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Feast or Famine? Seventeenth-Century English Colonial Diet at Ferryland, Newfoundland

ABSTRACT

Documentary and faunal evidence from the 17th-century English colony at Ferryland, Newfoundland, illustrates how the settlers adapted traditional English dietary practices to suit their new situation. The role of both domestic and wild mammals in the diet changed little over the course of the century. Pigs were consistently the most important mammal, supplemented by cattle, sheep/goat, caribou, and seal. The continuity of dietary patterns at the site indicates that the colonists very quickly developed a subsistence regime to maximize fresh meat consumption, given the scheduling demands of the cod fishery and the limitations and potential of the Newfoundland environment.

Introduction

During the colonial expansion of the 17th century, Europeans established settlements around the globe in order to exploit a wide range of natural resources. The diet of European colonists in the New World was shaped by the need to schedule subsistence activities around other economic pursuits, the natural and social environments of the colonies, and the traditional diet and husbandry practices of the settlers. The animal bones recovered from archaeological excavations at the 17th-century English colony at Ferryland, Newfoundland, provide an opportunity to examine how the site's occupants adapted their foodways to their new situation. While there is a limited amount of documentary evidence on hunting, livestock production, kitchen gardening, and imported foods, these faunal remains represent the first direct evidence of early English eating habits in Newfoundland.

Conditions at Ferryland provided the settlers with both constraints and new opportunities in terms of diet. The cod fishery was central to

the site's economy, and all subsistence pursuits had to be scheduled around the intensive fishing activity that took place from May to August. Because of Newfoundland's harsher winters, overwintering livestock would also have been more difficult in Newfoundland than in England. At the same time, Newfoundland lacked the restrictive game laws of England, and the working-class occupants of Ferryland had ready access to caribou and other wild game forbidden to their counterparts in England.

In addition to these broader influences, a number of changes over the course of the 17th century may have had an impact on subsistence practices at the site. The economic organization of the site appears to have shifted from a sponsored, centralized colonial venture to a more individualistic mercantile one around 1640. The first half of the century was also a time of harsher, colder climate with more sea ice than the second half of the century. Despite these changes, the faunal evidence indicates that diet at the site was fairly consistent over time in its emphasis on five main categories of mammals. The lack of change in the relative importance of wild and domestic mammals could be interpreted as a response to instability in the food supply. It is more likely an indication that the Ferryland colonists quickly established a subsistence strategy that maximized their meat consumption and maintained it, despite variability in the natural and socio-political environments of the site.

English Colony at Ferryland

Throughout the 16th century, the large cod stocks off Newfoundland attracted a seasonal fishing fleet from Europe in which Basque, Portuguese, French, and English vessels participated. As competition for fishing grounds grew early in the 17th century, the first permanent European settlements appeared in Newfoundland. The Colony of Avalon, in Ferryland, Newfoundland (Figure 1), was one of the first permanent English settlements in the New World. In 1620, Sir George Calvert (named Lord Baltimore in 1624) purchased a large tract of land

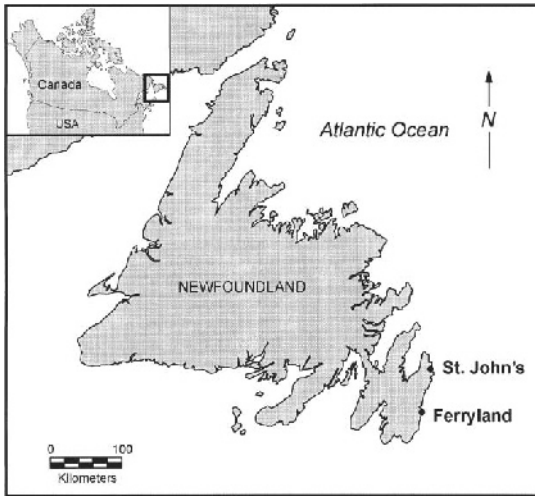


FIGURE 1. Location of Ferryland, Newfoundland. (Drawing by Edward Eastaugh.)

on the southern Avalon Peninsula. In 1621, his appointed representative Captain Edward Wynne arrived at Ferryland to establish a colony for the exploitation of the lucrative Newfoundland cod fishery. Calvert moved to Ferryland with his family in 1628, intending to settle permanently. His first winter convinced him that Newfoundland was an inhospitable place, and he moved south to Virginia, leaving a deputy in charge of affairs on the Avalon.

In 1638, the newly appointed governor of Newfoundland, Sir David Kirke, seized control of the settlement at Ferryland, ousting Calvert's agent and moving into the mansion house built by Calvert. Kirke, made governor by Charles I, was recalled to England and imprisoned during the interregnum. Although he died there in 1654, Kirke's widow and sons, powerful merchants in their own right, maintained control of Ferryland until it was destroyed during a French raid in 1696. The shift in political power as Kirke took over from Calvert was marked by a phase of construction at the site. Communal buildings such as the bakery and the forge were destroyed, the main house was enlarged, and several separate dwellings were constructed. This activity suggests a change from the centralized, community-oriented organization of the original colony to a more market-based economy emphasizing individual wealth (Tuck 1996). The rebuilding lends support to Peter Pope's

(2004) distinction between a corporate form of colonialism under Calvert and mercantile colonialism under Kirke. Calvert acted much like a feudal lord, sponsoring colonists and investing heavily in the settlement's infrastructure, while Kirke was motivated by a desire for personal rather than community success. He used his existing transatlantic trading connections to make Ferryland an important trading port, at the same time seizing control of local markets and monopolizing the trade in alcohol and salt (Pope 2004:54–55). Calvert's unified colony gave way to a loose association of independent interests under Kirke.

Population size at Ferryland varied seasonally as migratory workers swelled the ranks during the fishing season and annually as the profitability of the fishery fluctuated in response to catch rates, political unrest in England, and international conflicts. Only sporadic records of population size exist from Ferryland, many of them incomplete, but they provide a general sense of the settlement's size. In 1622, a letter from Captain Wynne to Calvert lists a total of 32 colonists including himself (Cell 1982:204). The same letter also requests additional carpenters, masons, quarry men, and maids, totaling approximately 20 people, plus a "good quantity" of lads and "a convenient number" of agricultural laborers (Cell 1982:203). In winter 1628, during which Calvert and his household overwintered at Ferryland, Pope (2004:127) estimates the population at more than 100. A series of censuses taken between 1675 and 1677 (Berry 1675; Wyborne 1676; Poole 1677) indicate between 8 and 10 planters (resident fishing-boat owners) at Ferryland with a total of 10 to 20 wives and children and 97 to 112 servants. The majority of these servants were male and would have been employed in the fishery. The documents do not make clear what proportion of the servants were permanent residents as opposed to seasonal migrants. Winter populations in the 1670s would have been somewhere between a minimum of 20 to 30 individuals, if only the planters and their families remained, and a maximum of 125 to 150 individuals, if all of the servants remained. Since the number of seasonal fishing boats was often roughly equal to the number of residential boats, the addition of fishing ships and their crews would have approximately doubled the population each

summer. It would have reached more than 200 in the late 1620s and more than 250 in the 1670s.

Newfoundland Environment

As at other English colonies, animal husbandry and diet at Ferryland would have been influenced by local environmental conditions. Ferryland settlers arrived in Newfoundland during the “Little Ice Age,” a period of climatic cooling in the North Atlantic between the 13th and 19th centuries (Grove 1988). Recent data from glacial ice cores in Greenland indicates that this period witnessed some of the most dramatic and rapid climate change of the Holocene (Mayewski et al. 1994; Meese et al. 1994; O’Brien et al. 1995). While the Little Ice Age was originally interpreted as an extended and uniform period of glacial advance and cooler climates throughout the North Atlantic, subsequent research has demonstrated that it was characterized by considerable regional and temporal climatic variation (Meese et al. 1994).

The Penny ice cap (PIC) record from Baffin Island provides an indication of variations in spring weather conditions in Newfoundland during the 17th century. The cold-water Labrador Current brings Arctic pack ice south along the Labrador coast to Newfoundland, where it influences spring ice and weather conditions. In the PIC record, sodium deposited by airborne sea salt acts as an indicator of the extent of regional sea ice (Grumet et al. 2001). A decrease in the amount of sodium reflects increased ice cover in surrounding areas, which reduces the amount of windborne sea salt being deposited on the ice cap. Increased sodium indicates an increase in windborne sea salt as a result of reduced ice cover. The sodium record appears to be particularly influenced by spring ice conditions (Grumet et al. 2001). The PIC sea salt sodium record shows considerable variability from A.D. 1500 to present but suggests a period of relatively severe ice conditions from the mid-16th to the mid-17th centuries, followed by cycles of more moderate ice conditions until the late-18th century (Woollett et al. 2000).

New England weather records confirm that the PIC sea salt sodium record is a reliable indicator of weather conditions on the northeast coast of North America. These records document very

cold winters during the first half of the 17th century, followed by a period of milder temperatures from the late 1650s to the mid-1670s. They then record a series of very harsh winters during the final two decades of the century (Pope 2004:33–34). The extreme winter conditions of 1600–1650 and possibly also the 1680s and 1690s would have increased the demand for winter fodder to support livestock populations.

While southern England and the Avalon Peninsula are at comparable latitudes, the English climate, even during the Little Ice Age, was considerably milder and more conducive to animal husbandry than that of Newfoundland. As today, this difference was primarily due to the moderating influence of the Gulf Stream on British climate and the cooling effect of the Labrador Current in Newfoundland. Newfoundland winters were colder, lasted longer, and saw considerably more snowfall than those in England. In the absence of precise climate records from the Avalon Peninsula during the 17th century, documentary evidence from Ferryland underscores the harshness of Newfoundland winters. Calvert describes his first winter in Newfoundland as follows:

For here, your Majesty may please to understand, that I have found by too dear bought experience, which other men for their private interests always concealed from me, that from the midst of October to the midst of May there is a sad face of winter upon all this land, both sea and land so frozen for the greatest part of the time as they are not penetrable, no plant or vegetable thing appearing out of the earth until it be about the beginning of May, nor fish in the sea, besides the air so intolerable cold as it is hardly to be endured. By means whereof, and of much salt meat, my house hath been an hospital all this winter (Calvert 1629).

Overwintering livestock would thus have been a challenge in Newfoundland. With no winter pasture available, the colonists had to provide enough fodder to sustain any stock that was not culled in the autumn.

Seventeenth-Century English Diet

The Ferryland diet was also shaped by contemporary English eating habits. Livestock agriculture in 17th-century England focused primarily on cattle and sheep, with pigs raised for household consumption. Wool production, which had

dominated the English livestock industry since the 14th century, began to wane in importance under Elizabeth I. The growth of towns provided a new market for red meat, butter, and cheese, and prices for these commodities grew to equal those of wool. As a result of these changes, cattle were an important source of meat and dairy products throughout England by the 17th century, and farmers were raising sheep for mutton as well as wool (Trow-Smith 1957; Urquhart 1983). The relative importance of cattle and sheep varied regionally throughout England. In the southwest, where most of the Ferryland settlers and the bulk of its trade originated (Pope 2004), the counties of Devon and Dorset produced large numbers of cattle and sheep. Devon, particularly the area around Barnstaple, was a renowned center of cattle production, while Dorset was famous for its large flocks of sheep (Trow-Smith 1957:175). In 1696, Gregory King estimated that there were 4.5 million cattle of all ages in England and Wales, 12 million sheep, and 2 million pigs. He also included 20,000 deer, 10,000 goats, 12,000 hares, and 2 million rabbits in his inventory of the nation's livestock (Whitworth 1771:219). King's estimate of the sheep population included a considerable number of animals raised purely for their wool. Cattle, as producers of meat and dairy products, ranked first in terms of their contribution to the diet, with sheep ranked second and swine, third. Unlike cattle and sheep, pigs were not raised commercially, but were intended largely for consumption on individual farmsteads (Trow-Smith 1957:250).

Diet, in particular meat consumption, was very closely tied to wealth and status in postmedieval England. Throughout the 17th century, the diet of the rural poor consisted primarily of bread, beer, "potage" (a soup prepared with beans and salted meat), cheese, and small quantities of bacon. In towns, the staples of the working classes were bread, beef, beer, and cheese. Townsfolk judged their standard of living largely by the quantity of meat in their diet, and they consumed as much of it as their finances would permit. The diet of the upper classes was heavily meat dominated. Their main meal always centered on a hot meat dish, and on special occasions a host would serve several courses of meat (Drummond and Wilbraham 1958:99–107).

Red deer, roe deer, and other wild game were particularly valued at the tables of wealthy

English households, and by the early-17th century, most of the large game in Britain was confined to royal forests and private parks owned by the gentry (Longrigg 1977:71). Game laws, in place since Norman times, officially prohibited anyone without sufficient land and income from hunting, not only large game but also rabbits and a wide range of game birds (Manning 1993:59). While people in rural areas undoubtedly set snares and traps in order to supplement their diets with birds, rabbits, and other small game, the consumption of large game was restricted primarily to the elite. Deer hunting was an intricate ritual among the upper classes, and venison was prized as a favorite gift and feasting dish of the gentry (Longrigg 1977).

Food at Ferryland

For the colonists, Newfoundland must have been a place of contradictions, where food was alternately abundant and scarce. On one hand, it provided a seemingly endless supply of codfish and other wild game. The absence of game laws meant that game species, traditionally associated with high social status, were equally available to all members of the community. At the same time, Newfoundland's short growing season, cold winters, and the demands of the summer fishery made traditional English agricultural pursuits difficult. Overwintering livestock is a critical aspect of animal husbandry in temperate climates and would have been a constant challenge in Newfoundland. For most of the 17th century, a source of readily available winterfeed for livestock was lacking in England. As a result, the traditional practice was to slaughter old and weak individuals in the autumn, preserving the surplus meat for winter consumption. Breeding stocks were overwintered on what they could graze at pasture, supplemented by straw and occasionally hay (Fussell 1936).

Several innovations during the 17th century began to change this practice in England. One was the introduction of turnips as a fodder crop. While turnips may have been adopted as a fodder crop in eastern England as early as the 1620s, they were not grown in the southwest of England until the early-18th century (Grigg 1989:49). The second was the use of water meadows, a system of channels that diverted

local waterways to flood areas of pasture, thus protecting them from frost, permitting growth through the winter, and allowing grazing to begin a month earlier than on unimproved pastures. The system was invented in 1589 and became popular throughout the 17th century (Whitlock 1983:121–123). The technique would have had very limited success in Newfoundland, where the persistently cold winter temperatures and extensive snow cover would have frozen even irrigated meadows each winter.

There is no archaeological or documentary evidence from Ferryland to suggest either large-scale cultivation of turnips as a fodder crop or the use of water meadows. In fact, the documentary evidence (outlined below) suggests that hay from the local meadows was the primary winter fodder at the site. It follows that the use of traditional fodder at Ferryland meant a reliance on the traditional autumn cull. Given Newfoundland's longer, more severe winter, the demand for winter hay would have been higher than in England and the ability to produce it more restricted, thus imposing more severe limits on herd size.

Documentary Evidence

A limited amount of documentary evidence supplements the animal bone record of husbandry and wild food consumption at Ferryland. A series of letters from the early years of Calvert's colony provide information about the attempts to establish a breeding stock of domestic animals. In 1621, Wynne sent the following request to Calvert:

It may please your Honour not to send any cattle the next year, because I cannot provide fodder for them so soon, before there be some quantity of corn growing. But it may please your Honour to send some goats, a few tame conies [rabbits] for breed, as also pigs, geese, ducks and hens (Cell 1982:256) [spelling and punctuation modernized].

Another letter from Wynne to Calvert, dated 17 August 1622, indicates the continuing concern with pasture and winter fodder, primarily in order to establish a cattle herd:

We have a meadow of about three acres. It flourished lately with many cocks [stacks] of good hay, and now it is made up for a winter feeding. We hope to be well fitted with many acres of meadow against another

year. Of pasture land, we have already to serve at least three hundred heads of cattle ... (Cell 1982:201) [spelling and punctuation modernized].

Wynne almost certainly overestimates the potential size of the cattle herd; his reports to Calvert often exaggerate the bounty of the plantation. However, Wynne does appear to have succeeded in quickly establishing a reasonable domestic stock:

And within these three years Master Secretary Calvert hath planted a company at Ferryland, who both for building and making trial of the ground have done more than ever was performed before by any in so short a time, having already there a brood of horses, cows and other beastial. And by the industry of his people he is beginning to draw back yearly some benefit from thence already ... (Stirling 1624:25) [spelling and punctuation modernized].

British inventories and census records also provide some information about domestic livestock at Ferryland during the later years when the site was under Kirke family control. A 1640 inventory indicates that most planters in St. John's and the southern Avalon kept swine, while only 30% of them kept cattle (Pope 2004). People generally kept only one or two pigs, while those who owned cattle had an average of eight individuals. It therefore appears that cattle rearing was far more centralized than pig rearing. This no doubt relates to the relative ease of providing food for pigs, which can be fed any organic waste, including fish guts and table scraps, while cattle require summer pasture and winter hay. A 1677 census lists a total of 71 swine and 22 cattle owned by six out of a total of eight planters at Ferryland (Poole 1677). The largest numbers of livestock belonged to David Kirke, Jr., and William Robinson, who between them owned 31 hogs and 18 cattle. Two of the other planters also owned more than 10 pigs each. Based on these numbers, Pope (2004) suggests that Ferryland had become something of a center for livestock rearing, producing in excess of the subsistence requirements of the community.

The documentary record is less informative about wild food sources. While there are several early descriptions of the presence of various wild animals around Ferryland, it is not always clear which species were consumed and which were not. James Yonge refers to a wide range

of Newfoundland fauna and flora in his diary entries from 1663:

Here are also seals, an amphibious animal like a dog. I have seen them abundantly on the ice, 30 leagues off the shore At the head of this river are many salmon; we caught abundance and our master saved several hogsheads and dried abundance in the smoke. ... Here are beaver, otter, and deer plentiful; for fruits, strawberry, raspberries, whorts, and wild grapes incredible. ... In the winter, the planters employ themselves in getting fish, sawing deal boards, making oars, catching beaver, and fowling. They have innumerable ducks, several geese, wild pigeons, partridge, hares, &c (Poynter 1963:55–60).

The documentary evidence thus raises several questions about meat consumption at Ferryland. While the early letters suggest a strong emphasis on cattle husbandry, documents from the Kirke era at Ferryland indicate that swine were far more common than cattle at the site. The faunal remains provide an independent means of evaluating the contribution of these species to the diet over the course of the century. They also provide a means to assess the importance of wild species relative to domestic ones, an issue on which the documentary record is silent, and provide direct evidence of the range of wild species exploited by the planters.

Faunal Evidence

Animal bone assemblages have been recovered from four different middens at Ferryland. All of the material was excavated under the direction of James Tuck between 1992 and 2002 and recovered using 1/4-in. screens (Tuck 1996; Carter et al. 1998; Tuck and Gaulton 2001). The contents and location of all of the middens suggest that they represent domestic refuse. Faunal remains from the early midden and the Bake/Brew House midden date from the first half of the century and appear to result from the initial Calvert occupation at Ferryland. The early midden consists of a single deposit (Events 367 and 391) that contains pipe bowls dating stylistically to the early- to mid-17th century. James Tuck and Barry Gaulton's unpublished field notes interpret this midden as a refuse layer associated with the initial occupation of the mansion house by Calvert and his employees. The Bake/Brew House midden is comprised of three sequential deposits (Events 520, 525, 530), all of which contain

pipe bowls and other material indicating a date during the first half of the 17th century. The uppermost of these deposits (Event 520) contains pipe bowls dating from 1620–1650/60. Since the Bake/Brew House was demolished during the rebuilding phase associated with the Kirke takeover of the site, the associated midden was clearly deposited between 1621 and 1638 during the period of Calvert control.

Two other midden assemblages date from the second half of the 17th century and were deposited during the Kirke era at Ferryland. The Kirke House midden is a single deposit (Events 287 and 359) associated with a large dwelling that was built over part of the earlier Bake/Brew House around 1640. Pipe bowls from this midden indicate a date in the second half of the 17th century. Finally, the Kitchen midden consists of four distinct deposits (Events 506, 507, 508, and 509) representing dumping episodes along an external wall of the kitchen building. The first two events can be dated to the mid-17th century based on the recovered pipe bowls. A single pipe bowl from Event 508 places it between 1650 and 1680, and artifacts recovered from Event 509 suggest a date in the mid- to late-17th century.

A broad range of species is represented throughout the 17th century occupation at Ferryland (Table 1) (Hodgetts 2006). Fish vary in importance in the four middens, ranging from 7% of NISP in the Kirke Midden to 48% in the Bake/Brew House midden (Figure 2). Pulverized fish bone, which proved impossible to quantify, was observed clinging to other bone material during analysis of all four midden assemblages. This suggests that the data in Figure 2 underestimate the relative importance of fish bone. The varying percentages of fish may relate to different levels of preservation within each assemblage.

The identified fish bone is almost exclusively cod, which is not surprising given the role of the site in the cod fishery (Table 1). While the dietary contribution of codfish is difficult to quantify, the Ferryland settlers clearly consumed fresh cod in addition to preparing preserved fish for the transatlantic trade. Bones of the cod skull and the vertebral column are well represented at Ferryland (Table 2). The preparation of salted fish for market has changed little since medieval times. The process involves gutting and heading

TABLE 1
 REPRESENTATION OF FAUNAL TAXA FROM 17C CONTEXTS AT FERRYLAND
 (NISP is presented for all taxa; MNI* appears in parentheses where appropriate)

Latin name	Common name	Early Midden	Bake House	Kirke Midden	Kitchen Midden	Total
<i>Mytilus sp.</i>	Mussel	61 (5)	—	1 (1)	—	62
Pisces (class)	Unidentified fish	167	53	10	23	253
<i>Salmo salar</i>	Atlantic salmon	—	1 (1)	—	—	1
<i>Gadidae</i>	Cod family	75 (4)	78 (3)	18 (2)	80 (2)	251
<i>Gadus morhua</i>	Atlantic cod	7 (3)	2 (1)	2 (1)	—	11
<i>Liopsetta glacialis</i>	Arctic flounder	1 (1)	—	—	1 (1)	2
<i>Glyptocephalus cynoglossus</i>	Witchflounder	—	2 (1)	—	—	2
Aves (class)	Unidentified bird	12	11	14	34	71
	Small bird	—	—	1	—	1
	Medium bird	4	6	3	13	26
	Large bird	—	—	—	1	1
<i>Gavia stellata</i>	Red-throated loon	—	—	—	1 (1)	1
<i>Pinguinus impennis</i>	Great auk	—	—	—	3 (2)	3
<i>Uria lomvia</i>	Thick-billed murre	—	—	—	4 (2)	4
<i>Uria aalge</i>	Common murre	—	—	—	2 (1)	2
<i>Alca torda/Uria sp.</i>	Razorbill/Murre	—	—	—	3	3
<i>Cephus grylle</i>	Black guillemot	—	—	—	2 (2)	2
Anatinae	Duck subfamily	6	—	—	1	7
<i>Melanitta fusca</i>	White-winged scoter	—	—	—	2 (2)	2
<i>Clangula hyemalis</i>	Oldsquaw	—	—	—	1 (1)	1
<i>Somateria sp.</i>	Eider	—	—	—	2 (2)	2
<i>Somateria spectabilis</i>	King eider	—	—	1 (1)	—	1
<i>Somateria mollissima</i>	Common eider	—	1 (1)	—	3 (2)	4
<i>M. fusca/Somateria sp.</i>	Scoter/Eider	—	—	—	1	1
<i>Phalacrocorax auritus</i>	Double-crested cormorant	1 (1)	—	—	—	1
Larinae	Gull subfamily	2	1	6	2	11
<i>Larus argentatus</i>	Herring gull	—	—	1 (1)	—	1
<i>Larus marinus</i>	Greater black-backed gull	—	—	6 (1)	—	6
<i>Charadrius sp.</i>	Plover	—	—	—	1 (1)	1
Scolopacidae	Sandpiper family	2	—	—	1	3
<i>Haliaeetus leucocephalus</i>	Bald eagle	—	2 (1)	—	1 (1)	3
<i>Bubo virginianus/ Nyctea scandiaca</i>	Great horned owl/ Snowy owl	—	—	—	1 (1)	1
<i>Columba livia</i>	Domestic pigeon	—	—	—	1 (1)	1
<i>Corvus corax</i>	Northern raven	1 (1)	—	—	—	1

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 REPRESENTATION OF FAUNAL TAXA FROM 17C CONTEXTS AT FERRYLAND
 (NISP is presented for all taxa; MNI* appears in parentheses where appropriate)

Latin name	Common name	Early Midden	Bake House	Kirke Midden	Kitchen Midden	Total
Mammalia (class)	Unidentified mammal	503	84	236	156	978
	Medium mammal	12	–	9	12	33
	Large mammal	43	1	23	21	88
<i>Castor canadensis</i>	Beaver	–	1 (1)	–	–	1
Microtinae	Vole/lemming fam.	–	–	–	11	
<i>Rattus sp.</i>	Rat	–	–	–	4 (1)	4
Cetaceae	Whale/dolphin fam.	–	1	–	–	1
Delphinidae	Dolphin	–	–	–	1 (1)	1
Carnivora (order)	Small carnivore	–	–	–	1	1
<i>Canis familiaris</i>	Dog	12 (1)	–	–	–	14
<i>Vulpes vulpes</i>	Fox	1 (1)	1 (1)	1 (1)	3 (2)	6
<i>Felis catus</i>	Domestic cat	–	–	1 (1)	–	1
Phocidae	Seal family	29 (2)	2 (2)	6 (1)	20 (4)	57
<i>Phoca vitulina</i>	Harbour seal	10 (2)	1 (1)	4 (2)	2 (2)	17
<i>Phoca groenlandica</i>	Harp seal	–	–	2 (1)	3 (2)	5
Ungulata (super-order)	Hoofed animals	2	1	17	–	20
<i>Equus equus</i>	Horse	1 (1)	–	1 (1)	–	2
Artiodactyla (order)	Even-toed ungulates	–	–	–	4	4
<i>Sus scrofa</i>	Pig	40 (3)	16 (3)	27 (3)	20 (4)	103
<i>Rangifer tarandus</i>	Caribou	15 (1)	7 (3)	14 (3)	15 (4)	51
	Caribou-sized	–	1	–	3	4
<i>Bos taurus</i>	Cattle	15 (1)	3 (2)	20 (1)	10 (5)	48
	Cow-sized	2	1	1	3	7
<i>Ovis/Capra</i>	Sheep/Goat	9 (1)	6 (2)	13 (3)	13 (3)	41
<i>Ovis aries</i>	Sheep	–	–	1 (1)	2 (1)	3
<i>Capra hircus</i>	Goat	1 (1)	–	–	–	1
	Sheep/Goat-sized	–	–	–	2	2
Unidentified		38	5	15	6	64
Grand Total		1,072	288	453	488	2,301
Total Identified [†] Specimens		228	126	129	214	697

*MNI values take into account skeletal element, part of element, side, age (based on bone fusion and tooth eruption), and depositional context (all depositional events are assumed to be independent). In certain cases, MNI values were calculated for taxonomic families (e.g., Phocidae) or groups of species (e.g., Sheep/Goat). In such cases, the MNI values assume (probably incorrectly) that all members of the category are from a single species.

[†]The identified assemblage includes all fish, bird, and mammal specimens identified to taxonomic order, family, subfamily, genus, or species.

TABLE 2
REPRESENTATION OF COD SKELETAL PARTS
(Includes all *Gadidae* and *Gadus morhua* specimens)

	Early Midden NISP (MNI)*	Bake House NISP (MNI)	Kirke Midden NISP (MNI)	Kitchen Midden NISP (MNI)
Head	10 (1)	15 (3)	2 (1)	7 (3)
Spine				
Atlas	3 (3)	2 (2)	0 (0)	0 (0)
Thoracic	20 (4)	12 (3)	10 (2)	2 (2)
Precaudal	10 (1)	12 (2)	3 (1)	30 (4)
Caudal	35 (2)	39 (3)	4 (1)	38 (4)

*MNI values indicate the minimum number of whole fish represented by the bones of the head and by each section of the vertebral column. Because the number of cod vertebrae varies according to the size and environment of each fish, MNIs were calculated using the mean value of 54 vertebrae, taken from Swain and Frank (2000), and assuming 1 atlas, 5 thoracics, 16 precaudals, and 32 caudals per fish. MNI values treat discrete archaeological deposits separately.

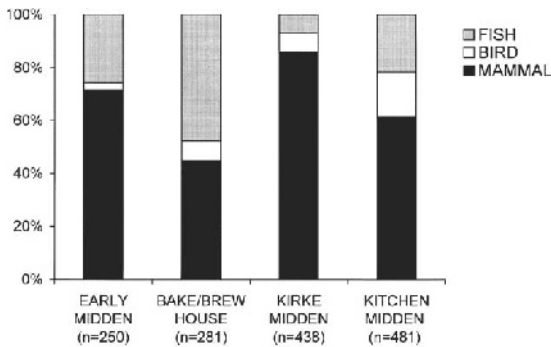


FIGURE 2. Relative importance of fish, birds, and mammals in Ferryland middens (NISP). (Drawing by author.)

each fish, splitting it lengthwise and then removing the front section of the backbone known as the “sound bone,” which includes the thoracic, precaudal, and some of the caudal vertebrae. All of this waste is dumped in the tidal zone at shoreline fishing premises (Butt 1979). The presence of bones from the head and the front of the vertebral column in Ferryland’s domestic middens suggests the preparation and consumption of whole fresh cod during the summer fishing season. Some of the caudal vertebrae may also result from the consumption of salt fish during the off-season; however, caudals are not over-represented relative to other parts of the spine as would be expected if large amounts of salt fish were being consumed.

In addition to fish, a wide range of birds and mammals are also present in the midden assemblages (Table 1). Birds, which are particularly well represented in the Kitchen midden, range from seabirds such as murres, guillemots, great auks, and gulls, to numerous species of wild duck and occasional specimens of sandpiper, bald eagle, and owl. The mammals include small numbers of beaver, fox, marten, rat, and dolphin, among others. Despite this variety, five main mammals dominate throughout the occupation at Ferryland: pigs, cattle, sheep/goats (these two species are treated as a single category because of the difficulty in distinguishing their bones), caribou, and seals.

Several lines of evidence suggest significant changes at Ferryland over the course of the 17th century that may have influenced diet at the site. Climate records indicate that the cold winters of the first half-century became much milder in the 1650s. Archaeological evidence indicates a shift from a community orientation in the earlier part of the century to a more individualistic, market-based economy during the latter half of the century. The documents also trace Ferryland’s transformation from a fledgling colony to a well-established central place (Pope 2004). In the early decades, Calvert clearly had to invest considerable capital to keep the colony afloat. Throughout the second half of the 17th century, the successful mercantile ventures of the Kirke family ensured that the settlement

played an important role in transatlantic trade networks. It supplied both the resident and migratory populations with necessities such as food, cloth, and salt, and luxuries such as alcohol and tobacco. None of these changes at the site are reflected significantly in the proportions of the five main mammalian taxa.

Figure 3 illustrates the relative importance of these mammals in the middens at Ferryland. It shows several small changes in the percentages

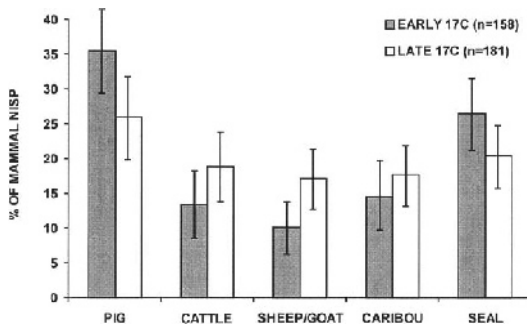


FIGURE 3. Relative importance of main mammalian taxa. (Drawing by author.)

of different species from the first to the second half of the century. The vertical lines in the center of each bar, however, indicate the 90% confidence limits based on the standard error for the proportions of each species. Because the error bars for the first and second halves of the century overlap for every species, none of the observed changes are significant at the 0.1 level. Though not statistically significant, some of the observed changes are suggestive and merit a brief examination. The two strongest trends are a minor decrease in the percentage of pigs at the site and a concurrent increase in the percentage of sheep/goat and to a lesser degree cattle. This could suggest an improvement over time in the colonists' ability to provide winter fodder, since pigs are omnivores while sheep, goats and cattle require more specialized feed. There is also a minor decrease in seal over time. Seal was initially a foreign food for the colonists at Ferryland as it was not part of a typical 17th-century English diet. Both harbor seals and harp seals were identified in the middens (Table 1). Harbor seals are pres-

ent in Newfoundland waters year-round, but they haul out on land most frequently in spring and summer, making them more susceptible to human predation (Bonner 1994). Harp seals are a migratory species, found on the ice floes off the east coast of the Avalon Peninsula during their spring migration (Sergeant 1991). The decrease in seal could reflect an improvement in the colonists' abilities to provision themselves through the winter, which resulted in less of a demand for seal in the spring.

Given that none of the temporal trends described above is statistically significant, the faunal remains are much stronger indicators of dietary continuity than of change over the course of the century. This stability in the diet is somewhat unexpected, given the independent evidence for climatic amelioration around mid-century and for a marked shift in the site's economic and political structure around 1640. The explanation for this continuity probably lies in the consistent and central importance of the cod fishery at the site.

Discussion

The occupants at Ferryland exploited a wide range of species throughout the 17th century. Their continued reliance on all five mammalian taxa reflects a generalized diet. This type of broad reliance on a variety of species could be interpreted as a response to uncertainty. If food is periodically scarce, exploiting a diverse food base means that if one resource fails, there are others to fall back on. At the English colonies in the Chesapeake Bay area, Henry Miller (1984) observes an increasing reliance on cattle and swine over the course of the 17th century. He suggests that the importance of a broad range of wild species during the initial decades of colonization was a response to the insecurities of the new environment. As the colony became more established, people focused on a narrow range of more reliable domestic species. Does the consistent ratio of wild to domestic animals in the Ferryland diet indicate that the site's occupants suffered dietary instability and periodic food shortages for close to a century? This seems unlikely given the documentary evidence for a relatively large livestock population at the site during the latter part of the 17th century. Instead, the Ferryland colonists appear to have

very quickly developed husbandry and hunting strategies that were scheduled around the labor demands of the intensive summer fishing season, allowing them to maximize their meat consumption throughout the year.

The faunal remains do not suggest a significant increase in the importance of cattle, sheep, and goats in the diet during the second half of the century. Given the demand for winter fodder, most domestic animals at Ferryland were probably killed in the fall and salted for winter consumption or killed during the winter and consumed immediately with any excess meat salted or frozen. The omnivorous diet of pigs accounts for their consistent dominance over other domestic species at the site. The climatic amelioration around mid-century would have both shortened the period during which winter fodder was required and provided a longer growing season in which it could be produced. However, documentary evidence indicates that only a small number of the Ferryland planters capitalized on this opportunity. William Poole's 1677 census indicates that cattle-rearing was restricted to a small number of wealthy planters and that no individual owned more than 10 cattle. Pigs were raised by a larger number of planters, with the largest numbers (up to a maximum of 20) generally kept by the same wealthy planters who owned cattle. Clearing pasture and making hay in the summer months to support larger numbers of cattle or sheep and goats would have introduced a scheduling conflict with the fishery. Clearly, providing winter food and shelter for cattle required an investment of labor in the summer months that not all of the Ferryland planters could afford. Even the wealthy planters did not specialize in livestock production to the same degree as some contemporary English producers who kept herds of cattle numbering in the hundreds (Trow-Smith 1957). The cod fishery clearly remained the economic priority at the site; it was the main focus for the wealthy planters and perhaps the exclusive focus for the poorer ones.

If the second half of the century brought an increase in the total number of livestock, it did not have a significant impact on the diet of the site's occupants. This is probably a result of the mercantilism of the colony at that time. During the Kirke years, Ferryland's wealthy planters were involved not just in fishing but

also acted as merchants in the developing local economy (Pope 2004). The planters with larger numbers of livestock were raising more animals than they required for household consumption. The excess could have been sold to the summer fishing crews as fresh meat or in the form of secondary products such as milk and butter. Thus, the changes in both the climate and the socioeconomic structure of the site around mid-century meant that a handful of wealthier planters could intensify their livestock production. This surplus was reserved for their commercial activities, however, and these changes did not alter the meat consumption patterns that were established during the initial Calvert years of the colony. The relative importance of pigs, cattle, and caprines remained unchanged throughout the century; it remained easier to support pigs, initially for household and later for small-scale commercial use, than cattle or sheep and goats.

The dietary contribution from caribou and seal was also fairly consistent throughout the 17th century. These species were probably hunted when they were available and consumed fresh. Exploitation of all wild fauna would have been less intense during the summer when the colonists were engaged in the fishery. Caribou were available year-round but would have been most useful as a source of fresh meat during the winter months. Seal may have been particularly important in the spring. The harp seal migration was conveniently timed to arrive at the end of the winter, when preserved foods may have been running low, and before the seasonal fishing fleet arrived with supplies.

Conclusion

The blend of traditional English foodstuffs and New World foods at Ferryland during the 17th century was shaped by the natural, social, and economic environment of the settlement. The faunal remains provide a level of dietary detail unavailable in the documentary record and suggest that the colonists relied on a mixture of codfish, waterfowl and other birds, and five main categories of mammal throughout the 17th century. Pigs were consistently the most important source of meat at the site, with seal, cattle, sheep/goat, and caribou all contributing substantially to the diet.

The subsistence strategy at Ferryland evolved rapidly in response to the primary economic interests and environmental conditions at the site. Perhaps the two most important factors shaping animal husbandry, hunting, and meat consumption at the site were the labor demands of the cod fishery during the spring and summer and the need to provide sufficient winter fodder for livestock. These concerns appear to have outweighed the importance of other variations in the site's natural and socioeconomic environment. Despite the transition from Calvert's collective community organization to Kirke's market-based individualism around 1640, cod fishing remained the main economic pursuit at the site, and domestic subsistence activities had to be organized so that they did not conflict with the commercial fishery. Around the same time, reduced spring ice would have made it easier to overwinter larger numbers of livestock, yet winter fodder remained a limiting factor on livestock production and pigs, with their broader diet, remained the preferred domestic species.

For all but the Calverts and the Kirkes, the move to Ferryland from England likely meant an increase in the "social value" of meat in their diet, in terms of both the type and overall quantity of meat consumed. While in England deer was hunted and consumed only by the gentry, caribou was universally available at Ferryland and formed an important part of the diet. The quantity of meat in the diet was also directly correlated with social position in 17th-century England. Household meat consumption at Ferryland must already have been considerable during the first half of the century since it was unaffected by the ability to produce larger numbers of livestock and the transition to small-scale commercial production in the latter part of the century. There were clearly social differences at Ferryland, among planters according to their wealth and between planters and servants. These differences were probably not expressed through access to meat to the same degree as in England. Because it represented access to foods that were socially proscribed in England, perhaps a diet that included wild game and larger quantities of domestic meat was one of the attractions of settlement in Newfoundland. Thus, less tangible social factors may have worked alongside more practical concerns, such as scheduling around

the fishery and feeding livestock through the winter, to promote dietary continuity at Ferryland throughout the 17th century.

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