694 persons (Lovell 1984:319). Between 1860 and 1920 the Cape's population decreased by 26% (Brown 1995:204).

While the population of the town as a whole was beginning to decline, that of the western village declined slightly from 1870-1883, but it appears that this portion of Sandwich was more isolated from the general population trend affecting Sandwich and Cape Cod in general. The western village maintained its own share of town industry and economic growth. The Keith Car Company which began in 1847 by making tools, axles and ironware expanded its operations throughout the century and eventually focused its production on Pullman cars for the expanding railroad (Lovell 1984:394). Coupled with the growth of the Keith Company was the expansion of the railroad on Cape Cod and specifically its expansion to Woods Hole. The line traveled through the western village and contributed to the tourist trade beginning in the late nineteenth century (Lovell 1984:370).

As a result of the growth in the western village, they sought to incorporate themselves into a separate town. The first attempt at separating from Sandwich was in 1873. This was a result of the rise in the value of the land in the western village where 51% of Sandwich's land valuation lay and the fact that there was a great deal of new construction in the western portion (Lovell 1984:371). While the first attempt at secession was not successful, the second attempt in 1883 was. The town of Bourne was incorporated in 1883 and at this time it included eight schools, six post offices, seven telephones, four churches, two foundries, one railroad car plant, fifteen grocery stores, five blacksmith shops, one lumber yard, one ax factory and eight cemeteries (Lovell 1984:375).

While 1883 represented a year of government freedom for the citizen's of Bourne, economically it was early in the slide of the economy. Although Bourne was its own town, it still was economically tied to its mother town Sandwich and Sandwich's financial future was in doubt.

Probably the main industry in Sandwich was glass making, but by the 1870s this business was becoming increasingly unprofitable. This was the trend on all of the East Coast as the markets favored the glass producers in the Midwest (Lovell 1984:381). The depression of 1874 with its financial panic and associated business depression as well as the power of the unions in creating strikes among workers, marked the end of the Sandwich Glass Factory. The factory which at its height employed 520 workers, placed a for sale sign outside of its main factory on October 16, 1888 (Lovell 1984:385). Out of work glass makers tried to form their own company, the Cooperative Glass Co., which had limited success until it too went under in 1911. The failure of the Sandwich Glass Factory was also paralleled by the Cape Cod Glass Works of Sandwich, which closed its doors in 1892 (Lovell 1984:388-389).

The railroad business peaked in the 1890s when Eben Keith was expanding his car works, but at the turn of the century Bourne, as well as Cape Cod, faced an uncertain future. The population of Sandwich as a whole continued to decline until 1930 when it stabilized and grew (Lovell 1984:515). Bourne's population, while never as large as Sandwich's, grew throughout the century especially after 1920 (Lovell 1984:515).

The economic base of Bourne in the early years of the twentieth century was somewhat uncertain. Manufacturing, the marine industries and farming all experienced substantial losses. Industries continued to close down in town, many of which were reopened by new owners just to be closed down again. Industry always appeared to town planners to have the potential to save the town. The great boom times for Sandwich had been during the Sandwich Glass Company years, and it would appear that many saw the potential for a return to the glory years by encouraging new industry. The potential was never realized and industry never again played a major role in town economics.

The savior of Bourne was the increase in tourism and summer residency in the early twentieth century. As early as 1903 summer residents paid seventy five percent of the town's taxes (Lovell 1984:435). Along with this influx of tourists went the need to house all of them. Many towns along the west coast of Cape Cod were able to accommodate the tourists. Bourne participated in the building boom from the area around the presumed location of Aptucxet to the southern end of the Cape Cod Canal. Sandwich on the other hand was not as affected by the building boom because of the previous population decline. Many of the new residents merely moved into vacant houses in the town (Lovell 1984:499).

The economic gain to the town was accompanied by a cultural loss felt by the year round inhabitants. The small town atmosphere was lost for several months out of the year as the summer residents returned. The local history of the town began to be researched, polished up and put on display for the summer residents. By 1930 two historical businesses formed the core of the historical tourism aspect of Bourne and Sandwich's tourist industry.

The **Early Modern Period (1915-1940)** saw the completion of the Cape Cod Canal in 1935, significantly shortening the route from Buzzards Bay to points north. This period also saw the construction and improvement of roadways leading to Cape Cod, encouraging tourist traffic to Cape Cod and away from the Town of Bourne (MHC 1981:14). This led to some population decline and economic difficulties. Bourne did remain the most industrial town on Cape Cod during this period. The Keith manufacturing Company as well as foundries at Bournedale and Pocasset provided the majority of the economic base for Sandwich and Bourne. Unfortunately, the Keith Company closed in the 1930s and the economic base of the town quickly shifted to cranberry growing, dairying and the tourist trade (MHC 1981:15). The population of what was formerly the Herring Pond Reservation numbered 42 persons by 1928 with three families owning the land at or near the current project area, but not actually living on it (Shaw and Merrick 1982: 13).

IV. ARTIFACT ANALYSIS

A total of 1359 artifacts were recovered from the screening of the soils that had been previously excavated by contractors from beneath the floor of the house (Table 2).

Table 2. Artifacts recovered in 2010 from backdirt

Artifact	Count	Notes
Brick	1	
Clay Pipes	11	
Ceramics	109	
Button	5	2 copper, 3 bone
Cloth	2	
Leather shoe parts	34	
Bone	889	
Crustacean shell	4	
Shell	23	
Nuts/ Seeds	27	Apricot, peach, walnut, hickory. wheat
Cordage	2	Basswood
Maize	41	
Wood	10	
Curved Glass	87	
Flat Glass	35	
Lithic flake	1	Rhyolite
Coins	3	2 copper, 1 silver
Furniture tacks	2	Copper
Cast iron pot leg	1	
Nails	52	Hand wrought, machine cut, wire
Iron other	5	
Lead waste	1	
Lead Kame	1	1712 date on interior
Plastic	1	Toy

Clay Pipes

Clay tobacco pipes are, to the archaeologist, two things, one of the most commonly occurring objects on colonial sites and easily dated by their makers' marks and bowl styles. The stem bores of tobacco pipes gradually became smaller over the centuries since they were first produced in England. The stems of the pipes were slowly lengthened over time and as a result the bore of the stems became smaller with those from the 1580-1620 period are predominantly of a 9/64" bore while those of 1650-1680 are predominantly of a 7/64" bore. J.C. Harrington discovered this reduction sequence when he worked with clay pipes from Jamestown in the 1950s and it has been refined over the years.

9/64"	1580-1620
8/64"	1620-1650
7/64"	1650-1680
6/64"	1680-1710
5/64"	1710-1750
4/64"	1750-1800

This dating by stem bores was initially believed to be the answer to the problem of dating sites. Of course, dating artifacts is never as easy as Harrington and Binford felt that it could be. In reality, the dates for the different pipe stem bores represent the specific periods of greatest popularity for those sizes, so there is a degree of over lap with all of these sizes. When the 7/64" were in their greatest popularity, there were still 8/64" being made, and later in their period of popularity there were 6/64" being made. For example, Hume shows a chart on which he estimates the percentages of production at different time periods for different bore diameters:

Date range	9/64"	8/64"	7/64"	6/64"	5/64"	4/64"
1620-1650	20%	59%	21%			
1650-1680		25%	57%	18%		
1680-1710			16%	72%	12%	
1710-1750				15%	72%	13%
1750-1800				3%	20%	74%

These percentages all represent the popularity of the sizes at the median date of production. In the early years of the different size's production there would have been a greater percentage of the earlier sizes bores. As one moves through the production period the earlier sizes would be phased out and the next smaller size would begin towards the middle to end of the period, moving into the next period. But one can assume that there was never any regularity to the production outputs by various producers in the different times for the different bores. What this means is that just because you find a pipe stem bearing a 9/64" stem bore, it does not necessarily follow that the site was occupied between 1580 and 1620, it is just as likely to have been occupied between 1580 and 1650. Pipe stem bore dates are just one tool that the archaeologist uses to date a site, not the only means.

Bearing in mind the imprecision of stem bores as an absolute dating tool, what can be accomplished using these stem bores is to see when the range of activity at the site occurred. Sites with small percentages of 9/64" stems, large percentages of 8/64" stems and a small percentage of 7/64" stems can be assumed to have their maximum period of occupation between the 1620 to 1650 period.

Another method that can be used to help to date a site is the establishment of median dates. By taking the median dates for each of the pipe stem bores, multiplying this by the number of fragments of each bore, adding all of the resultant answers together and finally dividing them by the total number of measurable fragments, the median date of occupation at the site can be hypothesized. This will result in a median date based on the assumption of pipe makers strictly adhering to the changes in pipe length in a given period.

Median dates such as these do help somewhat when attempting to determine if the site dates to a specific possible owner's period of occupation. For example, if one believes that the site is that of a farmer who the documents say lived at his home from 1635-1687, the median occupation date of the site based on the documents is 1661. If one looks at the pipe stems and uses the formula and the median date is 1740, then the researcher becomes suspicious of the plausibility of the site being that specific farmer's house. Of course, a good archaeologist is not merely going to look only at the clay pipes to interpret or date a site, they will look at all the artifacts from the site and then be more confident in assigning a specific site to a specific occupant.

The bowl styles which would date to this period are outlined by Hume (Hume 1969:302). The styles from England have been studied extensively by Adrian Oswald in his monumental work on the Bristol pipe makers (Oswald 1975). The pipe bowls from this period would be characterized by a diminutive size, but not as small as those from the 1580-1620 period. Their bowls tilt forward away from the smoker and they usually have rather larger heels which are the portions of the bowls on the underside. Later bowls became larger and the heels shrunk until late in the seventeenth century they sometimes have disappeared altogether. The clay pipes from a site dating from 1635-1650 would be expected to be composed of large bored stems mainly of the 8/64" variety and small sized bowls similar to those shown in Hume's work. Using his work, the various bowls and many bowl fragments found at a site can be used to support or refute the chronology of the site or features based on the stem bore diameters. In its most basic sense, clay pipe bowl sizes increased throughout the seventeenth century. Along with the increased bowl size went a change in shape. The earliest bowls are small bulbous "belly" bowls with relatively narrow bowl openings. Over time the bowls remained bulbous but then grew larger and the diameter of their bowl openings increased.

A total of 11 clay pipe stem and bowl fragments were recovered (**Figure 2**). Five stem fragments with 6/64" stem bores (1680-1710), three with 5/64" stem bores (1710-1750), and one with a 4/64" stem bore (1750-1800) were recovered. This distribution indicates a period of initial deposition in the late seventeenth to early eighteenth century, a period that correlates well with the recovered window lead that was dated 1712, and one of the pipe bowl fragments that was stamped E (B or R) on the rear. The second period of deposition was between 1710-1800 when the majority of the ceramics and other coins date. One other pipe bowl that was recovered dated to the 1820-1860 period.

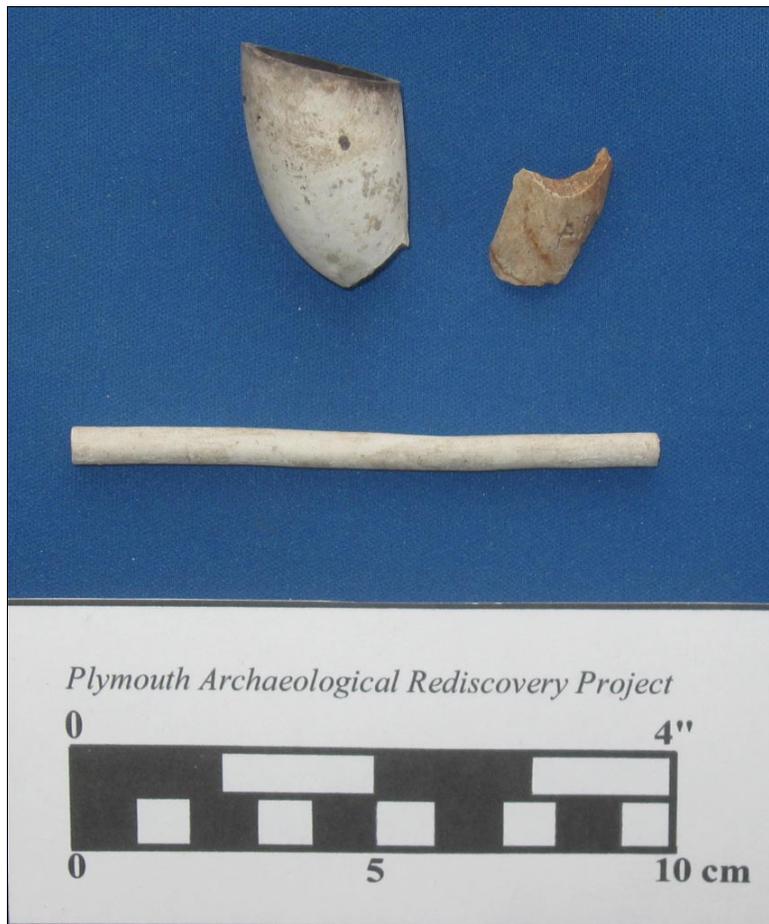


Figure 2. Tobacco pipes. Top Left: 1820-1860 pipe bowl; Top Right: E (R or B) stamped bowl
Bottom stem fragment

Ceramics

A total of 109 ceramic fragments were recovered consisting of redware, Jackfield, creamware, pearlware, ironstone, and white salt-glazed, Fulham, and Westerwald stonewares. These 109 fragments constituted a total of 36 ceramic vessels (Table 3).

Table 3. Ceramics recovered

Ceramic Type	Vessel Type	Fragment Count	Vessel Count
Redware	Hollowware, cup, flowerpot, bottle, chamberpot, pan, bowl, mug, pot	80	15
Jackfield	Mug	1	1
Creamware	Plate, bowl	3	2
Pearlware	Salt and pepper shaker, plate, saucer, tea cup, tea bowl	18	13
Ironstone	Plate	1	1
White salt-glazed stoneware	Saucer, bowl	4	3
Fulham Stoneware	Mug	1	1
Westerwald Stoneware	Jug	1	1

Total		109	36
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Ceramics in Plymouth Colony

In an attempt to move beyond mere description when reporting ceramic occurrences from archaeological excavations (e.g. "15 pieces of creamware, 4 pieces of pearlware and one piece of ironstone were recovered") to an explanation of why they occurred, Dr. James Deetz formulated a series of propositions regarding the use and distribution of ceramics in Plymouth Colony between the years 1620 and 1835 (Deetz 1972). Deetz's propositions were based on ceramics recovered from numerous excavations he directed while at Plimoth Plantation in the 1950s to late 1960s. He stressed the relationship between behavior and its material products and how the acquisition, use and ultimate disposal of artifacts such as ceramics, all resulted from certain aspects of the lifeways of their owners (Deetz 1972: 15). Deetz's propositions were as follows:

- 1) Ceramics are a functional component of a cultural system
- 2) Three successive cultural systems were operative in New England in the period 1620-1835
- 3) In all three cultural systems the presence of ceramics is a function of four factors: availability, need, function, and social status
- 4) Ceramics in Plymouth will exhibit a threefold division in time, corresponding to the three successive cultural systems in operation in New England (1620-1660, 1660-1760, 1760-1835), and within each time period there will be greater internal consistency than between time periods.
- 5) The pattern of ceramic use for the first period will reflect ceramic usage of the Stuart yeomen foodways subsystem as well as that of the first settlers of Plymouth.
- 6) Ceramics of the second period will show differences in terms of use and type, reflecting divergences from the parent culture. They will also exhibit strong conservative tendencies in stylistic and functional trends.
- 7) Ceramics of the third period will show a greater homogeneity and will reflect a more structured pattern of use than those of the earlier period 1760-1835 shows major shift in pottery types
- 8) There will be a marked increase in the rate of change in ceramic types during the third period, and domestically produced ceramics will decrease in relative quantity.

The colonists who settled in Plymouth arrived with the baggage of their medieval heritage and their Stuart yeoman ways. They were not totally representative but were basically less prosperous Stuart yeomen and husbandmen. They were conservative, potentially self-sufficient, and greatly influenced by religious attitudes. This way of life continued relatively unchanged and unchallenged for nearly a generation until the Puritan Revolution in the 1640s led to dramatic reduction in emigration. This led to depressed economic conditions, shortages of imported goods and a cultural isolation that led to a slow but steady divergence from the earlier yeomen lifeways.

The century between 1660 and 1760 saw the isolated New Englanders develop a distinctive Anglo-American folk culture that was different from the English culture in the motherland. After 1760 and until 1835, American culture was impacted by the emergence of a Georgian tradition, which was Deetz's third period.

The Georgian tradition was characterized by symmetrical cognitive structures, homogeneity in material

culture, progressive and innovative world view, and an insistence on order and balance that permeates all aspects of life and contrasted sharply with earlier medieval tradition (Deetz 1972: 18). This Georgian tradition was truly the first popular culture in America and served to dissolve regional boundaries and reanglicized the American culture.

Three general groups of ceramics were identified by Deetz as having been excavated in Plymouth Colony:

Group 1 Fine imported wares

French stoneware, sgraffito, delftware, marbled slipware, trailed slipware, mottled ware, agateware, Wheildon type wares, Jackfield type wares, porcelains, creamware, pearlware

Group 2 coarse imported, undecorated wares

Borderware, North Devon gravel-tempered wares, undecorated redwares

Group 3 Coarse domestic redware

undecorated and later slip-painted and trailed types

Deetz's first period (1620-1660) was characterized by a low occurrence/ minimal need for ceramics within the Stuart yeoman foodways system. Wares that occur during this period were limited to Group 1 French stonewares, Group 2 Borderwares and undecorated redwares. Ceramics were limited to their use in dairying and as drinking vessels.

Deetz's second period (1660-1760) saw a marked increase in the occurrence of fine imported ceramics of Group 1 (delftware, combed slipware, Westerwald stoneware predominantly, supplemented by mottled ware, dipped white stoneware, North Devonshire sgraffito ware), a decrease in Group 2 Borderwares with a concomitant increase in North Devon Gravel Tempered wares, and a growing increase in the use of Group 3 domestically produced redwares. Ceramics were still used for dairying, but by 1650 there was a marked shift in balance of power from the clergy to the merchants at which was indicative of growing trend toward secularization of certain aspects of the growing aspects of culture (Deetz 1972: 27). Supplies were arriving in renewed quantities after the 1660 Restoration, and a greater variety of European ceramics being used in the colonies is not surprising. Another change was the increasing reliance on ceramics as flatwares, dishes and plates, versus their earlier use as hollowares

Finally, the third period was characterized by a complete replacement of all the earlier types by the developing English refined earthenwares- creamware and then pearlware. The Georgian world view was of a more orderly relationship between man and his artifacts could account for it as well possibly creating a situation where there was now one plate, one cup, and one chamberpot relationship per person. Ceramic usage now conformed more closely to conform more closely to our 21st century concepts of the place of ceramics in culture (Deetz 1972: 32).

Ceramic Analysis Method

Analysis began with the identification of the ware (creamware, whiteware, pearlware, redware, etc.). Minimum vessel counts will be generated for each class and a functional analysis of the types of vessels (cups, bowls, saucers, etc.) were carried out. Additionally, the types of decorations (undecorated, hand-painting, transfer printing, etc.) present on the wares were examined and compared to determine if any matched sets are present or if the vessels present appear to be mis-matched sets.

The presence of matched sets over mis-matched pieces may help to better assess the socio-economic status of the household over time. Matched sets may indicate a desire by the inhabitants to own proper service sets and likely indicate that the individuals purchased the pieces specifically for the motif and with the desire to have a matched set. Mis-matched vessels may indicate that the pieces were either purchased with no real desire for the order and propriety implied by matched sets, that the pieces were purchased piece meal over an extended period of time, which may have resulted in the inability to find matching pieces when the time came to purchase another piece. Alternately, mis-matched sets may be a sign that the pieces were donated to the family and were not purchased at all. This would be especially true if the pieces were found to show a time lag between the occupation of the site and the types of ceramics present (i.e. older ceramics donated to a poorer family from a middle class family after that style had gone out of fashion).

There are three general classes that ceramics fall within, being distinguished by the amount of time that they have spent in the kiln. These are earthenwares, stonewares and porcelain with each being higher fired and thus more water-resistant. Earthenware and stoneware were recovered from the Site Examination testing. No porcelain was recovered, possibly reflecting the lower class status of the inhabitants of this site. Earthenwares can be characterized as being a ceramic class composed of glacial or alluvial clays that have been fired in a kiln at temperatures not exceeding 1200 degrees Celsius. Before the firing, the body may be, but was not always, covered with a powdered or later, a liquid lead oxide glaze. This glaze fused to the body and created a waterproof, glass-like surface.

Different paste textures, decorative techniques, and glazes produced different types of earthenware identified by the distinctions: redware; tin-enameled; slipware; North Devon gravel-tempered and gravel-free wares, slipware, and refined earthenwares such as creamware, pearlware, whiteware and ironstone. Some of these varieties have distinct temporal ranges, while others continued in production virtually unchanged for centuries.

The ceramic forms were identified following Beaudry's Potomac Typological System (Beaudry 1988). Milk pans are over 10" in diameter and are similar in shape to the pans and were used for cooling milk, as wash basins and probably for cooking (Beaudry 1988:65). Mugs are single handled, strait sided drinking vessels, taller than wide, and ranging from 1 gill (1/4 pint) to over 2 quarts (Beaudry1988:60). Cups differ from mugs mainly in their size, being only of a pint in capacity. Pots, also called butter pots, are large cylindrical or slightly convex-sided vessels, taller than wide, with some of their possible uses being for souring cream, storing butter and lard (Beaudry 1988:66). A basin is defined as an open vessel with convex sides of greater width than depth, having a brim or everted lip and used for washing, shaving and dining, was found almost complete (Beaudry 1985:63).

Earthenware

Redware

Redware is the largest and most commonly occurring type of earthenware encountered on European Colonial sites. Redware itself has not received a great deal of careful and scholarly work to tightly date them. Apart from Laura Watkins' paramount work and Sarah Turnbaugh's 1985 treatise on the subject, there has not been much follow up work done to continue the scholarship. As a result, while redware makes up the greatest percentage of the assemblages looked at, they can not be closely dated, and must be given limited weight to the amount they can contribute to the identification of an early seventeenth

century site. What can be said about them relates primarily to their glaze colors.

Studying the English ceramic traditions which formed the precedent for colonial potters work, Turnbaugh identified 12 redware traditions in England which she felt were perpetuated by New England potters (Turnbaugh 1985:216-217). Her date ranges for wares made in England date from ca. 1200 to 1795, and those in New England from ca. 1650 to 1815. Turnbaugh identified seven types of decorative styles, based on post-firing glaze color and decoration, with several sub-types for four of the larger types (Table 4). Several Charlestown potters are known including John Parker, who, in

Table 4. Turnbaugh redware types

Type	Color Munsell	Decoration	Date
1a Yellow to Red Glazed	2.5YR3/6 to 5YR 4/8-5/8 to 7.5YR 5/6-5/8 (Dark red to yellow red to strong yellow brown)	Glaze Only	1650-1800
1b Yellow to Red Glazed Slipware	Same as 1a	Yellow slip decoration Metropolitan Style	1685-1800
1c Yellow to Red Glazed Slipware	Same as 1a	Yellow/ dark yellow slip with copper specks Wanfried Style	1685-1800
1d Yellow to Red Glazed Slipware	Same as 1a	Yellow slip limited to bands at rim and base Astbury Style	1763-1800
2a Olive Glazed	2.5Y 5/4- 4/4 to 5Y 7/6 to 5/6 (Olive brown to olive yellow)	Glaze Only	1650-1800
2b Olive Glazed Slipware	Same as 2a	Yellow Slip Decoration	1685-1800
3a Ferruginous Black Glazed	10YR5/1-3/1 (reddish gray to dark reddish gray)	Cistercian Style	1685-1735
4a Black Glazed	5YR2/1-2/2 to 7.5YR2/0 - 2/1 (black to very dark reddish brown)	Jackfield Style	1685-1715
4b Black Glazed Slipware	Same as 4a	Yellow slip Wrotham Style	1685-1735
5a Mottled Glazed	2.5YR4/6 -2/0 (mottled red to dark reddish brown to dusky red to black)	English Manganese Mottled Ware Style	1725-1815
6a Bright Green Glazed	10GY5/4-4/4 (Yellowish green)	Tudor Green/ Borderware Style	1650-1750
7a Yellow Glazed Slipware	2.5Y4/6 -7/6 (light olive brown to yellow)	yellow slipware with sponge-splashed brown design elements	1763-1800

1750, is known to have sold to Barnstable and Harwich as well as Duxbury and Daniel Parker Jr. in 1832 (Watkins 1968: 45). Additionally it is known that Noah Bradford, son of Noah Bradford , potter, of Kingston, Massachusetts, operated a pottery in Barnstable from 1819-1830 that he had bought from Prince Nye (Watkins 1968: 45). People on Cape Cod also received pottery from Long Island in New York (Watkins 1968: 27).

Eighty redware fragments, representing 15 vessels were recovered (**Figure 3**). Vessel forms were limited to mugs, cups, pans, chamberpots, a possible storage pot, a bowl, a bottle, and a flowerpot. Two vessels were decorated with brushed slip designs on the exterior, a technique that dates to the late seventeenth into the eighteenth centuries. The majority of the vessels were associated with food preparation, storage and service. Only two were associated with hygiene.

Jackfield

Jackfield was produced in England between 1745 and 1790. It is easily recognized by its purple or gray paste covered with a black glossy glaze. Jackfield ware was produced in Shropshire after 1750 by Maurice Thursfield and by Thomas Wheildon in Staffordshire (Noel Hume 1969: 123). Wheildon's Jackfield has red body and glossier glaze. The principal ware produced in Jackfield were tea wares and pitchers and they are common in America on sites dating to the 1760s (Noel Hume 1969: 123).

A total of one fragment of Jackfield representing a mug was recovered (**Figure 3**).

Creamware

While English folk and Colonial settlers were content to use redwares for their utilitarian needs, there was always a market for “white wares”, beginning with the importation of Oriental porcelain. But porcelain was expensive and the availability was limited, which led to the development of tin-glazed soft-bodied delft wares which copied the motifs and forms of the more expensive porcelains. By the middle eighteenth century, the English’s quest for a less expensive light-glazed ware similar to Chinese porcelain was brought one step closer by Josiah Wedgwood’s perfection of Creamware in 1762 (Noel Hume 1970:125). This ceramic type was not pure white, but had a light to deep yellow tint to the glaze and pooled green in the crevices of the vessels. Creamware was produced until 1820 and was generally replaced by a whiter “pearlware” that began production in the late 18th century. Early Creamware had a deep yellow tint which, by 1775, was refined to a lighter yellow by the use of kaolin clays in the manufacturing process. Decoration on Creamware was limited to some molding, and hand painting and transfer printing to a much smaller degree. Miller and Hunter (1990) summarized Creamware edge treatments thus:

- 1750-1775 Molded Whieldonware
- 1766-1790 Queen's ware
- 1766-1820 Royal Pattern
- 1765-1790 Feather edge

A total of three fragments of creamware, one feather edged plate and one plain bowl, were recovered (**Figure 4**). The recovery of creamware indicates that at least some of the material recovered from the backdirt dated to after 1762 .



Figure 3. Redware and Jackfield (Right Bottom)

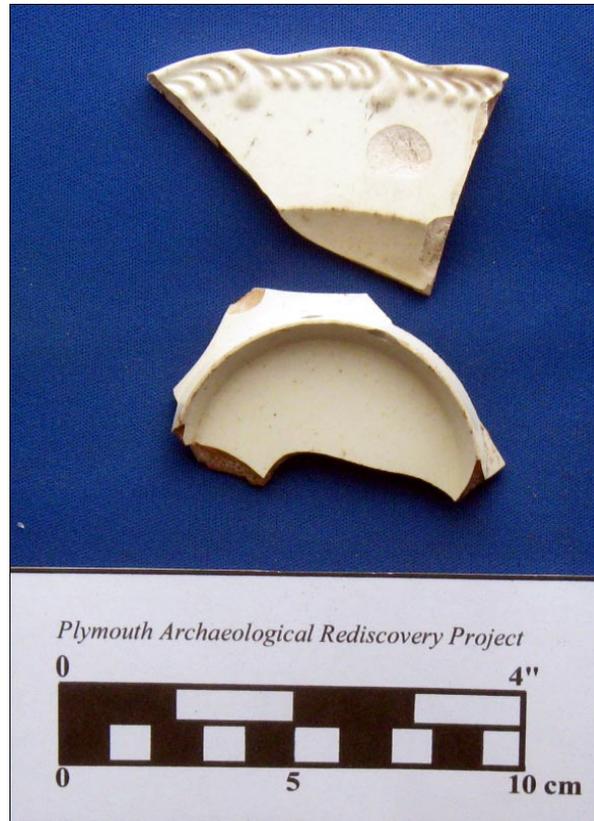


Figure 4. Recovered creamware (Top: feather edged plate; Bottom: bowl)

Pearlware

Pearlware is said to be the most common type of ceramic encountered on early 19th century sites (Noël Hume 1970:130). Whereas when the glaze of creamware pooled green in the crevices of the foot ring on the bottoms of vessels, pearlware pooled blue. Pearlware was used on a wide variety of forms from chamberpots to eggcups but it is most frequently encountered in the form of plates and saucers decorated with blue or green shell edging around their interior rims. Decoration on Pearlware also took the form of cup and mugs decorated with annular bands on the exterior. These “annular wares” were produced from approximately 1795-1815 (Noël Hume 1970:131).

Decorative techniques used on Pearlware, and eventually Whiteware, are more temporally sensitive than the wares themselves. Blue or green shell edge-decorated wares first appear in Wedgwood's 1775 and Leeds' 1783 pattern books and became one of the standard products of the Staffordshire potteries in the nineteenth century. This is believed to be due to the fact that they are the least expensive decorative table ware available (Miller and Hunter 1990). Initially both green and blue were used on the edges, but by 1840 green-edged had become rare with blue shell-edged remaining in production until the 1860s. By the later part of the nineteenth century the production of shell-edged wares had discontinued but blue-edging, edging that was just blue but that lacked the earlier molded edging, continued until the 1890s. Miller and Hunter summarized the production of blue and green edging in 1990:

1780-1810 Rocco Style, irregular scalloped rim and undecorated center
1800-1840 Evenly scalloped Shell Edge

- 1820-1840 Embossed Edge
- 1840-1870 Unscalloped Shell Edge with impressed pattern
- 1850-1890 Unscalloped and unmolded Shell Edge

Pearlware, and later whiteware, were also decorated by hand-painting. Two general types were used: thin-lined and broad-lined (Price 1979). Prior to 1835 polychrome hand-painted designs were executed in mustard yellow, mocha brown and burnt orange, but after 1835 brighter colors such as grass green, golden yellow, red and powder blue were used. The singular use of blue painted designs, intended to mimic porcelain designs, occurred on earthenware from 1775-1840 and was eventually replaced by transfer printing by 1815. After 1820 until approximately 1830, blue floral designs were executed with a bolder stroke and are easily distinguished from the earlier technique.

Transfer printing was the decorative technique that replaced hand-painting after the 1830s (Table 5). This technique was first used in 1797 with the first colors being blue, black and sepia and was followed by red, yellow in 1848 and then brown and green in 1852 (Miller 1965). The earliest patterns were Chinese until 1805 when the development of copper plate engraving allowed the creation of finer lines and more variation in color tone. After 1830 the quality of design and color intensity declined and multicolor underglazing was developed in 1848. Color is considered the most temporally sensitive property of this decorative technique. The following table (compiled by Stelle:2001) outlines the temporal changes in transfer printing in the nineteenth century (as described by Miller 1987, Esary 1982, Sonderman 1979, and McCorvie 1987):

Table 5. Transfer-printing color date ranges and periods of maximum popularity.

Type	Date Range	Maximum Popularity
Dark Blue	1820-1860	1820-1830
Light Blue	1826-1831	1827-1828
Blue and Painted	1840-1860	
Red	1829-1850	1829-1839
Brown	1829-1850	1829-1839
Green	1829-1850	1829-1839
Black	1830-1850	
Purple	1829-1860	1829-1839
Purple and Painted	1840-1860	
Gray and Painted	1840-1860	
Red and Green	1832-1838	
Scenic Flow Blue or Black	1840-1860	1840-1849
Flowery Flow	1870-1879	

Three green edged pearlware plates and one green edged salt and pepper shaker were recovered. The edges of the plates are not evenly scalloped but the edge they are embossed, dating them to the 1820-1840 period (**Figure 5**).



Figure 5. Green edged pearlware plate

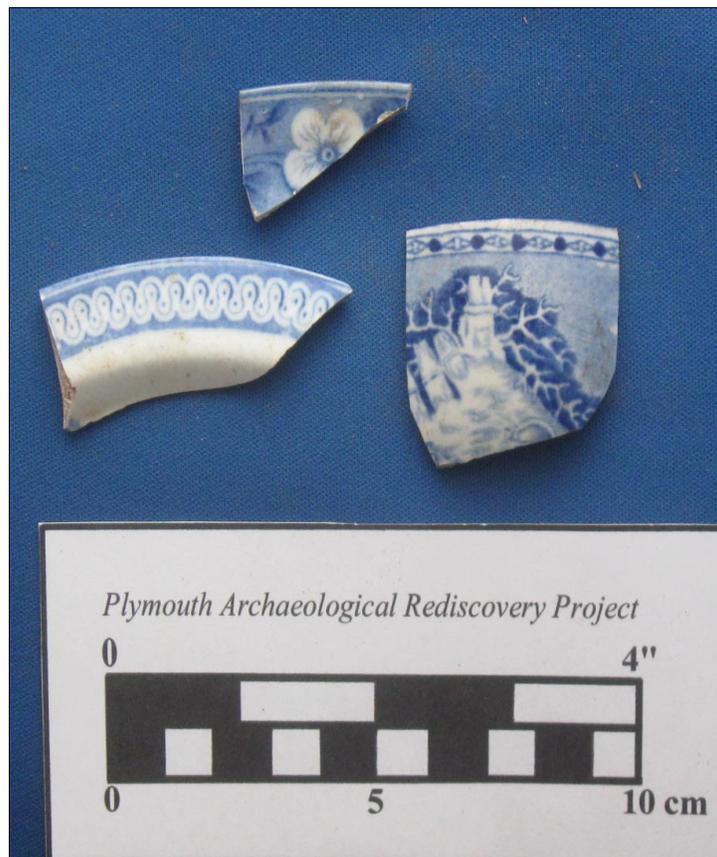
Four blue hand-painted pearlware teawares were recovered. One of the vessels is executed in a fine line design that probably dates from 1775-1820 while the remaining ones bear a bolder stroke that dates from 1820-1840 (**Figure 6**). Two tea bowls were decorated with polychrome hand painting on their exterior, dating them between 1835 and 1840 (**Figure 6**). Three lighter blue transferprint decorated vessels, two saucers and one tea cup, were recovered (**Figure 6**). These probably date from 1820-1830.



Blue hand painted pearlware.
Top Right: 1775-1820 style



Polychrome hand painted pearlware



Blue transferprinted pearlware

Figure 6. Decorated pearlwares

Ironstone

Ironstone is a high-fired earthenware that approaches, but never quite reaches the hardness of

stonewares. Ironstone was developed to compete with the whiteware market. With the final development of thin whiteware, the thicker ironstone was relegated to products such as plates, pitchers and bowls, chamber pots and other heavy utilitarian wares. Ironstone was first introduced by Charles Mason of Staffordshire, England in 1813 and was shipped to American markets by 1842. Ironstone was decorated in the same ways as Whiteware. Additionally it was often left plain or molded with leaves, ribs, or flowers. Plain wares were produced for the entire time span of Ironstone production, whereas molded ironstone with sharp angles, and hexagonal or octagonal body forms were popular from the 1840s through the 1880s. After 1860 embossed plant elements became popular and in the 1860s and 1870s, luster decorated “tea leaf” patterns were popular (Kovel 1973).

One fragment of plain white ironstone was recovered. The fragment came from a plate and dates to after 1842 (**Figure 7**).

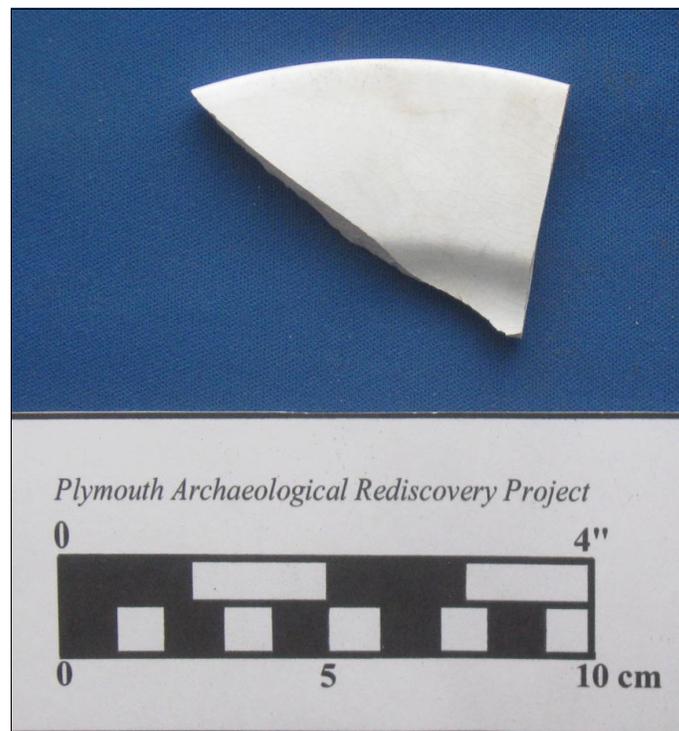


Figure 7. Ironstone plate fragment

Stoneware

Stoneware can be described as a ceramic type that is made of alluvial or glacial clays which is fired in a kiln at temperatures of 1200 to 1400 degrees Celsius. Firing the clays at these temperatures produces a dense, vitrified, waterproof body of a gray, brown or buff color. Vessels were often glazed by throwing handfuls of salt into the kiln at the peak of firing. This imparted a salt glaze, giving the exterior surface a waterproof glaze with an orange peel like texture.

Stoneware products often took the form of heavy, utilitarian objects such as mugs, jugs, crocks, churns, pitchers, inkwells and oil lamps. Four general types of surface treatments can be present on stoneware: Unglazed/Plain, Salt-Glazed, Albany-Slipped and Bristol. Unglazed stoneware is considered relatively rare (Stelle 2001). Salt glazing was commonly used in all periods of production and was often used in combination with Albany Slip, with salt glazing generally being less popular after the 1860s (Zilmer 1987:35). Albany Slip is described as a hard, chocolate brown glaze produced by natural clays found in

the Albany region of New York (Stelle 2001). Bristol glaze consists of a white to off-white hard and glossy glaze often used in combination with Albany slip on the exterior of “whiskey” jugs before 1920, but also was used on jars and crocks. It was common after 1890. No Albany slipped stoneware was recovered, helping to support a date of deposition for this material as before the middle of the nineteenth century.

Westerwald

The second type stoneware common in the eighteenth century were German ceramics produced in the Westerwald region. These were most commonly made in the form of jugs that were decorated with cobalt blue and a salt glaze on a gray stoneware body. Over time the finely executed decorations and lines on Westerwald vessels became degraded. By the late seventeenth and especially the eighteenth century, they were distinctly debased. After approximately 1660 manganese was also used in conjunction with cobalt in the decoration of these vessels (Hume 1969:281). German stoneware is found on American sites dating to the eighteenth century before the American Revolution.

One fragment of a Westerwald jug bearing an incised floral and molded decorations that was colored with both cobalt and manganese was recovered. This vessel is believed to date between 1660-1775 (**Figure 8**).

English Brown Stoneware

The English stoneware type that truly kicked off Britain’s entry into the stoneware market was produced by John Dwight of Fulham England in 1671. It is believed that Dwight was modeling his stoneware on the products of Germany’s Rhineland and his best known products were small drinking mugs with reeded necks (Noël Hume 1970:112). Ceramics of this type of brown English stoneware continued to be made in England and America until circa 1775.

One fragment of a Fulham English stoneware mug was recovered (**Figure 8**).



Figure 8. Stoneware. Left: Westerwald; Right: Fulham

White Salt-Glazed Stoneware

While Germany was the best known stoneware producer in the 17th and 18th centuries, other countries, especially England, began to try their hand at this craft as well. The most important development in England’s stoneware industry was the perfection in 1720 of a thin bodied white salt-glazed stoneware. This ware became common tableware by the middle 18th century and soon took away much of the trade

from the tin-enameled producers (Noël Hume 1970:115). Common shapes included plates with molded rim decorations and cup and saucers with a scratch blue decoration. This later decorative technique became popular in the mid 18th century, especially in the third quarter.

Four fragments of white salt-glazed stoneware were recovered representing two saucers and one bowl. One of the vessels bore a scratch blue decoration.

Ceramics Summary

The use of ceramics by type and by period can be seen in Table 6. Utilitarian duties (dairying, hygiene)

Table 6. Ceramic occurrence by use classes

Ceramic Type	Dairying	Serving	Hygiene	Decorative
Redware	5	5	2	1
Jackfield		1		
Creamware		5		
Pearlware		13		
Ironstone		1		
White salt glazed		3		
English brown		1		
Westerwald		1		
Totals	5	30	2	1

were carried out using redwares while the other wares were used to serve and consume liquids and solids (cups, plates, saucers, bowls, salt and pepper shaker). Redware was used in Plymouth Colony from its founding up until approximately 1860 for many purposes. White salt-glazed stoneware and later creamwares began to replace redwares on the dinner table and the redwares were relegated under the bed and in the dairy house. This trend continued in the nineteenth century until metal eventually replaced redware in the dairy and finer wares replaced them under the bed.

The dairying class of ceramic vessel forms included butter pots and milkpans. Butter pots were used to hold butter after it had been churned and milkpans were used to let milk settle after it was collected so that the cream, which was used to make butter, could rise to the top and be skimmed off. The presence of these vessels in the cellar indicates either that the cellar was being used to process milk into butter and possibly cheese, that these vessels were being stored here and subsequently broke or that these vessels were deposited at the same time as the animal bones and as a result represent trash from elsewhere redeposited here.

The serving class included vessels that were used for serving both liquids and solids. Vessels for serving liquids included cups, bowls, a bottle, a jug, and mugs. Plates represented the vessels that were used for serving solids. No platters or dishes were identified. Among the serving vessels were several matching saucers and cups and two teapots of various types of ceramics. These vessels represent tea services. Serving tea became popular among the upper class in the late seventeenth century in England and gained popularity in the eighteenth century in New England. By the nineteenth century, tea drinking and tea sets were no longer signs of social status but more just common items in persons homes. Status though tea sets in the nineteenth century was demonstrated through the use of finer ceramics such as porcelain over the plainer and less expensive ones such as whiteware and pearlware.

The hygiene class is represented by redware chamber pots. These types of vessels are often encountered archaeologically and redware is a very common material for them.

The decoration class is represented by one flowerpot. Flowerpots were common ceramic forms made out of low fired redware in the eighteenth century to today. Noël Hume states that is hard to date flowerpots due their simple utility of form (1970). The essential form of the flowerpot, a truncated cone, has remained virtually unchanged throughout the years. Differences are to be seen in the manner in which the rims are finished and their manufacturing techniques.

The ceramics can be lumped into one period covering the period from ca. 1760 to 1842. This indicates that ca. 1830-1840 the floor of the hall was open, possibly during a period of renovation, and the assemblage may have been deposited at this time. The fact that the majority of the artifacts recovered were foodways related indicates that they may have all come from activities that occurred in the hall-cooking and consumption.

Faunal Remains

David Landon's study of the seventeenth through nineteenth century provisioning systems in Boston came to the following conclusions regarding urban versus rural butchery, body part representation and kill-off patterns. Landon found broad similarities in the taxonomic representation in all the assemblages with domestic mammals dominating the mammalian portion of the assemblage and a variety of domestic and wild birds and marine resources. It was hypothesized, and verified, that wild fauna may be better represented in the rural assemblages versus the urban ones (Landon 1996:117). Reitz, working in the southeast, found that urban assemblages had a greater range of domestic species, more domestic birds, fewer wild mammals, fewer reptiles, fewer fish and a wider variety of commensal species (Reitz 1986:54-56). Landon found that deer and opossum were present in one urban assemblage but many more were recovered from rural assemblages. Twelve different wild bird species were present in the rural assemblages versus only five in the urban ones. Landon's second hypothesis was that urban assemblages would have exotic species present due to trade connections in the city. This hypothesis was not supported as no exotic species were identified. For domestic species, Landon found that sheep were better represented in the urban assemblages than in the rural ones, a finding supported by the body part representation at the urban sites as well. He identified this as an urban versus rural dietary difference, probably the result of small farmers selling excess animals in urban markets.

Body Part Representation

The basic premise of the study of body part representation was that there was a degree of spatial separation of different processing stages in urban areas and this orientation towards the exchange of meat cuts will be evident in the body part representation (Landon 1996:119). If, in a rural context, certain parts were removed from the butchery process early before the animals got to the urban markets, then these elements should be present in the rural assemblage and absent from the urban assemblages. Landon found that this hypothesis was supported for sheep and cattle where metapodials and phalanges were under represented in the urban deposits. The idea that meatier elements would be over represented was also supported by the cattle and sheep remains. For these species, more upper fore and hind limbs were present in the urban deposits. This did not hold true for swine remains. In general though, Landon found that the evidence for differential body part representation between urban and rural contexts was not very strong (Landon 1996:119).

Butchery Patterns

There are three steps to the butchery process: primary, secondary and tertiary. Primary butchery involves the killing, bleeding, evisceration and skinning of the animal. This stage does not show up well on the bones with the only evidence being skinning cuts around the ends of the metapodials. Secondary butchery involves the division of the carcass into major portions. This generally involves removing the head, splitting the carcass into two halves and dividing the halves into cuts. Tertiary butchery is the consumption phase. This may involve smashing bones to remove marrow, chopping the mandible to remove the tongue or cutting meat off of the bones. Landon's hypothesis regarding butchery patterns were that in urban areas animals will be divided into smaller more standardized portions and that there would be clear evidence for the differential use of various body parts, basically that there would be more secondary and tertiary butchery marks in urban deposits (Landon 1996: 120). No evidence was found to support Landon's first hypothesis and no evidence was found to show that urban butchery was more standardized than rural. The types of tools used to butcher was also found to be the same in urban and rural assemblages and variable due to the size of animal butchered. The only difference was found in the butchery marks related to skinning where Landon found the rural assemblages to contain more skinning marks, a possible indicator of greater desire to have a complete skin. The final conclusion relating to butchery patterns was that urban butchers did little in the way of butchery and that most of the carcass division was done on the urban houselot, with only the feet of cattle and sheep being removed by the butcher.

The pattern of butchery from the 17th to 19th century changed as more standardized meat cuts became commonplace. Essentially new ways of creating certain cuts of meat were introduced and become evident archaeologically on the swine humerus and femur and cattle scapulae.

Kill-off Patterns

Landon found that seasonal slaughter patterns were similar for both urban and rural contexts (Landon 1996: 122). It is believed that as specialized husbandry to supply meat to urban markets increased, urban assemblages will become dominated by younger individuals. Age profiles including older individuals may show evidence of different husbandry practices with age of slaughter being based on use. Essentially, animals raised for meat are slaughtered before adulthood but after they have attained maximum meat weight, for example 18-24 months for swine. Cattle and sheep remains showed that they were not being raised solely for meat at this time. It does appear that some animals were culled from the herd and sold for urban markets. It would be expected that urban assemblages would contain more young animals and rural ones more older and young. Unfortunately, Landon failed to find any clear evidence of this difference in his study (Landon 1996:123). The cattle all appear to be very old or very young while the swine ages appear to be fairly consistent at approximately 18-24 months with a few younger and older present. Sheep appear to have slaughtered at a wide variety of ages with no real pattern. Seasonally it has been shown by Bowen in her study of the Sheffield, Connecticut husbandry system that slaughter was closely tied to the agricultural cycle. Swine and cattle, both large animals that took time to butcher and preserve, were found to have been killed in the coldest months while lambs and calves were killed in the summer and adult sheep in the late summer and fall. This finding was supported by Landon's study of micro growth patterns seen in the teeth from the various assemblages.

Landon did not find that specialized husbandry designed to supply the urban market by the rural farm was evident archaeologically. The decisions as to which individuals were culled had more to do with rural conceptions of the value and use of domestic animals as opposed to market demands. Essentially

it was found that rural values shaped the urban market and not the other way around.

Shellfish

A total of 25 fragments of shell representing seven species were recovered (Table 7). While some of

Table 7. Shellfish recovered

Species	Fragments	Individuals
Quahog	5	1
Whelk	6	4
Nassa	1	4
Soft Shell Clam	3	3
Oyster	5	4
Ribbed Mussel	1	1
Lobster	5	1
Totals	25	18

these species were associated with the Native occupation, others were probably associated with the colonial occupation. Some of the species (ribbed mussel, mud nassa) were probably not consumed but either arrived at the site attached to other species or with seaweed carried to the site by storms. The remaining species, oyster, quahog, surf clam and soft-shell clam, are all believed to have been consumed.

Quahog

The Northern Quahog (*Mercenaria mercenaria*) is one of the most common shellfish remains from archaeological sites. Quahogs are found within sheltered bays and estuaries with a salinity of at least 10 parts per thousand, preferring to live in a sandy firm bottom that can provide attachment points for its young (Chesapeake 1988: 86). This large bivalve has a dark purple “eye” one inner edge of each shell, and as the quahog grows and the shell thickens, so too does the eye. Quahogs can attain a maximum length of 10.9 centimeters long (Amos 1986:402).

Oyster

The Eastern Oyster (*Crassostrea virginica*) is a species with fairly demanding requirements for growth and reproduction. Oysters need a salinity of at least 5 parts per thousand and as a result are found at estuary mouths and even several miles up rivers where there is considerable mixing with seawater (Coke 1983: 37). Along with their salinity requirement, oysters are one of only two bivalves from the site that require firm substrate, preferably one with a minimum of 50 percent clutch to anchor onto. The clutch can be in the form of rocks, shells, gravel, shell hash, or old oyster beds (Chesapeake 1988: 86). They can grow up to 20.5 centimeters long, or longer if you believe the seventeenth century reports, and occur in water intertidally to 12.2 meters deep (Amos 1986 406). Oysters are preyed upon by oyster drills and whelks (Chesapeake 1988: 86).

Soft Shell Clam

Soft-shelled clams (*Mya arenaria*) live in sandy, sandy-mud or sandy clay substrates of bays and inlets intertidally to depths of up to 9.1 meters, generally preferring stiff sands and mud. Soft-shell clams

average from 7-150 millimeters long with most of them being under 100 millimeters and adults can number from six to eight per square foot, burrowing up to 30 centimeters into the sand. Surf clams grow up to 20 cm long and prefer coarse to fine sand substrates.

Whelk

Two species of whelk, the knobbed whelk (*Busycon carica*) and the channeled whelk (*Busycon caniculatus*), were recovered. Both species are common from Cape Cod to Georgia and occur from the shore to 9-15 meters respectively feeding primarily on quahogs (Abbott 1986: 139). They are commonly found on the same sandy or muddy substrates as quahogs, and are often collected attached to quahogs or are accidentally found when quahogs are sought. The knobbed whelk is the larger of the two and can attain a size of 30.8 centimeters under favorable conditions (Sutton 1986:372). The channeled whelk can grow up to 19.1 centimeters and is abundant in shallow bays (Amos 1986:372). Elizabeth Little reports that they migrate in from deeper waters in the spring and summer and remain inshore until October (Little 1986:51).

The most well known documented use for the whelk by Southern New England Native people was for the production of “wampum” beads. These beads were made from the central columnellae of the whelks which were ground round, cut to a length of approximately 1 centimeter and drilled with traded European awl blades (Ceci 1989).

Mud Whelk/ Nassa

One species of Mud Whelk/ Mud Nassa was also recovered. The eastern mud Nassa also known as the mud dog whelk (*Ilyanassa obsoleta*) is an active scavenger on intertidal mud flats in quiet bays and estuaries (Abbott 1986:140). They are also often found on salt marshes such as those that border the cove at the site (Amos 1986:110). These nassas grow to 3.2 centimeters (Amos 1986:383). No seventeenth century references to their use exists and Speck concludes that “...there is no evidence as to the nature of their use, if any.” (Speck and Dexter 1948:261). The fact that these nassas live on mudflats near the low tide line and not attached to shells means that the most probable explanation for their presence is from deliberate collection, possibly as a “sweetmeat.”

Ribbed Mussel

The Atlantic Ribbed Mussel (*Geukensia demissa*) commonly makes its home embedded in muddy sand flats at the low water mark in salt marshes and bays (Abbott 1986:198). It prefers brackish water and can attain a length of 12.8 centimeters (Amos 1986:408).

Vertebrate Faunal Remains

Cattle

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 ocation 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 Anglicentric 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.

Swine

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 hog master 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 cauldron 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

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 sheep masters 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 stapel were found in the CotsallCotsall 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 Wool, 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 wooled, 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 the 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).

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.

Sheep were first imported into Plymouth Colony is 1625, presumably by Myles Standish following his 1625 trip to England. Aside from this anecdotal evidence based on his sale of sheep to Abraham Pierce, little other information is available for the use and history of sheep in Plymouth Colony. Royal permission was granted in 1629 to ship 140 cattle, sheep, horses and goats from Southampton, England

to Massachusetts Bay and when the Winthrop fleet arrived in 1630 they came bearing sheep. The Winthrop fleet sheep, because they left England at Southampton, were probably what would be considered of the Wiltshire breed today. Wiltshires can be described as being "horned sheep, with large head and eyes, Roman-nosed, long faced, wide nostrils, horns falling back behind their ears, chest wide and deep, back straight, legs long, and bones large" (Salm 1892). They fatten well and are good wool producers, being the largest of the fine, medium length wool sheep. The next recorded shipment of sheep to Massachusetts Bay was in 1631 when five sheep, eight heifers, and a calf were shipped from Barnstable in Devonshire, England, in 1633 when 34 Dutch sheep were imported, and in 1635 when 88 Dutch ewes arrived (Salm 1892). Dutch sheep were "rather large, white faced, no horns, long legged, and with a light fleece... mixed Holland and English origin, from the lowlands of Holland and the Texel." (Salm 1892). Even distant locations such as Piscataqua and Norridgewock were recorded in 1635 as having 92 sheep (Salm 1892). By 1640 it was recorded that there were 1000 sheep in the whole colony (Salm 1892). Other breeds that were common in New England were the Romney Marsh, the Herefordshire, the Norfolk, and the old Southdown or Sussex sheep.

Wiltshire sheep gave a fleece that was seldom more than two pounds in weight while the beasts themselves weighed between 150 and 200 pounds. The Romney Marsh sheep from southern Kent had long, thick hearts, broad foreheads crowned with a shock of wool, flat-sided and wide at the loin with narrow breasts, large feet with large bones. They thrived in the winter with little additional feed aside from a little hay and were well adapted to harsh conditions. Their wool was long and coarse (Salm 1892). Herefordshire sheep were a small breed weighing an average of 56 pounds with light bones with soft fine wool (Salm 1892). Norfolk and Suffolk sheep were long and slender with black or mottled faces and legs. They had long, thin faces with straight horns on the ewes and wethers and great curling horns on the rams. Their wool was short and fine that could be made into coarse cloth. They could survive on a variety of pastures and were a good mutton sheep. Sussex (Southdown) sheep were dusky or black and small with long, thin necks with fine black wool (Salm 1892).

The English Civil War (1642-1651) essentially cut the colonies off from many of its English suppliers, forcing them to rely on themselves for the goods they needed. In order to encourage the propagation of sheep in the Colony, Massachusetts Bay ruled in 1654 that no ewes or ewe lambs could be transported out of the country under a penalty of 5 pounds a piece and no rams or wethers could be killed until they were two years old (Salm 1892). The courts recognized the fact that the colony could not rely on any other country as a source of cloth goods, and encouraged households to spin wool, cotton, flax and hemp for their own use with the goal be to spin 30 weeks a year and produce 3 pounds per week of linsey, cotton, or woolin under penalty of 12d per pound short (Salm 1892). Selectmen of the towns were empowered to create and order sheep commons and in 1656 sheep were assessed at 10s per head in order to encourage more people to own more sheep (Salm 1892). By the end of the century towns were producing enough homespun cloth that surplus was being created for trade and export (Salm 1892). This was especially true on Nantucket. The first fulling mill in America was erected in Rowley, Massachusetts in 1643. Fulling is the step in the making of woolen cloth that involves cleaning and thickening the wool, essentially producing clean felt at the end. Fulled cloth is smaller, thicker, waterproof and more durable than other cloths. Fulling involves three steps: scouring, milling, and stretching. Scouring involves placing the dirty wool, water, and fuller's earth into a fulling mill, a simple mill consisting of one or more large wooden hammers (fulling stocks) that pounded the wool. The stocks could be of two types, vertical, which just scoured the wool, and hanging or driving stocks which beat the wool at an almost horizontal angle, turning and tumbling the wool as it was beaten. The head of the stock was triangular with notches at the end to help turn the wool. Further pounding milled

the cleaned wool and felted it. Felting was used for short staple wool used for woolens but not for the worsteds, which were made from long-stapled wool. Once the felt was removed from the mill, it was stretched on wooden frames called tenters using L-shaped tenterhooks and allowed to dry. Benjamin Nye was granted permission to build a fulling mill at Spring Hill on August 8, 1675 "The Towne hath given Benjamin Nie liberty to build a Fulling Mill upon a river comonly called Spring Hill river, provided it doth not damnify the country rode. And Benjamin Nie hath liberty to keep up a mill in the said place as long as he shall see cause to keep up a Fulling Mill in the said place." (NFA 1903: 25). It has been theorized that while he was granted permission to build one here, he may have eventually built on at his residence on Old County Road instead. As far as is known the first mill to be erected at Spring Hill was in 1717 when permission was granted by the town for a saw mill to be erected on the brook at Spring Hill. The first mill on the brook appears to have been built in 1742 when Samuel Wing was granted "the liberty to erect a grist mill on Spring-hill river" (Deyo 1890: 273).

Following the end of the English Civil War, the wool industry in the colonies continued, especially in the production of hats and stockings, but little effort was made to increase flocks or increase production of local homespun products for export. The American Revolution had the affect of making it a Patriotic obligation to wear colonial versus imported woolens and did to promote an increase in wool production in the colonies. On September 5, 1774 the General Congress that the merchants "...to import no more goods, and all the people to use their utmost endeavors to improve the breed and increase the number of sheep by killing as few of them as possible, and not exporting them, but selling on moderate terms to their neighbors who might need them." (Salm 1892). This, and various local recommendations, resulted in 20, 000 less sheep being killed the following year than in 1774 (Salm 1892). Due to the fact that many colonial farmers left the farm to fight in the Revolution, the character of American sheep suffered during this period and resulted in a massive importation of new sheep from abroad following the cessation of hostilities with 229, 904 being imported from a variety of countries (Salm 1892). By 1800 the average New England farmer had the following in livestock: one or two horses, from one to two yoke of oxen, and from ten to twenty sheep (Salm 1892). Sheep fed on grass in the spring to fall and in the winter on hay, corn, turnips, potatoes, carrot, and pods, straw of beans and peas, and cornstalks with the average cost of keeping a sheep was \$1.50- \$2.00 per year and the cost of eight sheep being equal to one cow and the average weight being 12 pounds per quarter (Salm 1892)

At the turn of the century, sheep raising was still focused on the level of the small farmer. Each farmer had a certain number which were sufficient to provide for domestic use and little attention was paid to improvement. Between 1800- 1810 can be seen as a decade of visible progress in American sheep husbandry. Continued hostilities, a virtual Cold War, with England led Americans to rely on themselves to industrialize the woolens industry and begin to produce finer cloths from the same sheep that formerly were used for homespun. Another factor that was limiting sheep production on a larger scale was the lack of an American market for mutton. Tench Coxe recorded in 1794 that mutton was considered fit for "seminaries of learning and poorhouses" but that it was also consumed by the richer classes in the cities and towns but not popular with the mass of the populous (Salm 1892). The greater appreciation of mutton would have to wait until a better breed was introduced that produced both mutton and wool. The breed that eventually did that was the Merino which was first brought to America from Spain in 1785 and was introduced into Massachusetts in 1801 and were being sold at \$30.00 per pair (Salm 1892). Merinos had an average weight of 270 to 300 pounds and produced 3 pounds of wool. It is estimated that by 1810 there were about 7, 000,000 sheep in America with Massachusetts having 399, 182 (Salm 1892).

The War of 1812 and its embargoes caused America's Woolens industry to both grow and become static. Domestic use increased as less goods were imported but exportation was all but halted by Britain's blockading of various ports where American goods were formerly shipped (Salm 1892). This also caused an increased appreciation for Merino sheep which prices rising from \$100.00 to \$1000.00 for a single animal that could be crossed with a farmer's on hand flock (Salm 1892). Wool prices concomitantly rose from \$1.00 to \$2.00 per pound.

Woolen trade with Britain was always an important factor controlling the raising of sheep in America. When trade was good more sheep were raised, when trade flagged, often so too did Americans' interest in sheep. The tariff of 1824 encouraged American woolen manufacture and 2,288 Saxony sheep were subsequently imported in 1826 to improve the American stock (Salm 1892). But the market became flooded and the benefits of the tariff were essentially neutralized with wool and Saxony prices rapidly dropping from \$30.00 per head to as little as \$6.00 (Salm 1892). The Tariff of 1828 revived interest in Saxony again and enterprising farmers threw their efforts into raising sheep versus crops. The result seemed inevitably ironic, wool prices crashed from 45 cents to 29 cents by 1829. This latest crash proved fatal to the Saxony, who never again gained any appreciable amount of popularity. In 1830 there were 350,082 sheep in Massachusetts, mostly Saxony Merino crosses (Salm 1892). By 1840 there were 378,226 sheep in Massachusetts and flocks rarely exceeded 200 or 300 head on a farm with most farms having far fewer (Salm 1892). In 1845 there were 105,428 Merinos and crosses and 33,875 Saxonies, in 1855 there were 95,548 Merinos and crosses and only 6,800 Saxonies (Salm 1892). The total value of wool produced in 1845 was \$923,420 while in 1855 it was \$464,889 (Salm 1892). This period from 1845 to 1855 also marks the switch from a fine-wool to a coarse-wool and mutton focus in the sheep industry, principally as a result of the 1846 tariff which was disastrous to the fine wool industry (Salm 1892). Before that date American factories were producing broadcloth equal in quality to any from the Old World but America could not compete in terms of labor costs to the established Old World mills and the production of broadcloth was abandoned (Salm 1892). The factories now shifted to making medium and coarse fancy cashmeres which required long, coarse staple wool, thus fine wool sheep were now valued only for their meat and not their wool. The Civil War increased the demand for both coarse and fine woolens, thus increasing the value of sheep and their wool and the sheep population in Massachusetts increased from 123,445 in 1860 to 169,442 in 1865 (Salm 1892). After the war there was a demand for a new woolen, combing wool which has long, moderately fine staple and strong fiber. Massachusetts, which never was a strong supplier of wool, suffered from this shift, and by 1875 the sheep population dropped to 55,140 with most of the required wool now being provided by the West (Salm 1892).

At the same time that the wool market was breathing its last gasps in Massachusetts, the mutton and lamb industry was increasing as consumption of these increased. Southdowns were the preferred breed and Shropshire or Oxford Down rams were crossed to add size and wool without detracting from "the splendid mutton qualities, aptitude to fatten, quiet disposition, and perfection of form for the butcher, with tendency to twins, and great capacity for milk found in properly bred Southdowns" (Salm 1892). Other breeds that were favored were a cross of Cotswold, Leicester, or Lincoln, which provided size of carcass and length of staple. By the 1890s, the most profitable branch of Massachusetts sheep raising was the growing of early lambs for market with lambs being dropped from January 1 to March 15 (Salm 1892).

To summarize the use of animals in New 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.

A wide variety of species were recovered from around the house (Table 8). Species recovered

Table 8. Vertebrate species recovered

Species	NISP	MNI	Age
Mouse	2	1	Adult
Rat	2	1	Adult
Raccoon	3	1	Immature
Woodchuck	5	2	Adult
Cat	9	2	Adults
Medium Mammal	30		
Sheep	44	3	1 under 8 mo 1 over 42 mo
Pig	191	4	3 under 30mo, 1 over 42 mo
Cattle	86	2	1 over 36mo 1 under 30 mo
Small Bird	1	1	
Pigeon	1	1	
Duck	34	3	Adult
Chicken	130	5	Immature under 12 mo
Goose	39	2	Adult
Crane	1	1	
Turkey	2	1	Adult
Fish	61		
Bass	13	1	

Bluefish	1	1	
Catfish	6	2	
Cod	78	1	
Scup	118	11	
Sea Robin	1	1	
Sturgeon	1	1	
Flounder	12	3	
Rat Snake	16	1	
Total	887	54	

included both commensal species, animals that live along side of people but that are not commonly domesticated, wild consumed species, and domestic species. . It appears from the remains of the rat, cats, woodchuck, mouse, rat snake, and woodchuck that the space under the house was accessible at least to a degree to wild animals. It appears more probable that they are commensal species that just happened to die beneath the house. The cats probably brought some of the faunal remains beneath the house to consume them as well. This was evidenced by the small carnivore chew marks on several bones, especially the goose and duck skulls. The household cats were probably given the heads of these species when they were butchered.

David Landon published an extensive study of faunal remains from rural versus urban archaeological sites in and around Boston, Massachusetts (Landon 1996). Landon used collections from four historical sites in Massachusetts which spanned the years 1630 to 1825: the Winslow Site in Marshfield (1650-1700), the Paddy's Alley/ Cross Street (late 17th to early nineteenth century), the Wilkinson Backlot site (1650-1825), and the Spencer-Pierce-Little site (late eighteenth century) (Landon 1996: 19-28).

Landon's analysis focused on differences in rural versus urban assemblages in terms of butchery patterns, ages and seasons of slaughter and how these differences reflected how fauna were raised, butchered and consumed in and around Boston. Landon focused more on broader patterns of urban supply and distributions versus the ethnicity and socioeconomic examinations commonly carried out with faunal remains (Landon 1996: 2).

The amount of meat consumed by occupants of a site has been found to be reflective of the relative wealth of the occupants of the site (Landon 1996: 1). Unfortunately, the amount of preserved (boneless) meat consumed at a site can not be controlled for though. This has been determined to be a potential source of difficulty in interpreting the amount of meat consumed by the occupants of a site (Landon 1996: 2).

In terms of body part representation, Landon found that the taphonomic history of an assemblage influenced the pattern of body part representation in the assemblage. Taphonomically, the assemblages from the Wing Fort House showed a moderate amount of post-use damage- canine chewing and rodent gnawing were present.

The evidence of butchery and consumption marks on the faunal remains indicate the occupants

purchased their meat cuts versus raising their own animals. Similar elements showed similar butchery evidence between species. Sawing is presumed to have been used by the professional butcher to subdivide the larger carcass into salable parts, representing primary, secondary butchery. These parts were then further subdivided by chopping, into more manageable sized pieces for roasting or boiling, which represents tertiary butchery. The occurrence of chop versus saw marks in the three assemblages may indicate that the post-deposition assemblage was subject to a greater degree of post-professional butchery subdivision than the occupation or abandonment assemblages. The paucity of cut marks on the elements indicates a likely preference for boiled versus roasted meats. Boiling bone-in meat would relieve the bone of its meat while adding all the fats and grease present in the meat and bone into the stew, broth or soup. As the meat is removed from the bone by means of boiling, there would be a lack of marks caused by knives on the bones.

Landon found in his analysis that the largest (the trunk, consisting of the scapula, ribs, vertebrae, and pelvis) and meatiest elements of the body (humerus, and femur) logically had the highest percentage of butchery evidence (Landon 1996: 61). Saw marks were found to show an increase in frequency of occurrence over time in all of the urban and rural assemblages studied, rising to 75% by the end of the nineteenth century. Landon interpreted this as coinciding with the rise in the production of standardized and discrete cuts of meat that characterized the butchering industry by the end of the nineteenth century and continues today (Landon 1996: 65). The butchery marks present on the Buttermilk Bay House bone are all represented by examples from Landon's work as well: chopping of the mandible to remove the tongue and jowl meat; lateral splitting of the vertebral column representing initial subdivision of the carcass and further subdivision into cuts; the subdivision of the scapula to create steaks or roasts; finer scale subdivision of the humerus again into cuts; horizontal chopping of ribs to produce slabs; chopping of the pelvis with the proximal end of the femur possibly articulated as one cut; and the subdivision of the tibia and its possible articulation with the distal end of the femur (Landon 1996 68-95). The relative lack of sawing marks indicates that the assemblage originated before sawing became a common practice in the later nineteenth century. The sawn elements that are present may not be from the material recovered under the house and may have become mixed in with the assemblage when it was deposited in the yard.

Excavations in the early 1970s in downtown Plymouth by Plimoth Plantation on the lot located between Main and School streets (C-13A site), encountered three privies that were filled between 1790 and 1835. Faunal remains from this site indicate a possible shift in the use of domestic species over time. Cattle use remained constant but the use of swine showed a continuous and steady decline in the popularity with an inverse rise in the popularity of sheep (Anonymous 1974). The shift from swine to sheep was interpreted as possibly being a result of the gradual deforestation in the Plymouth area with the result being a shift in husbandry approaches to grazing versus foraging species.

Domestic Mammals

Age of Slaughter

Cattle

Eighty-six of cattle bones representing a minimum of two individuals were recovered. The two individuals present were aged under 30 months and over 3 years. There was at least one calf and one older individual represented in the combined cattle remains.

The consumers at the house (one calf and one older individual) was similar to cattle remains from the Harlow Old Fort House. At this site the inhabitants consumed meat from one calf, one young cattle of

the ideal under 2 years old maximum meat time, and 1 older cattle, possibly a cow over three years who was no longer producing. Joann Bowen in 1994 concluded an in depth study of Chesapeake versus Plymouth Colony foodways and found that this was a common pattern in the eighteenth to nineteenth centuries (Bowen 1994:157). Looking at Bowen’s 1994 work, this would indicate that either the inhabitants of the house were practicing a livestock management program consistent with a combination dairying and beef production or that they were purchasing meat from a market that was providing such. Dairying practices lead to a selling of young bull calves for veal and of older cows not producing milk whereas beef production sees few veal calves and more animals being killed at the prime age of slaughter, 18-24 months (Bowen 1994:26).

Pig

One hundred and ninety-one fragments of pig bones representing a minimum of four individuals were recovered. The individuals present were under 30 months old (n=3) and over 42 months old (n=1) as evidenced by the degree of epiphiseal fusion on the ends of some of the bones and from the eruption ages of the teeth present. It is believed that the three individuals present were probably approximately 18 months old, the prime age for slaughtering. This may indicate that the sows that bore these pigs had a spring and fall farrowing (Bowen 1994: 26).

Sheep

Forty-four fragments of sheep bones representing a minimum of three individuals were recovered, being under 8 months old and over 42 months old. The sheep remains from the Harlow Old Fort House, were under two years old (probably much younger and representing lambs), and over five and one half years old. The occupants of the Harlow Old Fort House appear to have consumed sheep at the prime age of slaughter (under two years) and as mutton. The occupants of the Buttermilk Bay House appear to have been consuming sheep in a similar pattern

Skeletal Elements Present

The cattle skeletal elements present in the assemblage at the house indicate that the inhabitants were most probably raising consuming their own cattle verses purchasing cuts of meat from a butcher. The majority of the elements were from the higher meat yielding elements versus from the lower meat yielding elements (Table 9). These are the elements that yield the least amount of meat and are often

Table 9. Faunal elements present

Element	Cattle	Sheep	Swine
Low	26	25	101
Maxilla	1	2	16
Mandible	3	4	16
Ulna	2	3	5
Radius	2	3	1
Carpal/ Tarsal	9	1	3
Metacarpal	1		12
Tibia	4	3	5
Astragelous	2	1	3
Calcaneus		2	6
Metatarsal			9
Phalanges	2	6	27

High	59	18	76
Cervical Vertebra	10	2	8
Thoracic Vertebra	7		14
Lumbar Vertebra	4	1	8
Caudal Vertebra	1	1	
Ribs	23	6	35
Scapula	2	4	1
Humerus	4		6
Pelvis	3	2	1
Femur	4	2	3
Patella	1		

discarded during butchery. If the refuse recovered from beneath the hall was a result of activities from within the hall, food cooking and consumption, the occurrence of meatier elements versus those elements associated with butchery is to be expected, especially in the case of a large animal like cattle. The cattle assemblage from the Harlow House in contrast indicates that the consumers in the house were purchasing their meat cuts rather than raising their own cattle and slaughtering them. Only one element from a cattle head was recovered, while there were numerous thorax or main body fragments and less lower leg elements. The lower occurrence of elements such as the head and feet and the high incidence of body elements indicates that the consumers in the household either disposed of the less meaty elements such as the head and feet elsewhere, or that these elements were not as commonly purchased.

In contrast to the cattle remains, the higher occurrence of elements such as the head and feet and the somewhat lower incidence of body elements indicates that the consumers in the household were probably raising, butchering and consuming the swine at the site and that more of the swine was being brought within the house for processing and consumption. The swine bones from the Harlow Old Fort House that the occupants of that house were doing much the opposite, they were purchasing cuts versus raising their own swine.

The sheep skeletal elements present in the assemblage follow a pattern similar to the swine elements. The pattern indicates that the consumers in the house were raising their own sheep and then slaughtering them. As can be seen in Table 10, more elements from the lower meat yielding elements were present. Element occurrence indicates that there was a preference for fore leg (cervical vertebra, scapula, humerus, radius) and hind leg (lumbar vertebra, pelvis, femur and tibia) over ribs.

Bone Modification

Many of the cattle bones recovered showed evidence of either butchery or scavenger modification (Table 10) (**Figures 9, 10, and 11**). Butchery modification was represented by cutting and chopping.

Table 10. Bone modifications

Alteration	Cattle	Swine	Sheep	Chicken	Duck	Goose	Turkey
Saw	1	1					
Chop	42	42	16	1			

Cut	3		2	1			
Carnivore Chewed	5	3	5	4	2	8	1
Rodent Gnawed	1						
Totals	52	46	23	6	2	8	1

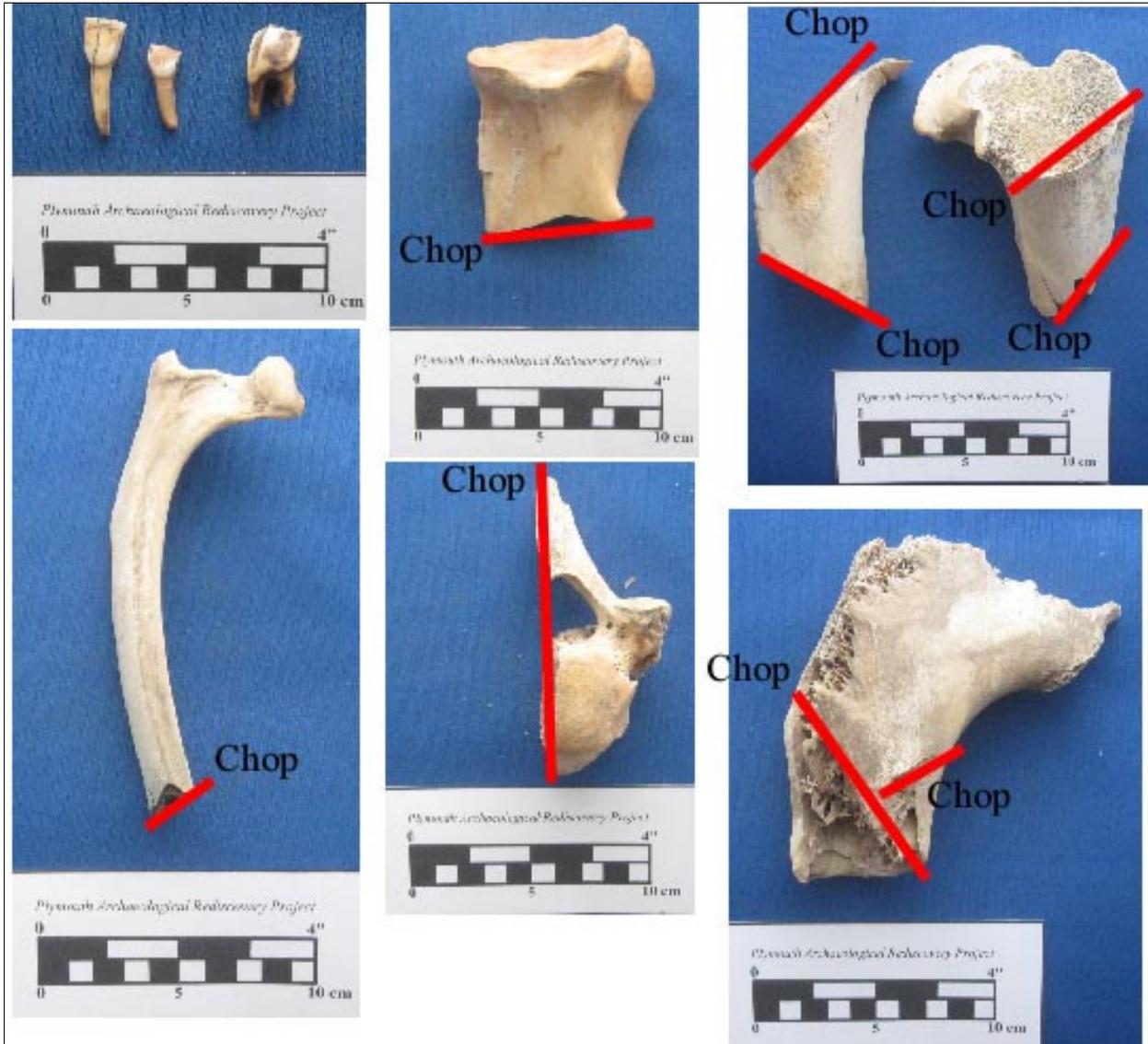


Figure 9. Cattle bones recovered



Figure 10. Swine bones recovered



Figure 11. Sheep bones recovered

Chopping and represents the initial division of the carcass into two halves along the head to tail midline and subsequent segmenting of these halves into cuts. Chop marks were concentrated on vertebra, ribs and humerus. Cut marks were located only on the ribs and thoracic vertebra in the cattle, ribs in the sheep, and longbone in the chicken. Generally, cut marks occur throughout the history of people eating meat and the same can be said with chop mark.

Chew marks are evidence of carnivore activity at a site. Cats, skunks, dogs, foxes and coyotes often chew bones to digest the upper and lower ends where nutrients are concentrated. The chew marks in the assemblage appear to be from small ones such as cats and skunks. The presence of chew marks indicates that at least part of the assemblage was exposed to these animals and was not buried and that the cats probably carried some elements under the house to eat them. The absence of canine and the low occurrence of rodent chew marks on the bones may indicate that they were protected from these species, possibly by the presence of cats.

Small Mammals

A total of five species (cat, woodchuck, mouse, rat, raccoon) of small mammals were recovered (**Figure 12**). All of these species commonly dwell near and beneath humans, making them commensal species. The cats were probably farm cats that at least hunted if not caught the rat and mouse species and used the under the hall space as their den. The woodchuck and the raccoon also may have used the space as dens or may have been consumed.

Bird Species

The six avian species recovered (chicken, duck, goose, turkey, pigeon, crane and unidentified small bird) were both domestic and wild species (**Figure 13**). Domestic species included the chickens and probably the ducks, some of which appear to have been of the Muscovy variety based on skulls shapes, geese, turkey and possibly the pigeon. The remaining species, the crane and small bird, are assumed to have been wild. The small bird may have been brought back to the space under the hall floor by one of the cats and the duck skulls all bear evidence of small carnivore chewing. The chewing marks on the duck skulls were most probably the result of the heads being brought to the space by the cats following the ducks butchery. The pigeon may have been a domestic pigeon, a wild mourning dove, or a wild passenger pigeon which was either consumed by the inhabitants or was brought back to the den by a cat. Poultry raising appears to have been an important activity at the farm at some point in its nineteenth century history.

Fish Species

Most of the other species that were recovered were represented by many bones and indicate that even though they were small and probably did not contribute significantly to the diet, they were probably a welcome addition. The fish were probably caught locally and the wide variety of species present is indicative of the richness of the adjacent Little Buttermilk Bay (**Figure 14**).

Scup

The scup (*Stenotomus chrysops*) is a member of the Sparidae family and is one of only two members of this family that frequents New England waters. These fish have large incisors and broad rounded molars that are adapted well for their diet. Scup are browsers that nibble on invertebrates that live on bottom. They grasp them with their incisors and crush with their molars. This diet includes clams,

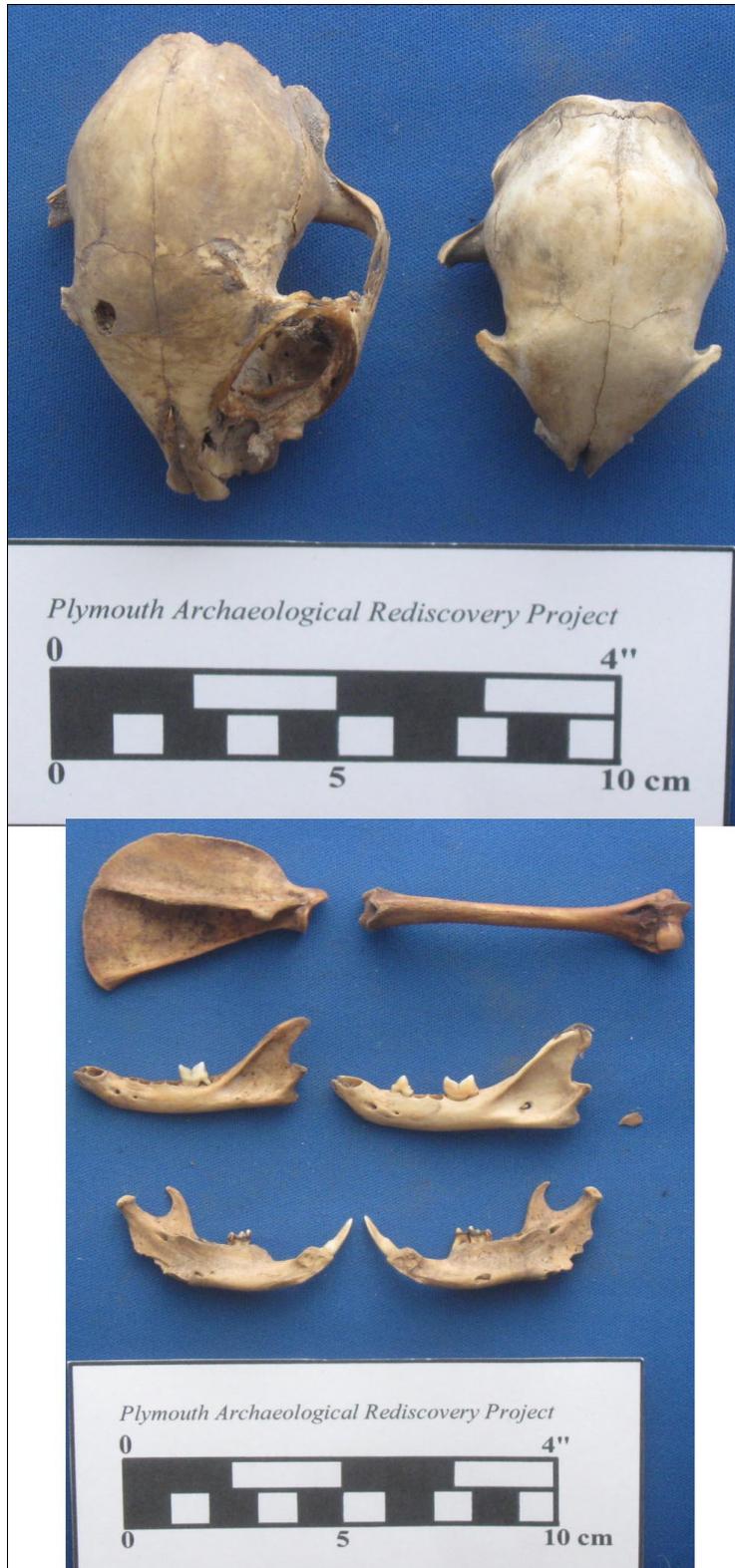


Figure 12. Small mammal bones. Top: cat skulls; Bottom: Top- Raccoon, Middle- cat, Bottom- Woodchuck



Figure 13. Bird bones from the site. Top: Duck, goose, and pigeon skulls; Bottom: chicken, goose and duck bones



Figure 14. Fish (upper) and snake (lower) bones from the site.

crabs, and sea worms. Scup can have been recorded as living up to 15 years, by which time they may reach a maximum length of 46 centimeters and 1870 grams. Specimens found which are over 20 cm can be considered adults. Scup prefer a substrate of smooth sand with weeds such as eelgrass and their main predators are bluefish, weakfish and striped bass, sharks and hake (Bigelow 1953:413).

The schools of scup arrive inshore off of Woods Hole, Massachusetts from their offshore wintering grounds in early May when the water temperature gets above seven degrees Celsius. They appear to travel in schools segregated by size and although it has not been proven, it is said that the larger ones arrive in the spring with the smaller ones following later (Bigelow 1953:413). Spawning occurs inshore from May to August with a concentration in June. During this time, as the water temperature warms, the schools become more widely spread out, only to congregate again in the fall as the temperature cools. They are also not known to feed as much or bite bait during the spawning time but afterwards will (Bigelow 1953:413). Their congregation and feeding patterns indicate that the optimal time to catch the scup without spending a great deal of effort would be in the spring before they disperse of in the fall when they re-congregate. The scups spawning period coincides with that of the weakfish, searobin and tautog and they are often found together. Scup remain in the New England waters, mainly on the southern shore of Cape Cod until late October when they begin their offshore migration (Bigelow 1953:413).

Northern Searobin

The second most common species of fish remains recovered were those of the Northern Searobin (*Prionotus carolinus*). This is a non-schooling fish that is commonly caught as a bottom feeder rarely on mud or rocky bottoms (Bigelow 1953:469). They appear to favor smooth hard sandy grounds as comfortable in estuaries as they are on the edge of the continental shelf. The searobin feeds on shrimp, crabs, squids, bivalves, worms, herring, menhaden, flounders, annelids, seaweed, and bivalves (Bigelow 1953:469). The searobin can reach a maximum size of 406 millimeters and weigh up to 170 grams. Most commonly specimens approximately 305 millimeters are caught. They are one of the food species of the Dusky and the Sandbar sharks (Bigelow 1953:469). The northern searobin in a warm weather visitor primarily to the waters on the southern shore of Cape Cod. They arrive with the warming waters in May and stay in the area until October with July and August being the peak spawning months (Bigelow 1953:469).

Black Bass

The black bass or rock bass (*Centropristis striata*) is one of the more pelagic species that was recovered from the excavations. The juveniles are often found in the more saline areas of estuaries but the adults are less often found here, unless there are oyster beds present. Black bass like the other species present at the site, are seasonal residents in northern waters. They arrive off of our coast in Early May and are most abundant around Woods Hole from July to September, although they remain here until early November (Bigelow 1953:408). Black bass are most plentiful in waters under 20 fathoms deep over a hard or rocky bottom. Here they feed on crabs, lobsters, shrimp, mollusks, small fish and squid (Bigelow 1953:408).

The adult black bass can reach a maximum length of sixty centimeters and weigh up to 3.4 kilograms. Here in their northern range they rarely achieve a weight greater than 2.5 kilograms and the bass which are commonly caught are approximately 700 grams (Bigelow 1953:408). A general rule of thumb regarding the length to weight ration for bass is that a specimen 30 centimeters long will weigh approximately .5 kilograms whereas one 45 to 55 centimeters long will weigh 1.4 kilograms (Bigelow

1953:408). There also seems to be a degree of sexual dimorphism between the sexes because the adult males develop a fatty hump on the back in front of the dorsal fin whereas the females will not (Bigelow 1953:408). Interestingly this was noted in the seventeenth century as well. William Wood in 1634 noted that bass were "...one of the best fish, meat delicate, fine, fat, fast fish with a bone in its head which contains a saucerful of marrow, sweet and good, pleasant to the palate and wholesome to the stomach. When there is a great store we only eat the heads and store up the rest for winter." (Wood 1634:55). Although he and other writers of the period do not make a distinction between striped bass (*Morone saxatilis*) and the black bass his description of the fineness of the fish could apply to either.

Cod

The cod (*Gadus morhua*) is the best known fish from the New England area. The great abundance of the cod off of the coast of Cape Cod and Georges Banks was one of the primary impetuses that led to Europeans to come to New England in the seventeenth century. Cod are another migratory species of fish that spends the winters inshore and the summers offshore. A number of European sources note their presence year round in New England and especially in Plymouth Harbor though, so possibly due to their great numbers or to a different seasonal migration pattern they were available throughout the year. The larger ones appear at the mouths of rivers in late summer and winter on Cape Cod, approximately around early November and continue here until April (Bigelow 1953:193). They are just visitors though with no spawning occurring off of southern Cape Cod (Bigelow 1953:192).

Cods favor rocky, pebble ground, gravel, or sand and clay with broken shells, basically a hard substrate near which they generally remain to feed. They feed on herring, and other small fish but the largest part of their diet consists of mollusks and crustaceans such as crabs, lobster, shrimp, starfish, sea urchins, and surf clams (Bigelow 1953:185). They feed on these fish at dawn and dusk with the crab being the primary food they eat on the Nantucket Shoals. Cod, in turn, are fed upon by large sharks, spiny dogfish, pollock and larger cod.

Because the cod were very important to Europeans, there are many references to them. The first was by the man who named Cape Cod, due to the abundance of the cod, Gosnold. He merely stated in 1602 that he saw them here in great abundance (Gosnold 1602:48). Champlain, in 1605, commented on the Native technique to catch cod, and probably other large fish as well. While anchored in Plymouth harbor in July, he noted that "The natives came in a boat who had been fishing for cod which are found in very large numbers. These they catch with hooks made of a piece of wood to which they fasten a bone in the shape of a spear, and fasten it very securely. The whole has a fang shape, and the line made of the bark of trees. The bone is fastened on with cordage, plant used is gathered, not cultivated and grew to a height of 4-5'." (Champlain 1605:82-83).

As was stated earlier Europeans stated that they saw cod in a number of months that we today do not see them. Champlain saw them in July in Plymouth harbor in 1605, Weymouth took them in May off of Maine in 1605, Pring saw them on Cape cod, where he stated there were many in June in 1606, John Smith stated that in March, April, May and the first half of June they were in great abundance, and Winslow stated that from March to October the sea is full of cod (Champlain 1605:82; Weymouth 1605:110; Pring 1606:60; Smith 1614:231; Winslow 1622: 294). These observations differ from the occurrence of cod in the area today that is from early November to April. The difference may come from a number of sources. It may be that some explorers mistook other fish that the Natives were fishing for cod. It may also be that the explorers were not specific about where they saw the cod and as many of them traveled from Cape Cod to Maine, they may have seen them in June in Maine and

assumed that they were present off of Cape Cod at the same time.

Winslow's statement is interesting in that it reverses almost exactly the present day occurrence of cod in southern New England. He states that they are present from March to October when in fact he may have meant they were present from October to March. This may have been his own mistake or it may have been an error on the part of the typesetter for the original publication. Small, young cod are present in the summer at the mouths of rivers, but the larger ones do not appear until the fall (Bigelow 1953:192). Seasonality work which has been done on cod indicate that they appear to have occurred at the same time as they do today (Barber 1982: 79-81). It is probably safe to assume that the reasons for the differences in the occurrences noted in the period and today are due to human error and generalizations on occurrence.

Bluefish

The bluefish (*Pomatomus saltatrix*) arrives in New England waters in late May and by late June the schools of thousands of fish will work themselves inshore (Bigelow 1953:384). The smaller ones under 1.4 kilograms will run up into harbors and estuaries while the larger ones, being more oceanic in nature, will generally stay offshore, only sometimes occurring in estuaries and brackish water (Bigelow 1953:386; Fishbase). Adult bluefish can reach 120 centimeters in length and weigh up to 14 kilograms (Bigelow 1953:384). They feed on menhaden, mackerel, herring, alewives, scup, hake, butterfish, cunners and squid (Bigelow 1953:384). Bluefish leave New England as the water begins to get colder and are gone by early November.

Sources from the seventeenth century record that bluefish and bass were often caught at the same time and in much the same manner. Pory noted that both bass and bluefish were caught with seine nets and hooks in mid-May when they arrived. Concerning the bluefish specifically, he stated that "...in delicacy it excelleth all kind of fish that ever I tasted; I except the salmon of the Thames in his prime season, nor any other fish. We call it by the compound name of black, white, blue, sweet, fat-the skin and scale, blue; the flesh next under the scale for an inch deep black and as sweet as the marrow of an ox; the residue of the flesh underneath, purely white, fat, and of a taste requiring no addition of sauce. By which alluring qualities it may seem dangerously tending to surfeit, but we found by experience that having satisfied (and in a manner gluttoned) ourselves therewith, it proved wholesome unto us and most easy of digestion." (Pory 1622:09).

Bullhead Catfish

The Bullhead catfish (sp. *Ameiurus*) is distributed in North America virtually anywhere east of the Mississippi River. They live in a wide variety of habitats such as brackish ponds, lakes and rivers and feed off of anything they find on the bottom. Bullheads average 1-2 pounds in weight although larger individuals up to 10 pounds in weight have been reported. Generally these are considered rough fish and are not eaten but there is no reason why they can not be eaten.

Sturgeon

The Atlantic sturgeon (*Acipenser oxyrinchus*) is among one of the oldest fish species and has a range that extends from Canada to Florida. Sturgeon can reach maximum lengths of 15 feet and weight over eight hundred pounds, but the average length tends to be eight feet and the average weight is 300 pounds. Young sturgeon under the age of six and being between three and five feet long, stay in brackish water where they were born before migrating to the ocean. Sturgeon are anadromous,

traveling up the streams that they were born in every two to six years to spawn. Sturgeons were harvested for food, the skins were used for leather that was used in clothing and bookbinding, and the swim bladders were used to make isinglass that was used to clarifying jellies, glues, wines and beer. meat was exported per year. The export soon dropped due to overfishing to 22,000 pounds and the sturgeon is virtually unfishable today on the East Coasts.

Winter Flounder

The winter flounder (*Psuedopleuronectes americanus*), is distributed on the East Coasts of the North America from Labrador to Georgia. They are found in inshore waters such as bays and estuaries during the winter, moving to deeper water in the summer. Winter flounder may attain sizes of 58 cm in length.

The fish species recovered indicate that the possible renovation of the house in the early nineteenth century was most probably carried out in the warmer months. The species represented were probably caught locally from little Buttermilk Bay using hook and line.

Snake

Several vertebra from a black rat snake were recovered. The snake was a commensal species that may have hunted rodents or hibernated beneath the house (**Figure 14**).

Faunal Summary

The faunal assemblage from the site consisted of mostly domestic species with a few wild one being present. The age distribution of the the domestic mammal indicates that swine were butchered at the prime age of 18 months and sheep were butchered when they were young and old indicating that they were probably raised for meat versus. The cattle remains indicate that they were being raised for dairy purposes and to a lesser extent for meat. Wild species made up only a minor component. Wild species such as the woodchuck, mouse, rat, raccoon, snake, and cat represent commensal species that inhabited the same space as people, often unobserved or literally living beneath the under the house.

Floral Remians

A total of 89 floral and worked wood fragments were recovered (**Figure 15**). The majority of these pieces were nuts, seeds and plant parts from corn (n=41), apricots (n=1), almonds (n=3), English walnut (n=1), gourd (n=4), pumpkin (n=17), peach (n=2), pignut hickory (n=2), wheat (n=1), pitch pine



Floral remains



Top: Pith pine bark; Bottom Left to Right: almond, almond, corn, pumpkin
Figure 15. Floral remains recovered

(n=4), and basswood cordage (n=2). Some of these nuts and seeds were probably carried under the hall by rodents while others were incorporated under the floor during the construction of the second house.

Brick

The dimensions of seventeenth and eighteenth century bricks were legally regulated. As early as 1625 there was a law in England stating the dimensions for bricks being 9" by 4 1/2" by 3" high (22.9 x 11.4 x 7.6 cm), which was very similar to the 1700 dimensions for statute (a.k.a common) bricks which was 9 x 4 1/2 x 2 1/4" (22.9 x 11.4 x 5.7 cm)(Cummings 1979:118). The Massachusetts bay Colony set regulations on brick sizes in 1679, stating that the molds for bricks must be 9" long, 4 1/2" wide and 2 1/4" high, but, as William Leybourn observed in 1668, molds of such size seldom produced bricks of such size due to drying and burning (Cummings 1979:118).

The firing of a single brick clamp results in three different types of bricks: Clinker- those that lie closest the fire which have a glaze on them; those that lie next in the clamp which are of second quality; Samuel or Sandal-bricks- those that lie at the outside of the clamp and which are soft and will dissolve in the weather (Neve 1736).

Measurable bricks from the Allerton Cushman Site in Kingston, Massachusetts (c1650-1690), ranged in width from 9 to 11.5 cm , 4.8 to 6.1 cm in height, and 17 cm long. The single measurable brick from the the Ezra Perry II (Aptuxet Trading Post Museum Site) in Bourne (c. 1670-1720) measured 10 cm wide, 6.35 cm high, and 20 cm long. Later sites, such as the Lot Harding House in Truro, Massachusetts (1746 to present) had bricks measuring 8.6 to 10.9 cm wide, 4.3 to 5.7 cm high and 18.2 to 18.8 cm long and the Duxbury Second Meeting House (1708-1785) bricks were 8.5 to 11 cm wide, 4.3 to 6.2 cm high, and 14 cm long. All of these bricks roughly fit within the known seventeenth and eighteenth century brick regulations.

Bricks such as these were made of local clay mixed with sand, gravel, and even larger pebbles and small rocks to act as aggregates to give strength to the clay. The molding process was begun by drenching a wooden mold into water and then placing it on a table covered with a thin layer of sand. The mold was then filled with a large glob of clay and a board was run either vertically or horizontally across the upper face to level the mold off. The mold was then removed and the brick was paled in the sun to dry before it was fired. Firing bricks involved stacking them up in a specific manner, building what is referred to as a clamp. Wood was placed within the clamp, around the bricks, and the whole thing was set on fire and allowed to burn until the bricks were hard. Bricks that were fired close to the heat source tend to be blackened on their faces that faced the fire, often bearing a vitrified, glass-like surface finish, while those that were farther from the direct heat were more evenly colored. The bricks that were closest to the flames tended to warp and often deformed to some degree. The bricks from the Fort House bore evidence of the sand covered table on one side (moderate to heavy sand being present), the strike to the opposite face to level the clay (most commonly a horizontal strike and rarely vertical), grass impressions on the struck face (from being placed either on the grass or more probably on a straw covered board to dry, the straw ensuring the brick did not stick to the board) , and some vitrification and deformation.

One brick fragment was recovered from the backdirt pile.

Nails

Hand-Wrought Nails

A total of 19 hand-wrought nails or hand-wrought nail fragments were recovered. Hand-wrought nails were made by specific craftspeople called “nailers” in the seventeenth and eighteenth centuries. Nailers took long thin rods of iron and hand formed each individual nail. The resulting nail is distinctive from later machine-made nails in that the shank of the former is square in cross-section and tapers to a sharp point. The heads of hand-wrought nails are large and broad, often with four distinct blows of the headers hammer visible, giving them a distinctive “rose head” appearance. T-headed hand wrought nails are believed to have been used in the later part of the eighteenth century and are probably associated with the Georgianization of the earlier salt box house during the Joshua Wing period before 1800. Similar nails can be found in the attic of the Fort House being used to hold hinges onto a Georgian door.

A total of 26 machine-cut nails and spikes and 7 wire nails were recovered. The shanks of machine-cut nails are rectangular in cross-section, which is a result of the cutting of nail blanks from a flat sheet of iron versus hand hammering each nail. Machine cut nails initially were individually headed but later, by the 1820s, had roughly rectangular machine-stamped heads. While hand-wrought nails and spikes were produced since ancient times, by the late eighteenth century they were replaced by partially machine cut nails between 1790 and 1825, with the machine cutting the nail shanks and a human finisher applying the heads by hand. By 1825 machines had been developed to crudely make the heads and by 1840 the heads and shanks were completely machine-made. Machine-cut nails continue to be produced until the present time. Eventually, by 1890s, round-shanked wire nails, which were first produced in the 1850s, began to dominate the nail market, replacing the machine-cut nails and continuing in use to this day.

Nails are designated by their “penny” size, which refers to how much it costs to purchase 100 of each nail size. A two penny nail would cost two pennies to purchase 100 while a 10 penny nail, due to its larger size, would cost 10 pennies to purchase 100. The abbreviation “d” is used for penny, thus a “10 penny” nail is abbreviated “10d”. The “d” used in the abbreviation comes from the Roman word for a coin, denarius, thus the “d”. Fourteen sizes of hand-wrought nails were identified at the site. These range in size from small brads 30d nails.

Nail sizes correspond to their uses, with smaller nails used for fastening thinner wood and larger nails used for fastening thicker wood. A modern day rule of thumb is that in fastening sheathing, shingles, clapboard, etc., the nail should be at least three times longer than the thickness of the sheet or board being fastened. This means that the 2d to 6d nails, the majority of those recovered, were being used for fastening wood that was .3 to .6” thick, which would be appropriate for clapboards or shingles. The larger nails would have been used for larger pieces of wood. It is generally recommended that 8d nails should be used to nail 1” stock, sheathing, rough flooring and window and door trim. The use of 10d nails is limited to toenailing frames, and framing in general. Other sizes used in framing are 16d, 20d and 60d. Small nails like 3d to 8d are used for nailing clapboards and wood shingles with the smallest size used on lathe as well. Larger stock, such as 2-3” thick pieces, are nailed with 16-60d nails. The majority of the nails were of the 3d (1 1/4” long) size. Recovered hand wrought nails measured from 6-8 cm (7d-12d) while a wider range of machine-cut nail sizes, 3-10 cm (3d-20d) were recovered. The larger hand wrought nails may indicate that the original house may not have been covered with clapboards, which was a common practice and which used smaller nails, and may have been of vertical plank construction. The small machine-cut nails indicate that the exterior of the house was covered either with clapboards or with shingles. The paucity of hand wrought nails of 10-30d size may be related to the use of treenails/ trunnels and the vertical plank construction used for the the earliest

phases of the house.

Flat Glass and Window Leads

A wide variety of colors of flat glass were recovered, most being aqua, but olive, heavily patinated, and clear also occurred. It is believed that the patinated glass was used with the older house (17th-late eighteenth century). Most of the window glass, except the patinated fragments that were used for quarrels, the small diamond-shaped panes used to make a seventeenth to early eighteenth century window, is believed to have been used in rectangular pane windows.

One piece of lead kame was recovered (**Figure 16**). Window kames are H-shaped in profile and are

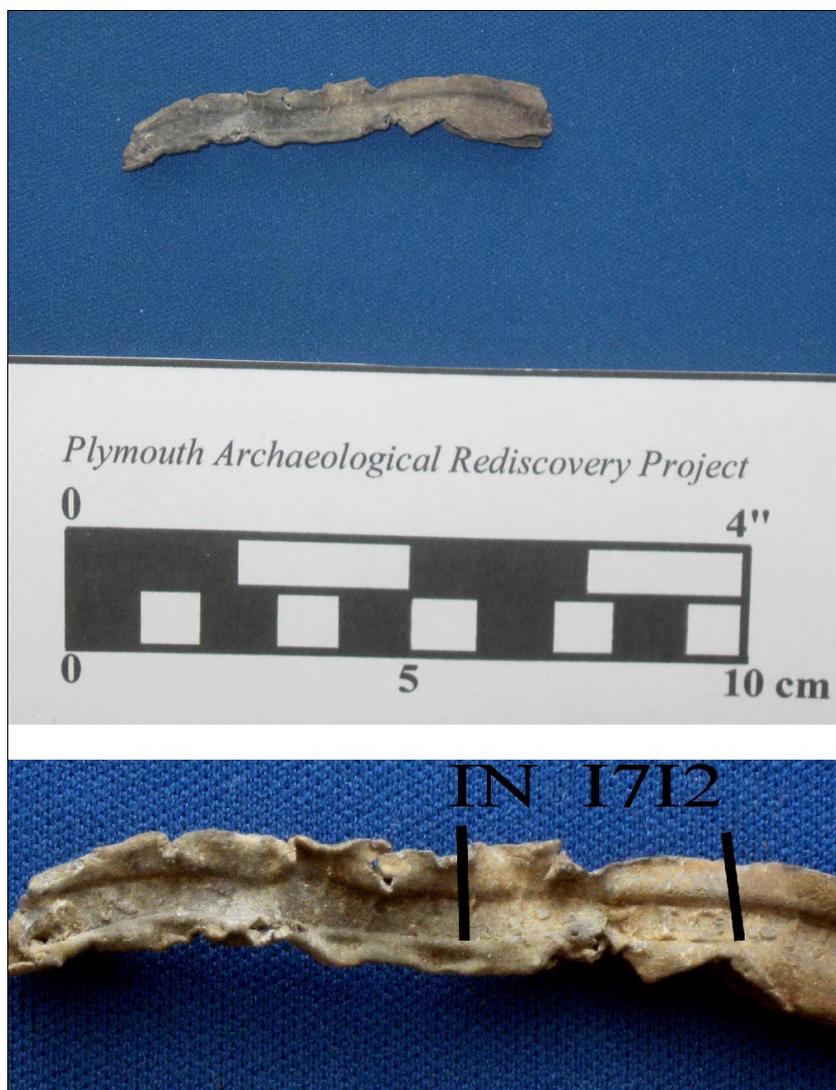


Figure 16. Lead kame. Bottom: close up showing embossed "IN 1712" on interior commonly found on houses dating to the seventeenth to early eighteenth century. They were eventually replaced with casement windows bearing rectangular panes similar to those found in houses today. The window leads were eventually removed and the lead melted as evidenced by the fragments of twisted lead kame that are commonly recovered from sites. Six window leads were recovered from the Ezra Perry II (Aptucxet Trading Post Museum Site) in Bourne. All of them are of the standard H shape and at least 2 have the following printed on the interior : "W.M. 1675 I.P.". This is the

manufacturers printing to insure quality control. These turned leads in generally date from the seventeenth into the first half of the eighteenth century (Hume 1969:233). The kame from the Buttermilk Bay House was opened and found to conatins the date "1712" possibly indicating the date of construction for the original house.

Glass

Glass artifacts that were expected to be encountered included flat glass from windows, mirrors, picture frames and lanterns, curved glass from bottles and hurricane lamp chimneys, pressed glass from candlesticks, oil lamps, tablewares, and decorative items and buttons. Glass fragments were analyzed in much the same way as the ceramics with vessel types and manufacturing techniques being identified and cross mending within and between contexts being attempted. An low occurrence of patent medicines, fairly ubiquitous artifacts from sites occupied from the middle nineteenth to early twentieth centuries, representing a shift from herbal remedies among rural inhabitants for those provided by medical science, may indicate the degree of reliance on home and local remedies versus the purchasing of quack cures that were mostly alcohol by the inhabitants of the site.

Color can be used as a dating tool for glass (Stelle 2001). Clear lead glass was first produced in the 1770 and continued to the present day. Lead glass was used for table wares such as pressed glass, wine and drinking glasses and lamps. Clear soda-lime glass was first used in 1860 and continues to the present. Soda-lime glass was used for bottles. Solarized glass, glass with a purple, pink or amethyst tint to it (a result of manganese being added to the glass) was first produced in 1880 and continued until 1918. Dark olive green "black" glass, which was only used for wine bottles, was produced until 1870.

A total of 87 fragments of vessel glass representing eleven vessels and one lightbulb were recovered (Table 11).

Table 11. Glass vessels recovered

Number	Type	Color	Date
1	Hand Blown Drinking Glass with Twist	Clear	Early 19th century
2	Wine Glass	Clear	1780-1825
3	Wine Bottle	Olive	ca. 1698
4	Wine Bottle	Dark Olive	ca. 1800
5	Hurricane Lamp Chimney	Clear	Middle to late 19th century
6	Lamp Chimney	Clear	First half 19th century
7	Case Bottle	Dark Olive	18th-19th century
8	Case Bottle	Aqua	19th century
9	Case Bottle	Very Dark Olive	19th century
10	Case Bottle	Olive	17th-18th century
11	Drinking Glass with Wheel Etched Decoration	Clear	18th-early 19th century

Fragments from three drinking glass vessels were recovered. Hand blown bottles were predominantly wine and case bottles although other forms were present as well. Hurricane lamp chimney glass (post

1859) was found but no machine made bottle glass (dating after 1907) was found.

Drinking

A total of three drinking glass fragments representing a minimum of three vessels were recovered from the excavations. Vessel 1 was a thin mold blown drinking glass with a twisted decoration, vessel 2 was the stem from a late 18th to early 19th century wine glass, while vessel 11 was a drinking glass with a wheel etched floral decoration on the exterior (**Figure 17**). Noel Hume says that wheel etched vessels



Figure 17. Drinking glass fragments. Left: Vessel 1; Top right: Vessel 2; Bottom right: Vessel 11

were popular in the eighteenth century with most dating between 1780 and 1820 (Hume 1969: 194).

Hand Blown

A total of 42 hand blown bottle fragments representing a minimum of five vessels were recovered. The vessels represented are wine bottles and case bottles. The wine bottles appear to be of shapes that date to ca. 1698 and ca. 1800. Case bottles, square bodied bottles that were often shipped and stored in wooden cases with dividers creating separate compartments for each bottle, are often associated with the shipment of refined spirits such as gin (hence their other name “Dutch Gin Bottles”). These date from before 1640 (when globular wine bottles were first produced) to the early nineteenth century, but the ones from the Buttermilk Bay House probably date from the seventeenth to eighteenth century.

Molded

Two fragments from one mold blown case bottle were recovered. Bottles were made this way before the use of automatic bottle machines in 1903. This bottle is believed to date to the nineteenth century.

Lighting Glass

Household lighting evolved slowly since the colonizing of New England in 1620. Early settlers used rush and oil lamps as well as candles. Before the late eighteenth to early nineteenth century, these remained the most common lighting devices. With the start of the whaling boom in the late eighteenth century, whale oil lamps became popular in people's homes. Whale oil lamps disappeared with the discovery of oil and the invention of the Drake well in 1859 and the subsequent production of kerosene oil lamp burners after 1860. In association with these kerosene lamps, were thin, clear glass chimneys used on top of the lamps. Eventually, electricity and the light bulb replaced kerosene lamps in the late nineteenth and early twentieth century.

A total of 27 fragments from an unknown number of hurricane lamp chimneys were found.

Clothing

Buttons

A total of five buttons, three bone and two cuprous, were recovered (**Figure 18**) (Table 12).



Figure 18. Recovered buttons Left to Right: Cuprous, cuprous, bone, bone, bone

Table 12. Recovered buttons

Type	Description	Diameter	Date	Type
Cuprous	Tin-washed round	1.6 cm	1850-1900	Woman's Coat
Cuprous	Button back, domed	1.3 cm	1850-1900	Woman's Coat
Bone	Death Head Disc with one hole	1.2 cm	1750-1900	Man's Shirt
Bone	Death Head Disc with one hole	1.7 cm	1750-1900	Man's Shirt
Bone	4-hole	1.7 cm	1850-1900	Man's Shirt

Two of the buttons were of the "death head" variety which is essentially a variety of thread covered button popular between the middle eighteenth to late nineteenth centuries. A bone or wood button form, a disc with a hole in it, is covered with silk, linen, or mohair thread in a specific pattern (**Figure 19**).

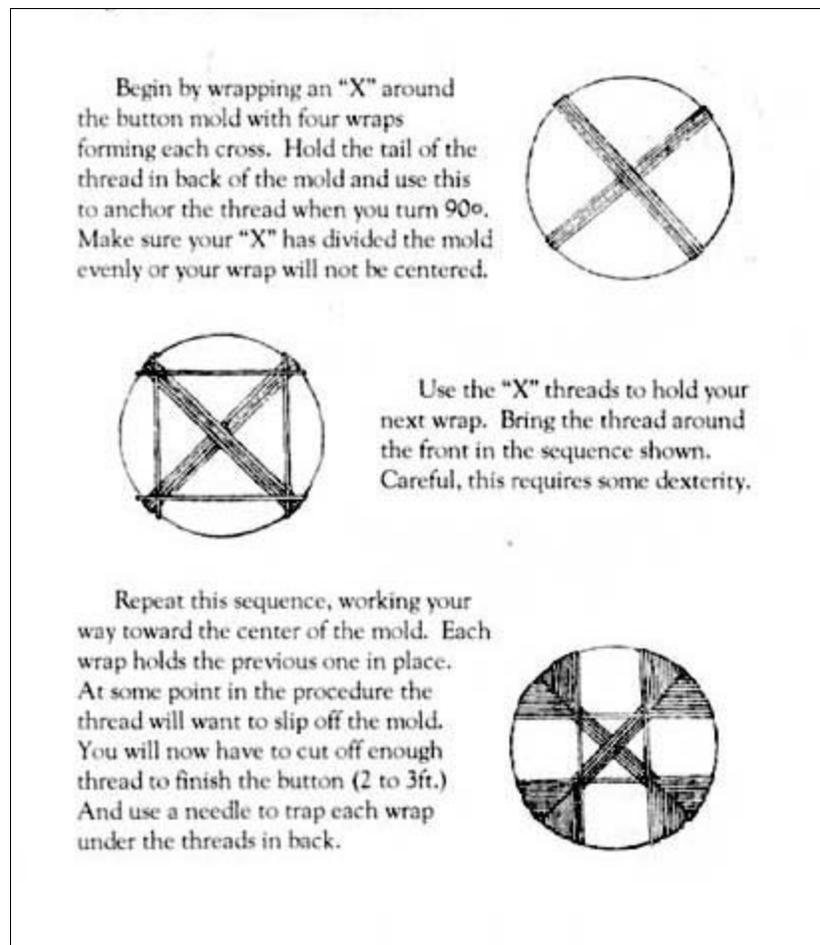


Figure 19. How to thread a death head button (from Wilbur *The Revolutionary Soldier* 1969)

Shoes

Before the first quarter of the nineteenth century, the manufacture of shoes had changed little. Shoes were hand sewn by cobblers and the heels were sewn, nailed, or less commonly, pegged on with wooden pegs. The first machine for the manufacture of wooden shoe pegs was introduced in 1811 and in 1829 a hand operated pegging machine was in use. Before 1811 the wooden pegs used to fasten heel had to be hand made by cobblers, a laborous and time consuming process that resulted in a preference for the use of nails or sewing versus pegs (Anderson 1968:58). Pegging became common by 1842 when the use of the pegging machine was widespread. Other changes in the manufacture of shoes occurred in the nineteenth century as well, including the use of patterns for cutting pieces (1830s); the use of counters (thick pieces of leather that fitted around the back of the heel) (1830s); the invention of the rolling machine in 1845 to compress sole fibers; the use of rubber for heels in the middle nineteenth century; and the use of the sewing machine after 1854 to sew the shoes. Another change in shoe design

was the abandonment of straits in the 1860s, an innovation that resulted in the creation of left and right shoes versus a generic "shoe" (Anderson 1968:59). The various nineteenth century innovations can be seen in shoes recovered archaeologically. For example, when shoes were machine stitched the stitching hole was oval versus a round hole for hand stitching or nailing.

The shoes from the Buttermilk Bay House all appear to have been hand stitched without the use of pegs, dating them to the first quarter of the nineteenth century (**Figures 20 and 21**). Represented were



Figure 20. Early nineteenth century child's shoe with nailed heel



Figure 21. Hand stitched shoes. Left: Man's shoe; Right: Child's shoe with mark on heel

two children's shoes and one adult man's shoe. The man's shoe and one of the child's shoe evidence of wear on the stitched heel while the second child shoe's heel had been nailed on. One child's shoe also bore an impressed X as a manufacturer's or quality control mark on the sole.

Cloth

Two fragments of cloth, one a fine woven possible silk and the other of a coarser linen (Figure 22). The possible linen fragment has a stitched hem and may have been part of a shirt sleeve cuff.



Figure 22. Cloth fragments. Top: linen; Bottom: silk

Coins

Three coins were recovered, two copper and one silver (Figure 23). One of the two copper coins is a Woods Hibernia Half Penny with a visible date of 1723 on it. It depicts King George I on it and was minted for only a short period from 1722-1724. These coins were originally issued for use in Ireland but were rejected there. They were subsequently sent to the American colonies. It is very worn, not as worn as the other copper coin though, and was probably discarded or lost long after its minting date. The other copper coin is another English half penny of an unknown variety and date. It is heavily worn, is domed in the center possibly in an attempt to punch a hole through it for suspension, and bears a number of scratches on one face. It was probably lost or discarded a significant time after it was originally minted. The final coin is 1792 silver Spanish 2 reales coin, minted in Mexico and bearing a bust of Charles IV on one face. It has been punched through the center, possibly with a nail, probably for suspension on a necklace or cord. This coin is also slightly worn and was probably lost or discarded soon after its minting date.



Figure 23. Recovered coins. Top: Numismatic example of a Woods Hibernia Half Penny; Center Left to right: Woods Hibernia Half Penny, Mexico 2 reales, undated copper half penny; Bottom: Numismatic example of a Mexico 2 reales.

Other Recovered Artifacts

A few other artifacts were recovered including one leg from a cast iron kettle, a small thin iron "can" with soldering around a joint, two domed copper furniture tacks, and the central spinner from a plastic toy top.

V. CONCLUSION

While screening of previously machine excavated backdirt is not the ideal way to collect artifacts and investigate an archaeological site, the investigation carried out at the Buttermilk Bay House proved very informative. The recovered artifacts dated to a fairly tight time span of time between 1770 and 1830 and represented a wide range of material associated with the people who were living in the house at this time. Architectural remains indicate that an earlier house that was built in the late seventeenth, but more probably in the early eighteenth century, in a post-in-ground style of construction, was removed between 1770 and 1820 (probably more towards the 1820 date) and was replaced with the current house.

The recovered artifacts reveal that the occupants of the house purchased pottery that had been manufactured in England and Germany as well as locally manufactured redwares. The majority of the material recovered were kitchen related items, which is interesting since the deposit came from the kitchen/ hall section of the house, indicating the material was deposited beneath the floor where it was in use. The occupants of the house raised their own animals- cattle, sheep, pigs, chickens, and probably ducks and geese, and also harvested fish and bird species from the immediate surrounding area. They also had at least two cats who used the space beneath the hall as a den where they brought duck and goose heads to consume, and may have also brought other species such as the pigeon, mouse, rat, and maybe some of the fish for the same purpose.

The deposit has allowed a unique glimpse into the lives and foodways of these people who were living in Bourne in the early nineteenth century and into the interesting trend relating to the disposal of rubbish beneath occupied house floors, a trend that has been noted at other sites as well.

It is recommended that in the future, when any work is being done immediately around the house (gardens, fences, tree plantings) care should be taken and the homeowner should try to be aware of the potential for impacting or damaging the fragile resources that exist outside of the house. The potential archaeological resources that may be present relate both to the Native, the Colonial, and the Pot-Colonial occupations of the house. It is recommended that if any excavation occurs around the house, the holes should be kept to a minimum depth and the soil should be screened through 1/4" hardware cloth. The collected artifacts, even things that are questionable as to what they may be, should be placed in zip-lock sandwich bags and labeled with information as to when it was dug, how deep the material was found and where the excavation occurred. The homeowner should feel free to contact the author of this report to help identify anything recovered.

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