THE ARCHAIC/CERAMIC PERIOD TRANSITION IN NEW BRUNSWICK AND MAINE: AN ANALYSIS OF STEMMED BIFACE MORPHOLOGY

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ISBN 0-315-55000-7

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by

© Douglas E. Rutherford, B.A.

A thesis submitted to the School of Graduate
Studies in partial fulfillment of the
requirements for the degree of
Master of Arts

Department of Anthropology
Memorial University of Newfoundland
September 1989

St. John's Newfoundland

ABSTRACT

A study of lithic assemblages from nine Archaic and Ceramic Period sites was conducted in order to determine possible material culture continuity between these time periods in the Maine-Maritimes' region. A further aim was to examine and define the Terminal Archaic Period in the region, with the goal of identifying the attributes of that period and clarifying the regional chronology.

The study resulted in the recognition of traits from the Moorehead Phase Late Archaic and Susquehanna Tradition continuing into the Early Ceramic Period. Early Ceramic Period narrow stemmed projectile points are strongly similar to Moorehead Phase points. Susquehanna Tradition related points are known from northeastern New Brunswick and the St. Croix drainage, and chipped and ground adzes from the Early Ceramic Period are related to those of the Susquehanna Tradition.

This allows for commentary regarding the transitional period between the Archaic and Ceramic Periods. Hypotheses are proposed regarding the postulated decline of the Moorehead Phase, the potential for relationships between Moorehead Phase peoples and those of the Susquehanna Tradition, and possible explanations for the small number of sites which may be attributable to this time period in the Maine-Maritimes region.

ACKNOWLEDGEMENTS

This project involved travelling to New Brunswick, Maine, and Ottawa to view a number of collections over a fourteen week period. This required living under less than ideal conditions in unfamiliar places. Such a situation would have been a great deal more difficult without the help of a number of people. Although this list is reasonably lengthy, it is required because of the degree of contribution provided.

This project was primarily funded through a research grant from the Institute of Social and Economic Research, Memorial University of Newfoundland. I am grateful to Ms. Janet Oliver and Dr. Priscilla Renouf for assisting me with the bureaucratic details involved in the application process. Without the financial assistance of the Institute, this project would never have been accomplished.

I am also grateful to Dr. Christopher Turnbull and Patricia Allen, Archaeology Services, Department of Tourism, Recreation and Heritage, Province of New Brunswick. They provided access to collections curated by the Department at Fredericton, available field notes and catalogues, and more than adequate work space, assistance and advise. I would like to also thank Dr. Turnbull for additional financial assistance, and both he and Pat for their interest in the aims of the project.

Others in Fredericton are also deserving of thanks, and this is expressed to Scott and Louise Hale Finley, Albert Ferguson, and Fidele

Thériault for their hospitality to me during my stay there. I also owe a great deal to Heather Fowler, who freely provided access to her library, and subsequently, preserved much of my sanity throughout the months of May and June, 1988.

I would also like to thank Andrea Bear Nicholas, Tobique Reserve, for allowing me to examine the Bernard collection and see the site. Her interest, and that of others on the reserve, in heritage preservation is an example for all of us.

I am also grateful to Dr. Arthur Spiess, Maine Historic Preservation Commission, Augusta, Maine, who located most of the Maine collections used in this research for me, and who took the time to show me the Hart's Falls and Michaud collections.

Further, I am indebted to Dr. Bruce Bourque and Dr. Steven Cox, Maine State Museum, Augusta, Maine, for their interest in the project. They provided access to the Museum's collections and work space to undertake the research there. Particularly, I am grateful for the access to unpublished materials from the Turner Farm and Goddard collections they provided.

Several persons at the Department of Anthropology, University of Maine, Orono, also made significant contributions. These are Dr. David Sanger, who provided access to the Young site and Hirundo site collections, as well as giving me a tour of other collections housed by the Department and providing marvelous opportunities to discuss Maine-Maritimes prehistory.

Bill Belcher, Doug Kellog, and Brian Robinson are also to be thanked for their assistance and hospitality during my stay in Orono.

Access to collections curated by the Archaeological Survey of Canada, Canadian Museum of Civilization, in Ottawa was provided by Mr. Robert Pammett, Curator of Collections. I am grateful for the assistance provided, and would especially like to thank Ms. Jean Langdon-Ford and Ms. Ellen Foulkes for their constant help.

Additional, unpublished information and general comments were provided by Dr. James Petersen, University of Maine at Farmington. I am thankful for his insights into the Piscataquis Archaeological Project and the Smith site.

Lastly, I am most appreciative of the assistance provided by my supervisor, Dr. Michael Deal, Department of Anthropology, Memorial University of Newfoundland. Without his guidance, this project would never have gotten off the ground and converted into thesis form.

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CHAPTER 1

INTRODUCTION

One of the major goals of archaeology is to establish cultural chronologies. A reasonable understanding of the chronology is required for the examination of cultural development within a given area, permitting a diachronic view of such elements as economy and subsistence, social aggregation, technology, and ideology reflected in the archaeological record. How these elements can interact within the cultural system may also be examined in a diachronic perspective. However, before such study can be undertaken, it is necessary to have a reasonably complete culture history for the geographical area under study.

The culture history for the Maine-Maritimes region extends back to an early point in prehistory. Extensively excavated Paleoindian Period sites exist in the region, including the Debert site in Nova Scotia (MacDonald 1966, 1968), the Vail (Gramley 1982), Michaud and Dam (Spiess and Wilson 1987) sites in central Maine, and sites from Munsungen Lake (Bonnichsen *et al.* 1982) and Lake Aziscohos (Gramley 1988) in northern Maine. Fluted points, diagnostic of this period, have also been surface collected from throughout New Brunswick (Keenlyside 1985) and Maine (Spiess and Wilson 1987: 193-201).

Although early sites exist in the Maine-Maritimes region, the record of occupation is discontinuous. Two chronological gaps appear in the regional sequence. The first of these was proposed earlier to run from c. 10,000 B.P.[1] to c. 5000 B.P. (Sanger 1971a, 1975, 1977; Tuck 1975, 1984, n.d.). Recent data have indicated that this gap is probably an artifact of research with more sites and surface collected artifacts from this time being recovered (*e.g.* Spiess, Bourque and Gramley 1983; Petersen *et al.* 1988).

This research addresses the problem of the second of these gaps. This break has been proposed to fall between the later portion of the Archaic Period, which dates from c. 5000 B.P. to c. 2500 B.P., and the Ceramic Period, which commences at c. 2500 B.P. The time between the decline of the last known Late Archaic Period group and the appearance of Ceramic Period ones is poorly understood (Sanger 1971a, 1979: 99; Bourque 1975: 43; Davis 1982: 146; Turnbull n.d.). Most published radiocarbon dates from the region tend to fall into groups on either side of the period in question (see Tables 1, 2, and 3), and many of the dates which exist have come from contaminated samples.

This period of time has been referred to as the Terminal Archaic or Transitional Period (*e.g.* Ritchie 1969a; Sanger 1975, 1986: 145; Yesner 1984: 113; Hoffman 1985: 58). The Terminal Archaic Period commences with the appearance of Susquehanna Tradition assemblages in the region and continues to the Ceramic Period. This transitional time between the Late Archaic and Early Ceramic periods has not been well defined for the region. A description of Maine-Maritimes' culture history for the period is given in Chapter 2.

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[1]Dates given, unless otherwise notes, are expressed in radiocarbon years before present (B.P.) without calibration in atmospheric ^{14}C levels. These dates were derived using the half-life standard for ^{14}C of 5568±30 years.

The apparent hiatus is partly due to incomplete sampling and partly to delays in publication. For example, the Smith site (69.14) on the Kennebec River has yielded a series of nine radiocarbon dates ranging from c. 3600 to c. 2500 B.P. The latest date may be inaccurate, and if so, occupation would range from 3600 to c. 2900 B.P. One feature from the site has yielded two overlapping dates of 3210±100 B.P. (Beta-18222) and 3160±80 B.P. (Beta-15273) (J. Petersen 1988: personal communication).

Further, cognates of Orient fish tail projectile points, which date from c. 2950-2715 B.P. in New York state (Ritchie 1980: 165), have been excavated in central Maine (J. Petersen 1988: personal communication) and surface collected from the St. Croix River drainage (D. Sanger 1988: personal communication; B. Bourque 1988: personal communication). These dates and artifacts appear to indicate that at least part of the region was occupied during the transitional period.

Some attempts have been made to flesh out the gap during the end of the Terminal Archaic Period; however, these have largely taken the form of hypothesis proposal, rather than directly approaching the available data and drawing any possible links between the Archaic and Ceramic Periods.

For example, Turnbull (n.d.) argues for possible Terminal Archaic association for the Tobique Complex, based upon formal similarities with other materials and stratigraphic context. Five of the projectile points from the preceramic assemblage at Teacher's cove (Davis 1978: 55, Plate V a, e, i, j, k) are similar to those from the Tobique Complex Bernard collection. Large scrapers are also known from both assemblages. Further comparison with Tobique Complex artifacts is drawn to the artifacts recovered from the mound fill at Augustine which Turnbull (1980) proposes to be earlier than the burials. One of these burials is dated at 2330±110 B.P. (Turnbull 1976: 55). This possibly earlier mound fill assemblage contains stemmed points, bifaces, and scrapers which are quite similar to those from the Bernard collection (Turnbull n.d.)

Faced with the comparison of Tobique materials with those of other Maritime Provinces sites, stratigraphic context from sites such as Teacher's Cove, and the absence of known artifacts to fit into this chronological period, Turnbull (n.d.) suggests that the Tobique Complex may reflect Terminal Archaic temporal placement.

Sanger (1979) has also commented on the period following the decline of the Susquehanna Tradition.

> ...there is a gap in our knowledge spanned only by a few collections and artifacts until the introduction of ceramics. At several sites, there are stemmed points, large scrapers, and chipped and ground adzes. There are no radiocarbon dates from these sites in Maine, but a related site in New Brunswick's Passamaquoddy Bay has a date of about 2400 B.P. (Sanger 1979: 99).
>
> In the third millennium B.P., just prior to the advent of the Ceramic Period, most chipped stone spear points and/or arrowheads were quite large and had stems that tended to be parallel to contracting in form (Sanger 1979: 110).

Unfortunately, Sanger has not made the basis for the assignment of such artifact assemblages to the Terminal Archaic Period explicit.

However, some confirmation for Sanger's proposals does exist. Similar projectile points are known from the undated basal layers of the Oxbow site, on the Little Southwest Miramichi River in northeastern New Brunswick (Allen 1980: 137; 1981: 41). These are straight-stemmed, with straight bases and right to wide angled shoulder forms. Radiocarbon dates of 2600±60 B.P. and 2640±50 B.P. are associated with higher stratigraphic levels, and considering the vertical separation between these levels, Allen (1981: 112) has proposed a date of at least 2800 B.P. for these projectile points. Such an age is purely speculative; however, it is evident that these projectile points may pre-date 2600 B.P.

Similar assemblages are known from the region. These frequently underlie Ceramic Period assemblages at multi-component sites such as Teacher's Cove (Davis 1978), where large scrapers and straight and contracting-stemmed projectile points were recovered. This assemblage is similar to that of Moose Island, near Eastport, Maine, which yielded 25 straight-stemmed projectile points (Kingsbury and Hadlock 1951; c.f. Davis 1978: 29). Ceramics are not associated with these assemblages, indicating possible site utilization prior to the Ceramic Period. Stratigraphy and the absence of ceramics do appear to indicate temporal location prior to the Ceramic Period; however, this does not pinpoint these assemblages to the Terminal Archaic Period. Radiocarbon dates are not available for these assemblages.

Therefore, the previous proposals may be summarized as follows. A consistent range of stemmed projectile points and large scrapers is known from a number of sites in the region. Stratigraphically, these appear to underlie Ceramic Period assemblages while possibly being later than Susquehanna Tradition assemblages.

Problem Statement

A poorly understood period exists in Maine-Maritimes prehistory between c. 3400 and c. 2500 B.P. At least part of this region was occupied during this time. Does the apparent hiatus in the remainder of the region reflect a depopulation of the area or inadequate sampling?

Testable Hypotheses and Implications

The following were developed for the purposes of examining the above-stated problem.

Hypothesis 1. The Terminal Archaic Period was a time of *in situ* cultural development and there was continuous occupation of some parts of the region from Late Archaic to Early Ceramic Period times (Allen 1980: 137; Tuck 1975, 1976: 123, 1984: 36; Turnbull n.d.).

Corollary: Early Ceramic Period assemblages from areas exhibiting continuous occupation should demonstrate attributes similar to those of Terminal Archaic Period assemblages (*e.g.* Bourque 1975, 1976; Snow 1975) and/or Late Archaic period Moorehead Phase assemblages (*e.g.* Bourque 1976).

Under this hypothesis, this time period would be manifested in continuous occupation and *in situ* cultural development. The later Terminal Archaic groups would have evolved from people present in the region during Late Archaic or earlier part of the Terminal Archaic Periods. This would probably be illustrated by a continuous development of lithic assemblages and lithic tool attributes from those of the Late Archaic Period and/or early Terminal Archaic Period to the emergence of Early Ceramic Period assemblages.

Hypothesis 2. Tobique Complex sites represent occupation of indigenous groups dating to the Terminal Archaic Period (Tuck 1984: 40, n.d.; Turnbull n.d.).

Corollary: Tobique Complex sites do not represent intrusions of Shield Archaic Tradition populations (see Sanger 1971b; Wright 1972).

Under this hypothesis, the Deadman's Pool (Sanger 1971b; Wright 1972) and Bernard sites (Turnbull n.d.) represent occupations by indigenous groups rather than migration of Shield Archaic peoples into the Tobique/St. John River drainage. This may be reflected in assemblages showing a high degree of conformity to other assemblages dating to this time period in the area, should they exist.

Hypothesis 3. During the Terminal Archaic Period, there was a de-population of the region (*i.e.* represented by a decline in Susquehanna-related tool assemblages) and a subsequent increase in population to mark the beginning of the Early Ceramic Period.

Corollary: Early Ceramic Period cultural groups bear little or no relationship to Late Archaic Period ones in the region.

Under this hypothesis, the population of the region would have been lowered to the point of archaeological invisibility. This may have been due to changes in the environment reducing the carrying capacity of the area below the levels required to maintain large scale human occupation. Increasing the population to archaeological visibility would probably occur through two means. The first is through migration of peoples, especially from the south and west. In this case, there would have been no evolution from Late Archaic peoples, and there should be a distinct break in the continuum of tool attributes and lithic assemblage compositions from this time. In this case, no continuity should be seen between these assemblages and those of the Early Ceramic Period.

Secondly, the area may have been re-populated by an interim cultural group, which also declined prior to the appearance of known Early Ceramic Period groups. Here, there should be no relationship exhibited among Late Archaic, Terminal Archaic, or Early Ceramic Period assemblages. Population replacement would have occurred prior to 2600 B.P. in northeastern New

Brunswick where ^{14}C dates from the Oxbow site indicate occupation by that time (Allen 1980: 144). If coastal migration from the south took place, occupation would be earlier for sites in Passamaquoddy Bay; however, high rates for coastal submergence (Grant 1975; Simonsen 1978) have probably inundated the earliest sites and the earliest dates from the area are from the early Ceramic Period (Sanger 1979: 99).

Testing Methodology

The research was conducted in the following manner. A sample of lithic assemblages from the Late Archaic, Terminal Archaic, and Early Ceramic Periods was examined using attribute analysis. The attributes examined are detailed in Appendix B. This entails classification of artifacts according to attributes and seeking any trends which may identify homogeneous and heterogeneous artifact groups. This method permits the observation of micro-scale differences and similarities of artifact form within and between assemblages, and allows the flexibility of observing aspects of form, size, and function independently or in combination (Dincauze 1976: 35).

The sample was taken from nine sites in New Brunswick and Maine. Because the chronologies of Nova Scotia and Prince Edward Island are not as well understood, no sites from these provinces were selected for comparison.

The criteria for selection were the presence of stemmed projectile points and definite temporal association for components. Sites were also included where assemblages have been identified as pertaining to the Tobique Complex, or where components of the site were assigned to the transitional period in question by the report's author or authors. All sites were professionally excavated, so provenience data are, for the most part, available. These sites are listed in Chapter 4.

Summary

A "chronological gap" appears at a pivotal point in the region's chronology that has complicated the in-depth examination of cultural development for Maine and the Maritime Provinces. In this chapter, a series of hypotheses were presented for testing. This may lead to clarification of this time period.

Chapter 2 represents a description of the region's culture history during the Late and Terminal Archaic and Early Ceramic Periods. The environmental context for these time periods is described in Chapter 3. Artifact descriptions and analyses are presented in Chapter 4 and Chapter 5 describes the conclusions of the research.

CHAPTER 2

CULTURE HISTORICAL CONTEXT

This chapter examines part of the culture history for Maine and New Brunswick, along with applicable material from the remainder of the Maritime Provinces, southern New England, Québec, and Labrador. External influences have had some effect on the study area and these have to be considered when describing the cultural sequence. A map showing the sites mentioned in the text is provided in Figure 1.

Several problems exist with defining the chronology for New Brunswick and Maine. First, professional archaeology in this area has not had a lengthy history (Connelly 1977; Spiess 1985). This has resulted in large areas of the region receiving little attention and consequently, the chronology of some areas is poorly known. For example, little research has been conducted in interior New Brunswick and attempts to generalize about the prehistory of the province as a whole have frequently required application of data from other parts of the province. Because of this factor, generalized chronologies for the region must be considered cautiously.

Secondly, the soils from the region are frequently acidic, yielding generally poor organic preservation. This limits the amount of data available on prehistoric material culture and, therefore, restricts the scope of retrievable information. This problem, in conjuction with the short history of research in the area,

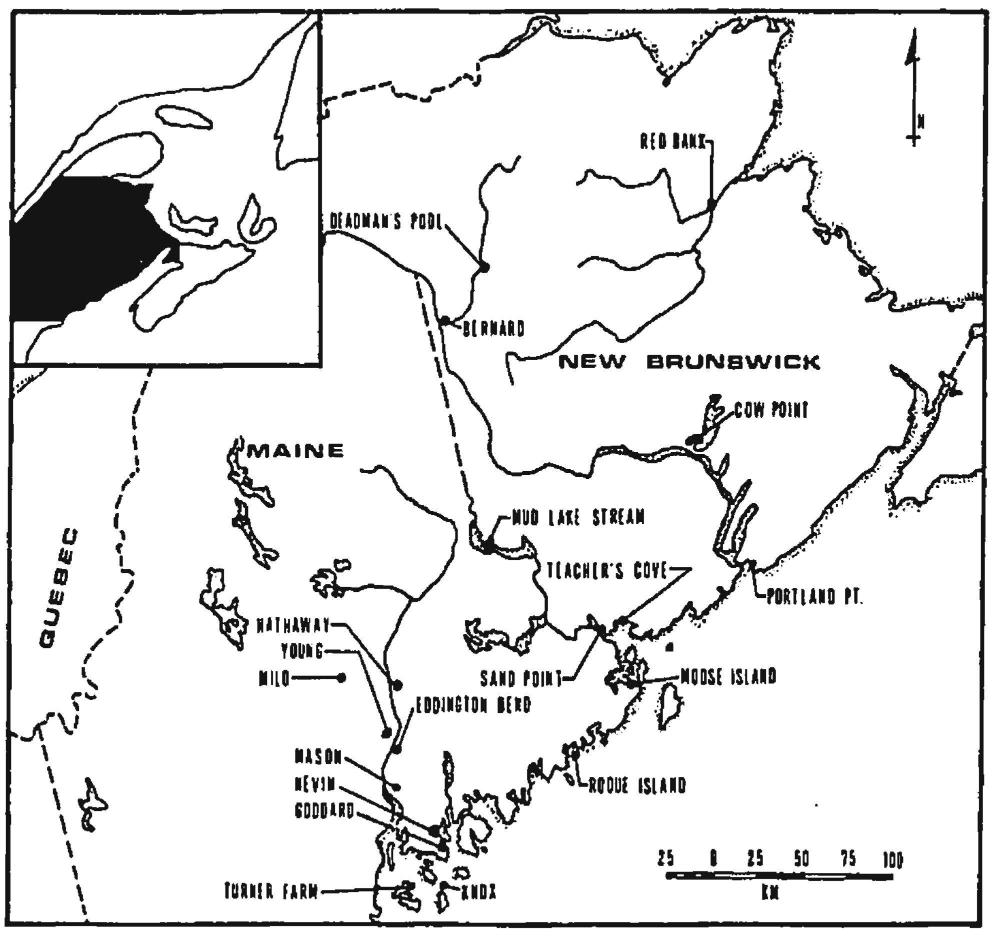

Figure 1. Map of New Brunswick and Maine showing sites mentioned in the text.

has limited the degree to which conclusive statements can be made about prehistoric human behaviour.

This has led to differences in opinion regarding the chronology of the Maine-Maritimes region. Debates have been conducted regarding the origins of tool traditions and the application of tradition names to particular parts of the region. Parts of the cultural sequence may be considered open to interpretation.

The following overview of the chronology of the region will examine the Late Archaic through the Early Ceramic Periods. Differing interpretations will be included.

The Late Archaic Period

The Late Archaic Period dates from approximately 6000-3500 B.P. (Table 1). By this definition, this period overlaps into the Terminal Archaic Period by as much as 500 years. Three principal tool traditions have been associated with the Late Archaic in the Maine-Maritimes region. These are the Maritime Archaic, Laurentian Archaic, and Shield Archaic Traditions.

The Maritime Archaic Tradition draws its name from its geographic location and that "because in every geographical area of its expression there seems to have been some part, in most areas a major part, of the culture oriented to the sea" (Tuck 1971: 350). Sites with excellent preservation, such as Port aux Choix (Tuck 1971), Turner Farm (Bourque 1975, 1976; Bourque *et al.* 1984), and Nevin (Byers 1979), include harpoon points, toggles, foreshafts, slate and bone

TABLE 1

RADIOCARBON DATES FROM MOOREHEAD PHASE

SITES IN NEW BRUNSWICK AND MAINE[a]

Lab No.	Site	Date (B.P.)	Range (B.P.)[b]
SI-1921	Turner Farm	4390±55	4445 - 4335
SI-1920	Turner Farm	4410±80	4490 - 4330
SI-1923	Turner Farm	4555±95	4650 - 4460
SI-988	Cow Point	3630±135	3765 - 3495
SI-989	Cow Point	3835±115	3950 - 3720
SI-1532	Stanley	3750±80	3830 - 3670
RL-368	Goddard	3700±130	3830 - 3570
GX-1708	Goddard	3910±90	4000 - 3820
SI-4255	Goddard	4995±100	5095 - 4895
SI-878	Hathaway	5165±185	5350 - 4980
Beta-23425	Sharrow	3890±80	3970 - 3810
Beta-18879	Brigham	3900±90	3990 - 3810
n/a	Derby	3970±80	4050 - 3890

[a] All dates reported using Libbey half life of 5568±30 years, uncorrected for atmospheric ^{14}C levels.

[b] Range given at 1σ level.

(Sanger 1973: 89; Sanger 1975: 62; Snow 1975: 50; Bourque and Cox 1981: 11; Petersen and Putnam 1987: 23; Petersen *et al.* 1988: 20)

---

spears and lances, barbed bone leister points, and bird darts. These may have been used for the hunting of seals, walrus, and porpoises, although the variety of seal hunted depended upon the location. Sea birds and marine and anadromous fish would also have been available resources (Tuck 1978a: 32-33). Gouges, axes, adzes, slate bayonets, stone rods, bone whistles or flutes, and bone needles are also known (Tuck 1976: 116). Tuck (1971: 354) sees this tradition as a distinct one aimed at exploiting the resources of the coastal and easily accessible interior areas, and

> ...is located in the Canadian Maritime Provinces with extensions northward into Québec, Newfoundland, and Labrador, southward into northern New England, especially the state of Maine, and westward up the St. Lawrence probably at least as far as the city of Québec (Tuck 1971: 350).

The date range for this tradition begins c. 8000-9000 B.P. in Labrador (McGhee and Tuck 1974: 117) with its decline c. 3500 B.P. south of the St. Lawrence River (Bourque 1976: 28).

Much of the data associated with the Maritime Archaic Tradition comes from a Late Archaic Period fluorescence of mortuary ritual. This is the Moorehead Burial Tradition, which extends from Maine through the Maritime Provinces and into Labrador (Sanger 1973; Tuck 1978b).

During the early part of this century, hundreds of Moorehead Tradition burials were excavated in Maine (Moorehead 1922; Willoughby 1935). Sites are less numerous outside Maine, however. There are only three definite Moorehead Tradition burials in New Brunswick. These are at Portland Point (Harper 1956), Cow Point (Sanger 1973), and, possibly, the Gerrish site near Newcastle (Allen 1989). Two charcoal samples from Cow Point have yielded radiocarbon dates of 3630±135 B.P. and 3835±115 B.P. (Sanger 1973: 89). Nova Scotia has also provided some evidence of this burial tradition (Tuck

1978b: 70; Stephen Davis 1988: personal communication). These burial sites have yielded characteristic Maritime Archaic Tradition artifacts as grave inclusions (Tuck 1978b; *e.g.* Moorehead 1922; Willoughby 1935; Harper 1956; Sanger 1973; Snow 1975).

Bourque (1975) has criticized the extensive geographical and chronological range for the Maritime Archaic Tradition. His argument is against the possibility of ethnic unity for peoples over such a large area and over such a long period of time.

> ...to apply the term 'Maritime Archaic Tradition' to the entire time range from c. 7000 B.P. on and to the entire Northeast obscures, or at least does not explain, what appear to be very significant variations in culture and environment through time and space....The obvious times which link the Atlantic Provinces to Maine are limited to the late sixth and early fifth millennia B.P., although more generalized similarities in tool inventories apparently exist from c. 5000 B.P. (Bourque 1975: 40).

The difficulties in determining direct cultural affiliations for this time period have prevented a satisfactory solution for these differences in opinion. Both arguments possess a great deal of merit. The physical evidence from known Archaic Period sites supports Tuck's proposals, while it is also reasonable to suspect an argument suggesting ethnic unity over so large an area and so long a period of time.

One attempt has been made to clarify the problem of these indistinct cultural affiliations. Bourque (1976) has separated the latter temporal portion for the Archaic Period from earlier times. This is classified into a Moorehead Phase with the following characteristics:

> 1. Clear chronological boundaries throughout most of its [geographical] area of ca. 4500-3500 B.P.

> 2. Definable geographic boundaries, including Maine...and the Atlantic Provinces.
>
> 3. Easily recognized technological constituents, including short grooved stone gouges, slender ground bone and slate points, plummets, bone harpoons and harpoon foreshafts, stemmed projectile points, animal figurines carved of bone and stone and bone flutes or whistles.
>
> 4. Extensive seasonal exploitation of large maritime game.
>
> 5. A trade pattern for the movement of exotic stone artifacts from the Atlantic provinces into Maine....
>
> 6. A religion or pattern of mortuary ceremonialism including interment of humans and dogs with red ochre and a limited range of distinctive utilitarian and 'symbolic' artifacts (Bourque 1976: 28).

Bourque's definition appears valid faced with the physical evidence for the time in question. However, this differs very little from Tuck's definition for the Maritime Archaic Tradition, serving only to restrict the time range.

Sanger (1973, 1989) has also argued the application of data predominantly derived from mortuary sites to entire cultural systems. Sanger (1973: 106) proposed the concept of a Moorehead burial tradition, rather than formulating sweeping taxonomic entities which assumed all cultural sub-systems from data provided from the mortuary sub-system. This perspective has been repeated in a reconsideration of the old and new data acquired since this was first proposed.

> Some progress has been made in the search for habitation sites of the societies that contributed to the Moorehead burial tradition cemeteries (Borstel 1982; Bourque and Cox 1981; Petersen and Sanger 1987; Sanger *et al.* 1977). But even here, detailed analyses that would permit an integration of habitation and cemetery sites are inadequate. In short, we still know too little about the non-mortuary aspects of the culture(s) to warrant the formulation of yet another major whole cultural tradition (Sanger 1989).

Sanger (1973, 1975, 1986, 1989) has also disagreed with Tuck's interpretation of the Maritime Archaic. Sanger (1986: 145) proposes that parts of the region were inhabited by peoples using lithic tools of the Laurentian Tradition described by Ritchie (1965).

> [The Laurentian Tradition's] most diagnostic traits, occurring in considerable morphological variety, comprise the gouge; adz; plummet; ground slate points and knives, including the semi-lunar form or ulu, which occurs also in chipped stone; simple forms of the bannerstone; a variety of chipped-stone projectile points, mainly broad-bladed and side-notched forms; and the barbed bone point (Ritchie 1969: 79).

This is based upon the appearance of Laurentian-like materials at sites such as Hirundo (Sanger *et al.* 1977) and Young (Borstel 1982) in central Maine, Goddard (Bourque and Cox 1981) in Blue Hill Bay, and at Big Lake in Washington County, Maine (S. Cox 1989: personal communication). Diagnostic artifacts have also been surface collected in Nova Scotia (Sanger 1986: 145). These include cognates of Otter Creek side notched projectile points (Ritchie 1969a: 87, Plate 26) and fully grooved ground stone gouges (*e.g.* Erskine n.d.).

The possible relationships between Laurentian Tradition and other Late Archaic manifestations is unclear. The Laurentian Tradition dates between c. 5800-4400 B.P. in this region (Sanger *et al.* 1977; Petersen *et al.* 1988: 20), and thusly, appears to have little relationship to later periods of time.

Regardless of these differences in opinion, one point can be made about this tradition. There was a Late Archaic presence during at least the early portion of the Terminal Archaic Period in the region, although the relationship between this and other Terminal Archaic cultural manifestations has never been clear.

The last of these Late Archaic Period tool traditions is that of the Shield Archaic. This has been proposed as a Boreal forest adaption, distributed in the Northwest Territories and northern Manitoba, Ontario, Québec, Labrador, and parts of the Maritime Provinces (see Wright 1972: xx, Figure 1). Assemblages are comprised of varying proportions of:

> ...biface and uniface blades, lanceolate and side-notched projectile points, a wide range of scraper varieties, crude chopping and scraping-cutting tools, and a paucity or absence of stone grinding (Wright 1968, cited in Tuck 1976: 114).

Scrapers make up a major proportion of artifacts recovered from Shield Archaic sites, comprising more than 40% of assemblages (Wright 1972: 5). The temporal range of the Shield Archaic Tradition is poorly understood, and poor organic preservation at sites has left only lithic assemblages.

The Deadman's Pool site, a Tobique Complex site in interior New Brunswick, has been related to the Shield Archaic Tradition (Sanger 1971b; Wright 1972: 66-67), although Sanger has reconsidered his interpretation (cited in Turnbull n.d.). This was originally based upon the shared traits of large implements based upon coarse-grained raw materials, a high percentage of biface lanceolates, uniface lanceolates, and many carefully formed end scrapers (Sanger 1971b: 20). Wright (1972: 67) has also closely related this site to the Shield Archaic Pointe de Camp 2 component from the Mistassini-Albanel region of Québec, an assemblage "guess dated" to c. 4950 B.P. (Martijn and Rogers 1969).

However, arguments exist regarding the presence of the Shield Archaic Tradition in the region. Tuck (1984: 40, n.d.) and Turnbull (n.d., q.v. Chapter 1) have proposed an alternative to Shield Archaic affiliation of Tobique Complex artifacts. These call for the materials pertaining to the transition between the Archaic and Ceramic Periods in the region.

Tuck's (n.d.) argument is based upon the criteria used to affiliate the Tobique Complex with the Shield Archaic. These were the frequency of artifact classes within the assemblage (Wright 1972: 66-67). Wright (1972: 67) proposes that, at the Deadman's Pool site, the percentages of scrapers (26.2%) and biface blades (44.9%) conform to percentages from sites of the Mistassini-Albanel region of Québec. However, stylistic differences occur between these assemblages. There are large straight to expanding-stemmed projectile points from Dead Man's Pool, while those from Québec are side-notched. Bifaces from Québec do not appear to be as well made as those from New Brunswick, and Québec scrapers are smaller and appear to be less completely flaked (Tuck n.d.).

These differences underline the key problem with the defining characteristics of the Shield Archaic Tradition. Frequencies of artifact classes alone are insufficient as the criterion for determining relationships between assemblages. The variable forms exhibited by artifacts assigned to this tradition (Wright 1972) raise questions on how adequate such a definition can be, and further refinement of this is required.

The Terminal Archaic Period

As mentioned in Chapter 1, much of the Terminal Archaic Period is poorly known. This time commences c. 4000 B.P. with the appearance of Susquehanna Tradition assemblages in the region (q.v. Table 2). The end of the period is marked by the appearance of pottery in the archaeological record. Dating for this differs in various locales; however, pottery use appears to have been adopted throughout the area by 2500 B.P. This date is frequently provided as the approximate starting point for the Early Ceramic Period, although pottery use does appear in some places several hundred years earlier (*e.g.* Allen 1980; Hamilton and Petersen 1982; Belcher 1987).

By approximately 4000 B.P., parts of the region were occupied by peoples associated with the Susquehanna Tradition. Susquehanna Tradition artifacts are known from sites in Maine and New Brunswick, with surface collected finds also known from Nova Scotia.

Diagnostic assemblages for the Susquehanna tradition are comprised of distinctive broad-bladed, stemmed points and knives, and cremation burials associated with red ochre, full-grooved axes, pecked and flaked adzes, pounding pestles, steatite bowls and strike-a-lights (Ritchie 1969a; Griffin 1978:

TABLE 2

RADIOCARBON DATES FROM SUSQUEHANNA TRADITION SITES IN MAINE AND NEW BRUNSWICK[a]

Lab No.	Site	Date (B.P.)	Range (B.P.)[b]
SI-889[c]	Hathaway	2920±135	3055 - 2785
SI-887	Hathaway	3355±125	3480 - 3230
SI-888[c]	Hathaway	3620±150	3770 - 3470
SI-890[c]	Hathaway	3840±155	3995 - 3685
SI-789	Eddington B.	3430±145	3575 - 3285
N/A	Turner Farm	3480±75	3555 - 3405
SI-1924	Turner Farm	3515±80	3595 - 3435
SI-2404	Turner Farm	3610±90	3700 - 3520
SI-1919	Turner Farm	3630±85	3715 - 3545
SI-1922	Turner Farm	3650±75	3725 - 3575
SI-4247	Turner Farm	3700±85	3785 - 3615
SI-2390	Turner Farm	3710±80	3790 - 3630
SI-4248	Turner Farm	3825±65	3890 - 3760
SI-2405	Turner Farm	3855±75	3930 - 3780
SI-2393	Turner Farm	4020±80	4100 - 3940
Beta-76	Mud Lake St.	4010±100	4110 - 3910
Beta-11206	Mud Lake St.	4000±180	4180 - 3820
Beta-25023[c]	Brockway	3670±90	3760 - 3580
Beta-25022[c]	Brockway	3730±90	3820 - 3640
Beta-19970[c]	Brockway	3740±100	3840 - 3640
Beta-20719	Sharrow	3650±110	3760 - 3540

[a] All dates reported using Libbey half life of 5568±30 years, uncorrected for atmospheric ^{14}C levels.

[b] Date range given for 1σ.

[c] Date obtained from presumed Susquehanna feature.

(Snow 1975: 51, 53; Bourque 1975: 22; Bourque *et al.* 1984: 115, Table 1; Deal 1986: 78, 1988: personal communication; Petersen 1988: personal communication).

234). Similar complexes are known from southern New England (Dincauze 1968, 1972, 1975).

In Maine, Susquehanna components have been excavated at Turner Farm (Bourque 1975, 1976; Bourque *et al.* 1984), Hirundo (Sanger and McKay 1973; Sanger *et al.* 1977), Eddington Bend, Hathaway (Snow 1975: 50-51), and the Young site (Borstel 1982). The earliest associated radiocarbon date from the region is 4020±80 B.P. and was obtained from the Turner Farm site (Bourque *et al.* 1986: 115, Table 1); however, the majority of related radiocarbon dates appear during the period of 3800-3400 B.P. (q.v. Table 2).

In New Brunswick, scattered finds have occurred at sites such as Teacher's Cove (Davis 1978: 55, Plate Vd, h) and Portland Point, where steatite bowl fragments were recovered (Harper 1956). A steatite bowl has also been recovered from the French River area in the Saint John River drainage. The Mud Lake Stream site on the Chiputneticook-St. Croix drainage has produced a Susquehanna component with large, stemmed projectile points, bifaces, drills, and an unfinished celt dated at 4010±180 B.P. (Deal 1985, 1986: 78). There are no excavated Susquehanna sites in Nova Scotia, but privately collected materials from southwestern Nova Scotia include some broad, stemmed projectile points and a fully grooved axe. These, in the Wilbur Sollows and Thomas Raddell collections, are presently held at the Nova Scotia Museum. Other materials have also been recovered from Lake Rossignol and Gaspereau Lake (Tuck n.d.). No Susquehanna artifacts have yet been reported from Prince Edward Island or Cape Breton Island.

The origin for this tool tradition in the Northeast has been debated. This debate centers on whether the Susquehanna Tradition represents diffusion of a trait complex into the region or the migration of Susquehanna Tradition tool users into the area (Snow 1980: 245-247).

A migration hypothesis has been proposed by Turnbaugh (1975). He proposes that Broadpoint tool users migrated throughout the Eastern Seaboard of North America as an environmental reaction. A northward adjustment of migration areas for the American shad (*Alosa*) and alewife (*Pomolobus*) caused by sea level adjustments established favourable conditions for Broadpoint Tradition peoples in northerly areas. Concomitant population increases among these peoples necessitated increasing territorial requirements. As shad and alewife migrations moved into more northerly parts of the Atlantic coast, these people expanded into these areas.

Rebuttal for this has come from Cook (1976). This is primarily concerned with Turnbaugh's (1975) consideration of a spread of Broadpoint Tradition artifacts across the Atlantic coast of the United States and into the Maritime Provinces. Cook examined this proposed spread of Broadpoint culture using seven biocultural dimensions and 14 subcategories for these. These considered stylistic, technological, adaptational, trade, mortuary, biological, and sociocultural dimensions. This led to the conclusion that "this dimensional analysis of Broadpoint Culture, as defined by Turnbaugh, did not exist. Moreover, the migration claimed by Turnbaugh on the basis of radiocarbon dates cannot be substantiated" (Cook 1976: 350). Instead, Cook concludes that the appearance of Broadpoint forms was a horizon, a minor technological innovation adopted by a variety of local cultures along the Atlantic seaboard.

Sanger (1975) has also examined the possibility of migration causing the appearance of Susquehanna Tradition materials. He concludes that migration is probably the best explanation, using the five criteria proposed by Rouse (1958) for indicating migration in the archaeological record. These are:

> 1. identify the migrating people as an intrusive unit in the region that it has penetrated;
>
> 2. trace this unit back to its homeland;
>
> 3. determine that all occurrences of the unit are contemporaneous;
>
> 4. establish the existence of favorable conditions for migration, and
>
> 5. demonstrate that some other hypothesis, such as independent invention or diffusion of traits, does not better fit the facts of the situation (Rouse 1958: 64).

As a sixth criteria, Sanger (1975: 73) has added that one should "establish the presence of all cultural subsystems and not an isolated one such as the mortuary subsystem." Sanger concludes that these criteria can be met for the Terminal Archaic in northern New England.

> The homeland can be identified; the chronologies are right; the environmental conditions for population movements are favorable. ...there is no evidence for an independent *in situ* development; and the number of traits including all subsystems examined suggest strongly actual population movement (Sanger 1975: 73).

Work at Turner Farm and elsewhere has also led to support of this proposal from Bourque (1975). "The intrusion of the Susquehanna Tradition into central

Maine seems, at this time, to represent the migration of substantial new populations into the area from southern New England" (Bourque 1975:43).

There is no clear consensus on the role of the Susquehanna Tradition in subsequent cultural development in the region. Two hypotheses have been proposed to explain this. The first suggests that Susquehanna Tradition peoples spread throughout the region and were ancestral to the peoples present at the time of European contact. Alternatively, the second suggests that Susquehanna Tradition peoples either became extinct or merged with other peoples in the region (Tuck 1984: 36). Unfortunately, this problem has not been the subject of detailed research. Published research indicates that the most likely date for the decline of Susquehanna Tradition assemblages in the region is c. 3400 B.P. (Sanger 1986: 145). Following this is the period of uncertainty which continues until the Ceramic Period.

The Early Ceramic Period

The beginning of the Ceramic Period is usually defined by the introduction of pottery (Tuck 1984: 2; Sanger 1986: 148). The Early Ceramic Period dates from c. 2500 B.P. to 2000 B.P. (q.v. Table 3).

A key characteristic of Early Ceramic Period lithic assemblages is diversity and a number of artifact styles is known. Some differences exist for regional artifact sequences.

TABLE 3

RADIOCARBON DATES FROM EARLY CERAMIC PERIOD SITES IN NEW BRUNSWICK AND MAINE[a]

Lab No.	Site	Date (B.P.)	Range (B.P.)[b]
N/A	Knox	2720±90	2810 - 2630
N/A	Knox	2270±70	2340 - 2200
N/A	Knox	2020±70	2090 - 2000
Beta 23443	Mud Lake S.	2750±80	2830 - 2670
Beta 11205	Mud Lake S.	2470±110	2580 - 2360
S-1605	Oxbow	2640±50	2690 - 2590
S-1653	Oxbow	2600±60	2660 - 2540
S-1805	Oxbow	2480±105	2585 - 2375
S-1606	Oxbow	2145±65	2210 - 2080
S-1652	Oxbow	2120±65	2185 - 2055
S-1806	Oxbow	2075±55	2130 - 2020
S-1804	Oxbow	2060±100	2160 - 1960
Beta 5486	Kidder Pt.	2600±110	2710 - 2490
Beta 4192	Mason	2410±60	2470 - 2350
Beta 4026	Mason	1960±70	2030 - 1890
S-2215	Partridge I.	2400±105	2505 - 2295
Y-1293	Minister's I.	2370±80	2450 - 2290
Beta 21263	Minister's I.	1930±110	2040 - 1820
RL-344	Augustine	2330±110	2440 - 2220
RL-369	Goddard	2300±120	2420 - 2180
GX-2463	Turner Farm	2275±130	2405 - 2145

[a] All dates reported using Libbey half-life of 5568±30 years, uncorrected for atmospheric ^{14}C levels.

[b] Range given at 1σ level.
(after Bourque 1976: 23; Turnbull 1976: 55; Wilmeth 1978: 151; Allen 1980: 144-145; Bourque and Cox 1981: 12; Klein 1983: 633; Spiess and Heddon 1983: 54; Belcher 1987; M. Deal 1988: personal communication; L. Jefferson 1988: personal communication; Bishop 1983: 119)

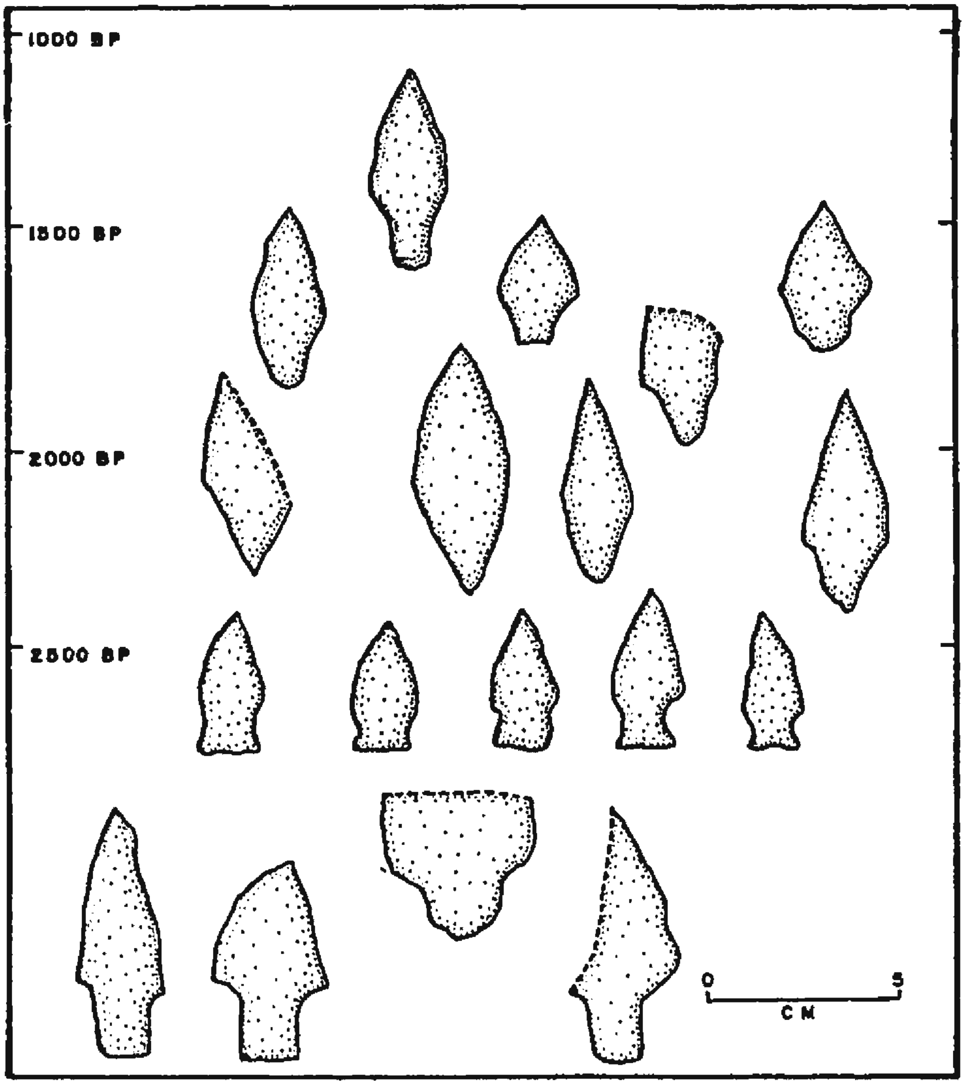

Figure 2. Projectile point sequence from the Oxbow site (after Allen 1980: 136, Figure 4.)

The projectile point sequence for the Oxbow site is radiocarbon dated and stratigraphically supported (Allen 1980: 136, Figure 4; q.v. Figure 2). Here, narrow stemmed points are replaced by small expanding stemmed projectile points, appearing c. 2600 B.P. Similar projectile points have also been found in the large surface and excavated collections from sites located at the confluence of the Northwest and Little Southwest Mirimachi Rivers (Allen 1980: 141). The points appear to have been utilized in the area until c. 2400-2200 B.P., when bipoints appear in the sequence.

The bipoints appear to bear little resemblance to the preceding expanding-stemmed points. These, like their predecessors, are found throughout the Miramichi River district (Allen 1980: 141), as well as at Fulton Island (Foulkes 1981), where a radiocarbon date of 2045±45 was obtained (Allen 1980: 142). Bipoints have also been recovered from Passamaquoddy Bay sites, such as Minister's Island (Linda Jefferson 1988: personal communication).

Bipointed forms are present in the Oxbow sequence until the appearance of small stemmed points, associated with a date of 1745±70 B.P., with similar forms dated near 1680 B.P. at Fulton Island (Allen 1980: 143).

Small stemmed points are dated at 1670±100 B.P. at Cap-à-l'Orignal on the Gaspé Peninsula (Dumais 1978: 72). The small stemmed points appear to have gradually evolved from bipoint forms at both Oxbow and Fulton Island (Allen 1980: 142-143). These may have continued in the sequence until as late as 1000 B.P. in northeastern New Brunswick (Allen 1980: 144).

The lithic sequence for the Early Ceramic Period in Maine and southern New Brunswick differs slightly from that of northeastern New Brunswick. To the south, straight and contracting-stemmed projectile points are distinctive until the end of the Middle Ceramic Period. By 1000 B.P., there is divergence into two basic forms. These are the side or corner-notched form, found in eastern Maine and Passamaquoddy Bay, while triangular forms with straight or slightly concave bases are known from central and western Maine and southwestern Nova Scotia (Erskine n.d.). There appears to be a decrease in the number of ground stone artifacts when compared to Late Archaic Period sites from the area. In eastern Maine, there is a gradual increase in the number of scrapers at Ceramic Period sites. These show a decrease in size through the period (Sanger 1979: 111, 114).

Intrusive to these sequences are two externally-based cultural manifestations. These are the Middlesex Burial Tradition, associated with the Adena culture of the Ohio River Valley (Turnbull 1976, 1986) and the Meadowood Phase of New York state (Wintemberg 1937; Allen 1983).

Adena-related materials have been recovered from the Augustine and McKinlay sites at Red Bank/Sunny Corners (Turnbull 1976, 1986), and Minister's Island (Sanger 1986: 147-148) in New Brunswick, the Skora (S. Davis 1988: personal communication), Eaton and Woodman's Orchard sites (Deal 1988) and near Gaspereau Lake (Preston 1974: 4) and Yarmouth, Nova Scotia, and near Grand Lake Stream (Sanger 1986: 147-148) and at the Turner Farm

(B. Bourque 1988: personal communication) and Mason (Moorehead 1922) sites in Maine.

The Middlesex Burial Phase is defined by a set of grave goods included as part of the burial ritual: stemmed points, bifaces, gorgets, boatstones, blocked-end tubular pipes, celts, scrapers, and copper beads (Turnbull 1986: 21). Regional differences emerge between the Maritime Provinces and more southerly expressions of this tradition; however, this is probably to be expected in view of the geographical range which exceeds 2,000,000 square miles (*e.g.* Turnbull 1976: 61). These differences are the use of square-stemmed projectile points, as opposed to the lobate-stemmed ones found at the Boucher and Swanton sites in Vermont (Perkins 1874), the inclusion of pottery in Maritimes' graves, and the local preference for chipped and ground adzes rather than southern pecked and polished ones (Turnbull 1986: 21-22). Many of the grave goods are of Ohio/Midwestern origin, although local materials are also used for grave inclusions (Turnbull 1976: 55, 1986: 22).

The associated burial practices themselves are not as consistent as their artifact inventories. Primary and secondary inhumation and cremation were practiced, and all three appear to have been used at the Augustine site (Turnbull 1976: 55, 57). Bodies at the MacKinlay site were wrapped in birch bark (Turnbull 1986: 8), and some birch bark was also recovered from some burials at Augustine (Turnbull 1976: 54). The practice of burial mound construction is evident at Augustine (Turnbull 1976), while the MacKinlay and Minister's Island burials may have been pit inhumations (Sanger 1986: 147-148; Turnbull 1986:

8). The reasons behind such differentiation within and between sites may be due to temporal separation or differentiation in individual status (*e.g.* Tainter 1978; O'Shea 1984).

Radiocarbon dates exist for several Middlesex burial sites in the region. Dates of 2410±60 and 1960±70 have been obtained from the Mason site in Maine (Klein 1983: 633). Augustine has been dated at 2330±110 B.P. (Turnbull 1976: 55), while the Minister's Island burial was dated at 1930±110 (Linda Jefferson 1988: personal communication).

There are differing opinions on why this intrusive burial tradition is found in the region. Turnbull (1976: 61) outlines three possibilities for this. These are the migration of people from the Ohio Valley into the surrounding regions, the presence of a widespread trade network diffusing goods and ideas into the area, and that people from the Maritimes may have travelled south, acquiring the exotic goods and ideas from the source area. Of these, he places the greatest likelihood on the second possibility.

> At this stage of my thinking about the site [Augustine], the exchange network hypothesis seems to be a much more profitable avenue of exploration, although no possibility can be discarded without examination. The presence of quantities of the dominant local material in the site certainly points to a local orientation. In the Northeast, the spread of the material over 2 million square miles, the temporal range, and the lack of habitation sites speaks not of a single movement of one people, but of an extensive interconnection of local peoples through specialized trade (Turnbull 1976: 61).

Allen (1981: 143) holds the opinion that an amended migration theory is more applicable for explaining the presence of Middlesex sites. Her proposal is based upon the similarity among early pottery excavated at Oxbow and

Middlesex pottery from the central burial pit at Augustine and from the MacKinlay collection (Allen 1981: 142). Further, comparisons are drawn between the Oxbow small expanding-stemmed points and nine similar ones recovered from the Middlesex Phase Rosenkrans site in New Jersey (Allen 1981: 141). This proposal calls for two northward migrations of Adena people into the region, with eventual mutual assimilation of the Adena and indigenous peoples (Allen 1981: 143-144).

Problems emerge with this proposal (*c.f.* Rutherford 1989). The first is that, even though the Red Bank/Sunny Corners area is the location for two Middlesex Phase burial sites, no Adena habitation sites have yet been proposed for the area. The absence of habitation sites makes an Adena migration questionable. The presence of possibly related pottery and projectile points at the Oxbow site is also inconclusive evidence for migration, as the diffusion of these traits is equally likely. Further, the differentiation in burial practices also raises questions, although this may be due to additional factors yet to be recognized. The presence of a single cultural subsystem, in this case mortuary ritual, cannot be taken as confirmation of migration in itself. Until more data become available, the diffusion of the Middlesex Burial Phase into the region through trade must be considered the most likely hypothesis.

The second of these "intrusive cultural manifestations" is the Meadowood Phase. Diagnostic Meadowood artifacts include side-notched projectile points, cache blades, stone gorgets, birdstones, adzes, and a few gouges. Vinette I pottery is also considered diagnostic (Snow 1980: 266). This is a...

> ...moderately thick, coarse to medium grit-tempered, gray to black or buff colored ware, derived from fairly large, unornamented, straight-sided, conoidal-based vessels, cord- or fabric-roughened over the entire surface, both outside and inside (Ritchie 1980: 194).

Tubular pipes, similar to those of the Middlesex Phase but made of clay, are also noted. These are made of a clay having the same paste characteristics as Vinette I pottery (Snow 1980: 266).

Most data available for the Meadowood Phase come from New York state, and the majority of these from burial sites. Some New York habitation sites have been discovered, with site distribution indicating a preference for flat terrain near rivers and small lakes (Ritchie 1969: 181).

This riverine/lacustrine settlement pattern is copied in the Maine-Maritimes' region. Meadowood artifacts have been recovered from the Mud Lake Stream site (Deal 1986) in the Chiputneticook-St. Croix drainage, and at the Tozer (Wintemberg 1937) and Wilson (Allen 1983) sites in the Red Bank/Sunny Corners area in northeastern New Brunswick. Spot finds of Meadowood projectile points are also recorded for other parts of the province of New Brunswick (Turnbull n.d.). Meadowood Phase sites are also known from Penobscot Bay (Belcher 1987; Bourque 1988: personal communication). Vinette I pottery has also been recovered at Maine sites, but there are few radiocarbon dates available (see Petersen and Sanger n.d.). These are dates of 2720±90 B.P. and 2270±90 B.P. from the Knox site in Penobscot Bay associated with corded pottery; however, only the latter date is associated with lithic artifacts similar to Meadowood Phase assemblages (Belcher 1987). Corded pottery, cognate with

Vinette I, has also been recovered from the Great Diamond Island site, Casco Bay, Maine, associated with a date of 2315±130 B.P. (Hamilton and Yesner 1981: 44).

Two dates may be associated with Meadowood occupations at Mud Lake Stream. These were 2470±110 B.P., from a charcoal sample taken from near and stratigraphically below a Meadowood feature and a date of 2750±80 from an undefined feature (M. Deal 1988: personal communication). The latter was obtained from a partially excavated feature, discovered on the last day of the 1985 field season. It was associated with a small bone point. No diagnostic Meadowood artifacts were recovered from this feature, and without further investigation, its significance is unknown.

The presence of pottery at many Meadowood sites allow for their temproal placement in the Ceramic Period; however, the absence of ceramics at the Tozer site does not preclude a Ceramic Period date for this site also. The Tozer site represents two cremation burials, with red ochre, Meadowood cache blades, and a copper awl recovered (Wintemberg 1937). Meadowood burials, however, are not noted for the inclusion of ceramic objects as grave goods (Ritchie 1980: 199; Snow 1980: 266, 268), so the absence of pottery cannot be seen as pre-Ceramic Period usage.

In New York state, where the Meadowood Phase appears to have centered, some radiocarbon dates are available from Meadowood sites. These range from 3180±95 B.P. to 2580±100 B.P. (Granger 1978: 28, Table 2.2). The applicability of this date range to the Maritime Provinces awaits the discovery of further Meadowood sites with datable charcoal. In view of the dates that are available, it appears that Meadowood in Maine and the Maritimes emerges later than it does to the south.

Like the Middlesex Phase, Meadowood Phase manifestations should probably be viewed as the results of diffusion, although the possibility of migration should not be ruled out until more info:. :ation becomes available. The diffusion hypothesis is supported by the fact that Meadowood peoples were known for the conduct of long-distance trade (Ritchie 1980: 196; Snow 1980: 267), which may account for the appearance of Meadowood traits in the Maine-Maritimes region.

Southern New England

The hiatus for the Maine-Maritimes region's Terminal Archaic Period is not seen to the south. Evidence exists for continuous occupation to the south through the transition between the Archaic and Ceramic Periods. A brief description of the southern chronological sequence will be provided for comparison.

In southern New England, there is continuous cultural development pertaining to the Susquehanna Tradition throughout the Terminal Archaic. This is defined in a series of phases, commencing with the Atlantic Phase. The Atlantic Phase dates from 4140±100 B.P. in southeastern New England (Dincauze 1972: 56). This phase terminates c. 3600 B.P., with the beginning of the Watertown Phase (Dincauze 1972: 57). Three Watertown sites have been dated in southern New England, yielding results of 3470±125 B.P. in Massachusetts (Dincauze 1968: 45), 3430±100 B.P. in Rhode Island (Fowler 1968: 26), and 3620±110 B.P. in New Hampshire (Dincauze 1968: 76).

The final phase in the New England Susquehanna Tradition sequence is the Orient Phase (Dincauze 1972: 60; Ritchie 1980: 164-178). Dates from New York state span between c. 2950 B.P and 2715 B.P. (Ritchie 1980: 165), which place this phase during the hiatus in Maine and the Maritimes. Orient Phase sites are characterized by a distinctive projectile point known as the Orient fishtail, "found in all habitation and burial sites, nearly every grave, and constitutes over 88 per cent of the points used in this culture" (Ritchie 1980: 171). The end of the Orient Phase marks the end of the Terminal Archaic Period, with the beginnings of the Meadowood Phase in New York state (Granger 1978: 28, Table 2.2; Ritchie 1980: xxx-xxxi, Figure 1).

Summary

The culture history of the Maine-Maritimes region is plagued by a series of interpretative problems. Cultural relationships from the Late Archaic, Terminal Archaic, and Early Ceramic Periods are frequently poorly understood. The intervening period between the Archic and Ceramic Periods is the least known of these times. Many researchers have speculated on the Archaic/Ceramic Period transition and a few hypotheses have been offered. However, until now, research has not been explicitly applied to provide clarification for this time frame.

CHAPTER 3

ENVIRONMENTAL CONTEXT

The reconstruction of the environment within the study region relies heavily upon geological and palynological data. Since there are no directly applicable data for parts of the region, some application of previous research from other parts of the region must be undertaken (*i.e.* it is largely a speculative exercise). Further, the methodologies used in paleoenvironmental reconstruction are frequently biased by the formation procedures which create the record being studied (Butzer 1982: 177-181).

The majority of available paleoenvironmental data from the region come from palynological studies (*e.g.* Potzger and Friezner 1948; Bradstreet and Davis 1975; Mott 1975; Bernabo and Webb 1977; Sanger *et al.* 1977; Davis and Jacobson 1985). These studies have attempted to correlate forest species present at a particular time with fossil pollen taken from ponds and bogs. Problems are inherent with this methodology, particularly in correlation of fossil pollen assemblages to climate (Terrasmae 1973: 203), the small number of radiocarbon dated profiles from the region (Bradstreet and Davis 1975: 8; Sanger *et al.* 1977: 462), and correlation of fossil pollen studies with those of modern pollen rain (Livingstone 1968: 87). Descriptions of the paleoenvironmental setting based upon palynological data must consider the possible effects of these factors.

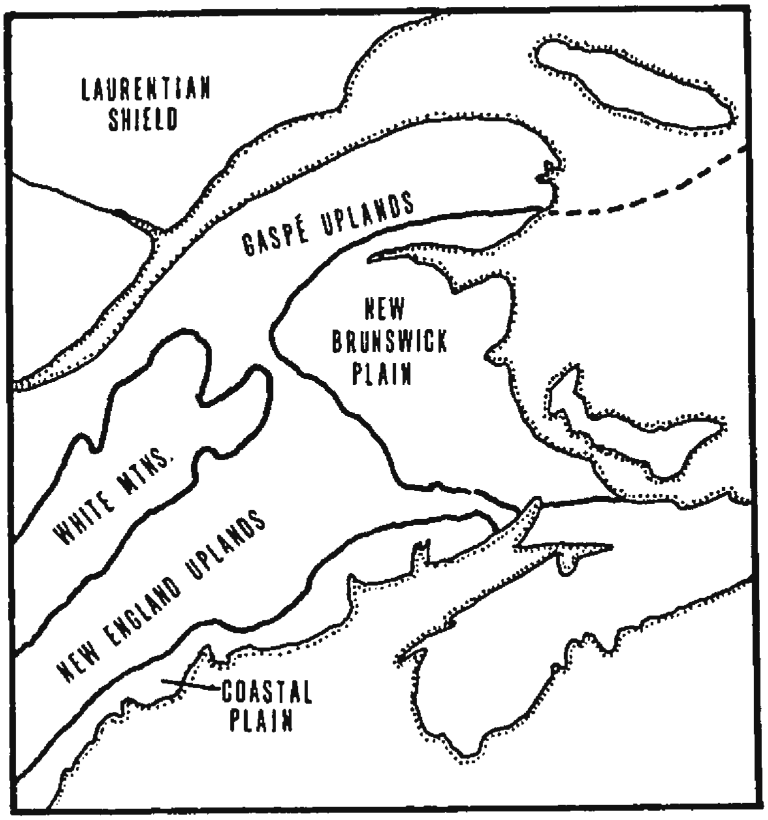

Figure 3. Map showing physiographic relief zones from New Brunswick and Maine (after Pounds 1971).

<u>The Physical Environment</u>

The physiography of New Brunswick can be broken into four divisions. These are the Maritime Plain, the New Brunswick Highlands, Chaleur Uplands, and Notre Dame Mountains (Bostock 1970). Maine physiography can be separated into three relief zones: the White Mountains, New England Uplands, and Coastal Plain (Pounds 1971: 85, Figure 22). Generally, the interior of the study area is mountainous with a decline in elevation towards the sea coast, although this is not true throughout. The relief zones are shown in Figure 3.

A variety of waterways are available to provide both transportation and ecological zones for exploitation. Maine has more than 2200 lakes and ponds and over 5100 rivers and streams (Bearse 1969: 4). Principal among the river drainages are the Penobscot, St. Croix (shared with New Brunswick), Kennebec, Androscoggin, and Aroostook Rivers. New Brunswick also offers several river drainages, including the St. John, Miramichi, Tobique, Restigouche, and Richibucto Rivers. Access to the remainder of the Northeast is available via the St.Lawrence River or portages via the river drainges in Maine to those of New York state and Ohio.

The sea coast offers a considerable number of sheltered bays and estuaries, which may be illustrated using the coast of Maine. The direct distance between Maine's northerly and southerly coastal boundaries is c. 370 km, while the distance along the coast, tracing along bays and inlets, is 6000 km (Hay and Farb 1966: 35). The present coastline does not accurately reflect that of the time period in question, however, due to sea level change.

The physical diversity of the study area presents a broad variety of ecological zones for exploitation by prehistoric peoples. This may be seen in the variety found in faunal assemblages recovered from sites in the region (*e.g.* Bourque 1975; Bonnichsen and Sanger 1977; Yesner 1984; Deal 1986). A list of faunal remains from New Brunswick and Maine sites is presented in Appendix

A. Because of poor preservation at most sites, the list should not be considered completely representitive of prehistoric use of faunal resources.

The coastal zone provided marine mammals, such as seals (*Halichoerus*, *Phoca*, and *Cystophora*) and walrus (*Odobenus rosmarus*), fish, birds, and shellfish, including soft shelled clam (*Mya arenaria*) and mussels (*Mytilus* and *Volsella*).

The interior provided a variety of mammals, including white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), beaver (*Castor canadiensis*), mink (*Mustela vison*), otter (*Lutra canadensis*), wolf (*Canis lupus*), fox (*Vulpes vulpes*), lynx (*Lynx Canadensis*) and bobcat (*Lynx rufus*). Lakes and ponds in the interior provided a hunting place for waterfowl and a variety of such are known from faunal records. Further, the interior waterways from the region are known for several species of game fish, including salmon (*Salmo salar*) and trout (*Salvelinus*).

Changing sea levels must also be considered in an examination of the environment of the study region. In the Bay of Fundy/Gulf of Maine region, sea levels have been rising at an uneven rate. It does appear that the region was affected by tidal amplitude by 4000 B.P., and that the rate of eustatic change was greatest during the period between 7000 B.P. and 4000 B.P, and has greatly reduced since 2500 B.P. (Scott and Greenberg 1983: 1561-1562). The rate of decline for the Maritime Provinces at present averages approximately 30 cm per century (Grant 1975); however, this rate will vary with each particular location.

However, some of the shores of eastern New Brunswick are presently emerging. This varies at a rate of near zero at Cape Tormentine to near 1 m per century near Miramichi Bay. Other parts of the eastern coast are submerging at rates of 25-50 cm per century (Bird 1980: 119).

The differential effects of past sea level changes complicates present paleoenvironmental reconstructions for coastal areas in the Maritime Provinces and Maine. For example, some present estuaries may well have been created by sea level rise following the transition between the Archaic and Ceramic Periods. This may affect the interpretation of settlement patterns in the region, further complicated by the effects of differential site loss through erosion (*e.g.* Simonsen 1978). The rising or lowering sea levels will also affect the gradient of rivers (Sanger 1975: 30-32), resulting in changes in migration for anadromous and catadromous fish and possibly in the course of the river itself. An example of the latter may be seen at the Deadman's Pool site, located on a former channel of the Tobique River (Sanger 1971b: 7).

Palynological Record

Comparison of fossil pollen profiles does reveal a good degree of consistency (Figure 4), and from this, trends become apparent. These indicate that from c. 4000 B.P. to 200 B.P., the profiles are dominated by hardwood and conifer species, with a decline in hemlock (*Tsuga*) values at the beginning of this period (Bradstreet and Davis 1975: 16). This decline may be attributed to

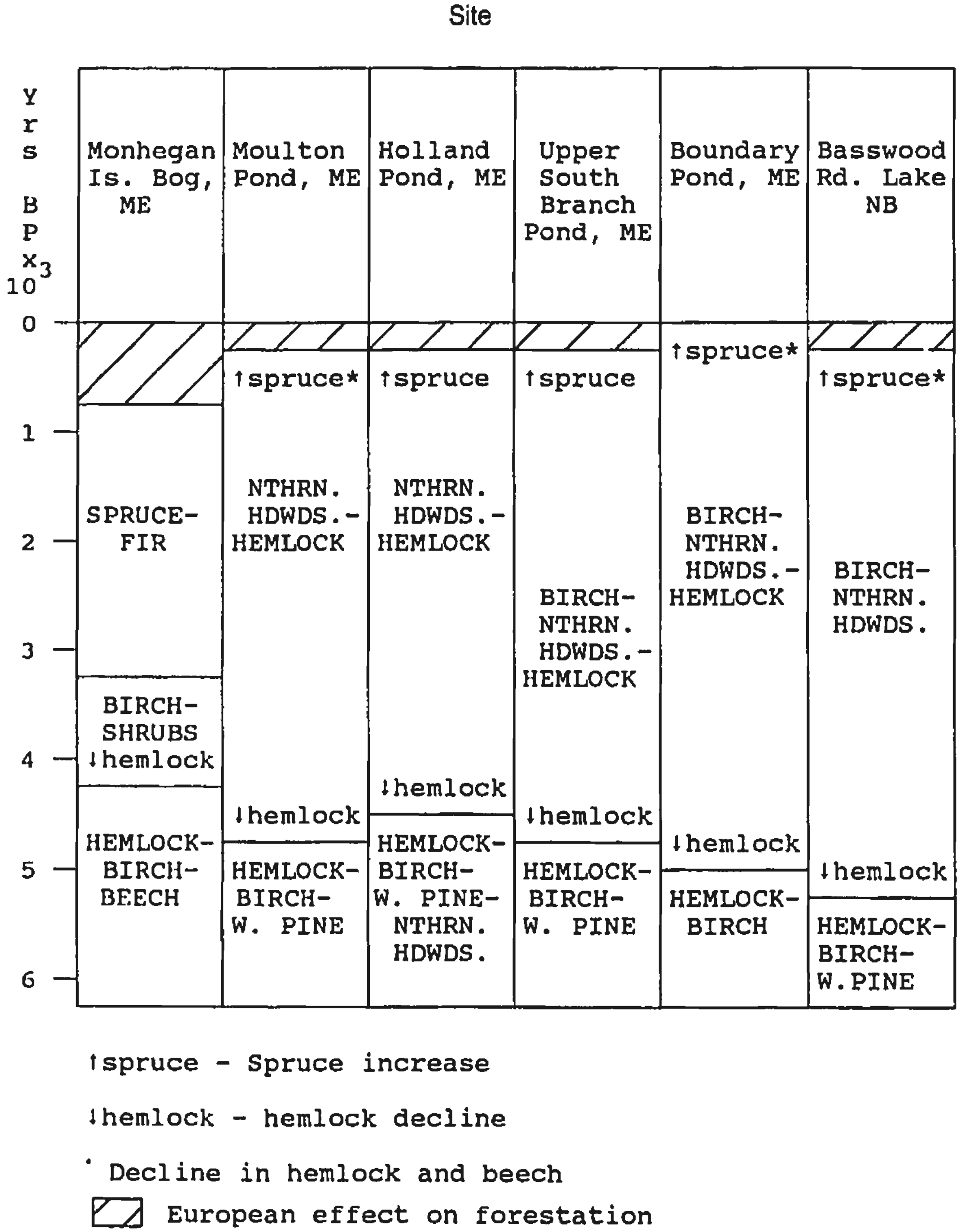

Figure 4. Palynological forest reconstructions for New Brunswick and Maine (after Yesner 1984: 112).

drier climatic conditions (Potzger and Freizner 1948: 187) or may be due to a possible pathogen (Sanger *et al.* 1977: 462).

By c. 3400 B.P., there was another change in the profile, with an increase in influx rates and percentages for hemlock and beech (*Fagus*). Between 3400 B.P. and 200 B.P., beech reaches its maximum values in percentage composition from pollen profiles. This has been interpreted as a period of closed, mesic, temperate hardwood-hemlock forests (Bradstreet and Davis 1975: 17; Sanger *et al.* 1977: 462). This change may indicate a period of more abundant moisture (Potzger and Friezner 1948: 187; Mott 1975: 75, Figure 5, 77 Figure 7). The climate may also have been milder than at present (Terrasmae 1973: 208, Figure 9; Bradstreet and Davis 1975: 17).

A further change in vegetational history is evident c. 2000 B.P. This is manifested in a sharp increase in spruce (*Picea*), alder (*Alnus*), and hazel (*Corylus*) with a subsequent decrease in hemlock, beech, and birch (*Betula*) (Potzger and Friezner 1948: 189; Bradstreet and Davis 1975: 17; Mott 1975: 79; Bernabo and Webb 1977: 80, 82). This has been an interpreted as being due to increased environmental severity of an edaphic and/or climatic and/or anthropogenic nature (Potzger and Friezner 1948: 189; Bradstreet and Davis 1975: 17).

According to Bradstreet and Davis (1975: 17) "the change at 2000 B.P. begins a record of environmental 'deterioration' which becomes increasingly evident upward in time, despite the fact that relative productivity is apparently increasing."

Although palynological studies do have inherent problems which may confuse results, the consistency of profiles from the region does allow some statements about vegetational and climatic history. These must be tempered with the fact that the entire region has not been tested and differences at the microscale and semi-microscale levels are probable in view of the diverse environments in the region.

Based upon the palynological data, it appears that some climatic change took place c. 3400 B.P., the approximate time of the decline of the Susquehanna Tradition. There appears to be a shift to a mild, more moist climate with reduced productivity. The closed forests may have restricted game movements in the area, limiting the carrying capacity and, subsequently, population levels. This condition persisted until the beginning of the Middle Ceramic Period, c. 2000 B.P. At this point, the climate became colder, or there was a shift in edaphic conditions, resulting in increased productivity despite more severe conditions.

Summary

Maine and New Brunswick provided a diverse environment, rich in resources for at least part of the transition between the Archaic and Ceramic Periods. This was a time of possible climatic changes, reflected in the palynological record as occurring c. 3400 B.P. The latter of these may have resulted in restricted game movements in the interior, with the possible consequence of a reduced carrying capacity and population. Coastal areas may have undergone a resultant population increase due to migration from the interior.

CHAPTER 4

ARTIFACT DESCRIPTIONS

The artifacts described in this chapter were recovered from the following sites. These are Oxbow (CfDl-1) (Allen 1980, 1981), Augustine (CfDl-2) (Turnbull 1976, 1980), Teacher's Cove (BgDr-11) (Davis 1978), Sand Point (BgDs-6) (Lavoie 1971), and Cow Point (BlDn-2) (Sanger 1973, 1989) in New Brunswick and Turner Farm (29.9) (Bourque 1975, 1976), Goddard (30.42) (Bourque and Cox 1981), Young (73.10) (Borstel 1982), and, Roque Island (61.34) in Maine. All of these artifacts came from excavated sites so that proveniences were available for each. Surface collected artifacts and private collections were not used for artifact group definition, although these were referred to for comparative purposes. This was to ensure that the data were as accurate and pertinent as possible.

In some cases, entire assemblages were not available for study. This occurred where some artifacts were not available for examination during the course of the research because they were on loan or display.

Several artifact classes were examined during the course of this research. These were stemmed bifaces, nonstemmed bifaces, scrapers, and celts. Of these, only the first of these categories, and to a limited extent, the last, yielded diagnostic trends. The only diagnostic trait indicated by celts was their degree of finishing. Because of these factors, only the stemmed bifaces will be described in detail (see Appendices C-I).

Artifact descriptions are presented by group and followed by a brief analysis.

Group 1 Stemmed Bifaces (n=64)

Terminal Archaic (?)/Early Ceramic Period

[Figure 5; Plates 1, 2 a-b, 3c, 6 e-h; Tables 4, 5, 10]

Group 1 stemmed bifaces incorporate straight or slightly convex blade edges, straight or contracting stems, and straight bases. Group 1 stemmed bifaces have either undated aceramic or definite Early Ceramic Period temporal placement. Those without temporal placement, recovered from the Teacher's Cove site (BgDr-11), the Young site (73.10), and the mound fill at the Augustine site (CfDl-2), have been subclassified into Group 1A (n=11). Those with definite Early Ceramic placement have been assigned to Group 1B (n=53). Group 1B stemmed bifaces were recovered from Sand Point (BgDs-6), Oxbow (CfDl-1), and Turner Farm (29.9).

Group 1A stemmed bifaces used for the study are described in Appendix C. Metric attributes are listed in Table 4. Group 1B stemmed bifaces are described in Appendix D, while their metric attributes are listed in Table 5. A sample outline of a Group 1B point is shown in Figure 5.

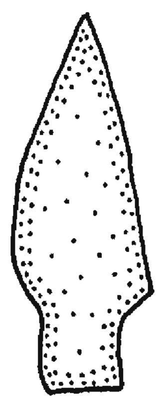

Figure 5. Group 1B stemmed biface from the Turner Farm site.

Height of original: 51 mm.

TABLE 4

GROUP 1A STEMMED BIFACES

METRIC ATTRIBUTES

Attribute	Range	Mean	σ
Length (mm)	40 - 76	55.9	11.2
Width (mm)	14 - 28	23.0	4.0
Length/Width	1.9 - 3.0	2.4	0.3
Thickness (mm)	6 - 19	9.9	3.4
Neck Width (mm)	8 - 19	14.1	3.0
Base Width (mm)	5 - 16	10.7	3.5
Exp./Con. Index	93.8 - 380.0	149.5	78.2
Weight (gm)	2.8 - 20.5	11.0	5.2

TABLE 5

GROUP 1B STEMMED BIFACES

METRIC ATTRIBUTES

Attribute	Range	Mean	σ
Length (mm)	36 - 84	55.8	10.4
Width (mm)	12 - 31	19.7	4.2
Length/Width	1.7 - 7.0	3.3	1.2
Thickness (mm)	5 - 12	7.3	1.7
Neck Width (mm)	8 - 17	11.7	2.1
Base Width (mm)	5 - 17	9.6	2.3
Exp./Con. Index	100.0 - 280.0	125.4	29.4
Weight (gm)	1.6 - 19.9	5.6	3.7

Moorehead Phase Stemmed Bifaces (n=12)

Late Archaic Period

[Figure 6; Plates 3 a-b, 4; Table 6, 10]

The Moorehead Phase stemmed bifaces are included for comparative purposes. Examples are described by site in sequential order of site and artifact numbers in Appendix E. A sample outline of a Moorehead Phase chipped stone point is provided in Figure 6. Metric attributes for the sample are listed in Table 6.

The sites used for this comparison are the Turner Farm site(29.9), North Haven Island, Penobscot Bay, the Goddard Site (30.42), Naskeag Point, Blue Hill Bay, and Roque Island (61.34) in Maine, and Cow Point (BlDn-2), near Grand Lake, New Brunswick.

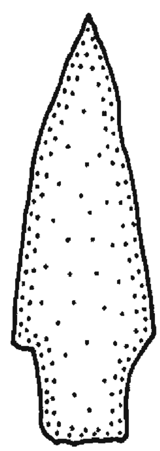

Figure 6. Moorehead Phase Stemmed biface from the Cow Point site. Height of original: 56 mm.

TABLE 6

MOOREHEAD PHASE STEMMED BIFACES

METRIC ATTRIBUTES

Attribute	Range	Mean	σ
Length (mm)	38 - 107	69.4	19.0
Width (mm)	15 - 27	20.4	3.8
Length/Width	1.9 - 4.7	3.4	0.7
Thickness (mm)	5 - 13	9.3	2.4
Neck Width (mm)	8 - 15	12.6	2.2
Base Width (mm)	6 - 14	10.5	2.3
Exp./Con. Index	100.0 - 162.5	121.9	16.3
Weight (gm)	2.3 - 23.5	12.0	5.9

Group 2 Stemmed Bifaces (n=3)

Terminal Archaic Period/Early Ceramic Period

[Figure 7 ; Plate 7]

Group 2 stemmed bifaces were recovered from the mound fill of the Augustine site (CfDl-2), in northeastern New Brunswick, and at the Goddard site (30.42), Naskeag Point, Blue Hill Bay, Maine. They are from a pre-ceramic

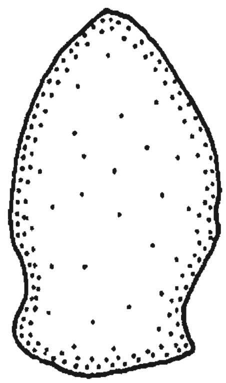

Figure 7. Group 2 stemmed biface from the mound fill at the Augustine site. Height of original: 47 mm.

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component at Goddard, and associated with a radiocarbon date of 2840±105 B.P. from that site (Bourque and Cox 1981: 12). No associated dates were recovered from the Augustine site. Some pottery sherds were recovered from the mound fill at the site (Turnbull 1980: 43), but association with Group 2 stemmed bifaces cannot be ascertained.

Group 2 stemmed bifaces are characterized by convex blade edges,expanding stems formed by wide side notching, wide rounded shoulders, and straight or convex bases.

The descriptions for the sample are provided in Appendix F. A sample outline of a Group 2 stemmed biface is shown in Figure 7. Because of small sample size, the metric attributes have not been listed in table form.

Group 3 Stemmed Bifaces (n=4)

Early Ceramic Period

[Figure 8; Plate 8; Table 7]

Group 3 stemmed bifaces were all recovered from the Oxbow site (CfDl-1) in northeastern New Brunswick. These are associated with two radiocarbon dates from the EarlyCeramic Period, 2600±60 B.P. (S-1650) and 2640±50 B.P. (S-1605) (Allen 1981: 229-230).

Group 3 stemmed bifaces are characterized by convex blade edges, expanding stems formed by wide side notching, straight or concave bases, and wide angled, narrow rounded, or wide rounded shoulders.

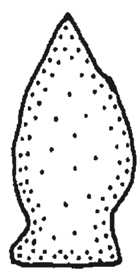

Figure 8. Group 3 stemmed biface from the Oxbow site. Height of original: 33 mm.

TABLE 7

GROUP 3 STEMMED BIFACES

METRIC ATTRIBUTES

Attribute	Range	Mean	σ
Length (mm)	33 - 41	36.8	2.9
Width (mm)	14 - 19	17.0	1.9
Length/Width	1.9 - 2.6	2.2	0.3
Thickness (mm)	6 - 7	6.5	0.5
Neck Width (mm)	12 - 15	13.3	1.3
Base Width (mm)	14 - 16	14.5	0.9
Exp./Con. Index	85.8 - 93.8	89.5	3.8
Weight (gm)	2.7 - 4.1	3.5	0.6

Artifact descriptions for Group 3 stemmed bifaces are listed in Appendix G and a sample outline is shown in Figure 8. Metric attributes are listed in Table 7.

Group 4 Stemmed Bifaces (n=4)

Tobique Complex

[Figures 9, 10; Plate 9]

Group 4 stemmed bifaces were all recovered from the Deadman's Pool site (CgDt-3) on the Tobique River, New Brunswick. No radiocarbon dates are associated with the assemblage from this site, nor are there definite cultural affiliations known. Two types of projectile point form are known from the site, and these have been sub-divided into Groups 4A and 4B.

Group 4A forms are characterized by convex blade edges, straight or expanding stems formed by corner removal, straight bases, and wide angled shoulders. One specimen is complete, while the tip is missing from the second. Artifact descriptions are listed in Appendix H and a sample outline of a Group 4A stemmed biface is shown in Figure 9.

Group 4B forms are characterized by expanding stems, where present, convex blade edges, convex stem bases, biconvex cross and longitudinal sections, and wide rounded shoulders. They are thicker than Group 4A stemmed bifaces, but not as broad in the blade. Group 4B artifact descriptions are provided in Appendix I and a sample outline is shown in Figure 10.

The metric attributes for Group 4A and 4B stemmed bifaces are not listed in table form due to small sample size.

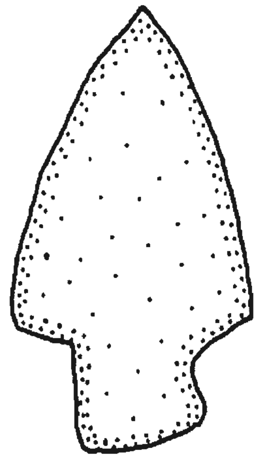

Figure 9. Group 4A stemmed biface from the Deadman's pool site. Height of original: 58 mm.

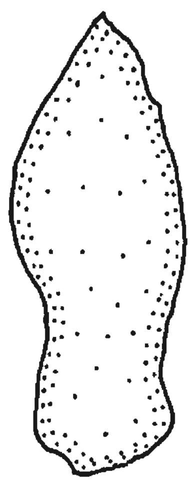

Figure 10. Group 4B stemmed biface from the Deadman's Pool site. Height of original: 59 mm.

Stemmed Biface Analysis

Group 1 stemmed bifaces indicate that Moorehead Phase stemmed biface morphology continues into the Early Ceramic Period. This is substantiated by the high degree of similarity between Moorehead Phase and Group 1 stemmed bifaces. The implications of this are discussed in Chapter 5. This similarity can be seen in comparison of Tables 5 and 6, which indicate overlap of all metric attributes at the 1σ level.

The degree to which metric measurements of Group 1B and the Moorehead Phase stemmed biface sample are similar are shown in Tables 8 and 9. Group 1B was used for this comparison rather than the total for Group 1, because of the known temporal placement for Group 1B. The variation in metrics were compared in a one-tailed t test, which resulted in the determination that the differences in metric variation between Group 1B and Moorehead Phase stemmed bifaces are not large enough to be significant (Table 8).

Table 9 examines the significance of Table 8. X^2 testing was performed on metric attributes of Moorehead Phase stemmed bifaces fitting into the range of metric variation for Group 1B. In this case, the X^2 value was quite low (X^2 = 0.74), indicating that the differences between Group 1B and Moorehead Phase stemmed bifaces are not significant at a 0.05 level of confidence.

Temporal trends may be evident in comparison of Late Archaic and Early Ceramic Period samples. These trends appear in the degree of thickness reduction and basal treatment of these projectile points. The majority of

TABLE 8

t TEST FOR GROUP 1B AND MOOREHEAD PHASE

STEMMED BIFACES

	Group 1B		Moorehead		
	Mean	σ	Mean	σ	t
Length	55.8	10.4	69.4	19.0	-0.687
Width	19.7	4.2	20.4	3.8	-0.177
L/W	3.3	1.2	3.4	0.7	-0.137
Thickness	7.3	1.7	9.3	2.4	-0.801
Neckwidth	11.7	2.1	12.6	2.2	-0.393
Basewidth	9.6	2.3	10.5	2.3	-0.375
Index[a]	125.4	29.4	121.9	16.3	0.206
Weight	5.6	3.7	12.0	5.9	-1.122

df = 11 $t_{0.02}$ = 2.718

[a] Index of Expansion/Contraction

Moorehead Phase points used for comparison are less completely reduced in thickness than their Early Ceramic Period counterparts. This is evident in the Archaic points frequently exhibiting the original curvature of the flake on which they were manufactured. None of the Group 1 stemmed bifaces share this characteristic.

Basal treatment may also indicate temporality. Early Ceramic Period stemmed bifaces show variation in the treatment of the stem base. These

TABLE 9

X^2 TESTING FOR METRIC ATTRIBUTES

GROUP 1B AND MOOREHEAD PHASE STEMMED BIFACES

	O_i	E_i	$O_i - E_i$	$(O_i - E_i)^2$	$(O_i - E_i)^2/E_i$
L	10	12	-2	4	0.33
W	12	12	0	0	0.00
L/W	12	12	0	0	0.00
T	10	12	-2	4	0.33
N	12	12	0	0	0.00
B	12	12	0	0	0.00
I	12	12	0	0	0.00
WT	11	12	-1	1	0.08
					X^2 =0.74

df = 7 $X^2_{0.05}$ = 14.0671

L = length, W = width, L/W = length/width, T = thickness, N = neck width, B = base width, I = index of expansion/contraction, WT = weight

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include the presence of the striking platform at the base, basal thinning with or without stem grinding, or no evidence of either of these characterisitics. The majority of Moorehead Phase points retain the striking platform at the stem base, and none of those used for the study exhibit basal thinning or stem grinding.

Other temporal trends appear evident. Table 10 shows a comparison of frequency of morphological attributes. There is a trend from predominantly

TABLE 10
MORPHOLOGICAL ATTRIBUTES
GROUP 1 AND MOOREHEAD PHASE STEMMED BIFACES

	M'Head	Grp 1A	Grp 1B
Blade Edge:			
Straight	91.7%	54.5%	41.5
Convex	8.3	27.2	13.2
Asymmetric	0.0	18.2	0.0
Straight/Convex	0.0	0.0	11.3
Not Determined	0.0	0.0	33.9
Total[a]	100.0%	99.9%	99.9%
Stem Form:			
Straight	91.7%	63.6%	81.1%
Contracting	8.3	27.2	11.3
Expanding	0.0	9.1	0.0
Irregular	0.0	0.0	1.9
Not Determined	0.0	0.0	5.7
Total[a]	100.0%	99.9%	100.0%
Base Form:			
Straight	66.7%	72.7%	75.5%
Convex	16.7	27.3	18.9
Irregular	16.7	0.0	0.0
Not Determined	0.0	0.0	5.7
Total[a]	100.1%	100.0%	100.1%
Shoulder Form:			
NR	50.0%	9.1%	43.4%
NR/WA	25.0%	9.1%	0.0%
WA	16.7%	27.3%	28.3%
Striking Platform @ Base:	66.7%	27.3%	45.3%
Basal Thinning:	16.7%	27.3%	26.2%

[a] Values not equalling 100% are due to the rounding of figures.

straight blade edges to an increasing number with convex blade edges. An increase in contracting stems is also evident, as is the decrease in the number of forms with convex stem bases. There is an increase in the number of Group 1B forms indicating wide angled shoulders, with a consequent reduction in the number with narrow rounded ones.

There is a degree of variation between Group 1A and Group 1B stemmed bifaces (see Tables 4 and 10). The different percentanges of straight vs. contracting or asymmetric blade edges between these groups may be explainable in light of the high percentage (33.9%) of Group 1B points where the blade edge could not be determined. There is overlap in all metric attributes examined during the study; however, it should be noted that standard deviations for Group 1A are high due to smaller sample size.

Group 2 stemmed bifaces do not appear to have emerged from any regional point style. Neither can direct comparison be made to projectile point styles from external areas to the south or north. This appears to be a totally indigenous form which emerged in the region towards the end of Terminal Archaic Period, possibly immediately prior to the adoption of pottery in the region. Unfortunately, the sample size is small and more examples are required before definite statements regarding them can be proposed.

Continuity from the Terminal Archaic Period may be indicated by Group 3 stemmed bifaces. These are cognates of Susquehanna Broad projectile points (Witthoft 1953; Ritchie 1969a: 157, 1971: 53-54). Further, Group 3 stemmed bifaces may have been used contemporaneously with Group 1 stemmed bifaces at the Oxbow site (P. Allen 1988: personal communication). The significance of this possible mixing of Moorehead Phase and Susquehanna Tradition continuity will be discussed in Chapter 5.

Group 4 stemmed bifaces do not match any lithic tool tradition presently known. Some similarity to Susquehanna Tradition stemmed bifaces is seen in the outline of Group 4A forms; yet these do not match other attributes for Atlantic-like projectile points found in the region. The Group 4 stemmed bifaces, therefore, cannot be assigned to any known tradition. Temporal placement for these forms cannot be assigned until such time as Tobique Complex sites with datable charcoal are excavated.

Temporal trends may be exhibited in raw material usage. Table 11 illustrates the percentage composition of various raw materials for several groups in the study.

The temporal placement of the artifact groups in Table 11 is based upon the following. Moorehead Phase stemmed bifaces are the earliest form in the sample. Group 2 stemmed bifaces are assigned the next earliest age, due to the associated a radiocarbon date of 2840±105 at Goddard (Bourque and Cox 1981: 12). Group 1B points have been found in association with Vinette 1 cognate pottery (B. Bourque 1988: personal communication), suggesting an early temporal placement. Group 3 stemmed bifaces are associated with two dates, 2640±50 and 2600±60 and the presence of dentate stamp decorated pottery (Allen 1980: 144). Because dentate stamping appears to be preceded by Vinette 1 wares in the Northeast, Group 3 stemmed bifaces are assigned the latest place in the sequence.

TABLE 11

RAW MATERIAL PERCENTAGES BY ARTIFACT GROUP

	M'head	Grp 1B	Grp 2	Grp 3
Felsite	50.0	18.9	0.0	0.0
Rhyolite	41.7	67.9	33.3	0.0
Basalt	8.3	0.0	0.0	0.0
Quartzite	0.0	5.7	0.0	0.0
Chert	0.0	3.8	0.0	25.0
Quartz	0.0	1.9	33.3	75.0
Not Determined	0.0	1.9	33.3	0.0
TOTAL	100.0	100.0	99.9[a]	100.0

[a] Value less than 100% due to rounding of figures.

Comparison of raw material frequencies indicate a decline in felsite usage after the Moorehead Phase, followed by an increase in the use of rhyolites. Basalt also declines at this time. Rhyolite usage also decline by the middle of

TABLE 12

RAW MATERIAL PERCENTAGES BY ARTIFACT GROUP

UNDATED GROUPS

	Grp 1A	Grp 4A	Grp 4B
Felsite	45.5	0.0	0.0
Rhyolite	9.1	100.0	100.0
Quartz	9.1	0.0	0.0
Not Determined	36.4	0.0	0.0
TOTAL	100.0	100.0	100.0

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the Early Ceramic Period, with a contemporaneous increase in the use of quartz and chert.

This table may be misleading as it is compiled from several sites, rather than a sequence throughout the period from one or more sites. Further research is required before this sequence can be substantiated.

Table 12 indicates raw material usage for stemmed biface forms without definite temporal placement. This, when compared with Table 11, provides no conclusive suggestion for the temporal placement of these forms. However, it should be noted that, like Table 11, the data come from several sites and may not be useful for comparitive purposes.

CHAPTER 5

CONCLUSIONS

As mentioned in Chapter 2, there are several problems inherent in archaeology in the Maine-Maritimes region (*i.e.* the history of research and poor preservation). Consequently, many of the following conclusions have been augmented by data from previous research. Many of these, too, are speculative in nature and should be considered as hypotheses for future testing, rather than definite statements on the culture history of the Maine-Maritimes region.

The following will examine the Tobique Complex and the potential significance and implications of trait continuity from the Late and Terminal Archaic Periods into the Early Ceramic Period. Continuity will be described in terms of the "source tradition" for each trait. The cultural implications will be discussed and some comments will be offered regarding the transition between the Archaic and Ceramic Periods in the region.

The Tobique Complex

The Tobique Complex, represented by Group 4 stemmed bifaces remains an enigma. There are few traits suggesting affiliation with any other tool tradition, other than Wright's (1972) weakly defined Shield Archaic Tradition. This affiliation is only evident in frequencies of functional categories for lithic tools. There is an immense amount of stylistic deviation in tool morphology from counterparts in the Shield Archaic Tradition (Tuck n.d.), and this alone is probably adequate to negate affiliation between the Tobique Complex and the Shield Archaic.

Turnbull's (n.d.) comparison with possible Terminal Archaic assemblages also appears inadequate. Similarity to other assemblages, such as Teacher's Cove and the mound fill artifacts from the Augustine site, is minimal. There is little to suggest that the Deadman's Pool site is related to either of these.

There are problems with associating Deadman's Pool with other sites in the Maine-Maritimes region. Most of the artifacts recovered were broken during the process of manufacture. This is evident in that many of the reassembled artifacts showing differential weathering, suggesting breakage prior to weathering. Further, many are obviously unfinished, also suggesting breakage during the manufacturing process. Unfinished artifacts are difficult to compare with finished ones, complicating interpretation of the assemblage.

Secondly, the Deadman's Pool site represents a workshop site (Sanger 1971b: 21). The assemblage composition of workshop/quarry sites can be assumed to differ from those of habitation sites. Such makes it difficult to directly compare the Tobique Complex materials from Deadman's Pool to those of other types of sites in the region.

Problems also exist with use of the material from the Bernard collection for comparative purposes (Turnbull n.d.). First, the collection represents surface collected artifacts from a previously plowed field (A. Bear Nicholas 1988: personal communication). This indicates the definite possibility of mixing of different components of differing ages. Included from some of the recently collected material is a ground slate ulu, indicating an age far greater than the Transitional Period between the Archaic and Ceramic Periods. Because of the distinct possibility of mixing of components, it is not possible to date the site using the presence of the ground slate ulu. At present, the Bernard collection should be considered a multi-component collection of unprovenienced artifacts. The greatest similarity seen with the stemmed bifaces recovered from the site is with Group 3 stemmed bifaces. Further data are required, however, and controlled excavation of the site and a series of radiocarbon dates would clarify the problems presented by the collection and, possibly, the Tobique Complex. More definition is required for this cultural manifestation.

Moorehead Phase Trait Continuity

The first aspect to be discussed is the continuity of lithic traits from the Moorehead Phase into the Early Ceramic Period. This is seen in the Group 1 stemmed bifaces. The degree of similarity between Moorehead Phase and Group 1 stemmed bifaces is so high that it was frequently difficult to differentiate between Archaic and Ceramic Period specimens during the analysis of the Goddard site. Artifact distribution was used for this classification when the stemmed bifaces were not accompanied by diagnostic associations (S. Cox 1988: personal communication).

This similarity may indicate that the Moorehead Phase concept of stemmed biface morphology is present in the Early Ceramic Period, suggesting that some continuity exists over the intervening time. This continuity could take two forms. The first is a continuity of population, with descendants of Moorehead Phase peoples occupying the region over this period of time. Second, new peoples may have migrated into the region and adopted this form of technology over their own. A last possible cause is independent invention of this form by people occupying the region during the Early Ceramic Period.

With one *caveat*, the latter mechanism is rejected. Group 3, stemmed bifaces are contemporary with Group 1 forms (P. Allen 1988: personal communication). It is assumed that, given that a stemmed biface form already exists within the cultural inventory, there are few reasons for inventing a new form. However, tool function may play a role here. Little research has been conducted on the function of Maine-Maritimes lithic artifacts. It is possible that a new form of stemmed biface was required for a particular purpose, resulting in the re-invention of Group 1 stemmed bifaces in the Early Ceramic Period. Until more of this type of research has been conducted, this cause for the independent invention of Group 1 stemmed bifaces remains an untested hypothesis.

Far more probable are the first two mechanisms for trait continuity: continuous occupation of indigenous peoples or the adoption of this morphological concept by immigrant peoples. However, evidence exists which may negate the second hypothesis.

The question of a possible Susquehanna migration into the region c. 4000 B.P. was examined in Chapter 2. The most cogent of the related arguments have been forwarded by Cook (1976), who proposes that the Susquehanna Tradition reflects a technological adaptation by indigenous peoples to a maritime economy, and by Sanger (1975), proposing the migration of peoples from the south into the region. The pertinence of these arguments must be reviewed.

Cook successfully rebuts Turnbaugh's (1975) proposal of a Broadpoint (Susquehanna) culture extending along the Eastern seaboard from Florida in the south into the Maritime provinces. However, the present evidence indicates that Cook's proposals are invalid for northern New England and the Maritimes. This is seen in the radiocarbon chronology and major differences in technology, economy, and ideology.

First, there are definite differences between Moorehead Phase and Susquehanna Tradition lithic technology. These are evident in every aspect of these assemblages. The Susquehanna Tradition does not exhibit the large number of ground stone wood working tools nor plummets evident in Moorehead Phase artifact assemblages. The latter, however, does not possess the number of formed drills found at Susquehanna sites. Projectile point morphology is different between both, and the Susquehanna Tradition does not demonstrate the ground slate bayonets and projectile points seen in the Moorehead Phase.

There is also a difference in economic orientation between the Susquehanna and Moorehead Phase occupations of the Turner Farm site. During the

Moorehead Phase, c. 4500-3700 B.P., there was a strong orientation to coastal exploitation. Heavy emphasis was placed upon seasonal offshore fishing for cod and swordfish.

> Moose, bear, beaver and seal hunting, bird hunting (for great auk, loons, ducks, and geese), and fishing for species other than cod and swordfish are all definitely of secondary importance [in the Moorehead Phase] (Spiess *et al.* 1983: 95).

By the time of the Susquehanna occupation, there was extensive exploitation of deer (*Odocoileus virginianus*), moose (*Alces alces*), and bear (*Ursus americanus*). The frequency of seal bones relative to all other mammals, is half of that of Moorehead Phase times. Birds were taken at twice the frequency relative to mammals as was the case for the Moorehead Phase occupation. This has led to the interpretation that the Susquehanna economy was the least marine-oriented at the Turner Farm site (Spiess *et al.* 1983: 98). Therefore, there appears to be a definite shift in economic strategy, from marine to terrestrial resources, with the appearance of the Susquehanna Tradition at the Turner Farm site.

The archaeological record indicates definite ideological differences between the two. The Moorehead Phase is associated with the Moorehead Burial Tradition, with large cemeteries and grave inclusions of diagnostic Moorehead artifacts. The Susquehanna Tradition is known for cremation with the inclusion of characteristic Susquehanna artifacts. Numbers of individual graves per site are fewer than those usually found at Moorehead Phase sites (eg., Moorehead 1922; Willoughby 1935; Sanger 1973). Hathaway had four burial pits presumed to be Susquehanna cremations (Snow 1975: 51, 53), Eddington Bend had five such pits (Moorehead 1922: 140), and the Young site possessed only one (Borstel 1982: 61, 64-65). An exception to the trend of smaller numbers of Susquehanna burials at any particular site may be seen at Turner Farm, with 14 Susquehanna burial features excavated, most involving multiple individuals. Approximately the same number of related features remain to be excavated at the site (B. Bourque 1989: personal communication).

The Turner Farm site has yielded another aspect of Archaic Period ritual. Five dog burials, one near a cache of utilitarian and probably ceremonial objects, are associated with the Moorehead Phase occupation of the site (Bourque 1976: 24). This form of ritual is not seen in the Susquehanna Tradition; however, this may be due to the Susquehanna practice of cremation masking this trait.

Chronology also indicates the possible migration of Susquehanna peoples from the south. At sites with both a Susquehanna Tradition and Moorehead Phase component, there is a definite temporal break between these occupations (q.v., Figure 13). This break appears to indicate that there is no gradual development of one tradition into the other. Further, none of the multi-component sites indicate artifact forms transitional between the two.

In summation, the evidence for Maine and the Maritime Provinces indicate that migration is the most plausible explanation for the appearance of the Susquehanna Tradition. Sanger's (1975: 69) application of Rouse's (1958) criteria for migration strongly indicates that this is, indeed, the case.

The extent of penetration into the region by Susquehanna Tradition peoples is difficult to determine. Assemblages related to the Susquehanna Tradition have been recovered in Maine and southern New Brunswick from Mud Lake Stream and the Portland Point sites.

However, there are no definite Susquehanna sites from further north in New Brunswick. A fully grooved axe and the base of a possible Atlantic/Snook Kill point from the Red Bank area exist in a private collection (Plate 11); however, this minimal evidence does not provide incontrovertible proof of a Susquehanna Tradition presence in northeastern New Brunswick. A burial site, dated to 3670±90 B.P. at Ruisseau-des-Caps on the southern shore of the St. Lawrence River, Québec, is also similar to Susquehanna Tradition burials from further south. Grave goods from this site, however, show stylistic deviation from typical Susquehanna assemblages (Dumais 1978: 71). Further, given the paucity of Susquehanna Tradition materials from Northern New Brunswick, it is more likely to presume that the source of such cultural concepts at this site came from southern Ontario along the St. Lawrence River, rather than through New Brunswick. Southern Ontario has yielded a definite Susquehanna Tradition presence (*e.g.* Spence and Fox 1986: 5, Figure 1).

The size of the groups that moved into the region is also difficult to determine. Paleodemographic studies for the region are few in number (eg., Miller 1976; Snow 1980). It has been proposed that, for southern New England, there was no mass migration of Susquehanna peoples from the south. Rather, this was "an infiltration of small groups of people whose industrial traditions were markedly different from those of the resident populations" (Dincauze 1975: 27). Presently, it is difficult to ascertain whether or not this was the situation in Maine and the Maritimes.

In relation to the continuity in the use of Moorehead Phase stemmed bifaces, the absence of transitional artifact assemblages between the Moorehead Phase and Susquehanna Traditions is significant. It is logical to assume that, for a particular culture, entire artifact assemblages are not likely to change at the same time. Given the impetus for change, various aspects of material culture should alter at differing times. Some evidence of transition should be available, particularly at multi-component sites such as Turner Farm and Hathaway. Because transition is not indicated by assemblages, it is argued that the continuity of Moorehead Phase stemmed biface morphology is probably not directly attributable to Susquehanna Tradition peoples adopting this trait.

It, therefore, appears that there may have been some continuity in Moorehead Phase populations in the region. These peoples may have co-existed with Susquehanna peoples moving into the region, as appears to be the case in parts of southern New England (Ritchie 1969b). Present evidence makes this difficult to speculate upon.

Population continuity may be responsible for the temporal variation evident between Group 1 and Moorehead Phase stemmed bifaces. This is seen in the degree of thickness reduction, the treatment of the base, and the frequency of some other morphological traits. Moorehead Phase points are not reduced in thickness to the degree that later ones are and in many cases, the original curvature of the flake is still evident on the early forms.

The mean thickness for Moorehead Phase forms is 9.3 mm (q.v. Table 6), while that of the Group 1B forms is 7.3 mm (q.v., Table 5). However, it should be noted that these do overlap at the 1σ level. Further, 66.7% of the Moorehead Phase points retained the striking platform unreduced at the stem base, while 16.7% of the sample exhibited basal thinning. Early Ceramic Period forms demonstrate the retention of the striking platform in 45.3% of the sample, while basal thinning was exhibited by 26.2% of the sample. One half of the Moorehead Phase points still retained the curvature of the flake from which they were manufactured. None of the points from the Group 1B sample demonstrated this trait. This is probably related to the greater degree of thickness reduction seen in the Early Ceramic Period, and consequently, the greater average weight of Moorehead Phase stemmed bifaces.

Increasing frequencies of convex blade edges and contracting stems are also seen by the Early Ceramic Period (q.v., Tables 8 and 9). This is also evidenced by an increase in wide angled shoulder forms in the Group 1B sample, with a reduction in the percentage of narrow rounded shoulders. Such temporal variation is reasonable to expect from a projectile point form that appears to have been in use for over 2000 radiocarbon years.

This trait continuity may also extend into the early part of the Middle Ceramic Period (c. 2000-1000 B.P.). Two Group 1 stemmed bifaces from Turner Farm (29.9.148 and 29.9.236) and one from Teacher's Cove (BgDr-11:

988) possess sharply contracting stem forms. These are reminiscent of bipoints, and may well be ancestral to these Middle Ceramic Period forms. Further research is required before more definititive statements can be made on this matter.

Susquehanna Tradition Trait Continuity

Two examples of Susquehanna Tradition lithic material culture are present in the Early Ceramic Period. These are the cognates of Susquehanna Broad points (Group 3 stemmed bifaces) and chipped and ground celts.

Group 3 stemmed bifaces are distributed throughout New Brunswick and Nova Scotia, with one specimen known from Maine. In northeastern New Brunswick, the Red Bank/Sunny Corners area has produced several samples. These have been recovered from the Wilson, Howe, and Hogan Mullin sites (Allen 1981: 138). The Point de l'Isle East site on Miramichi Bay (Keenlyside 1970) and the Old Mission Point site (Turnbull 1973, 1974) near Atholville have also yielded Group 3 stemmed biface forms.

Passamaquoddy Bay shell middens have also produced occasional finds of similar nature. These were recovered from Minister's Island, Sand Point, and the BgDr-5 and BgDr-8 sites (Allen 1981: 138). Rafter Lake, near Halifax (Allen 1981: 137), and a site in Mahone Bay (Smith and Wintemberg 1929: 137, Plate V, Nos. 16, 17) in southwestern Nova Scotia have also yielded Group 3 stemmed bifaces.

Only two examples are known from Maine. One, in the Chandler collection, curated by the University of Maine at Orono, was collected from the St. Croix River drainage (D. Sanger 1988: personal communication). The second is from Big Lake, Washington County (S. Cox 1989; personal communication).

Allen (1981: 141) has compared these points with nine similar ones excavated at the Rosenkrans site in New Jersey, a Middlesex Burial site. Kraft (1976: 32) proposes that these may have been the projectile point style used by people of the Middlesex culture. However, these appear to resemble more closely Susquehanna Broad points, attributed to the Frost Island Phase of New York state (Ritchie 1969a: 158, Plate 51, Nos. 5-14, 18).

The distribution of Group 3 stemmed bifaces matches that of the Susquehanna Tradition in the region, with one notable exception. This is in northeastern New Brunswick, an area with a minimal number of recovered Susquehanna artifacts. As mentioned above, two possible Susquehanna artifacts were recovered from Red Bank and a potentially related burial exists on the southern shore of the St. Lawrence River; however, more research is necessary to ascertain a Susquehanna presence in this area.

Chipping and grinding technology for the manufacture of celts also represents a Susquehanna Tradition trait present in the Early Ceramic Period. These forms, however, are not as densely distributed as Group 3 stemmed bifaces. Specimens are known from the Augustine and McKinlay sites (Turnbull 1976, 1986) in New Brunswick and the Goddard site in Maine. At the latter site, two of these were associated with a radiocarbon date of 2300±120 B.P.

(Bourque and Cox 1981: 12). Some of the axes recovered from the Oxbow site also reflect chipping and grinding technology in their manufacture (Allen 1981: 57, 58).

The presence of Susquehanna Tradition lithic traits raise several questions. The first of these relates to the radiocarbon dates associated with Group 3 stemmed bifaces.

Differences exist between Group 3 stemmed bifaces and southern Susquehanna Broad points. Ritchie (1971: 53) describes Susquehanna Broad points as having a base which is almost always concave: "base is rarely straight or extremely concave." In the sample, three of the four had straight bases while only one specimen had a concave base. Further, Susquehanna Broad points are "generally half as broad as long, or less" (Ritchie 1971: 53). The mean length/width ratio for the sample was 2.3:1, slightly smaller than that called for by Ritchie. Lastly, all but one example of Group 3 stemmed bifaces had rounded shoulders. Susquehanna Broad points have shoulders which "are usually angular, forming an obtuse angle" (Ritchie 1971: 53). These differences, however, may be due to the small size of the sample of Group 3 points (n=4). Ritchie (1971: 53) assigns a probable age range of 3150 B.P. to 2650 B.P. to his southern forms.

There is one date given for the Frost Island Phase in New York state. This, 3200±100 B.P., was obtained at the O'Neil site in Cayuga County (Ritchie 1969a: 157). Two associated dates for Group 3 stemmed bifaces are 2600±60 and 2640±50 B.P. at the Oxbow site (Allen 1981: 112). This indicates an approximate 600 radiocarbon year difference between the appearance of these in New York and their adoption in the Maritimes.

This temporal separation suggests that, during this time, some type of cultural contact was taking place with the south. However, their distribution suggests that these contacts are not direct. Their relative absence in Maine appears to indicate that these external influences may be entering the region via the Great Lakes/St. Lawrence River, rather than directly along the coast. Their presence in southwestern Nova Scotia is indicative of some cultural contact to the east, as well.

Without further data, it is difficult to comment on the mechanism for the transfer of this trait from its apparent source in New York state.

The continuity of chipped and ground celts offers an interesting avenue of investigation. The vast majority of Early Ceramic Period examples come from Middlesex Tradition burials. Specimens from Augustine, McKinlay, and the Minister's Island sites are all from burial proveniences. These differ from the pecked and ground celts included in southern Middlesex burials (Turnbull 1986: 22). Chipped and ground celts, while known as a Susquehanna trait in much of the Northeast (Griffin 1978: 254), are not common in Maine and New Brunswick. They are found at the Turner Farm site (Plate 11), however, as burial inclusions in a Susquehanna feature (B. Bourque 1988: personal communication). This may suggest continuity in, not only technological, but ideological function also.

Cultural Implications

The continuity of Moorehead Phase and Susquehanna Tradition traits suggests several aspects of the transitional period between the Archaic and Ceramic Periods. These aspects form a body of hypotheses for further testing.

The first of these relates to the "decline" of the Moorehead Phase. The potential for the continual occupation of parts of the region by peoples using Moorehead Phase tool assemblages counters a possible decline of the Moorehead Phase. This raises several questions. The first is what, if any, were the relationships between the Moorehead Phase and Susquehanna peoples?

Some indications appear that there were few amicable relations between the two. As mentioned previously, multi-component sites show a definite chronological break between occupations. This suggests that the Susquehanna Tradition peoples displaced those of the Moorehead Phase in the southern parts of New Brunswick and Maine. This displacement occurred quickly at each particular site, as is indicated by radiocarbon chronology. How this displacement could have occurred is presently unknown.

A notable exception to this hypothesis is the Goddard site (Bourque and Cox 1981; q.v., Figure 12, Tables 1 and 2). Here, artifacts of the Moorehead Phase are associated with radiocarbon dates from well into the period of time associated with the Susquehanna Tradition. This may be indicated in the occupation of the Goddard site by Moorehead Phase peoples during the Susquehanna occupation of Turner Farm, only a short distance away. It is possible that Moorehead Phase peoples abandoned the Turner Farm location, as demonstrated by the chronological break between Moorehead Phase and Susquehanna occupations (q.v., Figure 12). It is not known why Turner Farm would have been abandoned in favour of the Goddard location. This may be partially due to environmental change during the period of time with consequent changes in flora and fauna.

It is known that Turner Farm residents placed heavy economic emphasis on swordfishing during the Moorehead Phase (Spiess *et al.* 1983). Increasing sea levels (Grant 1975; Scott and Greenberg 1983) did increase tidal amplitude in the Gulf of Maine during this time, and the consequent reduction in water temperature may have made the marine environment unsuitable for swordfish (*e.g.* Sanger 1975). This may have been one possible reason for Moorehead Phase peoples abandoning Turner Farm; however, this sheds no light on why Goddard was continuously occupied into Susquehanna times. Further, in view of the continuity of possible descendants of Moorehead Phase peoples into the Ceramic Period, it is obvious that some change in economy had to take place to allow for the depletion of a major resource, namely, swordfish.

Susquehanna Tradition artifacts were recovered from the site (Bourque and Cox 1981: 11). One radiocarbon date of possible Susquehanna origin was yielded by the site. This sample, associated with...

> ...a plummet at its top (at the midden/subsoil junction) and an unground celt preform at its base produced a date of 3485±65 (SI-4254). This date falls within the range of Susquehanna phase dates in Maine (Bourque 1975: 43) and in hindsight the feature may be Susquehanna-associated (Bourque and Cox 1981: 11).

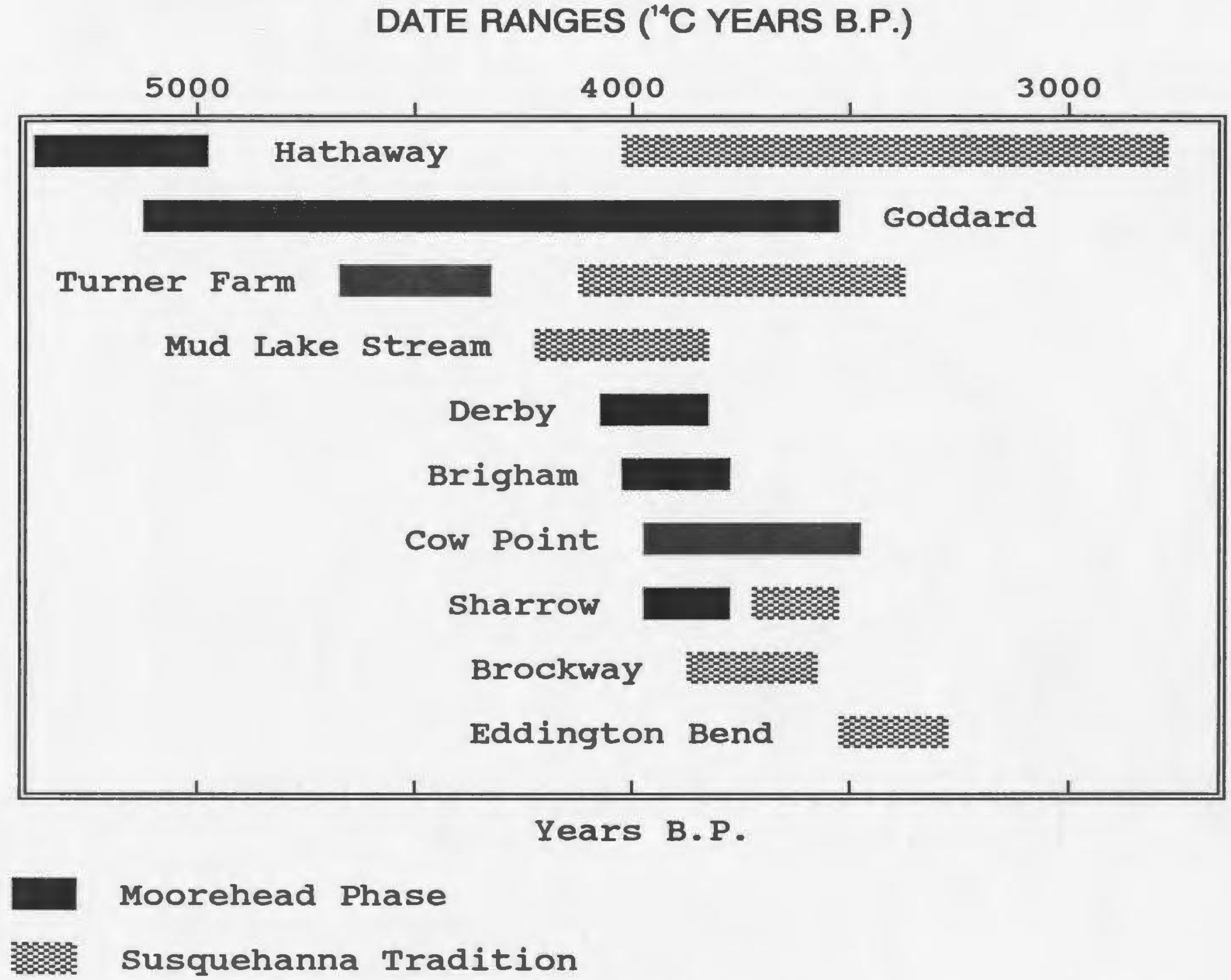

Figure 12. Radiocarbon date ranges (1σ) for New Brunswick and Maine Moorehead Phase and Susquehanna Tradition sites.

Although the two sites are less than 50 km from each other, people using artifacts of the Moorehead Phase were apparently occupying Goddard hundreds of years after the Moorehead Phase had been supplanted by the Susquehanna Tradition at Turner Farm.

Two possible explanations may exist for this anomaly. The first is that Moorehead Phase peoples were still present at Goddard after Susquehanna occupation of Turner Farm. Alternatively, the later Moorehead Phase dates from Goddard were contaminated and are erroneous.

An examination of another site in Blue Hill Bay does little to support either of the above hypotheses. The Nevin site (Byers 1979) has yielded a Moorehead Phase-associated date of 3010±80 B.P. The sample used for dating, however, was bone which may not provide results comparable to those using wood charcoal. Because of this factor, it is difficult to provide definite comment on this problem. Further research in the Blue Hill Bay region may do more to clarify the situation.

A second question emerges regarding the difference in assemblage compositions between the Late Archaic and Early Ceramic Periods. By 2500 B.P., the ground stone wood working tools and ground slate points and bayonets have disappeared from tool assemblages (Sanger 1979: 111). Further, Ceramic Period assemblages include an increasing number of formed unifacial scrapers, a trait not frequently exhibited during the Archaic Period. Given population continuity, what caused this alteration in assemblage composition?

Some speculation on this problem allows a possible explanation. This may have occurred due to technological change within the societies involved. The heavy ground stone tools, for example, may not have been required within the cultural inventory. It has been suggested that dugout canoes may have been used during the Archaic Period in the Maine-Maritimes region. These, however, would have been difficult to portage in interior river systems (Sanger 1979: 68) or to land on highly tidal mud flats. A shift to the use of more portable birchbark canoes during this transitional period may have negated the need for heavy wood working tools. This could have resulted in their disappearance from the cultural inventory, and, subsequently, given the impression of the demise of the Moorehead Phase people.

This is not totally speculative. To reach offshore sites such as Turner Farm and Stanley (Sanger 1975), some form of watercraft would have been required. The Eaton site, in North Reading, Massachusetts, may have been a Susquehanna dugout workshop site (Petzold 1961), although the evidence to support this is tenuous. Two dugout canoes from Ontario, with a proposed age of 2000 years (Hothem 1978: 132) have been since been determined to date from late prehistoric times. One dugout canoe, recovered from Ohio, has been radiocarbon dated to 3550±70 B.P. (Brose and Greber 1982: 247); however, this does not prove that such technology was available in the Maine-Maritimes' region. It is possible that dugout canoes were in use in the region during the Late Archaic period, but definite evidence is lacking.

The increase in the number of scrapers in the Early Ceramic period may also result from an shift to birch bark technology and a shift in economic focus to more terrestrial mammal hunting, indicated at Turner Farm during the Susquehanna occupation. Few use wear studies have been performed in the region, but one from the Indian Gardens site in Nova Scotia seems to support this (Murchison 1987: 199). Here, between 40% and 50% of the scrapers appear to have been used for skinning, hide scraping, shredding, and cutting.

This may be the result of increasing emphasis on the hunting of terrestrial mammals.

Of the remainder of the sample, 37% appear to characterize "hard scraping" of wood, antler, or bone. This could be the result of construction of birch bark canoes and wooden paddles, or could be coupled with an increasing emphasis on bone and antler technology.

The shift from dugout to birch bark canoe contruction, if a factor in the decline of ground stone wood working tools, may not have been the single cause. Other factors, such as environmental change (e.g, Terrasmae 1973: 208; Bradstreet and Davis 1975: 17), may also have been related. Further research along these lines is required to resolve this problem.

The decrease of ground slate tools shown by the end of the Moorehead Phase may also be explainable. This may be due to a reduction in fish processing and sea mammal hunting, which has been proposed as the function of these tools (Tuck 1987: personal communication). Alternatively, ground slate bayonets and points may have been use for swordfishing, and with the decline of swordfish populations in the Bay of Fundy/Gulf of Maine (Sanger 1975), may have become redundant in the cultural inventory.

A manifestation which has led to postulation of a Moorehead Phase demise is the disappearance of the Moorehead burial complex, c. 3650 B.P. This may also be partially due to technological innovation. The largest group of artifacts included as grave goods in Moorehead burials are ground stone tools (*e.g.* Moorehead 1922; Willoughby 1935; Sanger 1973). The possible disappearance of the functional need for ground stone wood working tools in the societies in question may have been associated with the deletion of their ideological function as a grave inclusion. Ground slate bayonets, often highly decorated and far too delicate to have served a utilitarian function, were also included as grave goods (*e.g.* Sanger 1973). The alteration in technological requirements for ground stone and slate tools, in conjunction with environmental change c. 3700 B.P. (Bradstreet and Davis 1975: 16), and the possible movement of Susquehanna Tradition peoples into the region, may have led to the decline of this form of mortuary ritual.

At this point, some commentary may be offered regarding the period between the disappearance of classic Susquehanna Tradition sites (c. 3400 B.P.) and the Early Ceramic Period. This was a period of continuous occupation and *in situ* cultural development in the region.

However, during this time, there may have been a decline in population. This may have been due to environmental trends evinced by fossil pollen profiles in the region, which suggest a period of closed, mesic forest (Bradstreet and Davis 1975: 17; Sanger *et al.* 1977: 462) during this time. This may have resulted in restricted productivity and game levels within the region. Such a reduction may have limited the carrying capacity of the region, reducing population levels. This may have resulted in the small number of radiocarbon dates available from the region for this period of time, although sampling may also have had some effect on this.

The Late Transitional Period also appears to have been a time of minimal contacts with regions to the south. Some evidence of contact is seen with the appearance of cognates of Susquehanna Broad and Orient points in parts of the region; however, the latter are quite few in number and the former, where radiocarbon dates in association exist, emerge later than their cognates from the south. Susquehanna Broad points are primarily found in the Susquehanna drainage and only thinly distributed in western New England (Snow 1980: 237). The distribution of Group 3 stemmed bifaces (New Brunswick and the St. Croix drainage in Maine) suggests the St. Lawrence drainage as the possible avenue of diffusion of these into the region. This may be due to a minimum of relations between descendants of Moorehead Phase and Susquehanna Tradition peoples and the possible emergence of some form of ethnic affiliation in the region. This may have provided a barrier to the flow of ideas through southern Maine and into New Brunswick.

A greater degree of contact with external regions appears in the Early Ceramic Period, with the appearance of Adena-related and Meadowood Phase-related mortuary ceremonialism in Maine and New Brunswick.

Some commentary may also be offered regarding this possible ethnic boundary. The Susquehanna Tradition occupation at the Turner Farm site appears to have been a year-round one (Spiess *et al.* 1983: 98). Year-round occupation of a particular site may imply territoriality, which in turn, may lead to ethnic affiliation being indicated. This is speculative, and more research is needed before this can be clarified.

Mutual assimilation, or a shift in territorial boundaries, must have taken place by the Early Ceramic Period. This is apparent in the re-introduction of Group 1, Moorehead Phase cognate, stemmed bifaces in Penobscot and Passamaquoddy Bay. Alternatively, there may have been co-existence between Moorehead Phase and Susquehanna Tradition peoples in these areas. However, no evidence exists to support the latter hypothesis.

Summary

This research indicates a continual occupation and *in situ* cultural development within the Maine-Maritimes region during the Archaic/Early Ceramic Period transition (Hypothesis 1). This, in turn, negates Hypothesis 3, which states that the region was not occupied during this transition period. Further, no direct evidence exists to support a Terminal Archaic Period temporal context for the Tobique Complex (i.e, Hypothesis 2). It should be noted that no evidence exists to disprove this hypothesis, and further research is required to ascertain temporal placement for this cultural manifestation.

Obviously, this is not the last word on this important period in Maine-Maritimes' prehistory. While it does contribute one more piece to the culture historical jigsaw puzzle of this region, it has perhaps raised more questions than it has resolved. These pertain to the proposed extinction of the Moorehead Phase populations, the Moorehead Burial Tradition decline, the relationships between peoples using the Moorehead Phase and Susquehanna tool traditions, and the Tobique Complex. In this regard, it is hoped that this work will point out new directions for future research concerning the Archaic/Ceramic Period transition in the region.

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APPENDIX A

FAUNAL REMAINS FROM NEW BRUNSWICK AND MAINE

Mammalia

Sylvilagus floridanus (Eastern cottentail)

Lepus americanus (Snowshoe rabbit)

Tamas striatus (Eastern chipmunk)

Castor canadensis (Beaver)

Microtus pennsylvanicus (Meadow vole)

Erethizon dorsatum (Porcupine)

Ondatra zibethicus (muskrat)

Canis familiaris (dog)

Canis latrans (coyote)

Canis lupus (wolf)

Vulpes fulva (red fox)

Ursus americanus (Black bear)

Procyon lotor (racoon)

Martes americana (American marten)

Martes pennanti (fisher)

Mustela vison (American mink)

Mustela vison macrodon (sea mink)

Lutra canadensis (River otter)

Lynx canadensis (lynx)

Lynx rufus (bobcat)

Odobenus rosmarus (walrus)

Halichoerus grypus (grey seal)

Phoca vitulina (harbour seal)

Phoca groenlandica (harp seal)

Cystophora cristata (hooded seal)

Rangifer caribou (Woodland caribou)

Odocoileus virginianus (white tailed deer)

Alces alces (moose)

Aves

Branta canadensis (Canada goose)

Clangula hyemalis (oldsquaw)

Anas rubripes (black duck)

Mareca penelope (European widgeon)

Bucephala islandica (Barrow's goldeneye)

Bucephala albeola (bufflehead)

Somateria mollissima (eider)

Somateria spectabilis (king eider)

Melanitta deglandi (white-winged scoter)

Melanitta perspicillata (surf scoter)

Mergus merganser (common merganser)

Pinguinis impennis (great auk)

Vria aalge (common murre)

Urgia aalge (Atlantic murre)

Larus argentatus (herring gull)

Haliaeetus leucocephalus (bald eagle)

Canachites canadensis (spruce grouse)

Gavia immer (common loon)

Gavia stellata (red-throated loon)

Phalacrocorax carbo (great cormorant)

Podiceps auritus (horned grebe)

Anas platyrhynchos (mallard)

Amphiba

Ranidae (frog family)

Mollusca

Buccinum undatum (common northern whelk)

Nucella lapillus (Atlantic dogwinkle)

Lunatia heros (common northern moon snail)

Acmaea testudinalis (Atlantic plate limpet)

Mya arenaria (soft shelled clam)

Mytilus edulis (blue mussel)

Modiolus modiolus (horse mussel)

Placopecten magellanicus (sea scallop)

Astarte undata (waved astarte)

Reptilia

Chelydra serpentina (snapping turtle)

Anthropoda

Balanus sp. (barnacle)

Stronglyocentrotus drobachiensis (green sea urchin)

Crassotrea virginica (oyster)

Mercenaria mercenaria (quahog)

Fish

Gadus morhua (Atlantic cod)

Melanogrammus aeglefinus (haddock)

Myoxocephalus octodecem-spinosus (longhorn sculpin)

Xiphias gladius (swordfish)

Acipenser oxyrhynchus (Atlantic sturgeon)

Salmo salar (Atlantic salmon)

Salvelinus fontinalis (broook trout)

Salvelinus namaycush (lake trout)

Pomotomus saltatrix (bluefish)

Harengus harengus (Atlantic herring)

Osmerus sp. (smelt)

(after Bourque 1975; Bonnichsen and Sanger 1977: 127-128; Yesner 1984; Deal 1986)

APPENDIX B

PROJECTILE POINT ATTRIBUTES

1. Blade edge
    a. convex
    b. concave

2. Stem form
    a. contracting
    b. expanding
    c. straight
    d. rounded

3. Base form
    a. straight
    b. concave
    c. convex

4. Notch form
    a. wide corner
    b. narrow corner
    c. wide side
    d. narrow side

5. Cross section (lateral and longitudinal)
    a. biconvex
    b. plano-convex
    c. biplano
    d. concave-convex

6. Shoulder form
    a. wide angle
    b. narrow angle
    c. wide rounded
    d. narrow rounded

7. Metrical data
    a. width
    b. neck width
    c. base width
    d. length
    e. index of expansion and contraction
    f. thickness

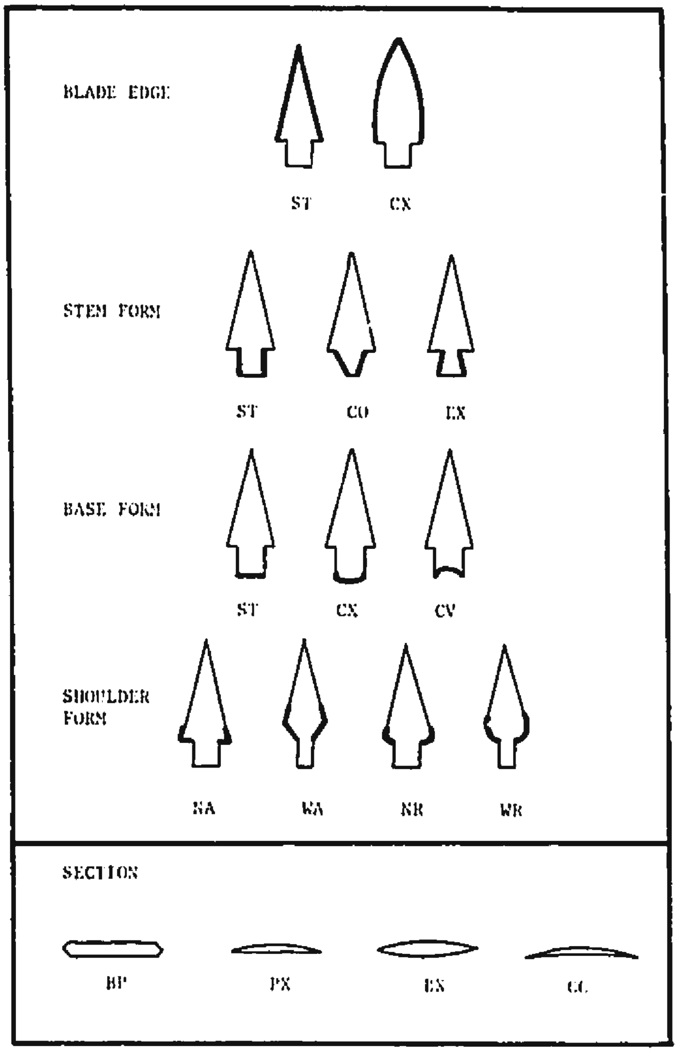


Figure 13. Stemmed biface attributes (after MacKay and Sanger 1972; Davis 1978). ST = straight; CX = convex; CO = contracting; EX = expanding; CV = concave; NA = narrow angled; WA = wide angled; NR = narrow rounded; WR = wide rounded

APPENDIX C

GROUP 1A STEMMED BIFACES

Attribute	BgDr11:702	BgDr11:958	BgDr11:988
Blade Edge	st	st	st
Stem Form	st	st	co
Base Form	st	st	st
Shoulder Form	nr/wa	wr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	bx	px
Striking Platform	n	n	y
Basal Thinning	y	y	n
Flake Curvature	n	n	n
Material	ft	ft	ft
Maximum Length (mm)	40	59	59
Maximum Width (mm)	14	27	22
Length/Width	2.9	2.2	2.7
Maximum Thickness (mm)	6	11	8
Neck Width (mm)	8	15	19
Base Width (mm)	8	14	5
Exp/Con. Index	100.0	107.1	380.0
Weight (gm)	2.8	12.9	6.8
Plate Number	6g	6f	6h

APPENDIX C (Con't.)

Attribute	CfDl2:277	CfDl2:624	CfDl2:937
Blade Edge	st	as	as
Stem Form	st	st	st
Base Form	cx	st	st
Shoulder Form	na	wr	wr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	bx	bx
Striking Platform	n	n	n
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	nd	tr	qz
Maximum Length (mm)	46	63	76
Maximum Width (mm)	24	27	25
Length/Width	1.9	2.3	3.0
Maximum Thickness (mm)	9	10	12
Neck Width (mm)	15	15	17
Base Width (mm)	16	12	15
Exp/Con. Index	93.8	145.4	113.3
Weight (gm)	7.8	16.2	20.5
Plate Number		2a	

APPENDIX C (Con't.)

Attribute	CfDl2:943	CfDl2:1064	CfDl2:1709
Blade Edge	cx	st	st
Stem Form	st	st	ex
Base Form	cx	st	cx
Shoulder Form	wr	wa	na/wr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	bx	bx
Striking Platform	n	n	n
Basal Thinning	n	n	y
Flake Curvature	n	n	n
Material	nd	nd	nd
Maximum Length (mm)	47	46	67
Maximum Width (mm)	19	22	28
Length/Width	2.3	2.1	2.4
Maximum Thickness (mm)	19	11	8
Neck Width (mm)	13	15	16
Base Width (mm)	10	13	11
Exp/Con. Index	127.3	107.7	145.4
Weight (gm)	7.7	10.0	14.5
Plate Number			

APPENDIX C (Con't.)

Attribute	73.10.275	73.10.452
Blade Edge	cx	cx
Stem Form	co	co
Base Form	st	st
Shoulder Form	nr	wa
Notch Form	n	n
Cross Section	bx	bx
Longitudinal Section	nd	nd
Striking Platform	y	y
Basal Thinning	n	n
Flake Curvature	n	n
Material	ft	ft
Maximum Length (mm)	nd	nd
Maximum Width (mm)	22	18
Length/Width	nd	nd
Maximum Thickness (mm)	9	6
Neck Width (mm)	12	10
Base Width (mm)	6	8
Exp/Con. Index	200.0	125.0
Weight (gm)	nd	nd
Plate Number		

Legend: as = asymmetric, bx = biconvex, co = contracting, cx = convex, ft = felsite, n = not evident, na = narrow angled, nd = not determined, nr = narrow rounded, qz = quartz, st = straight, tr = Traveller rhyolite, wa = wide angled, wr = wide rounded, y = yes

APPENDIX D
GROUP 1B STEMMED BIFACES

Attribute	BgDs6:601	CfDl1:734	CfDl1:1036
Blade Edge	st	st/cx	st
Stem Form	co	st	st
Base Form	st	st	st
Shoulder Form	wa	wa	nr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	px	bx
Striking Platform	y	n	n
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	ft	rt	qz
Maximum Length (mm)	57	51	65
Maximum Width (mm)	17	31	nd
Length/Width	3.4	1.7	nd
Maximum Thickness (mm)	8	8	12
Neck Width (mm)	9	17	15
Base Width (mm)	6	17	12
Exp/Con. Index	150.0	100.0	115.4
Weight (gm)	6.1	11.6	nd
Plate Number	3c		2c

APPENDIX.D (Con't.)

Attribute	CfDl1:1567	29.9.7	29.9.13
Blade Edge	st	nd	st
Stem Form	st	st	st
Base Form	st	cx	st
Shoulder Form	wa	wa	wr
Notch Form	n	n	n
Cross Section	bx	bx	px
Longitudinal Section	bx	nd	px
Striking Platform	y	n	n
Basal Thinning	n	y	y
Flake Curvature	n	n	n
Material	rt	rt	ch
Maximum Length (mm)	63	nd	84
Maximum Width (mm)	24	19	12
Length/Width	2.6	nd	7.0
Maximum Thickness (mm)	8	8	6
Neck Width (mm)	14	9	9
Base Width (mm)	14	9	7
Exp/Con. Index	100.0	100.0	128.6
Weight (gm)	9.4	nd	7.5
Plate Number	2b		

APPENDIX.D (Con't.)

Attribute	29.9.44	29.9.72	29.9.148
Blade Edge	st	st	cx
Stem Form	st	nd	co
Base Form	st	nd	st
Shoulder Form	wa	nd	nr/wr
Notch Form	n	nd	n
Cross Section	bp	bx	bx
Longitudinal Section	bx	nd	bx
Striking Platform	n	n	y
Basal Thinning	y	nd	n
Flake Curvature	n	nd	n
Material	ft	ch	tr
Maximum Length (mm)	nd	nd	nd
Maximum Width (mm)	17	20	19
Length/Width	nd	nd	nd
Maximum Thickness (mm)	7	7	8
Neck Width (mm)	11	nd	13
Base Width (mm)	8	nd	7
Exp/Con. Index	137.5	nd	185.7
Weight (gm)	nd	nd	nd
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.236	29.9.263	29.9.297
Blade Edge	st	nd	st
Stem Form	co	st	co
Base Form	st	st	st
Shoulder Form	nr/wr	nr/wr	nr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	nd	bx
Striking Platform	n	y	y
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	ft	qt	tr
Maximum Length (mm)	50	nd	51
Maximum Width (mm)	16	27	16
Length/Width	3.1	nd	3.2
Maximum Thickness (mm)	6	8	6
Neck Width (mm)	12	15	9
Base Width (mm)	7	13	8
Exp/Con. Index	171.4	115.4	112.5
Weight (gm)	2.8	nd	3.5
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.358	29.9.378a	29.9.433
Blade Edge	st	nd	nd
Stem Form	st	st	st
Base Form	cx	st	st
Shoulder Form	nr	nr	nr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	ir	nd	nd
Striking Platform	n	y	n
Basal Thinning	y	n	n
Flake Curvature	n	n	n
Material	rt	tr	ft
Maximum Length (mm)	72	nd	nd
Maximum Width (mm)	17	24	18
Length/Width	4.2	nd	nd
Maximum Thickness (mm)	7	9	6
Neck Width (mm)	10	10	14
Base Width (mm)	8	9	12
Exp/Con. Index	125.0	111.1	116.7
Weight (gm)	6.0	nd	nd
Plate Number	1a		

APPENDIX.D (Con't.)

Attribute	29.9.607	29.9.635	29.9.715
Blade Edge	nd	nd	nd
Stem Form	st	ir	st
Base Form	st	st	st
Shoulder Form	na/nr	wa/wr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	nd	nd	nd
Striking Platform	y	y	y
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	ft	rt	tr
Maximum Length (mm)	nd	nd	nd
Maximum Width (mm)	25	17	19
Length/Width	nd	nd	nd
Maximum Thickness (mm)	10	5	6
Neck Width (mm)	12	9	13
Base Width (mm)	9	9	10
Exp/Con. Index	133.3	100.0	130.0
Weight (gm)	nd	nd	nd
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.807	29.9.851	29.9.867
Blade Edge	cx	nd	st
Stem Form	st	st	co
Base Form	st	st	st
Shoulder Form	wr	na/nr	nr
Notch Form	n	n	n
Cross Section	bx	bx	ir
Longitudinal Section	nd	nd	bx
Striking Platform	y	y	n
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	ft	rt	tr
Maximum Length (mm)	nd	nd	54
Maximum Width (mm)	15	22	14
Length/Width	nd	nd	3.9
Maximum Thickness (mm)	5	5	7
Neck Width (mm)	8	14	9
Base Width (mm)	7	12	7
Exp/Con. Index	114.3	116.7	128.6
Weight (gm)	nd	nd	3.0
Plate Number			1b

APPENDIX.D (Con't.)

Attribute	29.9.943	29.9.944	29.9.948
Blade Edge	cx	nd	cx
Stem Form	st	st	st
Base Form	st	st	cx
Shoulder Form	wr	nr/wr	wr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	nd	bx
Striking Platform	y	n	n
Basal Thinning	n	y	y
Flake Curvature	n	n	n
Material	rt	rt	tr
Maximum Length (mm)	44	nd	67
Maximum Width (mm)	16	19	30
Length/Width	2.8	nd	2.2
Maximum Thickness (mm)	7	9	12
Neck Width (mm)	10	12	14
Base Width (mm)	6	12	13
Exp/Con. Index	166.7	100.0	107.7
Weight (gm)	4.4	nd	19.9
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.990	29.9.1003	29.9.1018
Blade Edge	st	nd	nd
Stem Form	st	st	st
Base Form	cx	cx	cx
Shoulder Form	wa/wr	wa/wr	wa/wr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	nd	nd	nd
Striking Platform	n	n	n
Basal Thinning	n	y	y
Flake Curvature	n	n	n
Material	tr	tr	ft
Maximum Length (mm)	nd	nd	nd
Maximum Width (mm)	19	29	18
Length/Width	nd	nd	nd
Maximum Thickness (mm)	8	nd	8
Neck Width (mm)	11	12	12
Base Width (mm)	9	11	10
Exp/Con. Index	122.2	109.1	120.0
Weight (gm)	nd	nd	nd
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.1021	29.9.1022	29.9.1161
Blade Edge	st/as	cx	nd
Stem Form	st	st	nd
Base Form	st	cx	nd
Shoulder Form	wr	nr	nd
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	ir	bx	nd
Striking Platform	y	n	n
Basal Thinning	n	y	n
Flake Curvature	n	n	n
Material	tr	ft	tr
Maximum Length (mm)	56	46	nd
Maximum Width (mm)	18	18	19
Length/Width	3.1	2.6	7
Maximum Thickness (mm)	8	7	nd
Neck Width (mm)	10	12	nd
Base Width (mm)	8	11	nd
Exp/Con. Index	125.0	109.1	nd
Weight (gm)	4.7	4.4	nd
Plate Number	1j		

APPENDIX.D (Con't.)

Attribute	29.9.1182	29.9.1250	29.9.1288
Blade Edge	cx	st	st
Stem Form	st	st	co
Base Form	st	st	cx
Shoulder Form	wr	nr/wr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	nd	bx	bx
Striking Platform	n	n	y
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	ft	rt	tr
Maximum Length (mm)	nd	66	55
Maximum Width (mm)	20	21	20
Length/Width	nd	3.1	2.8
Maximum Thickness (mm)	10	6	9
Neck Width (mm)	12	14	14
Base Width (mm)	10	11	5
Exp/Con. Index	120.0	127.3	280.0
Weight (gm)	nd	6.2	5.2
Plate Number		1f	1l

APPENDIX.D (Con't.)

Attribute	29.9.1294	29.9.1327	29.9.1333
Blade Edge	st	st	st
Stem Form	st	st	st
Base Form	st	st	st
Shoulder Form	nr	nr/wr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	nd	bx	bx
Striking Platform	y	y	y
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	rt	ft	rt
Maximum Length (mm)	nd	44	62
Maximum Width (mm)	18	17	19
Length/Width	nd	2.6	3.3
Maximum Thickness (mm)	7	8	5
Neck Width (mm)	10	13	9
Base Width (mm)	9	10	7
Exp/Con. Index	111.1	130.0	128.6
Weight (gm)	nd	4.1	3.6
Plate Number			1g

APPENDIX.D (Con't.)

Attribute	29.9.1405	29.9.1413	29.9.1535
Blade Edge	st/cx	st	st/cx
Stem Form	st	st	st
Base Form	st	cx	st
Shoulder Form	wa	nr/wr	wa
Notch Form	n	ws/wc	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	bx	bx
Striking Platform	y	n	y
Basal Thinning	n	n	n
Flake Curvature	n	n	n
Material	rt	rt	rt
Maximum Length (mm)	44	66	61
Maximum Width (mm)	15	16	19
Length/Width	2.9	4.3	3.2
Maximum Thickness (mm)	6	7	5
Neck Width (mm)	9	10	12
Base Width (mm)	9	8	8
Exp/Con. Index	100.0	125.0	150.0
Weight (gm)	2.4	6.5	4.9
Plate Number			1c

APPENDIX.D (Con't.)

Attribute	29.9.1544	29.9.1763	29.9.1791
Blade Edge	st	nd	st/cx
Stem Form	st	st	st
Base Form	st	st	cx
Shoulder Form	wa	nr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	nd	bx
Striking Platform	y	n	n
Basal Thinning	n	y	y
Flake Curvature	n	n	n
Material	qt	tr	rt
Maximum Length (mm)	48	nd	57
Maximum Width (mm)	18	21	19
Length/Width	2.7	nd	3.0
Maximum Thickness (mm)	6	7	7
Neck Width (mm)	9	13	10
Base Width (mm)	9	10	9
Exp/Con. Index	100.0	130.0	111.1
Weight (gm)	3.2	nd	5.0
Plate Number	1h		1k

APPENDIX.D (Con't.)

Attribute	29.9.1868	29.9.1875	29.9.1882
Blade Edge	nd	as/cx	nd
Stem Form	st	st	st
Base Form	st	st	st
Shoulder Form	nr	nr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	nd	px	nd
Striking Platform	n	n	n
Basal Thinning	n	n	y
Flake Curvature	n	n	n
Material	nd	rt	rt
Maximum Length (mm)	nd	43	nd
Maximum Width (mm)	20	16	19
Length/Width	nd	2.7	nd
Maximum Thickness (mm)	5	6	8
Neck Width (mm)	12	11	11
Base Width (mm)	10	10	9
Exp/Con. Index	120.0	110.0	122.2
Weight (gm)	nd	1.6	nd
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.2148	29.9.3259	29.9.3624
Blade Edge	st	st	st/cx
Stem Form	st	st	st
Base Form	st	st	st
Shoulder Form	wa	nr	wa
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	nd	bx
Striking Platform	y	y	n
Basal Thinning	n	n	y
Flake Curvature	n	n	n
Material	rt	qt	tr
Maximum Length (mm)	51	nd	57
Maximum Width (mm)	18	19	17
Length/Width	2.8	nd	3.4
Maximum Thickness (mm)	6	6	6
Neck Width (mm)	9	12	12
Base Width (mm)	9	12	9
Exp/Con. Index	100.0	100.0	133.3
Weight (gm)	3.5	nd	3.7
Plate Number			

APPENDIX.D (Con't.)

Attribute	29.9.3751	29.9.5346	29.9.5595
Blade Edge	st/cx	nd	nd
Stem Form	st	st	st
Base Form	st	st	st
Shoulder Form	wa	nr	na/nr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	bx	nd	nd
Striking Platform	n	n	y
Basal Thinning	y	y	n
Flake Curvature	n	n	n
Material	tr	tr	rt
Maximum Length (mm)	36	nd	nd
Maximum Width (mm)	20	19	29
Length/Width	1.8	nd	nd
Maximum Thickness (mm)	8	6	11
Neck Width (mm)	14	13	14
Base Width (mm)	12	10	13
Exp/Con. Index	116.7	130.0	107.7
Weight (gm)	3.1	nd	nd
Plate Number		11	

APPENDIX.D (Con't.)

Attribute	29.9.5880	29.9.7281
Blade Edge	nd	st
Stem Form	nd	st
Base Form	nd	st
Shoulder Form	nr	na
Notch Form	n	n
Cross Section	bx	px
Longitudinal Section	nd	nd
Striking Platform	nd	n
Basal Thinning	nd	y
Flake Curvature	nd	n
Material	rt	tr
Maximum Length (mm)	nd	nd
Maximum Width (mm)	18	29
Length/Width	nd	d
Maximum Thickness (mm)	8	9
Neck Width (mm)	14	15
Base Width (mm)	nd	9
Exp/Con. Index	nd	166.7
Weight (gm)	nd	nd
Plate Number		

Legend: as = asymmetric, bx = biconvex, bp = biplano, co = contracting, cx = convex, ft = felsite, ir = irregular, n = not evident, na = narrow angled, nd = not determined, nr = narrow rounded, qt = quartzite, qz = quartz, st = straight, tr = Traveller rhyolite, wa = wide angled, wc = wide corner, wr = wide rounded, ws = wide side, y = yes

APPENDIX E

MOOREHEAD PHASE STEMMED BIFACES

Attribute	BIDn2:185	BIDn2:237	29.9.579
Blade Edge	st	st	cx
Stem Form	st	st	st
Base Form	lr	st	st
Shoulder Form	nr/wa	na/nr	wr
Notch Form	n	n	n
Cross Section	bx	bx	bx
Longitudinal Section	px	bx	bx
Striking Platform	y	y	y
Basal Thinning	n	n	n
Flake Curvature	y	y	y
Material	ft	ft	rt
Maximum Length (mm)	77	56	79
Maximum Width (mm)	19	17	23
Length/Width	4.1	3.3	3.4
Maximum Thickness (mm)	12	7	9
Neck Width (mm)	13	11	14
Base Width (mm)	12	11	11
Exp/Con. Index	108.3	100.0	127.3
Weight (gm)	14.4	5.5	15.7
Plate Number	3a	3b	4b

APPENDIX E (Con't.)

Attribute	29.9.1396	29.9.1525	29.9.4125
Blade Edge	st	st	st
Stem Form	st	co	st
Base Form	ir	st	st
Shoulder Form	wa/wr	nr/wa	wa
Notch Form	n	n	n
Cross Section	px	px	px
Longitudinal Section	bx	px	px
Striking Platform	y	y	y
Basal Thinning	n	n	n
Flake Curvature	n	n	y
Material	bs	tr	tr
Maximum Length (mm)	86	69	82
Maximum Width (mm)	21	23	23
Length/Width	4.1	3.0	3.6
Maximum Thickness (mm)	9	13	9
Neck Width (mm)	15	13	15
Base Width (mm)	12	8	13
Exp/Con. Index	125.0	162.5	115.4
Weight (gm)	15.6	16.2	12.2
Plate Number	4e	4a	4d

APPENDIX E (Con't.)

Attribute	29.9.5010	30.42.9	30.42.13
Blade Edge	st	st	st
Stem Form	st	st	st
Base Form	st	st	st
Shoulder Form	nr/wr	nr	na/nr
Notch Form	n	n	n
Cross Section	px	px	px
Longitudinal Section	bx	px	px
Striking Platform	y	n	y
Basal Thinning	n	n	n
Flake Curvature	n	y	n
Material	tr	ft	ft
Maximum Length (mm)	84	49	38
Maximum Width (mm)	23	16	15
Length/Width	3.7	3.1	2.5
Maximum Thickness (mm)	10	8	5
Neck Width (mm)	13	10	8
Base Width (mm)	10	8	6
Exp/Con. Index	130.0	125.0	133.3
Weight (gm)	16.2	6.2	2.3
Plate Number	4c		5a

APPENDIX E (Con't.)

Attribute	30.42.16	61.34.3	61.34.49
Blade Edge	st	st	st
Stem Form	st	st	st
Base Form	st	cx	cx
Shoulder Form	nr	nr/wa	nr
Notch Form	n	n	n
Cross Section	px	bx	bx
Longitudinal Section	px	bx	bx
Striking Platform	y	n	n
Basal Thinning	n	y	y
Flake Curvature	y	n	n
Material	rt	ft	ft
Maximum Length (mm)	55	51	107
Maximum Width (mm)	15	27	23
Length/Width	3.7	1.9	4.7
Maximum Thickness (mm)	7	10	13
Neck Width (mm)	10	14	15
Base Width (mm)	9	14	12
Exp/Con. Index	111.1	100.0	125.0
Weight (gm)	5.7	10.1	23.5
Plate Number	5b	6c	6a

Legend: as = asymmetric, bx = biconvex, co = contracting, cx = convex, ex = expanding, ft = felsite, n = not evident, na = narrow angled, nd = not determined, nr = narrow rounded, qt = quartzite, st = straight, tr = Traveller rhyolite, wa = wide angled, wr = wide rounded, ws = wide side, y = yes

APPENDIX F

GROUP 2 STEMMED BIFACES

Attribute	CfDl2:52	CfDl2:158	30.42.1872
Blade Edge	cx	cx	cx
Stem Form	ex	st	ex
Base Form	st	cx	cx
Shoulder Form	wr	na/wr	nr/wr
Notch Form	ws	ws	ws
Cross Section	bx	bx	bx
Longitudinal Section	bx	bx	bx
Striking Platform	n	n	n
Basal Thinning	n	n	n
Material	qz	nd	ft
Maximum Length (mm)	46	nd	57
Maximum Width (mm)	28	26	23
Length/Width	1.6	nd	2.5
Maximum Thickness (mm)	11	11	7
Neck Width (mm)	26	18	12
Base Width (mm)	22	19	21
Exp/Con. Index	118.2	94.7	57.1
Weight (gm)	15.6	nd	11.0
Plate Number	7a	7b	

Legend: bx = biconvex, cx = convex, ex = expanding, ft = felsite, n = not evident, nd = not determined, qz = quartz, st = straight, wr = wide rounded, ws = wide side, y = yes

APPENDIX G

GROUP 3 STEMMED BIFACES

Attribute	CfDl1:721	CfDl1:765	CfDl1:782
Blade Edge	cx	cx	cx
Stem Form	ex	ex	ex
Base Form	st	st	st
Shoulder Form	wr	wa	nr/wr
Notch Form	ws	ws	ws
Cross Section	bx	bx	bx
Longitudinal Section	bx	px	bx
Striking Platform	n	n	n
Basal Thinning	n	y	n
Material	qz	qz	ch
Maximum Length (mm)	37	41	33
Maximum Width (mm)	18	19	17
Length/Width	2.1	2.2	1.9
Maximum Thickness (mm)	7	6	6
Neck Width (mm)	15	12	12
Base Width (mm)	16	14	14
Exp/Con. Index	93.8	85.7	85.7
Weight (gm)	4.1	4.1	2.7
Plate Number	8a	8d	8b

APPENDIX G (Con't.)

Attribute	CfDl1:886
Blade Edge	cx/cv
Stem Form	ex
Base Form	cv
Shoulder Form	nr/wr
Notch Form	ws
Cross Section	bx
Longitudinal Section	bx
Striking Platform	n
Basal Thinning	y
Material	qz
Maximum Length (mm)	36
Maximum Width (mm)	14
Length/Width	2.6
Maximum Thickness (mm)	7
Neck Width (mm)	13
Base Width (mm)	14
Exp/Con. Index	92.9
Weight (gm)	3.1
Plate Number	8c

Legend: bx = biconvex, ch = chert, co = contracting, cx = convex, ex = expanding, n = not evident, nd = not determined, nr = narrow rounded, qz = quartz, st = straight, wa = wide angled, wr = wide rounded, ws = wide side, y = yes

APPENDIX H

GROUP 4A STEMMED BIFACES

Attribute	CgDt3:1	CgDt3:4
Blade Edge	cx	cx
Stem Form	st	st
Base Form	st	st
Shoulder Form	wa	wa
Notch Form	n	n
Cross Section	bx	bx
Longitudinal Section	cc	nd
Striking Platform	y	n
Basal Thinning	n	n
Material	rt	rt
Maximum Length (mm)	58	nd
Maximum Width (mm)	30	32
Length/Width	1.9	nd
Maximum Thickness (mm)	7	9
Neck Width (mm)	17	17
Base Width (mm)	18	18
Exp/Con. Index	94.4	94.4
Weight (gm)	11.4	nd
Plate Number	9a	9b

Legend: bx = biconvex, cx = convex, ex = expanding, n = not evident, nd = not determined, st = straight, wa = wide angled, y = yes

APPENDIX I

GROUP 4B STEMMED BIFACES

Attribute	CgDt3:2	CgDt3:3
Blade Edge	cx	cx
Stem Form	ex	ex
Base Form	cx	cx
Shoulder Form	wr	wr
Notch Form	ws	ws
Cross Section	bx	bx
Longitudinal Section	bx	bx
Striking Platform	n	y
Basal Thinning	y	n
Material	rt	rt
Maximum Length (mm)	59	63
Maximum Width (mm)	13	25
Length/Width	4.5	2.5
Maximum Thickness (mm)	13	12
Neck Width (mm)	15	20
Base Width (mm)	17	21
Exp/Con. Index	88.2	95.2
Weight (gm)	13.0	15.9
Plate Number	9c	

Legend: bx = biconvex, cx = convex, ex = expanding, n = not evident, na = narrow angled, nd = not determined, rt = rholite, wr = wide rounded, ws = wide side

PLATE 1 (Following Page)

a-m: Group 1B Stemmed Bifaces.

SOURCE: Turner Farm Site (B. Bourque 1988: personal communication).

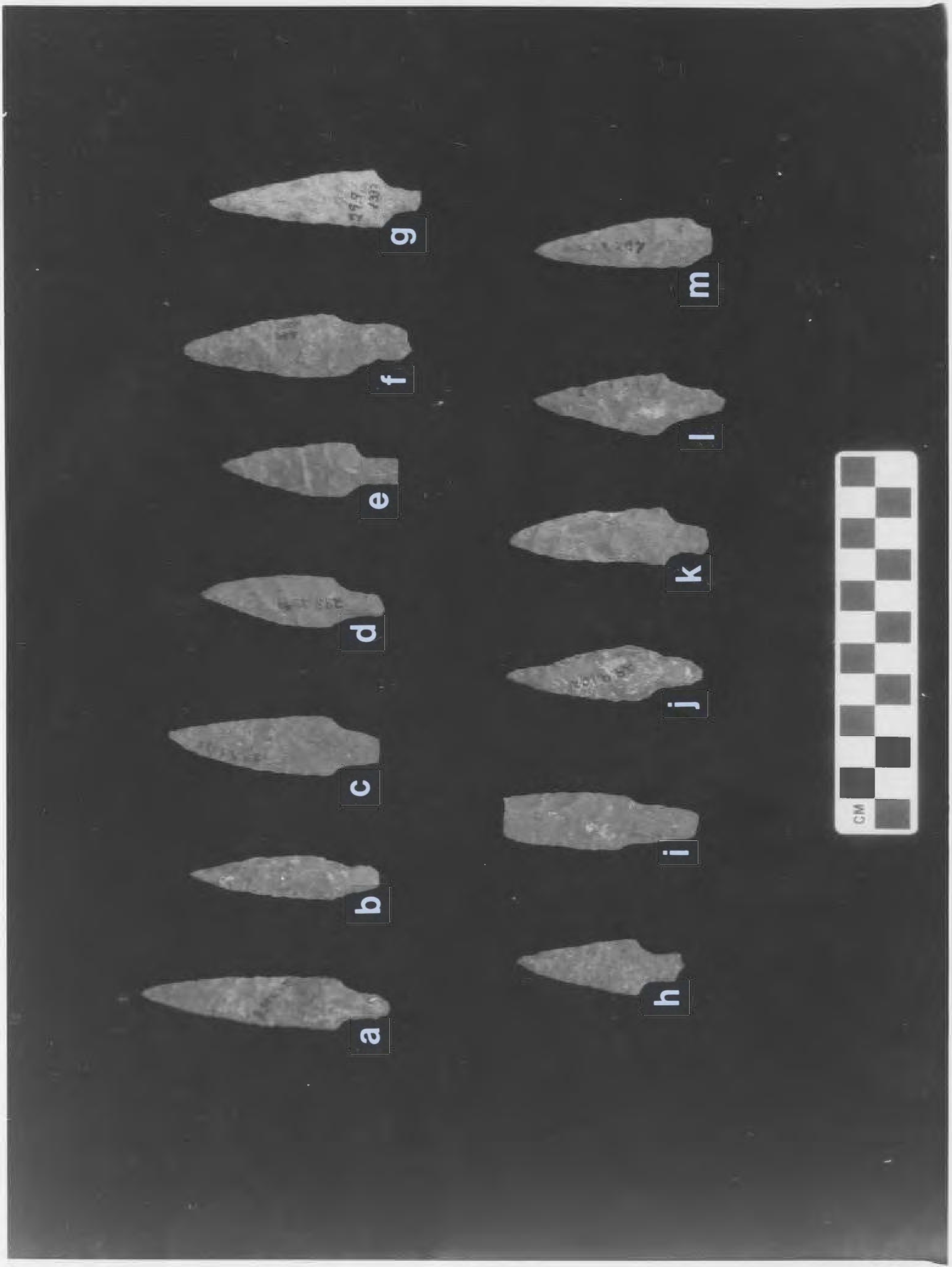

a
b
c
d
e
f
g
h
i
j
k
l
m
CM

PLATE 2 (Following Page)

a: Group 1A Stemmed Biface from the Augustine mound fill (Turnbull 1980).

b: Group 1B Stemmed Bifaces from the Oxbow site (Allen 1980, 1981).

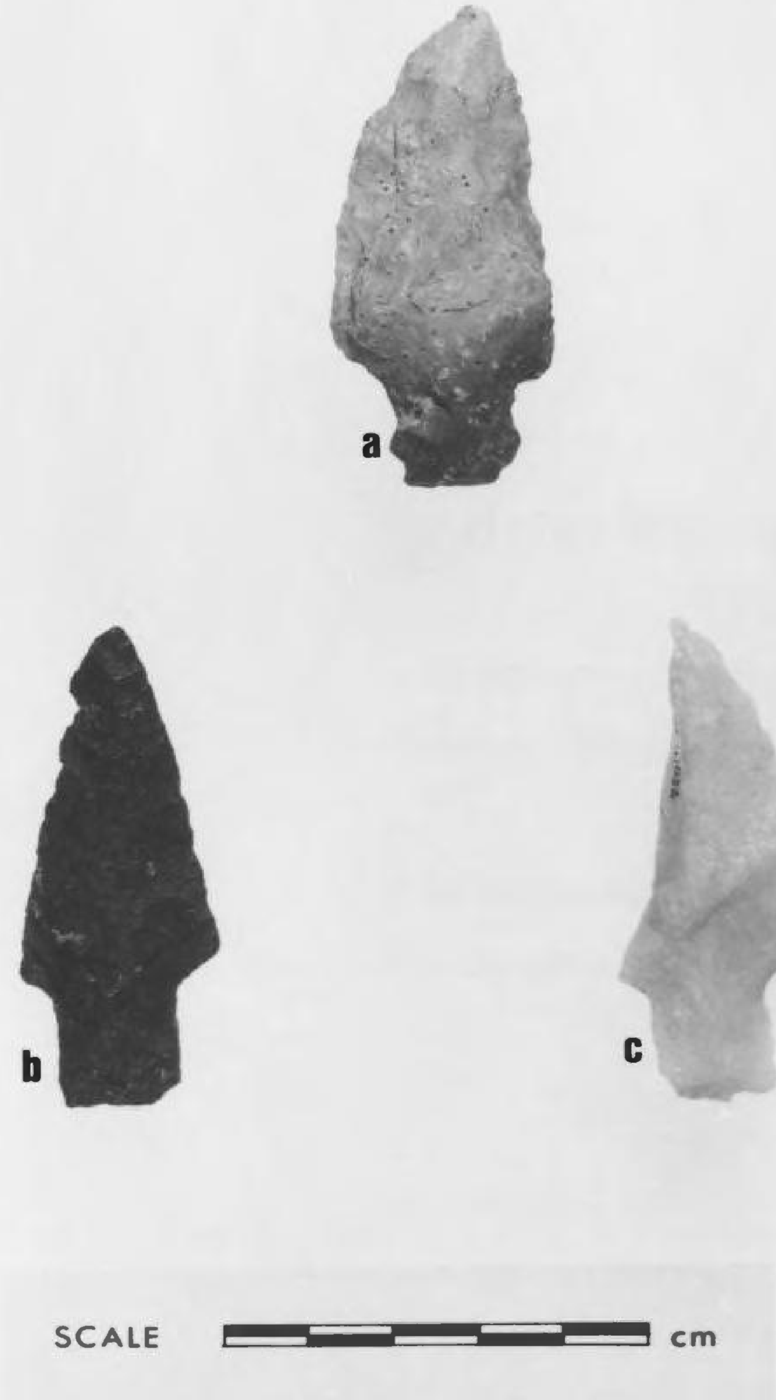

a
b
c
SCALE
cm

PLATE 3 (Following Page)

a, b: Moorehead Phase Stemmed Bifaces from the Cow Point site (Sanger 1973).

c: Group 1B Stemmed Biface from the Sand Point site (Lavoie 1971).

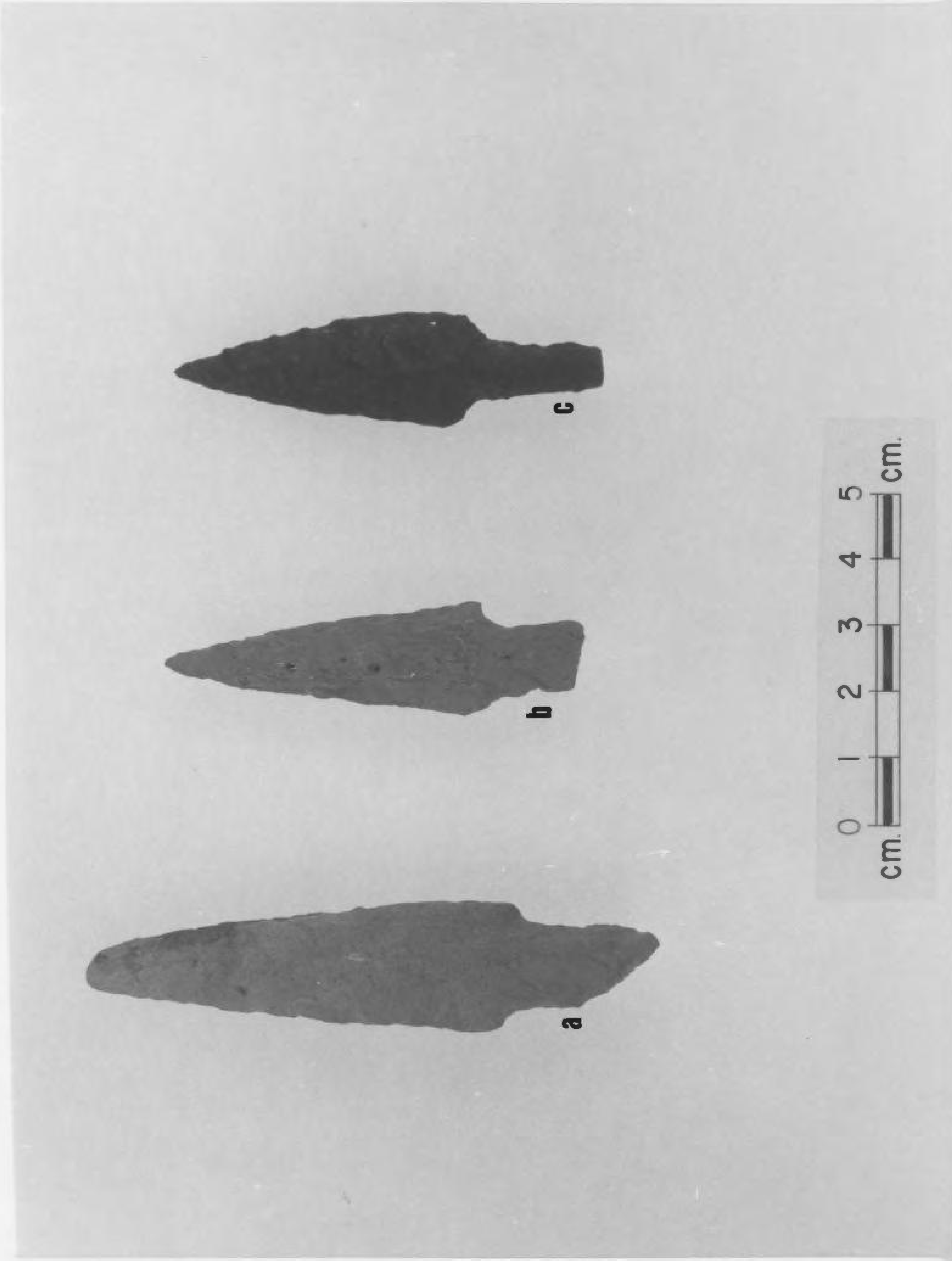

a
b
c
cm. 0 1 2 3 4 5 cm.

PLATE 4 (Following Page)

a-e: Moorehead Phase Stemmed Bifaces.

SOURCE: Turner Farm Site (B. Bourque 1988: personal communication).


a
b
c
d
e
CM

PLATE 5 (Following Page)

a-c: Late Archaic Period Stemmed Bifaces.

SOURCE: Roque Islands, ME (61.34) (D. Sanger 1988: personal communication).

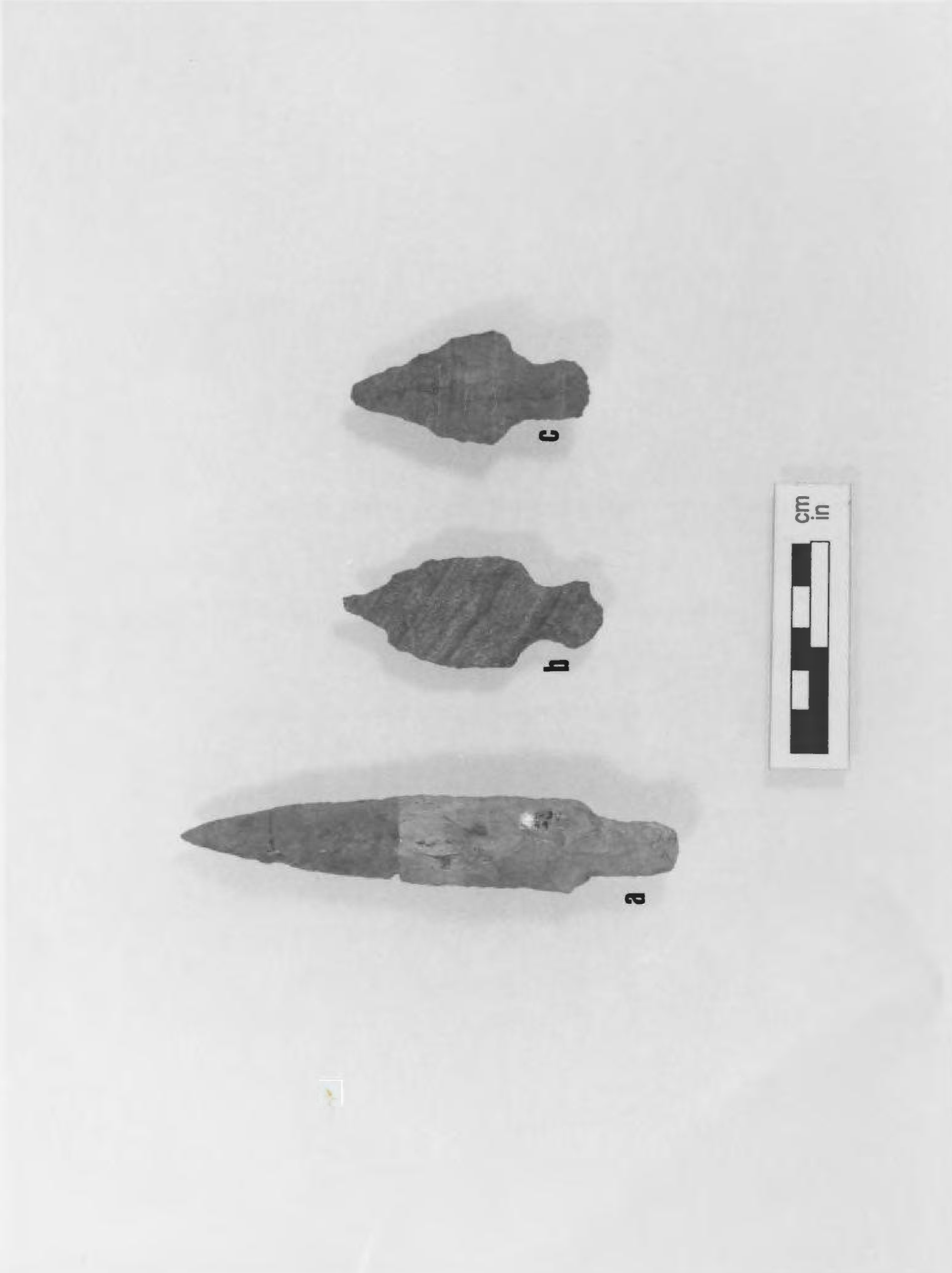

c
b
a
cm
in

PLATE 6 (Following Page)

a,b: Susquehanna Tradition Stemmed Bifaces.

c,d,i: Miscellaneous Stemmed Bifaces.

e-h: Group 1A Stemmed Bifaces.

SOURCE: Teacher's Cove Site (Davis 1978).

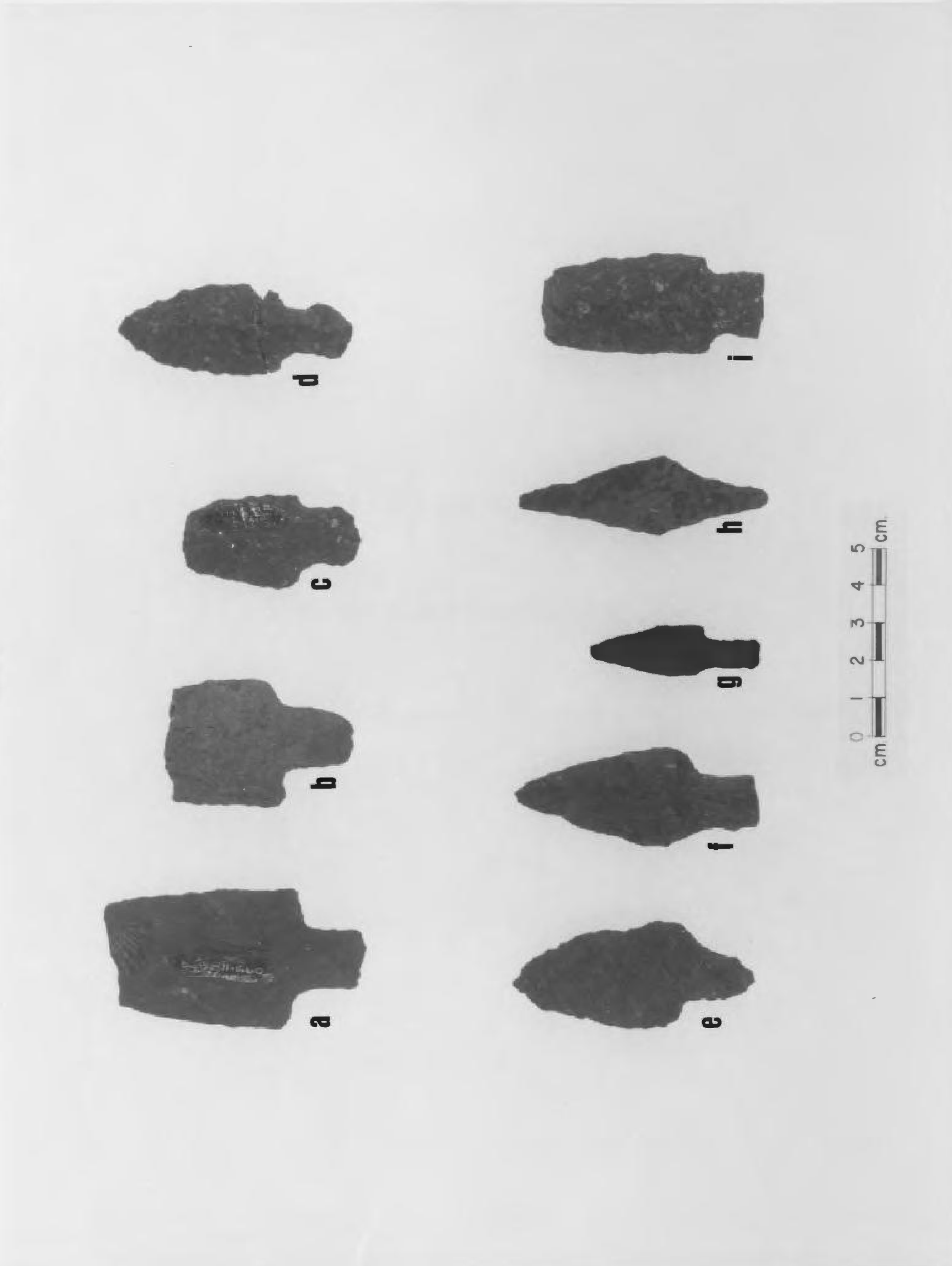

a
b
c
d
e
f
g
h
i
cm 0 1 2 3 4 5 cm

PLATE 7 (Following Page)

a,b: Group 2 Stemmed Bifaces.

SOURCE: Augustine Site Mound Fill (Turnbull 1980).


a
b
SCALE
cm

PLATE 8 (Following Page)

a-d: Group 3 Stemmed Bifaces.

SOURCE: Oxbow Site (Allen 1980, 1981).


d
c
b
a
SCALE
cm

PLATE 9 (Following Page)

a,b: Group 4A Stemmed Bifaces.

c: Group 4B Stemmed Biface.

SOURCE: Deadman's Pool Site (Sanger 1971b).


a
b
c
0
5
CM

PLATE 10 (Following Page)

a-c: Susquehanna Tradition chipped and ground celts.

SOURCE: Turner Farm Site (B. Bourque 1988: personal communication).

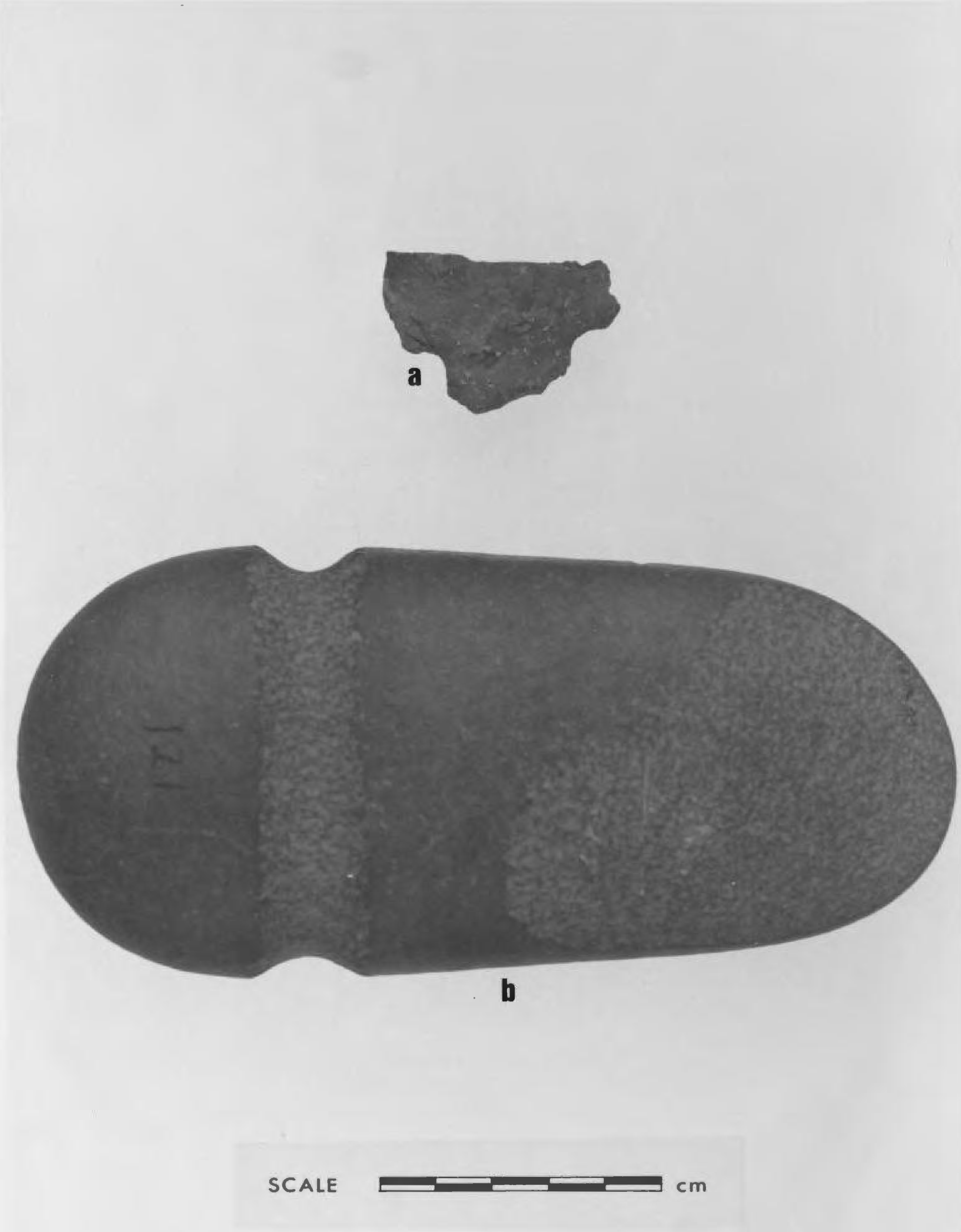

c
b
a
CM

PLATE 11 (Following Page)

a: Possible Susquehanna Tradition Stemmed Biface base, collected from Red Bank.

b: Fully grooved axe, collected from Red Bank.

SOURCE: R.P. Gorham Collection, Archaeology Service, Department of Tourism, Recreation and Heritage, Fredericton, New Brunswick.


a
b
SCALE
cm