THE LATE PREHISTORY OF NOVA SCOTIA AS VIEWED FROM THE BROWN SITE

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by

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ABSTRACT

Unlike most other areas of North America where prehistoric cultural sequences have been established for some time and archaeological research can be directed toward solving more intricate problems such as determining settlement patterns and population dynamics, in Nova Scotia the fundamental research of the prehistoric period remains to be done, i.e., the culture history of the area has yet to be discovered.

Excavation of a late prehistoric site on the Atlantic coast of the province in 1978 and 1985 produced information on the last 1000 years of prehistoric occupation in the area. The standard archaeological techniques of radiocarbon dating and artifact attribute analysis were employed to reveal the nature of human occupation at the site, which was found to be represented by one prehistoric component spanning the time from 1,300 years ago to the beginning of the historic period.

Environmental and geographic data were used to postulate a settlement-subsistence pattern for eastern Nova Scotia. Additionally, the Brown site assemblage was compared to assemblages from other late prehistoric sites in the Maritime provinces with a view to determining general similarities and differences.

It was concluded that a lengthy period of cultural stability occurred in eastern Nova Scotia beginning at least

1,300 years ago and ending with the arrival of Europeans. The late prehistoric peoples are viewed as ancestral to the modern native peoples of the province. The late prehistoric settlement pattern in eastern Nova Scotia is thought to have been a flexible one that could adapt swiftly to annual weather fluctuations and did not suffer from the rigidity of the early historic winter-interior, summer-coastal pattern. Some degree of cultural or ethnic difference is believed to have existed between the late prehistoric peoples of Nova Scotia on the one part and Prince Edward Island and New Brunswick on the other part.

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CHAPTER I

HISTORICAL BACKGROUND

Introduction

Relatively little archaeological research has been directed toward the examination of the culture history and lifeways of the prehistoric inhabitants of Nova Scotia. Preliminary examination of one archaeological site, the Brown site, located on the Atlantic coast of Nova Scotia, suggested that occupation of the site was during the latter part of prehistory. This late prehistoric site was excavated and analyzed in order to gain information concerning: (1) the nature of the site itself, including the number of components, seasonality, site function and the type of assemblage; (2) the nature of coastal exploitation in eastern Nova Scotia during the late prehistoric period; and (3) the degree of similarity of the site to other late prehistoric sites in the Maritime Provinces. The information presented in the following five chapters is the result of the analysis and interpretation of the Brown site data.

The first chapter presents a brief review of the history of the discipline of archaeology in Nova Scotia and sets the intellectual atmosphere under which the current research took place. Chapter II outlines the environmental setting of the Brown site and presents the basic information needed to attempt to understand the manner in which the late prehistoric peoples of the area hunted, fished, moved and generally lived their lives. The techniques of excavation of the site are presented in Chapter III together with the results of radiocarbon and thermoluminescence dating procedures and a discussion of the features found at the site. The fourth chapter presents the results of the analysis of the artifacts from the Brown site. The fifth and final chapter discusses the implications of the data presented in the previous chapters for interpretation of the site within itself and for interpretation of the site within the wider sphere of the late prehistoric period of the Maritime Provinces.

History of Archaeological Research

The establishment of the Nova Scotian Institute of Natural Science in 1862 heralded the beginnings of professional, or organized, archaeology in the province. The Institute held bimonthly meetings, organized field trips and published members' papers in the Proceedings and Transactions. It provided organization for persons with archaeological interests and was in large part responsible for the archaeological fluorescence of the following five decades.

The first articles published by the Nova Scotian Institute of Science reflect a problem-oriented approach to the excavation and description of archaeological sites in which sites were sought, excavated and commented upon in relation to a specific scientific theory. Two of these early articles were "On the Occurrence of the Kjoekkenmoedding, on the Shores of Nova Scotia" (Gossip 1864) which reports on the shell middens of St. Margarets Bay and Cole Harbour, and another account of a shell midden in an 1863 article by Reverand James Ambrose - "Some Accounts of the Petrel - the Sea Serpent - and the Albicore - as Observed at St. Margarets Bay - Together with a Few Observations on a Beach Mound, or Kitchen Midden, near French Village." These early articles display a good knowledge of the archaeological techniques of the day on the part of the authors and illustrate that a healthy exchange of information with bodies such as the Smithsonian was occurring.

The next series of articles published by the Nova Scotian Institute of Natural Science showed somewhat of a decline in archaeological research, as they tended to be purely descriptive in nature and contributed little to the understanding of the prehistoric period. Gilpin (1873) described the Micmacs of Nova Scotia using Lescarbot's Nova Francia as a source of information. In 1889 an article by George Patterson was published in which were described some archaeological sites and artifacts discovered in Nova Scotia. Harry Piers, the curator of the Nova Scotia Museum at the turn of the century, contributed several articles to the series including descriptions of artifacts housed in and recently acquired by the Museum (Piers 1889, 1890).

During the period of time from 1894 to 1912 archaeological research in the province came to a virtual standstill as the Nova Scotian Institute of Science became more interested in other scientific pursuits and no other organization existed to guide the interests of those few who might have contributed to Nova Scotian archaeology. No further archaeological work was published until 1912 when an article by Harry Piers appeared in the Proceedings and Transactions of the Institute. This article presented all the known data on the Micmacs, drawing information from the three fields of archaeology, history and ethnology.

The next piece of archaeological research conducted in Nova Scotia consisted of a survey and excavation of shell middens sponsored by the National Museum in 1914. Acting on behalf of the Museum, Harlan Smith and W.J. Wintemberg excavated and analyzed shell middens in Merigomish Harbour on the Northumberland Strait and in Mahone Bay on the south shore of the province. A relatively detailed account of their excavations and the artifacts recovered was published by the National Museum in 1929 (Smith and Wintemberg 1929).

At the close of the nineteenth century archaeology in Nova Scotia appears to have been healthy and on par with that in the rest of the continent. The period from 1840 to 1914 has been referred to as the Classifactory-Descriptive period of American archaeology (Willey and Sabloff 1974); Nova Scotian archaeology of this time period certainly fits this definition of early archaeology in North America. Over most of North America archaeologists built and expanded upon the base provided by the Classifactory-Descriptive period to produce refined procedures for delving into their countries' past. In Nova Scotia, however, the momentum did not continue and the work of the late nineteenth and early twentieth century archaeologists was not built upon by the following generation. By the time archaeologists once again began to practice in the province too great a time period had elapsed to allow the early works to be of much use except as occasional references since the early data could not easily be compared with modern data that was obtained using new techniques and more precise recording (Connolly n.d.:58).

From the time of the excavations of Smith and Wintemberg in 1914 until the late 1950's archaeological research in Nova Scotia fell into a state of total neglect. No professional excavations were carried out during this period and no publications came from the province. The late 1950's and the 1960's saw a semi-revival of archaeology in Nova Scotia with two extremely different types of excavation - one carried out by the National Museum of Canada, the other by the Nova Scotia Provincial Museum. The National Museum sponsored the investigation of a complex Palaeo-Indian site at Debert. The site was excavated and analyzed in a thoroughly professional manner (MacDonald 1968) and presently is one of the best documented Palaeo-Indian sites in the Northeast (Snow 1980).

In marked contrast to the Debert excavation were those supported by the Provincial Museum. In the late 1950's and 1960's a number of prehistoric sites at various locations throughout the province were excavated for the Nova Scotia Museum by the amateur archaeologist John Erskine. Erskine excavated a large number of sites and generated large collections of artifacts for the Museum, unfortunately, however, using inadequate techniques and with some lack of adherence to natural stratigraphic levels. A professional who re-examined in 1974 one of the sites that had been excavated by Erskine observed a complex shell matrix in two exposed pits and a stratigraphy that was much more detailed than the three levels described by Erskine (1959) (Connolly 1977:38). As a result of Erskine's inadequate field methods, the data that he gathered cannot be assumed to be accurate and should not be used without prior re-investigation.

One of the positive contributions that Erskine did make to Nova Scotian archaeology was his theoretical speculations. He assimilated the facts that he discovered and began to build the rudimemtary beginnings of a culture history for the area, e.g., in a later article (Erskine 1971) he notes that the early Indian Gardens points are square-based, corner and/or side notched and "seem to belong to two or three centuries earlier ... than the fan-based type" (Erskine 1971:8), the latter being the convex-based, corner-notched Indian Gardens point.

The 1960's was the ideal time for the revival of professional archaeology in Nova Scotia for two major reasons: (1) Erskine's work should have provoked reaction from archaeologists and led them to undertake controlled excavations and publish alternate theories; and (2) the professionalism of the excavations at Debert should have encouraged further such work. Unfortunately, the stimulus provided by Erskine and MacDonald was not sufficient to provoke continuous archaeological research and prehistoric investigations have remained sporadic until today.

The lack of organized prehistoric research in Nova Scotia certainly is not due to a lack of extant sites for, although coastal shoreline erosion takes its toll, there remain a great number of prehistoric sites in the province as evidenced by surveys conducted by professional archaeologists in the 1970's that served to locate a large number of prehistoric sites (Bower 1974; Davis 1974; Nash 1976, 1978; Preston 1974a, 1974b). Since the 1960's the majority of the small amount of archaeological research that has been performed in Nova Scotia has been concentrated upon the French and English inhabitations of the historic period, especially the extensive fortifications at Louisbourg, also at the Citadel in Halifax and more recently upon Acadian sites in the Annapolis Valley. Thus, while more is being learned about early European occupations in the province, the previous 10,000 years of prehistory are still poorly understood.

The result of the slow pace of archaeological research in Nova Scotia is that information concerning the prehistoric period in the province is relatively scarce compared to neighbouring areas of New England, Quebec, Ontario and Newfoundland. For the Maritime Provinces as a whole, basically three major periods are recognized in prehistory: (1) Palaeo-Indian - 11,000 - 9000 B.P.; (2) Preceramic or Archaic - c. 9000 - 2500 B.P.; and (3) Ceramic or Woodland - c. 2500 B.P. to European contact (Tuck 1984:2). These periods are based primarily upon information obtained from New Brunswick, thus for Nova Scotia it is not known for certain if, for example, ceramics were introduced c. 2500 B.P. as they were in New Brunswick. At the moment these dates and periods are used as a matter of convenience for Nova Scotia as there exists insufficient information to prove otherwise.

The late prehistoric period referred to herein covers the last 1000 years of the Ceramic period, i.e., from c. 1500 B.P. to European contact. In the past it often was assumed that the lifeways of the late prehistoric peoples of the Maritimes were similar to those of the early historic native peoples and thus, since a significant quantity of information was available on early historic peoples in the writings of early explorers and adventurers such as Biard, Lescarbot, Leclerq, Champlain and Denys, it was believed that a great deal also was known about late prehistoric peoples in the area. The major problem, however, in reconstructing prehistoric cultures from the early accounts is that the observations of the early European explorers do not date to the first contact. Sporadic but frequent interaction between European fishermen and Indians occurred for decades before the first useful written accounts of the native peoples of the Maritimes were produced and unknown changes may have been wrought during this period.

As anthropologists and archaeologists have become more familiar with historical documents it has become evident that "cultural change as a result of European contact began much earlier and was considerably more extensive at an early stage than had hitherto been assumed" (Trigger 1982:143). Since it has become increasingly obvious that due to acculturation the lifeways of the early historic Indians became altered in numerous ways from the lifeways of their late prehistoric ancestors, it falls primarily to the archaeologist to discover information about the late prehistoric Indians of the Maritimes.

Because of the lack of archaeological research in Nova Scotia, a culture history for the prehistoric period has not yet been established. Often it is difficult to avoid the appeal of comparing Nova Scotian prehistory to the well-established prehistoric sequence of neighbouring New England and postulating that they probably are similar. Nova Scotia and New England, however, have regional environmental variations that potentially played significant roles in the development of regional cultures and thus the accuracy of such comparisons is questionable. Only the excavation and analysis of prehistoric sites within Nova Scotia itself will lead to the development of an accurate prehistoric chronology.

CHAPTER II

THE SETTING

Environment

Nova Scotia lies within a mixed forest region known as the Acadian forest which covers most of northeastern North America and in which tree species of Boreal, Canadian and Alleghenian forests are found. True Boreal forest is found only in highland areas in northern Cape Breton (Simmons et al 1984:232).

Of the thirty native tree species red spruce is the most characteristic to Nova Scotia (Hosie 1979:22). Other species are balsam fir, white spruce, black spruce, white pine, hemlock, red pine, larch, jack pine, cedar, red maple, yellow birch, sugar maple, white birch, mountain white birch, large toothed aspen, trembling aspen, balsam poplar, beech, red oak, white ash, grey birch, American elm, black ash and ironwood (Simmons et al 1984:212).

The climate of Nova Scotia is characterized by:

> ... ample and reliable precipitation; a fairly wide but not extreme temperature range; a late and short summer; skies that are often cloudy or overcast; frequent coastal fog; and marked changeability of weather from day to day. (Simmons et al 1984:93).

Because the prevailing wind direction in Nova Scotia is west, these winds bring to the province a modified version of the continental climate of the interior of North America. Continental climates have greater seasonal and daily fluctuations in temperature than maritime climates, thus Nova Scotia has colder winters, warmer summers and more snowfall than areas with true maritime climates (Simmons et al 1984:93). The climate is not truly continental, however, because the sea, which almost entirely surrounds the province, does play a modifying role. Because the sea warms up and cools down at a much slower rate than land, the coastal waters and the winds from them serve to delay spring and to extend fall (Simmons et al 1984:97).

Local variations in Nova Scotia's climate are due mainly to the influence of the sea, for instance, the cold waters of the Labrador Current create a generally colder climate along the eastern shore than in southwestern Nova Scotia which is influenced by the Gulf Stream (Simmons et al 1984:97). Rarely does elevation influence local climate since the only areas over 350 meters are the Cape Breton Highlands and the Cobequid Mountains.

In Nova Scotia the coldest months are January and February, with mean temperatures ranging from -5°C in the highlands to 5°C along the coasts. The warmest months are July and August when mean temperatures are coolest along the southern and eastern coasts, 15 - 16°C, and warmest in the uplands, 18 - 19°C (Simmons et al 1984:101).

The lowest snowfall occurs in coastal areas where the warm onshore winds cause more precipitation to fall as rain. The depth of snow cover ranges from a mean of under 30 cm. along the Atlantic coast to over 75 cm. in the highlands. Snow rarely covers the ground for the entire winter season as thaws are common. Along the Atlantic coast snow cover exists only 50 - 60% of the time while in the interior the ground is covered during 75% of the season (Simmons et al 1984:104).

Most coastal areas are not greatly affected by ice in the winter. Significant quantities of ice occur only at the head of the Bay of Fundy and along the Northumberland Strait and the west coast of Cape Breton. Temporary freezing may occur in other areas and sometimes pack ice can drift as far as the southern shore (Simmons et al 1984:111) but usually the coastal waters are open.

The eastern shore is characterized by an indented submergent coastline consisting of headlands separated by long inlets. The bedrock is of a type resistant to erosion and thus the rocky shores slope gently to the Atlantic and do not form cliffs (Simmons et al 1984:137). The resistant bedrock creates a scarcity of sediment, resulting in restricted sizes and numbers of beaches and marshes in the area. The beaches and marshes that do exist, including the large barrier beaches of Clam Bay, Martinique and Lawrencetown, are not derived primarily from presently accumulating sediments but from "reworked surficial sediments including eroded drumlins, glacial outwash and marine deposits" (Simmons et al 1984:127). Deltas do not develop in the estuaries of most rivers because of the combined effects of high tidal amplitude and the small amount of sediment carried by the rivers (Simmons et al 1984: 146).

In general the eastern shore can be characterized as having resistant granitic and metasedimentary rocks, with a low rocky indented coast with some eroding drumlins, with beaches being absent or of barrier type, ice present in sheltered areas for two to three months, tides ranging from one to two meters and sediment being very scarce (Simmons et al 1984:151).

The climate of the eastern shore is influenced strongly by the sea and the area has the warmest winters and the coolest summers in the province. Along the coastal strip the predominant forest type is white spruce and balsam fir with maple and birch. This coastal climatic zone extends only a few kilometers inland, as evidenced by the change to spruce, fir and pine stands (Simmons et al 1984:698). The ground vegetation in this forested habitat is dominated by Schreber's moss and Broom moss with more herbaceous plants occurring in clearings and in areas with a thinner overhead canopy (Simmons et al 1984:431). The eastern shore experiences high amounts of rainfall and frequent heavy sea fog.

Fauna

The information on flora and fauna presented below is intended to create a general impression of the variety and wealth of the natural resources of the province and to create a basis for the discussion of settlement and subsistence patterns presented in Chapter V. The species described herein are those that are believed to have had some economic significance to the late prehistoric peoples of the eastern shore of Nova Scotia.

Mammals

The indigenous fauna of Nova Scotia includes over forty species of mammals. In the province, in general, distinct mammal regions do not exist because mammals are very mobile and the habitats in the province are widely distributed (Simmons *et al* 1984:255).

Included among the larger mammals are three species of ungulates -- moose, white-tailed deer and caribou. Moose, *Alces alces*, are found scattered throughout the province. The male can weigh up to 650 kg and stand 2-2.5 m at the shoulder; the female is slightly smaller. Moose are found in forested areas which contain a mixture of mature softwoods and young hardwoods. Shallow lakes, swamps and bogs also are favoured habitats (van Nostrand 1968:2). Their diet consists of the shrubby growth of sub-climax vegetation including leaves and twigs of a variety of trees and plants.

Woodland caribou, Rangifer tarandus, became extinct in Nova Scotia near the beginning of the twentieth century (Benson and Dodds 1980:34). Before their extinction caribou probably migrated from the Cobequid Mountains where they spent the summer to southwestern Nova Scotia in the winter (Simmons et al 1984:261).

Virginia white-tailed deer, Odocoileus virginianus, are found throughout Nova Scotia in wooded terrain having suitable cover, usually maturing softwoods, and in other areas bearing suitable food such as open fields and "low, young or open hardwood stands" (van Nostrand 1968:3). Bucks can weigh up to 140 kg and does up to 100 kg. In deep snow groups of two to over 25 deer will concentrate in restricted areas with suitable food and cover known as yards (van Nostrand 1968:3).

Archaeological evidence suggests that deer inhabited Nova Scotia prehistorically. Smith and Wintemberg (1929) found deer bones in prehistoric shell middens in Mahone Bay on the Atlantic coast and at Merigomish Harbour on the Northumberland Strait. At the Bear River West site on the southwest coast deer bones and antlers were found below a hearth that gave a date of 2111 ± 65 B.P. by John Erskine. At the Waterside site near Pictou Erskine found deer bones in the older levels and deer and caribou in the younger levels (Benson and Dodds 1980:2). Deer antlers were found in the lower levels at Whynacht's Cove on Mahone Bay while two fragments of caribou antler were found in the upper levels (Erskine 1961:4). This evidence is not conclusive, however, as Erskine admits that "I cannot distinguish deer bones from caribou bones with any confidence" (Erskine 1961:6).

Deer appear to have declined substantially by the historic period as only a few vague references to the animal exist in the early historic literature. In 1612 Lescarbot, who was at Port Royal, commented that a resident of Port Royal went to see the butchering of a deer that had been caught by the oldest son of Membertou (Benson and Dodds 1980:3). In Diéreville (1968) there is an illustration of a hunter carrying an animal that bears a great resemblance to a deer. No references are made to deer from the early historic period until the end of the nineteenth century when they were reintroduced to the province (Benson and Dodds 1980:3).

The only species of bear in Nova Scotia is the black bear, Ursus americanus. Adults weigh up to 200 kg and stand up to one meter at the shoulder. This large omnivore frequents forested and barren areas where it feeds on a variety of foods including fruits, nuts, roots, carrion, insects and sometimes easily killed animals such as fawns (van Nostrand 1968:4). One to three cubs are born during the winter hibernation period from December to March and remain with the mother for over a year (van Nostrand 1968:4).

The beaver, Castor canadensis, is a large aquatic rodent which, when adult, weighs 20-30 kg. It is found throughout

Nova Scotia in "rivers, ponds and lakes, preferably bordered by poplar, willow, alders and other hardwoods, or having plenty of water plants" (van Nostrand 1968:17).

The nocturnal raccoon, Procyon lotor, weighs up to 15 kg. It usually is found in wooded areas near streams where it forages along the stream edges for shellfish, frogs, small animals, birds, eggs, insects, fruit, carrion and garbage (van Nostrand 1968:26).

The native rabbit, Lepus americanus, also is known as snowshoe hare because of its large hind feet that support it on snow, and as varying hare because its fur colour changes from winter white to summer brown. Rabbits weigh one to two kg. They prefer "thick, brushy woods and dense alder or softwood swamps" (van Nostrand 1968:6) where they feed on grasses and leaves in summer and twigs and bark in winter. Rabbits are snared easily in winter as they use habitual paths through the snow (van Nostrand 1968:5-6).

The porcupine, Erethizon dorsatum, is a solitary animal found throughout mainland Nova Scotia but not in Cape Breton. It is found in "wooded areas, ranging from pure softwood stands to nearly pure hardwood stands, preferably with good denning sites such as rocky clefts, hollow trees" (van Nostrand 1968:30). Porcupines reach 15 kg in weight, produce one large young each spring and can live for 20 years. Because they are slow-moving and easily found and killed porcupines have been described as " a ready source of food for any unarmed person lost in the woods" (van Nostrand 1968: 30).

Muskrats, Ondatra zibethicus, are highly aquatic rodents that weigh one to two kg. They are found in shallow marshes and along the marshy borders of lakes and streams where they build one to two meter high houses of vegetation. Muskrats are widely distributed and can be heavily trapped without significant reduction in population density because of their prolific nature (van Nostrand 1968:24).

Six members of the mustelid family are among the native Nova Scotian mammals: otter, mink, weasel, skunk, fisher and marten. The aquatic otter, Lutra canadensis, weighs 10 kg or more and lives in interior streams and rivers and on lake edges (van Nostrand 1968:20). Male mink, Mustela vison, weigh 1-1.5 kg and females are half that size. They are semi-aquatic and live along forested lakes and streams (van Nostrand 1968:20). Weasels, Mustela erminea, weigh only 90-110 g but are extremely ferocious for their size (van Nostrand 1968:22). Skunks, Mephitis mephitis, are the size of house cats with soft, durable fur (van Nostrand 1968:23). The skunk may not be native to the province but may have moved into Nova Scotia from New Brunswick around 1850 (Smith n.d.: 227). The fisher, Martes pennanti, and the marten, Martes americana, were found throughout Nova Scotia at one time but presently are extremely rare (Smith n.d.:226).

Two large carnivores, bobcat and lynx, are indigenous to Nova Scotia. The nocturnal bobcat, Lynx rufus, weighs up to 15 kg and is found in wooded areas throughout the province (van Nostrand 1968:27). The lynx, Lynx canadensis, also is nocturnal and is slightly larger than the bobcat, weighing up to 18 kg. Its chief foods are rabbits, mice, squirrels and grouse. Its fur is longer and fluffier than that of the bobcat and in spite of its shrewd hunting ability it is relatively easy to trap (van Nostrand 1968:28).

Other Nova Scotian mammals include the wolf, Canis lupus, which is now extinct; woodchuck or groundhog, Marmota monax, which lives in colonies on the wooded edges of clearings and hibernates for eight months of the year; red fox, Vulpes fulva, which occurs in deep woods and on the brush-covered borders of marshes; and the common red squirrel, Sciurus vulgaris (van Nostrand 1968).

Birds

A great variety of bird species is found in Nova Scotia because the mixed forests can support birds from both the northerly coniferous regions and the southerly deciduous regions (Simmons et al 1984:234). Large numbers of migratory birds occur seasonally throughout the province and add to the variety of species.

The spruce grouse, Canachites canadensis, is a permanent resident that is quite common especially in sphagnum bogs with spruce and larch where it feeds upon the buds of spruce and other conifers (Taverner 1922:113). It usually will allow humans to approach within a few feet before moving away and easily can be killed with sticks or stones (Tufts 1961:138).

The woodcock, Philohela minor, is slightly larger than a robin with a long bill for feeding in soft mud (van Nostrand 1968:10). It is common in Nova Scotia from March until November when it flies south (Tufts 1961:167).

Wilson's or common snipe, Capella gallinago, is a summer resident. From the middle of April to the end of November snipe are common in open marshy or boggy areas. They often are classified as shorebirds but their natural habitat is wet meadows and bushy swamps. Snipe are of a similar size to woodcock (Tufts 1961:171).

The extinct passenger pigeon, Ectopistes migratorius, probably once was very abundant in Nova Scotia. Large flocks of pigeons bred in dense rookeries in trees in Canada, including Nova Scotia and flew south for the winter (Taverner 1922:117).

In Nova Scotia is found the eastern variety of Canada goose, Branta canadensis. This goose is a large bird weighing three to six kg that sometimes winters along the south coast of the province and breeds farther north (van Nostrand 1968:11). It is most common from mid-March to mid-April and again in October when thousands of birds make brief stop-overs during their migrations. Canada geese are found throughout

Nova Scotia but are most common on the eastern shore during spring and autumn (Simmons et al 1984:698).

In size Brant geese, Branta bernicla, are inbetween black ducks and Canada geese. Unlike most geese Brant remain near coastal waters and do not venture inland. In Nova Scotia large numbers of Brant are found on the coastal salt flats and eel grass beds in the spring during their migration to the northern breeding grounds (van Nostrand 1968:11).

The large number of duck species that are common in Nova Scotia can be classified as either surface feeding or diving. The most important surface feeding duck is the black duck, Anas rubripes, which is a permanent resident. Blacks ducks are common over all Nova Scotia except in winter when they tend to concentrate along the coasts (Tufts 1961:72). Along the eastern shore are found larger numbers of black ducks than anywhere else in the province. Large numbers of black ducks also breed along this coast on the barrier beaches, marshes and estuaries (Simmons et al 1984:698).

Other surface feeding ducks are the green-winged teal, Anas cardinensis, which is quite common from April to November; the wood duck, Aix sponsa, which is a summer resident that nests in hollow trees and is quite unwary and easy to ambush (Tufts 1961:85); the mallard, Anas platyrhynchos; the pintail, Anas acuta; and the shoveller, Spatula clypeata (van Nostrand 1968:12). All surface feeding ducks require shallow water, i.e., under 45 cm, for feeding, usually on the marshy edges of lakes and streams and in coastal areas (van Nostrand 1968: 13).

The category of diving ducks includes all ducks that dive under water to acquire food which consists of both plant and animal matter, especially fish, shellfish, clams and aquatic plants. Diving ducks usually frequent coastal bays or large deep rivers and lakes (van Nostrand 1968:15) and include the following species.

The greater scaup, *Aythya marila*, is a winter resident that is common along the coasts from October to April especially on eel grass covered mud flats (Tufts 1961:91). The bufflehead, *Bucephala albeola*, also is quite common from October to April in suitable harbours and inlets (Tufts 1961:95). Another winter resident common along coasts and inshore waters is the oldsquaw duck, *Clangula hyemalis* (Tufts 1961:95). Three species of scot[redacted]: American, *Oidema nigra*, white-winged, *Melanitta deglandi*, and surf, *Melanitta perspicillata*, migrate to Nova Scotia in October and remain through the winter.

American mergansers, *Mergus merganser*, are common throughout Nova Scotia while red-breasted mergansers, *Mergus serrator*, are common in all but the southern parts of the province. Mergansers are found on fresh water in the breeding season. They are diving ducks that feed on fish, shellfish and eels (van Nostrand 1968:16). Other Nova Scotian diving ducks are the ring-necked duck, *Aythya collaris*, which breeds in boggy or marshy lakes and the American goldeneye, *Bucephala clangula*, which migrates to the province during late fall (van Nostrand 1968:15).

Large numbers of migrating waterfowl and shorebirds are found on the Atlantic coast during spring and fall, especially on the shores north of Halifax (Simmons et al 1984:247). The four major inlets of Cole Harbour, Chezzetcook Inlet, Petpeswick Inlet and Musquodoboit Harbour provide suitable habitat for large numbers of migrating and wintering waterfowl (Simmons et al 1984:698).

Other Nova Scotian birds include the loon, Gavia immer, which is found on fresh water in summer and on salt water in winter (Tufts 1961:25); the abundant herring gull, Larus argentatus, and other gulls; and numerous smaller shorebirds and songbirds.

Fish

Compared to most other regions of northeastern North America Nova Scotia has a relatively small number of fresh water fish species. One of the most widely distributed fresh water fish is the brook trout, or sea trout, Savelinus fontinalis, which inhabits clear cold streams and lakes (Livingstone 1951:25). Even the brook trout, however, often will move from fresh to salt water with rising temperatures and crowding especially in the spring and early summer (Leim and Scott 1966:116). Trout are very common in coastal waters but usually they are caught in estuaries rather than in salt water. Sea trout usually weigh under three kg (Vladykov and McKenzie 1935:57).

Several species of anadromous fish run into Nova Scotia's rivers and streams. Predominant among these is the Atlantic salmon, Salmo salar. The Atlantic salmon spawns in rapid fresh water streams in October and November. Some salmon can enter fresh water to spawn in June or July and are called "early run fish" (Leim and Scott 1966:110). Most salmon, however, are the late run fish that enter fresh water in August or September (Leim and Scott 1966:110). In the early twentieth century the main salmon catches were made near estuaries during the summer (Vladykov and McKenzie 1935:56).

The gaspereau or alewife, Pomolobus pseudoharengus, is another common anadromous fish. It usually is caught in estuaries and rivers during the spring (Vladykov and McKenzie 1935:54). Gaspereaux often will ascend smaller streams where they easily can be caught with bare hands.

Smelt, Osmerus mordax, enter estuaries from the open sea during the autumn. They remain in estuaries during the winter and upon spring break-up they move into the coastal streams to spawn (Livingstone 1951:29). Smelt spawn "in brooks and streams above the head of tide and sometimes below the head of tide, particularly if obstructions bar further progress" (Leim and Scott 1966:121).

Tomcod, Microgadus tomcod, are very common along the coasts especially near and within estuaries. In December and January tomcod run up coastal rivers and streams to the head of tide to spawn (Leim and Scott 1966:209). Often this fish is known as 'Frostfish' because usually it is caught during the winter (Vladykov and McKenzie 1935:68).

Striped bass, Morone saxatilis, is a coastal species that is common in Maritime waters. It spawns in fresh water in spring when the adults migrate up rivers to the spawning grounds in June. Sometimes bass spawn just above the head of tide but usually move further into fresh water (Scott and Crossman 1973:695).

The catadromous eel, Anguilla rostrata, is caught in large numbers in coastal waters in July and August (Vladykov and McKenzie 1935:60). Young eels migrate upstream in May and June and move into lakes and rivers with muddy silty bottoms. Adult eels move downstream in autumn to spawn in the open sea (Scott and Crossman 1973:625-627).

Marine Mammals

The most common marine mammals on the eastern shore are the harbour seal, Phoca vitulina, and the grey seal, Halichoerus grypus. Occassionally harp and hooded seals are seen off Cape Breton (Simmons et al 1984:290).

Harbour seals are scattered along the coast in sedentary, locally discrete populations. Several hundred seals will gather together during the whelping season in May on estuarine mud flats or sand bars and on reefs and small rocky islands. Large groups also gather at favourite feeding areas in late summer and fall. Harbour seals are permanent residents but rarely are seen in the winter as they dislike leaving the water when air temperatures are low (Simmons et al 1984:290). Harbour seals usually are found near islets, reefs and inlets. They are attracted to fresh water and will enter estuaries, rivers or lakes. In winter they avoid ice and will move further offshore if ice forms in inlets. The Atlantic coast between Shelburne and Louisbourg supports the largest harbour seal population in Nova Scotia (Simmons et al 1984:290).

Grey seals are common along the coastline especially along heavily indented rocky coasts. They also can be seen feeding in lagoons and estuaries. Grey seals gather in larger and fewer colonies than harbour seals for whelping which occurs in January and February on land-fast ice packs or on inshore islands. A major whelping area on the eastern shore is situated off Camp Island (Simmons et al 1984:292).

Marine Invertebrates

Hundreds of species of marine invertebrates are found on the coasts of the province including approximately 200 species of Malacostraca - shrimps, crabs, etc. - and approximately 150 species of Mollusca - snails, clams, etc. (Simmons et al 1984).

Clam shells often are the main ingredient in prehistoric shell middens. They usually are of two types; soft-shell clam, Mya arenaria, and hard-shell clam or quahog, Mercenaria mercenaria.

Soft-shell clams range from Labrador to South Carolina and are common in the Atlantic provinces. They often occur in estuaries and inlets "in sandy or muddy sediment around mid-tide level" (Anon. 1980:5). They have a thin, brittle, chalky-white shell. Soft-shell clams are dug up with a clam fork and usually measure approximately five cm in length although shell sizes of 8-15 cm are not uncommon (Anon. 1980:5).

Quahogs "have a thick, hard greyish-white shell and when fully grown can reach 13 centimetres in length" (Anon. 1980:5). They are found as far south as the Gulf of Mexico. Unlike the soft-shell clam, quahogs cannot tolerate the cool waters of Nova Scotia's eastern, southern and Fundy coasts and in the Maritimes they presently are restricted to the warmer waters of the Northumberland Strait (Derek Davis, pers. comm.). Here they are found on muddy or sandy bottoms where they are harvested at low tide with clam forks. If the beds are covered by water long-handled rakes or tongs are used from boats to collect the molluscs (Anon. 1980:5).

Flora

Nova Scotia sports a wide variety of native plant species many of which are edible or produce edible sections during various months. Certainly the most noticeable edible plant parts are the berries.

The wild strawberry, Frageria virginiana, grows in open woods and clearings and produces sweet red berries from late June to August (MacLeod and MacDonald 1977:42). The raspberry, Rubus strigosus, is found in wooded clearings and bears fruit in August (MacLeod and MacDonald 1977:52). In a similar habitat to the raspberry is found the blackberry, Rubus sp., which produces berries in late August and September (Fernald and Kinsey 1943). Blueberries, Vaccinium angustifolium, grow abundantly in open woods, clearings and barrens and produce their distinctive blue berries in July and August (MacLeod and MacDonald 1977:116). Bunchberry, Cornus canadensis, produces red berries in August and is common in wooded areas (MacLeod and MacDonald 1977:28). The cranberry, Vaccinium macrocarpon and V. oxycoccus, occurs in open bogs and its berries are available in late fall (MacLeod and MacDonald 1977:106). In bogs and rocky woods abounds the foxberry, Vaccinium vitis-idaea, whose berries ripen in late August and early September (MacLeod and MacDonald 1977:108). Choke cherry, Prunus virginiana, and pin cherry, Prunus pensylvanica, are large shrubs or small trees that produce small sour cherries during late summer (MacLeod and MacDonald 1977:125). Indian pear, *Amelanchier* sp., is a shrub or small tree that grows in woodland clearings and develops edible sweet berries in late July and August (MacLeod and MacDonald 1977:12). The berries of the common juniper, *Juniperus communis*, are available throughout the year because they require three years to mature. Juniper is most common in bogs and barrens but also occurs in woods with poor soil (MacLeod and MacDonald 1977:118).

Besides fruits and berries, several other forms of edible vegetable food are available in Nova Scotia. By autumn the acorns of red oak, *Quercus borealis*, have ripened. During the summer months the roots of Indian cucumber, *Medeola virginiana*, are edible (MacLeod and MacDonald 1977:20). Fiddleheads, the young uncurled fronds of *Matteuccia struthiopteris*, are available in early spring (MacLeod and MacDonald 1977:6). The ripe, grain-like seeds of lamb's quarters, *Chenopodium album*, are produced from June to August (MacLeod and MacDonald 1977:40). The core of the root of cinnamon fern, *Osmunda cinnamomea*, which also is known as Indian meat, is most palatable in spring (MacLeod and MacDonald 1977:24). Along river edges grow cattails, *Typha latifolia*, the roots of which can be harvested throughout the year (MacLeod and MacDonald 1977:74). In shallow waters grow the nutritious roots of the arrowhead, *Sagittaria latifolia* (MacLeod and MacDonald 1977:82).

CHAPTER III

THE EXCAVATIONS

Site Description

The Brown site, BeCs-3, is located approximately 11 kilometers from the open coast at the head of the inlet known as the Head of Jeddore which is an extension of the eastern arm of Jeddore Harbour. The harbour is a long, narrow inlet of the Atlantic coast of Nova Scotia (Fig. 1). The Head of Jeddore varies in depth from seven fathoms in its center to one fathom at its head and is navigable along its entire length.

The surrounding terrain is composed of rolling hills with occasional cliffs that are covered by the mixed coastal forest of white spruce, balsam fir, maple and birch. The ground is littered with large rounded granite boulders covered by a thick mat of moss. These large granite boulders descend to the shoreline and into the inlet, resulting in very few beaches along the entire length of Jeddore Harbour. Wildlife is still abundant in the area today and a variety of animals including mergansers, deer, porcupines and seals were observed during the course of the field work.

The site is located on the west bank of the Salmon River at the point where the river enters a brackish pond at the head of the Head of Jeddore inlet. This pond drains into the salt water inlet via a shallow boulder stream that is not navigable for any craft except possibly at high tide. The Salmon River itself is a rushing boulder stream that begins at the eastern end of Salmon Lake, the most easterly of an interior chain of lakes, and falls over two four to five meter high waterfalls on its short course to the Jeddore inlet.

The Brown site is situated in a grassy clearing in the woods beside the stream on the first terrace. The level below this terrace, i.e., the present floodplain, becomes wet and swampy in the spring and following heavy summer rains. Several more terraces extend up the slope along the west bank of the river.

The area is still in use today. A well-used footpath that runs in between the boulders on the west bank from the head of the inlet, along the brackish pond, across the site and up to Salmon Lake, is used by sports fishermen, recreational campers and the occasional salmon poacher.

Excavations - 1977 and 1978

BeCs-3 was first discovered and reported by a Mr. Brown of the village of the Head of Jeddore. In the fall of 1977 a small excavation of the site was undertaken by an archaeological field school from Saint Mary's University, Halifax under the direction of Stephen Davis. The recovery of artifacts such as an iron barbed harpoon head suggested that further excavation would be productive (Dowling n.d.).

During the summer of 1978 the excavation of the site was continued by Stephen Davis and a crew from Saint Mary's University. The area excavated during the 1977 and 1978 field seasons consisted of 29 m^2 in the central grassy area of the site (Fig. 2). A baseline was established across the site running roughly north-south and a grid was established in reference to the baseline. The site was excavated in 1m x 1m units and each unit was numbered according to the coordinates of its northwest corner. The units were excavated with trowels and all soil was screened with a 1/4 inch mesh screen (Stephen Davis, pers. comm.).

The field notes, photographs and maps of the 1977 and 1978 excavations have been lost and the only remaining information is the artifacts and their catalogue sheets. The catalogue sheets indicate that artifacts that were recognized as formed tools in the field were given the measurements of the distance, in centimeters, from the north wall of the pit and the distance, in centimeters, from the west wall of the pit. The depth below a designated datum point, in this case a nail in a tree on the west side of the site, also was established for each artifact. It appears that the flakes from each pit were bagged together and that the site was excavated in one level. The artifacts recovered during the 1977 and 1978 field seasons were catalogued but were not analyzed.

Excavations - 1985

During the excavation of the Brown site in 1977 and 1978 no testing had been done and thus the extent of the site was unknown. The two major objectives of the 1985 excavations were: (1) to discover the extent of the site and explore the possibility of the presence of occupations on the upper terraces; and (2) to obtain a good understanding of the area that was excavated in 1977 and 1978 through the excavation of its perimeter; this was necessary because of the loss of the field notes of the previous excavations.

With the assistance of Stephen Davis the 1978 baseline and datum were re-established. A theodolite was used to establish a grid over the entire site. The site was excavated in 1m x 1m units with the exception of six 50cm x 50cm test pits and three 1m x 2m pits. The extra length of the latter pits was necessary in order to negotiate three large boulders (Fig. 2). All pits were numbered in reference to the southern end of the baseline, N100W100, and were numbered according to the coordinates of their northwest corners.

All units were excavated using trowels except those pits on the perimeters of the site where it was apparent that no cultural material was present and shovels were used. All soil was screened with a 1/4 inch mesh screen. A shovel was used to dig holes approximately 50 cm into the sterile soils to ascertain that the soils were, in fact, sterile.

It was decided to excavate the site in natural levels even though only one cultural level existed extending from the surface to the sterile soil and varying from 10 to 25 cm in depth. Since some form of vertical control was required within the cultural level, and arbitrary levels were deemed unsuitable, each formed tool such as retouched flakes, scrapers and projectile points and each diagnostic ceramic sherd, i.e., decorated or rim sherds, was given a depth below surface rounded to the nearest centimeter. The depth below surface was measured from the northwest corner of each pit using a line level and tape measure. A transit was used to obtain the height of the surface of the northwest corner of each pit using the 1978 datum. Depths also were measured for the surface of the soil and for the top of the sterile soil at the four corners of each pit. It should be noted that it would have been useful to excavate in arbitrary levels and also assign individual coordinates as the use of arbitrary levels facilitates rapid calculation of relative depth while individual coordinates permit precise but time consuming calculation of relative depth. Flakes, undiagnostic ceramics, bone and shell were not given individual coordinates but were bagged by pit number. All bone and shell fragments were collected.

Some flotation was attempted in the river using a metal tub with a 1/8 inch mesh screen bottom but with little success.

The principal purpose of the flotation was to recover small bones, possibly fish bones, if present, but as the bones were all either calcined or burnt they did not float with the rootlets and assorted vegetal matter; instead they had to be laboriously picked out of the small stones at the bottom of the screen.

During the 1985 season a total of 24 pits representing 27 m^2 was excavated (Fig. 2). A cluster of six pits was excavated in an area located just inside the trees at the northwest corner of the grassy clearing. Thirteen pits were placed around the perimeter of the 1977 and 1978 excavations in the grassy clearing and five pits were placed at what was believed to be the edges of the site.

In addition six 50cm x 50cm test pits were placed at strategic locations around the site in an attempt to discover its extent (Fig. 2). Their somewhat scattered arrangement was due mainly to the necessity of avoiding the numerous large boulders and trees that abounded on the perimeter of the site. The test pits were excavated with a shovel and all soil was screened.

The six test pits yielded no cultural material. The pit located in the extreme northwest corner of the site was placed here because a large quartz chopper, BeCs-3:1003, was lying on the surface of the moss, but it probably was placed there recently as no cultural remains were located in the underlying soil. At the northern end of the baseline on the footpath that runs across the site flakes were present on the surface of the path and were present on the surface of the path to a distance of approximately four meters north of this point.

Results

The immediate objectives of the 1985 excavation program were realized in that (1) the extent of the site was determined satisfactorally and the possibility of the presence of occupations on the upper terraces was ruled out; and (2) excavation of the perimeter of the 1977 and 1978 excavation area permitted a good understanding of this area of the site.

It was found that cultural material at the Brown site existed over a small area of only approximately 150 m² which consisted primarily of the central grassy clearing and a small area in the woods to the northwest of the clearing. No cultural material occurred on the terraces above the clearing or on the area below the clearing that constitutes the present river floodplain.

At the end of the project approximately 30% of the site had been excavated and a reliable sample of the contents and structure of the site had been obtained. Artifacts that were recovered included 735 formed lithic tools, 1033 ceramic sherds, 10,246 flakes, approximately 1000 pieces of bone and 926 g of shell. A few historic artifacts of European manufacture also were recovered. A detailed description and analysis of the artifacts is presented in Chapter IV.

Stratigraphy

In the central portion of the site only two soil levels existed - the cultural level and the sterile level. The soil that contained the cultural materials was black and loamy with inclusions of decaying granite. It extended from the surface, where it supported grasses and mosses; to the sterile level and varied in depth from 10 to 12 cm in most units (Fig. 8). In a few areas the black cultural level extended as far as 25 cm below the surface with no change in colour, texture or content.

Artifacts occurred throughout the black loamy soil from the surface to the sterile soil. No strict vertical separation between artifacts of different dates existed, for example, a piece of twentieth century beer bottle glass was found at approximately 12 cm below the surface in one unit. Soil disturbance resulting from pothunting activities was evident at the eastern edge of the site but was not the cause of the general lack of vertical coordination throughout the site It is believed that the depth of artifacts within the cultural level was affected by the action of natural agents such as roots and frost upon the relatively loose soil structure.

The sterile soil level lay directly underneath the cultural level. The sterile soil varied across the site from a light grey sand to a rusty brown loam, sometimes with both soils appearing in one unit.

At the extreme edges of the site three soil levels could be determined - a thick rusty brown humus level, a thin black cultural level and the sterile level (Fig. 8). The cultural and sterile levels were of the same form and type as in the center of the site. The humus level began underneath the surface leaf and twig litter and extended to the cultural level. This thick humus level was totally absent at the center of the site.

Features

Only one feature was discovered during excavation - a large charcoal stain measuring 40cm x 35cm and approximately seven cm in depth situated in front of two large boulders at the eastern half of unit N106W100 (Figs. 6,7). No hearth rocks were associated with this feature except four small scattered fire-cracked rocks. The charcoal stain was lying directly upon the sterile soil level. Artifacts found in direct association with the feature, i.e., within the charcoal area, were a finely worked side-notched point, BeCs-3:633+768, (Fig. 13m), and a decorated ceramic sherd from Vessel 19, BeCs-3:752. The feature was in a good location for a hearth and is interpreted as being one.

No other features were discovered at the Brown site, no post moulds, other hearths or artifact concentrations. It was reported that a small shell midden existed at the eastern extreme of the site in 1978 (Stephen Davis, pers. comm.), but no evidence of it remained. The bone and shell recovered were found scattered throughout the cultural soil level. Small pockets of charcoal were scattered throughout the excavated area but were in the shape of burnt roots and probably represent burnt roots from a forest fire, although no ash layer that would represent an intensive fire was found. Inquiries of field workers of the 1978 season concerning the presence of features also proved negative.

Dating

Thermoluminescence

Four ceramic sherds with samples of associated soil were sent for thermoluminescence dating to Alpha Analytic. All of the samples, however, presented major difficulties that considerably reduced their value for determining age (Jerry Stipp, pers. comm.). Sample number BeCs-3:1147 (Alpha-2354) produced a date of 370 ± 50 B.P. but exhibited fading, a sloping plateau and soil radon loss. These three problems were also exhibited by sample BeCs-3:1148 (Alpha-2355) which gave a date of 1350 ± 60 B.P. BeCs-3:1149 (Alpha-2356) dated to 250 ± 40 B.P. but experienced soil radon loss and sample

BeCs-3:1150 (Alpha-2357) gave a date of 230 ± 30 B.P. but produced fading and a sloping plateau.

A sloping plateau usually indicates that the sherd was reheated at some time after it was manufactured. Fading can occur if the ceramics were tempered with volcanic materials. Another problem with the sherds and associated soil was that uranium values were unusually high (Jerry Stipp, pers. comm.).

Due to the numerous difficulties associated with the dating of these four ceramic sherds, the dates produced by them are not reliable (Jerry Stipp, pers. comm.) and will not be used for dating the Brown site.

Radiocarbon

A sample of wood charcoal was collected from the hearth feature described above. After cleaning the sample consisted of 0.65 gram of carbon which when submitted to an extended counter time gave a date of 1230 ± 70 B.P. (Beta-14052, BeCs-3: C.S.1).

It is believed that bone, when marrow and collagen are absent, will produce less reliable dates than shell because bone will more readily absorb carbon from surrounding organic materials (J. Gordon Odgen III, pers. comm.). Thus the bone fragments from the Brown site were not dated but three samples of quahog shell were sent for radiocarbon dating. They yielded dates of 740 ± 60 B.P. (Beta-15479, BeCs-3:C.S.2), 530 ± 60 B.P.

(Beta-15480, BeCs-3:C.S.3) and 280 ± 70 B.P. (Beta-15481, BeCs-3:C.S.4).

The shell samples were not directly and firmly associated with specific cultural material since each shell sample consisted of all the quahog shells collected from a single unit; thus the radiocarbon technique serves to date the shell itself and shows that shell was utilized at this location for approximately 500 years. Shell is believed to produce less reliable dates than wood charcoal and so the date of 1230 ± 70 B.P. probably is more reliable than the three dates from shell. The three later dates from the shell, however, are believed to have some validity. The radiocarbon date of 1230 ± 70 B.P. probably dates the initial occupation of the site and the three later radiocarbon dates suggest that the site continued to be occupied at least on an intermittent basis until the historic period.

CHAPTER IV

THE ARTIFACTS

The following artifact descriptions and analyses include all artifacts from the 1977, 1978 and 1985 excavations except for those artifacts from four 1m x 1m pits (Fig. 2) that were stolen in 1985 and were not recovered. It should be noted that the stolen artifacts were very similar to the rest of the Brown site material and did not represent unique occurrences except for one piece of incised slate which is described in this chapter under the heading of "Cut Slate".

Artifacts from the Brown site are of both European and aboriginal manufacture. Artifacts of aboriginal manufacture are divided into four categories based on material type: lithics, ceramics, bone and shell. The category of lithics is further subdivided into the functional categories traditionally used by northeastern archaeologists, i.e., bifaces, scrapers, etc.

The linear measurements of the artifacts were measured with a pair of sliding calipers and measurements were rounded to the nearest millimeter. Weights were taken using a balance beam scale and were rounded to the nearest gram. At the rear of the thesis is a series of appendices that list the individual attributes of projectile points, bifaces, scrapers, retouched flakes, cores and bipolar cores. The methods of taking individual measurements for these tool types are explained at the beginning of each appendix.

European Artifacts

A small percentage of artifacts from the Brown site was of European manufacture. The oldest of these artifacts dates from the late sixteenth century. The most recent artifacts represent twentieth century deposition; these beer bottle and tin can remains were not collected. The European artifacts that are described below have been categorized according to the type of material from which they were manufactured. All dates pertaining to European items are given in years A.D.

Ceramics

Included among the European ceramics recovered from the Brown site were 15 sherds of red coarse earthenware. These sherds probably represent one vessel which had an unglazed exterior and a clear glaze underlain by a white slip on the interior. This earthenware has a red to orange coloured fabric and is known as Anglo-American coarse earthenware (James Campbell, pers. comm.). It probably originated from New England and was manufactured for a couple of centuries beginning in c. 1660 (Watkins 1968), (Fig. 40).

Eighteenth century French coarse earthenware from the Saintonge region of France is represented by 13 sherds (James Campbell, pers. comm.). These sherds, which have a white fabric and a green glaze are of the type Saintonge Slipware

Type L1 (Barton 1981:10) that is found at the Fortress of Louisbourg.

Fine earthenware is represented by 29 sherds with a white glaze, one sherd of creamware and 18 sherds of pearlware. Creamware was perfected in England by 1762 and is common on American archaeological sites of the late eighteenth and early nineteenth centuries (Noël Hume 1970:125). Four sherds of pearlware are decorated with a band in underglaze blue; 12 sherds have hand-painted decoration in underglaze blue and overglaze gold. Pearlware commonly was decorated in a simple Chinese-style hand-painted decoration in underglaze blue during the late eighteenth and early nineteenth centuries, c. 1779-1820. Pearlware commonly is found on early nineteenth century archaeological sites and by 1820 it had started to disappear (Noël Hume 1970:129-130).

Fifteen undecorated sherds of a clear glaze semiporcelain saucer were recovered. Semiporcelain and hard white wares have been produced since the mid-nineteenth century and are almost impossible to date accurately (Noël Hume 1970:130).

White Clay

Seventeen stem fragments and 20 bowl fragments of white clay pipes were recovered from the Brown site (Fig. 40). One of the stem fragments retains a heel with the letters 'G' and 'M' embossed on either side. The practice of placing initials on either side of the heel dates from the late seventeenth into the nineteenth century (Noël Hume 1970:297). Another stem fragment has the numbers '78' embossed near the bowl. Six of the stems have bore diameters of 4/64 of an inch; 11 have bore diameters of 5/64 of an inch.

The 20 pipe-bowl fragments all display the thin, straight walls and large bowl cavities of later pipes. One almost complete bowl has the more acute angle between bowl and stem (108°) that occurs on pipes of 1800 and later (Noël Hume 1970: 303), (Fig. 32). The bowl of this pipe is decorated along both mould seams with an embossed feather motif. The portion of the stem that is attached to the bowl has a spur and a bore diameter of 5/64 of an inch. The only other decorated bowl fragment displays the letters 'BENSQ' inscribed within a floral motif (Fig. 40).

Lewi[illegible]nford has developed a formula for calculating dates of pipe stems using their bore diameters. This formula, $Y = 1931.85 - 38.26X$ where Y is the date in years A.D. and X is the mean diameter of a sample of pipe stem bores, is supposed to be reliable within ± 30 years. This formula is only accurate, however, up to approximately 1760; after 1760 it does not work well (Noël Hume 1970:297). For pipe stems from the Brown site this formula gives a date a 1753, which indicates that the sample can date anywhere from 1720 to well into the nineteenth century.

Metal

The majority of European artifacts were made of metal. Fifty-six whole nails and 18 fragments were recovered. Two of the whole nails were over 130 mm long and none of the 74 specimens showed any signs of modification. All are of ferrous material with square, non-waisted shanks, pointed tips and flat square heads with the fiber of the metal running along the length of the nail (Fig. 39). These machine-cut, non-waisted nails with lengthwise fiber were made from approximately 1820 until near the end of the nineteenth century when wire nails became popular (Noël Hume 1970:253).

The one coin recovered from the Brown site probably is a George I halfpenny. It is of the same dimensions as the halfpenny and displays a pronounced ridge bordering the legend on the reverse side. Pronounced crenelation also is evident along the edge of the reverse side. This ridge and crenelation are characteristic of George I halfpennies, which were minted between 1717 and 1724 (Friedberg 1962:55, Noël Hume 1970:160). The obverse side of the coin is worn almost smooth but the faint outline of the head is very similar to that of George I.

The brass button from BeCg-3 corresponds to Type 18 of the South typology, which was manufactured from 1837 to 1865 (Noël Hume 1970:90). Several letters are stamped into the concave back, one of which is a 'G'. A fouled anchor motif is stamped into the face of the button and the eye is soldered onto the back (Fig. 39).

Included among the historic artifacts is an almost complete flintlock mechanism that lacks only the top half of the cock. The plate is slightly convex and the rear of the plate slightly curves downward and is of similar shape to the end of a banana. According to Noël Hume (1970:214) this slightly downcurved, banana-like rear plate section dates to c. 1690-1740. Also, in general, English flintlocks of 1700-1750 usually had a slightly convex plate while after 1750 the plate became flat (Hamilton 1960b, Noël Hume 1970:214).

The outer decorative rim of a locket shows signs of modification in that a single hole has been added to the rim. This item may have been used as a pendant (Fig. 39).

A slightly flattened washer-like object (Fig. 39) may be part of a pin-brooch, a clothing fastener that was worn by the historic Micmac (Ruth Whitehead, pers. comm.).

A unilaterally barbed iron harpoon head was recovered from the site. Each of the three barbs curves slightly outward. The harpoon head measures 160 mm in length with the shaft being 11 mm wide and five mm thick. The bottom 25 mm of the shaft is approximately twice as wide (19 mm) as the upper shaft portion.

A roughly rectangular section of an iron pot measures 120 mm by 85 mm and has six mm thick walls.

A rectangular iron rod measures six mm by six mm and is 195 mm long. It is slightly curved through its length and one end is tapered to a point. It might possibly be a leister prong.

A blade-like sheet of ferrous metal measures 139 mm in length. It is tapered along its length from a width of 17 mm at one end to seven mm at the opposite end. A circular hole is present in the narrow end. The thickness of the object is tapered along the width from five mm at one side to one mm at the opposite side.

Twentieth century metal artifacts are represented by five shells of 22 caliber, one small eyelet and a section of a machine-made fire grate. A large spoon, 21 cm long, with an egg-shaped bowl, and with 'MADE IN CANADA' stamped into the back of the handle, is either of late nineteenth or twentieth century date.

Unidentified metal objects include three pieces of lead, three small fragments of copper or brass, three fragments of sheet copper and five ferrous fragments.

Flint

Five gunflints are included in the historic artifact sample. Four of these are of black flint; the fifth has been burnt and the original colour of the flint cannot be determined. It is difficult to determine the original shape of these gunflints because they have been heavily used and exhibit extensive crushing along all margins. Two of the gunflints exhibit the flat cleavage faces of prismatic flints and it is possible that they are of the English black prismatic type that became popular after 1812 (Witthoft 1966:32) and that they were deposited sometime during the nineteenth century. The burnt gunflint is wedge-like in shape and probably is a gunspall, an early type of gunflint that dates from 1675 to 1775 (Hamilton 1960a:76).

TABLE 1

DIMENSIONS OF GUNFLINTS FROM BeCs-3

Cat. No.	Length(mm)	Width(mm)	Thickness(mm)
132	27	18	8
132	21	18	9
148	22	25	9 (burnt)
182	21	14	7
343	23	21	9

Glass

The only glass from the site beside modern bottles was an oval bead measuring nine mm in length. It is dark blue with an intermediate white core visible at either end and has three longitudinal white stripes (Fig. 39). It has been identified as a frit core bead (William Fitzgerald, pers. comm.), Kidd type 11b73 (Kidd and Kidd 1983:229) which dates from approximately 1580 to 1600 (Kenyon and Kenyon 1983:60).

Aboriginal Artifacts

Lithics

Projectile Points

For the purposes of this classification projectile points are defined as bifacially worked specimens each having a clearly defined hafting element and a pointed tip at the distal end. The projectile points are described according to the standards set by MacKay and Sanger (1972), (Figs. 9, 10).

It has long been acknowledged that changes in projectile point morphology are good indicators of 'cultural' changes and that the hafting element, i.e., shoulders, stem and base, is particularly sensitive to change over time. Gradual and regular changes over time usually are thought to represent *in situ* development while abrupt and radical changes may indicate that population replacement has occurred or that a new technology has been adopted (James Tuck, pers. comm.). Based on this premise an analysis of the attributes of the hafting elements of the projectile points was performed in order to identify groups of projectile points that exhibit differing sets of attributes.

It was found that two distinct groups of projectile points could be identified using the index of contraction and expansion (Fig. 11). This index measures the amount of contraction or expansion of the stem and is calculated by the following formula:

$$\frac{\text{width of neck}}{\text{width of base}} \times 100$$

An index value of less than 100 indicates an expanding stem, of 100 indicates a straight stem and over 100 indicates a contracting stem.

The projectile point category from the Brown site consists of 48 complete or near complete ~~points and~~ 29 fragments that show some portion of the hafting element. Of these the index of contraction and expansion could be calculated for 56 - 33 complete or near complete and 23 fragments. The distribution of the projectile points is illustrated in Figure 12.

Group 1

Group 1 consists of 31 complete and 23 fragmentary projectile points. The index of contraction and expansion values for these 54 specimens range from 40 to 110 and follow a near-normal distribution curve. It might be argued that the two points with values of 100 to 110 have straight or near-straight stems and should be in a separate group, but, statistically speaking, they represent one extreme of the normal distribtuion of Group 1 projectile points and should be included in Group 1 (see Fig. 11).

All Group 1 projectile points have expanding stems, convex or straight to slightly concave bases and slightly convex to straight blade edge shape (Figs. 13, 14, 15). Approximately 75% of the notches are in the corner and are either narrow or wide; the remaining 25% of the notches are located in the side of the point. Shoulders usually are angular, or if barbs rather than shoulders are present they usually are short or on the short side of medium. Transverse sections are biconvex, edges are serrated by bifacial retouch along the margins and bases are bifacially thinned by flaking (no grinding is present).

Group 1 projectile points display a great range of sizes. Seventeen points are under 35 mm in length, 22 are between 35 and 50 mm in length and ten are over 50 mm long. The small points would have been more suitable for tipping arrows while the larger points would have been more suited for lances and spears. It also is possible that the larger projectile points were, in fact, knives. In a late nineteenth century article Harry Piers, curator of the Nova Scotia Museum, noted that:

> Lescarbot makes no mention of spears as one of the weapons of the Micmacs or Souriquois of his day, although he enumerates with a good deal of detail their other implements of war, such as bows and arrows, and clubs. This negative evidence has not been sufficiently noted. It is far more probable that most of the so-called spear-heads and leaf-shaped implements found in Nova Scotia, are knives. Our Micmacs had stone tools for fashioning bows and arrow-shafts and for skinning animals, and yet they are seldom recognized by collectors. This indicates that the Indian knife has been confounded with some other implement which it resembles. (1898:35).

Two points deserve individual description. The first is BeCs-3:633+768 (Fig. 13m) which was found in direct and close association with the charcoal stain from which the radiocarbon date of 1230 ± 70 B.P. (Beta-14052) was obtained. This point is fashioned from a mottled orange, beige and red chalcedony. It has symmetrically convex blade margins with narrow side notches and short barbs. The point has been very finely worked and measures only four mm in thickness. The blade edges are serrated and the transverse section is biconvex. Although the index of contraction and expansion could not be calculated because one lateral edge of the base is broken and thus the width of the base cannot be measured, it is evident from the opposite lateral basal edge that the point has an expanding stem. The base has not been finished, possibly because of the presence of a small nodule of agate, thus it cannot be determined if the concave base shape is the intended result or is only one stage, or a mistake, in the manufacturing process. The unfinished state of the base also accounts for the lack of basal thinning which is present on the majority of expanding stem points from the site.

The second point, BeCs-3:742, (Fig. 15e) is informative because of its unfinished condition. The point is made from a mottled white, grey and black chalcedony flake. The striking platform of the flake clearly is visible, as is the hinge fracture at the distal end. The right margin of the flake has been bifacially flaked to produce a hafting element with an expanding stem, narrow corner notches, a convex base and short barbs. The left margin of the flake has been bifacially flaked to a tip. The transverse section is biconvex and because of its unfinished condition basal thinning and edge serration cannot be determined.

Group 2

Group 2 consists of two contracting stem points with index values ranging from 155 to 160. The small size of this group allows each point to be described separately.

BeCs-3:455 (Fig. 15f) closely resembles a non-stemmed biface but it has clearly defined shoulders and the convex base can be distinguished from the pointed tip. The point has straight blade edges, wide corner notches and wide rounded shoulders. The transverse section is biconvex. The lateral margins are not serrated; the base has been thinned by flaking. The point is made of a grey and white chalcedony.

BeCs-3:657 (Fig. 15g) is a contracting stem point made of quartzite. The blade edges are slightly convex and the base is convex. It is similar to BeCs-3:455 in that it has wide corner notches, wide rounded shoulders, a biconvex transverse section and lacks serrated blade edges. Multiple small hinge fractures at the base may indicate an attempt at basal thinning.

Bifaces

The Brown site yielded 40 complete or near complete bifaces and 198 bifacially worked fragments. The complete or near complete bifaces were divided into categories on the basis of overall shape, resulting in the six categories of triangular, rectangular, oval, lanceolate, leaf-shaped and asymmetric bifaces. The 198 biface fragments were not included in this analysis because of their fragmentary nature.

Triangular Bifaces

The category of triangular bifaces consists of 13 specimens all of which are in finished or near finished condition (Fig. 17, 19). These triangular bifaces are smaller than the other bifaces, ranging from 21-42 mm in length with a mean of 40.1 mm, from 15-24 mm in width with a mean of 19.8 mm and from 1-10 mm in thickness with a mean of 6.8 mm. Five of the bifaces are made of quartzite, seven of chalcedony and one of quartz. All have biconvex transverse sections. The bifaces have slightly convex or straight bases and pointed tips and all but one have serrated edges. Blade edge shape is either slightly convex or straight. One of the bifaces has a small wide corner notch on one edge of the proximal end that creates a stem (Fig. 17a).

Rectangular Bifaces

One preform, three biface blanks and three finished bifaces are classed as rectangular bifaces. Large flake scars are the predominant feature on both faces of the preform and blanks and none exhibit marginal retouch. The defining characteristic between the preform and the three blanks is thickness, the preform being 20 mm thick and the others ranging from ten to 11 mm thick. Length and width measurements are much closer; the preform length is 52 mm and the blanks are 38 to 58 mm long; the preform is 32 mm wide and the blanks are 19 to 24 mm wide. Tne preform has a biconvex transverse section, as do two of the blanks. The third blank is plano-convex (Fig. 19).

The three finished rectangular bifaces are all made of chalcedony. These bifaces display a wide corner notch on one side of the base that results in a small stem at the proximal end of the biface (Fig. 16). These bifaces were not classed as projectile points because the stems are not well defined and the tips are rounded rather than pointed. These bifaces each have one serrated edge, which could be the working edge, and one non-serrated roughly worked edge. On one of the bifaces the serrated edge is opposite the notch on the base; on the other two bifaces the serrated edge and the notch are on the same side of the base. All specimens have convex bases, biconvex transverse sections and range from 32 to 59 mm in length, 20 to 25 mm in width and all are eight mm thick. One biface has straight blade edges while two are asymmetrically convex.

Oval Biface

The one oval biface exhibits convex blade edges, a sharply convex base and a pointed tip. The transverse section is biconvex and marginal retouch is minimal. The dimensions of this biface are: length - 54 mm; width - 28 mm; and thickness - 14 mm. The biface is fashioned from a mottled brown chalcedony with small crystalline inclusions (Fig. 18a).

Lanceolate Bifaces

The three lanceolate bifaces all have convex blade edges, straight bases, pointed tips and biconvex transverse sections. All specimens are made of chalcedony. Serrated edges are present on one biface. All are in finished or near finished condition and range from 45 to 60 mm in length, 18 to 26 mm in width and nine to ten mm in thickness (Fig. 19).

Leaf-shaped Bifaces

Thirteen bifaces were classified as leaf-shaped. Five of these are incompletely finished in that they have been roughly flaked, show minimal marginal retouch and cortex is present on three of the bifaces (Fig. 18). These five bifaces are biconvex in transverse section with convex blade edges, convex bases and pointed to rounded tips. They measure from 48 to 69 mm in length, 23 to 40 mm in width and seven to 27 mm in thickness.

Of the eight finished specimens one is much smaller than the rest. It has been finely worked from a fine-grained black and grey chalcedony and measures only four mm in thickness. The other two dimensions of 29 mm length and 16 mm width are well below the range for the other seven finished leaf-shaped bifaces. The biface has a biconvex transverse section, convex base, pointed tip and serrated edges (Fig. 18g).

The seven larger finished bifaces range from 46 to 69 mm in length, 23 to 42 mm in width and seven to ten mm in thickness. All have biconvex transverse sections, convex blade edges, convex bases and pointed tips. Three have serrated edges (Fig. 18).

Asymmetric Bifaces

The category of asymmetric bifaces consists of three specimens which are made of chalcedony. The asymmetric bifaces have one blade edge that is convex and one that is concave in shape. Transverse sections are plano-convex and edge serration is present on only one biface. The three bifaces are very similar in size and shape with length ranging from 35 to 36 mm, width from 23 to 29 mm and thickness from seven to ten mm (Fig. 17).

Scrapers

Scrapers are defined as formed tools that display steep unifacial marginal retouch. This category contains the largest number of complete tools, with 207 complete or near complete scrapers and 21 fragments.

The scrapers were divided into five groups according to which edge or edges of the flake had been steeply retouched and whether the retouch was continuous or discontinuous. The scrapers in each of the five groups were divided into sub-groups based on general shape, thus distal edge scrapers were divided into circular distal edge scrapers, traingular distal edge scrapers, etc. This classification system follows that used by Allen (1981).

Distal Edge Scrapers

This category contains by far the greatest number of scrapers and accounts for 80.2% of the total. Of the 167 distal edge scrapers 42 are circular in shape, 50 triangular, 70 rectangular and 5 oval (Fig. 21). Distal edge scrapers often are called end-scrapers in the archaeological literature.

The circular distal edge scrapers are made of chalcedony except for two that are made of quartz. One scraper exhibits a straight retouched edge; 16 have slightly convex working edges and 25 have moderately convex working edges. Six scrapers are made on biface thinning flakes and only one has any cortex present.

TABLE 2

DIMENSIONS OF CIRCULAR DISTAL EDGE SCRAPERS

	range(mm)	mean(mm)
length	13-26	19.0
width	12-25	19.9
thickness	3-10	5.7

Chalcedony is the only material used for the triangular distal edge scrapers. One scraper has been retouched on the ventral face of the flake rather than on the dorsal face. Two scrapers have straight working edges, 27 have slightly convex working edges and 21 have moderately convex working edges. None display any cortex.

TABLE 3

DIMENSIONS OF TRIANGULAR DISTAL EDGE SCRAPERS

	range(mm)	mean(mm)
length	9-29	19.6
width	10-27	19.1
thickness	2-10	5.1

Rectangular distal edge scrapers are all of chalcedony except for three of quartz and one of a coarse-grained rock. Nine are fashioned from biface thinning flakes and only one has cortex present. Three of the working edges are straight, 33 are slightly convex and 34 are moderately convex. One scraper is retouched on the ventral face rather than the dorsal face.

TABLE 4

DIMENSIONS OF RECTANGULAR DISTAL EDGE SCRAPERS

	range(mm)	mean(mm)
length	10-33	20.2
width	13-28	18.9
thickness	2-9	5.0

All of the oval distal edge scrapers have moderately convex working edges. Four are made from chalcedony and one from a coarse-grained rock.

TABLE 5

DIMENSIONS OF OVAL DISTAL EDGE SCRAPERS

	range(mm)	mean(mm)
length	27-31	29.4
width	22-24	22.8
thickness	5-8	6.8

One-edge Scrapers - Not Distal

Thirteen, 6.3%, of the scrapers have one edge retouched that is other than the distal edge of the flake. This type of scraper also is known as a side-scraper.

Circular one-edge scrapers are eight in number. Four have been retouched on the left side and four on the right side. One has been made from a biface thinning flake. One scraper has a straight working edge, one slightly convex and six moderately convex.

TABLE 6

DIMENSIONS OF CIRCULAR ONE-EDGE SCRAPERS

	range(mm)	mean(mm)
length	15-24	19.5
width	14-23	19.6
thickness	4-8	5.0

The sole traingular one-edge scraper has been retouched on the left side. The retouched edge is moderately convex and the scraper is made from chalcedony. It measures 22 mm in length, 15 mm in width and seven mm in thickness.

Three of the four rectangular one-edge scrapers have been retouched on the left side and one has been retouched on the right side. All are made from chalcedony. One has a slightly convex working edge and three have moderately convex retouched edges.

TABLE 7

DIMENSIONS OF RECTANGULAR ONE-EDGE SCRAPERS

	range (mm)	mean(mm)
length	16-24	18.6
width	17-39	25.3
thickness	3-8	5.5

Continuous Multiple Edge Scrapers

These 20 scrapers display steep unifacial retouch on more than one edge. The retouched area is not interrupted by non-retouched areas. This category comprises 9.6% of the total number of scrapers (Fig. 22).

Nine of the continuous multiple edge scrapers are circular in shape. Two of these are made from quartz and the rest are chalcedony. Three have cortex on the entire dorsal face and two have been retouched on all sides. The working edges of three scrapers are slightly convex in shape and six are moderately convex.

TABLE 8

DIMENSIONS OF CIRCULAR CONTINUOUS MULTIPLE EDGE SCRAPERS

	range(mm)	mean(mm)
length	13-24	20.7
width	13-27	20.3
thickness	4-7	5.9

Two continuous multiple edge scrapers are triangular. Both are made from chalcedony and both have slightly convex retouched edges.

TABLE 9

DIMENSIONS OF TRIANGULAR CONTINUOUS MULTIPLE EDGE SCRAPERS

	range(mm)	mean(mm)
length	16-25	20.5
width	20-29	24.5
thickness	5-6	5.5

The eight rectangular continuous multiple edge scrapers are made from chalcedony (7) and from quartz (1). Two working edges are slightly convex and six are moderately convex. Two are made from biface thinning flakes.

TABLE 10

DIMENSIONS OF RECTANGULAR CONTINUOUS MULTIPLE EDGE SCRAPERS

	range(mm)	mean(mm)
length	12-25	19.3
width	14-27	20.0
thickness	4-8	5.6

One continuous multiple edge scraper is oval in shape. It is made from chalcedony and has a moderately convex retouched edge. The length is 29 mm, width 22 mm and thickness seven mm.

Discontinuous Multiple Edge Scrapers

These five scrapers have more than one retouched edge that is disrupted by unretouched areas. On all of the scrapers the retouched margins are the distal and proximal edges. These scrapers comprise only 2.4% of the total number of scrapers. Two of the scrapers are circular and three are rectangular (Fig. 23).

Of the two circular scrapers one is of chalcedony and one is of quartz. The dorsal face of the quartz scraper is comprised entirely of cortex. One has a slightly convex edge and one has a moderately convex edge.

TABLE 11

DIMENSIONS OF CIRCULAR DISCONTINUOUS MULTIPLE EDGE SCRAPERS

	range(mm)	mean(mm)
length	16-22	19.0
width	18-25	21.5
thickness	5-7	6.0

The three rectangular scrapers are all made of chalcedony. One has a slightly convex retouched edge and two have moderately convex retouched edges.

TABLE 12

DIMENSIONS OF RECTANGULAR DISCONTINUOUS MULTIPLE EDGE SCRAPERS

	range(mm)	mean(mm)
length	16-22	19.0
width	14-23	17.3
thickness	4-6	4.7

Opposing Face Scrapers

Two scrapers, 0.9% of the total, display steep unifacial retouch on opposing faces (Fig. 23). On the circular scraper the retouch on the dorsal face is on the distal edge and the retouch on the ventral face is on the right edge. It is made from chalcedony with a slightly convex retouched edge. The length is 18 mm, width 21 mm and thickness six mm.

On the rectangular scraper the retouch on the dorsal face is on the distal edge and the retouch on the ventral face is on the proximal edge. It is made from chalcedony with moderately convex retouched edges. The length is 20 mm, width 17 mm and thickness six mm.

Retouched Flakes

The category of retouched flakes includes 108 flakes and six fragments that have been slightly marginally retouched. The retouch is very shallow and in many areas can be identified as a nibbling along the flake margins.

On 51 of the flakes only the distal margin has been retouched. Twenty-eight others have only one retouched edge, either the right or the left, and one has the retouch on the proximal edge of the flake. Ten retouched flakes have continuous multiple edge retouch and 15 have discontinuous multiple edge retouch. Three flakes have been retouched on opposing faces: one flake has discontinuous multiple edge retouch on the dorsal and ventral faces - on the left, distal and right edges on the dorsal face and on the left and right edges on the ventral face; the second flake has been retouched on the left side on the dorsal face and on the right side on the ventral face; the third flake has retouch on the left and right margins on the dorsal face and on the proximal margin on the ventral face.

The majority of retouched flakes are made from chalcedony (83.3%), with only a few quartz (2.6%), quartzite (7.9%) and miscellaneous coarse-grained rocks (6.1%).

All the flakes have straight to convex working edges except two that have concave retouched areas. Three flakes have been retouched on the ventral rather than the more common dorsal face. Sixteen have been made from biface thinning flakes. Six flakes have cortex present on the dorsal face and two have cortex present on the striking platform.

Retouched flakes are quite varied in size as is evident from the range of dimensions. Maximum length ranges from 12 to 54 mm with a mean of 24.3 mm, width ranges from ten to 44 mm with a mean of 19.8 mm and thickness ranges from two to 14 mm with a mean of 4.9 mm.

All flakes have been unifacially retouched except for two that are partially bifacially retouched. It is believed that the retouch on these flakes results from two different processes: (1) from intentional use of another object to retouch a flake that is to be used as an expedient or a general purpose tool for a task that does not require a well-made durable blade edge; and (2) from the removal of small flakes from the margin of an unretouched flake during use. This latter process is more commonly known as use wear.

Cores

Two basic forms of cores were recovered from the Brown site: bipolar (37) and non-bipolar (20).

Non-bipolar Cores

The 20 non-bipolar cores vary widely in size: length ranges from 16 to 85 mm with a mean of 43.0; width ranges from 16 to 48 mm with a mean of 33.9 mm; and thickness ranges from seven to 36 mm with a mean of 22.4 mm.

Cortex is present on half of the cores in varying amounts. On four of these cores cortex is present only on the striking platform area; the remaining ten cores had no cortex present.

On 11 of the cores the flaking pattern appears to be random with flakes being struck off from all directions. On the other nine cores the flakes were removed at regular intervals down the length of the core and the core approaches a roughly polyhedral shape (Fig. 24).

Bipolar Cores

Bipolar cores are cores that exhibit extensive crushing and numerous hinge fracture scars on at least two opposing margins. These are the result of core reduction using the bipolar technique in which a core is placed on a hard anvil and hit with a hammerstone. Crushing and flake removal on one margin is due to being struck by the hammerstone and crushing and removal of small basal flakes on the opposing margin is due to the force of the impact travelling through the core into the anvil and rebounding into the core again from the anvil. The cleavage faces of the core converge on both zones of percussion. Often in the Northeast artifacts exhibiting such battered margins are classified as wedges or pièces esquillées (see Allen 1981, Foulkes n.d.) but it is more probable that at the Brown site these artifacts are the result of bipolar manufacture. This conclusion is based on the fact that the other lithic artifact classes at this site are made primarily from chalcedony with quartz artifacts averaging only 12.5%. For bipolar cores, however, 75.6% are made of quartz. This substantial difference in percentage of quartz artifacts strongly suggests that the bipolar technique was used to reduce quartz cores in order to obtain usable quartz flakes. In this area quartz usually occurs in the form of small water-worn cobbles the exterior surfaces of which are covered with small depressions which serve to cushion the impact of blows and renders impracticable the flaking techniques used to reduce other materials such as chalcedony. The bipolar technique appears to be more effective for reducing these small weathered cobbles (Hayden 1980).

The 37 bipolar cores in this assemblage were classified according to the system established by Binford and Quimby (1963) in which bipolar cores are classified according to the types of percussion surfaces present. Percussion surfaces can be of three kinds: (1) an area, which is a surface from which no flakes have been removed but flakes have been removed around the edges along other core surfaces; (2) a ridge, which is an acute angle edge formed by the joining of two core faces; and (3) a point, which is the junction of three or more core faces. Cores are classified according to the type of striking platform first and to the type of basal percussion zone second, thus an area-ridge core has a striking platform that is an area and a base that is a ridge (Binford and Quimby 1963).

The Brown site assemblage contains 26 ridge-ridge cores, three ridge-point cores and eight area-ridge cores (Fig. 25). Ridges and points represent exhausted areas of percussion, thus all but eight area-ridge cores are exhausted bipolar cores. Dimensions of the bipolar cores are listed in the table below.

TABLE 13

DIMENSIONS OF BIPOLAR CORES

core type	#	length(mm)		width(mm)		thickness(mm)	
		range	mean	range	mean	range	mean
ridge-ridge	26	12-45	25.3	10-29	17.8	4-13	8.3
ridge-point	3	18-29	23.6	12-18	15.0	7-12	10.0
area-ridge	8	16-48	24.3	12-30	19.0	4-16	7.9

Gravers

From the Brown site were recovered one probable and two possible gravers (Fig. 26). One specimen, of chalcedony, is a flake that clearly has been worked to a point at one extreme and exhibits both flake removal and marginal retouch in this area. This graver measures 27 mm by 13 mm by five mm.

The other two specimens, one of a pinkish chalcedony and one of quartz, are not as clearly worked but do show some evidence of flake removal resulting in a sharp point. The chalcedony graver measures 20 mm by 11 mm by two mm and the quartz one measures 20 mm by 25 mm by five mm.

Choppers

Two quartz choppers are among the artifacts recovered from the Brown site. BeCs-3:1003 (Fig. 29a) exhibits bifacial flake removal with one face being entirely worked and the other being worked only at the margins with cortex existing over most of the face. The margins exhibit numerous large hinge fracture scars and crushing. This chopper measures 71 mm in length, 61 mm in width and 22 mm in thickness.

BeCs-3:886 (Fig. 29b) is smaller and bears less evidence of heavy usage. It is a large quartz flake with cortex covering most of one face. The one acute angle edge displays flake scars resulting from heavy retouch. The opposing obtuse angle margin has a 15 mm long area of extensive crushing. The tool measures 73 mm in length, 37 mm in width and 14 mm in thickness.

Both specimens are interpreted as being heavy duty, probably multi-purpose, chopping tools.

Hammerstone

Only one hammerstone was excavated at the Brown site (Fig. 29c). It is a regularly shaped, oval beach cobble which has been heavily worn and pitted at one end and slightly pitted at the opposing end. Slight pitting also is present on both sides of the cobble. The hammerstone measures 96 mm by 60 mm by 23 mm and weighs 267 g.

Anvilstone

The single anvilstone from the Brown site, like the hammerstone, is a regularly shaped oval beach cobble (Fig. 28). In the center of one face is located an indented area of extensive pitting. This pitting probably results from the bi-polar method of core reduction in which a core is placed on a hard anvil, such as this cobble, and struck with a hammerstone. The force of the impact of the hammerstone on the core is transmitted through the core to the anvilstone and results in scarring and pitting of the anvilstone.

The anvilstone measures 114 mm by 75 mm by 60 mm and weighs 735 g.

Ground Stone

The ground stone category of artifacts consists of four celts and eight miscellaneous fragments.

Of the celts two are complete, one is incomplete and one is a preform. The preform has been shaped roughly by flaking into the general size and shape of a celt. It measures 82 mm by 50 mm by 26 mm.

The three worked celts all have biconvex transverse sections, suggesting their function as axes rather than as adzes which generally are plano-convex in transverse section. All three specimens have a ground bit. The two faces of each axe have been ground to some extent and margins near the bit also have been ground (Fig. 27).

TABLE 14

CELT DIMENSIONS

cat. no.	length(mm)	width(mm)	thickness(mm)
166	115	50	29
54	85	40	22
864	-	58	26

The miscellaneous ground stone fragments consist of three flakes each having one or two grinding facets, two fragments of an abrader or whetstone and three fragments of unidentified ground stone tools (Fig. 26).

Cut Slate

One small piece of cut grey-black slate was recovered from the site. It measures 15 mm by 13 mm and is four mm thick. It is roughly rectangular in shape. All four margins show unmistakeable signs of cutting that indicate that the piece of slate had been cut from a larger section.

One piece of incised slate was recovered but was stolen before it could be catalogued. A drawing was made from memory immediately after the piece was lost and all measurements should be regarded as approximations. The artifact was a thin, c. 16 mm, rectangular piece of slate measuring c. 45 mm by 115 mm. One face of the slate displayed a grinding facet running along its entire length located approximately ten mm from the edge of the face. Running parallel to the grinding facet were two sharply incised lines approximately 20 mm apart (Fig. 30). In width and depth these lines were similar to those of the petroglyphs in Kejimikujik National Park and on MacGowan Lake (see Molyneaux n.d.). The reverse face of the slate showed no signs of modification.

Miscellaneous Lithics

Six artifacts are grouped together in the miscellaneous category. They can be described as follows: (1) one unmodified quartz cobble measuring 55 mm by 45 mm by 32 mm; (2) one quarter of a split quartz cobble, with no signs of modification other than that it has been split, measuring 99 mm by 76 mm by 54 mm; (3) one unmodified rectangular beach cobble measuring 84 mm by 24 mm by 21 mm; (4) one unmodified beach pebble measuring 45 mm by 29 mm by 16 mm; (5) one nearly perfectly spherical granite beach cobble bearing no signs of modification measuring 99 mm by 95 mm by 81 mm and weighing 1045 g; and (6) a rectangular tabular piece of chalcedony with cortex on both faces and evidence of chipping on all four sides, measuring 50 mm by 27 mm by 14 mm.

While four of the artifacts described above bear no signs of human modification their presence at the site is regarded as significant because rounded beach cobbles are exotic to the site and must have been transported from some other locale for an unknown purpose. The piece of chalcedony is exotic not only to the site but to the eastern shore of Nova Scotia and probably was transported from the Bay of Fundy area.

Flakes

The 10,246 flakes were sorted into material type and the presence of biface thinning flakes and burnt flakes was noted. Almost half of the flakes, by number, (42.8%), were quartz and 31% were varieties of chalcedony. Most of the chalcedony flakes were small secondary flakes while many of the quartz flakes were large primary flakes, often with cortex present. Fifty-nine flakes of the biface thinning type (Crabtree 1972) were present in the sample.

141 of the flakes have been burnt but they apparently are not the product of heat treatment during tool manufacture. If heating were part of the manufacturing process it would be expected that most tools would have evidence of heating but very few finished tools show signs of heating and one projectile point that was broken after manufacture has a heated tip and an unheated base. This suggests that the tip was heated after the point was broken.

Eight of the flakes are not of Nova Scotian origin (Robert Grantham, pers. comm.) and were identified as Ramah chert (James Tuck, pers. comm.) which is found only in Ramah Bay on the northern Labrador coast.

Lithic Material Types

All lithic artifacts were sorted into the material types of quartz, quartzite, chalcedony and miscellaneous coarse-grained rocks (Hamblin 1982:61,120). The term 'chalcedony' includes all fine-grained cherts and agates. The numbers and percentages of each tool category made of each lithic material are presented in Table 15. The miscellaneous category of artifacts includes gravers, choppers, ground stone, the anvilstone and the hammerstone.

The lithic material break down shows that there existed a preference for fine-grained chalcedonies from the Bay of Fundy area of western Nova Scotia which includes North Mountain, Scots Bay, Blomidon and the Minas Basin (Fig. 41). Also, White Rock quartzite, the pink and yellow variety found near Kentville, Nova Scotia and in cobble form on the eastern shore beaches (Robert Grantham, pers. comm.) was preferred over the white to grey coloured quartzite that is common along the eastern shore of the province.

Locally available quartz was used to some extent but does not appear to have been a preferred material for artifact manufacture. The large amount of quartz debitage compared to the small numbers of quartz artifacts indicates that quartz artifacts were manufactured at the Brown site. Chalcedony probably was brought to the site in the form of small chunks, either traded or obtained directly from western

Nova Scotia, and was worked into tools as the need arose, accounting for the large number of small secondary flakes and scarcity of large primary flakes of chalcedony.

The presence of Ramah chert suggests far-reaching, probably indirect, contacts to areas as distant as northern Labrador, i.e., Ramah chert was traded from group to group until it reached these people.

TABLE 15

LITHIC MATERIAL TYPES

artifacts	quartz		quartzite		chalcedony		misc.		total
	#	%	#	%	#	%	#	%	
points	9	11.7	21	27.3	41.	53.3	6	7.8	77
scrapers	9	3.9	0	0	213	93.4	6	2.6	228
bifaces	2	5.0	13	32.5	25	62.5	0	0	40
biface frag.	20	10.2	46	23.4	113	57.4	18	9.1	197
retouched flakes	3	2.6	9	7.9	95	83.3	7	6.1	114
bipolar cores	28	75.6	1	2.7	8	21.6	0	0	37
cores	7	35.0	2	10.0	10	50.0	1	5.0	20
misc.	5	19.2	0	0	3	11.4	18	69.2	26
totals	83	11.2	92	12.4	508	71.8	56	7.6	739
flakes	4389	42.8	2193	21.4	3181	31.0	483	4.7	10246

Ceramics

Ceramic sherds from the Brown site were analyzed using the vessel as the smallest unit of analysis. This analytical procedure helps to reduce distortion of data due to vessels being represented by unequal numbers of sherds, e.g., vessels from the Brown site were represented by as few as one and as many as 180 sherds; if, for example, sherds were used as the minimum unit of analysis the 180 sherds from a shell-tempered vessel would numerically overwhelm the one sherd from a grit-tempered vessel and it would appear that shell tempering was 180 times as frequent as grit tempering when, in reality, the two temper types were used with equal frequency in vessel tempering.

Both rim and body sherds were used in the ceramic analysis. For each 1 m^2 excavation unit the sherds were sorted into individual vessels using similarities in texture, firing quality, temper type and temper size. The individual vessels from each excavation unit then were compared to vessels from adjoining units and portions of the same vessel were joined. Refitting of all vessel sherds was attempted with some success.

Of the 1033 ceramic sherds from the Brown site 83 were unanalyzable and the remaining 950 were grouped into 51 vessels. The attributes of each vessel are listed in Table 16. Vessel terminology is the same as that employed by Keenlyside (1978) and is illustrated in Figure 31.

For each vessel lip thickness was measured at the lip surface and rim thickness was measured one centimeter below the lip. Vessel wall thickness was measured as the mean thickness of the walls of all the body sherds of the vessel (Fig. 31). In all cases thickness is defined as the shortest distance between the interior vessel wall and the exterior vessel wall. The diameter of the mouth of the vessel was obtained by aligning rim sherds of sufficient size on a series of concentric circles of known diameter. Two measurements were made for the size of the temper: (1) the size of the majority of particles; and (2) the size of the largest particles, where 'size' is the maximum linear measurement of a particle. Only those particles that were present on the exterior surfaces of sherds were measured, using calipers. The form of the rim of the vessel was noted as being vertical, everted (outflaring) or inverted (inflaring) in relation to the vessel body. The profile of the rim walls was recorded as being contracting or expanding from the direction of the base to the lip, or parallel (Fig. 32). Other attributes used were the type of temper, i.e., organic or grit; the variety of temper, i.e., which organic or grit substance; the presence of decoration; the presence of wiping or combing marks, which are parallel lines resulting from smoothing of the wet clay surface during vessel manufacture - wiping marks are under one millimeter in width and combing marks are one millimeter or more in width; the presence of coil breaks, i.e., sherd edges with either a convex or a concave shape that indicates that the sherd broke along the line of a coil; and the lip form, i.e., the shape of the lip surface.

Sherds from ten ceramic vessels were subjected to thin-section analysis. The results of this analysis are reported in Appendix H.

Manufacture

Vessels from the Brown site were made using the coil technique of manufacture. The coils were smoothed over on the interior and exterior of the vessel and the vessel surface was smoothed prior to the application of decoration.

Grit and organic temper were used with nearly equal frequency: 22 vessels exhibit grit temper, 16 have organic temper and 12 have a combination of grit temper and organic temper. It should be noted that in Appendix H Judith MacIntyre suggests that the grit temper in the vessels from the Brown site is not a true temper at all in the sense that it was not added deliberately by the potters but is a natural inclusion in the clay. For the purposes of the present discussion, however, the term 'grit temper' will be used in reference to those vessels that contain large grit particles in the clay fabric.

The organic temper in all vessels is interpreted as being shell that has leached out of the clay fabric leaving irregularly shaped cavities. Particles of feldspar, mica and quartz in 30 of the grit and organic and grit tempered vessels indicate that the grit temper was crushed granite. In one of the vessels the crushed granite is combined with small beach pebbles approximately six mm long and in another vessel unusually high amounts of feldspar are present in the temper. Four vessels have temper of crushed quartz. In all vessels most of the particles of both organic and grit tempers are under one mm in size. Maximum temper sizes in the vessels ranges from two to six mm.

Mouth diameter could be measured for only five vessels and ranges from approximately 18 to 28 cm. Rim sherds of vessels for which mouth diameter could not be determined showed a small degree of curvature, suggesting that the mouth diameters for these vessels also is relatively large.

Sherds representing portions of the upper rim and lip are present for 21 vessels. The profiles of these rims, which are illustrated in Figure 33, show only slight variation in form and shape. Rim forms are either vertical (12) or slightly everted (7). Sixteen rims exhibit parallel walls and three have slightly contracting walls.

The mean wall thickness of the 51 vessels ranges from six to 14 mm with a mean of 8.3 mm. Organically tempered vessels tend to have thinner walls than grit tempered vessels.

No distinctive basal sherds were recognized in the ceramic assemblage possibly because the vessels may be of

Abbreviations used in Table 16:

o = organic
g = grit
sh = shell
crg = crushed granite
crq = crushed quartz
smp = small pebbles
v = vertical
e = everted
p = parallel
c = contracting
pr = present
ab = absent
int = interior
ext = exterior
f = flat
r = rounded
\- = portion not available
? = do not know
ab? = absent from available sherds but possibly not entire vessel
" " = blank space = not applicable
8 = measurement in millimeters

TABLE 16

CERAMIC VESSEL ATTRIBUTES BeCs-3

vessel #	1	2	3	4	5	6	7	8
associations								
# rim sherds	0	0	2	0	0	2	1	1
# body sherds	1	2	4	5	19	7	0	30
lip thickness	-	-	6	-	-	9	4	8
rim thickness	-	-	6	-	-	9	6	8
mouth diameter	-	-	-	-	-	-	-	-
temper type	o+g	o+g	g	g	o+g	g	g	g
temper variety	sh+ crg	sh+ crg	crg	crg	sh+ crg	crg	crg	crg
temper size - most -	<1	<1	<1	<1	<1	<1	<1	<1
largest -	1.5	3	2	3	5	3	2	4
carbon	ab?	ab?	ab	ab?	ab	ab?	ab?	pr
rim form	-	-	v	-	-	e	v	v
rim shape	-	-	p	-	-	p	c	p
decoration	ab?	ab?	pr	ab?	pr	pr	pr	pr
wiping	ab?	ab?	pr	ab	ab?	pr	pr	ab
combing	ab?	ab?	ab	ab	ab?	ab	ab	ab
wall thickness	9	-	6	-	7	-	-	11
coil breaks	pr	pr	pr	pr	pr	pr	pr	pr
lip form	-	-	f	-	-	f	r	r
figure							37	

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	9	10	11	12	13	14	15	16
associations								
# rim sherds	0	0	4	1	3	0	3	0
# body sherds	14	4	114	9	1	17	2	2
lip thickness	-	-	6	-	8	-	7	-
rim thickness	-	-	7	-	6	-	8	-
mouth diameter	-	-	-	-	-	-	-	-
temper type	o	g	o	o+g	o	o	o+g	o+g
temper variety	sh	crg	sh	sh+ crq	sh	sh	sh+ crq	sh+ crq
temper size - most -	1	<1	<1	<1	1	1	<1	<1
largest -	4	2	2	3	4	4	3	4
carbon	pr	ab?	ab	ab?	pr	pr	ab	ab?
rim form	-	-	e	-	v	-	v	-
rim shape	-	-	p	-	p	-	c	-
decoration	pr	pr	pr	pr	pr	pr	pr	pr
wiping	ab	-	ab	ab	ab	ab?	ab	-
combing	pr	-	ab	ab	ab	ab?	ab	-
wall thickness	9	-	6	7	-	7	10	-
coil breaks	pr	ab?	pr	pr	pr	pr	pr	pr
lip form	-	-	f	r	f	-	r	-
figure							35b	

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	17	18	19	20	21	22	23	24
associations			C14					
# rim sherds	0	1	3	0	3	0	1	1
# body sherds	29	0	177	3	96	1	6	0
lip thickness	-	8	7	-	11	-	7	6
rim thickness	-	6	7	-	7	-	10	8
mouth diameter	-	-	-	-	180	-	-	-
temper type	o+g	g	o	g	o+g	o	g	o+g
temper variety	sh+ crg	crg	sh	crg+ smp	sh+ crg	sh	crg	sh+ crg
temper size - most -	<1	<1	1	<1	<1	<1	1	<1
largest -	2	3	3	6	4	4	4	3
carbon	ab	ab	pr	ab?	ab	ab?	ab	ab?
rim form	-	v	v	-	v	-	-	e
rim shape	-	p	p	-	p	-	-	c
decoration	ab?	pr	pr	pr	pr	pr	pr	pr
wiping	ab?	ab?	ab	ab	pr	ab?	pr	pr
combing	ab?	ab?	ab	ab	ab	ab?	ab	ab
wall thickness	10	6	6	14	8	8	10	8
coil breaks	pr	?	pr	pr	pr	pr	pr	pr
lip form	-	f	f	-	f	-	f	r
figure								

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	25	26	27	28	29	30	31	32
associations								
# rim sherds	0	4	0	0	0	1	0	0
# body sherds	2	81	4	47	8	44	11	13
lip thickness	-	12	-	-	-	9	-	-
rim thickness	-	11	-	-	-	6	-	-
mouth diameter	-	280	-	-	-	-	-	-
temper type	o	g	o+g	o	g	o	o	o
temper variety	sh	crg	sh+ crg	sh	crg	sh	sh	sh
temper size - most -	1	‹1	‹1	‹1	‹1	‹1	‹1	‹1
largest -	4	3	4	3	4	3	3	4
carbon	ab?	ab	ab?	ab	ab?	ab	ab?	ab?
rim form	-	e	-	-	-	v	-	-
rim shape	-	p	-	-	-	p	-	-
decoration	pr	pr	ab?	pr	pr	pr	pr	pr
wiping	pr	ab	ab?	ab	ab?	pr	ab?	pr
combing	ab?	pr	ab?	ab	ab?	ab	ab?	ab?
wall thickness	9	11	-	7	10	7	7	8
coil breaks	pr	pr	pr	pr	pr	pr	pr	pr
lip form	-	f	-	-	-	f	-	
figure		35+ 38				36d		

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	33	34	35	36	37	38	39	40
associations								
# rim sherds	0	4	0	1	9	0	0	0
# body sherds	4	12	1	13	28	23	25	7
lip thickness	-	8	-	10	8	-	-	-
rim thickness	-	9	-	10	10	-	-	-
mouth diameter	-	220	-	-	280	-	-	-
temper type	g	o	o	o	g	g	o	o+g
temper variety	crg	sh	sh	sh	crg	crg	sh	sh+ crg
temper size - most -	<1	<1	1	<1	1	1	<1	<1
largest -	2	2	4	3	5	4	3	2
carbon	ab?	ab?	ab?	ab	pr	ab?	ab	ab
rim form	-	v	-	v	e	-	-	-
rim shape	-	p	-	p	p	-	-	-
decoration	pr	pr	pr	pr	pr	pr	pr	pr
wiping	-	pr	pr	pr	ab	-	pr	pr
combing	-	ab?	ab?	ab	ab	-	ab	ab
wall thickness	-	7	9	10	11	-	6	6
coil breaks	pr	pr	pr	pr	pr	pr	pr	pr
lip form	-	f	-	f	f	-	-	-
figure		36e			34			

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	41	42	43	44	45	46	47	48
associations								
# rim sherds	0	0	0	0	2	0	1	0
# body sherds	7	3	2	12	5	16	18	3
lip thickness	-	-	-	-	9	-	10	-
rim thickness	-	-	-	-	9	-	9	-
mouth diameter	-	-	-	-	-	-	180	-
temper type	g	g	o+g	g	g	o	g	o+g
temper variety	crg	crg	sh+ crg	crg	crg	sh	crg	sh+ crg
temper size - most -	<1	<1	<1	<1	<1	<1	<1	<1
largest -	2	2	3	2	2	3	2	2
carbon	ab?	ab?	ab?	ab?	ab?	pr	ab?	ab?
rim form	-	-	-	-	e	-	v	-
rim shape	-	-	-	-	p	-	p	-
decoration	pr	pr	pr	ab?	pr	pr	pr	pr
wiping	pr	ab?	-	pr	ab?	ab?	pr	ab?
combing	ab	pr	-	ab?	ab?	pr	ab	ab?
wall thickness	10	6	-	10	9	9	9	9
coil breaks	pr	pr	pr	pr	pr	pr	pr	pr
lip form	-	-	-	-	f	-	f	-
figure					36c		36a	

TABLE 16 cont.

CERAMIC VESSEL ATTRIBUTES - BeCs-3

vessel #	49	50	51
associations			
# rim sherds	0	1	0
# body sherds	2	1	1
lip thickness	-	8	-
rim thickness	-	6	-
mouth diameter	-	[illegible]	-
temper type	g	o	g
temper variety	crg	sh	crg
temper size - most -	<1	<1	1
largest -	2	5	2
carbon	ab?	ab?	ab?
rim form	-	e	-
rim shape	-	p	-
decoration	pr	pr	pr
wiping	ab?	ab	ab?
combing	ab?	pr	ab?
wall thickness	7	6	6
coil breaks	pr	pr	pr
lip form	-	f	-
figure		35c	

globular form with a rounded base. It would be difficult to distinguish between basal sherds and body sherds of vessels with such uniform curvature.

Carbonized remains are present on only seven vessels - on the interior of six and on the interior and exterior of one. These remains could have resulted from the use of the vessel for cooking. For 30 of the vessels the absence of carbonized remains could not be determined conclusively due to the small number of sherds available. On 14 vessels carbonized remains definately are not present.

Vessel 19 deserves special mention as it was associated with the charcoal feature from which the date of 1230 ± 70 B.P. (Beta-14052) was obtained. This vessel is organically tempered with shell particles of approximately one mm in size, ranging up to three mm. The rim is vertical with parallel sides and a flat lip. Wall thickness averages six mm. The body is decorated with simple stamp cord-wrapped stick and dragged simple stamp cord-wrapped stick with impressions from both decorative methods numbering five per cm and measuring one mm in width.

Decoration

The decorative attributes of the 51 vessels were examined and are listed in Table 17. For each vessel the location of the decoration was noted. For each location the type or types of decoration were identified, the orientation of the decoration to the vessel's lip edge was noted as was the number of impressions per cm on each decorative tool and the mean width of each impression.

Ceramic vessels from the Brown site exhibit four types of decoration: trailing, punctates, cord-wrapped stick impressions and dentate stamping. A trailed decoration is that which is produced by dragging a tool, usually with a sharp point, through wet clay to produce a linear impression. If this technique is performed after the clay has hardened it is known as incising.

The production of punctates is done by simple stamping of the end of a tool such as a small stick to create singular impressions that are oval, circular, irregular, etc. depending upon the shape of the implement being employed.

Cord-wrapped stick decoration is produced by using a stick around which a length of material such as sinew, flexible root or twisted cord has been wrapped. The decorative tool is impressed into the wet clay to produce a line of roughly oval marks. Cord-wrapped stick decoration can be applied by several techniques. With the simple stamp technique the decorative tool is lifted entirely from the clay after each impression is made. With the dragged simple stamp technique the cord-wrapped stick tool is not lifted completely off the clay when it is moved from one position to another but is rolled or dragged inbetween the impressions to create a ribbon-like effect. The rocker stamp technique in which one end of the decorative tool is left on the clay as the tool is moved into position for the adjoining stamp does not occur on the Brown site vessels.

A tool with several teeth that usually are rectangular in shape is used to produce dentate decoration. The decoration can be applied using either the simple stamp or the rocker stamp technique. For additional descriptions of the decoration processes see Allen (1981:72-77), Finlayson (1977:89) and Wright (1967:12).

Decoration of some form is present on 45 of the 51 vessels from the Brown site. The absence of decoration on six vessels cannot be determined conclusively because it is possible that decoration was present on some portion or portions of the complete vessel but is not represented on any of the recovered sherds.

Cord-wrapped stick is the dominant type of decoration, occurring on 44 of the 45 decorated vessels. The cord-wrapped stick decoration usually is simple stamp but can be combined with dragged simple stamp, punctates or trailing. Trailing occurs on only two vessels. On Vessel 21 a small sharply pointed implement was used to create a series of roughly parallel lines that are less than one mm wide. Vessel 25 exhibits a complex geometric trailed pattern on the interior of a body sherd; the trailed lines are approximately two mm wide.

Most cord-wrapped stick motifs contain four to six impressions per linear centimeter but can contain as few as two or as many as eight impressions per centimeter. Most impressions measure one or two mm in width. The variety in the width of individual impressions and in the number of impressions per centimeter indicates that many different cord-wrapped stick tools were used to decorate the ceramic vessels. The decoration can consist of narrow impressions widely spaced, narrow impressions narrowly spaced, wide impressions widely spaced or wide impressions narrowly spaced. On 14 vessels it was possible to determine from the cord-wrapped stick impressions the direction in which the cord had been wrapped around the stick. On 13 vessels the cord had been wrapped obliquely from the right side of the stick up to the left side; on one vessel the direction had been reversed and the cord was wrapped obliquely from the left side of the stick up to the right side.

Vessel 7 consists of a single rim sherd that is unique in this ceramic assemblage in that it exhibits impressions of a large toothed dentate stamp on the exterior of the upper rim. This sherd has a fine grit temper of crushed granite;

the rim is vertical and the walls contract to the rounded lip.

Decoration is present at a number of locations on the Brown site vessels including the lip surface, lip edge, upper rim interior, upper rim exterior and body. Of the 21 vessels with upper rim sherds only one vessel possesses an undecorated upper rim exterior; the lip surface of this vessel, however, is decorated. The upper rims of two vessels are decorated on the interior with dragged simple stamp cord-wrapped stick and are not decorated on the upper rim exteriors. One vessel is decorated on both the upper rim exterior and interior with dragged simple stamp cord-wrapped stick. The upper rims of most vessels are decorated with simple stamp cord-wrapped stick either alone (11) or in combination with punctates (4). The lip surface is decorated on seven vessels and undecorated on 14 vessels. Of the vessels with decorated lip surfaces five are decorated with cord-wrapped stick impressions oriented either horizontally or obliquely to the lip edge; on one of these vessels a horizontal line of cord-wrapped stick is combined with notching of the exterior edge of the lip. A horizontal line of circular punctates decorates another lip surface and the remaining vessel displays notching of the interior edge of the lip.

Abbreviations used in Table 17:

Location: ur = upper rim
lr = lower rim
b = body
ls = lip surface
le = lip edge
int = interior
ext = exterior

Tool: cws = cord-wrapped stick
den = dentate
pun = punctate
t = trailing implement
n = notching implement
drul = down right, up left = direction of cord wrapping
dlur = down left, up right

Method: ss = simple stamp
dss = dragged simple stamp
n = notching
p = punctating
t = trailing

Orientation: ? = unknown
h = horizontal to lip edge
v = vertical to lip edge
ol = slanting obliquely to the left from the lip to the base
or = slanting obliquely to the right

TABLE 17

CERAMIC VESSEL DECORATIVE ATTRIBUTES

vessel#	location	tool	method	orientation	#imp/cm	width-imp. (mm)
3	ur	cws	ss	h	6	1
		pun	p	h	3	2
5	b	cws	dss	?	5	1.5
6	ls	cws	ss	ol	6	1
	ur	cws	ss	ol	5	1
	b	cws	ss	h,v,ol,or	5	1.5
		pun	p	?	1	9x2
		pun	p	?	1	3
7	ur	den	ss	ol	3	2
8	le,int	n	n	h	4	1
	ur	cws	ss	ol	5	1.5
	b	cws,drul	ss	h,v,ol	5	1.5
9	b	cws	ss	?	5	2
10	b	cws	ss	?	6	1
11	ur,int	cws	dss	v	3	2
	ur	cws	dss	h	3	2
12	b	cws	ss	?	8	0.5
13	ls	cws	ss	h	5	1
	ur,int	cws	dss	v	5	1
	b	cws	dss	?	4	1.5
14	?	cws	ss	?	4	1.5
15	ur	cws	ss	h,ol,or	6	1
		pun	p	h	3	1.5x3
	b	cws	ss	?	5	1
16	b	cws,drul	ss	?	4	2
18	ur	cws	ss	v,h	5	1.5
19	ur	cws	ss	h	5	1
	b	cws	ss	?	5	1
		cws	dss	?	5	1

TABLE 17 cont.

CERAMIC VESSEL DECORATIVE ATTRIBUTES

vessel#	location	tool	method	orientation	#imp/cm	width imp. (mm)
20	b	cws	ss	?	4	1.5
21	ls	cws	ss	h	3	2
	b	cws,drul	ss	?	2	2
		t	t	?	-	<1
22	b	cws	ss	?	7	1
23	ur	cws	ss	h,ol	5	1
	b	cws,drul	ss	?	6	1
24	ur	cws,drul	ss	h	6	1
25	b	cws	ss	?	5	1
	b,int	t	t	v,h	-	2
26	ls	pun	p	h	2	2
	ur	pun	p	h	2	2
		cws,drul	ss	v	5	1
	lr	pun	p	h	1	2x7
		cws,drul	ss	h	5	1
	b	cws,drul	ss	h,ol,or	5	1
28	?	cws	ss	?	4	1
29	b	cws,drul	ss	?	6	1
30	ls	cws	ss	h	5	1
	le,ext	n	n	h	5	1
	lr,int	cws	dss	v	-	1
	b	cws	ss	?	4	2
31	b	cws,drul	ss	?	4	1.5
32	b	cws	dss	?	5	1
33	b	cws,drul	ss	?	7	1
34	b	cws,drul	ss	?	4	1.5
	ur	cws	ss	h	3	1.5
35	b	cws	ss	?	5	1.5

TABLE 17

CERAMIC VESSEL DECORATIVE ATTRIBUTES

vessel#	location	tool	method	orientation	#imp/cm	width imp. (mm)
36	ls	cws	ss	or	4	1.5
	ur	cws	ss	h	5	1.5
		pun	p	?	1	6
37	ur	cws	ss	h	4	1.5
	b	cws,dlur	ss	?	5	1.5
38	b	cws,drul	ss	?	5	1.5
39	b	cws	dss	?	6	1
40	b	cws	ss	?	5	2
41	b	cws	ss	?	6	1
42	b	cws	dss	?	4	1.5
		cws	ss	?	5	1
43	b	cws	ss	?	4	1
45	ur	cws	ss	or	8	1
	b	cws	ss	?	8	1
46	b	cws	ss	?	5	1
47	ur	cws	ss	h	6	1
		pun	p	?	1	4x5
	b	cws	ss	?	5	1
48	b	cws	ss	?	4	1.5
49	b	cws	ss	?	4	2
50	ur	cws	ss	h	4	1
51	b	cws	ss	?	8	1

Discussion

The ceramic assemblage from the Brown site is interesting in that it does not conform to a widely held, yet unpublished, belief, namely that in Nova Scotia ceramic vessels originally were tempered with grit, which was replaced gradually by organic temper, usually shell, and that in the period immediately before the manufacture of aboriginal ceramics was halted, organic temper was the only type of temper in use.

At the Brown site, however, which probably was not occupied much before 1300 B.P., was a nearly equal proportion of grit tempered, shell tempered and grit and shell tempered vessels. Moreover, there exists no evidence from the site that grit tempered vessels predate shell tempered vessels and, in spite of the lack of strict vertical separation of artifacts, reasonable evidence exists, in the form of Vessel 19 which was associated with the earliest radiocarbon date of 1230 ± 70 B.P., of the use of shell tempered ceramics at the early stage of site occupation. If shell had replaced grit as a tempering medium then it would be expected that, since shell evidently was in use near the beginning of occupation at the Brown site, relatively few grit tempered vessels would have been used at the site and the majority of vessels would have been shell tempered. Grit tempered vessels, however, outnumber those tempered by shell by 22:16. It is more probable, in view of the above evidence, that differences in temper indicate differences in function of the ceramic vessels rather than differences in the time period of manufacture (see Appendix H).

Faunal Remains

Shell

A total of 926 g of shell was collected from the Brown site. This amount represents all the shell that was encountered during the excavations in 1985. All the shells are of one species that has been identified as hard-shell clam or quahog, Mercenaria mercenaria (Derek Davis, pers. comm.). The shell was not found in a typical midden context as is the case at many late prehistoric sites in Nova Scotia, but was scattered throughout the soil matrix in the same manner as were the lithic and ceramic artifacts.

Bone

Most of the bone fragments were either calcined or burnt with only 12 exhibiting no signs of burning. It is believed that the unburnt specimens may not be associated with the prehistoric component since it appears that burning is a prerequisite for preservation in the acidic soils of the area. The unburnt specimens include four beaver bones, three moose, one large bird and three large mammal.

The faunal remains were sent to Gwyn Langemann of Calgary, Alberta for identification. Her report is attached at the end of this thesis as Appendix G. Mammals are heavily represented in the sample but this may well be a factor of sample bias due to differential preservation of relatively robust mammal bones and relatively fragile bird and fish bones.

Because of the fragmentary nature of the faunal remains only a few bones could be identified to a species level. Seventy-eight bones are of beaver, representing a minimum of four animals. Black bear is represented by a single metapodial fragment and seven bones were identified as white-tailed deer (MNI = 1).

Three bones were tentatively identified as belonging to the order Carnivora. Only one bird bone was identified to a family level - the proximal ulna of Anatidae, one of the smaller ducks. The only fish specimen in the faunal assemblage is the calcined atlas vertebrae of a herring-size fish. One crustacean claw tip was tentatively identified as crab.

Bones that could not be identified were sorted according to general size and class (see Table 18). For the purposes of this classification small mammals are those that are the size of small mustelids, rodents and hares; medium mammals are the size of beaver and lynx and large mammals are the size of bear, deer and marine mammals. Medium-sized birds are hawks, gulls and loons and large birds are the size of Canada geese.

TABLE 18

FAUNAL ELEMENTS NOT IDENTIFIED BELOW CLASS LEVEL

	# elements
small bird	2
medium bird	6
large bird	2
small mammal or bird	92
small mammal	1
small-medium mammal	518
medium mammal	120
medium-large mammal	220
large mammal	35

The faunal remains are of little help in determining seasonality of the Brown site since none of the animals represented in the collection are restricted in their seasonal distribution in eastern Nova Scotia. The faunal remains do give some indication of the diet of the prehistoric occupants of the site but it should be noted that they represent only those dietary elements that have survived the centuries; less durable elements such as plants and fish that probably were present in the prehistoric diet are subject to more rapid decay and thus are unlikely to be represented in the faunal assemblage in quantities that accurately reflect relative use. The significance of the faunal remains at the Brown site will be discussed in greater detail in Chapter V.

CHAPTER V

INTERPRETING THE EVIDENCE

The following chapter presents, in two major sections, the implications of the Brown site data for the understanding of the late prehistoric period in Nova Scotia. The first section concentrates upon what the data tell us about the site itself, particularly regarding length of occupation, number of components, function and seasonality. The second section views the results obtained from the Brown site in relation to other late prehistoric sites in Nova Scotia and the Maritime Provinces.

The Brown Site

Occupation

The three major aspects of occupation at any site are the length of occupation, the number of components and the number of occupations. Length of occupation refers to the time span over which people were present at the site; the number of components refers to the number of culturally discrete groups of people who used the site; and the number of occupations refers to the number of times each group of people visited the site. The first two of these aspects usually can be determined with some degree of accuracy through examination of the archaeological record; the third usually remains for the most part within the realm of speculation.

Length of Occupation

The presence of historic artifacts and the dates obtained through radiocarbon analysis of charcoal and shell suggest that the site was occupied for a lengthy period of time extending from approximately 1300 years ago until well into the historic period. The three radiocarbon dates from the prehistoric period, 1230 ± 70 B.P. (Beta-14052), 740 ± 60 B.P. (Beta-15479) and 530 ± 60 B.P. (Beta-15480) (half life = 5568 years), span a period of 700 years and indicate that the site could have been occupied through much of the late prehistoric period. Historic occupation is indicated by one radiocarbon date, 280 ± 70 B.P. (Beta-15481), and by the presence of historic artifacts that date from the late sixteenth century to the nineteenth century.

Little evidence exists for the occupation of the site before 1300 B.P. The two contracting stem projectile points that in neighbouring New England predate c. 1000 B.P. and are not associated with the later, corner-notched variety of projectile point (Snow 1980), have in Nova Scotia been found associated with later points (Stephen Davis, pers. comm.). It is possible that some of the contracting stem points are contemporaneous with the corner-notched points in Nova Scotia in general and at the Brown site in particular, and represent the decline of the popularity of this style of projectile point in the province (see Dethlefsen 1981, Dethlefsen and Deetz 1966).

Components

Artifactual evidence indicates the existence of three major components at the Brown site - late prehistoric Micmac, historic Micmac and historic European. The identity of the late prehistoric Indians as Micmac can be determined with a high degree of certainty using the direct historical approach which, although it has many disadvantages when employed in the Northeast (see Sanger 1979a, Trigger 1982), can be used in conjunction with the archaeological record to determine the identity of a group of people. Thus, using the knowledge that this area of Nova Scotia was inhabited by Micmac in early historic times and the continuous nature of the archaeological record from late prehistoric to early historic times at the Brown site, it can be said with some certainty that the Brown site was occupied by prehistoric Micmacs. This conclusion is not surprising especially in view of the evidence from Cape Breton that places Micmacs on the island for the past 1500 years (Nash 1980).

The division between the two Micmac components of the Brown site is somewhat artificial as it is highly probable that Micmacs occupied the site sporadically from the late prehistoric to the early historic period, with the beginning of the historic period being marked by a relatively abrupt change in material culture due to acculturation but not by a change in genetic identity.

This thesis concentrates upon the late prehistoric component. The two historic components are extremely small in comparison, the early historic Micmac being represented by the sixteenth century glass bead, the pin-brooch and the locket trim, and the historic European occupation being represented by the later ceramics and nails. The gun lock, gunflints, barbed iron harpoon head and possible iron leister prong may belong to either the historic Indian or the European occupation.

Based on the evidence of the radiocarbon dates, the prehistoric component appears to span the time from approximately 1300 years ago to contact. At this site it is nearly impossible to determine accurately the association of particular artifacts with particular radiocarbon dates because of the lack of vertical structure within the site, with the exception of the corner-notched point and the sherd from Vessel 19 that were associated with the charcoal feature from which the date of 1230 ± 70 B.P. was obtained. It reasonably can be assumed, however, that at least some prehistoric artifacts are associated with each prehistoric radiocarbon date since the dates that do not have definite artifact associations were obtained from quahog shells. Because these shells were found within the main body of the site, approximately 70 meters from the shore, they could not have been deposited here naturally by otters or muskrats, which shuck shells at the water's edge, or by inundation since sea levels would have been lower, not higher, at the time of site occupation (Grant 1970). Therefore, it can be assumed that the shells were culturally deposited and other artifacts probably were deposited simultaneously.

Assuming that artifacts were deposited over the time period covered by the radiocarbon dates, it becomes apparent that over the 700 year period of prehistoric occupation at the Brown site very little change occurred in the form and style of lithic and ceramic tools. The prehistoric artifacts show little difference within lithic classes, i.e., little variety exists among the projectile points, among the scrapers, among the bifaces, etc. Except for type of temper, which may be associated with function (see Appendix H), the aboriginal ceramics also show little variation.

Within the discipline of archaeology there exists a basic theoretical assumption that changes in the cultural fabric of a people usually are reflected in changes in the form and style of objects of their material culture (Binford 1968). The use of this assumption in conjunction with the data from the Brown site leads to the conclusion that generally the prehistoric artifacts from the Brown site show little evidence of change in form and style over time and thus indicate a long-term cultural or ethnic stability in this area of Nova Scotia during the late prehistoric period.

The late prehistoric assemblage consists of tightly corner-notched projectile points, numerous small thumbnail scrapers and a variety of bifaces that tend to be leaf-shaped. The preferred material for lithic manufacture is the fine-grained chalcedony from the Bay of Fundy area of the province, although other materials also were utilized such as quartz and quartzite. A definite selection for the yellow to red coloured White Rock quartzite over local white to grey quartzites is apparent. Other notable aspects of the lithic assemblage are the presence of coarsely flaked and pecked celts, the occasional presence of the exotic Ramah chert and the presence of the occasional contracting stem projectile point. Ceramics are cord-wrapped stick decorated, coil-made and take two basic forms that possibly reflect functional differences (see Appendix H) - thinner walled, shell-tempered vessels and thicker walled, grit-tempered vessels.

Site Function and Seasonality

It is difficult to separate the two factors of site function and seasonality as they are closely interdependent, e.g., if the site functioned solely as a smelt fishing station it would be occupied in early spring each year; the function, smelt fishing, and the seasonality, early spring, are interdependent facts. For purposes of clarity the following discussion will center arbitrarily upon site function, with seasonality being discussed in relation to function.

Some indication of the function of a prehistoric site can be gained through examination of the size of the site, the nature of the artifact assemblage, the nature of the features and seasonality.

Site Size

The Brown site is relatively small. The artifact scatter and associated black cultural soil cover an area of 150 m^2, 100 m^2 of which consists of the central level clearing. This clearing probably was the main living area, an assumption that is supported by several characteristics including the absence of the jumble of large boulders that surround the site and upon which it would have been exceedingly uncomfortable to live, and the elevation of the site above surrounding areas that tend to become flooded after heavy rainfall. Another fact that suggests that the clearing was the living area is that more artifacts were recovered in areas immediately adjacent to the clearing than in the clearing itself. Contrary to traditional belief, the area that yields the most artifacts is not necessarily the main living area (see Clark and Kurashina 1981:315, Gallagher 1977:410).

Once the boundaries of a site have been determined an estimate can be made of the number of occupants. Naroll (1962) conducted a study into a method of estimating with some degree of accuracy the population of a site. The formula p = m/10, where p is the population and m is the floor area of the site in square meters, was developed to approximate the population of an archaeological site.

Naroll's data were re-evaluated by Weissner (1974) who conducted an ethnoarchaeological study of a number of small modern Bushman sites. At these sites, where the number of occupants and the area of their occupation were known facts, Naroll's formula was found to be inaccurate in that it predicted a smaller number of occupants than actually did live at the site. Weissner found that for Bushman sites of less than 300 m², at least, the number of people living at the site exceeded Naroll's formula by a factor of two thirds.

When Naroll's formula is applied to the Brown site, a maximum number of 15 occupants is derived. Since the site is quite small in size the total number of people who lived here at one time may exceed this number by a factor of two thirds, or ten persons, to produce a maximum population of 25.

The small size of the Brown site suggests that the site was occupied briefly on a seasonal basis each year. Sites that were occupied for longer periods of the year probably would be substantially larger. At the moment this conclusion is speculative as there exists little comparable information for Nova Scotia, but, given the available evidence, this is the most logical conclusion concerning site size and function.

Artifact Assemblage

The nature of the artifact assemblage of a site often is used as an indicator of site function. If, for example, a large proportion of the artifacts is known to be related to fishing activities then it is reasonable to assume that fishing was a major activity performed at the site; if a large number of hammerstones, primary flakes and preforms is found near a source of lithic raw material it is reasonable to assume that procuring raw material for stone tool manufacture was a major activity.

The artifact assemblage from the Brown site does not contain a preponderance of any one type of tool. The most numerous tool is the scraper, the abundance of which, however, cannot be linked conclusively to a prevalence of scraping activity at the site because it is quite probable that in eastern Nova Scotia, as in Maine (Sanger 1979b:114), a large number of scrapers is a general characteristic of late prehistoric sites and is not a good indicator of site function for the late prehistoric period in this area.

The assemblage from the Brown site can be characterized as containing a large number of artifacts that are fairly evenly distributed among tool types and that are a representative sample of the contents of the site. The assemblage is not representative, however, of the tools that were deposited at the site at the time of occupation as only lithic tools and ceramics were recovered. Tools made of perishable materials such as bone, wood and leather that probably formed a large proportion of the tool kit of the occupants of the site would have decomposed since deposition.

The even distribution of the artifacts among tool classes suggests that the site was not used as a specialized hunting or foraging station. It may have been a specialized fishing station and the fishhooks, which usually are made of bone, have not been preserved, but this is not likely in view of the large number of other types of artifacts that were found at the site. The most reasonable conclusion concerning site function based on evidence from the artifact assemblage is that multiple activities were carried out and if specialization did occur it was slight enough not to be reflected in the archaeological record.

One unusual aspect of the artifact assemblage is the high density of formed tools and ceramic vessels that were recovered from the site. Although the cultural layer of the site is only ten to fifteen centimeters deep, the 50 m² area that was excavated yielded 735 formed lithic tools and 1033 ceramic sherds representing 51 vessels. At other sites in the Maritimes the artifact density is not nearly so high - The Oxbow site in northeastern New Brunswick yielded 321 lithic artifacts and ceramic sherds from 194 vessels from an excavated area of 119 m² with a cultural layer that varied from 50 to 220 cm in depth (Allen 1981); at Teacher's Cove in southeastern New Brunswick the cultural layer was up to one meter in depth in places. From the 182 m² that was excavated only 273 lithic tools and 234 ceramic sherds from at least 19 vessels were recovered (Davis 1978).

The high artifact density at BeCs-3 suggests that the site was intensively used, but its small size and seasonal nature suggest that the site was used for only part of the year by a small group of people. The most plausible explanation of the combination of high artifact density, small size and seasonal nature at one site is that the site was occupied on a seasonal basis for a long period of time, probably over much of the last 1000 years of the prehistoric period. This speculation is supported by the range of radiocarbon dates obtained from the site.

Seasonality

Knowledge of the seasonality of a site, i.e., the season or seasons during which the site was occupied, can aid in the interpretation of site function. In trying to gain some indication of site seasonality it often is useful to examine the natural resources that presently are available in the area, taking into consideration the changes that may have occurred since the time of site occupation, together with the faunal remains that were obtained from the site during excavation.

Most of the mammals that are found along the eastern shore of Nova Scotia, in the vicinity of Jeddore, are available throughout the year. Moose, deer, porcupine, beaver, rabbit, muskrat and red fox occur in the area year-round. The only seasonally scarce mammals are black bear which hibernate during the winter months from December to March, and harbour seals which move offshore in winter if ice forms in coastal inlets.

The faunal resources that are seasonally abundant in the vicinity of the Brown site are migratory birds and anadromous fish. The head of Jeddore Harbour lies on the major spring and autumn migration routes for shorebirds and waterfowl and is in a migratory bird stop-over zone (McGuire 1980). Black ducks can be found in the area all year but are more abundant during the winter months when they concentrate along the coasts. Brant occur in large numbers in the spring and Canada geese are extremely abundant in the spring and autumn. Sea ducks, which include the greater scaup, bufflehead, oldsquaw and scoters, are found in the area during the colder months of the year from October to April.

Several fish species occur in the Head of Jeddore inlet with seasonal abundance. In March smelt spawn at the head of tide which is at the mouth of the Salmon River at the Brown site. Brook trout can be found near the site in spring and summer; Atlantic salmon can occur from late spring to early autumn depending upon whether they are early or late run fish; tomcod and winter flounder can be found at the head of the estuary in mid-winter. The anadromous gaspereau and the catadromous eel, two species that can occur with great abundance in the rivers of Nova Scotia in the spring and autumn respectively, are not found in the Head of Jeddore or the Salmon River (McGuire 1980) probably because the two waterfalls on the Salmon River effectively block the route to the interior lake for these species. The absence of eels in the Salmon River definately rules out the possibility that the site was an autumn eel fishing camp. Furthermore, the site is unlikely to have been occupied in autumn if, in fact, eels were such a critical resource as has been suggested by Nash (1980). The autumn months presumably would have been spent at sites on rivers where an abundant supply of eels could be procured.

The faunal remains that were recovered from the site do not give a good indication of site seasonality. Black bear, represented by one bone, usually is found in the warmer months from April to December but also can be hunted in winter if its hibernating place is found. Beaver, which comprise the majority of identified faunal elements, can be found in the vicinity of the Brown site throughout the year. It may have been easier to hunt beaver in warm weather when water was unfrozen, but it also was possible to hunt them in winter, at least in the early historic period (see Lescarbot 1928:269). It is difficult to determine from the early European accounts of Micmac winter beaver hunting the degree of difficulty compared to hunting other mammals in the winter, the extent to which the hunt was aided by the use of European manufactured metal tools, or the extent to which winter beaver hunting was motivated by the unnatural pressures of the fur trade. It is difficult to determine late prehistoric beaver hunting practices since early historic hunting methods cannot be projected into prehistory with any certainty, thus the seasons during which beaver were hunted at the time of occupation of the Brown site are not known and the presence of beaver bones at the site gives no indication of site seasonality.

White-tailed deer, represented by three bones, are present throughout the year in the area surrounding the Brown site. The single fish vertebra that was recovered from the site was not identified at a generic or species level and thus gives no indication of site seasonality. The Anatidae bone from one of the smaller ducks that was included in the faunal assemblage also does not indicate seasonality as various species of these ducks are present in the area all year. Quahogs, represented by numerous shells, could have been obtained in any month although they are said to be unappetizing in spring and summer and may not have been utilized during these seasons. Erskine (1959:354) relates that "Peter Michael, an old Micmac, told me that it was their custom not to eat clams from April to July because they were then full of eggs and sand."

It is evident from the above discussion that the faunal remains recovered from the site do not aid in determining site seasonality. The faunal resources that are present in the area today are most concentrated in the spring when migratory waterfowl and anadromous fish are present; this does not mean, however, that the site was occupied in the spring as fauna are present in adequate amounts at other seasons, especially summer when salmon run and winter when black ducks concentrate on the coast.

Tentative negative evidence does exist for site occupation during the warmer months of late spring and summer. At a site that was occupied for a number of years during cool weather it is likely that a greater amount of charcoal and ash would have been deposited than was found at the Brown site. During late spring and summer fires would not have been required for heat and thus, presumably, less charcoal would build up on a summer site than a winter site. Although this evidence is tentative, at best, it does point to warm weather occupation.

The available evidence suggests that the Brown site was a place at which a small group of people lived during the late spring and/or summer and engaged in multiple activities, probably including mammal and bird hunting and fishing. The fact that only one fish bone was recovered from the site does not preclude the possibility that fishing was conducted here. Fish bones are more delicate than mammal and might not have survived where mammal bones did, either because they were not calcined and subsequently decayed or because they did not survive the calcination process itself, i.e., they were consumed rather than calcined by fire. It also is possible that fish were processed on the floodplain between the site and the river and the bones either were not excavated or decayed soon after deposition.

The Maritime Provinces

Settlement-Subsistence

Hypotheses concerning late prehistoric settlement-subsistence patterns in the Maine-Maritimes area have changed greatly over the past few decades. The prevalent belief before the 1970's was that late prehistoric settlement-subsistence patterns were similar to the early historic patterns described by Europeans in the sixteenth and seventeenth centuries - a seasonal round in which summers were spent on the coast and winters were spent in the interior.

Perhaps the most detailed account of early historic Indian settlement and subsistence is that of Pierre Biard (1897:79-83). In this account Biard describes early seventeenth century Micmac activities as follows:

> ... in January they have the seal hunting: for this animal, although it is aquatic, nevertheless spawns upon certain Islands about this time ... Likewise in the month of February and until the middle of March, is the great hunt for Beavers, otters, moose, bears (which are very good), and for the caribou, an animal half ass and half deer ... In the middle of March, fish begin to spawn, and to come up from the sea into certain streams, often so abundantly that everything swarms with them ... Among these fish the smelt is the first; this smelt is two and three times as large as that in our rivers; after the smelt comes the herring at the end of April; and at the same time bustards, which are large ducks, double the size of ours, come from the South and eagerly make their nests upon the Islands ... At the same time come the sturgeon, and salmon, and the great search through the Islets for eggs, as the waterfowl, which are there in great numbers,

> lay their eggs then, and often cover the Islets with their nests. From the month of May up to the middle of September, they are free from all anxiety about their food; for the cod are upon the coast, and all kinds of fish and shellfish; and the French ships with which they traffic... Water game abounds there, but not forest game, except at certain times birds of passage, like bustards and gray and white geese. There are to be found there gray partridges, which have beautiful long tails and are twice as large as ours; there are a great many wild pigeons, which come to eat raspberries in the month of July, also several birds of prey and some rabbits and hares. Now our savages in the middle of September withdraw from the sea, beyond the reach of the tide, to the little rivers, where the eels spawn, of which they lay in a supply; they are good and fat. In October and November comes the second hunt for elks and beavers; and then in December... comes a fish called by them ponamo, which spawns under the ice. Also then the turtles bear little ones, etc.

Other early historic records also indicate that the Indians of Maine and the Maritimes occupied the coast in the summer and moved inland during the winter. Summer coastal settlements are mentioned by Gomez in 1525 and by other Europeans in 1605 (Waymouth 1905), 1607 (Popham and Gilbert 1905) and 1609 (Hudson 1905). In 1542 Alfonsee wrote of a camp occupied in autumn and winter located "fifteen leagues below the head of the tide", probably on a river mouth (Bourque 1973:6). Champlain (1907) also mentions inland occupation in the winter months in his description of the winter settlements between Penobscot Bay and Port Royal as small, temporary interior camps.

The above mentioned data quite clearly indicate that in the early historic period the Indians of Maine and the

Maritimes lived on the coast in the summer and inland in winter. By using the direct historical approach this early historic settlement pattern was projected into the late prehistoric period with what was believed to be general accuracy.

In the 1970's, however, excavation of a series of late prehistoric sites on the coasts of Maine and southern New Brunswick that dated from A.D. 200 to A.D. 1150 generated data that forced a major rethinking of the nature of the late prehistoric settlement pattern in this area. Much variability was evident in faunal remains from these coastal sites. The presence of great auk bones, deer skulls with shed antlers and teeth of mammals killed in fall and winter (Bourque et al 1978), as well as the presence of semi-subterranean house pits suggested occupation in the cooler months of the year (Sanger 1982). The presence of sea urchin in several levels at one site suggested occupation between January and March since only at this time of year are any quantities of edible parts provided by spawning females (Bourque 1973). On the other hand, the remains of fish most easily caught in the summer months such as sturgeon suggested occupation during this season. There also is the possibility that sites such as Turner Farm on North Haven Island in Penobscot Bay were not occupied in any one particular season but may have been central camps from which groups ventured to procure specific resources at smaller, special activity camps (Sanger 1982:201).

For the coastal areas of northern Maine and southern New Brunswick archaeological evidence has shown that the late prehistoric settlement pattern was not as simple as the two zone coastal-interior pattern of the early historic period. Since the direct historical approach has proven generally inaccurate for predicting late prehistoric settlement patterns in northern Maine and southern New Brunswick it is doubtful that it could be used to predict the late prehistoric settlement pattern of nearby eastern Nova Scotia, as it is probable that the factors that caused a shift in settlement pattern in Maine and New Brunswick also affected settlement patterns in Nova Scotia.

The archaeological research that has been conducted in northern Maine and southern New Brunswick is valuable to researchers of Nova Scotian prehistory in that it has shown the unreliability of the direct historical approach in this area. However, the information that has been learned of the late prehistoric period in Maine cannot be applied directly to eastern Nova Scotia for two major reasons. Firstly, northern Maine and southern New Brunswick were inhabited by Passamaquoddy and Maliseet Indians while eastern Nova Scotia was the home of the Micmacs and:

> ... the relatively deep linguistic split between the Micmac and other Eastern Algonquians to the southwest suggests that the Micmac prehistoric sequence will show significant independence from other Eastern Algonquian sequences. (Snow 1978:69).

Secondly, although the Maritimes and northern Maine share a similar environment with similar resources, the resources can vary greatly from region to region and thus could lead to variations in settlement-subsistence patterns. Because of this regional variation "any attempts to generalize [settlement patterns] for the Maritime provinces as a whole may be suspect" (Burley 1981:214). Therefore, when studying late prehistoric settlement-subsistence patterns in relation to the Brown site, the area under study should be restricted to eastern Nova Scotia - Halifax, Guysborough and Pictou counties and Cape Breton.

At the moment little is known of the nature of settlement-subsistence patterns in the late prehistoric period in Nova Scotia. The primary study of Micmac economic systems was conducted by B.G. Hoffman (n.d.) in 1955. Hoffman's model suggested that the subsistence strategy of the Micmacs was based primarily on fishing, with over 90% of their food being obtained from the sea over ten months of the year. Recent archaeological work on the eastern Northumberland coast and in Cape Breton, however, indicates that Hoffman's model might not apply to eastern Nova Scotia.

A survey by Ronald Nash of Saint Francis Xavier University has shown that late prehistoric settlements on the eastern Northumberland coast of mainland Nova Scotia and in Cape Breton tend to be concentrated on the coastal lowlands (Nash 1980:33). Faunal remains recovered from these coastal sites, however, do not suggest that the subsistence strategy was concentrated on fishing.

Four Cape Breton sites yielded portions of birds, dog, beaver, red fox, mink, river otter, moose, seal and caribou or deer, with some selection for red fox and beaver at two of the sites (Stewart 1980). These data indicate that terrestrial mammals formed a significant portion of the economy of the occupants of the coastal sites. No evidence of fishing has been found at the Cape Breton sites:

> No fishing implements, tidal traps or weirs have been found, nor have any fish remains. Limited application of flotation and fine seiving techniques have not produced even an otolith. Survey along the salmon-rich lower Margaree River, particularly at salmon pools, has also been unproductive. (Nash 1980:35).

Further indication of the lack of a strongly maritime oriented economy in eastern Nova Scotia and Cape Breton is the absence of shell middens. Although shellfish are obtained easily in these areas today only four clam shells were found at Gegansig, two shell fragments at Cow Bay, 98 periwinkle fragments at Indian Point and 1300 oyster shells and a quahog shell at Ben Francis (Nash 1980:36).

The faunal remains from the Brown site fit the Cape Breton pattern well. Although the Brown site is located on the inner coast at the head of a major estuary, only one fish vertebra and approximately 1000 quahog shell fragments were found at the site and the majority of faunal remains were of terrestrial mammals. The scarcity of fish remains at the Brown site and at the Cape Breton sites probably is due to a combination of two factors: (1) poor preservation in the acidic soils of the province; and (2) a less strongly maritime oriented economy than suggested by Hoffman (n.d.).

Although the amount of information on the late prehistoric period in eastern Nova Scotia is limited, some speculation on the settlement-subsistence pattern of this period can be attempted relying heavily upon environmental information, especially geography and faunal resources.

As is evident from the information presented in Chapter II, Nova Scotia has a fairly uniform climate with the greatest difference occurring between the coastal areas and the interior highlands. Coastal areas, influenced by the waters of the Atlantic, have a 10°C higher mean temperature in the winter and 3°C cooler mean temperature in the summer than the interior highlands. Snowfall also is less along the coasts than in the interior since the warm onshore winds cause more precipitation to fall as rain, resulting in a mean snow depth of less than 30 cm for the Atlantic coast, compared to over 75 cm in the interior.

The major terrestrial mammals are found throughout the province with a general lack of distinct mammal regions and generally are not subject to great seasonal population fluctuations. The large ungulates are present throughout the year in most areas of the province as are black bear, beaver, rabbits, porcupines and other mammals.

Although the ethnohistoric record must be applied carefully to prehistoric lifeways, it is useful in this instance for showing that although there may have been a seasonal preference for hunting a particular mammal, such as moose in February, it was possible to hunt the major land mammals of Nova Scotia at all times of the year. For example, moose were reported to have been hunted in winter (Biard 1897:79, Denys 1908:429, Leclerq 1910:274) and in spring, summer and fall (Denys 1908:419, 427, 430; Leclerq 1910:276). Black bear were hunted all year round, even during the winter hibernation (Denys 1908:433), and various techniques were used to hunt beaver in all seasons (Biard 1897:79, 83; Denys 1908:419, 429, 431; Leclerq 1910:279).

The greatest seasonal fluctuations in population occur among waterfowl and fish. The Atlantic coast north of Halifax is home to large numbers of migrating waterfowl and shorebirds during the spring and fall. Predominant among these are the Canada goose in spring and autumn and the Brant in the spring. The black duck, which is a permament resident, is found in all areas of the province except in winter when it tends to concentrate along the coasts. Winter coastal residents also include the greater scaup, bufflehead, American scoter, white-winged scoter and surf scoter. Large numbers of game birds, therefore, are present on the coasts during the spring, autumn and winter.

Anadromous fish runs begin in early spring with smelt, followed by gaspereau, striped bass and salmon. Tomcod run up coastal streams in December and January to the head of tide to spawn. The catadromous eel runs downstream in autumn. The mouths of coastal rivers and streams are good locations for harvesting these fish, but, with the exception of tomcod which runs only to the head of tide, they also can be caught at suitable interior locations.

Seasonally abundant coastal fauna include the harbour and grey seals. Harbour seals whelp in May on estuarine mud flats and small rocky islands and also gather in large groups in late summer and autumn at feeding areas. Grey seals whelp in January and February on land-fast ice packs or inshore islands.

Synthesis of the above data does not lend support to the winter-summer coastal-interior dichotomy. In the winter the coast offers ducks, grey seals and tomcod while the interior offers deeper snow for hunting ungulates. Coastal areas may have been more favourable in the spring when waterfowl as well as anadromous fish were present. The salmon and eel runs of summer and autumn could be utilized equally well from coastal and interior locations.

TABLE 19

SEASONAL RESOURCES - NOVA SCOTIA

season	coast	interior
winter	sea ducks	ungulates (snow)
	black ducks	
	grey seals (whelping)	
	tomcod	
spring	harbour seals (whelping)	smelt
	smelt	gaspereau
	gaspereau	bass
	bass	
	Canada goose	
	Brant	
summer	salmon	salmon
autumn	eels	eels
	Canada goose	

Given the nature of the landscape of Nova Scotia with its numerous short river and lake systems which allow for easy access between coast and interior over most of the province, and the nature of the faunal resources, the most likely settlement pattern for a hunting and gathering people probably would be a flexible one in which some time each year was spent at coastal and interior locations but without the rigidity of the winter-interior, summer-coastal pattern. It is quite possible that movement between the coast and the interior varied from year to year depending upon a number of factors, especially weather. This idea was first suggested by Erskine (1958:445) who stated that "the winter migration was never true of all Micmacs. Many bands went inland, but others spent the summers inland and winter on the shore, if such movements better suited the food supply." It also is possible that movement varied among different groups of people, with, for example, one group catching eels in the autumn on the coast at the mouth of a river and another contemporaneous group engaged in the same activity on a river in the interior of the province, with the deciding factor for the location of an eel fishing camp being natural features such as a narrow spot in a boulder river that greatly facilitated harvest of the resource, rather than the coastal or interior nature of the location.

The above speculations, by their very nature, are tentative, for at the present time inadequate amounts of archaeological data exist to either substantiate or refute them. More sites at both interior and coastal locations need to be excavated and thoroughly analyzed before any definitive statements can be made on late prehistoric settlement patterns in Nova Scotia.

Inter-Site Variability in the Maritimes

Sites with similar assemblages to that of the Brown site have been found throughout the Maritime provinces. These assemblages were compared to the Brown site in order to try to distinguish general similarities and/or differences. The sites described below were selected on the basis of the availability and reliability of the archaeological data, either through published reports of professional archaeologists, personal communication with the excavators and/or examination of the assemblage by the author.

Mersey River East-1, BbDh-16, which is situated on the east side of the Mersey River between Kejimikujik Lake and Lake Rossignol (Fig. 41) was discovered during a survey of Lake Rossignol in 1985 (David Christianson, pers. comm.). The artifacts from the two test pits that were excavated at the site were all in good association (David Christianson, pers. comm.) and include thick-walled, grit-tempered, cord-wrapped stick decorated ceramics exhibiting coil breaks and flat lips, numerous small, thumbnail scrapers and corner-notched projectile points with serrated edges. The majority of scrapers and projectile points are of Scots Bay and Minas Basin chalcedonies; a few are of quartz.

The Eel Weir site, BdDh-6, is a multicomponent site that was excavated by Parks Canada during the 1982 and 1983 field seasons. It is situated on the west bank of the Mersey River near Kejimkujik Lake. The late prehistoric assemblage from the site consists of corner-notched points with serrated edges, numerous small thumbnail scrapers and cord-wrapped stick ceramics. Chalcedony from the Bay of Fundy area of Nova Scotia is the material of which the majority of the points and scrapers are made. A number of the small scrapers was associated with two hearths from which radiocarbon dates of 470 ± 60 B.P. (Beta-6362) and 790 ± 100 B.P. (Beta-6363) were obtained (Robert Ferguson, pers. comm.). The cord-wrapped stick ceramic vessels from Eel Weir are very similar to vessels from the Brown site, especially in the form of the lips and rims. The temper in the Eel Weir vessels tends to be coarse and can be grit, shell or a combination of both. The few faunal remains that were recovered from the site give no indication of seasonality (Robert Ferguson, pers. comm.).

BfCv-5 is a single late component site situated in central Nova Scotia on the Shubenacadie River near Grand Lake (Fig. 41), (Brian Preston, pers. comm.). This site also yielded corner-notched projectile points, most of which have serrated edges, and many small thumbnail scrapers. Different varieties of Bay of Fundy chalcedonies predominate among the scrapers. These chalcedonies also are present among the projectile points but White Rock quartzite is more frequent. A few straight and contracting stem points were associated with the corner-notched points. Both dentate and cord-wrapped stick decorated ceramics were found at the site. No faunal remains were recovered from the site.

Ronald Nash of Saint Francis Xavier University has tested and excavated three Ceramic period sites in Cape Breton. The Ben Francis site, CaCf-3, is situated at a good fishing location near the entrance to Indian Bay in the Bras D'Or Lakes. The earliest Ceramic period occupation has been dated to 1465 ± 80 B.P. (I-9693) and 1345 ± 85 B.P. (I-9694) (Nash 1978:139), which is slightly older than the earliest Brown site date. The artifacts from the prehistoric component include contracting stem and corner-notched projectile points, small bifaces and small scrapers. The majority of scrapers are manufactured from local chalcedonies. Faunal remains include moose, seal, beaver, bear, mink and bird. Late winter to early spring occupation is suggested tentatively by the presence of a single bone from a juvenile seal that would have been killed in its first spring or summer (Stewart n.d.:155).

The Cow Bay site, CaCf-6, is located approximately three kilometers northeast of Ben Francis on Cow Bay (Fig. 41).

One of the site's components yielded some contracting stem points and corner-notched, convex-base points in association with small scrapers, small bifaces, weathered ceramics of uncertain decoration and the occasional celt. The ceramics and corner-notched points are very similar to those from Ben Francis (Nash 1980:140) and presumably are of similar date. The lithic artifacts are of chalcedony and "one probable piece of imported Ramah chert" (Nash 1978:140) is included in the assemblage. Faunal remains were fragmentary, calcined and scarce and consisted of two bird bones, one of which belonged to a large duck, and 27 mammal bones of which only three could be identified to the species level - fox, probable fox and probable dog (Stewart n.d.:148).

The Indian Point sit , BlCj-1, is situated on the southwest coast of Cape Breton in the same location as a historic Micmac village that existed here in A.D. 1775 (Nash 1978:140). The prehistoric component produced a radiocarbon date of 465 ± 80 B.P. (I-9695) with which were associated contracting stem and corner-notched points, a few small ceramic sherds, small scrapers one of which "appears to be of Ramah chert" (Nash 1978:140), medium-sized bifaces and a large number of celts. The site is interpreted as being occupied at least in the fall and early winter for eel fishing and possibly at other times of the year for clams, deer, ducks, geese and shorebirds (Nash 1978:141). The few calcined faunal remains that could be identified to species level are red fox, beaver, river otter and dog (Stewart n.d.: 153).

The assemblages from the above mentioned sites show the homogeneous nature of the material culture of the late prehistoric inhabitants of much of Nova Scotia. It has been recognized for quite some time that the corner-notched, convex-based projectile point, called the Indian Gardens point by Erskine (1971), was a late prehistoric manifestation in Nova Scotia, but only recently has the competent excavation of a series of late prehistoric sites allowed the confirmation of and expansion on earlier theories of the late prehistory of Nova Scotia. Data from the few sites described above suggest that for approximately 1000 years the assemblage of the prehistoric Micmac of Nova Scotia remained relatively unchanged and was characterized by the use of corner-notched, convex-based projectile points with which occasionally were associated contracting stem points; the use of numerous small scrapers and roughly made celts; the occasional use of Ramah chert; a preference for fine-grained chalcedonies for lithic tool manufacture; and the manufacture of cord-wrapped stick decorated shell and/or grit tempered, coil-made, poor quality ceramics.

Late prehistoric assembalges from Prince Edward Island and New Brunswick do not display the same degree of similarity to the Brown site assemblage as do those from the sites previously described. In all areas the assemblages generally are similar in that projectile points are tightly corner-notched, scrapers are small and usually numerous and ceramics are cord-wrapped stick decorated. In some instances specific similarities occur, e.g., in northeastern New Brunswick, like in Nova Scotia, it is not unusual to find contracting stem points in association with tightly corner-notched points (Patricia Allen, pers. comm.), and the design motif on ceramic vessel 26 (Fig. 38) from the Brown site is identical to one on a vessel, CeDw-3:15, in the collection of Historical Resources Administration that originated from an island in the Saint John River just north of Fredericton. Differences exist, however, that are believed to be significant for indicating lack of strong cultural unity within the late prehistoric period in the Maritime Provinces.

A major difference in late prehistoric assemblages from Prince Edward Island and northeastern New Brunswick on the one part and Nova Scotia on the other part lies in the choice of lithic material for tool manufacture. Component I of the Wakelin site, CcCm-9, at the eastern tip of Prince Edward Island is believed to date between 1150 and 550 B.P. (Keenlyside 1982:77). Most of the lithic artifacts from the component are of white quartz, which is not a locally available material. "The closest source presently known for this material is east coastal New Brunswick and is commonly associated with late prehistoric assemblages" (Keenlyside 1982:76).

In northeastern New Brunswick, in the Oxbow area in particular, the late prehistoric peoples manufactured the majority of their lithic tools from quartz even though many varieties of chalcedony are present in the local river gravels (Patricia Allen, pers, comm.).

There appears to be a real and significant difference in selection for lithic material for tool manufacture in the two areas of the Maritimes. In northeastern New Brunswick and Prince Edward Island quartz was selected over chalcedony even though the latter was equally available. In eastern Prince Edward Island quartz was imported from the east coast of New Brunswick, yet, presumably, fine-grained chalcedonies could have been imported with equal ease from the north coast of Nova Scotia. Over most of Nova Scotia, however, during the same period of time fine-grained chalcedonies were selected over quartz, even in areas such as the Brown site where quartz could be obtained locally and the chalcedonies had to be imported several hundred kilometers. White quartz is very common in Nova Scotia so its relative scarcity in late prehistoric assemblages cannot be attributed to difficulties in procurement.

In other parts of the world selection for different types of stone is known to be related to cultural differences. Two far-flung yet relevant examples serve to illustrate this point, one from northern Sweden and one from Labrador.

In northern Sweden during the Mesolithic a degree of cultural preference can be detected in the choice of raw material for stone tool manufacture. During the course of prehistory a succession of stones was preferred - first a "flint-like porphyritic" stone (Broadbent 1978:180), then quartz, followed by flint and finally quartzite. These different preferences for raw material can be linked to influences from various external cultural groups (Broadbent 1978:180).

In northern Labrador the Pre-Dorset Eskimoes of Ramah Bay manufactured their stone tools from locally available Mugford cherts; the later Dorset Eskimoes who occupied the same area, however, used Ramah chert for stone tool manufacture (Fitzhugh 1980). Since the flaking properties of the two cherts are not sufficiently different to affect tool manufacture (James Tuck, pers. comm.) and the two cherts were equally available to both groups of Eskimoes, it is likely that cultural preferences dictated the selection of chert.

The late prehistoric artifact assemblage of northeastern New Brunswick and Prince Edward Island are very similar to those of Nova Scotia in content and form and both quartz and chalcedony are available in both areas, therefore, differences in selection for raw material in these areas cannot be attributed either to availability or to differing technological requirements. It is most probable, therefore, that the preference for quartz in northeastern New Brunswick and Prince Edward Island and for chalcedonies in Nova Scotia reflects a degree of cultural or ethnic difference in the late prehistoric Indians of the areas. At the moment it is not known if this difference occurs only in the selection of lithic material or if it extends to other aspects of culture such as subsistence techniques or settlement patterns. Considering, however, that the late prehistoric peoples of both areas are believed to be ancestral to modern Micmacs (Allen 1981:ii) it would be surprising if a large degree of difference existed between the two areas.

Conclusions

Based on the analysis of material recovered during the excavation of the Brown site a better understanding of the lifeways of the late prehistoric inhabitants of eastern Nova Scotia has been gained. Evidence from the site indicates a long period of cultural stability in this area of the province from at least 1300 years ago to the arrival of Europeans and the beginning of the historic period.

In eastern Nova Scotia the late prehistoric tool kit is characterized by the presence of corner-notched, convex-based projectile points and large quantities of small scrapers. The majority of lithic tools are of chalcedony from the Bay of Fundy, with smaller amounts of White Rock quartzite and quartz also being used. Other characteristics of the tool kit are the presence of coarsely flaked and pecked celts, the occasional presence of Ramah chert and the presence of the occasional contracting stem projectile point. Ceramic vessels form a major portion of the assemblage. They are decorated with the cord-wrapped stick technique, are coil-made and are tempered with either organic or grit substances.

Only speculations based on environmental data could be made on the settlement-subsistence pattern of the late prehistoric period. The pattern that best appeared to fit the environmental data was a flexible one which allowed for adaptation to annual fluctuations in weather and which was not based upon a strict adherence to occupation of a specific environmental area, i.e., coast or interior, during a specific season.

Comparison of the Brown site material to that of other late prehistoric sites in the Maritimes yielded interesting results. Within most of Nova Scotia assemblages were similar, but those of Prince Edward Island and northeastern New Brunswick differed in the selection for white quartz over chalcedony for tool manufacture. It is believed that this difference is indicative of a degree of cultural or ethnic difference between the late prehistoric peoples of the two areas.

REFERENCES CITED

Allen, Patricia M.
1981 The Oxbow Site: Chronology and Prehistory in Northeastern New Brunswick. New Brunswick Manuscripts in Archaeology, Series 2, No. 1. Fredericton: Historical Resources Administration.

Ambrose, Reverand James
1863 Some Accounts of the Petrel - the Sea Serpent - and the Albicore - together with a Few Observations on a Beach Mound, or Kitchen Midden, Near French Village. Proceedings and Transactions of the Nova Scotian Institute of Natural Science 2:34-35.

Anonymous
1980 Atlantic Shellfish. Underwater World. Ottawa: Communications Branch, Department of Fisheries and Oceans.

Barton, Kenneth James
1981 Coarse Earthenware from the Fortress of Louisbourg. History and Archaeology 55. Ottawa: National Historic Parks and Sites Branch, Parks Canada, Environment Canada.

Benson, Denis A. and Donald G. Dodds
1980 The Deer of Nova Scotia. Revised ed. Halifax: Department of Lands and Forests, Province of Nova Scotia.

Biard, Pierre
1897 Relation of New France, Of its Lands, Nature of the Country, and of its Inhabitants. In The Jesuit Relations and Allied Documents, Vol. 3 - Acadia 1611-1616. R.G. Thwaites (ed.). Cleveland: Burrows Brothers.

Binford, L.R. and G.I. Quimby
1963 Indian Sites and Chipped Stone Materials in the Northeastern Lake Michigan Area. Fieldiana, Anthropology 36(12):277-307.

Binford, Sally R.
1968 Variability and Change in the Near Eastern Mousterian of Levallois Facies. In New Perspectives in Archaeology. S.R. Binford and L.R. Binford (eds.), pp. 49-60. Chicago: Aldine.

Bourque, Bruce
1973 Aboriginal Settlement and Subsistence on the Maine Coast. Man in the Northeast 6:3-20.

Bourque, B.; K. Morris and A. Spiess
1978 Determining the Season of Death of Mammal Teeth from Archaeological Sites: A New Sectioning Technique. Science 199:530-531.

Bower, Carolyn
1974 Salvage Survey of Shelburne County, Nova Scotia, Summer 1973. National Museum of Man, Archaeological Survey of Canada, Mercury Series 26:12-16.

Broadbent, Noel D.
1978 Prehistoric Settlement in Northern Sweden: A Brief Survey and a Case Study. In The Early Post-glacial Settlement of Northern Europe. P. Mellars (ed.). pp. 177-205. London: Duckworth.

Burley, David V.
1981 Proto-historic Ecological Effects of the Fur Trade on Micmac Culture in Northeastern New Brunswick. Ethnohistory 28:203-216.

Champlain, Samuel de
1907 Voyages of Samuel de Champlain 1604-1618. W.L. Grant (ed.). New York: Barnes and Noble.

Clark, J. Desmond and Hiro Kurashina
1981 A Study of the Work of a Modern Tanner in Ethiopia and its Relevance for Archaeological Interpretation. In Modern Material Culture: The Archaeology of Us. R.A. Gould and M.B. Schiffer (eds.). pp. 303-321. New York: Academic Press.

Connolly, John
n.d. Archaeology in Nova Scotia and New Brunswick between 1863 and 1914 and its Relationship to the Development of North American Archaeology. Unpublished Honours Thesis, Department of Anthropology, Saint Mary's University, Halifax. 1976.

1977 Bear River, Nova Scotia: A Collection Analysis. Man in the Northeast 14:35-47.

Crabtree, Don E.
1972 An Introduction to Flintworking. Occasional Papers of the Idaho State University Museum 28.

Davis, Stephen A.
1974 The Archaeological Salvage Survey of Mulgrave Industrial Area, Canso Strait, Nova Scotia. National Museum of Man, Archaeological Survey of Canada, Mercury Series 26:52-59.

1978 Teacher's Cove. New Brunswick Archaeology, Series 1, No. 1. Fredericton: New Brunswick Heritage Publications.

Denys, Nicholas
1908 The Description and Natural History of the Coasts of North America. Toronto: The Champlain Society.

Dethlefsen, Edwin S.
1981 The Cemetery and Culture Change: Archaeological Focus and Ethnographic Perspective. In Modern Material Culture: The Archaeology of Us. R.A. Gould and M.B. Schiffer (eds.). pp. 137-159. New York: Academic Press.

Dethlefsen, Edwin and James Deetz
1966 Death's Heads, Cherubs and Willow Trees: Experimental Archaeology in Colonial Cemeteries. American Antiquity 31(4):502-510.

Diéreville, Sieur de
1968 Relation of the Voyage to Port Royal in Acadia or New France. J.C. Webster (ed.). New York: Greenwood Press.

Dowling, Brenda
n.d. The Brown Site: A Contact Site in Southeastern Nova Scotia. Unpublished Honours Thesis Proposal. On file Anthropology Department, Saint Mary's University, Halifax. 1978.

Erskine, J.S.
1958 Their Crowded Hour: The Micmac Cycle. Dalhousie Review 38:443-452.

1959 Shell-heap Archaeology of Southwestern Nova Scotia. Proceedings and Transactions of the Nova Scotian Institute of Science 24:339-375.

1961 Micmac Notes 1960. Nova Scotian Museum Occasional Papers 1. Halifax.

1971 The Archaeology of Some Nova Scotian Indian Campsites. Proceedings of the Nova Scotian Institute of Science 27: 1-10.

Fernald, Merritt Lyndon and Alfred Charles Kinsey
1943 Edible Wild Plants of Eastern North America. Cornwall-on-Hudson, New York: Idlewild Press.

Finlayson, William David
1977 The Saugeen Culture: A Middle Woodland Manifestation in Southwestern Ontario. National Museum of Man, Archaeological Survey of Canada, Mercury Series 61.

Fitzhugh, William
1980 Review of Paleo-Eskimo Culture History in Southern Quebec-Labrador and Newfoundland. Etudes-Inuit-Studies 4(1-2):21-31.

Foulkes, Ellen V.
n.d. Fulton Island: A Stratified Site in the Saint John River Valley of New Brunswick. Unpublished Masters Thesis, Department of Anthropology, Trent University, Peterborough. 1981.

Friedberg, Robert
1962 Coins of the British World. New York: The Coin and Currency Institute.

Gallagher, James P.
1977 Contemporary Stone Tools in Ethiopia: Implications for Archaeology. Journal of Field Archaeology 4(4): 406-414.

Gilpin, J. Bernard
1873 On the Stone Age of Nova Scotia. Proceedings of the Nova Scotian Institute of Natural Science 3:220-231.

Gossip, William
1864 On the Occurrence of the Kjoekkenmoedding, on the Shores of Nova Scotia. Proceedings and Transactions of the Nova Scotian Institute of Natural Science 1:94-99.

Grant, Douglas R.
1970 Recent Coastal Submergence of the Maritime Provinces, Canada. Canadian Journal of Earth Sciences 7:676-689.

Hamblin, W. Kenneth
1982 The Earth's Dynamic Systems, Third ed. Minneapolis: Burgess.

Hamilton, T.M.
1960a Additional Comments on Gunflints. Missouri Archaeologist 22:73-79.

1960b The Determination of Date and Origin of Archaeological Gun Parts. Missouri Archaeologist 22:5-24.

Hayden, Brian
1980 Confusion in the Bipolar World: Bashed Pebbles and Splintered Pieces. Lithic Technology IX(1):2-7.

Hoffman, Bernard Gilbert
n.d. Historical Ethnography of the Micmacs of the Sixteenth and Seventeenth Centuries Unpublished Doctoral Thesis, Department of Anthropology, University of California, Berkeley. 1955.

Hosie, R.C.
1979 Native Trees of Canada. Don Mills, Ontario: Fitzhenry and Whiteside.

Hudson, Henry
1905 The Third Voyage of Master Henry Hudson, Written by Robert Juet, of Lime House. In Sailors Narratives of Voyages along the New England Coast 1524-1624. G.P. Winship (ed.). pp. 179-192. New York: Burt Franklin.

Keenlyside, David L.
1978 Late Prehistory of Point Pelee, Ontario and Environs. National Museum of Man, Archaeological Survey of Canada, Mercury Series 80.

1982 Prince Edward Island Archaeological Research 1980. In Archaeological Resources in the Maritimes 1980. C.J. Turnbull (ed.). pp. 62-99. The Council of Maritime Premiers, Reports in Archaeology 5.

Kenyon, Ian T. and Thomas Kenyon
1983 Comments on Seventeenth Century Glass Trade Beads from Ontario. In Proceedings of the 1982 Glass Trade Bead Conference. C.F. Hayes III (ed.). pp. 59-74. Rochester Museum and Science Center, Research Records 16.

Kidd, Kenneth E. and Martha Ann Kidd
1983 A Classification System for Glass Beads for the Use of Field Archaeologists. In Proceedings of the 1982 Glass Trade Bead Conference. C.F. Hayes III (ed.). pp. 219-254. Rochester Museum and Science Center, Research Records 16.

Leclerq, Chretien
1910 The New Relation of Gaspesia. Toronto: The Champlain Society.

Leim, A.H. and W.B. Scott
1966 Fishes of the Atlantic Coast of Canada. Fisheries Research Board of Canada Bulletin 155.

Lescarbot, Marc
1928 Nova Francia, A Description of Acadia, 1606. New York: Harper and Brothers.

Livingstone, D.A.
1951 The Fresh Water Fishes of Nova Scotia. Proceedings of the Nova Scotia Institute of Science, Vol. XXIII, Part 1.

MacDonald, George F.
1968 Debert: A Palaeo-Indian Site in Central Nova Scotia. National Museum of Man, Anthropology Papers 16.

MacKay, R.G. and D. Sanger
1972 From the Archaeology Lab, Instructions for Point Attribute Sheets. Bulletin of the Maine Archaeological Society, 2(3):13-16.

MacLeod, Heather and Barbara MacDonald
1977 Edible Wild Plants of Nova Scotia. Halifax: Nova Scotia Museum.

McGuire, B.E.
1980 Environmental Atlas of Eastern Nova Scotia, Section 3 - Halifax to Moser River. Environment Canada, Environmental Protection Service, Atlantic Region. (no pagination).

Molyneaux, Brian L.
n.d. The McGowan Lake Petroglyph Recording Project Queens County, Nova Scotia 1983, Vol. I and II. Unpublished manuscript on file Nova Scotia Museum History Section, Halifax.

Naroll, R.
1962 Floor Area and Settlement Population. American Antiquity 27(4):587-589.

Nash, Ronald J.
1976 Discoveries on Ingonish Island, 1975. Cape Breton's Magazine 14:13-14.

1978 Prehistory and Cultural Ecology - Cape Breton Island, N.S. In Canadian Ethnology Society, Papers from the Fourth Annual Congress, 1977. Richard J. Preston (ed.). pp. 131-155. National Museum of Man, Canadian Ethnology Service, Mercury Series 40.

1980 Research Strategies, Economic Patterns and Eastern Nova Scotia Prehistory. In Proceedings of the 1980 Conference on the Future of Archaeology in the Maritime Provinces. D.M. Shimabuku (ed.). pp. 23-41. Department of Anthropology, Saint Mary's University, Occasional Papers in Anthropology 8.

Noël Hume, Ivor
1970 A Guide to Artifacts of Colonial America. New York: Alfred A. Knopf.

Patterson, George
1889 The Stone Age in Nova Scotia, as Illustrated by a Collection of Relics Presented to Dalhousie College. Proceedings and Transactions of the Nova Scotian Institute of Natural Science 7:231-252.

Piers, Harry
1889 Aboriginal Remains of Nova Scotia - Illustrated by the Provincial Museum Collections. Proceedings and Transactions of the Nova Scotian Institute of Natural Science 7:276-290.

1890 Aboriginal Remains of Nova Scotia - Illustrated by the Provincial Museum Collections. Proceedings and Transactions of the Nova Scotian Institute of Science: 8:270-290.

1898 Relics of the Stone Age in Nova Scotia. Proceedings and Transactions of the Nova Scotian Institute of Science 9:26-58.

1912 A Brief Account of the Micmac Indians and Their Remains. Proceedings and Transactions of the Nova Scotian Institute of Science 8:99-125.

Popham, George and Raleigh Gilbert
1905 The Relation of a Voyage unto New England. In Sailors Narratives of Voyages along the New England Coast 1524-1624. G.P. Winship (ed.). pp. 155-175. New York: Burt Franklin.

Preston, Brian
1974a An Archaeological Survey of the Shubenacadie River System, 1970. Nova Scotia Museum Curatorial Report 18.

1974b Excavation at a Complex of Prehistoric Sites along the Upper Reaches of the Shubenacadie River, 1971. Nova Scotia Museum Curatorial Report 19.

Sanger, David
1979a An Introduction to the Prehistory and Paleo-environments of the Maine-Maritime Provinces Area. In Discovering Maine's Archaeological Heritage. D. Sanger (ed.). pp. 11-22. Augusta: Maine Historic Preservation Commission.

1979b The Ceramic Period in Maine. In Discovering Maine's Archaeological Heritage. D. Sanger (ed.). pp. 99-115. Augusta: Maine Historic Preservation Commission.

1982 Changing Views of Aboriginal Seasonality and Settlement in the Gulf of Maine. Canadian Journal of Anthropology 2(2): 195-203.

Scott, W.B. and E.J. Crossman
1973 Freshwater Fishes of Canada. Fisheries Research Board of Canada Bulletin 184.

Simmons, M.; D. Davis; L. Griffiths and A. Muecke
1984 Natural History of Nova Scotia. 2 Vol. Halifax: Nova Scotia Department of Education and Department of Lands and Forests.

Smith, Ronald Ward
n.d. The Land Mammals of Nova Scotia. Berkeley, California: Museum of Vertebrate Zoology, University of California.

Smith, H.I. and W.J. Wintemberg
1929 Some Shell-heaps in Nova Scotia. National Museum of Canada Bulletin 47.

Snow, Dean R.
1978 Late Prehistory of the East Coast. In Handbook of North American Indians. Vol. 15. B.G. Trigger (ed.). pp. 58-69. Washington: Smithsonian Institution.

1980 The Archaeology of New England. New York: Academic Press.

Stewart, Frances L.
1980 Faunal Remains from Four Cape Breton Island, Nova Scotia, Archaeological Sites. In Proceedings of the 1980 Conference on the Future of Archaeology in the Maritime Provinces. D.M. Shimabuku (ed.). pp. 147-163. Department of Anthropology, Saint Mary's University, Occasional Papers in Anthropology 8.

Taverner, P.A.
1922 Birds of Eastern Canada. Second ed. Canada Department of Mines Geological Survey Memoir 104.

Trigger, Bruce
1982 Response of Native Peoples to European Contact. In Early European Settlement and Exploitation in Atlantic Canada: Selected Papers. G.M. Story (ed.). pp. 139-155. St. John's: Memorial University of Newfoundland.

Tuck, James A.
1984 Maritime Provinces Prehistory. Ottawa: National Museum of Man, Archaeological Survey of Canada.

Tufts, Robie W.
1961 The Birds of Nova Scotia. Halifax: Nova Scotia Museum.

van Nostrand, Neil
1968 Notes on Nova Scotia's Wildlife. Revised ed. Province of Nova Scotia, Department of Lands and Forests Bulletin 32.

Vladykov, V.D. and R.A. MacKenzie
1935 The Marine Fishes of Nova Scotia. Proceedings of the Nova Scotian Institute of Science, Vol. XIX, Part 1.

Watkins, Lura Woodside
1968 Early New England Potters and Their Wares. U.S.A.: Archon Books.

Waymouth, George
1905 A True Relation of Captain George Waymouth His Voyage Made this Present Year 1605; in the Discoveries of the North Part of Virginia. In Sailors Narratives of Voyages along the New England Coast 1524-1624. G.P. Winship (ed.). pp. 101-151. New York: Burt Franklin.

Wiessner, P.
1974 A Functional Estimator of Population from Floor Area. American Antiquity 39(2):343-350.

Willey, Gordon R. and Jeremy A. Sabloff
1974 A History of American Archaeology. San Francisco: W.H. Freeman.

Witthoft, John
1966 A History of Gunflints. Pennsylvania Archaeologist 36:12-49.

Wright, J.V.
1967 The Laurel Tradition and the Middle Woodland Period. National Museum of Man, Anthropological Series Bulletin 217.

Figure 1

Geographic Location of BeCs-3

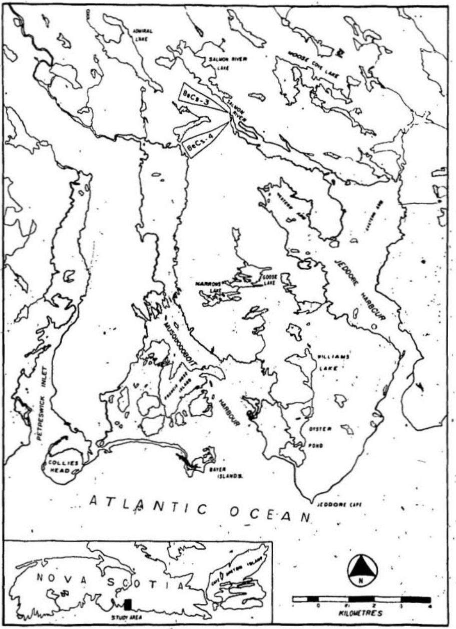

ADMIRAL LAKE
SALMON RIVER LAKE
MOOSE COVE LAKE
BeCs-3
BeCs-4
SALMON RIVER
JEDDORE HARBOUR
GOOSE LAKE
MUSQUODOBOIT
WILLIAMS LAKE
PETPESWICK INLET
HARBOUR
OYSTER POND
COLLIES HEAD
BAYER ISLANDS
ATLANTIC OCEAN
JEDDORE CAPE
NOVA SCOTIA
CAPE BRETON ISLAND
STUDY AREA
N
KILOMETRES

Figure 2

Excavation Plan - BeCs-3

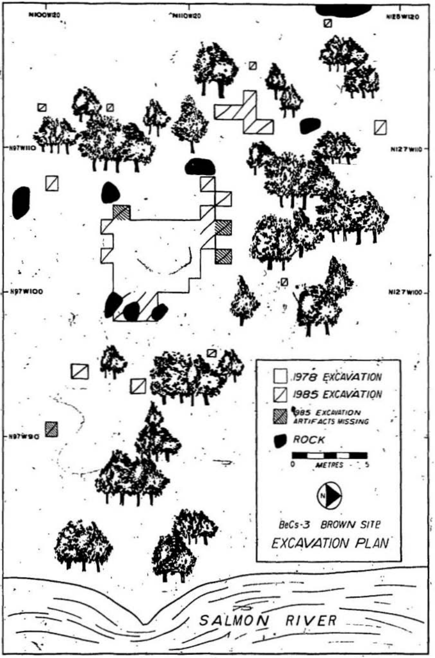

N100W120
N110W120
N125W120
N97W110
N127W110
N97W100
N127W100
N97W90
1978 EXCAVATION
1985 EXCAVATION
1985 EXCAVATION ARTIFACTS MISSING
ROCK
0 METRES 5
N
BeCs-3 BROWN SITE
EXCAVATION PLAN
SALMON RIVER

Figure 3

View of the Brown site from river. The site is in the center of the photograph on the far river bank.

Figure 4

View from center of BeCs-3, showing relation to river.

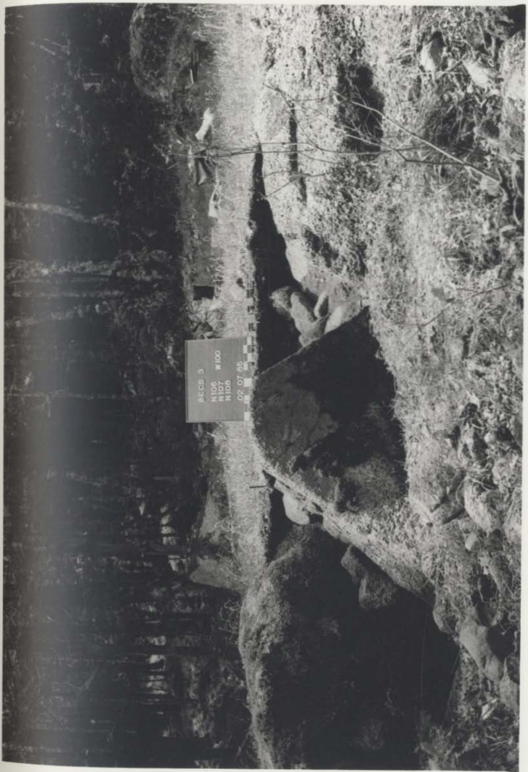
Figure 5

View of BeCs-3 from river,
showing central grassy clearing.

Figure 6

View of excavation - BeCs-3

Charcoal feature is in lower left corner of photograph.



BECS 3
N106 W100
N107
N105
02 07 05

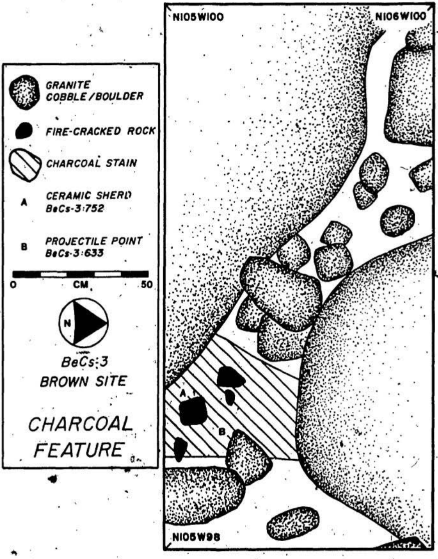

GRANITE COBBLE/BOULDER
FIRE-CRACKED ROCK
CHARCOAL STAIN
A CERAMIC SHERD BeCs-3:752
B PROJECTILE POINT BeCs-3:633
0 CM 50
N
BeCs:3
BROWN SITE
CHARCOAL FEATURE
N105W100
N106W100
N105W98
A
B

FIGURE 7

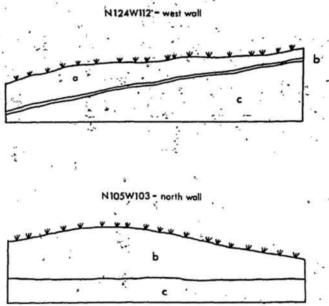
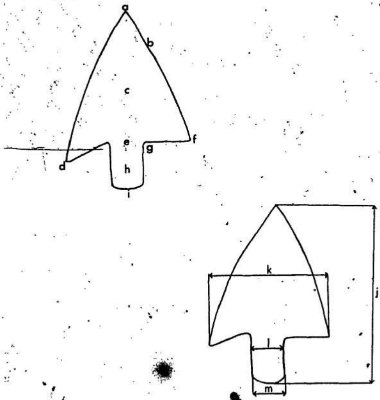


FIGURE 8
SOIL PROFILES
BeCs-3

a - humus, non-cultural
b - loam, cultural
c - sand, sterile

10 cm



key

a	tip	h	stem
b	blade edge	i	base
c	blade	j	maximum length
d	barb	k	maximum width
e	neck	l	neck width
f	shoulder	m	base width
g	notch		

FIGURE 9

PROJECTILE POINT TERMINOLOGY

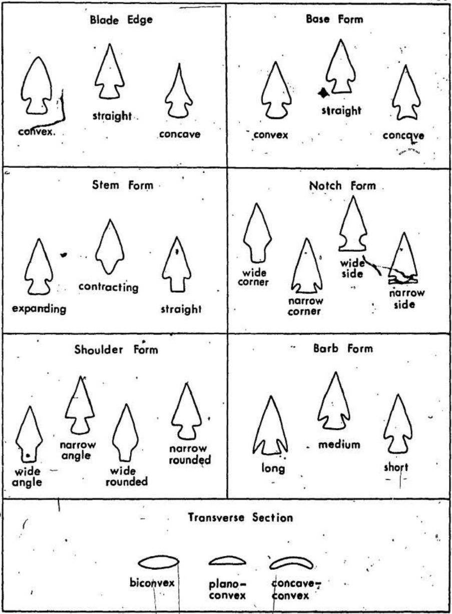


FIGURE 10

PROJECTILE POINT ATTRIBUTES

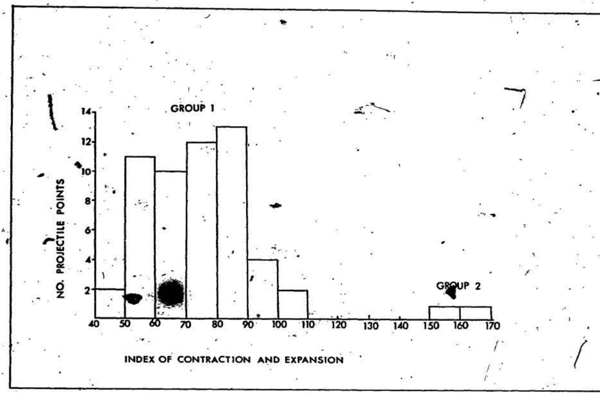


FIGURE 11

DISTRIBUTION OF INDEX OF CONTRACTION AND EXPANSION FOR BeCs-3 PROJECTILE POINTS

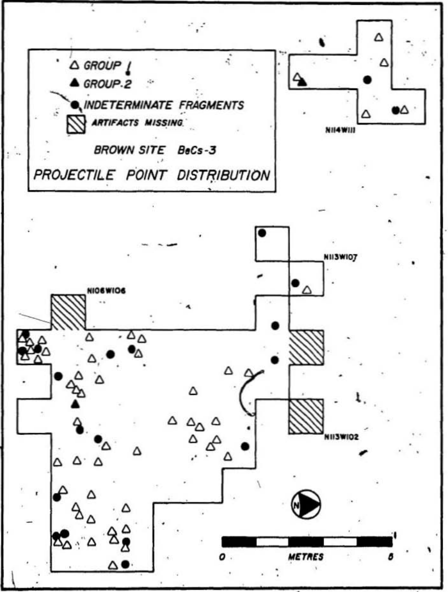

GROUP 1
GROUP 2
INDETERMINATE FRAGMENTS
ARTIFACTS MISSING
BROWN SITE BeCs-3
PROJECTILE POINT DISTRIBUTION
N114W111
N113W107
N106W106
N113W102
N
0
METRES
5

FIGURE 12

Figure 13

Projectile Points - BeCs-3

a-m - expanding stem points, Group 1

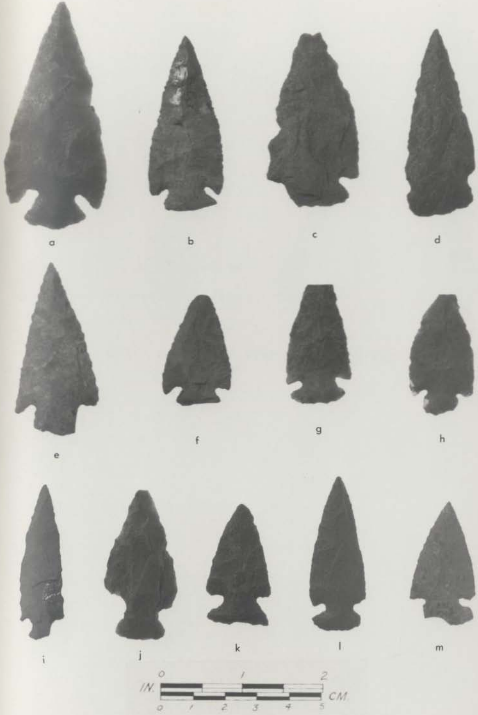

a
b
c
d
e
f
g
h
i
j
k
l
m
0
1
2
IN.
CM.
0
1
2
3
4
5

Figure 14

Projectile Points - BeCs-3

a-p - expanding stem points, Group 1


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
IN.
0 1 2
CM.
0 1 2 3 4 5

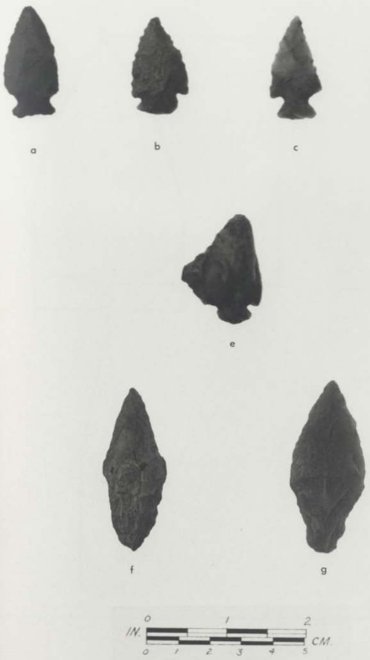
Figure 15

Projectile Points - BeCs-3

a-d - expanding stem points, Group 1

e - incompletely finished point

f,g - contracting stem points, Group 2


a
b
c
d
e
f
g
0
1
2
IN.
CM.
0
1
2
3
4
5

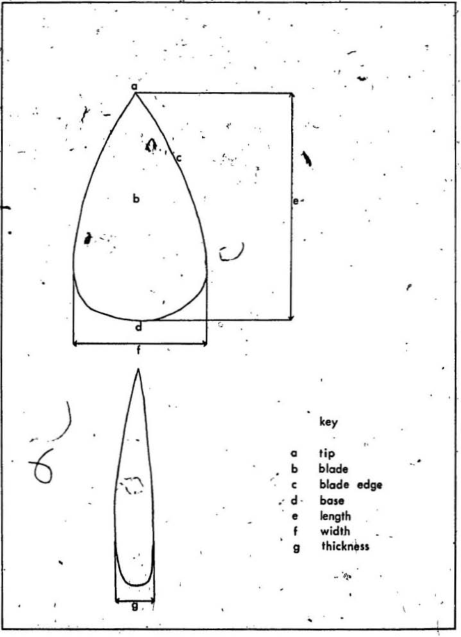


FIGURE 16
BIFACE TERMINOLOGY

Figure 17

Bifaces - BeCs-3

a - triangular biface

b-d - rectangular bifaces

e-g - asymmetric bifaces

h-k - triangular bifaces

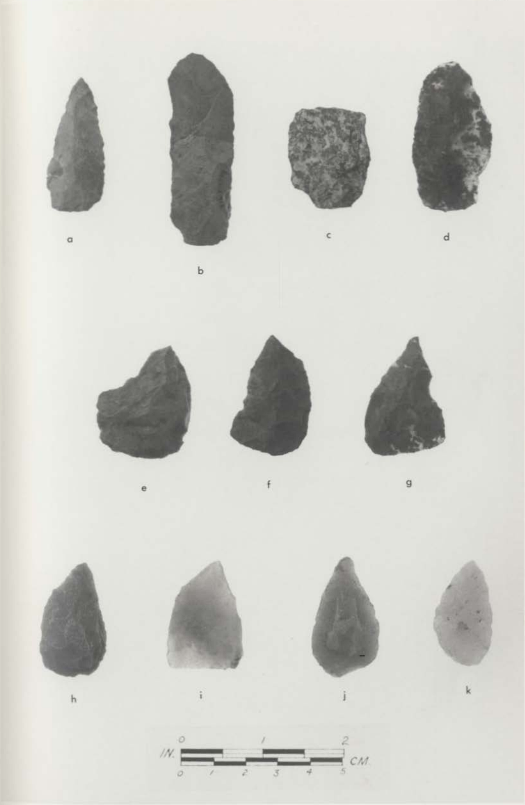

a
b
c
d
e
f
g
h
i
j
k
0 1 2
IN.
CM.
0 1 2 3 4 5

Figure 18

Bifaces - BeCs-3

a - oval biface

b-i - leaf-shaped bifaces

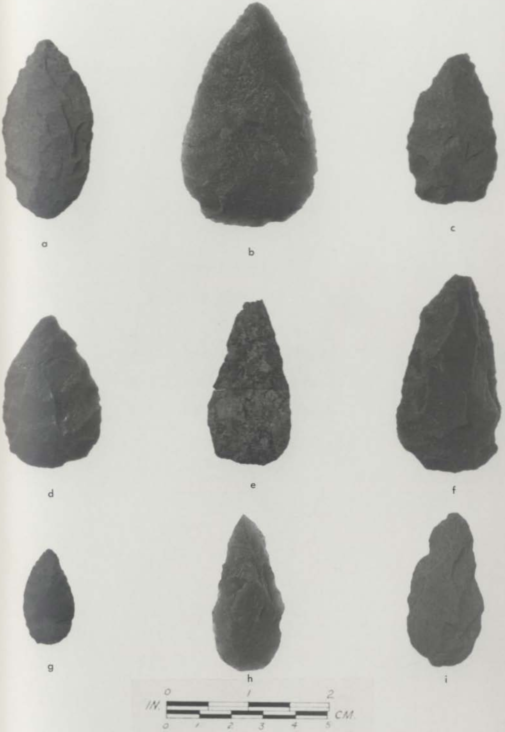

a
b
c
d
e
f
g
h
i
0 1 2
IN.
CM.
0 1 2 3 4 5

Figure 19

Bifaces - BeCs-3

a-f - triangular bifaces

g-j - rectangular bifaces

k-m - lanceolate bifaces


a
b
c
d
e
f
g
h
i
j
k
l
m
IN.
0 1 2
CM.
0 1 2 3 4 5

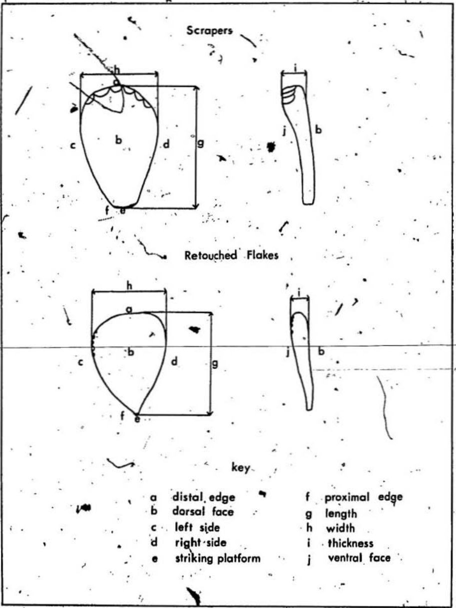


FIGURE 20

SCRAPER AND RETOUCHED FLAKE TERMINOLOGY

Figure 21

Scrapers - BeCs-3

a-d - oval distal edge scrapers

e-i - rectangular distal edge scrapers

j-n - triangular distal edge scrapers

o-s - circular distal edge scrapers


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s
0 1 2
IN.
CM.
0 1 2 3 4 5

Figure 22

Scrapers - BeCs-3

a - oval continuous multiple edge scraper

b-f, i-k - rectangular continuous multiple edge scrapers

g,h - triangular continuous multiple edge scrapers

l-p - circular continuous multiple edge scrapers


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
IN.
0 1 2
CM.
0 1 2 3 4 5

Figure 23

Scrapers - BeCs-3

a,b - circular discontinuous multiple edge scrapers,

c-e - rectangular discontinuous multiple edge scrapers

f - circular opposing face scraper

g - rectangular opposing face scraper


a
b
c
d
e
f
g
IN.
0 1 2
CM.
0 1 2 3 4 5

Figure 24

Non-bipolar Cores - BeCs-3

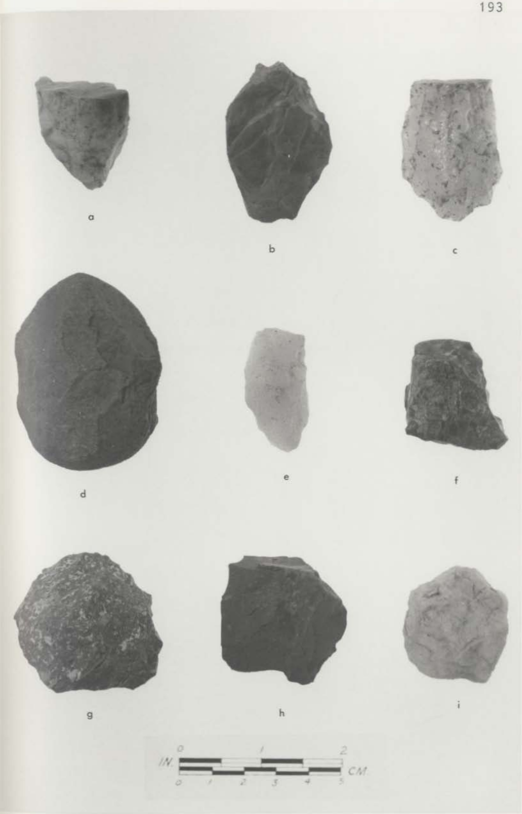

a
b
c
d
e
f
g
h
i
IN.
0
1
2
CM
0
1
2
3
4
5

Figure 25

Bipolar Cores - BeCs-3


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
IN.
0
1
2
CM
0
1
2
3
4
5

Figure 26

Gravers and Ground Stone - BeCs-3

a-c. - gravers

d,e - abrader fragments

f-h - miscellaneous ground stone fragments

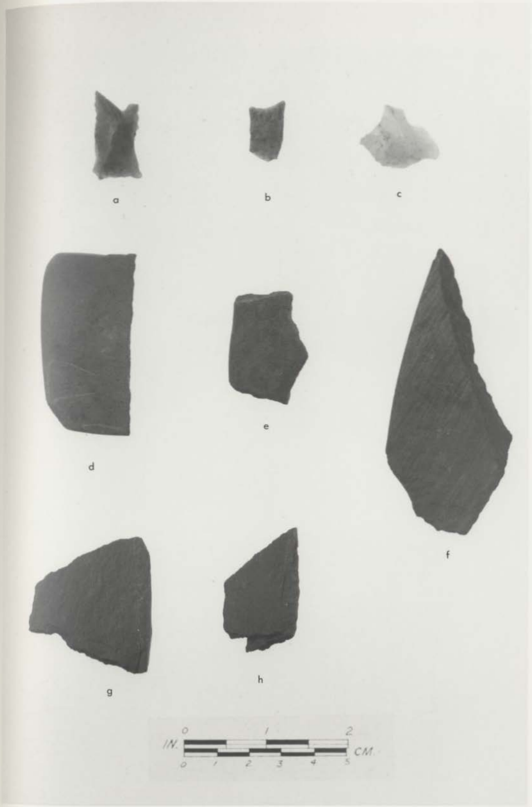

a
b
c
d
e
f
g
h
IN.
0
1
2
CM.
0
1
2
3
4
5

Figure 27

Celts - BeCs-3

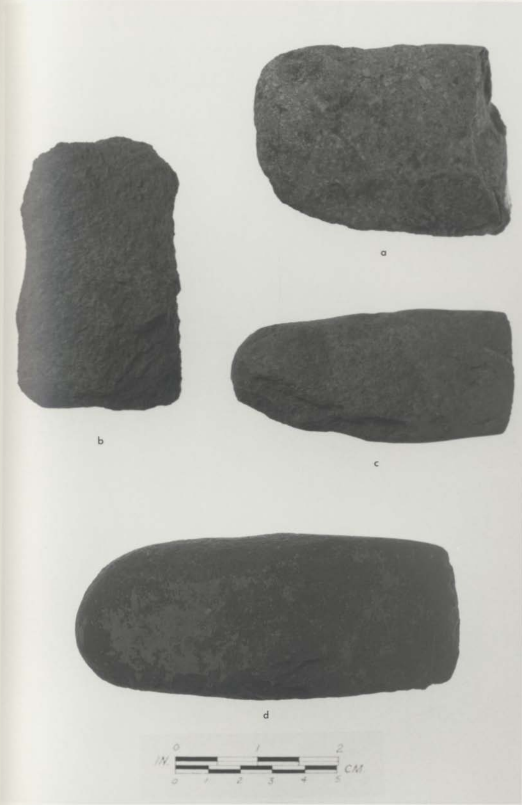

a
b
c
d
0 1 2
IN.
CM
0 1 2 3 4 5

Figure 28

Anvilstone - BeCs-3


IN
CM
0
1
2
3
4
5

Figure 29

Choppers and Hammerstone - BeCs-3

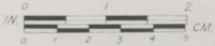
a,b - quartz choppers

c - hammerstone

a

b

c



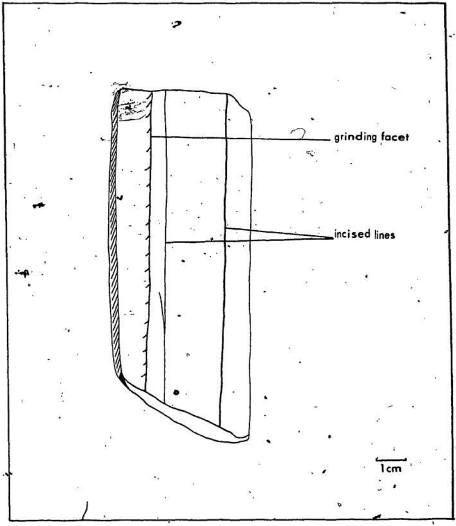


FIGURE 30

INCISED ARTIFACT
BeCs-3

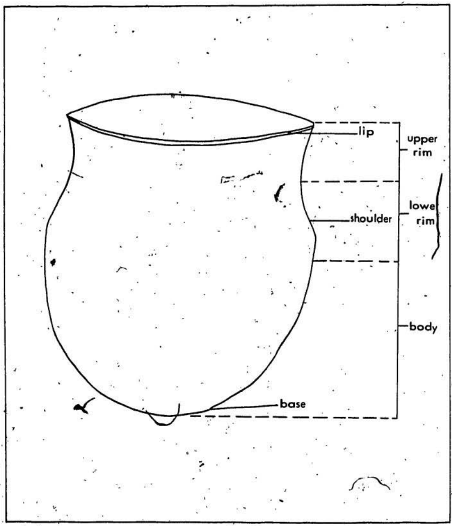


FIGURE 31

CERAMIC VESSEL TERMINOLOGY

(adapted from Keenlyside (1978 : 334))

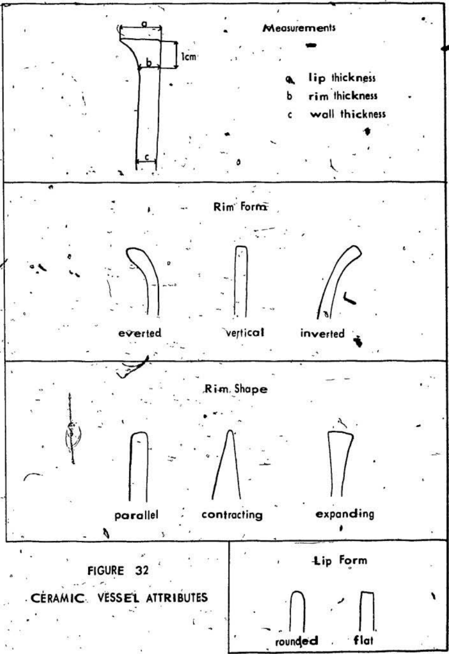


FIGURE 32

CERAMIC VESSEL ATTRIBUTES

Figure 33

Ceramic Vessel Rim Profiles - BeCs-3

* note - The rim profiles are shown so that the exterior wall of the vessel is on the left side.

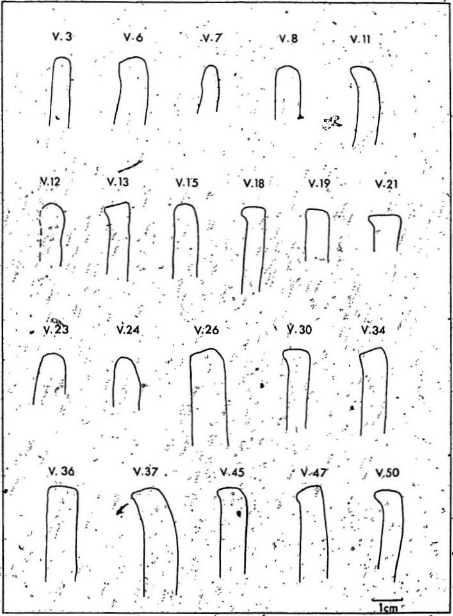


FIGURE 33

CERAMIC VESSEL RIM PROFILES – BeCs-3

Figure 34

Ceramics - BeCs-3

Rim sherd of Vessel 37

showing exterior wall


0 1 2
IN.
CM.
0 1 2 3 4 5

Figure 35

Ceramic Sherds - BeCs-3

a - rim sherd, Vessel 26, exterior

b - rim sherd, Vessel 15, exterior

c - rim sherd, Vessel 50, exterior

a

b

c

Figure 36

Ceramic Sherds - BeCs-3

a - rim sherd, Vessel 47, exterior

b - body sherd, Vessel 26 , exterior

c - rim sherd, Vessel 45, exterior

d - rim sherd, Vessel 30, interior

e - rim sherd, Vessel 34, exterior

f - rim sherd


a
b
c
d
e
f
0 1 2
IN.
CM.
0 1 2 3 4 5

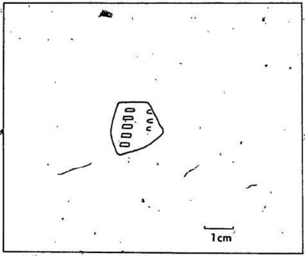


FIGURE 37

CERAMIC VESSEL NUMBER 7, BeCs-3

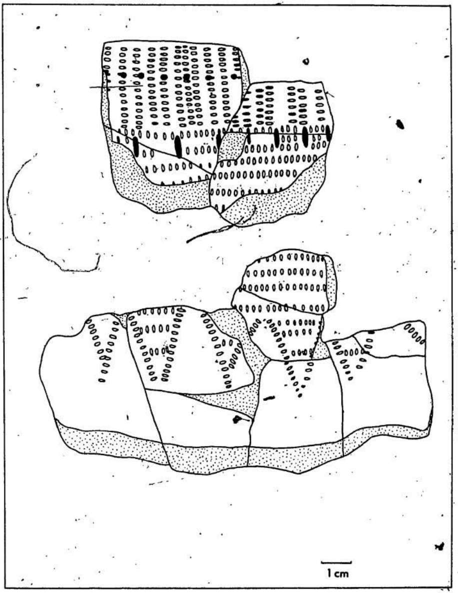


FIGURE 38

CERAMIC VESSEL NUMBER 26, BeCs-3

Figure 39

European Artifacts - BeCs-3

a-d - square shank nails

e - locket portion

f - modified washer

g - glass bead

h - metal button

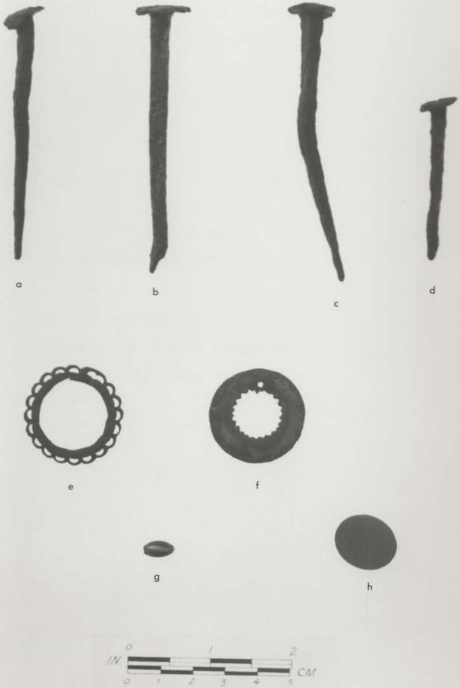

a
b
c
d
e
f
g
h
0
1
2
IN.
CM
0
1
2
3
4
5

Figure 40

European Artifacts - BeCs-3

a-c - ceramics

d-g - pipe bowl fragments

h,i - pipe stem fragments


a
b
c
d
e
f
h
g
i
0 1 2
IN.
CM.
0 1 2 3 4 5

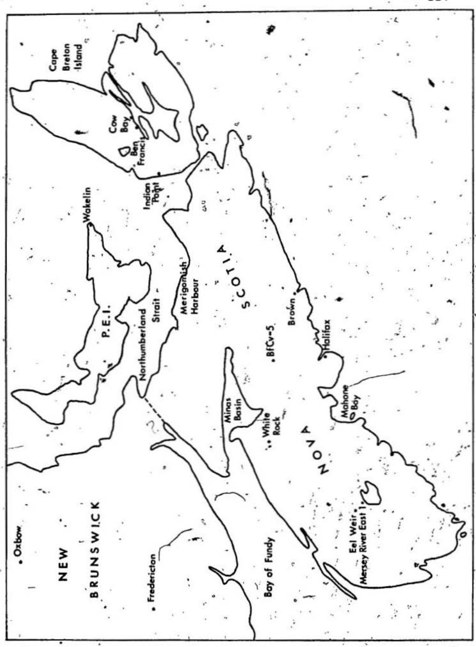


FIGURE 41

The Maritime Provinces

APPENDIX A

PROJECTILE POINT ATTRIBUTES - BeCs-3

APPENDIX A

PROJECTILE POINT ATTRIBUTES - BeCs-3

The terminology used in describing projectile points is illustrated in Figure 9. Most of the projectile point attributes are illustrated in Figure 10. In the following table "catalogue number" refers to the number assigned to the artifact in the field. "Portion" indicates the segment of the point that is available for study; this can be whole; basal, i.e., the tip is missing; medial, i.e., both the tip and base are missing; or tip, i.e., the base is missing. "Serrated edges" refers to the presence of fine pressure flaking along lateral margins of opposing faces that produces a wavy edge. The term "basal thinning" indicates the presence of flaking on the base that results in a reduction of the thickness of the base. All linear measurements were made in millimeters and rounded to the nearest millimeter. "Thickness" refers to the shortest distance between the two blade faces; the maximum thickness of the projectile point is that which was measured. "Index" refers to the index of contraction and expansion that is defined in Chapter 3. The term "material" indicates the type of lithic material from which the point was manufactured. "Figure" refers to the figure in this report in which the point is illustrated.

Abbreviations used in table:

Portion
t = tip
m = medial
b = basal
wh = whole

Blade Edge
cx = convex
st = straight
a = asymmetric

Stem Form
ex = expanding
st = straight
cn = contracting

Base Form
cx = convex
cv = concave
st = straight

Transverse Section
bc = biconvex
pc = plano-convex

Notch Form
nc = narrow corner
ns = narrow side
wc = wide corner
ws = wide side

Shoulder Form
wa = wide angle
na = narrow angle
wr = wide rounded
nr = narrow rounded
a = asymmetric

Barb Form
m = medium
s = short

Material
ch = chalcedony = all cherts and agates
qt = quartzite
qz = quartz
ms = miscellaneous

General

- = portion not available

" " = blank space = not applicable

pr = present

ab = absent

Basal th = basal thinning

Serr edge = serrated edges

Cat no = catalogue number

Tr section = transverse section

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	3	47	110	124	135	189	210	303	305	341	467	596
portion	b	b	b	b	b	b	b	b	b	b	b	b
blade edge	-	-	-	-	cx	cx	-	-	st	-	cx	st
stem form	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex
base form	cx	cx	cx	cx	cx	cv	cx	cx	cx	st	cx	cx
notch form	nc	ns	-	ns	nc	nc	wc	ws	ns	nc	nc	nc
shoulder form		wa	-	wa				wr	na			
barb form	m		-		m	s	s			m	m	s
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	pr	pr	-	-	pr	pr	pr	pr	pr	pr	pr	pr
basal th	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr
length	-	-	-	-	-	-	-	-	-	-	-	-
width	-	15	-	-	27	22	21	21	19	27	26	20
thickness	6	6	-	-	9	4	7	7	4	6	8	6
width neck	13	10	10	19	10	11	11	14	11	11	14	11
width base	16	13	20	21	14	12	15	20	19	16	18	17
index	81.3	76.9	50.0	90.4	71.4	91.6	73.3	70.0	57.9	68.7	77.7	64.7
material	ch	ms	ch	ch	qt	ms	qz	qt	ch	qt	ms	ch
figure												13g

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	712	786	808	919	973	998	1087	1122	1125	1130	1146	6
portion	b	b	b	b	b	b	b	b	b	b	b	wh
blade edge	-	-	-	-	-	-	-	-	-	-	-	cx
stem form	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex	ex
base form	cx	cx	cx	-	cx	cv	cx	cx	cx	cx	cv	cx
notch form	nc	-	-	wc	ns	-	-	-	-	-	-	ws
shoulder form		-	-	wa		-	-	-	-	-	-	wa
barb form	s	-	-		s	-	-	-	-	-	-	
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	ab	-	-	pr	ab	-	-	-	-	-	-	pr
basal th	pr	pr	pr	-	pr	pr	pr	pr	pr	pr	pr	pr
length	-	-	-	-	-	-	-	-	-	-	-	31
width	17	-	-	19	21	-	-	-	-	-	-	12
thickness	6	-	-	5	7	-	-	-	-	-	-	5
width neck	13	12	13	13	12	11	9	8	11	9	9	7
width base	15	21	18	16	18	19	19	16	20	15	11	10
index	86.6	57.1	72.2	81.2	66.6	57.8	47.3	50.0	55.0	60.0	81.8	70.0
material	ch	ch	qt	ch	qt	ch	ch	ch	ch	ch	ms	qz
figure												14k

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	29	123	125	142	178	183	186	205	252	322	371	385
portion	b	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
blade edge	cx	st	a	st	st	cx	a	cx	cx	st	st	st
stem form	ex	ex	ex	ex	st	ex	ex	ex	ex	ex	ex	ex
base form	cx	cx	cv	st	cx	cx	cx	cx	cx	st	st	st
notch form	wc	nc	ws	ws	nc	nc	nc	nc	nc	wc	wc	ws
shoulder form	wa		na	wa			a			na	wr	wa
barb form		m			m	m		s	s			
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr
basal th	pr	pr	pr	pr	pr	pr	pr	ab	pr	pr	pr	pr
length	-	70	41	40	53	54	41	48	-	35	46	34
width	20	32	19	18	25	23	18	17	20	26	21	17
thickness	6	8	6	5	8	5	5	5	7	9	7	6
width neck	10	11	11	12	13	11	10	8	9	9	10	14
width base	18	19	16	15	13	16	14	15	11	12	15	16
index	55.5	57.9	68.7	80.0	100.0	68.7	71.4	53.3	81.8	75.0	66.6	87.5
material	qz	qt	ch	ms	ch	ch	ch	qt	ch	ch	qt	qt
figure	14a	13a	14e	14f	13e	13b	14h	13l	13h	14d	13j	14m

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	451	462	481	580	589	595	609	631	637	673	678	736
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
blade edge	cx	st	a	cx	a	a	st	cx	a	a	cx	st
stem form	ex	ex	ex	ex	ex	st	ex	ex	ex	ex	ex	ex
base form	cx	cx	st	cv	cv	cx	cx	cx	cx	cx	-	cv
notch form	ns	ws	wc	wc	wc	wc	wc	nc	nc	wc	nc	wc
shoulder form	na	wa		wa		wa	wa					
barb form			s		s			s	s	s	m	s
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr
basal th	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr
length	-	34	33	34	42	27	28	30	31	48	35	-
width	15	15	16	17	15	13	12	20	18	15	22	22
thickness	5	5	5	4	7	5	5	5	6	6	5	8
width neck	7	12	7	10	8	8	8	9	11	7	10	13
width base	15	13	12	13	10	8	9	14	13	8	14	15
index	46.6	92.3	58.3	76.9	80.0	100.0	88.8	64.2	84.6	87.5	71.4	86.6
material	ch	ch	ch	ch	ch	qz	qz	ch	qt	ms	ms	ch
figure	15d	14i	15c	15a	14b		14l	14o	15b	13i	13f	14n

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	742	789	809	811	948	1000	21	559	619	620	691	740
portion	wh	wh	wh	wh	wh	wh	b	b	b	m	b	m
blade edge	cx	st	a	a	cx	a	-	-	a	st	-	a
stem form	ex	ex	ex	ex	ex	ex	ex	ex	ex	-	ex	ex
base form	cx	st	cx	cx	cv	cx	-	cv	-	-	cx	-
notch form	nc	wc	nc	ns	wc	ws	nc	nc	wc	-	nc	ws
shoulder form		na		na	na	wr		-	wa			wa
barb form	s		s				s	s		s	s	
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	pc
serr edge		pr	pr	pr	ab	pr		-	pr	pr	pr	pr
basal th		pr	pr	pr	pr	pr		-	pr	-	pr	-
length	34	37	-	39	-	58	-	-	-	-	-	-
width	24	20	16	19	17	22	27	-	30	19	22	16
thickness	7	6	4	7	8	9	6	-	9	6	6	5
width neck	9	10	8	11	11	18	19	11	12	9	-	-
width base	11	19	13	14	16	20	-	-	-	-	-	-
index	81.8	52.6	61.5	78.5	68.7	90.0	-	-	-	-	-	-
material	ch	qt	ch	qt	ch	qt	ch	qz	qt	qt	ch	ch
figure	15e	13k	14j	14g	14p	13d						

Appendix A

Projectile Point Attributes - BeCs-3

cat. no.	785	1024	1143	95	209	264	324	444	507	600	633	676
portion	b	b	m	t	t	wh	t	m	wh	m	wh	wh
blade edge	-	-	-	cx	a	cx	cx	cx	cx	st	cx	cx
stem form	-	ex	-	-	ex	st	st	-	ex	-	ex	ex
base form	-	st	-	-	-	-	-	-	-	-	cv	-
notch form	-	-	-	-	nc	wc	wc	nc	wc	-	ns	nc
shoulder form						wa	nr		wa			
barb form	s	-	s	s	s			m		s	s	s
tr section	bc	-	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	-	-	pr	pr	pr	pr	pr	pr	pr	pr	pr	pr
basal th	pr	pr	-	-	-	pr	-	-	-	-	-	pr
length	-	-	-	-	-	38	-	-	-	-	38	41
width	-	-	-	14	19	16	18	31	15	20	20	20
thickness	-	-	4	7	5	5	6	6	5	5	4	6
width neck	11	-	9	7	10	-	11	15	8	10	11	10
width base	-	18	-	-	-	-	-	-	-	-	-	-
index	-	-	-	-	-	-	-	-	-	-	-	-
material	ch	qz	ch	qz	qz	qt	qt	qt	qt	ch	ch	ch
figure											13m	14c

Appendix A
Projectile Point Attributes - BeCs-3

cat. no.	851	856	953	455	657
portion	wh	wh	wh	wh	wh
blade edge	a	cx	cx	st	cx
stem form	-	ex	ex	cn	cn
base form	-	cx	-	cx	cx
notch form	nc	nc	wc	wc	wc
shoulder form				wr	wr
barb form	m	s	s		
tr section	bc	bc	bc	bc	bc
serr edge	pr	pr	pr	ab	ab
basal th	-	pr	-	pr	pr
length	33	53	-	51	54
width	23	28	20	20	23
thickness	6	7	5	6	9
width neck	11	17	8	17	16
width base	-	-	-	11	10
index	-	-	-	154.5	160.0
material	ch	qt	ch	ch	qt
figure		13c		15f	15g

APPENDIX B

BIFACE ATTRIBUTES - BeCs-3

APPENDIX B

BIFACE ATTRIBUTES - BeCs-3

The terminology used to describe bifaces is illustrated in Figure 16. The points from which the measurements of length, width and thickness were taken also are illustrated in this figure. All linear measurements are in millimeters.

In the following table the term "catalogue number" refers to the number that was assigned to the artifact in the field. The term "finish" refers to the degree to which the artifact appears to have been completed, i.e., whether it appears to be incompletely or completely finished or is a preform. "General shape" indicates the overall shape of the biface whether it be lanceolate, rectangular, oval, etc. The shape of the blade edges and the form of the base and tip also are noted. Blade edges are convex, asymmetric or straight; bases can be convex, concave or straight; and tips can be either pointed or rounded. The term "transverse section" indicates the shape of the cross-section of the width of the artifact. The presence of serrated edges, as defined in Appendix A, was noted as was the presence of stems and cortex. "Material" refers to the type of lithic material of which the artifact is composed and the term "Figure" indicates the photograph in which the artifact is illustrated.

Abbreviations used in table:

Finish
c = completely finished
ic = incompletely finished
p = preform

General Shape
tr = triangular
ls = leaf-shaped
r = rectangular
la = lanceolate
o = oval
a = asymmetric

Blade Edge
cx = convex
st = straight
a = asymmetric

Base Form
cx = convex
cv = concave
st = straight

Tip Form
pt = pointed
ro = rounded

Transverse Section
bc = biconvex
pc = plano-convex

Material
qt = quartzite
qz = quartz
ch = chalcedony = all cherts and agates

General
pr = present
ab = absent
- = portion not available
" "= blank space = not applicable
gen shape = general shape
tr section = transverse section
serr edge = serrated edges

Appendix B
Biface Attributes - BeCs-3

cat. no.	176	967	138	10	756	57	987	837	30	626	45	472
finish	c	c	c	c	ic	c	c	c	ic	ic	c	c
gen shape	tr	tr	ls	ls	tr	tr	tr	tr	r	tr	tr	tr
blade edge	cx	cx	cx	cx	a	st	st	st	cx	a	a	cx
base form	cx	-	cx	cx	cx	cx	st	cv	cx	cx	st	st
tip form	pt	pt	pt	pt	pt	pt	pt	pt	ro	pt	pt	pt
tr section	bc	bc	bc	bc	bc	bc	bc	bc	pc	bc	bc	bc
serr edge	pr	pr	pr	pr	ab	pr	pr	pr	ab	ab	pr	pr
stem	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	38	42	50	47	36	37	32	34	58	38	34	26
width	20	-	26	30	20	23	21	-	24	21	-	16
thickness	10	7	7	7	10	8	7	7	11	10	5	5
material	qt	ch	ch	qt	qt	ch	ch	qt	qt	qt	ch	ch
figure	19d		18e	18d	17h	19e	19a		19h	17j	17i	19b

Appendix B

Biface Attributes - BeCs-3

cat. no.	204	66	642	985	958	281	915	22	179	989	954	831
finish	ic	c	p	c	c	c	c	c	c	c	ic	ic
gen shape	ls	tr	r	tr	tr	r	r	la	la	la	r	r
blade edge	cx	a	cx	cx	a	a	st	cx	cx	cx	cx	a
base form	cx	cx	cx	cx	cx	cx	st	st	st	st	cx	cx
tip form	pt	pt	ro	pt	pt	ro	ro	pt	pt	pt	ro	ro
tr section	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	ab	ab	ab	pr	pr	pr	pr	pr	ab	ab	ab	ab
stem	ab	ab	ab	ab	pr	pr	pr	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	57	32	52	21	41	47	59	56	60	45	38	45
width	-	18	32	15	18	24	20	26	24	18	29	19
thickness	10	7	20	5	8	8	8	9	9	10	10	10
material	qt	qz	ch	ch	ch	ch	ch	ch	ch	ch	ch	qz
figure		17k	19i	19c	17a	17d	17b	19l	19m	19k	19j	19g

Appendix B
Biface Attributes - BeCs-3

cat. no.	31	1045	191	72	789	1007	592	187	430	70	127	688
finish	ic	c	c	c	c	ic	c	ic	c	ic	ic	ic
gen shape	r	a	a	a	tr	o	ls	ls	ls	ls	ls	ls
blade edge	a	a	a	a	cx	cx	cx	cx	cx	cx	cx	cx
base form	cx	-	-	cx	cx	cx	cx	cx	cx	cx	cx	cx
tip form	ro	pt	pt	pt	-	ro	pt	pt	-	pt	ro	pt
tr section	bc	pc	pc	pc	bc	bc	bc	bc	bc	bc	bc	bc
serr edge	ab	pr	ab	ab	ab	ab	pr	ab	ab	pr	ab	ab
stem	pr	-	-	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	pr	ab	ab	ab	pr
length	32	36	35	35	34	54	69	60	46	69	48	48
width	25	23	25	29	24	28	42	32	28	31	31	23
thickness	8	8	7	10	6	14	9	16	9	12	13	7
material	ch	ch	ch	ch	qt	ch	qt	qt	qt	ch	ch	ch
figure	17c	17f	17g	17e	19f	18a	18b	18f	18c			18i

Appendix B
Biface Attributes - BeCs-3

cat. no.	975	254	349	852
finish	c	c	c	ic
gen shape	ls	ls	ls	ls
blade edge	cx	cx	cx	cx
base form	cx	cx	cx	cx
tip form	pt	pt	-	pt
tr section	bc	bc	bc	bc
serr edge	pr	ab	ab	ab
stem	ab	ab	ab	ab
cortex	ab	ab	ab	pr
length	29	49	-	52
width	16	23	31	40
thickness	4	8	9	27
material	ch	qt	qt	ch
figure	18g	18h		

APPENDIX C

SCRAPER ATTRIBUTES - BeCs-3

APPENDIX C

SCRAPER ATTRIBUTES - BeCs-3

Figure 20 illustrates the terminology used in the description of scrapers. In the following table all linear measurements are in millimeters. The term "catalogue number" refers to the number that was assigned to the artifact in the field. "Portion" refers to the part of the artifact that is available for study, i.e., either the entire artifact or only a fragment. The term "general shape" indicates the overall outline of the artifact. "Retouch-face" refers to the face of the scraper upon which the retouch is located; "retouch-shape" refers to the shape of the retouched edge of the scraper, whether it be convex, concave or straight; "retouch-edge" refers to which lateral margin or margins of the scraper that exhibits the retouch; and "retouch-continuity" refers to whether the retouch is continuous or is disrupted by unretouched areas. The term "biface thinning" indicates whether the scraper is made from a biface thinning flake. "Cortex" indicates whether a portion of the scraper exhibits the weathered exterior of the lithic material. "Material" refers to the type of lithic material from which the scraper was manufactured and the term "figure" indicates the photograph in which the artifact is illustrated.

Abbreviations used in table:

Portion

wh = whole

fr = fragment

General Shape

c = circular

tr = triangular

re = rectangular

ov = oval

Retouch-Face

d = dorsal

v = ventral

Retouch-Shape

scx = slightly convex

mcx = moderately convex

hcx = highly convex

st = straight

Retouch-Continuity

c = continuous

dc = discontinuous

opp = on opposing faces

Retouch-Edge

d = distal

r = right

l = left

p = proximal

a = all

Material

ch = chalcedony = all cherts and agates

qz = quartz

ms = miscellaneous

General

ab = absent

pr = present

- = portion not available

" " = blank space = not applicable

cat. no. = catalogue number

gen shape = general shape

retouch-cont = retouch-continuity

biface th = biface thinning

Appendix C
Scraper Attributes - BeCs-3

cat. no.	790	721	108	1092	639	325	92	545	1124	456	302	643
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	tr	re	re	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	scx	mcx	scx	scx	mcx	scx	mcx	scx	scx	mcx	mcx	mcx
retouch-edge	d	d	d	d	d	d	l	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	pr	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	28	19	18	13	16	27	17	16	11	33	28	16
width	24	16	20	18	16	23	21	13	16	24	16	20
thickness	9	5	3	4	3	7	5	3	3	6	5	4
material	ch	ch	ch	ch	ch	qz	ch	ch	ch	ch	ms	ch
figure					21i					21e		

Appendix C

Scraper Attributes - BeCs-3

cat. no.	85	326	58	720	44	253	1123	895	535	591	211	368
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	scx	scx	mcx	scx	mcx	mcx	scx	scx	scx	scx	mcx
retouch-edge	r	d	d	d	l,d	d	d,p	d	d	d	d	d,r
retouch-cont	c	c	c	c	c	c	dc	c	c	c	c	c
biface th	ab	pr	ab	pr	ab	ab	ab	ab	ab	ab	ab	pr
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	24	15	20	15	12	21	16	14	15	16	18	25
width	39	19	20	20	18	15	14	15	15	18	18	15
thickness	8	6	5	3	5	4	4	3	6	3	4	6
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure		21g			22d	21f	23d					22k

Appendix C

Scraper Attributes - BeCs-3

cat. no.	261	40	450	190	647	394	1144	249	309	773	49	795
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d	d	v	d	d	d
retouch-shape	mcx	mcx	mcx	mcx	mcx	mcx	mcx	mcx	mcx	scx	scx	mcx
retouch-edge	d	d	d	d	d,p	l	d	d	d	d	d	d
retouch-cont	c	c	c	c	dc	c	c	c	c	c	c	c
biface th	ab	ab	pr	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	26	26	23	24	19	16	13	15	22	11	13	17
width	20	20	18	20	15	24	15	16	21	13	13	18
thickness	6	5	4	5	4	6	3	6	6	3	2	5
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure					23e			21h				

Appendix C

Scraper Attributes - BeCs-3

cat. no.	894	76	660	638	145	888	582	93	466	200	731	588
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	scx	mcx	scx	scx	scx	scx	scx	scx	scx	mcx	mcx	mcx
retouch-edge	d	d	d	d	d	d	l,d	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	18	25	23	20	17	20	16	12	19	17	15	19
width	23	23	27	18	17	20	20	18	11	16	18	20
thickness	3	9	10	4	4	5	5	4	7	4	4	4
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure				21k			22g	21n				

Appendix C

Scraper Attributes - BeCs-3

cat. no.	275	806	871	459	83	160	653	606	617	213	548	605
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	mcx	mcx	scx	mcx	scx	scx	scx	scx	scx	scx	scx
retouch-edge	l	d	d	d	d	l,d	d	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	22	20	17	16	22	25	16	23	20	21	22	18
width	15	19	18	17	18	29	19	22	20	17	16	15
thickness	7	5	5	3	4	6	6	6	4	5	5	3
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure					21j	22h						

Appendix C

Scraper Attributes - BeCs-3

cat. no.	687	67	741	69	874	937	665	788	1113	131	560	940
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	scx	scx	mcx	scx	mcx	scx	mcx	scx	scx	mcx	mcx	scx
retouch-edge	d	d	d	d	d	d	d	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	23	22	18	15	20	21	29	18	9	16	15	19
width	25	26	16	20	19	19	25	19	13	14	16	19
thickness	5	7	5	5	6	6	5	4	2	6	3	3
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure		21l				21m						

Appendix C

Scraper Attributes - BeCs-3

cat. no.	524	766	698	562	690	613	347	107	737	911	447	997
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	tr	tr	tr	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	mcx	st	scx	mcx	scx	mcx	mcx	st	mcx	mcx	mcx
retouch-edge	d	d	d	d	d	d	d	d,r	d	d	d	d,r
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	pr	ab	ab	pr	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	22	16	12	15	15	10	23	15	17	19	15	17
width	16	20	10	18	16	19	15	19	22	20	21	14
thickness	8	4	3	5	4	3	5	5	9	5	5	5
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure								22c				22i

Appendix C

Scraper Attributes - BeCs-3

cat. no.	77	926	569	432	133	479	382	215	1069	830	674	388
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	scx	scx	mcx	scx	mcx	mcx	scx	mcx	scx	scx	scx	st
retouch-edge	d	d	d	d	d	d	d,p	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	dc	c	c	c	c	c
biface th.	pr	ab	ab	ab	ab	ab	ab	ab	pr	pr	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	pr
length	16	22	15	29	21	27	22	20	25	14	16	25
width	21	15	16	26	14	20	23	14	13	16	21	28
thickness	4	5	4	6	6	5	6	6	7	3	4	6
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	qz
figure							23c					

Appendix C

Scraper Attributes - BeCs-3

cat. no.	707	306	207	549	448	1048	511	541	854	824	392	446
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	re	re	re	re	re	re	re
retouch-face	d	d	d	d	d	d	d,v	d	d	d	d	d
retouch-shape	scx	mcx	st	mcx	scx	mcx	mcx	mcx	mcx	mcx	mcx	mcx
retouch-edge	d	d	d	d	d,r	d	d,p	d	d	d	d	l,d
retouch-cont	c	c	c	c	c	c	opp	c	c	c	c	c
biface th	ab	ab	ab	ab	pr	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	13	23	15	29	17	12	20	25	21	22	21	25
width	20	18	17	16	20	21	17	21	21	23	16	24
thickness	4	6	4	5	4	3	6	5	7	7	5	8
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	qz
figure					22f		23f					22b

Appendix C

Scraper Attributes - BeCs-3

cat. no.	689	212	429	739	510	685	486	1090	583	366	216	364
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	c	c	c	c	c	tr	tr
retouch-face	d	d	d	d	d	d	d	d	d,v	d	d	d
retouch-shape	mcx	mcx	mcx	mcx	scx	mcx	st	scx	scx	scx	scx	st
retouch-edge	d	d,r	d	d	d	d	l	d,r	d,r	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	opp	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	31	23	15	16	13	15	21	24	18	16	27	14
width	21	27	19	16	18	12	21	19	21	17	26	17
thickness	8	8	3	3	4	5	8	6	6	4	8	4
material	ch	ch	ch	ch	ch	ch	ch	qz	ch	ch	ch	ch
figure		22j						22o	23g			

Appendix C

Scraper Attributes - BeCs-3

cat. no.	544	934	484	599	523	939	672	656	395	655	163	156
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr	tr
retouch-face	d	d	d	d	d	d	d	d	d	d	v	d
retouch-shape	scx	mcx	scx	mcx	mcx	scx	mcx	mcx	mcx	mcx	scx	scx
retouch-edge	d	d	d	d	d	d	d	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	13	21	18	25	21	28	19	21	21	20	21	25
width	17	16	21	24	19	25	19	16	20	21	16	26
thickness	5	6	5	5	3	4	4	5	6	6	5	9
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure												

Appendix C

Scraper Attributes - BeCs-3

cat. no.	184	469	659	960	89	48	879	611	959	75	649	946
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	c	c	c	c	c	c	c	c	c	c	c	c
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	scx	mcx	mcx	scx	mcx	mcx	hcx	mcx	mcx	mcx	mcx	mcx
retouch-edge	d	d,r,p	d,p	d	d	a	d,r	d	d,r	d	d	l
retouch-cont	c	c	dc	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	pr	ab	ab	pr	ab	ab	ab	ab	ab	a
length	20	24	22	26	23	23	23	22	20	20	19	22
width	21	27	25	25	25	21	21	21	22	23	21	23
thickness	6	7	7	7	5	7	6	10	5	6	6	6
material	ch	ch	qz	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure		22m	23a				22l	21p				

Appendix C

Scraper Attributes - BeCs-3

cat. no.	386	473	506	612	933	265	586	416	682	575	255	206
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	c	c	c	c	c	c	c	c	c	c	c	c
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	st	scx	scx	scx	scx	mcx	mcx	mcx	mcx	mcx	scx	mcx
retouch-edge	d	d,p	d	d	l,d	d	d	d	r	d	d	d
retouch-cont	c	dc	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	pr	ab	ab	ab	ab	pr	ab	ab
length	20	16	14	16	13	23	24	19	24	19	13	22
width	16	18	17	16	13	24	24	19	21	18	17	21
thickness	5	5	4	7	4	7	6	8	5	6	5	5
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch
figure		23b						21q		21r		

Appendix C
Scraper Attributes - BeCs-3

cat. no.	512	96	452	4	342	453	629	79	632	683	129	807
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	c	c	c	c	c	c	c	c	c	c	c	c
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	scx	scx	scx	mcx	scx	mcx	scx	scx	scx	scx	scx
retouch-edge	d,r	d	d	d	d	d	d	a	d	d	l	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	pr
cortex	ab	ab	ab	ab	ab	ab	ab	pr	ab	ab	ab	ab
length	24	19	22	19	20	21	14	16	18	22	21	13
width	23	21	23	23	16	20	16	18	17	23	22	17
thickness	5	7	7	5	5	5	5	7	4	8	4	3
material	ch	ch	ch	ch	ch	ch	ch	qz	ch	ch	ms	ch
figure	22n							22p				

Appendix C

Scraper Attributes - BeCs-3

cat. no.	146	471	825	278	188	932	991	540	501	938	574	404
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	c	c	c	c	c	c	c	c	c	c	c	c
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	mcx	mcx	scx	mcx	mcx	mcx	scx	mcx	mcx	mcx	mcx
retouch-edge	d	d	d	d	d	d	d	d	l,d	d	d	r
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	pr	ab	ab	pr	ab	pr	ab	pr	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	18	18	17	15	20	18	17	17	19	20	17	17
width	20	19	18	19	17	19	13	20	19	23	15	14
thickness	6	5	5	5	5	7	6	5	6	4	5	4
material	ch	ch	ch	ch	qz	ch	ch	ch	ch	ch	ch	ch
figure		21s							21o			

Appendix C

Scraper Attributes - BeCs-3

cat. no.	684	530	627	162	584	147	27	482	732	645	636	219
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	c	c	c	c	c	c	c	c	c	re	re	re
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	mcx	mcx	mcx	mcx	mcx	mcx	scx	mcx	scx	scx	mcx
retouch-edge	d	d	r	l	d	d	r	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	pr	ab	ab	pr	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	25	18	17	15	22	15	19	21	23	20	21	16
width	21	17	20	15	23	13	21	21	24	23	18	17
thickness	7	6	5	4	7	5	4	4	7	6	6	5
material	ch	ch	ch	ms	ch	ch	ch	qz	ch	ch	ch	ch
figure												

Appendix C

Scraper Attributes - BeCs-3

cat. no.	931	723	297	1006	1004	658	271	214	181	198	426	861
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
gen shape	re	re	re	re	re	re	re	re	re	ov	ov	ov
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	mcx	scx	scx	scx	scx	scx	scx	mcx	scx	mcx	mcx	mcx
retouch-edge	d	d	l,d	d	l	d	d	d	d	d	d	d
retouch-cont	c	c	c	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	17	18	20	24	18	15	17	24	13	29	29	31
width	17	14	23	19	17	17	19	19	18	23	23	22
thickness	5	4	4	6	3	3	6	5	6	8	6	5
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ms
figure			22e								21c	21d

Appendix C
Scraper Attributes - BeCs-3

cat. no.	65	630	570	876	1104	607	867	461	587	769	776	1061
portion	wh	wh	wh	fr	fr	fr	fr	fr	fr	fr	fr	fr
gen shape	ov	ov	ov	-	-	-	-	-	-	-	-	-
retouch-face	d	d	d	-	-	-	-	-	-	-	-	-
retouch-shape	mcx	mcx	mcx	-	-	-	-	-	-	-	-	-
retouch-edge	p,l,d	d	d	-	-	-	-	-	-	-	-	-
retouch-cont	c	c	c	-	-	-	-	-	-	-	-	-
biface th	ab	ab	ab	-	-	-	-	-	-	-	-	-
cortex	ab	ab	ab	-	-	-	-	-	-	-	-	-
length	29	27	31	-	-	-	-	-	-	-	-	-
width	22	22	24	-	-	-	-	-	-	-	-	-
thickness	7	8	7	-	-	-	-	-	-	-	-	-
material	ch	ch	ch	ch	ch	ch	qz	ch	ch	ch	ch	ch
figure	22a	21a	21b									

Appendix C

Scraper Attributes - BeCs-3

cat. no.	1095	1062	1110	266	675	1088	778	547	1121	563	964	525
portion	fr	fr	fr	fr	fr	fr	fr	fr	fr	fr	fr	fr
gen shape	-	-	-	-	-	-	-	-	-	-	-	-
retouch-face	-	-	-	-	-	-	-	-	-	-	-	-
retouch-shape	-	-	-	-	-	-	-	-	-	-	-	-
retouch-edge	-	-	-	-	-	-	-	-	-	-	-	-
retouch-cont	-	-	-	-	-	-	-	-	-	-	-	-
biface th	-	-	-	-	-	-	-	-	-	-	-	-
cortex	-	-	-	-	-	-	-	-	-	-	-	-
length	-	-	-	-	-	-	-	-	-	-	-	-
width	-	-	-	-	-	-	-	-	-	-	-	-
thickness	-	-	-	-	-	-	-	-	-	-	-	-
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ms	ms
figure												

APPENDIX D

RETOUCHED FLAKE ATTRIBUTES - BeCs-3

APPENDIX D

RETOUCHED FLAKE ATTRIBUTES - BeCs-3

The terminology used to describe retouched flakes is illustrated in Figure 20. Measurements of length, width and thickness that appear in the following table are in millimeters. In this table the term "catalogue number" refers to the number that was assigned to the retouched flake in the field. "Portion" refers to the part of the artifact that is available for study, i.e., either the entire artifact or only a fragment. "Retouch-face" refers to the face of the retouched flake that exhibits the retouch; "retouch-shape" refers to the shape of the retouched edge of the flake; "retouch-edge" refers to the edge of the flake that exhibits the retouch; and "retouch-continuity" refers to whether the retouch is continuous or is disrupted by unretouched areas. The term "biface thinning" indicates whether the flake is made from a biface thinning flake. "Cortex indicates whether a portion of the flake exhibits the weathered exterior of the lithic material and "material" refers to the type of lithic material from which the flake was made.

Abbreviations used in table:

Portion

wh = whole

fr = fragment

Retouch-Face

d = dorsal

v = ventral

Retouch-Shape

cs = convex or straight

cv = concave

Retouch-Edge

d = distal

l = left

r = right

p = proximal

Retouch-Continuity

c = continuous

dc = discontinuous

Material

ch = chalcedony = all cherts and agates

qt = quartzite

qz = quartz

ms = miscellaneous

General

ab = absent

pr = present

- = portion not available

cat. no. = catalogue number

retouch-cont = retouch-continuity

biface th = biface thinning flake

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	361	1106	697	974	1074	1029	1080	610	1134	1083	174	1027
portion	wh	wh	wh	wh	wh	wh	wh	fr	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	d	-	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	-	cs	cs	cs	cv
retouch-edge	d	d	l,r	l,d	d	r	r	-	d	d	r,d,l	l
retouch-cont	c	c	dc	c	c	c	c	-	c	c	d	c
biface th	pr	ab	ab	ab	ab	ab	ab	-	ab	ab	ab	ab
cortex	ab	pr	ab	ab	ab	ab	ab	pr	ab	ab	ab	ab
length	22	54	36	28	33	24	25	-	38	39	52	26
width	26	44	35	32	29	24	18	-	18	27	24	20
thickness	4	14	9	8	6	8	4	-	4	10	9	5
material	ch	qt	ch	ch	ch	ch	ch	qt	qt	qz	ms	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1119	941	1068	1035	141	665	1060	1028	478	515	384	1036
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	d	l,d,r	l,d,r	l,d,r	d	l,d,r	d	l,d,r	l,r	d	d	[illegible]
retouch-cont	c	c	c	dc	c	dc	c	c	dc	c	c	c
biface th	ab	ab	ab	ab	pr	ab	ab	ab	pr	pr	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	14	23	25	24	45	36	34	20	21	18	22	26
width	24	12	17	35	17	26	25	16	24	20	21	12
thickness	5	3	7	6	12	6	6	5	5	4	5	3
material	ch	ch	ch	ch	qt	ch	ch	ch	ch	ch	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1044	1032	1137	100	1133	1131	885	893	792	474	784	870
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d,v	d	d	d	d	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	d	d	l	l,d,r	d	d	l,r	l	d	r	d	d
retouch-cont	c	c	c	dc	c	c	dc	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	ab	pr	pr	pr	ab	ab
cortex	ab	ab	ab	ab	ab	pr	ab	ab	ab	ab	ab	ab
length	19	16	23	30	15	32	40	24	29	15	12	22
width	22	24	13	23	25	16	28	18	14	20	18	23
thickness	5	5	5	9	5	6	10	3	4	3	3	5
material	ch	qt	ch	ch	ch	qz	ch	ch	ch	ch	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1139	727	791	774	881	196	1023	585	1056	1077	603	1101
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	l,d,r	l	d,r	d	d	l,d,r	l	l,d,r	l	l,r	r	l,r
retouch-cont	dc	c	dc	c	c	c	c	c	c	dc	c	dc
biface th	ab	ab	ab	pr	ab	ab	ab	ab	pr	ab	ab	pr
cortex	ab	ab	pr	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	27	34	29	20	23	20	29	27	21	22	30	17
width	18	21	24	18	14	20	23	22	18	16	13	18
thickness	4	4	7	3	6	3	4	7	4	4	7	6
material	ch	ch	ch	ch	ch	ch	ch	ch	ms	ch	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1058	719	1093	984	1097	1115	942	1086	955	917	604	1091
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	d	v	d	d	d	d
retouch-shape	cs	cv	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	d	r	l,r	r	d	d	r	d	l,d	d	d	d
retouch-cont	c	c	dc	c	c	c	c	c	c	c	c	c
biface th	ab	ab	ab	ab	ab	ab	pr	ab	ab	ab	ab	ab
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	20	33	27	20	13	15	24	14	17	15	29	21
width	14	20	17	13	10	27	17	16	18	18	17	22
thickness	3	4	4	7	3	4	3	3	4	5	7	3
material	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	ch	qt

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1116	988	1020	546	1105	1076	1025	1038	868	992	891	605
portion	wh	wh	fr	wh	wh	fr	wh	wh	wh	wh	wh	wh
retouch-face	d	d	-	d	d	-	d,v	v	d	d	d	d
retouch-shape	cs	cs	-	cs	cs	-	cs	cs	cs	cs	cs	cs
retouch-edge	d	l	-	l,r	d	-	l,r	p	l	r	l,d,r	l
retouch-cont	c	c	-	dc	c	-	c	c	c	c	dc	c
biface th	ab	ab	-	ab	ab	-	ab	ab	pr	ab	ab	ab
cortex	ab	ab	-	ab	ab	-	ab	ab	ab	ab	ab	ab
length	29	23	-	23	12	-	20	13	14	27	25	22
width	23	20	-	15	12	-	18	19	11	27	19	13
thickness	4	3	-	3	3	-	3	4	3	4	7	4
material	ch	ch	ch	ch	ch	qz	ch	ch	ms	ch	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	91	700	1010	724	963	1042	1107	348	1019	904	858	1053
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	v	d,v	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	I	l	d	l,r	r	d	I	l,r	d	d	l,r	d
retouch-cont	c	c	c	dc	c	c	c	dc	c	c	dc	c
biface th	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	pr
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
length	15	17	24	41	27	25	41	25	21	17	32	19
width	16	22	21	21	25	22	32	24	24	19	19	14
thickness	4	4	6	6	6	4	10	5	4	3	3	3
material	ch	ch	ch	ch	ch	ch	qt	ch	ch	ch	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	1145	905	757	529	1065	87	943	1046	957	698	1059	1030
portion	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh	wh
retouch-face	d	d	d	d	d	d	d	d	d	d	d	d
retouch-shape	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs	cs
retouch-edge	d	d	d	r	l,r	d	l,d	d	r	d	d	d
retouch-cont	c	c	c	c	dc	c	dc	c	c	c	c	c
biface th	ab	ab	pr	ab	ab	ab	ab	pr	ab	ab	pr	ab
cortex	ab	pr	ab	ab	ab	pr	ab	ab	ab	ab	ab	ab
length	29	21	20	25	20	33	25	18	16	23	15	22
width	17	21	25	25	20	19	19	14	13	26	15	23
thickness	4	7	5	5	4	7	4	3	2	5	3	4
material	ch	ms	ms	ch	ch	ch	ch	ch	ch	ch	ch	qt

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	838	594	192	1128	579	1108	840	1114	1021	1037	1066	648
portion	wh	wh	wh	wh	wh	fr	wh	wh	wh	wh	fr	wh
retouch-face	d	d	d	d	d	d,v	d	d	d	d	-	d
retouch-shape	cs	cs	cs	cs	cs	-	cs	cs	cs	cs	-	cs
retouch-edge	d	d	l,r	d	d	-	r	l	d	r	-	d
retouch-cont	c	c	dc	c	c	-	c	c	c	c	-	c
biface th	ab	ab	ab	ab	ab	-	ab	ab	pr	ab	-	ab
cortex	ab	ab	ab	ab	ab	-	ab	pr	ab	ab	-	ab
length	21	27	53	21	20	-	18	20	19	20	[illegible]	13
width	17	18	17	11	19	-	10	19	16	15	-	15
thickness	6	7	7	3	3	-	2	5	2	3	-	2
material	ch	ch	ms	ch	ch	ch	ch	ch	ch	qt	ch	ch

Appendix D

Retouched Flake Attributes - BeCs-3

cat. no.	949	1047	458	1063	551	775
portion	wh	wh	wh	wh	fr	wh
retouch-face	d	d	d	d	-	d
retouch-shape	cs	cs	cs	cs	-	cs
retouch-edge	d	d	r	d	-	d
retouch-cont	c	c	c	c	-	c
biface th	ab	ab	ab	ab	-	ab
cortex	ab	ab	ab	ab	-	ab
length	21	19	19	19	-	21
width	13	16	18	20	-	14
thickness	2	2	4	4	-	3
material	ms	ch	ch	ch	ch	ch

APPENDIX E

NON-BIPOLAR CORE ATTRIBUTES - BeCs-3

APPENDIX E

NON-BIPOLAR CORE ATTRIBUTES - BeCs-3

The following table lists attributes of the non-bipolar cores from the Brown site. Measurements of length, width and thickness are in millimeters. Length was determined to be the distance between the two margins of the faces of the core along which the majority of flakes had been removed. Width was perpendicular to length and thickness was perpendicular to width. In the following table the term "catalogue number" refers to the number that was assigned to the core in the field. "Flaking pattern" refers to the pattern of flake removal on the faces of the core, i.e., the pattern is random where the flake scars have no apparent order or the pattern is approaching a polyhedral shape where the majority of flake scars originate from a single striking platform. The term "cortex" refers to the presence of cortex on any portion of the core. "Material" refers to the lithic material of which the core is composed and "figure" refers to the photograph in which the core is illustrated.

Abbreviations used in table:

Flaking Pattern

r = random

ap = approaching polyhedral

Material

ch = chalcedony = all cherts and agates

qz = quartz

qt = quartzite

ms = miscellaneous

General

ab = absent

pr = present

" " = blank space = not applicable

cat. no. = catalogue number

fl patt = flaking pattern

Appendix E

Non-bipolar Core Attributes - BeCs-3

cat. no.	480	51	601	90	36	17	770	597	17	602	495	860
fl patt	r	r	r	r	ap	ap	ap	ap	ap	r	r	r
cortex	pr	pr	pr	pr	ab	pr	pr	ab	ab	ab	ab	ab
length	77	51	59	85	59	47	42	29	48	44	46	35
width	47	48	48	37	44	27	40	35	34	43	27	34
thickness	26	36	33	24	18	17	32	20	21	31	24	22
material	ch	qz	ms	qt	ch	qz	qz	qz	ch	ch	ch	ch
figure			24d			24b		24i		24g		24f

Appendix E

Non-bipolar Core Attributes - BeCs-3

cat. no.	796	1072	552	977	1026	1079	671	1043
fl patt	r	ap	r	ap	ap	r	r	ap
cortex	pr	pr	pr	pr	ab	ab	ab	ab
length	35	33	22	45	37	22	27	16
width	37	36	31	31	19	19	25	16
thickness	26	27	21	19	15	14	15	7
material	ch	qz	ch	qz	qz	qt	ch	ch
figure	24h	24a		24c	24e			

APPENDIX F

BIPOLAR CORE ATTRIBUTES - BeCs-3

APPENDIX F

BIPOLAR CORE ATTRIBUTES - BeCs-3

The terminology used in describing bipolar cores is that used by Binford and Quimby (1963). Length was measured as the distance between the two zones of percussion from which originate the dominant flake scars, i.e., the zones of percussion that were the last to be used. Width was taken to be the distance across the face of the core, perpendicular to length; and thickness was measured as the distance between the faces of the core, perpendicular to width. In the following table all measurements are in millimeters. The term "catalogue number" refers to the number that was assigned to the core in the field. "Core type" refers to the type of bipolar core as defined by Binford and Quimby (1963). The term "cortex" refers to the presence of cortex on any portion of the core and "cortex location" indicates the part of the core that exhibits cortex. The term "material" refers to the lithic material of which the core is composed and "figure" refers to the photograph in which the core is illustrated.

Abbreviations used in table:

<u>Core Type</u>

rp = ridge-point

ar = area-ridge

rr = ridge-ridge

<u>Cortex Location</u>

s = striking platform

f = face

<u>Material</u>

qz = quartz

ch = chalcedony = all cherts and agates

qt = quartzite

<u>General</u>

ab = absent

pr = present

" " = blank space = not applicable

cat. no. = catalogue number

cor loc = cortex location

Appendix F

Bipolar Core Attributes - BeCs-3

cat. no.	1051	1141	1049	1082	1009	1138	1109	1041	1040	1031	567	247
core type	rp	rp	rp	ar	ar	ar	ar	ar	ar	ar	ar	rr
cortex	ab	ab	ab	pr	ab	ab	ab	ab	ab	ab	ab	ab
cor loc				s								
length	24	18	29	48	16	24	22	22	20	22	20	22
width	18	12	15	22	18	30	14	19	22	12	15	10
thickness	11	7	12	16	5	7	8	7	7	4	9	4
material	qz	qz	qz	qz	ch	ch	qz	ch	qz	ch	qz	qz
figure				25n		25l					25b	

Appendix F

Bipolar Core Attributes - BeCs-3

cat. no.	1112	1132	1067	460	1135	652	436	1078	1064	1055	1054	473	1057
core type	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
cortex	pr	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cor loc	f												
length	27	27	12	33	33	35	45	20	25	24	23	24	24
width	22	16	10	27	29	27	20	16	19	11	20	15	15
thickness	9	8	4	9	10	13	10	9	6	11	7	7	7
material	qz	qz	qz	qz	qz	qz	qz	qz	ch	ch	qt	ch	ch
figure	25m	25f			25o	25p		25d	25i	25k			25j

Appendix F
Bipolar Core Attributes - BeCs-3

cat. no.	218	449	1136	230	419	1033	365	536	424	1022	1118	966	109
core type	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr	rr
cortex	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab	ab
cor loc													
length	28	24	23	25	33	21	29	23	26	16	20	16	17
width	24	18	21	22	15	16	17	15	15	16	14	15	15
thickness	7	9	11	8	10	10	11	10	7	7	7	5	19
material	qz	qz	qz	qz	qz	qz	qz	qz	qz	qz	qz	qz	ch
figure			25h	25e	25c			25g	25a				

APPENDIX G

FAUNAL REPORT - BeCs-3

by

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Calgary, Alberta

1985

The faunal material discussed in this report is from a site in Eastern Nova Scotia: BeCs 3. The sample consists largely of small calcined bone fragments, although there are some unburnt pieces and several burnt fragments. The teeth recovered in the excavations were not included in this sample.

The bones were identified using the comparative collection at the Department of Archaeology, University of Calgary. In addition, sources such as Schmid (1972), Banfield (1974), Gilbert (1981), Peterson (1966) and Tufts (1973) were consulted. All of the bone was examined, separated into identifiable and unidentifiable (NID) groups, counted and weighed. Fragments were considered identifiable when the element could be recognized, whether or not the species was identified. Unidentifiable bone was divided roughly into general size classes, such as small mammal or bird, medium mammal, or large mammal. Small mammals would be the size of rodents, hares, or small mustelids. Medium mammals would be the size of beaver, small canids, lynx or the larger mustelids. Large mammals would be the size of deer, bear, larger ungulates, or possibly marine mammals. Large birds would be about the size of Canada geese; medium birds the size of hawks, gulls or loons.

When a sample consists entirely of calcined bones, it represents a very biased sample of the original fauna from a site. Preservation is poor; the twelve unburnt bones that were in the sample were weathered, and layers of the bone cortex exfoliating. When bone is burnt to the point of calcination, the dessication and heat involved break bone fragments into small rectangular fragments. The average fragment in this sample weighed 0.4 g. This limits the possibilities for identification; fragments this small from large mammals generally do not have any recognizable anatomical feature. Very small or delicate bones are likely to be completely destroyed, which leaves the bones from medium-sized mammals as the most likely to be identified. The robust bones of the beaver seem to break up into identifiable pieces, and in this sample beaver bones were by far the most common. Another problem with such a highly fragmented sample is that many of the identifiable elements will be the smaller elements in the body, such as phalanges, caudal vertebrae, carpals and tarsals. These are not generally the most diagnostic elements. The slender shafts of bird bone are broken into small rectangular fragments, and are often hard to distinguish from a small mammal of similar size, such as hare or the smaller rodents and mustelids.

Table I summarizes the distribution of identifiable and unidentifiable bone from the site. Table II describes the identifiable bones by species or class and element. Catalogue pages follow, describing the bones sample by sample.

Beaver elements are represented in most of the samples, from all over the site. Elements from all parts of the skeleton are found, with forelimb elements the most common. A minimum of four individuals are represented, based on the ulna fragments present. At least one individual is juvenile. Fused and unfused elements are present. The scapulae are all fused, and this fusion occurs in the second year in beaver (Robertson and Shadle 1954:199). Three fully fused and one partially fused proximal radii are present. The proximal radius is one of the earliest long bone fragments to fuse. The acetabulum fragment is fused; this suggests the individual is fully mature, as fusion occurs during the third year. The proximal tibia fuses by the fourth year, so the unfused fragment from the site would be from a younger animal. The distal radius fuses at about the same time as the proximal tibia; the unfused radius in the sample could belong to the same individual as any of the proximal radii. There are both fused and unfused rib heads in the sample.

A distal metapodial is from a black bear. This was the only element identified as bear, though some of the larger bone fragments may be bear also. The unburnt, unfused lumbar vertebra centrum and unfused epiphysis are probably moose. The lumbar vertebrae are among the last elements to fuse in the body, so they could be from an adolescent or nearly mature individual. The vertebra was quite battered, and all the processes and the neural arch broken off. Several fragments were identified as deer, including metapodia, phalanges, and two costal cartilage fragments. The unfused proximal phalanx fragment is from a young individual, as phalanges fuse early in the second year. One of the cartilaginous rib fragments may have been worked:

exhibits one bluntly tapered end, which is not the natural break in this element. The bone is of irregular texture, and does not show any cut or gnaw marks.

The conical serrated fragment is likely the tip of a crustacean claw. Only one fish element was present: the atlas vertebra of a small fish. It may be herring.

The only bird element that could be identified to a family level was the proximal ulna of one of the smaller ducks. The scapula and cervical vertebra did not match the specimens of Canada goose, swans, owls, large raptors or galliformes. They may belong to some of the sea or shore birds which are not well represented in the comparative collection. The proximal carpometacarpus may belong to the gull family. The radius shaft segments are too small to be further identified.

Three of the unidentified shaft fragments show modification. There are tooth scores visible on an unburnt fragment in sample BeCs-3:106. A burnt fragment of large mammal bone in sample BeCs-3:195 has been sawn. The fragment appears to have been sawn partially through the bone wall, and subsequently snapped off. There are two diagonal cut marks into a shaft fragment found in N105 W105. None of these pieces were further identified. Several of the small calcined fragments were stained green, as if they had been in contact with copper.

REFERENCES CITED

Banfield, A.W.F.
1974 The Mammals of Canada. University of Toronto Press.

Gilbert, B.M., L.D. Martin and H.G. Savage
1981 Avian Osteology. B. Miles Gilbert, Laramie, Wyoming.

Peterson, Randolph L.
1966 The Mammals of Eastern Canada. Toronto: Oxford University Press.

Robertson, R.A. and A.R. Shadle
1954 Osteologic criteria of age in beavers. Journal of Mammalogy 35(2):197-203.

Schmid, Elisabeth
1972 Atlas of Animal Bones. Amsterdam: Elsevier Publishing Co.

Tufts, Robie W.
1973 The Birds of Nova Scotia. Halifax: Nova Scotia Museum.

Table I

Counts and Weights of Identifiable and Unidentifiable Bone by Sample

Catalogue number, Provenance	Identifiable bone number	Identifiable bone weight(g)	Unidentifiable bone number	Unidentifiable bone weight(g)	Total number
BeCs-3:1179 unknown	-	-	2	0.8	2
BeCs-3:268, N111W102	2	1.2	2	0.1	4
BeCs-3:258, N108W103	2	0.9	12	3.3	14
BeCs-3:193, N106W105	1	1.6	1	0.3	2
BeCs-3:195, N110W103	-	-	2	1.2	2
BeCs-3:354, N109W102	7	4.7	71	26.6	78
BeCs-3:1185, unknown	2	0.7	4	1.8	6
BeCs-3:231, N109W103	-	-	9	3.4	9
BeCs-3:194, N108W103	7	3.3	47	13.2	54
BeCs-3:295, N107W102	-	-	2	1.0	2
BeCs-3:353, N106W102	1	0.4	-	-	1
BeCs-3:355, N110W102	1	1.7	-	-	1
BeCs-3:328, N108W101	3	1.2	4	0.3	7
BeCs-3:232, N107W102	-	-	22	3.1	22
BeCs-3:489, surface	1	1.0	-	-	1
BeCs-3:328, N108W101	-	-	10	6.8	10
BeCs-3:340, N108W101	1	3.3	-	-	1
BeCs-3:106, N108W102	1	2.2	1	1.7	2

(Table I continued)

Catalogue number, Provenance	Identifiable bone number	Identifiable bone weight(g)	Unidentifiable bone number	Unidentifiable bone weight(g)	Total number
BeCs-3:496, N110W104	1	0.3	3	1.1	4
BeCs-3:1182, unknown	4	3.6	3	1.2	7
BeCs-3:290, N109W101	3	9.2	29	25.7	32
BeCs-3:356, N109W102	2	0.3	46	12.4	48
BeCs-3:983, N107W100	-	-	1	8.1	1
BeCs-3:1187, N105W105	-	-	2	3.3	2
BeCs-3:1189, N106W100	3	3.1	30	13.6	33
BeCs-3:1180, N107W100	23	10.2	277	115.9	300
BeCs-3:1178, N108W100	6	3.8	126	51.2	132
BeCs-3:1184, N112W104	3	0.2	2	0.6	5
BeCs-3:1175, N112W105	3	0.8	26	4.6	29
BeCs-3:1186, N112W106	1	0.3	12	3.6	13
BeCs-3:1177, N112W108	13	18.5	43	14.3	56
BeCs-3:1188, N113W113	-	-	1	0.8	1
BeCs-3:1176, N114W113	3	2.7	93	35.1	96
BeCs-3:1183, N115W112	4	1.4	12	3.2	16
BeCs-3:1181, N115W113	6	4.6	130	36.5	136
Totals	104	81.2	1025	394.8	1129 (476g)

Table II
Identifiable bones by species, element, and side; BeCs-3

Element description	Right	Left	Axial or NID
Beaver (Castor canadensis) MNI = 4			
incisive, posterior part of dorsal surface		1	
palatine, 2 frags fit to make nearly a whole			1
temporal, zygomatic process		1	
maxillary, palatine part with alveoli for P^4 and M^1		1	
zygomatic, anterior/ventral corner		1	
fragments of incisor enamel, upper or lower NID			11
atlas vertebra, left anterior articular surface			1
caudal vertebrae, unfused, from more posterior part of tail			2
scapula, neck with none of glenoid or blade		1	
, glenoid and neck but none of blade or spine	2	2	
humerus, lateral shaft frag with deltoid tuberosity	1	1	
, lateral/distal shaft frag with the wide flare		1	
, distal articular condyles, medial third	1	1	
, distal articular condyles		1	
radius, mid shaft segment		1	1
, unfused distal end and one quarter of shaft	1		

(Table II continued)

Element description	Right	Left	Axial or NID
(Beaver, continued)			
radius, fused proximal end and one quarter of shaft	1	2	
, partially fused prox. end and one quarter of shaft	1		
, proximal part of shaft, none of articular surface	2	2	
, distal part of shaft, none of articular surface	1		
ulna, unfused proximal end and half of shaft	1		
, proximal half of shaft, none of articular facets	1		
, fragment of olecranon process, no radial facets	1		
, olecranon process and prox. part of semi lunar notch	1		
, radial articular facets only, none of posterior border of shaft or olecranon process	2		
, mid-shaft segment with base of the deep groove		1	
, shaft fragment, with some of groove			1
pelvis, ventral part of acetabulum, pubic and ilial parts	1		
, ischial body and neck, none of acetabulum	1		
, ischial part of acetabulum and some ischial body	1	1	
, ilial neck and some of body, no acetabulum		1	
femur, head, unfused diaphysis		1	
tibia, fragment of crest		1	

(Table II continued)

Element description	Right	Left	Axial or NID
(Beaver, continued)			
tibia, unfused proximal diaphysis, lateral edge		1	
patella, whole	2		
, distal half		1	
metapodial, NID, distal end with half of articular surface			1
metatarsal I, missing proximal articular surface			1
first phalanx, digit II, hind limb, whole		1	
first phalanx, digit NID, hind limb, missing proximal end			1
second phalanx, digit NID, front limb, distal 2/3			1
first phalanx, proximal end, digit NID			1
rib, unfused head and tubercle			1
, proximal end and some shaft, fused			2
, shaft segments, probably beaver			8
Black bear (<u>Ursus americanus</u>) MNI = 1			
distal third of metapodial III or IV			1

(Table II continued)

Element description	Right	Left	Axial or NID
White-tailed deer (Odocoileus virginianus) MNI = 1			
metatarsal, anterior shaft fragment			1
metacarpal, posterior shaft fragment with nutrient foramen	1		
proximal surface right first phalanx			1
proximal surface right second phalanx, unfused epiphysis			1
cartilaginous part of rib			2
posterior tibia shaft fragment, with muscle scars	1		
Moose (Alces alces) MNI = 1			
unfused lumbar vertebra centrum			1
unfused vertebral centrum epiphysis, posterior, lumbar?			1
rib shaft fragment			1
Carnivora			
first phalanx, 2 frags fit together			1
distal radius shaft fragment, large mammal			1

(Table II continued)

Element description	Right	Left	Axial or NID
(<u>Carnivora</u>, continued)			
canid? 7th lumbar vertebra, transverse process	1		
<u>Anatidae</u>			
proximal ulna and one quarter of shaft, one of the smaller ducks, missing the olecranon process	1		
<u>Large Bird</u>			
proximal scapula and small part of blade			1
cervical vertebra, partial			1
<u>Medium-sized bird</u>			
carpometacarpus, proximal end		1	
radius shaft segment			2

(Table II continued)

Element description	Right	Left	Axial or NID
Fish			
atlas vertebra			1
Crustacea			
tip of a claw, crab? 3 frags fit together			1

Catalogue

BeCs-3:1179 unknown provenance

2 NID long bone shaft segments, calcined, copper-green stained, small to medium mammal	0.8g

BeCs-3:268 N111W102

1 distal R radius with less than ¼ of shaft, unfused, beaver; calcined	0.6g
1 calcined R beaver ulna shaft segment, proximal part of semi-lunar notch, none of olecranon process or radial articular facets	0.6g
2 NID calcined frags fit together	0.1g

BeCs-3:258 N108W103

1 beaver L scapula, neck, missing the cranial border, broken at base of spine, and with none of the glenoid, calcined	0.8g
1 radius shaft segment, medium-sized bird; small tube segment from mid-shaft, calcined	0.1g
5 NID medium to large sized mammal fragments, calcined	2.4g
5 NID burnt long bone shaft fragments, small mammal or bird	0.7g
2 NID calcined long bone shaft fragments, small mammal or bird	0.2g

BeCs-3:193 N106W105

1 beaver R acetabulum, the ventral part with the beginnings of the pubic and ilial bodies, calcined, fused	1.6g

(Catalogue continued)

BeCs-3:193 N106W105 (cont.)

1 NID calcined long bone shaft fragment, small to medium sized mammal	0.3g

BeCs-3:195 N110W103

1 NID calcined long bone shaft tube segment, green copper stained, medium sized mammal	0.2g
1 burnt long bone shaft fragment, large mammal; the piece looks as if it has been sawn and then snapped beyond the cut section	1.0g

BeCs-3:354 N109W102

1 burnt NID long bone shaft fragment, large mammal, surfaces exfoliating, originally a spiral fracture	5.1g
1 beaver R radius shaft segment, proximal 1/3 of shaft, calcined	0.8g
1 beaver L radius shaft segment, proximal 1/3 of shaft, larger and more robust than the above, calcined	1.2g
1 beaver L radius, proximal end and 1/4 shaft, calcined, fused	0.8g
1 beaver unfused rib head and tubercle, very little of body, calcined	0.5g
1 beaver L zygomatic process of temporal, calcined	0.4g
1 beaver L palatine part of maxillary, with lingual side of alveoli for premolar 4 and molar 1	0.6g
1 bird ulna, one of the smaller members of the family Anatidae, calcined, proximal end and 1/4 of shaft, olecranon process missing, R	0.4g

(Catalogue continued)

BeCs-3:354 N109W102 (cont.)

61 NID burnt and calcined long bone shaft fragments, medium to large mammal	17.4g
8 NID calcined irregular bone fragments.	3.8g
1 NID unburnt long bone shaft fragment, small to medium mammal	0.3g

BeCs-3:1185 unknown provenance

1 burnt rib segment, probably beaver	0.3g
2 NID long bone shaft fragments, calcined	0.2g
1 NID calcined cranial fragment, green copper stained	0.1g
1 NID burnt medium mammal fragment	1.5g
1 proximal R bird scapula, with less than 1/4 of the blade, partially burnt, from a large bird	0.4g

BeCs-3:231 N109W103

3 NID long bone shaft fragments, burnt	1.4g
5 NID long bone shaft fragments, calcined	1.8g
1 NID long bone shaft fragment, calcined with green staining	0.2g

BeCs-3:194 N108W103

1 beaver L patella, distal half, calcined	0.3g
1 fish atlas vertebra, herring? something that small size, calcined	0.1g
1 R first phalanx, fragment of proximal surface, deer?, calcined, veryweathered	1.9g

(Catalogue continued)

BeCs-3:194 N108W103 (cont.)

1 beaver L tibia, unfused proximal diaphysis, lateral edge, calcined	0.5g
1 beaver L posterior 1/4 of palatine, calcined	0.1g
1 beaver, anterior half of palatine, fits the above	0.1g
1 beaver calcined radius shaft segment, side NID	0.3g
32 NID long bone shaft fragments, calcined, medium mammal	8.7g
11 NID long bone shaft fragments, small to medium mammal, calcined (1 is green stained, and 1 iron stained)	4.1g
3 medium mammal rib fragments, calcined, beaver?	0.3g
1 bird long bone shaft fragment, calcined	0.1g

BeCs-3:295 N107W102

2 NID irregular calcined fragments, medium mammal; one maybe an alveolar frag?	1.0g

BeCs-3:353 N106W102

1 beaver L radius shaft segment, proximal part of the mid diaphysis, calcined	0.4g

BeCs-3:355 N110W102

1 bear metapodial III or IV, distal 1/3, burnt, ridges on the palmar surface broken off	1.7g

(Catalogue continued)

BeCs-3:328 N108W101

1 medium-sized bird radius mid-shaft segment, calcined, side NID	0.2g
1 beaver 2nd phalanx, distal 2/3, front limb but digit NID, calcined	0.7g
1 beaver L radius, proximal end and less than 1/4 of shaft, calcined	0.3g
2 NID long bone shaft fragments, calcined, small to medium mammal	0.2g
2 NID fragments, calcined	0.1g

BeCs-3:232 N107W102

1 burnt long bone shaft fragment, small to medium mammal	0.3g
2 NID calcined long bone shaft fragments, medium to large mammals	1.2g
2 NID calcined fragments fit together, small to medium mammal	0.2g
17 NID calcined fragments, small to medium mammal	1.4g

BeCs-3:489 unknown pit, surface

1 beaver R ulna, mid shaft segment, broken just distal to articular facets and just distal to the deep groove in the shaft, calcined	1.0g

BeCs-3:328 N108W101

5 NID calcined long bone shaft fragments, small to medium mammal	0.8g
3 NID calcined long bone shaft fragments, large mammal, fragments with deep surface cracks	4.2g
1 NID long bone shaft fragment, half burnt, large mammal	1.7g

(Catalogue continued)

BeCs-3:328 N108W101 (cont.)

1 NID bird long bone shaft fragment, small to medium bird 0.1g

BeCs-3:340 N108W101

1 calcined shaft fragment with diagonal muscle scars, probably deer from posterior R tibia 3.3g

BeCs-3:106 N108W102

1 beaver R ulna, proximal 1/2, unfused, unburnt 2.2g

1 NID flat bone fragment, medium mammal, 2 scores on the outside surface that may be tooth scores 1.7g

BeCs-3:496 N110W104

1 beaver L humerus shaft, fragment with distal part of the curling deltoid tuberosity, calcined 0.3g

3 NID calcined long bone shaft fragments, small to medium mammal 1.1g

BeCs-3:1182 unknown provenance

1 rib segment, calcined, probably beaver 0.1g

1 deer metatarsal shaft fragment, anterior shaft, side NID, calcined 1.1g

2 NID calcined long bone shaft fragments, medium mammal 0.8g

(Catalogue continued)

<u>BeCs-3:1182 unknown provenance (cont.)</u>

1 NID calcined fragment 0.4g

1 beaver distal metapodial fragment, half of distal surface and some shaft, calcined 0.1g

1 rib shaft fragment, probably moose, unburnt 2.3g

<u>BeCs-3:290 N109W101</u>

1 large radius shaft fragment, burnt, possibly canid; the cortical bone is breaking off, leaving the cancellous core 4.3g

1 large mammal unburnt unfused flat bone, possibly a sternal element but it is flatter than most and slightly asymmetrical, might be marine mammal, very juvenile animal 2.7g

1 deer R metacarpal, posterior shaft fragment with nutrient foramen, calcined, mid-shaft 2.2g

9 NID large mammal long bone shaft fragments, calcined 15.4g

5 NID large mammal long bone shaft fragments, burnt 5.5g

13 NID small mammal or bird long bone shaft fragments, calcined 3.6g

2 NID calcined fragments, fit together, green stained, medium mammal 1.2g

(Catalogue continued)

BeCs-3:356 N109W102

4 NID burnt long bone shaft fragments, medium to large mammal	2.1g
1 NID burnt long bone shaft fragment, small mammal	0.2g
36 NID calcined long bone shaft tubes and fragments, medium mammal	8.4g
3 NID calcined bone fragments	1.3g
2 NID calcined bird long bone shaft tubes, deeply cracked and split, small bird	0.4g
1 beaver R radius, proximal part of shaft, burnt	0.2g
1 beaver rib, proximal end and some shaft, calcined	0.1g

BeCs-3:983 N107W100

1 NID unburnt long bone shaft fragment, large mammal, originally spirally fractured, but well weathered now, and layers exfoliating	8.1g

BeCs-3:1187 N105W105

1 NID calcined long bone shaft segment, 2 diagonal cut marks on one margin	0.5g
1 NID articular surface fragment, large mammal, calcined	2.8g

BeCs-3:1189 N106W100

1 beaver R pelvis, ischial part of acetabulum and some of ischium body, calcined	1.7g
1 fragment of cartilaginous part of rib, large mammal, deer?, calcined	0.6g
1 beaver R patella, calcined, nearly whole, edges worn	0.8g

(Catalogue continued)

BeCs-3:1189 N106W100 (cont.)

10 NID calcined long bone shaft segments, medium mammal	5.8g
18 NID calcined fragments	6.3g
1 NID long bone shaft segment, small mammal or bird, calcined	0.1g
1 NID long bone shaft segment, medium mammal	1.4g

BeCs-3:1180 N107W100

1 beaver R humerus, distal, medial 1/3 of the articular condyles and the medial edge, calcined	0.7g
1 beaver L humerus, distal articular condyles complete, calcined	1.0g
1 beaver L radius, proximal end, partially fused and 1/4 of shaft, calcined	0.8g
1 beaver L humerus, lateral/distal edge of shaft (the wide flare above the articular condyles) calcined	0.7g
1 beaver R ulna, the radial articular facets only, broken through the deep groove so none of the posterior shaft is present, calcined	0.6g
1 beaver L ischium, acetabular surface and some of body, calcined	0.8g
1 beaver L ilium, the neck and beginning of the blade, none of acetabulum, calcined	2.2g
1 beaver R ischium, body segment from just posterior to acetabulum, calcined	1.6g
1 beaver L 1st phalanx II, whole, hind limb, calcined	0.5g
1 bird cervical vertebra, partial and crumbly, unburnt, large bird	0.3g

(Catalogue continued)

BeCs-3:1180 N107W100 (cont.)

1 bird L carpometacarpus, burnt, proximal end and 1/4 shaft, missing carpal trochlea, medium to large bird (size of gull, but is NID).	0.3g
1 caudal vertebra, partial, beaver? calcined, from the more posterior end of the tail	0.7g
10 fragments of incisor enamel, beaver, upper or lower NID	0.1g
1 segment of cartilaginous rib, probably from a deer; one end appears to have been bluntly tapered, but no good cut or tooth marks show up. It does appear to have been worked, as natural breaks through this bone are usually of a more abrupt, irregular form.	0.6g
2 NID large mammal long bone shaft fragments, unburnt, spiral fracture on one	6.3g
20 NID long bone shaft fragments, small mammal or bird, calcined	4.8g
255 NID small to medium mammal calcined fragments	104.8g

BeCs-3:1178 N108W100

5 NID long bone shaft fragments, large mammal, calcined	9.9g
3 NID long bone shaft segments, medium mammal, calcined	0.9g
104 NID calcined fragments, small to medium mammal	38.3g
14 NID long bone shaft fragments, small to medium mammal or bird, calcined	2.1g
1 beaver incisor enamel fragment	0.1g
1 beaver L scapula, glenoid and neck, no body or spine, calcined	1.1g

(Catalogue continued)

BeCs-3:1178 N108W100 (cont.)

1 beaver L scapula, neck and base of spine, small part of glenoid, but the margins of the glenoid are gone, calcined	1.0g
1 beaver L humerus, distal end, medial 1/3, calcined	0.7g
1 medium canid, 7th lumbar vertab[illegible], transverse process, calcined	0.5g
1 beaver? rib body fragment, calcined	0.4g

BeCs-3:1184 N112W104

1 NID burnt long bone shaft fragment, medium mammal, spiral fracture	0.3g
1 NID calcined long bone shaft fragment, medium mammal	0.3g
1 serrated, hollow tip, looks like the tip of a crab claw, or something in that family, burnt, 3 fragments fit together	0.2g

BeCs-3:1175 N112W105

1 beaver metatarsal I, missing the proximal surface, calcined	0.4g
1 1st phalanx, carnivore, 2 fragments fit together, calcined. (It is the size of a medium canid, but the proximal end is too flat and thin. It looks very like lynx but the phalanx is too short for lynx.)	0.4g
5 NID long bone shaft fragments, calcined, small mammal or bird	1.0g
21 NID long bone shaft fragments, small to medium mammal, calcined	3.6g

(Catalogue continued)

<u>BeCs-3:1186 N112W106</u>

1 rib segment, calcined, medium mammal, beaver? 0.3g
11 NID long bone shaft fragments, calcined, medium mammal 3.4g
1 NID long bone shaft segment, small mammal or bird, calcined 0.2g

<u>BeCs-3:1177 N112W108</u>

1 beaver L zygomatic, anterior/ventral corner, calcined 1.3g
1 beaver L radius, mid shaft segment, calcined 0.4g
3 beaver rib segments, calcined 1.1g
1 moose lumbar vertebra centrum, unfused, unburnt, most of posterior articular face present, and the base of the L lateral process, none of the neural arch or R lateral process, weathered 10.2g
1 partial vertebral epiphysis, unfused, large ungulate, may fit on the posterior face of the above, unburnt
1 beaver unfused caudal vertebra, calcined, wings broken, one of more posterior in tail 0.4g
1 beaver R scapula, glenoid and neck only, calcined 1.0g
1 beaver R ulna, radial articular facets and a small part of the shaft distal to these, but broken through the groove so there is none of the posterior part of the shaft, calcined 0.6g
1 beaver L ulna, mid-shaft fragment including distal end of groove, calcined 0.7g
1 beaver ulna, side NID, shaft fragment 0.3g

(Catalogue continued)

BeCs-3:1177 N112W108 (cont.)

1 beaver L femur head, the unfused diaphysis, little of femur body, calcined	1.1g
28 NID long bone shaft fragments, medium to large mammal, calcined	10.5g
8 NID calcined long bone shaft fragments, small mammal or bird	1.2g
2 NID calcined irregular fragments, green-stained, medium mammal	0.9g
5 NID irregular calcined fragments	1.7g

BeCs-3:1188 N113W113

1 NID long bone shaft fragment, calcined, medium mammal	0.8g

BeCs-3:1176 N114W113

1 beaver R ulna, olecranon process and the proximal half of semi-lunar notch, none of radial facets or the proximal tip of the olecranon, calcined, fused	1.3g
1 unfused rib head, beaver? calcined	0.4g
1 beaver L tibia, fragment from crest, calcined	1.0g
1 NID bird long bone shaft segment, from tarsometatarsus? green-stained, calcined, medium bird	0.4g
1 NID burnt large mammal spiral fractured long bone shaft fragment	2.0g
20 NID calcined long bone shaft fragments, medium to large mammal	13.7g
1 NID calcined fragment, large mammal	2.1g
61 NID calcined fragments, small to medium mammal	14.8g

(Catalogue continued)

BeCs-3:1183 N115W112

1 beaver hind 1st phalanx, calcined, missing proximal surface and 1 distal condyle	0.4g
1 beaver R 1st phalanx, calcined, proximal surface	0.3g
1 beaver L incisive, posterior/dorsal portion	0.4g
1 beaver R radius, shaft segment from distal part of mid-shaft, calcined	0.3g
1 NID calcined shaft segment, rib? medium mammal, green-stained	1.2g
11 NID calcined fragments, small to medium mammal	2.0g

BeCs-3:1181 N115W113

1 beaver R patella, whole, calcined	1.1g
1 beaver R scapula, glenoid and neck, spine and blade gone, and coracoid process missing, calcined	0.9g
1 beaver atlas vertebra, L anterior articular surface, calcined	0.6g
1 beaver R humerus, deltoid tuberosity on the lateral side, and small part of lateral shaft, calcined	0.6g
1 beaver R radius, proximal end and 1/4 shaft, fused, calcined	0.6g
1 deer R 2nd phalanx, proximal unfused epiphysis, missing medial edge, calcined	0.8g
7 NID fragments, large mammal, calcined	10.5g
100 NID medium to large mammal fragments, calcined	23.0g
23 NID long bone shaft fragments, small mammal or bird	3.0g

APPENDIX H

RESULTS OF PETROGRAPHIC ANALYSIS - BeCs-3

by

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1986

This is a preliminary report which examines data obtained primarily from petrographic analysis in terms of local production and ceramic technology of Brown site pottery.

Petrographic analysis is one of several techniques of compositional analysis and permits characterization of ceramic materials (Bishop, Rands and Holley 1982; Braun 1982, 1983; Peacock 1970; Rye 1976, 1981; Shepard 1968). It is not possible to identify the actual clay minerals because they are too fine grained to be visible petrographically. Thus, characterization of ceramic materials more appropriately means the identification of accessory clay inclusions and deliberately added materials or tempers.

Identification of ceramic inclusions enables identification of their geological sources. If the materials used to manufacture Brown site ceramics also occur in the local environment, I hypothesize that these were the materials used and that the ceramics were probably locally produced. My underlying assumption is based on the catchment proposition that potters tend to minimize their efforts of procuring heavy, bulky materials used to produce ceramics and would choose resources closer at hand rather than travel greater distances to obtain the same kind of resources (Arnold 1981, 1985; Nicklin 1979).

Recent research (Braun 1982, 1983; Hanna 1984; Rye 1976, 1981; Steponaitis 1980) of differences in vessel function indicates that potters vary pastes and wall sizes to produce cooking and non-cooking pots and that underfiring may be a technological necessity because of the relationship between firing temperatures and thermal behavior of ceramic materials. Since there are different kinds of pastes in Brown site ceramics, namely grit, shell and a combination of them, differences in wall sizes and underfiring, functional analysis seems an appropriate interpretative tool.

Cooking and non-cooking pots have different technological requirements. Cooking pots must be able to withstand thermal shock, that is, sudden changes in temperature extremes. Non-cooking pots, however, need to survive only the initial firing process but must be mechanically strong because they are continually being moved about (Braun 1982, 1983).

The technological goal in producing any ceramic, regardless of function, is to control or to prevent the creation or the spread of fractures within the matrix. Fractures are the structural weaknesses which ultimately cause vessel failure.

Fractures develop to relieve stresses from mechanical failure or thermal shock. Mechanical failure means that the pot has cracked because of being moved or dropped. There are two causes of thermal stress: thermal gradients or unequal rates of heat penetration through vessel walls and thermal expansion of materials in the paste. Thick walls increase the risk of thermal gradients and are less suitable for cooking pots. All materials expand when subjected to heat. The more similar the volume increase of non-clay materials to surrounding clay materials the less likely will be the risk of stresses resulting from differential expansion. Shell is a suitable material for cooking pottery because its thermal expansion is similar to clay. The danger in using shell is that at temperatures ranging from 700° C. to 910° C., temperatures within the range of prehistoric firing, chemical changes occur to the calcium carbonate which constitutes the shell (Rye 1981, Steponaitis 1980). At the very least spalling can occur and at the most complete shattering of the vessel.

Potters attempt to control or to prevent the creation or the spread of fractures in several ways. Thin walls reduce thermal gradients and are thus more suitable for cooking pots than are thick walled vessels. Potters may use different tempers for different vessel functions. If shell is used, addition of salt will lower the point at which clay minerals bond so that the critical temperature is not reached (Rye 1976, 1981). Preheating shell before inclusion in the paste means that the volume increase takes place out of the ceramic matrix (Steponaitis 1980). Differences in tempering materials do not affect non-cooking pots to the same degree as they do for cooking pots; the important consideration in choice of tempering materials for non-cooking pots is that the material(s) do not induce stresses during the initial firing. Small-sized materials provide a greater surface area to which clay minerals bind and sintering (the beginning of fusion of clay inclusions) begins at lower temperatures. The result is a stronger fabric at lower temperatures which prevents cracks from beginning. However, if these hardened ceramics become cracked, they loose strength more quickly than do coarser-grained pots. For coarser-grained pots, cracks will begin but, because inclusions are larger in size, fractures penetrate only with difficulty and thus coarse grains prevent fractures from developing. Voids resulting from burnt-out shell serve as barriers to cracks as well (Rye 1976, 1981).

Method

Ten sherds were chosen on the basis of the kind of temper material. The materials were identified macroscopically as grit, shell and a combination of them. Petrographic analysis is a destructive technique because in order to observe diagnostic optical properties of minerals and rocks the sherd must be thin-sectioned to a standard thickness of 0.03 mm. Therefore, only body sherds were selected. The ten sherds were chosen after the attempt to reconstruct vessels or portions of vessels to ensure that vessels rather than sherds were represented.

The property of birefringency is used to determine the presence of sintering. Birefringency is an optical property recognized as color changes of minerals upon rotation of the microscope stage. It occurs only for minerals which have a crystalline structure. If clay minerals have sintered their crystalline structure, by definition, is breaking down and birefringency will be absent.

Analyzed grains are those which occurred in 50% of the total mass of each thin-section. Most inclusions have been measured with the micron scale in the ocular. Inclusions under 5 microns have not been identified or counted because the grains are too small for diagnostic optical properties to be observed. Grains larger than medium sand (Table 1) were measured with a millimeter ruler because of the inaccuracy of measuring large grains in micron increments.

For all sherds having shell temper, the shell itself is no longer present; I have inferred the presence of shell from the flat, thin, usually rectangular voids which occur. Size measurements relating to shell, then, are inferred from the sizes of the voids.

The 'grit' inclusions in Brown site ceramics are actually granite, schist and quartzite rocks and minerals. Granite is composed of feldspars, quartz, biotite as crystal faces, hornblende and pyroxenes. Granite is formed only under volcanic conditions. Schist consists of biotite and quartz. The biotite is in plate form and is the predominant mineral of the two. Grains are in subparallel (not quite parallel) alignment. Quartzite consists of interlocking quartz grains, the grains themselves very fine sand sizes. Schist and quartzite form under metamorphic conditions.

The thermal expansion factors of granite, schist and quartzite are difficult to establish in ceramics because the factor is derived from determining the frequency with which constituent minerals occur in the rocks themselves. Moreover, the minerals have separated from the rocks in the paste and occur as separate grains.

Having identified the components of the 'grit' and because of Rye's comment (1981) that granite has a much higher expansion factor than more basic rocks such as basalt, I began to wonder whether granite has a larger factor than shell. This suspicion actually led to my investigation of the expansion factor of granite, schist and quartzite. Although I could not determine the numerical factors, macroscopic investigation of the sherds indicated the presence of star-shaped cracks on exterior surfaces of some of the grit sherds but on none of the shell ones. Rye (1981) reports that this shape of fracture occurs only when large differences occur between thermal expansion factors of clay and non-plastics. Presence of star-shaped fractures proves that thermal stresses did occur in some of the grit ceramics. Shell and grit in the same sherd seemed counterproductive in terms of thermal stress and it made no sense that potters would add the two materials together. I decidd to test the assumption that the grit was not temper at all but a natural clay inclusion. I therefore plotted the distribution patterns of grade sizes of all grains sampled above 5 microns to determine their shapes.

Grade size refers to the geological classification of

Table 1 Particle size grades (a)

Class	Size mm.	Size mu.
gravel, pebbles	2.0+	2,000+
very coarse sand	2.0 - 1.0	2,000 - 1,000
coarse sand	1.0 - 0.5	1,000 - 500
medium sand	0.5 - 0.25	500 - 250
fine sand	0.25 - 0.125	250 - 125
very fine sand	0.125 - 0.062	125 - 62
very coarse silt	0.062 - 0.031	62 - 31
coarse silt	0.031 - 0.016	31 - 16
medium silt	0.016 - 0.008	16 - 8
fine silt	0.008 - 0.004	8 - 4
very fine silt	0.004 - 0.002	4 - 2
clay	less than 0.002	less than 2

(a) after Muller and Oberlander 1978:260

particles as clay, silt, sand and pebbles or gravel (Table 1). The classification is particularly important to ceramic analysis if the actual presence of temper is in doubt.

Fired but untempered clays share similarities of shape and grade size distribution patterns which characterize unfired natural clays. Naturally transported clays have accessory materials with rounded shapes because they have been subjected to erosion and distance which round off angular edges of grains which decompose _in situ_. There will be a narrow range of grade sizes due to the selective sorting and settling of grains in transport. Clays not transported are in primary locations, decomposing _in situ_, and will be angular because they have not been subjected to transportation and distances sufficient to round off edges. _In situ_ decomposition means that a minimum of selective sorting and settling occur and poorly sorted clays are the result. Thus, there is a broader range of grade sizes.

Rye (1981:52) proposes the following shapes of distribution patterns of inclusions as indicators of tempered and untempered ceramics:

> If their frequencies show a normal distribution, use of naturally graded (poorly sorted) silty clay is implied ... A bimodal distribution of grain size indicates a well sorted mixture of inclusions and suggest that sand or coarse sediment (or artificially prepared "temper") was added.

I have recently found evidence (MacIntyre, 1986) that distribution patterns of natural inclusions may be neither unimodal nor bimodal for clays in primary locations. The frequencies with which grain-sizes occurred were erratic, probably reflecting various stages of in situ decomposition due to differential erosion. I have also found examples of tempered ceramics in which the tempered materials clustered at the coarser end of the grade scale while natural ones clustered at the finer end. There was a hiatus, or gap, in which no coarser silt or fine sand occurred at all. The pattern suggests that coarser grained materials were added to a well sorted naturally transported clay.

The shape of the distribution patterns may differentiate between naturally transported clays or those decomposing in situ. It is, however, either the absence of a hiatus or the presence of unimodality which signals that tempering materials may not have been used. Conversely, the presence of a gap in grade size(s) or the presence of bimodality suggest that tempering materials were used. The latter situations rest on the assumption that random natural forces would not consistently sort natural inclusions into two clusters (bimodality) or produce gaps in grade sizes.

Presentation of Data

The six thin-sections with grit inclusions are from vessels numbered 1, 6, 26, 37, 38 and 47. In all cases, the kinds, shapes and distribution patterns of grade sizes of inclusions suggest that the clay has decomposed, in situ, from a volcanic source and that the clay was not tempered.

Most frequently (Table 2), inclusions are minerals which have separated from granite, schist and quartzite rocks. There are instances in which fragments of the three kinds of rock are still intact but they occur in trace amounts, that is, they do not occur in every sherd and represent less than 1% of the total counted inclusions. The volcanic source of the materials is suggested by the presence of complex twinning patterns of feldspars, which are the predominant mineral in the pastes. Complex twins are formed under volcanic conditions. The frequent shape of biotite is well-developed crystal faces which is a volcanic indicator as is the presence of pyroxene, a mineral formed only under volcanic conditions. The presence of schist and quartzite suggests that the volcanic materials were undergoing metamorphism.

For all six thin-sections, inclusions are almost always angular regardless of size and minerology. This characteristic indicates that grains were not transported distances sufficient to round off edges.

The distribution patterns are presented in Figure 1. All

Table 2 Minerological characteristics of untempered grit ceramics

Minerology	pebble	very coarse sand	coarse sand	medium sand	fine sand	very fine sand	very coarse silt	coarse silt	medium silt	fine silt
Vessel 1										
feldspar						2	5	8	15	36
quartz				2			2		4	12
biotite				2				1		
hornblende										
pyroxene										
granite					1	2	3	1	3	
schist										
Vessel 6										
feldspar	1	2	4	6	8	8	1	5	5	3
quartz							2	20	8	8
biotite							2	6	3	
hornblende										
pyroxene								3		
granite							2			
quartzite										
schist							3			

Table 2 Minerological characteristics of untempered grit ceramics

Minerology	pebble	very coarse sand	coarse sand	medium sand	fine sand	very fine sand	very coarse silt	coarse silt	medium silt	fine silt
Vessel 26										
feldspar	3	4	2	1		4	2	5	9	3
quartz				1	1	1	2	2	8	
biotite						3		6	3	
hornblende						1	1	1	2	4
pyroxene									2	
granite						1	1	1		
schist										
Vessel 37										
feldspar		1	1	1	1	1	2	8	12	25
quartz			1	1	1		1	6	8	1
biotite			1				2	3	5	1
hornblende					1		1	2		
pyroxene										
granite			1				1	1	2	
quartzite						1	1			
schist										

Table 2 Minerological characteristics of untempered grit ceramics

Minerology	pebble	very coarse sand	coarse sand	medium sand	fine sand	very fine sand	very coarse silt	coarse silt	medium silt	fine silt
Vessel 38										
feldspar		2	2	3	6	6	24	8	8	5
quartz							8	3	16	5
biotite										
hornblende										
pyroxene										
granite										
quartzite										3
schist										
Vessel 47										
feldspar		1	1	1	1	2	6	26	26	10
quartz				1			1	1	4	25
biotite										
hornblende										
pyroxene										
granite			1	1		1	2	3	1	
quartzite										
schist										

Figure 1 Grade size distribution patterns of Brown Site 'grit' ceramics

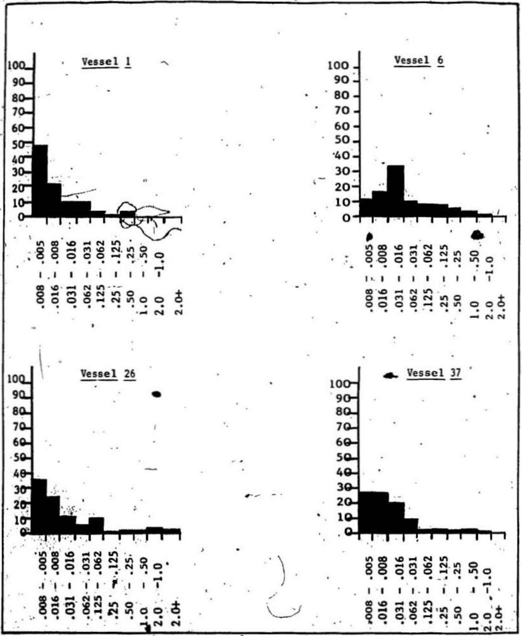
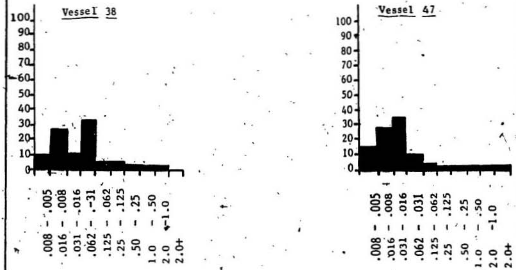


Figure 1 Grade size distribution patterns of Brown Site 'grit' ceramics



minerals and rocks in the sampled mass are included. The patterns indicate that all grades are present from fine silt to the observed maximum (clay and very fine silt particles are present but not recorded). Grades from fine silt to fine sand grades occur with higher frequencies than do grains of medium sand to pebbles. Shapes of the distribution patterns are neither unimodal nor bimodal but erratic suggesting that the clays were in various stages of decomposition when selected by the potters.

Birefringency is present on most exterior surfaces, usually occurs in patches on interior surfaces when present on this surface and does not occur at all in cores (Table 3). Firing occurred in an oxidizing atmosphere as oxidized exterior surfaces indicate and cores and interior surfaces have carbonaceous matter still present as their dark colors imply. Rye (1981) states that carbon at the wall surface burns off at about 500° C. Firing temperatures were neither high enough nor long enough to sinter clay minerals at the outer surfaces nor to oxidize carbonaceous matter contained in the cores and inner surfaces.

Star-shaped fractures occur on exterior surfaces on Vessels 37, 38 and 47 (Table 3) which indicate the presence of thermally induced stresses.

As Table 3 also indicates, average grain sizes range from fine silt (.005mm.) to coarse silt (.030mm.). Wall sizes range from .8mm. to 10.0mm. and are slightly larger than those associated with shell tempered pots. Although only six sherds are considered here, Helen Sheldon has noticed a trend for wall sizes associated with grit pastes to be larger than those with shell temper.

One sherd (Vessel 6) was identified macroscopically as having grit and shell temper. However, the clay used for the four sherds with shell inclusions (Vessels 11, 19, 21, 34) most likely came from the same source as that used for the six grit ones. The minerology of natural inclusions is identical and presence of angular grains mark the primary location of the clay. The larger natural grains are visible macroscopically, giving the impression for Vessel 6 that grit was added along with shell.

Clay minerals have not sintered in the four sherds with shell (Table 3). Birefringency is present either fully through cores or in patches and is present on exterior surfaces while for interior surfaces its presence is irregular. Firing temperatures probably exceeded the 500° C. guideline. The four associated vessels were subjected to either higher temperatures than the grit ones, longer durations or more frequent contact with firing as partial oxidation of cores and interior surfaces imply.

Wall sizes are thinner than those of the grit sherds (Table 3), ranging from 4mm. to 7mm. and are generally thinner in the total ceramic assemblage.

Star-shaped fractures do not occur in association with

Table 3 Paste characteristics of Brown site ceramics

Vessel	Inclusion				Wall	Birefringency		
	Kind	Size (mm.)			Size (mm.)	Exterior	Core	Interior
		Range	Mean	Grade				
1	grit	.005- .50	.014	medium silt	.8	patchy	none	patchy
6	grit	.005-2.1	.030	coarse silt	.8	full	none	patchy
26	grit	.005-2.4	.010	medium silt	1.0	full	none	patchy
37*	grit	.005-1.8	.016	medium silt	.8	full	none	none
38*	grit	.005-1.9	.009	medium silt	.8	full	none	yes
47*	grit	.005-2.0	.011	medium silt	.8	full	none	none
11	shell	.005-2.1	1.3	very coarse sand	.4	full	patchy	yes
19	shell	.005-6.0	1.5	very coarse sand	.6	full	patchy	yes
21	shell	.005-3.2	1.9	very coarse sand	.7	full	patchy	yes
34	shell	.005-1.0	1.9	very coarse sand	.7	full	patchy	yes

* star-shaped fracture present on exterior surface

any of the four sherds; either they are not present on the sherds sampled or differential thermal expansion between clay minerals, natural inclusions and shell was not sufficient to induce fractures.

I have not been able to determine whether the shell was preheated prior to inclusion in the paste. There are, however, no yellowish cubic minerals or voids to indicate the use of salt.

Interpretation

Helen Sheldon has observed that the Brown site overlies granite rocks which are rotting, that is, decomposing in situ. She has not observed the presence of any other kind of clay such as marine. Whatever the identity of the actual clay minerals, this volcanically produced clay is the only one available for use. I cannot comment on the source of shell temper but I believe that the ceramic clays used in Brown site pottery were procured locally.

Functionally, the presence of this single kind of clay means that the ceramic technology had to deal with the thermal behavior of granitic minerals. Schist and quartzite occur so infrequently that their effects would be minimal in terms of thermal stresses relative to the granite. Although the thermal factor is unreported here, the presence of star-shaped cracks proves that thermal stresses did occur some-where near the temperature estimate of 500° C. I infer from the association of thermal stress, thicker walls and greater portions of underfiring in walls that the grit ceramics were probably not used for cooking purposes but for non-cooking ones. Underfiring, however, eliminated the option of producing a hard matrix necessary to prevent cracks from beginning. The low frequency with which coarser-sized grains occur offers few barriers to prevent cracks from developing. This would increase the necessity of underfiring. The low frequency of coarser grains is most interesting: it implies that, at least in the period just prior to Contact, the technological requirements for producing non-cooking vessels was not sufficient to ensure mechanical strength. The inability of potters to achieve the property most needed for non-cooking pots may be part of the reason for the loss of ceramics in the material culture of prehistoric Nova Scotian natives.

Shell tempered pots fit more closely the requirements of cooking pots. I believe that the use of shell temper in coarser average sizes was to counteract thermal stresses induced by natural grit inclusions: grit caused the fractures, shell (or its voids) prevented them from developing. Shell's similar thermal expansion factor to clay minerals would not induce thermal stresses through differential expansion. Thinner walls would reduce the risk of thermal stresses from thermal gradients. Incomplete firing of shell tempered pots may have because of the restrictions to firing temperatures of the natural inclusions.

In summary, I hypothesize that potters at the Brown site produced their own pottery from local materials at least in terms of clay resources. Potters used both non-cooking and cooking pots which were produced from only one kind of available clay. The restrictions imposed by the natural inclusions of this clay made underfiring and the use of shell temper logical technological responses. The technology required to produce non-cooking pots could not fully control from beginning or developing leaving the pots structurally and therefore mechanically weak. This may be one aspect of the loss of ceramics by the time of European Contact.

REFERENCES CITED

Arnold, Dean E.
1981 A model for the identification of non-local ceramic distribution: a view from the present. In Production and Distribution: A Ceramic Viewpoint. H.Howard and E. Morris (eds.). pp. 32-44. B.A.R. International Series No. 120.

1985 Ceramic Theory and Cultural Processes. New York: Cambridge University Press.

Bishop, Ronald L., Robert L. Rands and George R. Holley
1982 Ceramic compositional analysis in archaeological perspective. In Advances in Archaeological Method and Theory. M.B. Schiffer (ed.). pp. 275-303. Toronto: Academic Press.

Braun, David P.
1982 Radiographic analysis of temper in ceramic vessels: goasl and initial methods. Journal of Field Archaeology 9:183-192.

1983 Pots as tools. In Archaeological Hammers and Theories. J.A. Moore and A.S. Keene (eds.). pp. 102-134. Toronto: Academic Press.

Hanna, Margaret
1984 Do you take this woman? Economics and marriage in a Late Prehistoric band. Plains Anthropologist 29:115-129.

MacIntyre, Judith
1986 Utilitarian Ware Production in Selected Northern Andean Areas. Unpublished Master's thesis. Trent University, Peterborough, Ontario.

Muller, Robert A. and Theodore M. Oberlander
1978 Physical Geography Today: A Portrait of a Planet. Second edition. New York: Random House.

Nicklin, Keith
1979 The location of pottery manufacture. Man 14(3): 436-458.

Peacock, D.P.S.
1970 The scientific analysis of ancient ceramics: a review. World Archaeology 1:375-389.

Rye, Owen S.

1976 Keeping your temper under control: materials and manufacture of Papuan pottery. Archaeology and Physical Anthropology in Oceania XI:106-137.

1981 Pottery Technology: Principles and Reconstruction. Manuals in Archaeology 3. Washington: Taraxacum.

Shepard, Anna O.

1968 Ceramics for the Archaeologist. Carnegie Institute of Washington Publication 609.

Steponaitis, Vincas

1980 Ceramics, Chronology and Community Patterns at Moundville, a Late Prehistoric Site in Alabama. Unpublished PhD thesis. University of Michigan.