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Zooarchaeological Evidence for Animal Husbandry and Foodways at Sylvester Manor

Sarah Sportman, Craig Cipolla, and David Landon

Analysis of over 12,000 zooarchaeological specimens recovered from Sylvester Manor provides archaeological evidence to complement the limited historical information about stock raising and food consumption on the plantation. The analyzed collection derives from the south lawn midden deposit at the site, and contains primarily the remains of domestic sheep, cattle, and pigs. The domestic animal ages, based on tooth eruption and wear, suggest aspects of the animal husbandry system. The patterns of skeletal part representation suggest most of the bones from the midden are refuse from household consumption rather than waste from exported foodstuffs. The Sylvesters and their tenant farmers maintained a dietary emphasis on traditional European domesticates, and this diet would have represented a major change for the plantation's African and Native American occupants.

L'analyse de plus de 12 000 spécimens zooarchéologiques mis au jour au Sylvester Manor fournit des preuves archéologiques qui complètent une information historique limitée à propos de l'élevage de bétail et la consommation de nourriture sur la plantation. La collection analysée provient d'un dépôt de la fosse à déchet de la pelouse sud du site, et contient principalement des restes de moutons domestiques, de bovins et de cochons. L'âge des animaux domestiques, obtenue en observant l'éruption et l'usure des dents, est utilisé pour identifier différents aspects du système d'élevage. L'ensemble des fragments de squelettes représentés suggère que la majorité des ossements provenant de la fosse à déchets ne constituent pas des déchets de nourriture destinée à l'exportation, mais plutôt des restes d'aliments consommés sur place. Les Sylvesters et leurs fermiers ayant maintenu un régime axé sur les espèces traditionnellement domestiquées en Europe, ce régime aurait constitué un changement majeur pour les occupants africains et autochtones de la plantation.

Introduction

A major component of the daily operations at Sylvester Manor was the practice of animal husbandry, both for the commercial provisioning enterprise and for the subsistence of the residents. The manor was intended to supply two Caribbean sugar plantations owned by brothers Nathaniel and Constant Sylvester and their business partners Thomas Rouse and Thomas Middleton. Documentary evidence suggests a shift in the function of the plantation from a large provisioning enterprise to a smaller, though perhaps still commercial, farm between 1681 and 1693. During the summers of 1999–2002, students from the University of Massachusetts Boston archaeological field school discovered and excavated large sections of a sizeable late-17th to early-18th-century trash midden located on the Manor, recovering thousands of animal bones. In order to understand animal husbandry goals and practices at Sylvester Manor at the time of the deposit, this paper combines an examination of relevant documentary evidence with a careful analysis of the midden faunal assemblage. This data is

then used to explore the following questions: Is the midden trash domestic or commercial? Which species were raised and/or utilized by the residents of Sylvester Manor, and for what purposes? What types of foodways does the faunal assemblage indicate, and what does this reveal about the identities of the Manor residents? The answers to these questions shed light on both the lives of Sylvester Manor's residents and the role of the plantation in the global economy of the late-17th and early-18th centuries.

A Brief Agricultural History

Nathaniel Sylvester and his wife, Grissell Brinley Sylvester, established Sylvester Manor in 1652 as both a family homestead and a large, slaveholding, provisioning plantation. The primary function of the Manor was to provision the family's other properties in Barbados with necessities such as timber, barrel staves, meat and grain. The initial property encompassed the 8,000-acre island in its entirety, but over the years it was inherited and re-inherited, and areas were leased and sold many times. The

Sylvester Manor of today is a much-reduced 250 acres, but remains in the hands of Sylvester descendants.

A 1680 inventory indicates that at the time of his death, Nathaniel Sylvester was a wealthy man and the owner of a prosperous, large-scale agricultural operation. Twenty individuals claimed as slaves labored at Sylvester Manor, eleven of whom Nathaniel owned outright and nine of whom were owned in partnership. In addition to the house, the property included a mill, a cider press, a large warehouse, garden lands, pastures, orchards and other "attachments." Personally, Sylvester owned 200 sheep, 20 horses, 70 cattle and 60 swine. In addition, livestock he held in partnership contributed another 227 sheep, 20 horses, 130 cattle and 60 swine (Budd et al. 1680). The large numbers of livestock are especially indicative of Sylvester Manor's affluence. During the same time period, a sizeable farm in New England held around 12 cattle, 50–75 sheep and 12 pigs (Russell 1976: 52).

Following the death of Nathaniel Sylvester in 1679 or 1680, the property, in particular the plantation core, was inherited by his eldest son, Giles. Based on surviving sections of Giles Sylvester's account books (G. Sylvester, 1680–1701), it appears that in the subsequent ten years the plantation continued to operate. It is difficult however, to discern the scale of operation and it is unclear from the documents if Sylvester Manor was still involved in Caribbean trade.

In 1693 Edward Downing, a Boston husbandman, signed a seven year lease with Giles for the property (Sylvester and Downing 1693). The December 1, 1693 lease agreement provides significant information regarding farming and animal husbandry activities at Sylvester Manor in the 1690s. As a condition of the lease, Downing was responsible for the upkeep of the grounds, the provisioning and sheltering of the animals and care and production of Sylvester Manor's other industries. Giles provided Downing with five horses, two bulls, twelve cows, two rams, twenty-five ewes, one boar and six sows. Additionally, Downing was permitted to keep six of his own pigs. The lease required that Downing annually deliver two-thirds the increase of horses and cattle at three years of age, half the increase of sheep at two years of age and half the increase of market-ready swine. For his part, Downing

was permitted the "use and profit" of the remaining livestock. Apart from livestock, the lease also indicates the production of cider, wheat, Indian corn, oats, dairy products and wool. Percentages of each were owed annually to Giles Sylvester. Based on the contents of the lease, it appears that by 1693 provisioning activities had likely ceased. In comparison to the 1680 inventory, the lease indicates a considerable decrease in the numbers of animals raised at Sylvester Manor as well as in the production of agricultural goods such as fruit and grains. Consequently, by the 1690s Sylvester Manor likely functioned as a medium-sized, but probably still commercial, farming operation (Sylvester and Downing 1693).

Zooarchaeology at Sylvester Manor

Analysis of the Sylvester Manor faunal assemblage is crucial for two reasons. The first involves the dearth of historical documents regarding stock and husbandry goals. While the documents discussed above do provide valuable information, a thorough examination of the social and economic history of Sylvester Manor requires more data. Second, this investigation is required by the very nature of the numerous non-faunal artifacts uncovered. While the many ceramic fragments, bits of jewelry, broken glass, and similar artifacts relate closely to the social and personal elements of Sylvester Manor history, they tell us very little about the production and economy of the site. As a provisioning plantation or even a smaller commercial farm, agriculture and stock-raising undoubtedly played major roles in the day-to-day operations of the Manor and the lives of its residents. At this point in the research, the animal remains excavated provide the bulk of that information.

The Sylvester Manor vertebrate faunal collection analyzed to date contains a total of 12,865 specimens (NISP) recovered from blocks A, B, M and I (see FIG. 6 in Hayes, this volume; TAB. 1). Block "A" is the largest excavation area, encompassing nine 2 m × 2 m units. Block "B" contains four units, "M" contains 3 units and only one unit was excavated in block "I." All excavation units are located in the front yard (South Lawn) of the current Manor house where they uncovered the remains of a large sheet midden deposited during the late-17th to early-18th centuries. All soils were screened

Table 1. Vertebrate taxonomic representation.

Taxon	Common Name	NISP	%	MNI	Weight (g)	Biomass (kg)	%
<i>Bos taurus</i>	Cow	545	4.2	8	10677.0	85.8	36.6
<i>Canis</i> sp.	Dog	13	0.1	1	81.8	1.1	0.5
Caprine	Sheep	805	6.3	25	3357.0	30.3	12.9
<i>Equus</i> sp.	Horse	2	0.0	1	59.2	0.8	0.3
<i>Sylvilagus</i> sp.	Rabbit	3	0.0	1	1.9	0.0	0.0
Mustelidae sp.	Skunk or Mink	1	0.0	1	0.4	0.0	0.0
<i>Odocoileus virginianus</i>	Deer	16	0.1	1	75.2	1.0	0.4
<i>Scurius</i> sp.	Squirrel	6	0.0	1	1.9	0.0	0.0
<i>Sus scrofa</i>	Pig	346	2.7	10	1667.0	16.1	6.9
<i>Vulpes</i> sp.	Fox	1	0.0	1	0.6	0.0	0.0
Large mammal		572	4.4		3600.0	32.3	13.7
Medium mammal		1327	10.3		2284.9	21.4	9.1
Small mammal		3	0.0		0.8	0.0	0.0
Unidentified mammal		8754	68.1		5042.0	43.7	18.6
<i>Anas</i> sp.	Duck	1	0.0	1	0.8	0.0	0.0
<i>Branta canadensis</i>	Canada goose	2	0.0	1	1.1	0.0	0.0
cf. <i>Cygninae</i>	Probable swan	1	0.0	1	2.5	0.0	0.0
Galiform	Chicken or pheasant	2	0.0	1	0.7	0.0	0.0
<i>Gallus gallus</i>	Chicken	13	0.1	1	6.4	0.1	0.0
Unidentified bird		204	1.6		105.8	1.1	0.5
Unidentified fish		236	1.8		99.4	0.8	0.4
<i>Chrysemys picta</i>	Painted turtle	5	0.0	1	1.4	0.0	0.0
Unidentified reptile		4	0.0		2.0	0.0	0.0
Total		12862	100.0	56	27069.8	234.8	100.0

Note: NISP is the number of identified specimens; MNI is the minimum number of individuals.

through $1/8''$ hardware cloth. The remains of mammals, birds, fish and reptiles are all present in the assemblage. Although this article deals exclusively with the vertebrate remains, the midden also contained large numbers of hard shell clam, soft shell clam, whelk, and coral specimens, as well as smaller numbers of oyster and scallop.

The majority of the vertebrate remains are fragmentary, the result of damage incurred during deposition, historic landscaping and excavation processes. Even so, 99% of the specimens are identified to at least a taxonomic class (mammal, bird, etc.), while 1762 or 13.7% of the collection is identified to a more precise level of classification; all but 24 of those specimens are identified to the species level. The zooarchaeological analysis of these specimens presented here is based on more detailed studies already completed (Sportman 2002, Cipolla 2003), and considers taphonomy, species representation, ages and uses of domestic animals, and skeletal part representation in terms of gross utility.

Taphonomy

Taphonomy, originally defined by the paleontologist Efremov (1940) as "the study of the

transition, in all details, of organics from the biosphere into the lithosphere" is relevant not only to the study of fossils, but also to the formation of the archaeological record (Lyman 1994). In terms of zooarchaeological analysis, taphonomy takes into account the various natural and cultural events that contribute to a bone's deposition, preservation and eventual discovery in the archaeological record. For the purposes of this study, taphonomic analyses are limited to the examination of the natural processes of weathering and scavenging and cultural modifications resulting from burning.

All specimens in the assemblage were examined for signs of weathering. Weathering refers to bone damage as the result of exposure to the elements and is dependent upon both temporal and climatic factors. Referencing Behrensmeier's (1978) scale of 0-5 for the weathering stages of mammal bones, a specimen in this study exhibiting damage of stage 2 or higher is categorized as "weathered."

Weathering was fairly uncommon in the Sylvester Manor assemblage, with only 136 or 1.1% of specimens exhibiting cracks and flaking of the outer surface. This indicates that the majority of the assemblage was not exposed to the elements for extended periods of time and

implies that the deposit was either constantly in use and added to or that it was quickly filled and covered. Given the large size, artifact density, spatial heterogeneity and broad timeframe established for the midden, the former explanation is most promising.

Damage from the gnawing of both rodents and carnivores is present on some of the Sylvester Manor assemblage. Rodent damage is generally characterized by small parallel scrapes made by rodent teeth, while carnivore gnawing often results in bones with a pitted or pocked appearance and/or jagged edges. In addition to carnivore tooth marks on some bone specimens, dog and fox remains are included in the midden deposit. Scavenger (carnivore and rodent) damage was not a common feature of the assemblage. A total of 92 specimens or 0.7% of the collection exhibited signs of scavenger damage. Instances of rodent and carnivore gnawing were similar in number, with 49 (0.4%) and 43 (0.3%), respectively. Cattle remains exhibited the highest frequency of scavenger damage, followed by caprines and pigs, respectively. Cattle bones show almost 50% of all rodent gnawing and 37% of carnivore damage. These frequencies are likely related to the size differential between cattle bones and the other identified taxa. Combined with the data on weathering, these figures support the idea that food waste in the midden was not left exposed for long periods of time.

Only 7% (902) of the collection exhibited signs of burning. Of these, 876 were small fragments categorized as unidentified mammal. Two cattle, three caprine, three pig, three large and twenty-five medium mammal specimens comprised the remaining burned bones. Most of these are not diagnostic to a specific skeletal part. Blackened or calcined bones indicate direct contact with fire. Burned bones are generally not consistent with food prepared in pots, but can result from open-fire roasting, in which case only the ends of bones are exposed to the flames. Additionally, activities such as burning trash or sweeping discarded bones into a hearth may also result in blackened or calcined bones (Crader 1990). Given that most of the burned specimens are small fragments, most are likely the result of such housekeeping activities.

Despite the limited proportions of burned, gnawed, and weathered specimens, it does

appear that the assemblage is biased by processes of density mediated attrition that preferentially favored the survival and recovery of denser bones over less dense bones. Zooarchaeologists have recognized that the relative representation of the proximal humerus compared to the distal humerus reflects the intensity of destructive forces acting on an assemblage (Lyman 1994). The distal humerus fuses earlier and is thus denser than the proximal humerus. In this assemblage, combining all of the medium and large mammal remains, there are only 8 proximal humeri, compared to 65 distal humeri. This disproportionate representation clearly suggests a pattern of density mediated attrition. As a result, we can assume that the bones of fish, birds, small mammals, and young animals have been disproportionately destroyed relative to those of larger and older animals, especially large adult mammals.

Mammal Remains

Table 1 presents a detailed view of taxonomic representation. Mammal remains dominate the assemblage, comprising over 96% of the total NISP, and over 99% of the total biomass. Identified mammals include cattle (*Bos taurus*), caprines (sheep/goat), pigs (*Sus scrofa*), white-tailed deer (*Odocoileus virginianus*), horse (*Equus caballus*), squirrel (*Sciurus sp.*), dog (*Canis sp.*), fox (*Vulpes sp.*), rabbit (*Lepus sp.*) and a small mustelid, such as a skunk or mink (*Mustelidae*).

Domestic animals clearly dominate the assemblage. The remains of cattle, caprines and pigs account for 1696 specimens or 96.3% of the identified taxa. The term "caprine" is used throughout this article to refer to animals that are either sheep or goats. Primary documents indicate that sheep were a major product of Sylvester Manor, while goats played no discernible role in the plantation's economy. Therefore, it is highly probable that most, if not all of the specimens identified as "caprines" are in fact sheep. Nonetheless, the blanket term is employed as a cautionary measure, because the teeth and bones of sheep and goats are difficult to distinguish.

There is little variety among wild species and their remains are few. It appears that hunting and trapping did not figure prominently into food procurement strategies at

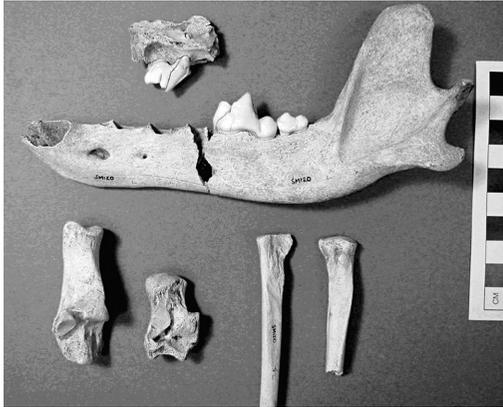


Figure 1. Bones from a large dog recovered from the midden. Several of these bones have butchery marks indicative of skinning.

Sylvester Manor. The one large game animal, a whitetail deer, is evidenced only by a few teeth, antler fragments and four fragmented bones. The deer was likely eaten and either taken as game, purchased from local Native Americans (Janowitz 1993: 12), or consumed by Native American workers on the plantation. Based on the small number of deer bones in the faunal assemblage, the appearance of venison on the Sylvester's table at the Manor was probably rare.

Rabbit, squirrel, and mustelid bones may represent the vestiges of food or they may simply be incidental additions to the deposit. The number of identified specimens of each is negligible, with one only rabbit, one mustelid, and six squirrel specimens. The miniscule numbers of these and other small mammal specimens probably does not accurately reflect their presence at Sylvester Manor, because the fragility and small size of such faunal remains result in frequent loss or destruction.

The remaining mammal species recovered from the midden include horse, fox and dog. Documentary evidence indicates that horses were raised at Sylvester Manor through much of its early history. Horses were originally raised for shipment to Barbados or to be otherwise sold. The 1680 inventory lists 20 horses owned outright, with another 20 held in partnership (N. Sylvester 1680). Later, Downing was allotted five horses during the period of his lease (Sylvester and Downing 1693). The horse whose remains were excavated from the midden may have been put down or simply died, and may or may not have been con-

sumed. None of the recovered horse bones show evidence of butchery.

Finally, and perhaps most interesting, are the remains of canids, one of which was identified as a domestic dog, similar in stature to a modern day German Shepherd (FIG. 1). Canid remains included various head and foot bones and a pelvis fragment. One specimen was concretely identified as fox and several of the foot bones are identified as belonging to a domestic dog. Other remains were categorized only as *Canis* sp. as it was not clear if they were wolf or dog. The presence of dog remains in a trash midden is not necessarily strange, but several of the tarsals exhibit evidence of butchery; the type of small, fine cuts consistent with skinning. When the skin of an animal is removed, the bones that lie just beneath the skin, like those in the skull and lower limbs, are often nicked (Rackham 1994: 15).

There are several possible explanations for the presence of a dead dog in the midden at Sylvester Manor. It may have been a pet, or perhaps a feral dog. The dog may have killed or threatened livestock and consequently was destroyed, or it may simply have died or been put down for humane reasons. These explanations, however, do not explain the presence of butchery marks. Consequently, we must examine other possibilities. The cut marks indicate that the animal was probably skinned and it may also have been eaten. If the dog was eaten it could represent the only clearly discernable presence of non-European foodways in the zooarchaeological assemblage.

Birds, Fish and Reptiles

The remains of birds, fish and reptiles represent 464 specimens, comprising only 3.6% of the total collection. Identified birds include chicken (*Gallus gallus*), goose (*Branta canadensis*), duck (*Anas* sp.) and probable swan (cf. Cygninae). Five shell fragments from the painted turtle (*Chrysemys picta*) are the only identified reptile remains. Precise identification of the fish remains has not yet been achieved; for the purposes of this paper, all are designated simply as "fish."

The low frequencies of these taxa are likely influenced by poor preservation and collection biases. Preservation is definitely an issue at Sylvester Manor and in the case of bird and

fish remains, can be partially attributed to the acidic soil. This is evidenced by the differential spatial distribution of these bones. Higher frequencies of bird and fish specimens are present in Block I, the smallest of all the excavated areas. Block I yielded 115 bird specimens, representing 51.6% of the total and a NISP more than twice that of Block A, an area nine times the size. Although more fish specimens were recovered from Block A, fish remains from Block I still made up 41.9% of the total. Block I also contained extremely high frequencies of shell and coral, and it is possible this influenced the survival of the fish and bird bones. Deposits of shell and coral are known to neutralize acidic soils, improving preservation. It is important to note, however, that the low numbers of fish and bird remains may also be a consequence of an apparently heavy dietary reliance on domestic mammals.

Birds make up 1.7% of the total collection. Keeping fowl was a common practice on farms in southern New England and New Netherlands (Cook 1986; O'Donnell 1968; Russell 1976). Chickens are included in the assemblage, and it is likely that the inhabitants of Sylvester Manor raised some chickens on site for meat and eggs. The presence of goose bones in the deposit indicates that these birds were either raised or hunted for food or sport. Duck and swan bones imply that they were among the few wild species hunted and consumed at Sylvester Manor.

The painted turtle is a common species in the northeastern United States (Behler and King 1979) and its remains allow a variety of possible explanations: it may have been eaten, collected as an empty shell, or it may simply represent an incidental addition to the assemblage. Given its single appearance in the deposit, either of the two latter explanations seems probable.

The frequency of fish remains is similar to that of birds, comprising 1.8% of the total assemblage. Although none were specifically identified, it was determined that many of the fish bones represent very large species. The prevalence of large fish may be indicative of procurement strategies or it could simply be a result of the poor preservation of small, fragile bones in the acidic soil. Excavations of features below the midden during the summer of 2004 recovered higher proportions of small fish

remains, suggesting that the midden assemblage does not necessarily characterize the entire site, and may only represent a temporally discrete period or functionally specific deposition.

Tooth Wear and Age Profiles

The goal of this particular aspect of the study is to gain insight into the animal husbandry practices at Sylvester Manor through an examination of age profiles based on tooth wear. Teeth, even more than bones, are a useful determinant of age. While epiphyseal fusion data is commonly used to calculate age, the process is fraught with biases and often results in confusing or misleading results. Fusion analyses are most accurate when applied to young animals, because in most species the bones are largely fused by the time the animal reaches maturity. On the other hand, most animals experience different stages of tooth development and wear throughout the course of their lives. As juveniles, they develop deciduous dentition or baby teeth. As the animal matures, these teeth suffer wear and are eventually pushed out as permanent teeth develop. Following eruption, permanent dentition also gradually wears. More precisely, when a tooth erupts, its occlusal or biting surface is completely covered with enamel. With regular use, the enamel starts to wear away, revealing the darker-colored dentine below. As wear progresses, the shape of the enamel and dentine on the tooth form fairly distinct patterns (Grant 1982). Though affected by environmental variables such as diet and disease, the various stages of this lifelong cycle of eruption, wear and loss generally occur at similar ages among animals of the same species, making tooth-wear analysis a fairly accurate way to ascertain age.

Information about the age at which an animal died provides evidence for various types of animal exploitation. For example, when animals are raised primarily as a source of meat, it is more economically viable to slaughter them at a relatively young age. Prolonging their lives after they are full-grown is simply a waste of time, energy and resources. If animals are utilized for secondary products such as milk or wool, however, it is logical to keep them alive until they cease to produce

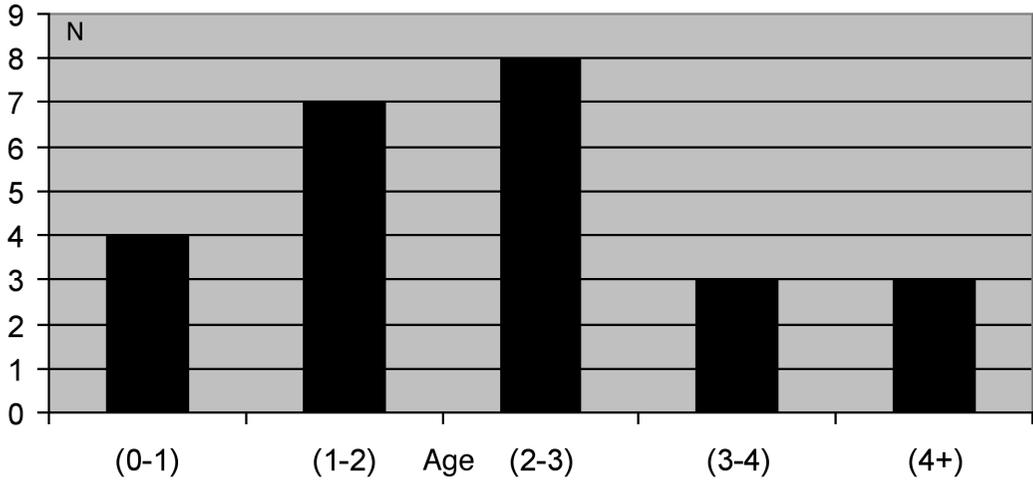


Figure 2. Age profile for caprines based on tooth eruption and wear stages.

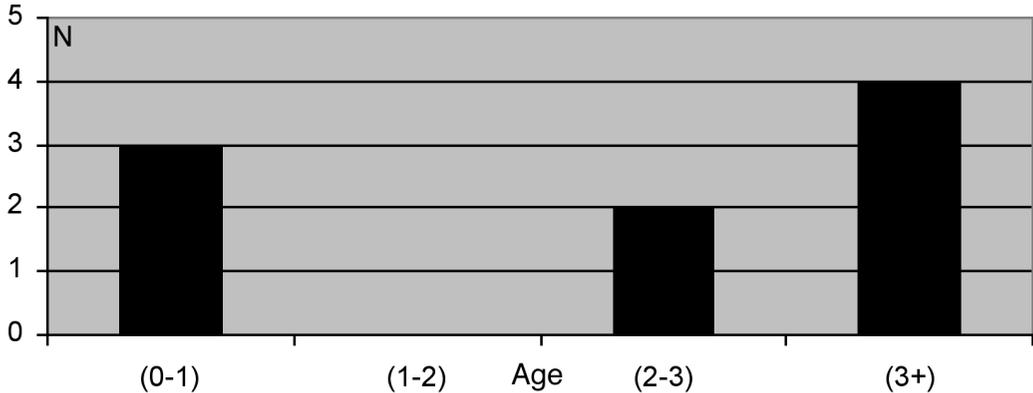


Figure 3. Age profile for cattle based on tooth eruption and wear stages.

whatever products they were raised to provide. Therefore, in the case of a dairy herd of cows, for instance, one would expect that with the exception of a few breeders, the males are probably killed as young animals, while the females are maintained until they no longer produced milk (Rackham 1994: 49).

The knowledge of tooth-wear stages in domestic animals is well developed and oft-utilized by zooarchaeologists (including, but not limited to Grant 1982; Hillson 1986; Landon 1996; Payne 1973, 1987). This study incorporates all of the above-mentioned resources, relying on the methods developed by Grant (1982) for pig and cattle teeth and Payne (1987) for caprine teeth. Both systems were originally developed for use on intact tooth rows. As very few intact mandibles were excavated from the Sylvester Manor deposit, we used modified

versions of both systems. Using data on the wear of teeth in tooth rows (Landon 1996) and on ages of tooth eruption (Hillson 1986), we looked at the pattern of loose tooth wear and made our best estimate of the number of animals in each category.

Analysis of caprine teeth from the midden indicates a minimum of 25 individuals and provides evidence of a clear kill-off pattern (FIG. 2). The majority of the animals (15) were slaughtered between the ages of one and three years of age. Additionally, we recovered evidence of four lambs less than one year old and only six animals that lived to more than three years of age. This differs greatly from the natural death pattern for herd animals, where the mortality rate is generally highest for the very old and the very young, with fewer deaths among healthy young adults. The pattern seen

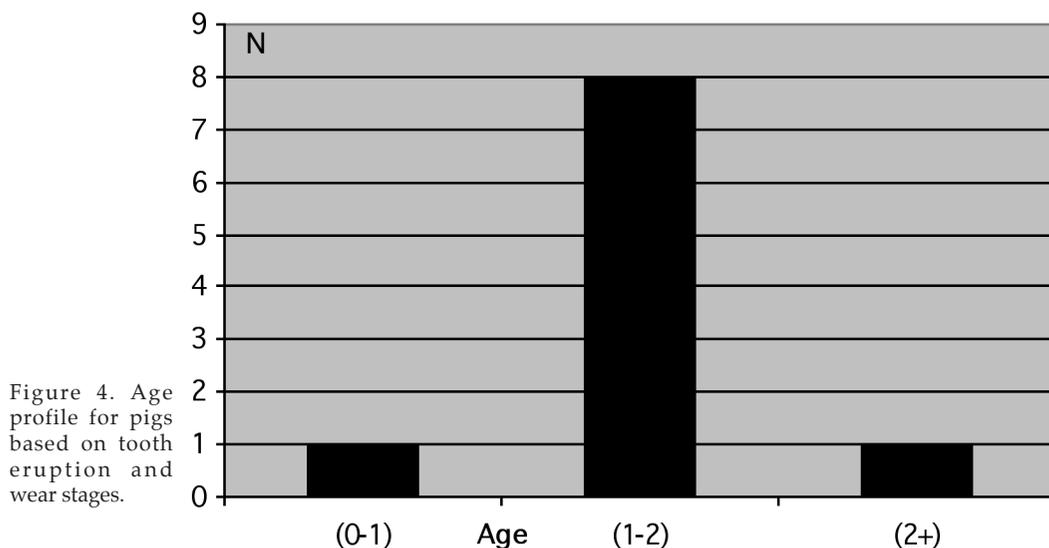


Figure 4. Age profile for pigs based on tooth eruption and wear stages.

here is clearly the result of human interference, as the majority of the animals were killed at or slightly past the age for optimum meat yield. This pattern indicates that most of the caprines found in the deposit were not being utilized for secondary products such as wool; rather, they were raised primarily for consumption. This interpretation contradicts the 1693 lease agreement, which indicates that wool was indeed a major product of the plantation (Sylvester and Downing 1693).

Cattle teeth recovered from the midden also reveal a fairly distinct age pattern (FIG. 3). The teeth indicate a minimum of nine individuals. Three of the animals died as juveniles, at less than one year of age, two died between two and three years of age and the remaining four were identified as older than three years of age. As discussed above, the practice of culling some young animals while a number are permitted to live through maturity is indicative of a herd utilized for its secondary products. Documents, including the 1693 lease, discuss dairying at Sylvester Manor, and the very young calves represented in the zooarchaeological assemblage were likely killed in order to milk the mothers.

Pig teeth recovered from the midden indicate the presence of at least ten animals in the deposit. Tooth-wear analysis of the pig teeth again reveals a distinct pattern (FIG. 4). Eight of the ten identified animals died between one and two years of age. Of the two remaining pigs, one died at less than one year of age,

while the other was older than two years of age. This pattern is common for pig-raising as the animals provide no secondary resources and are rarely maintained past the age of optimum meat yield.

Age profiles derived from the tooth wear analysis indicate definite animal husbandry patterns. The majority of caprines were slaughtered between one and three years of age, implying that most were killed around the age of prime meat yield, but at a younger age than expected for animals utilized in wool production. Cattle age profiles, meanwhile, do reflect, to some degree, expected patterns for a dairy herd. The majority of animals were killed either as juveniles, or adults older than three. However, a number of the adult animals were only slightly older than three years of age and would likely still have been productive in terms of milk. The majority of the pigs were killed between one and two years of age, reflecting the expected pattern for swine in almost any situation.

The 1693 lease agreement indicates that during the lease period, at least, wool and dairy products were important aspects of the Sylvester Manor economy. Age profiles generated from tooth wear, however, do not support significant wool production and are somewhat ambiguous in terms of dairying. In the case of both caprines and cattle, it appears that the primary goal in raising these species may have been meat production. The age profiles also imply that the seventh article in the 1652

Articles of Agreement (Middleton et al. 1652), which prohibited the slaughter of animals of less than six years of age, was no longer in effect at the time of the midden deposit. This suggests that the deposit dates to a period somewhat later than the 1650s, when animal populations were stable. In fact, the age profiles closely match aspects of the ages discussed in the 1693 lease agreement. It remains possible that the midden deposits analyzed to date represent specialized deposition of prime food animals, and that older animals might have been consumed elsewhere, such as housing for enslaved workers or laborers. Since many of the bones in the midden were probably deposited after the 1652 Articles of Agreement, and before the 1693 Downing lease, the age profile might also reflect slightly different animal husbandry goals than is described in either of these documents.

Skeletal Part Representation and Utility

Walter Klippel (2001) categorized skeletal parts by high and low utility to examine the provisioning of the British fortress of Brimstone Hill on the island of St. Kitts. Excavations concentrated on an area that was once the location of two hospitals, a kitchen and a craftsmen's building used by enslaved Africans. Based on the large proportion (90%) of high utility cattle parts in the deposit, Klippel argues that the enslaved laborers were provisioned, at least partially, with imported barreled beef. This idea was further supported by stable carbon isotope analysis, which confirmed that at least some of the cattle in the deposit were raised on a diet of mostly temperate as opposed to tropical grasses, suggesting they were not raised on St. Kitts, but much further to the north.

The practice of importing foodstuffs was not just limited to forts, but appears widespread among Caribbean plantations. Sugar production was an enormously profitable exercise. Subsequently, plantation owners in the British West Indies were reluctant to waste energy and resources on other ventures, including food production. Operating a sugar plantation, however, required large amounts of manpower, usually provided by enslaved Africans. To work effectively, these laborers needed adequate nutrition, so the expense of

importing food was tolerated (Klippel 2001: 1191).

Since Sylvester Manor was originally established as a provisioning plantation, set up to supply Sylvester sugar interests in Barbados, we used Klippel's approach of quantifying the proportions of high and low utility skeletal parts to see if the Sylvester Manor assemblage showed the opposite pattern of that from Brimstone Hill. Not all parts of the domestic food animals are equal in terms of meat production, as the axial and upper limb sections of a carcass yield more meat than the head and lower limbs. Based on this, we classified approximately 40% of a bovid skeleton (which includes both cattle and caprines) as high utility (high meat yield), and the remaining 60% as low utility (low meat yield). In the case of pigs, which have more metapodials and teeth, only 31.3% of the skeleton is classified as high utility, while 68.7% is classified as low utility (Crader 1984: 207–208). Low utility parts, such as the skull and lower limbs, are excluded from some barreled meat, as these bony parts are heavy, increasing shipping costs, and less productive in terms of usable meat. Klippel (2001) found this pattern for cattle remains at Brimstone Hill, which suggests the low utility parts might have been discarded at the butchery site. Based on this premise, a high percentage of low utility parts recovered from the midden deposit could be viewed as evidence of provisioning activities.

Caprines by far have the highest representation by specimen among the midden assemblage. Of the 805 specimens identified as caprines, 298 or 37% represent high utility parts, while the remaining 507 specimens or 63% are of low utility (FIG. 5). These figures differ only slightly from the expected 40:60 high to low ratio. A total of 545 specimens recovered from the midden are positively identified as cattle. Out of that sample, 191 or 35% represent high utility parts while the remaining 354 or 65% are low utility (FIG. 6). The high utility percentage of 35 is lower than the expected 40%, but, as in the case of caprines, not dramatically so. On the other hand, of the 346 specimens identified as pig, only 43 or 12.4% are high utility, while the remaining 303 or 87.6% are low utility (FIG. 7). These numbers differ significantly from the expected ratio of 31.3% high to 68.7% low.

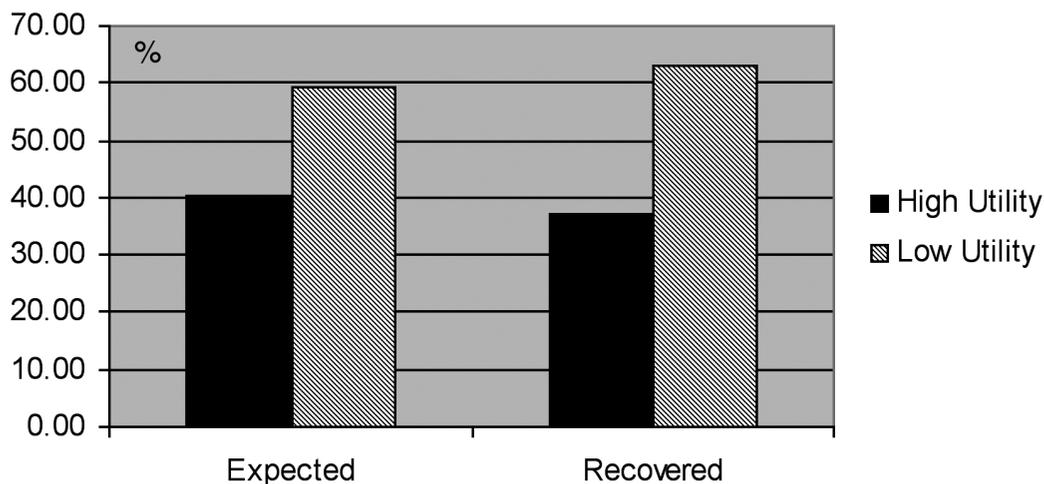


Figure 5. Relative representation of caprine bone specimens in the midden. High utility parts include the torso and upper limbs; low utility parts include the head and feet. Expected is the proportion in a single animal; recovered is the proportion in the bone assemblage.

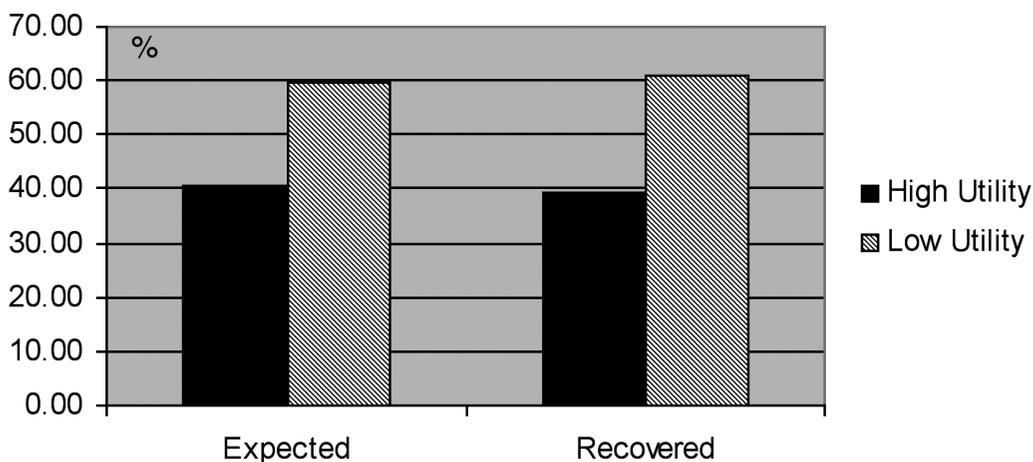


Figure 6. Relative representation of cattle bone specimens in the midden. High utility parts include the torso and upper limbs; low utility parts include the head and feet. Expected is the proportion in a single animal; recovered is the proportion in the bone assemblage.

As with the age profiles, our skeletal part utility analyses indicate clear patterns of animal exploitation. A distinctly higher percentage of low utility parts is found only among pig remains. The numbers for caprines and cattle are similar to expected patterns for animals killed and consumed in one location (Crader 1984). The results for caprines are not surprising in any case. Mutton does not preserve well and was not often salted or smoked. When sheep were exported to the West Indies, they were usually shipped live and sold upon arrival (Russell 1976: 86). Barreled beef was a

common export item, but the cattle remains in the midden assemblage do not reflect the provisioning end of the barreled beef trade.

There were significantly more low utility pig remains in the midden deposit, but it is not clear if this is evidence for the export of barreled pork sent to the Caribbean. The figure of about ten pigs generated from the MNI calculations does not seem indicative of a large butchery operation, especially since the midden suggest the deposition of household trash over a long period of time. However, as discussed below, a pit feature in an adjacent area of the

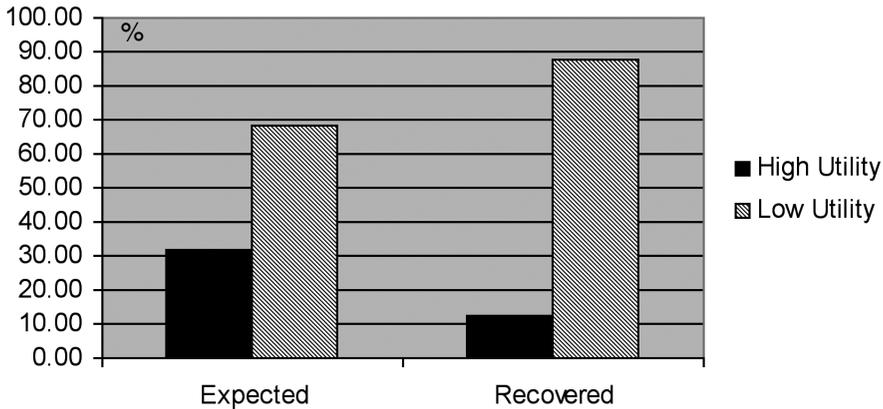


Figure 7. Relative representation of pig bone specimens in the midden. High utility parts include the torso and upper limbs; low utility parts include the head and feet. Expected is the proportion in a single animal; recovered is the proportion in the bone assemblage.

site does seem to show pig butchery for export, and has a similar over-representation of low utility skeletal parts. As a result, it is possible that the Sylvesters were barreling and shipping out some of the high utility parts, while eating the pig parts that were not being shipped and discarding the bones in the midden. In this interpretation, the pig bones in the midden are still household food waste, but nonetheless reflect the provision export functions of the plantation.

Conclusion

The information presented above permits a number of possible interpretations, but based on this research, the most likely is that the midden deposit is primarily domestic in nature. A number of factors support this explanation. The first is the physical location of the midden deposit, situated as it is in the area believed to be the plantation core, near the expected location of the original manor house. Second, the seventh provision in the 1652 Articles of Agreement detailing the ages at which animals can be slaughtered (six years of age), includes an addendum permitting the use of younger animals as needed to provide for the dietary needs of the inhabitants (Middleton et al. 1652). This offers one explanation for the comparatively young ages of the animals contained in the deposit, especially if it dates to the early period of settlement. Additionally, the hundreds of non-faunal artifacts excavated from the midden include numerous and varied

domestic items such as ceramics, clay pipe fragments, bits of jewelry, straight pins and glasswares. The presence of burnt bones also lends support to the idea of a domestic deposit, as much of this appears to be bone waste discarded in the fireplace.

Since the midden deposit is largely comprised of household refuse, the faunal remains detailed above provide more direct insight into the dietary habits of the residents of Sylvester Manor than the commercial husbandry activities in which they engaged. However, more recent archaeological excavation away from the midden area uncovered a bone deposit that looks more like a product of commercial production. During the summer of 2005 the field crew excavated part of a large pit feature (F. 221) that appears to represent a short-term butchery episode, presumably to prepare a shipment of meat for export. The bottom of the feature was comprised of a sandy fill layer containing fully 5,225 bones and very few artifacts. The archaeological data suggest rapid deposition of the bones followed by purposeful filling with sand. The bones in the sandy layer were about two-thirds pig bones (65%), with smaller proportions of cattle (19.4%), sheep or goat (3.2%), and very limited numbers of deer, chicken, dog, and raccoon. The pig skeletal part representation supports the idea of slaughter to preserve some meat, with heads and feet over-represented relative to normal anatomical proportions. The pattern in the pit feature is very similar to that in the midden (FIG. 7). In a regular pig skeleton 69% are low-meat yield

parts (like head and feet), while in the pit feature 89% of the bones are low yield parts. The cattle and sheep bones are represented in proportions either much closer to normal (cattle), or with high yield parts over-represented relative to normal proportions (sheep).

Although the pig bones in the midden are also disproportionately heads and feet, the midden clearly formed over a long period of time. The pit feature deposit suggests a short-term butchering episode, perhaps over the course of several days or weeks in a single season, rather than a long-term accumulation of slaughter waste. The pigs in this deposit are also generally older than those in the midden. The pigs in the midden generally have third molars in early stages of wear. By contrast, the pig teeth in the pit feature are heavily worn, with all but one of the lower third molars in wear stage "D" or higher (Grant 1982). These are older pigs, likely more than two years of age at the time of slaughter. The pig bones in the pit feature are also quite robust, suggesting large adult animals.

The jaws give an MNI of thirteen pigs represented in the pit. If we are correct that this is the result of a short-term butchery event, it represents gathering and slaughtering a large number of pigs, presumably to barrel meat for shipment to Barbados. Pig butchery was typically a cool weather event in the fall, perhaps after the pigs had been fattened on field stubble, nuts, or inferior grain left after the harvest. Preservation at this time was limited to salting and/or smoking, and it appears that most pork was salted first and smoked after aging in salt (Randolph 1860 [1993]; Simmons 1796 [1958]). After slaughtering, the pigs would have been hung for a day or two, cut into sections, rubbed down with salt, and packed into barrels with salt layered around them. Salt would have been a seasonally important product at the Manor, but there are currently no records to indicate salt imports specifically for this purpose.

It is hard to estimate dressed hog weights in the 17th-century, but as the pigs in the pit appear to be large adults, it is reasonable to assume 100 pounds as a dressed weight (Miller 1984: 422). The thirteen pigs represented would thus have yielded roughly 1300 pounds of meat. Historical documents suggest meat consumption ranged from about one-half to one-

pound per person per day (Derven 1984: 63; McMahon 1985: 56). So, 1300 pounds of barreled pork would have fed a household of ten people for between four and nine months. By contrast, slave rations were typically one pound per person per week (Walsh 1999: 273). At this rate, the 1300 pounds of meat would have provided a little over three months of salt pork rations for 100 laborers on a sugar plantation. Preparing and shipping out this quantity of pork would have potentially served as an important component of the provisioning plantation.

The documents tell us that dairying and wool production were, at certain times, key aspects of the economic system at Sylvester Manor. The zooarchaeological age profiles of the animals in the midden, however, indicate that the inhabitants primarily killed and consumed young and likely still productive sheep and cattle. This break in expected husbandry patterns is, perhaps, not so much an inconsistency as it is a sign of prosperity. The ability to ignore the most efficient and cost-productive activities in favor of choice and quality is indicative of a comfortable economic position for the Sylvester family.

It is important to note that the selection of food animals was not random, but actually quite controlled. Although different than expected, very distinct and focused age patterns are visible for each of the three major domestic species, indicating careful management of livestock. This attention to detail is evident in the earliest days of settlement from the livestock provision in the 1652 Articles of Agreement and based on the faunal assemblage from the midden deposit and the 1693 lease agreement, it continued throughout the late-seventeenth and early-eighteenth centuries.

The apparent lack of wild fauna among the midden remains is also meaningful, in that it too suggests some degree of prosperity. Based on the dearth of wild species, the residents of Sylvester Manor likely drew enough nutrition from the animals they raised and did not require much to supplement their diets. The relatively low numbers of bird and fish remains also lend support to this interpretation, although as a result of preservation and recovery issues, these species probably played a somewhat larger role than is evidenced by their representation in the deposit.

If the faunal remains from the midden deposit are indeed primarily domestic in origin, they are indicative not only of the economic aspects of food production and procurement, but the social and cultural facets of this activity as well. Colonial contexts such as that of 17th-century Sylvester Manor were the settings for new and life-changing experiences for Europeans, Africans and Native Americans. By drawing on new groups' lifeways and/or adopting new ways of relating to the landscape, participants in colonial interactions often re-forged their own cultural identities. Changes such as these are sometimes evident in the archaeological record when creolization, or the combining of "traditional" customs with newly introduced ones, is apparent. One way of understanding creolization processes is through the analysis of archaeological foodways. What people were eating at Sylvester Manor can thus be seen as a reflection of how they were changing with continued exposure to new groups of people, customs and landscapes within the context of colonialism.

Fayden (1993) and Greenfield (1989) both provide some information about faunal assemblages from Dutch households in 17th-century New Amsterdam. In these assemblages, pig bones were more common than sheep bones, a pattern quite different than that at Sylvester Manor. While zooarchaeological studies suggest beef was the most important meat in the Dutch diet, pork was a valued food, and an important part of the urban Dutch diet (Barnes and Rose 2002: 18; Bartels 2005: 59–60; Groenman-van Waateringe 1994: 148–153, 157). In Massachusetts, rural sites seem to emphasize pork over mutton, while the reverse is the case in Boston (Landon 1997: 55). The midden assemblage, with its higher relative representation of sheep remains, reflects a diet that appears more English and urban than Dutch or rural. Of course a variety of other factors contributed to variation in Colonial American faunal assemblages besides differential ethnic preferences. While high relative frequencies of pig remains at some Dutch colonial sites might be interpreted as a Dutch cultural preference, it may also simply have been a measure of the ease of raising pigs and preserving pork.

In terms of Sylvester Manor, several drastically different images of cultural identity can be drawn from the midden faunal assem-

blage, depending on who contributed to the assemblage and how. The archaeological and documentary records suggest that Europeans, Africans, and Native Americans all contributed to the midden deposit, thus all groups must be considered as possible contributors to the bone assemblage. As a result, the assemblage can be used as a point of departure for discussing how cultural identities of different groups might have been renegotiated within this context of colonialism. Each group is discussed briefly in order to consider what it might have meant if they played a role in generating the bone assemblage under study.

The European occupants of the site, the Sylvesters, were exposed to new people and a new landscape when they moved to Shelter Island in 1652 to begin their provisioning operation. The Sylvesters were likely the dominant occupants of the Manor grounds in the 17th century, using Native Americans and Africans as sources of labor. The faunal assemblage speaks of a heavy European domestic animal-based diet, consisting mainly of sheep, cattle and pigs. Thus, in regards to food, it may be inferred that the Sylvesters mostly stuck to their "traditional" ways of living. The dearth of deer bones in the assemblage indicates this strongly. Despite moving into a foreign land with new local food resources, the Sylvesters continued to rely on European domesticated animals as their main source of meat.

The African inhabitants of 17th-century Sylvester Manor experienced great change from their traditional lifeways. This includes exposure to new people and a new landscape, but also new social boundaries, as they were brought to Shelter Island as slaves. If, as was often the case in the Northeast, the Sylvesters' enslaved Africans lived with them in the main plantation house or another existing structure (Fitts 1996: 55–56), their food remains were likely deposited with the rest of the household trash. Thus, the faunal assemblage under study could represent African diets and/or labor. If the assemblage does represent African diets, it suggests that these individuals ate different foods than they would have traditionally. This is likely due both to the drastically new environment they were brought into as well as the strict curtailment of slave activities by European owners. Either way, the assem-

blage suggests a possible major switch in diet for African inhabitants of Sylvester Manor. One aspect of the faunal assemblage that warrants further exploration is that of the fish bones. These might offer clues to possible alternatives to European domesticated animals as sources of meat.

Although Native Americans had been living on Shelter Island and the land that would become Sylvester Manor long before the colonial period, these inhabitants were exposed to new people and life-ways when the Sylvesters established the Manor. Although Native Americans acted as a source of labor for the Sylvesters' provisioning operation, it is not clear they were living in the buildings immediately adjacent to the midden. It is thus unlikely that Native American laborers were generating much of the faunal refuse found in the midden, though the possibility must be considered. If the assemblage under study does represent Native American foodways, it speaks of drastic change for this group, suggesting almost complete abandonment of hunting practices for the adoption of European animal husbandry despite no apparent lack of locally available game animals. There are extremely few deer bones in the assemblage relative to domestic animals. The butchered dog might be one indication of the continuation of some traditional dietary practices. Many Native American groups, including some in the northeast, consumed dog meat, sometimes for ceremonial occasions (Schwartz 1997). With this possible exception there is little in the midden zooarchaeological assemblage that speaks to Native American foodways, and it likely that their food refuse was deposited elsewhere.

When considered in conjunction with primary documents and previous historical and archaeological research, the results of the zooarchaeological analysis of the Sylvester Manor trash midden provide a great deal of information about the agricultural, social and economic aspects of life on a northern plantation. The examinations of age profiles and skeletal part utility percentages reveal distinct animal husbandry patterns, which in turn help to illuminate economic and cultural practices. While the deposit cannot as yet be conclusively linked to any one household, such information is valuable because as a provisioning plantation or even a smaller commercial farm, agriculture

and animal raising would have played major roles in the day to day operations of the Manor and thus in the lives of its inhabitants.

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