

**Northeast Subsistence-Settlement Change:**  
*A.D. 700–1300*

edited by

John P. Hart and Christina B. Rieth

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## PREFACE

The New York State Museum has a long history of publishing important works on the archaeology of New York. William M. Beauchamp, Arthur C. Parker, William A. Ritchie, and Robert E. Funk all published classic monographs through the Museum that helped to define the archaeology of their times. Continuing with this tradition, the Museum has begun a series of edited volumes in its *Bulletin* series that present important new research results on the archaeology of New York and the greater Northeast. The first, *Current Northeast Paleoethnobotany* (Bulletin 494), is a collection of papers that highlights the importance of botanical remains in the interpretation of prehistoric subsistence in the Northeast. It was followed by *Nineteenth- and Early Twentieth-Century Domestic Site Archaeology in New York State* (Bulletin 495), a collection of papers that highlights the importance of archaeology in the understanding of our relatively recent history.

This third volume, *Northeast Subsistence-Settlement Change: A.D. 700-1300* (Bulletin 496) brings together a collection of papers that presents the results of recent research on early Late Prehistoric period (A.D. 700–1300) subsistence and settlement. The volume developed from a symposium I organized with coeditor Christina Rieth for the New York Natural History Conference VI, which was held at the New York State Museum in April 2000. Our goal for the symposium was to bring together regional experts in the early Late Prehistoric period to describe the scope of research being done on subsistence and settlement issues across the broader Northeast. Eighteen papers were presented, covering the region from the western end of Lake Erie through southern Ontario, Pennsylvania, New York, New England, and New Brunswick.

The symposium was very well received, and we thought it would work well as an edited book. As such things go, not all of the symposium participants were able to prepare their papers for publication, and some had made commitments to publish elsewhere, but we were able to assemble a collection of 18 chapters

that covers a broad geographical region and a diversity of topics concerned with subsistence and settlement during a 600-year period of prehistory. With the help of the volume contributors, we were able to bring the book to publication in the relatively short period of two years.

The early Late Prehistoric period is an important time in Northeastern prehistory because it was then that many of the subsistence and settlement traits of Native populations recorded during the early Historic period first become evident in the archeological record. The chapters in this book provide regional summaries, analyses of specific sites and site categories, analyses of pottery and paleoethnobotanical data, and models for the adoption of maize-based agriculture. While it would have been possible to organize the chapters on topical grounds, we felt that a geographical organization would provide a better sense of the range of variation in subsistence and settlement traits across the region. We also thought that such an organization would provide a sense for current controversies in the various subregions covered by the book. To those ends, the chapters are organized in a transect from west-to-east and south-to-north, sandwiched between an introduction by Christina Rieth and a concluding chapter by me and Bernard Means. We hope that this book will not only provide a sense of current research on the early Late Prehistoric period in the Northeast, but will spur additional research on this critical period of time.

As this book goes to press, additional volumes are in production in the *Bulletin* series that will highlight other important topics in New York and Northeast archaeology. *Geoarchaeology of Landscapes in the Glacial Northeast* (Bulletin 497) will bring together papers that highlight current geoarchaeological research in the Northeast. The collected papers in *The Archaeology of Albany* will present the results of recent archaeological investigations in Albany, New York, one of the oldest continually occupied Euroamerican settlements in the United States. Other topical volumes will follow in subsequent years.

The current volume would never have reached publication without the hard work of the chapter authors, whose diligence in meeting deadlines kept the publication on schedule. I want to particularly thank Christina Rieth, who not only wrote three of the chapters, but also assumed much of the editorial burden for the book. Thanks also to the two referees, who

provided timely and very thoughtful comments on the book and its chapters. Finally, many thanks to Jack Skiba for managing the book's publication and for redrafting many of the figures.

John P. Hart  
August 2002

# CHAPTER 1

## INTRODUCTION

Christina B. Rieth

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WHEN VIEWED WITHIN A REGIONAL CONTEXT, the early Late Prehistoric period (A.D. 700-1300) represents one of the most dynamic periods in Northeast prehistory. This period has been viewed as the time in which prehistoric populations adopted tropical domesticates (maize, beans, and squash), made the transition from a mobile to a semisedentary lifestyle, and carried out important changes in material culture including the replacement of thick-walled stamped ceramics with thinner-walled cordmarked containers, and a general simplification of lithic technology (Ritchie and Funk 1973:372 as cited in Oskam 1999:69; Ritchie 1994; Ritchie 1994; Wright 1966). While these changes do apply to some early Late Prehistoric populations, recent research suggests that the above summarized characterization is oversimplified and does not accurately depict the range of behaviors practiced by the prehistoric populations of the Northeast.

It is with this idea in mind that the current volume is presented. Eleven of the chapters in the volume were initially presented as papers in a symposium entitled "Early Late Prehistoric (A.D. 700-1300) Settlement and Subsistence Change in the Northeast" at the New York Natural History Conference held at the New York State Museum in April 2000; the remaining chapters represent solicited contributions from scholars who could not attend the conference. The intent of the symposium was to provide a forum in which scholars from different theoretical and methodological backgrounds could gather to discuss the diversity of settlement and subsistence patterns in the region and present research directed toward understanding how such patterns are reflected in the distribution of artifacts and archaeological features. The resulting chapters cover a wide range of environments and report on societies that exhibit a diverse array of settlement and subsistence attributes as measured through resources exploited, settlement locations, and socioeconomic organization. Despite the different theoretical and methodological frameworks

in which the individual chapter authors have pursued their work, this volume is united not only by a common temporal and thematic focus, but also by the authors' decisions to seriously question existing settlement and subsistence models in light of new data and theories in order to understand one of the most important periods in Northeast prehistory.

### GEOGRAPHIC AND TEMPORAL SCOPE OF VOLUME

The Northeast, as defined here, includes the area extending from the eastern Great Lakes south to the central Ohio River Valley and northeast to the Canadian Maritimes. The chapters in this volume draw from a variety of regions and encompass both upland and lowland locations across the Allegheny Plateau and Appalachian Highlands region of New Brunswick, New England, New York, Pennsylvania, Ohio, and southern Ontario. Traditionally viewed as part of the Eastern Woodlands, few volumes focus solely on the settlement and subsistence characteristics of the Northeast (but see Hart 1999e; Levine et al. 2000). Instead, the Northeast and the surrounding regions are often treated as a single-culture area with similar traits and limited internal variation (Trigger 1978). However, as Trigger (1978) points out, the cultures of the Eastern Woodlands are marked by substantial differences in their dependence on agriculture, population density, settlement characteristics, and degree of sociopolitical stratification. Before we can fully understand the differences between these Eastern Woodland populations, we must first understand the range of behaviors that characterize local and subregional populations. This volume does just this by providing a comprehensive discussion of Northeast settlement and subsistence patterning.

While the early Late Prehistoric period dates

between A.D. 700 and 1300, the chapters in this volume include discussions of contexts as early as the fourth and as late as the fifteenth century A.D., providing a broader context for the volume's themes. Since this period is referred to differently across the broad region (e.g., late Middle Woodland, early Late Woodland, Ceramic period 5), the term "early Late Prehistoric" has been applied to bridge diverse archaeological culture areas.

## THE NATURE OF NORTHEAST SETTLEMENT AND SUBSISTENCE STUDIES

Among Northeast archaeologists, the period A.D. 700 to 1300 is defined by three major traits: (1) the adoption and/or intensification of maize-based agriculture (e.g., Custer 1986:11; Fecteau 1985; Kent et al. 1971:329; Mockton 1992:9; Reid 1975; Ritchie 1994:276, 310; Wright 1972); (2) the shift from a mobile to a semi-sedentary village life (e.g., Custer 1986; Feder 1984; Pollock and Henderson 1992; Ritchie 1994:280-281; Silver 1981; Smith 1990: 279; Snow 1980; Stothers 1997; Wall et al. 1996:219-220; Wright 1972); and (3) the use and manufacture of cordmarked ceramics with complex design motifs (e.g., Brose 1994:50-51; Brown 1982:17-18; Bursey 1994:46; Chapdelaine 1995:77-95; Dragoo 1971; Fox 1990:175; Lavin 1980:3-41; Murphy and Ferris 1990:199-207; Prufer 1967; Snow 1980:315; Wright 1972).

The use of these traits to characterize the period largely resulted from studies completed during the second half of the twentieth century, which sought to create culture-historic taxa whose characteristics were homogeneous and bounded through space and time (Church 1987; Custer 1986:11-19; Hart 1999a; Lenig 2000:59-60; Smith 1990:281-284). Variation within culture-historic taxa was not viewed as important, but variation between culture-historic taxa was (Hart 1999a:19-26; Hart and Nass 2002). Under these conditions, theories concerning a single developmental sequence involving the intensification of maize horticulture and the occupation of semisedentary villages across much of the Northeast were accepted as fact and were "neither debatable nor demonstrable" (Custer 1986:11).

Variation within culture-historic taxa was explained as the result of limited information in the archaeological record or as problems with the interpretation of the data by archaeologists (Willey and Phillips 1958). An example of this can be seen in southern New England, where the lack of large village sites was explained by

suggesting that such sites either were destroyed during early development projects or were not identified because of deep burial in floodplains (but see Hasenstab 1999; Kerber 1988; McNiff 1990:37-38; Thorbahn 1988).

Discrepancies in the traditional views of prehistory were increasingly visible by the end of the twentieth century, causing some Northeast archaeologists to question the uniform and internally homogeneous nature of culture-historic taxa (Custer 1986:11-12; Hart and Nass 2002). Studies by Barber (1982), Bumstead (1980:73-81), Ceci (1979, 1982), Graybill (1973), Hart (1993), Kinsey and Graybill (1971), Powell (1981), Salwin (1968) and others questioned the "one size fits all" model proposed by culture historians, suggesting that the archaeological record was much more complex, with internal important variation in settlement and subsistence patterns discernable at both the local and regional levels.

While most archaeologists would agree that maize-based agriculture, occupation of semisedentary villages, and use of cordmarked containers are important traits across most of the region, recent studies by Northeast archaeologists acknowledge the fact that not all groups followed the same developmental pathway. An example of this can be seen in current discussions of the use of maize agriculture in New England. Following the publication of an article concerning the timing, intensity, and degree of reliance on maize horticulture by Ceci in 1982, archaeologists working in the region began to question whether and to what degree maize represented a staple food in prehistoric diets (e.g., Bernstein 1992, 1999; Chilton 1999a; Chilton et al. 2000). While evidence for and against the use of maize as a supplemental food item as opposed to a staple crop is presented in the chapters by Petersen and Cowie and Chilton, recent studies have shown that, in addition to cultivated crops, the diets of these early Late Prehistoric populations included a diverse array of plants and animals that was procured from both terrestrial and aquatic environments (Abel and Fuerst 1999:26-27; Barber 1982; Bellantoni 1987; Benison 1993; Bernstein 1999; Bradley and Spiess 1994; Brose 1994:150-151; Carlson 1999; Chilton et al. 2000; Church 1994; Hart and Asch Sidell 1996; Lavin 1988:101-120; Leveillee and Harrison 1996; Little 1993; Medaglia et al. 1990; Reid 1975; Smith and Crawford 1997, this volume; Vickery et al. 2000:288-291; Wall et al. 1996; Williams and Bendremer 1997).

Northeast archaeologists have also questioned basic assumptions put forth during the 1940s and 1950s concerning the timing of the adoption of tropical

domesticates and the occupation of large multicomponent villages. Discussion of the intensification of maize agriculture during the early Late Prehistoric period is a common theme in the archaeological literature (e.g., Chilton et al. 2000, this volume; Crawford and Smith 1997, this volume; Hart 1999c; Hart and Asch Sidell 1996). During the first half of the twentieth century, some archaeologists (e.g., Ritchie 1934:17, 1944; Ritchie et al. 1953) speculated that maize, beans, and squash, adopted as a unit or in quick succession, were important foods consumed by the early Late Prehistoric populations of New York, southern Ontario, central Pennsylvania, and western New England. However, until more detailed excavations were completed during the 1960s and 1970s, little evidence was available to support these assertions (Cassedy and Webb 1999). Archaeologists working in Ohio (e.g., Griffin 1978; Murphy and Ferris 1990; Stothers and Bechtel 2000) were of the opinion that maize and other tropical cultigens were not regularly used by the region's occupants until ca. A.D. 800 to 1000, while a radiocarbon date of A.D. 1070 from the Roundtop site in the upper Susquehanna River basin of New York (Ritchie and Funk 1973) was long considered to be the oldest evidence for maize agriculture in the Northeast (see Cassedy and Webb 1999:85; Hart 1999b). Contrary evidence (e.g., Stothers 1977; see also Stothers and Abel, this volume) was often viewed as equivocal.

Recent research suggests that maize agriculture may have been practiced several hundred years earlier than originally predicted. The earliest current evidence for maize agriculture in the Northeast has been identified at the Edwin Harness site in Ohio. Maize from this site has been directly dated using accelerator mass spectrometry (AMS) to A.D. 220 (cal 2  $\sigma$  A.D. 120 [270, 330] 540) (Crawford et al. 1997:Table 1; King 1999). In southern Ontario, evidence for the use of maize has been documented through direct AMS dating to the calibrated sixth century A.D. (Crawford et al. 1997:Table 1); while in Pennsylvania, New York, and western New England, evidence for maize agriculture can be found on sites dating to the last two centuries of the first millennium A.D. (Bendremer and Dewar 1994; Cassedy and Webb 1999; Hart and Asch Sidell 1996; Hart and Means, this volume; King 1999:19; Sciulli 1995; Wurst and Versaggi 1993).

Hart and Scarry (1999; Hart 2000a) have also shown that Ritchie and Funk's (1973) assertion that maize coupled early with other plants (including squash and beans) in the Northeast is incorrect. Rather, as demonstrated by a series of AMS dates, beans do not become archaeologically visible in the northeastern United

States until c. cal. A.D. 1300. Further evidence for the late arrival of beans has been put forth by Smith and Crawford (1997), who argue that in southern Ontario beans are rarely found on sites dating earlier than the fourteenth century. Most recently, Hart et al. (2002) have shown that beans are not archaeologically visible until approximately cal. A.D. 1300 from New England west to the Illinois River Valley. The adoption of beans can no longer be identified as contributing to maize-based agricultural intensification across the region beginning around A.D. 1000 (Hart et al. 2002).

Archaeologists also have developed ideas and interpretations related to the occupation of semipermanent villages and their relationship to other sites in a settlement system. Since the second half of the twentieth century, archaeologists have speculated that the onset of village life coincided with the initial use of maize and other cultivated plants. Ritchie (1994; Ritchie and Funk 1973) and others (Stewart 1990; Tuck 1978:326-328; Wright 1966) argued that in southern Ontario, New York, and central Pennsylvania, a shift from small fishing villages to farming hamlets first occurred between A.D. 800 and 1000. Between A.D. 1000 and 1300, larger horticultural villages located along floodplains and terraces were occupied and were thought to represent the fusion of smaller clans into a single community coincident with or soon after the adoption of maize agriculture (Ritchie 1994; Williamson 1990; Wright 1966). In the Scioto and Ohio River Valleys of Ohio, evidence seems to indicate that the transition to a semisedentary society was similar, involving the transition from a dispersed to a nucleated settlement pattern beginning around A.D. 500 and continuing until A.D. 1250 (Church 1987:279-280; Pollock and Henderson 1992:283-284). The nature of early Late Prehistoric settlement systems in southern New England remains poorly understood (Hasenstab 2000:149-150; Thorbahn 1988), making it difficult to assess whether the prehistoric occupants of this region practiced a semisedentary way of life resembling that of peoples to the west or mobile subsistence strategy based on hunting and foraging like that described by Black (this volume) and Deal (this volume) for the Canadian Maritimes. As the chapters by Petersen and Cowie and Chilton demonstrate, additional settlement studies are needed before these patterns can be characterized with any certainty.

Archaeologists working in New York, northern Pennsylvania, southern Ontario, and some parts of New England often consider the presence of large multifamily longhouses to be an important characteristic of early Late Prehistoric villages (Hart 2001; Hart and

Means, this volume; Knapp, this volume; Ritchie and Funk 1973). According to Ritchie (1994), these large residential units first appeared on sites dating to ca. A.D. 1000 and over time rapidly increased in size, with the largest longhouses appearing at the end of the early Late Prehistoric period, ca. A.D. 1300 (Prezzano 1992; Prezzano and Rieth 2001; Ritchie 1994; Ritchie and Funk 1973). Many of these residences were constructed along floodplains and knolls overlooking primary waterways (Prezzano and Rieth 2001). In southern Ontario and north-central Pennsylvania, longhouses were reported as similar in size and developing along a similar evolutionary trajectory to those in New York (e.g., Garrahan 1990; Smith and Crawford 1997, this volume; Snow 1980; Stewart 1990; Williamson 1990). However, the limited number of longhouses identified in southern New England has caused many archaeologists to question whether and to what extent such features existed during the early Late Prehistoric period (Dincauze 1990; Hasenstab 1999; Juli and Lavin 1996; Kerber 1988:66-70; McNiff 1990; Thorbahn 1988).

While large multifamily longhouses did exist in many areas of the Northeast, Hart (2000b:1-16) has questioned Ritchie's (1994) assertion that they appear as early as the eleventh century A.D. Based on new dates from village sites in south-central New York, Hart argues that large multifamily longhouses do not appear in this region until the calibrated thirteenth century A.D. Given this new evidence, it appears that village life did not coincide with the first appearance of maize agriculture, but rather postdated it by several hundred years (Hart 2000b, 2001). A more likely scenario is that the early Late Prehistoric occupants of the region occupied smaller sites for one or two seasons throughout the year. Following Benison (1993), and Miroff (this volume), the occupation of smaller settlements may indicate that smaller nuclear families or households may have been a more important unit of social organization than clans or chiefdoms during this period.

The large oblong-shaped longhouses that characterized much of the Northeast were not utilized by the early Late Prehistoric populations of western Pennsylvania and Ohio (e.g., George 1974:5; Vickery et al. 2000:284). Instead, small circular or rectangular structures constituted the primary residences of these groups (Brose 1994:42, 2000:99; Burkett 1999:9-11; Church 1987:Table 34; Dragoo 1971:553; Drooker 2000; George 1974, 1983; Herbstritt 1981:10; Nass and Hart 2000; Pollock and Henderson 2000; Prufer and Shane 1970). Many villages in western Pennsylvania and Ohio were constructed around a central plaza or com-

munal structure (Buker 1993; Church 1987:273-275; Drooker 2000:Table 7.3; George 1974, 1983; Hart 1993:98; Herbstritt 1981:10; Nass and Church, this volume; Pollock and Henderson 1992:283-284, 2000; Prufer and Shane 1970:246). In Ohio there is some evidence to suggest that residences may have been grouped to reflect lineage membership and/or social ties (Mills 1906 as cited in Church 1987:282; Means, this volume). Palisades encircled many thirteenth and fourteenth century Monongahela communities in the Upper Ohio River Valley (Buker 1993:14-16; Burkett 1999:9; Dragoo 1971; George 1983:5-7; Herbstritt 1981) Sandusky communities in northern Ohio (Redmond 1999:122-123) and some Fort Ancient villages in southern Ohio. However, Carskadden and Morton (2000:172) and Graybill (1981) argue that these features did not appear at eastern Fort Ancient settlements until after the fifteenth century A.D.

Research on the spatial arrangement of nonarchitectural features and the distribution of material objects at sites in western Pennsylvania and Ohio have contributed to our understanding of how these sites were used and the social relations of the site's occupants during the early Late Prehistoric period (Hart 1995; Means 2000, this volume; Nass 1989; Nass and Hart 2000; Redmond 1999:116-117; Riordan 2000). Discussions of mortuary patterns by Brose (1994:42, 153-154), Brown (1982), Church (1987), Dragoo (1971:560-561), Drooker (2000), George (1983), Herbstritt (1981), Means (1999b:15-44), Redmond (1999:127-128), Stothers and Abel (this volume), and Stothers and Bechtel (2000:25-32) highlight the range of burial treatments that were employed and how such practices reflect the social systems under which they were carried out.

Although large village sites have received much attention throughout the past century, small habitation sites, small campsites, and workstations are noticeably absent in many discussions of settlement systems due to their small size, the limited number of artifacts typically recovered from them, and their dearth of features (Hart 1993; Lennox 1993:1-7; Riordan 2000). With the increasing importance of cultural resource management in the Northeast, many of the sites that previously had been overlooked by archaeologists now represent the focus of more extensive site examinations and data recovery projects (e.g., Brown 1982; Ellis 1990; Feder 1990:61-68; Leveillee and Harrison 1996; Hart 1994; McBride and Bellantoni 1982; Means 1999a; Pagoulatos 1990:69-82; Raber 1995; Riordan 2000:404-424; Thorbahn 1988:46-57). The papers in this volume by Black, Crawford and Smith, Miroff, Nass and Church,

and Rieth highlight the important contributions that these small sites make to our understanding of larger regional settlement systems.

The manufacture of cordmarked ceramics with complex designs is the third major characteristic attribute of the early Late Prehistoric period of the Northeast. When studying settlement and subsistence patterns, ceramic artifacts (and their corresponding typologies) often are used to assess chronology (Carskkadden and Morton 2000:162-170; Chapdelaine 1995; Dragoo 1971:562-563; George 1983:29-39; Prufer 1967; Redmond 1999:134-140; Ritchie 1994; Ritchie and Funk 1973; Shane 1967; Stewart 1990), document the relationships between groups (Clermont 1995; Garrahan 1990:17-30; Lavin 1980:3-41; Mortin 2001; Pollock and Henderson 1992:285; Snow 1994; Stothers and Abel, this volume; Stewart 1990), and establish culture histories (Ritchie 1994; Ritchie and Funk 1973; Murphy and Ferris 1990:197-230; Stothers 1995:34-35; also see Chilton 1999c:97-98; Hart 1999a).

The use of ceramic types in this manner has been criticized by Chilton (1999b:45-46, 1999c:97-98) and others (Benison 1993; Morin 2001; Pretola 2000), who argue that the designation of types assumes that the makers of such objects were passive agents who shared the same sets of rules, and ascribe the same sets of meanings to behavior (Hodder 1986:49), failing to allow for individual agency as an explanation of artifact diversity (Hodder 1986). Such typologies often are applied across diverse culture areas (Pretola 2000), thus obscuring regional variation. As several archaeologists (e.g., Adams and Adams 1991:279; Dunnell 1971, 1986; Hart 1999a; Hart and Means, this volume; Hodder 1986; Pretola 2000:3) have pointed out, there can be no single typology, but there should be multiple typologies derived from theories used to explain the past. In addition, the use of culture-historical types as units of analysis often results in technical attribute variation being downplayed in favor of decorative attributes. This often results in erroneous assumptions about the occupants of these prehistoric sites. The chapters by Schulenberg and Rieth in this volume provide case studies that are used to discuss problems in the use of ceramic types to define units of analysis for the reconstruction of early Late Prehistoric settlement and subsistence patterns.

## CONCLUSION

This volume reflects the continuing interest and important contributions being made by archaeologists

to the study of early Late Prehistoric settlement and subsistence studies in the Northeast. In addition to highlighting the diverse activities of Native populations, much of the work in this volume challenges existing notions about the ways in which prehistoric populations exploited the local landscape for purposes of subsistence and settlement. This work has been greatly enhanced by the systematic use of modern analytical, recovery, and archaeometric techniques, which not only has allowed for the reanalysis of older data sets, but has also added new information to an already large regional data set. If Northeast archaeologists are to make substantive contributions to the study of settlement and subsistence diversity during the next century, we must continue to build on the works presented in this volume in order to more fully appreciate the range of behaviors employed by the region's early Late Prehistoric occupants.

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## CHAPTER 2

# CENTRAL OHIO VALLEY DURING THE LATE PREHISTORIC PERIOD: Subsistence-Settlement Systems' Responses to Risk

Flora Church and John P. Nass, Jr.

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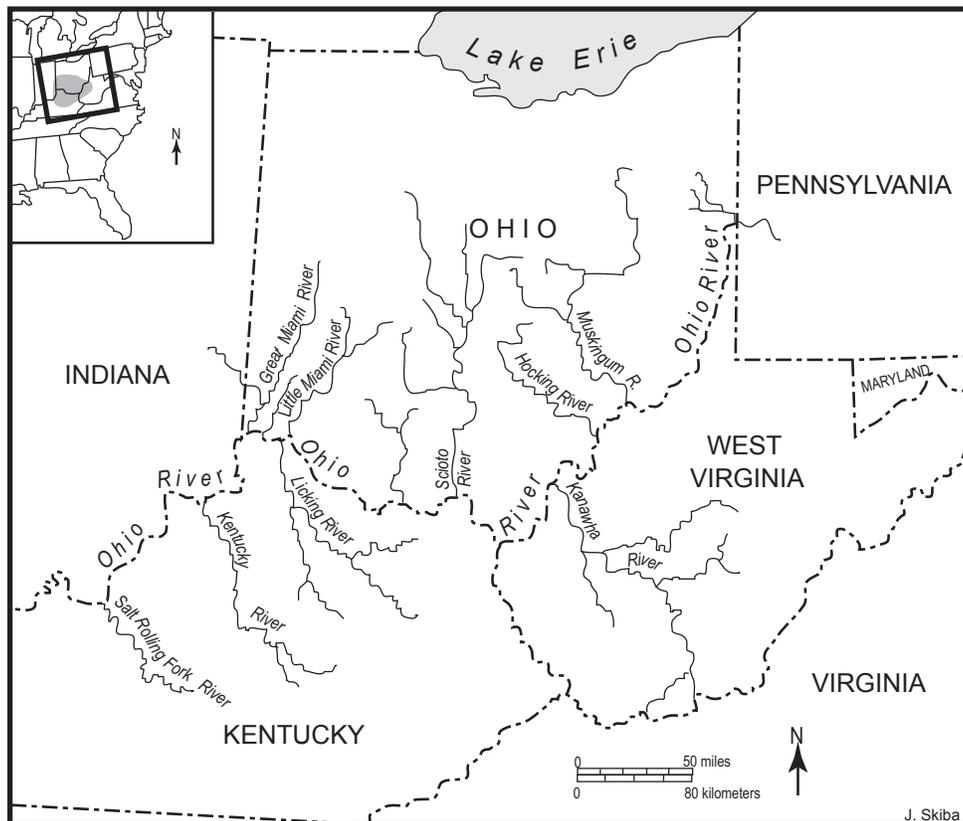
### INTRODUCTION

Central Ohio Valley Late Prehistoric societies referred to as Fort Ancient (Figure 2.1) responded to environmental and social perturbations associated with maize farming, population growth, sedentism, and population aggregation through changes in settlement arrangement and social organization. The effects of these choices and population growth upon settlement and subsistence systems are evaluated in this chapter by examining changes within the social, economic, and technological spheres over time. In the interval of time ca. A.D. 900/1000 to A.D. 1400, several Late Prehistoric cultural phases have been identified throughout the central Ohio Valley. Within this roughly 400-year interval, the Feurt, Baum, Anderson, Osborne, Manion, and Crogham phases of the Fort Ancient Tradition have been identified (Figure 2.2) (Griffin 1943; Henderson and Turnbow 1987; Turnbow and Sharp 1988). Also, Cowan (1986) has described the Turpin, Shoemaker, and Campbell Island phases within the lower Great and Little Miami drainages in southwestern Ohio, while Carskadden and Morton (1977, 2000) have made a case for the Philo phase in eastern Ohio (Figure 2.3). These Late Prehistoric phases differ substantially from the preceding Late Woodland cultural base (Church 1987; Graybill 1981; Wagner 1987). Data from a number of central Ohio Valley Late Woodland sites (Figure 2.4) will also be used to contrast with the changes documented at Late Prehistoric sites. We end our study at ca. A.D. 1400, when the regional variation (denoted by the various phases) becomes subsumed within a central Ohio Valley-wide ceramic style zone referred to as the Madisonville Horizon (Henderson et al. 1992). Accompanying this ceramic zone is a gravitation of settlements toward the Ohio River proper and the lower reaches of its major tributaries.

### THEORETICAL ISSUES

The spatial distribution of human populations can be arranged in a continuum from dispersed to nucleated. A dispersed population does not occur in clumps, but is more evenly arranged across the landscape in smaller units in relation to its resource base. At the other extreme, a nucleated or aggregated population resides in larger units that tend to reside at fixed locations for long periods of time. For this reason, large populations place greater demands on the local resource base. Long-term nucleation can result from a number of factors, such as defense against resource encroachment, or a need for pooling labor to facilitate resource procurement, or when resource productivity exceeds immediate needs and energy expenditure (Dancey 1992; Fuller 1981; Harris 1989). Whatever the arrangement of populations and the technology and buffering methods developed, labor is organized to ensure a continued supply of resources, be they collected, hunted, or grown.

Leonard and Reed (1993:651) refer to the logistics of resource procurement as "strategies" and "tactics." Strategies refer to what resources are to be procured or grown and in what quantities, while tactics refer to the methods (the organization of labor, social arrangement, etc.) used to obtain the desired resources. As both local and regional populations increase and seasonal mobility as a means of mitigating overexploitation is reduced, populations will be forced to devise tactics (which could include buffering mechanisms such as storage and/or exchange) to ensure a constant supply of needed resources (Braun and Plog 1982). Leonard and Reed (1993:651-652) contend those tactics and buffering mechanisms that are more successful at maintaining the necessary types and quantities of dietary staples (which increases the relative fitness or reproductive success of individuals within the



**Figure 2.1.** Map of the central Ohio River Valley.

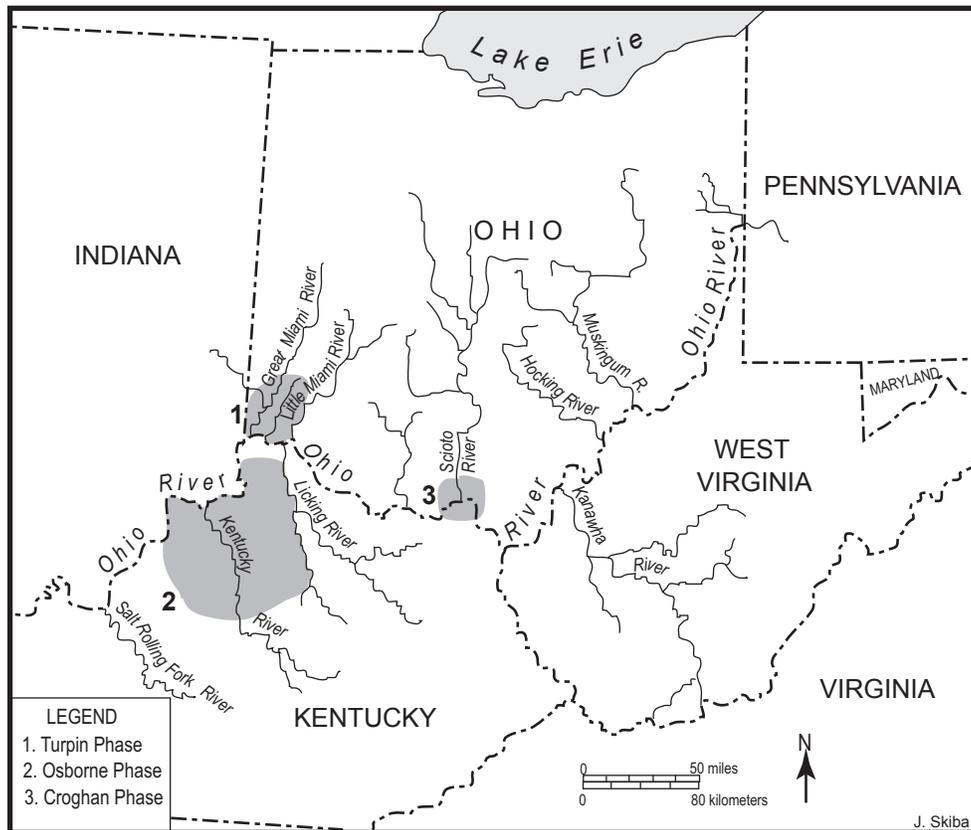
population) will be favored by selection and thus retained. Leonard and Reed (1993) use the concept of “replicative success” to describe the differential retention and spread of successful ideas and suites of behaviors by selection.

The basic selective component of selectionist theory is natural selection, which acts upon variation (Leonard and Reed 1993; Lyman and O’Brien 1998; O’Brien and Holland 1990; Teltser 1995). According to the selectionist model, archaeology is concerned with that component of the human phenotype acquired from others, that is, learned behavior (Leonard and Reed 1993:649). Such behavior, together with its material products, is transmitted both temporally and spatially between individuals who are members of human groups. The differential expressions of behavior, which can be seen as the differential retaining or persistence of traits, can be seen archaeologically. The traits themselves can be either behavioral or material in nature. While a culture can change or be transformed in the absence of variation (Leonard and Reed 1993), selection cannot operate without the existence of variation. O’Brien and Holland (1990:38-40) main-

tain that the retention of a trait, such as a tactic or a buffering mechanism, is entirely dependent upon its ability to confer some degree of fitness upon its possessor, such that it is replicated (differential reproduction) by other members of the population to achieve the same result. Thus, utilizing a selectionist model, it is possible to develop a better understanding of subsistence/settlement dynamics in terms of strategies and tactics.

Changes in the social, economic, and technological spheres (changes that can be detected archaeologically within settlement data) can be perceived as attempts (strategies and tactics) by populations to overcome perturbations (a type of risk) caused by variables such as environmental change, population growth, and population aggregation (cf. Boserup 1965). However, the rate of change, its direction, and its occurrence within any one sphere across a landscape are nonsynchronized, variable, and highly time-dependent.

Some of these tactics or perceived solutions can also be viewed as risk management responses by prehistoric populations. In one such model of risk



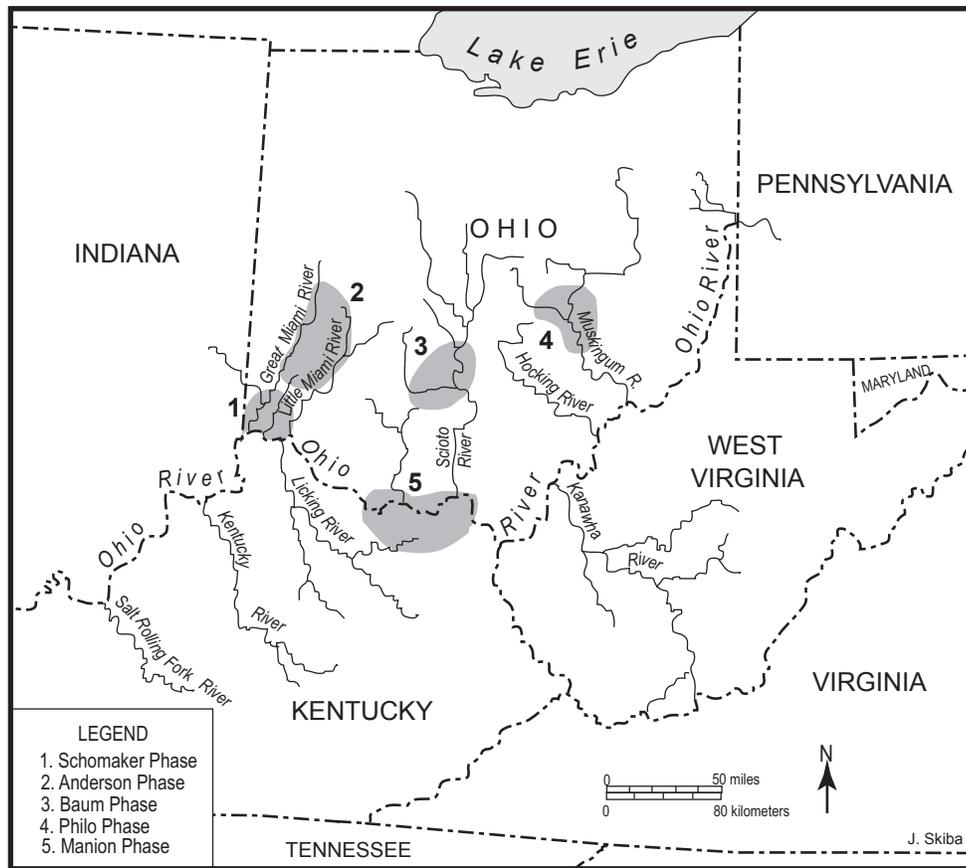
**Figure 2.2.** Map locating recognized pre-A.D. 1200 Fort Ancient phases.

management, Winterhalder and Goland (1997) outline a diet choice model in which resource selection decisions (Leonard and Reed’s strategies) affect population density and its spatial arrangement. In this model they examine how and why domesticates might enter a ranked list of resource staples; a list that already could include cultigens. They maintain that when the abundance of highly ranked wild animal and plant resource items diminishes, through environmental decline or overuse, foraging efficiency will decrease and the diet will expand to incorporate lower ranked items, which Winterhalder and Goland label “Transitional Domesticates.” Any change in these lower ranked resources that increases productivity (a favorable return for the level of energy input) and handling efficiency will move them into the highly ranked set.

The authors offer three scenarios for explaining changes in diet choices. In the first, transitional domesticates represent low ranking, low density resources that have a limited impact on subsistence, even if they move into the diet and their ranking increases.

In the second scenario, transitional domesticates represent low ranking, high-density resources that again have a limited impact on the overall diet. Winterhalder and Goland (1997:132-133) argue that incorporating such high density transitional domesticates can stimulate population growth. As population growth increases, the now high ranking transitional domesticates may come to dominate subsistence; however, these are prone to overexploitation. In this scenario, if the resource yield fluctuates stochastically, the population’s risk of resource exhaustion increases, while the option of compensating through harvest and sharing of foraged foods decreases (1997:136).

In the third scenario, the transitional domesticates may represent a high ranking, high density item. As such it will dominate the diet when introduced, and other previously high ranked resources will drop out of the diet. In this case, a narrowing of resource staples can be accompanied by a high risk. Population growth will likely increase as will a growing dependency upon the new resource. While excluded resources may remain as fallback foods, these may not be sufficient if the human population has grown too



**Figure 2.3.** Map locating recognized post-A.D. 1200 phases.

large. Proposed tactics of reducing the risk of resource shortages include regional exchange (see Braun and Plog 1982) and short-term storage (Winterhalder and Goland 1997:136).

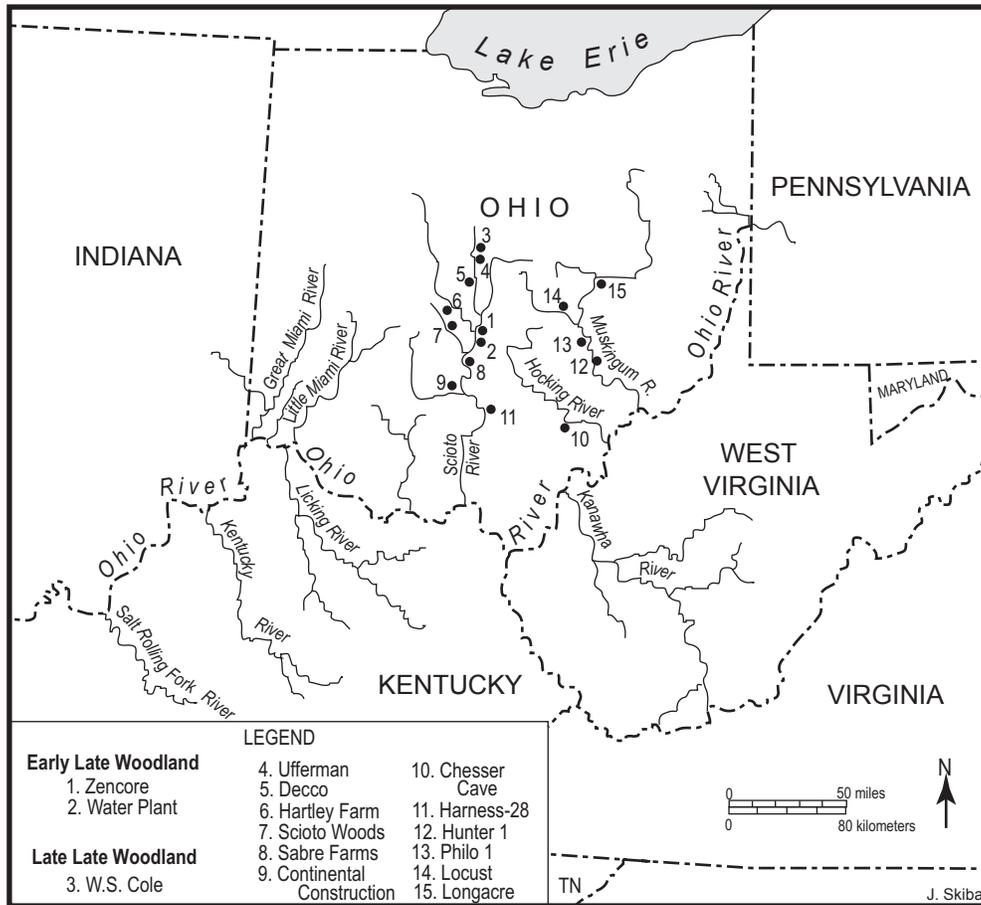
Winterhalder and Goland (1997:137-139, 142) contend that when storable, high density resources enter the diet of populations (which may already be utilizing cultigens), previous methods of risk buffering are no longer effective and new solutions must be sought. They outline two methods of risk buffering for temperate zone farmers. Both involve the use of spatially dispersed farming plots. Whereas the production cycle for individual foraging households is measured in days, the production interval for farmers is substantially greater, making long-term temporal averaging for them unreliable. Thus, the individual household cannot survive several failed production intervals. Other factors that could decrease the reliability of long-term temporal averaging include increased processing costs, storage losses, and the inability of one household to force another to equally contribute

resources for later redistribution and sharing.

The first method employs spatially dispersed farming plots cultivated by individual households. Because the plots are not planted concurrently, this method provides unsynchronized yields. This tactic, then, has the advantage of crop availability over a period of time.

The second method characterizes the spatial dispersion of fields (see Hart 1993 for a discussion of dispersed agricultural plots as a risk reduction tactic within the lower Upper Ohio River Valley) as a means of mitigating adverse microclimatic conditions and disease organisms that can easily spread between contiguous patches. Since the plots are again not planted concurrently, this method also provides unsynchronized yields. In both scenarios, the unsynchronized yields can still be efficiently managed at the intrahousehold level.

Redding (1988) approaches the problem of resource shortage by describing a different set of buffering methods that could be employed by foragers and



**Figure 2.4.** Map locating Late Woodland sites located within the Scioto and Muskingum river valleys.

early farming groups. His list includes population migration, resource diversification, storage technology, and increasing one's reliance on cultigens and/or domesticates. The selection of one or more of these buffering methods by a population is contingent upon its associated fitness value (Rindos 1984, 1989). Coombs (1980), however, maintains that high density resources (such as maize) do not in and of themselves always reduce the risk of resource shortage, since populations that lack adequate storage technology and/or the ability to share effectively lose the advantage that maximum yields could afford.

To test the assumptions of their diet choice model, Winterhalder and Goland (1997:145-149) utilize a previous study by O'Shea (1989), which compared the resource procurement strategies and tactics of the Pawnee and the Huron, two historically known farmers of maize. They begin by noting Smith's (1989) study

in which he characterized the usage of native cultigens and domesticates as diet supplements that were stored for winter/spring usage. Because Smith refers to these resources as supplements and not as high ranked staples that dominated the diet, Winterhalder and Goland consider them to be low density, low ranking resources that would not be capable of stimulating population growth. This characterization of native resources can be contrasted with maize, a high density domesticate that quickly became a highly ranked resource that dominated the diet. This reliance on maize produces an increased risk, especially if the population continues to grow and other highly ranked resources are depleted. To mitigate possible resource shortages caused by a narrowing of dietary staples and a growing population, tactics such as exploiting alternative unsynchronized storable resources that occur in dense patches must be devised.

Returning to O'Shea's (1989) comparison, the Pawnee were located on the plains. They planted diverse varieties of maize in scattered fields, with interannual storage. Fallback wild plant foods; the coordinated, cooperative hunting of buffalo that could be cured for storage; and social obligations for sharing within the village were employed to minimize or buffer the risks associated with maize farming. The Huron, by contrast, were Eastern Woodlands maize farmers who planted diverse crops in large contiguous fields and utilized above ground storage facilities. Shortfalls were buffered by exploiting wild plants and animals, especially white-tailed deer, anadromous fish, and exchange between Huron villages and between the Huron and other tribes for animal protein. Winterhalder and Goland (1997:150) suggest that unlike the situation for the Pawnee, the patchy soils in the Eastern Woodlands forced the Huron to clear more area for planting and thus increased their labor costs; this factor made field dispersion more costly. Because large communal fields were planted among the Huron, intravillage sharing was not as helpful for buffering shortages, because household harvests were all synchronized.

While Winterhalder and Goland's thesis seems reasonable, we disagree with their belief that soil conditions and suitability for maize cultivation compelled the Huron to concentrate their fields. The Huron were in a situation in which they could utilize riverine settings as well as uplands. The Pawnee, however, would have been limited to only riverine areas because they did not possess the technology to effectively utilize prairie soils, which have an especially thick sod. Even burning would not have made prairie soils any more usable for the cultivation of domesticates.

Since the Huron, often referred to as a confederation, practiced intervillage sharing and intergroup exchange to obtain needed resources to both supplement their diet and/or buffer perceived shortages, a high degree of coordination was needed. Boone (1992:317) attributes such coordinated effort to the existence of social hierarchies that arise when population emigration and dispersal are not logistically viable options to offset population growth.

Based on the above discussion, some of the strategies and tactics employed prehistorically to mitigate perturbations associated with farming, population growth, sedentism, and population aggregation should be detectable in subsistence residues and archaeological settlement patterning data (Rafferty 1994). For example, temporal and spatial variability in storage facilities can be monitored in conjunction with

an examination of subsistence remains. The size and spatial arrangement of settlements over time may also reveal responses to resource selection and the subsequent risks of those decisions. Another usable measure for examining issues of dietary decisions, labor organization, and population density is any spatial-temporal variability in dwelling size. An examination of these variables is attempted using the Late Woodland and Late Prehistoric databases (ca. A.D. 400 to 1400) for the central Ohio Valley.

## THE LATE WOODLAND DATABASE

Within central Ohio, a small number of late Late Woodland sites have been excavated or systematically surveyed. Within the northern Scioto drainage (Figure 2.4), data are available from the Walter S. Cole (Potter 1966), Ufferman (Barkes 1978), DECCO (Barkes 1982), and the Hartley Farm and Scioto Woods sites (Church 1992). In the central portion of the Scioto drainage data are available from Sabre Farms (Nass et al. 1990), Continental Construction (Pacheco 1987), Peters Cave (Prufer and McKenzie 1966), and Harness-28 (Otto 1983). Located to the east in the Muskingum River drainage are Philo II and Longacre (Morton 1984, 1989), Locust (Seeman 1985), and the Hunter 1 (Church 1991) sites, and the Childers and Woods sites (Shott and Jefferies 1990; 1992) in West Virginia (Figure 2.4).

During the early Late Woodland period (ca. A.D. 400-700), sites were nucleated, multihousehold settlements (1-3 ha in size) located on bluffs of major rivers or streams, and frequently surrounded by an earthwork or ditch feature (Church 1987; Dancy 1988). This pattern stands in contrast to the preceding Middle Woodland pattern of dispersed household units (Dancy 1988, 1991, 1992). Mounds are not present at these sites (e.g., Water Plant [Dancy et al. 1987], Zencor/Scioto Trails [Otto 1982], and Highbanks in Franklin County, Ohio). However, during the succeeding late Late Woodland period (ca. A.D. 700-950/1000), the settlement pattern changed in three ways. First, site location shifted predominantly to river and stream terraces or floodplains. Second, the area of a site occupied at any one time decreased in size. Third, site types varied considerably, as evidenced by structure and associated features (Table 2.1). For example, in the northern Scioto drainage, sites like Walter S. Cole, Ufferman, DECCO, and Hartley Farm vary between 0.1 and 0.4 ha in size and are scattered along the terrace and floodplain of the

Olentangy River and other minor tributaries of the Scioto. DECCO and Hartley Farm may represent habitations, while Walter S. Cole and Ufferman appear to be specialized mortuary sites. The Scioto Woods site, also within this size range, and located just west of the Hartley Farm site on a small bench overlooking the same stream, has been interpreted as a lithic workshop (Church 1992).

Farther south and to the southeast, the settlement picture differs somewhat. The Sabre Farms and Continental Construction sites also are located on the floodplain, but both are multi-component sites approximately 0.5 ha in size. Controlled surface collection at the Sabre Farms site delineated a linear surface scatter of Late Archaic, Early Woodland, and Late Woodland artifacts covering an area approximately 35 meters by 130 meters along a north-south-trending rise on the Scioto River floodplain. Excavation of a 5 meter-wide right-of-way across a segment of the surface scatter revealed a cluster of late Late Woodland shallow and deep basin pits, one large, deep storage pit; hearths; FCR concentrations; poorly preserved pit burials; and midden (Nass et al. 1990) (Figure 2.5). Artifacts place the site within the Peters phase (Seeman 1992a). Salvage excavation at the Continental Construction site (Pacheco 1987) revealed pit features containing late Late Woodland Peters phase ceramics, but no evidence of midden development. Again, pit features were located along a rise on the Scioto River floodplain.

At the same time, excavation of a number of well-known rockshelters in the uplands of south-central Ohio has revealed evidence of extensive use during this period. The Peters (Prufer and McKenzie 1966)

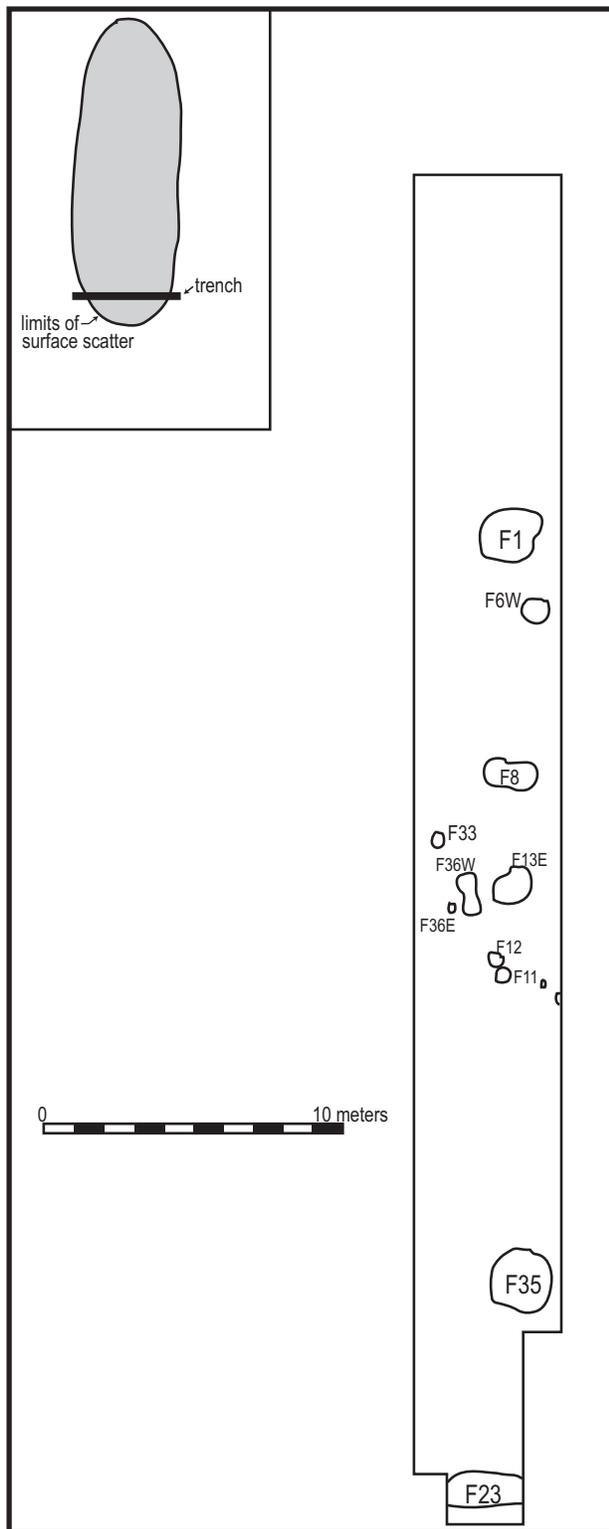
and Chesser (Prufer 1975) rockshelters may represent the cold weather equivalent of the warm weather floodplain and terrace occupations.

Along the Muskingum River, Philo II and the Longacre sites, located 3 kilometers upriver from Hunter 1, contain discrete clusters of pit features and artifacts attributable to the late Late Woodland (Morton 1984). Components are approximately 3 ha in size for these and other late Late Woodland settlements, but may be due more to repeated occupational usage rather than a single, long-term occupation (cf. Seeman 1992a, b; Shott and Jefferies 1992). The toolkit during this time contains limestone and chert-tempered, sub-conical ceramic jars; Raccoon Notched, Jacks Reef, and a small number of triangular points; bifacial knives, drills, scrapers; and ground stone celts, pitted cobbles, and hammerstones. The change in projectile point types from Chesser Notched and Lowe series points to Raccoon Notched, Jacks Reef, and triangular point types has been interpreted as a technological adaptation to the use of the bow and arrow in the region (Seeman 1992; Yerkes and Pecora 1991). No artifacts that could be interpreted as hoes have been found at any Ohio sites, but stone hoes made from sandstone have been recovered from West Virginia sites. Locally available raw materials dominated the chipped stone and expedient tool technology (Nass et al. 1990; Seeman 1992b; Shott and Jefferies 1990).

Associated features (Figure 2.6) consist of shallow basin and shallow flat-bottom-shaped pits that ranged from 27 to 240 liters in volume, and occasionally sheet midden remnants. With the exception of a large deep-pit feature at Sabre Farms, which exceeds 3,000 liters in volume, deep-cylinder and bell-shaped

**Table 2.1.** Details of Late Late Woodland Sites in the Central Ohio Valley.

Site	Landform	Site (ha)	Community Plan	Associated Feature
W. S. Cole	Terrace	0.1		Pits, burials
Ufferman	Terrace			Pits, burials
DECCO	Floodplain	0.1		Pits
Scioto Woods	Upland	0.04		None
Hartley Farm	Upland	0.3		Pits, surface hearths
Hunter 1	Terrace	0.1	Linear	Pits, hearths, midden remnants, postholes
Philo II	Terrace		Linear	Pits
Sabre Farms	Floodplain	5.0		Pits, midden, burials
Peters Cave	Rockshelter			Pits
Chesser Cave	Rockshelter			
Locust	Terrace	0.15		Pits, midden
Longacre	Terrace	0.8	Linear	Pits

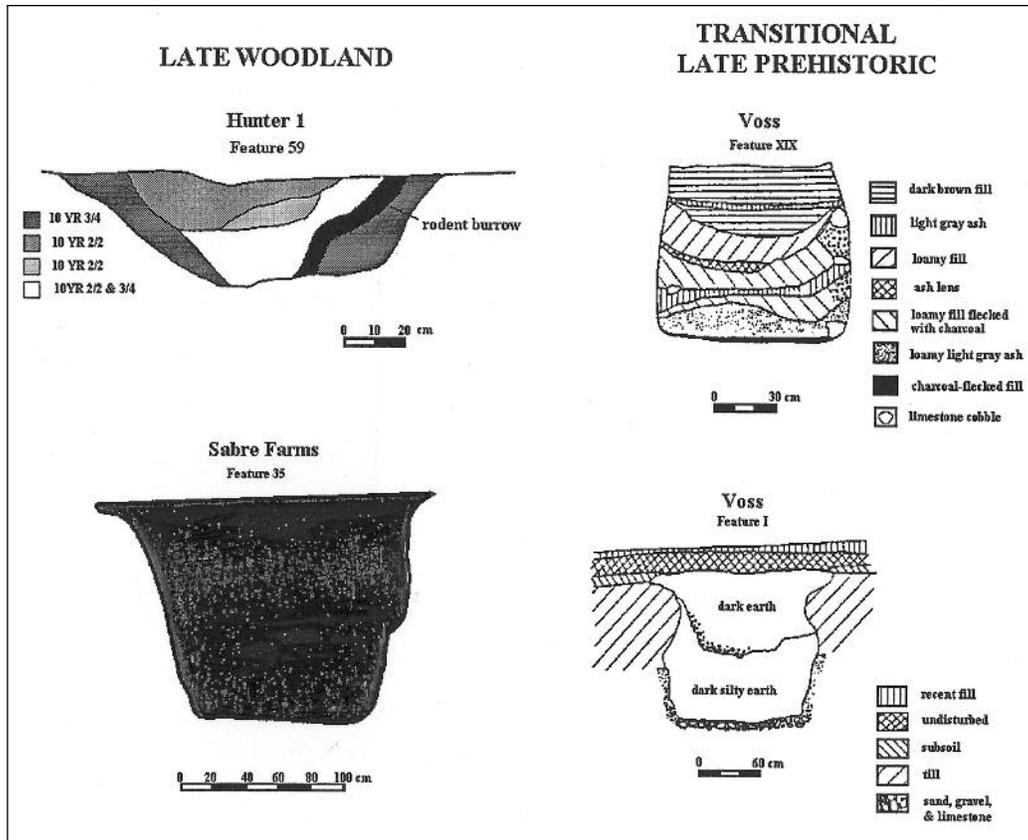


**Figure 2.5.** Map of the late Late Woodland Sabre Farm site (adapted from Nass et al. 1990).

pits are not present at other sites. Collectively, then, the feature data from the sites discussed do not support a major reliance on stored native or tropical cultigens for subsistence by late Late Woodland populations (Table 2.2). Data presented by Shott and Jefferies (1992) and McConaughly (1984) support this opinion.

Taken as a whole, late Late Woodland sites from central Ohio Valley reflect a settlement pattern of small, dispersed seasonal occupations of one or two households, some repeatedly occupied, and associated with special purpose sites like Ufferman (mortuary activity) and Scioto Woods (lithic workshop) (Church 1992; Shott and Jefferies 1992). As mentioned earlier, this pattern is more reminiscent of the Middle Woodland and stands in contrast to the preceding early Late Woodland archaeological record.

The nature of the subsistence base underlying the late Late Woodland settlement pattern is still evolving, but a reasonably good impression is available. While sites like Cole, Ufferman, and DECCO were excavated prior to the practice of taking flotation samples, and yet have faunal samples, other sites, such as Hunter 1 and Sabre Farms, had highly acidic soils and poor faunal and botanical preservation. The paleobotanical record for the central Ohio Valley late Late Woodland has been extensively summarized by Reidhead (1981), Wagner (1987), and Wymer (1987, 1990, 1992). Actual botanical remains recovered from the floodplain and terrace sites include black walnut, hickory, butternut, hazelnut, and squash at Philo II in the Muskingum Valley (Morton 1984, 1989); black walnut, hickory, and *Chenopodium* at Sabre Farms in the central Scioto Valley (Ericksen-Latimer 1990); maize, hickory, walnut, hazelnut, pawpaw, grape, blackberry, plum, hawthorn, squash, and starchy and oily seeds at Leonard Haag in the lower Great Miami Valley in Indiana (Reidhead 1981; Wagner 1987; and Wymer 1987) (see Table 2.2); and *Chenopodium*, walnut, and maize at Woods along the Ohio River in West Virginia (Wymer 1992). In contrast to Woods, little to no maize has been recovered from A.D. 750/800 to A.D. 900 in central Ohio, western West Virginia, and northern Kentucky late Late Woodland sites (Wagner 1987; Wymer 1992). While Wymer (1992) and others acknowledge that the botanical profiles reflect regional patterns of resource utilization, the overall usage of nuts, starchy complex seed taxa, oil seed taxa, and cucurbits decreases during the late Late Woodland in the central Ohio Valley, along with a generalized decrease in plant diversity (Wymer 1992). In contrast, there is an increase in seeds of ruderal taxa at some sites, such as Woods (Wymer 1992) and Leonard Haag



**Figure 2.6.** Comparison of Late Woodland and Transitional Late Prehistoric feature morphology.

(Reidhead 1981). Overall, Wymer (1992) notes that the central Ohio Valley late Late Woodland native crop portfolio comes to be dominated by fewer species, with the eventual loss of all but *Chenopodium* and sunflower, which continue into the Late Prehistoric Period (see Wagner 1987).

Hunting strategies during the late Late Woodland tended to emphasize the exploitation of fewer faunal resources as dietary staples, especially those that were resilient (Church 1997; Murphy 1977, 1984; Oetelaar 1990; Reidhead 1981). While birds; mammals such as black bear and raccoon; fish; and mussels were exploited, their numbers and presence varied considerably from site to site. None of these resources appears to have played an important role as dietary staples compared to white-tailed deer, wild turkey, and turtles. Shott and Jefferies (citing Oetelaar's 1990 data) also propose that the faunal record from central Ohio Woodland and Late Prehistoric sites could reflect a decrease in the mean live weight of deer. Should this pattern be replicated at other sites, Shott

and Jefferies (1992) suggest the trend could be due to increasing predation on faunal staples.

As previously mentioned, the dispersed communities of the late Late Woodland period stand in contrast to the nucleated pattern described for the early Late Woodland sites in Ohio, West Virginia, and Kentucky. What prompted this change in settlement pattern is still unclear. Perhaps the benefits afforded by nucleation (see Dancey 1992) and the dependence upon the major faunal staples and native cultigens within a site catchment could no longer sustain such population aggregates because of the need to continually expand garden plots. For instance, Johannessen (1993:68) points out that the cultivation of small grain plants would favor monocropping rather than mixed gardens because of the difficulty of sowing and harvesting. With population growth and continued nucleation, more labor and land would be needed to obtain the same amount of edible resource (see Netting 1974). Likewise, data on white-tailed deer exploitation presented by Shott and Jefferies (1992)

**Table 2.2.** Resource Use Documented at Sites in Sample.

Site	Chert	PLANTS				Major Fauna
		Wild	Indigenous	Tropical	Firewood	
W. S. Cole Ufferman DECCO Scioto Woods	Local	Not present	Not present	Not present	Unidentified	Deer
Hartley Farm	Local	Walnuts, amazes	Not present	Not present	Unidentified	
Hunter 1	Local	Walnuts, hickory nuts grapes	Squash	None	Floodplain species	
Philo II		Nuts				Deer, turkey
Sabre Farms	Local	Walnut	Goosefoot	None		Deer, turtle, bird
Peters Cave	Local					Deer
Chesser Cave	Local	Hickory nut, butternut, walnut				Deer, molluscs, elk, small mammals
Locust	Local	Hickory nut, Squash walnut, butternut, hazelnut, amaize, chestnut	None		Upland species	Deer, elk, turkey
Longacre	Local			Maize		Mussels, deer, turkey, beaver
Voss	Local	Unknown				Deer, elk, wolf, turkey
Blain	Local	Walnut, hickory black cherry, sumac, grape, pawpaw	Squash	Maize, beans	Upland slope, floodplain species	Deer, elk, turkey, turtle, fish
Howard Baum		Nuts, berries	Maize		Floodplain species	Deer, elk, turkey, turtle
Enos Holmes	Local	Unknown				Deer, elk, turkey, bear, small mammals, turtle, sucker
Killen	Local	Hickory, amaize	Not present	Maize	Floodplain and terrace species	Deer, elk, beaver, ground- hog, turkey, turtle, drumfish

support the notion of resource stress due to the intensive exploitation that could occur with long-term nucleation and population growth.

Also, there may have been demands and constraints on the social network of nucleated communities that could not be met by the existing subsistence base. An additional factor that may have encouraged populations to segment was the introduction of the bow and arrow (see Kerr and Niquette 1991; Seeman 1992a).

In addition, environmental conditions may have exacerbated the social and economic tensions inherent in maintaining nucleated communities. Baerreis et al. (1976) suggest a period of cooler, drier climatic conditions from ca. A.D. 700 to 1000, the onset of which coincides with the eventual disappearance of the nucleated communities.

The late Late Woodland settlement pattern itself was relatively short-lived and was replaced by a new form of population nucleation based not on native cultigens, but on maize. The accompanying changes in technology and community organization mark the turning point between the Late Woodland and the Late Prehistoric periods. However, Johannessen (1993) cautions that it is incorrect to always assume that a deterministic relationship exists between settlement and subsistence behavior.

## LATE PREHISTORIC DATABASE

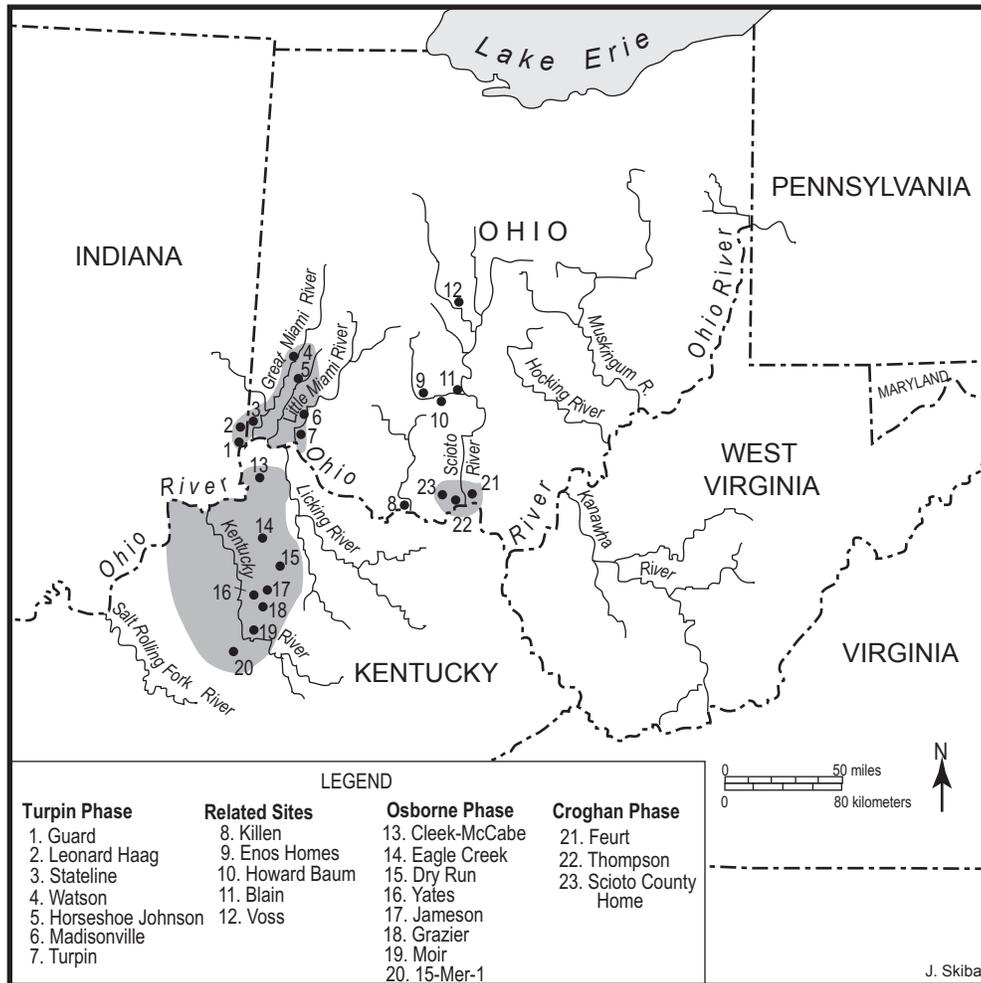
Our discussion of the prehistoric populations that resided in the central Ohio Valley after ca. A.D. 1000 will proceed with the use of blocks of time rather than terminology such as early, middle and late. This approach is somewhat different from the use of cultural units such as early Late Woodland and late Late Woodland that we employed in the previous section. The use of blocks of time has shown promise for helping reveal variability and its differential persistence in settlement data within the lower Upper Ohio River Valley (Nass and Hart 2000). An added benefit of this approach is that it plays down the formation of cultural units, which are assumed to be homogenous in composition (see Hart 1999a; Rafferty 1994), and the cultural evolution approach, which sees change as progress or transformational and gradual (Dunnell 1980; Rafferty 1994), and helps delineate the variations that exist within archaeological data. As Rafferty (1994:408) suggests, "archaeological assemblages reflect a series of behaviors of individuals, households, and communities; it is these which were under selection."

## Post-A.D. 1000 to 1200 Developments

Church (1987) has described A.D. 1000 to 1200 as a transitional period for the Late Woodland and the village-based Fort Ancient maize farmers. At some sites, settlement size, the random distribution of features and dwellings within them, and catchment location still resemble their Late Woodland counterparts. Others, however, exhibit a community plan (a more structured patterning to the placement of dwellings and associated pit features) more consistent with the post-A.D. 1200 Late Prehistoric Fort Ancient. Collectively, these sites are ca. 0.2-0.4 ha in size and are located on both floodplains and terraces. The consistent use of crushed mussel shell as the predominant ceramic tempering agent, a technological innovation long employed as a criterion denoting the Late Prehistoric, is also not evident at all simultaneously occupied sites.

A number of habitation sites have been identified as belonging to this transitional Late Prehistoric period (Figure 2.7) (Church 1987). One site, Voss (Baby et al. 1967), is located in the northern portion of the Scioto River Valley (see Table 2.3 for a listing of radiocarbon dates). Voss (Figure 2.8) displays a more spatial, structured arrangement of features and dwellings, which is more consistent with post-A.D. 1200 sites. Recent survey north of Voss has documented the Madeleine site (33 Ma 145), from which a radiocarbon date of cal. A.D. 880-1290 (midpoint cal. A.D. 1045-1115) was obtained (Gowan and Jackson 1995). The site yielded ceramics diagnostic of the same period. Blain (Prufer and Shane 1970), Howard Baum (Skinner et al. 1981), and Enos Holmes (Baby et al. 1968) are all located in the southern reaches of the Scioto drainage. To this list we would add Killen (Brose 1982), located to the southwest on Ohio Brush Creek, and the Locust site (Seeman 1985), located within the Licking River drainage.

In contrast to Voss, Howard Baum (Figure 2.9), and Killen (Figure 2.10) sites seem to represent a continuation of the pattern noted during the Late Woodland. Although radiocarbon dates for each site are not entirely in agreement with our model, and span our temporal dividing line of A.D. 1200 (Table 2.3), controlled surface collection and excavation at both sites revealed pit features within linear anthropic soil accumulations and artifact distributions. While at least six discrete posthole patterns were identified at Killen, excavation at Howard Baum was confined to a narrow easement and only pit features were encountered. A similar settlement pattern of linear sites seems to exist



**Figure 2.7.** Map locating pre-A.D. 1200/1250 Late Prehistoric sites within the central Ohio River Valley.

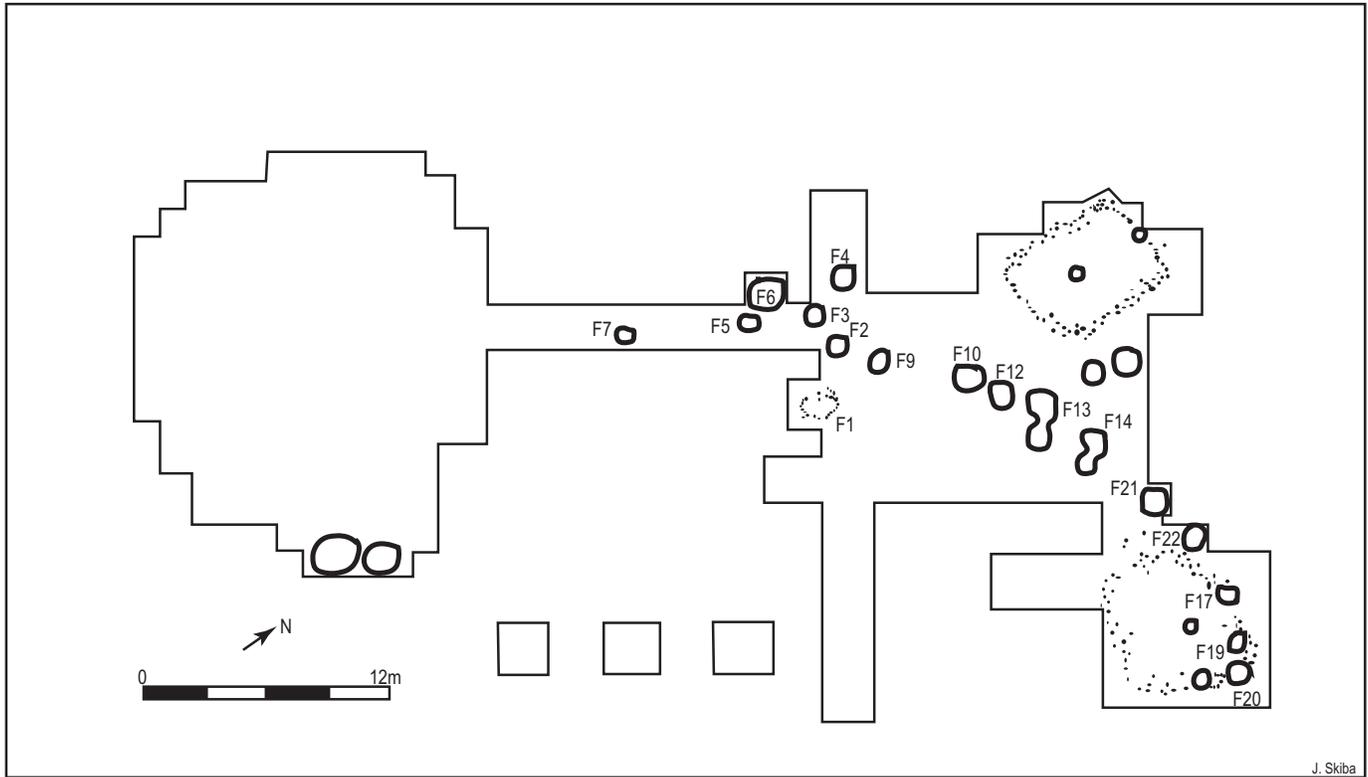
for some Turpin phase sites in southwestern Ohio as well (Cowan 1986).

Beyond Ohio proper, supporting data for this transition are apparent from Kentucky sites, where settlement and technological developments of the Osborne and Croghan phases mirror those for southern Ohio (Sharp and Turnbow 1987; Turnbow and Sharp 1988). This pattern is at odds with that posited by Graybill (1981), who has argued for the exclusive existence of formally planned villages across southern Ohio shortly after A.D. 1000.

Dwellings within these early sites are either circular or rectangular in shape, the latter form appearing for the first time in both Kentucky and Ohio after A.D. 1000. In addition, both pithouse-like and above-ground dwellings are evident. There does, however,

seem to be a preference for pithouse-like dwellings within the Little and Great Miami Valleys. Data on dwelling size is available for only Killen, and it is not possible at present to discern a change in dwelling size between the Late Woodland and the transitional Late Prehistoric sites.

While the collective settlement pattern (including the spatial organization of behavior) is more an extension of the Late Woodland period, aspects of the social and economic spheres were in a state of change. One noted change in social space is that played by ritual. The combination of ritual and social space is different at Voss, Killen, Blain, Howard Baum, Enos Holmes, and at some Turpin phase sites. At these sites, mounds become an integrated component of the social environment. This is a marked change from the



**Figure 2.8.** Map of the Transitional Late Prehistoric Voss site (adapted from Church 1987).

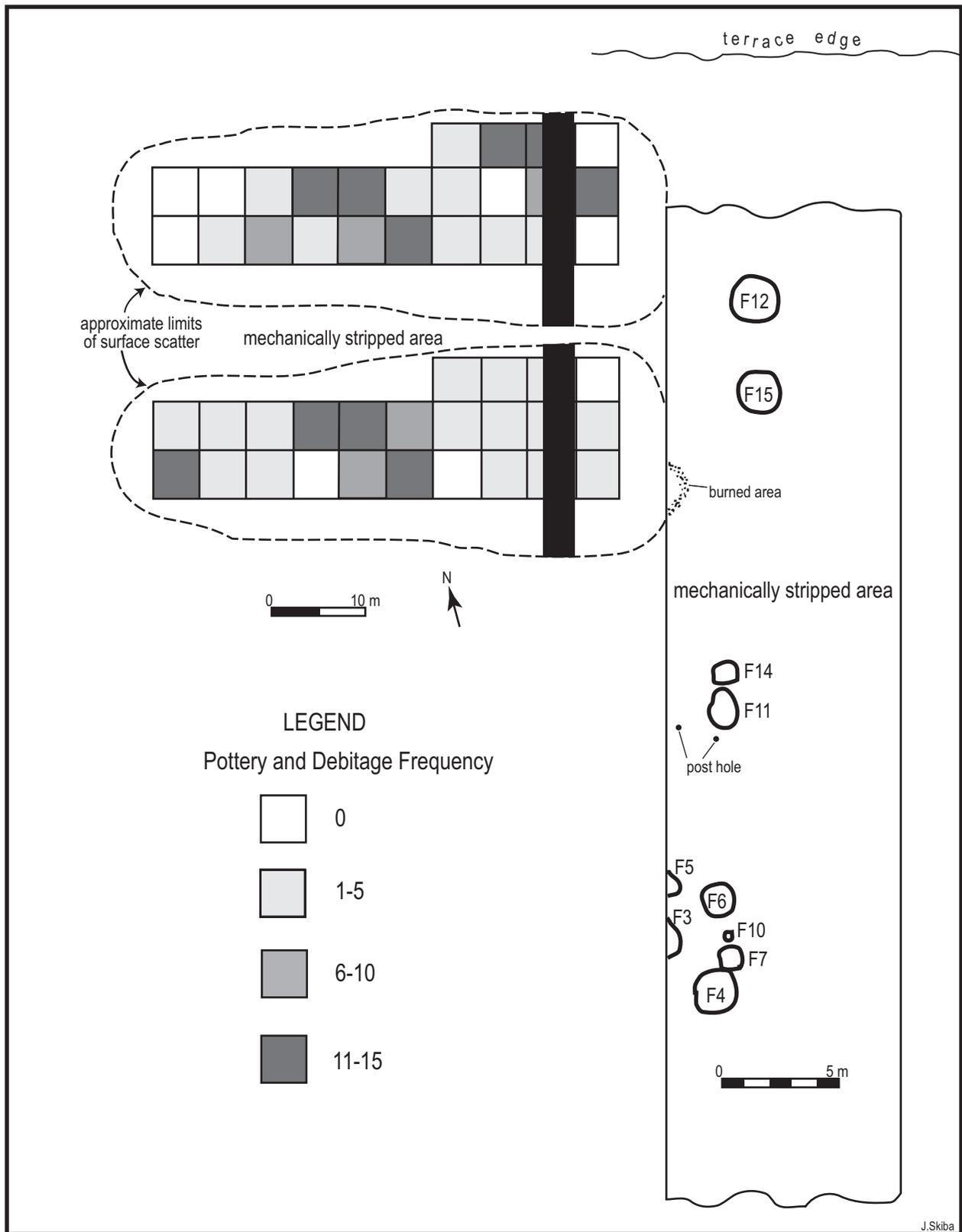
Late Woodland, for example, at which burials are found in shallow graves (such as Sabre Farms) or are intruded into earlier burial tumuli. Braun (1988:26-27) suggests that this incorporation of mounds into the community indicates a greater need for public ritual within daily life than was evident earlier. The integration of domestic and ritual/ceremonial spheres can also mean an increasing interdependency among household units (Braun 1988:27).

Economically, maize, which was already becoming an important high ranking domesticated for populations in West Virginia and Kentucky, quickly replaces the remaining native cultigens and domesticates, and varieties of it are present at all early Fort Ancient sites within Ohio, Kentucky, and West Virginia (Rossen 1992; Wagner 1987). Sunflower, another domesticated from outside the Ohio Valley, becomes the dominant oily seed domesticated (Rossen 1992). Archaeobotanical analyses have also identified pumpkin, squash, and gourd, as well as hickory and black walnut, *Chenopodium*, sumac, and erect knotweed from these sites (Rossen 1988; Wagner 1987). Although cultigens are storable, none of the transitional sites appear to

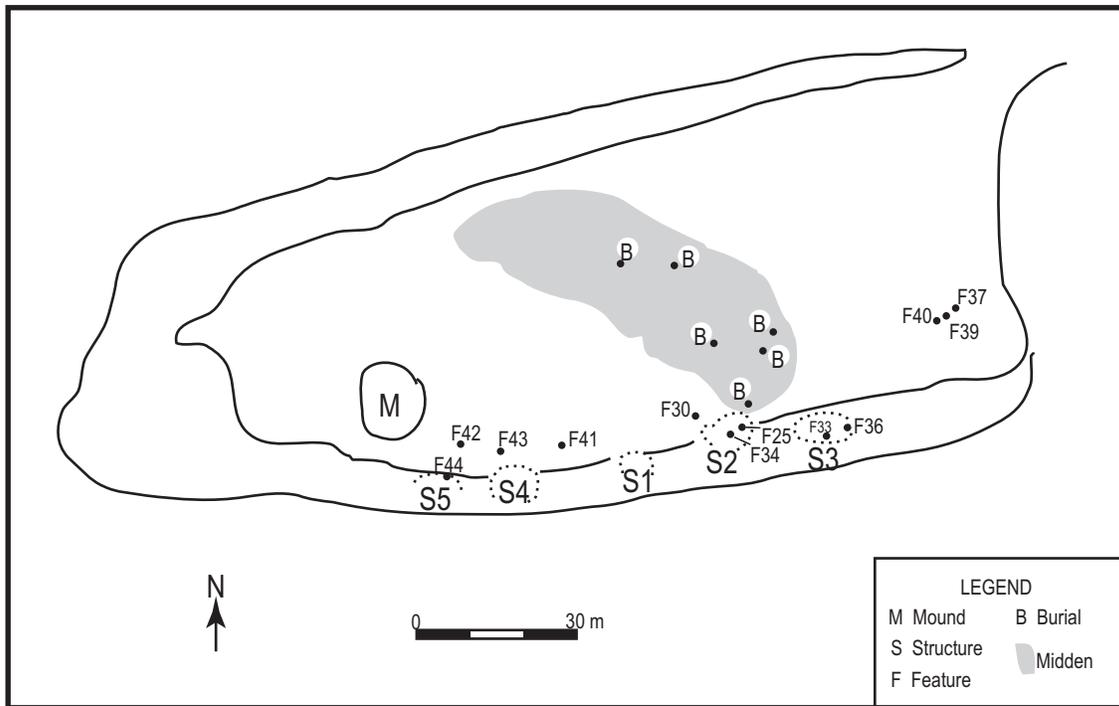
have been occupied for more than a few years and good data supporting year-round occupation or “sedentism” can be argued either way.

Calculated niche widths (see Hardesty 1975) for faunal collections from sites such as Muir in Kentucky, and Turpin, Howard Baum, Blain, Killen, and State Line in Ohio reflect diversity, yet record a concentration on those species that are abundant, high calorie-yielding, reliable, and capable of rebounding from heavy predation (Breitburg 1988, 1990) (see Table 2.2). Not surprisingly, white-tailed deer and wild turkey head the lists of high ranking staples. Again, the issue of year-round occupation can be argued either way.

In terms of technology, the dominant projectile point form in the central Ohio Valley (regardless of phase designation) is a long, narrow isosceles triangle. Most are made from locally available lithic materials, especially those from fluvially derived sources (see Table 2.2). This pattern of local stone utilization has also been documented at Late Woodland sites. These data support the opinion that group mobility and/or access to nonlocal sources of lithic material has not increased over time. Conversely, it may also



**Figure 2.9.** Map of the transitional Late Prehistoric Howard Baum site (adapted from Skinner et al. 1984).



J. Skiba

**Figure 2.10.** Map of the transitional Late Prehistoric Killen site (adapted from Brose 1982).

indicate the throwaway nature of the tool — that is, locally made triangular points are readily manufactured and are not as carefully curated as these and other tools may have been previously (Yerkes and Pecora 1991).

Ceramic containers were tempered now with shell, limestone, and a combination of shell with one or more materials. Shell tempering (which was not used by Late Woodland populations) occurs in relatively low frequencies (approximately 5 percent) in transitional assemblages, increasing to 20 percent at early Fort Ancient sites such as Kramer, Gartner, and Baum (Church 1987). Its appearance may be related to its utility for maintaining vessel integrity in both firing and cooking processes. Vessel shape is still that of a jar with a restricted orifice.

Agricultural implements in the form of shell and deer/elk scapula hoes have been found at some sites, but are rare to absent at earlier sites. The use of expedient materials for hoes, especially mollusk shells, is quite evident at early Fort Ancient sites, where they are a ubiquitous type of artifact. The absence of such tools from earlier sites could be explained in one of

two ways: (1) agricultural activities were not as intense during the Late Woodland period in central Ohio and northern Kentucky; or (2) hoes were made from materials other than shell and bone, such as slate, sandstone, or limestone — materials that have longer use-lives and hence a higher curation value.

In terms of storage technology, large deep pits exceeding 800 liters in volume are present at Howard Baum, Blain, Voss, and Muir, but are noticeably absent at Killen and within Turpin phase sites (Cowan 1986). For instance, at Muir, at least one large-pit feature is located adjacent to individual structures. It would appear that resource storage had a bearing on the distribution of houses and storage features within these sites. In addition, the total area of the site becomes larger, but all of the space within the site boundaries was not used for structures. Instead, site size seems to reflect both habitation space and agricultural space. If Muir, Killen, and Howard Baum are representative of this time period, then large, contiguous fields such as those described for the Huron and Iroquois are lacking, with individual households cultivating their own agricultural plots.

**Table 2.3.** Radiocarbon Dates for Selected Sites Mentioned in Text.<sup>1</sup>

Temporal Period/Phase	Site	Lab No.	Age C14 B.P.	Age C14 A.D.	A.D. Cal 2 $\sigma$ Range (intercepts)	References
<b>EARLY LATE WOODLAND</b>						
Newtown	Water Plant	B15506	1450 $\pm$ 80		430 (630) 663	Church 1987; Dancey 1988
		B15507	1330 $\pm$ 70		608 (680) 881	Church 1987; Dancey 1988
		B15508	1450 $\pm$ 70		443 (630) 686	Church 1987; Dancey 1988
		SMU1973	1324 $\pm$ 87		595 (680) 891	Carr 1988
Newtown	Zencor/ Scioto Trails	B4348	1330 $\pm$ 60		625 (685) 862	Wymer 1987
		B4349	1200 $\pm$ 60		678 (870) 985	Wymer 1987
		B	1170 $\pm$ 50		726 (886) 990	Wymer 1987
		B4347	950 $\pm$ 50		1002 (1041, 1150) 1219	Wymer 1987
		Eth3067	1425 $\pm$ 90		434 (640) 862	Carr 19885
<b>LATE LATE WOODLAND</b>						
Chesser Peters	Chesser Cave Sabre Farm	OWU180	880 $\pm$ 140		887 (1180) 1396	Ogden and Hay 1967
		B29167	1560 $\pm$ 70		380 (540) 648	Nass et al. 1990
Late Wood	Hunter I	B37801	1354 $\pm$ 70		597 (670) 856	Church 1991
		B37356	1412 $\pm$ 60		546 (650) 754	Church 1991
	Longacre I	I 13747	660 $\pm$ 80		1228 (1300) 1431	Morton 1984
	Longacre II	I 13616	590 $\pm$ 80		1280 (1400) 1445	Morton 1984
	Locust	DIC2889	690 $\pm$ 55		1246 (1300) 1401	Seeman 1985
		DIC2888	710 $\pm$ 55		1228 (1290) 1396	Seeman 1985
		DIC2562	720 $\pm$ 45		1235 (1286) 1380	Seeman 1985
		DIC2887	730 $\pm$ 45		1228 (1286) 1380	Seeman 1985
	Cole	DIC2284	680 $\pm$ 55		1259 (1300) 1403	

*continues*

**Table 2.3.** *continued*

Temporal Period/Phase	Site	Lab No.	Age C14 B.P.	Age C14 A.D.	A.D. Cal 2σ Range (intercepts)	References
<b>TRANSITIONAL AD 1000 - 1250</b>						
Croghan	Scioto County House	B23030	920 ± 30		1023 (1047, 1091, 1118, 1143, 1153) 1187	Jonathan Bowen, personal communication 1989
		B13367	810 ± 60		050 (1250) 1276	Henderson and Turnbow 1987
		B13368	920 ± 100		897 (1060, 1080, 1130, 1160) 1288	Henderson and Turnbow 1987
Turpin	Turpin	B11852	490 ± 60		1320 (1430) 1611	Henderson and Turnbow 1987
		M907		675 ± 150	1029 (1300) 1485	Cowan 1986 <sup>2</sup>
		UGa4483 WIS1793		1095 ± 65 1130 ± 70	1045 – 1260 1130 – 1275	Cowan 1986 <sup>2</sup> Cowan 1986 <sup>2</sup>
Osborne	Haag	GX 2930		1000 ± 160	855 – 1285	Cowan 1986 <sup>2</sup>
		DIC 239		1220 ± 120	1035 – 1415	Cowan 1986 <sup>2</sup>
		DIC 240		1270 ± 100	1215 – 1410	Cowan 1986 <sup>2</sup>
Osborne	Muir	B14987	1010 ± 80		885 (1020) 1218	Sharp and Turnbow 1987
		B14991	1010 ± 60		895 (1020) 1168	Sharp and Turnbow 1987
		B14988	980 ± 60		971 (1030) 1215	Sharp and Turnbow 1987
		B14989	890 ± 70		1013 (1170) 1283	Sharp and Turnbow 1987
		B14990	790 ± 60		1161 (1260) 1300	Sharp and Turnbow 1987
		B13296	780 ± 60		1164 (1280) 1303	Sharp and Turnbow 1987
		B 8800	860 ± 60		1020 (1182) 1246	Sharp 1984
		DIC851	750 ± 205		888 (1280) 1627	Brose 1982
		DIC853	710 ± 205		897 (1290) 1641	Brose 1982
		DIC856	640 ± 80		1248 (1310,1360,1380) 1641	Brose 1982
		DIC857b	780 ± 95		1031 (1280) 1398	Brose 1982
Howard Baum	Howard Baum	Eth4244	745 ± 75		1166 (1280) 1397	Carr 19965
		SMU1930	652 ± 39		1284 (1304,1369,1371) 1402	Carr 1988
		DIC1928	710 ± 50		1235 (1290) 1393	Murphy 1989; Skinner et al. 1984
Enos Homes	Enos Homes	OWU276	815 ± 55		1020 (1240) 1389	Ogden and Hay 1967

*continues*

Table 2.3. *continued*

Temporal Period/Phase	Site	Lab No.	Age C14 B.P.	Age C14 A.D.	A.D. Cal 2 $\sigma$ Range (intercepts)	References		
<b>TRANSITIONAL AD 1000 - 1250</b>								
Osborne	O.C. Voss	M1875	1030 $\pm$ 120		727 (1010) 1267	Crane and Griffin 1972		
		OWU92a	970 $\pm$ 79		895 (1030) 1248	Crane and Griffin 1972		
		M1882	880 $\pm$ 100		983 (1180) 1298	Crane and Griffin 1972		
		M1881	830 $\pm$ 100		1013 (1230) 1386	Crane and Griffin 1972		
		OWU243b	815 $\pm$ 220		777 (1240) 1485	Ogden and Hay 1969		
		M1873	780 $\pm$ 100		1027 (1280) 1401	Crane and Griffin 1972		
		OWU244	675 $\pm$ 90		1215 (1300) 1432	Ogden and Hay 1969		
		M1884	470 $\pm$ 150		1276 (1440) 1954	Crane and Griffin 1972		
		M1871	550 $\pm$ 100		1280 (1410) 1621	Crane and Griffin 1972		
		M1877	520 $\pm$ 100		1287 (1420) 1635	Crane and Griffin 1972		
		M1870	720 $\pm$ 100		1063 (1290) 1421	Crane and Griffin 1972		
		Blain	Blain	OWU247b	970 $\pm$ 220		650 (1030) 1416	Ogden and Hay 1969
				M1911	760 $\pm$ 100		1036 (1280) 1405	Crane and Griffin 1968
		<b>POST-A.D. 1250</b>						
Anderson	Anderson	DIC776	730 $\pm$ 65		212 (1290) 1396	Essenpreis 1982		
Anderson	Sunwatch	B20401	660 $\pm$ 60		1268 (1300) 1411	Nass 1987		
		B20402	780 $\pm$ 60		1164 (1280) 1303	Nass 1987		
		B20403	560 $\pm$ 80		1287 (1410) 1473	Nass 1987		
		A0175	652 $\pm$ 42		1280 (1300,1373,1378) 1402	Hart et al. 2002		
Baum	Gartner	AA38460	579 $\pm$ 33		1301 (1332,1339,1398) 1423	Hart et al. 2002 <sup>4</sup>		
		AA38462	593 $\pm$ 33		1298 (1328,1344,1394) 1416	Hart et al. 2002 <sup>4</sup>		
Schomaker	Schomaker	B14226		1410 $\pm$ 60	1325 – 1425	Cowan 1986 <sup>2</sup>		
		B17994		1480 $\pm$ 80	1330 – 1495	Cowan 1986 <sup>2</sup>		
		B17996		1230 $\pm$ 60	1235 – 1340	Cowan 1986 <sup>2</sup>		
Stateline		UGa2152	1255 $\pm$ 60		1255 – 1400	Cowan 1986 <sup>2</sup>		
		UGa2153	1165 $\pm$ 60		1190 – 1315	Cowan 1986 <sup>2</sup>		
		UGa2154	1235 $\pm$ 55		1230 – 1340	Cowan 1986 <sup>2</sup>		

*continues*

**Table 2.3.** *continued*

Temporal Period/Phase	Site	Lab No.	Age C14 B.P.	Age C14 A.D.	A.D. Cal 2σ Range (intercepts)	References
<b>POST-A.D. 1250</b>						
Philo	Philo II	I 14515	580 ± 80		1217 (1300) 1455	Carskadden and Morton 2000
		I 8237	690 ± 80		1217 (1300) 1416	Morton 1977
		I 7951		1240 ± 80	1252 (1277) 1375	Morton 1977 <sup>3</sup>
		I 7759		220 ± 80	1229 (1272) 1290	Morton 1977 <sup>3</sup>
		I 7868		1060 ± 80	1027 (1163) 1230	Morton 1977 <sup>3</sup>
Middle (KY) Florence	Richards	TX2346	600 ± 70		1282 (1400) 1455	Morton 1977 <sup>3</sup>
		TX2344	660 ± 60		1268 (1300) 1411	Morton 1977 <sup>3</sup>
		TX2345	680 ± 50		1267 (1298) 1401	Morton 1977 <sup>3</sup>
		I 9140	690 ± 80		1217 (1300) 1416	Morton 1977 <sup>3</sup>
		I 9227	690 ± 80		1217 (1300) 1416	Morton 1977 <sup>3</sup>
Manion	Fox Farm	B38925	600 ± 60		1287 (1330,1400) 1436	Jefferies et al. 1990
		B38926	520 ± 50		1314 (1421) 1455	Jefferies et al. 1990
		B18185	700 ± 50		1242 (1293) 1955	Fassier 1987
		B18186	770 ± 50		1188 (1278) 1300	Fassier 1987
Manion	Fox Farm	B13363	790 ± 70		1051 (1260) 1373	Henderson and Turnbow 1987
		B13364	590 ± 70		1285 (1400) 1444	Henderson and Turnbow 1987
		B11857	530 ± 70		1299 (1420) 1479	Henderson and Turnbow 1987
Manion	Wamsley	DIC854	710 ± 105		1063 (1290) 1431	Brose 1982
		DIC862	620 ± 80		1270 (1320,1350,1390) 1441	Brose 1982
Manion	Killen	DIC851	750 ± 205		888 (1280) 1627	Brose 1982
		DIC853	710 ± 205		897 (1290) 1641	Brose 1982
		DIC856	640 ± 80		1248 (1310,1360,1380) 1641	Brose 1982
		DIC857b	780 ± 95		1031 (1280) 1398	Brose 1982

<sup>1</sup>All radiocarbon essays, unless otherwise indicated, have been calibrated using Stuiver and Reimer Radiocarbon Calibration Program Rev. 3.0, 1993.

<sup>2</sup>Corrected using Klein et al. 1982.

<sup>3</sup>Corrected using Stuiver and Reimer 1986.

<sup>4</sup>NSF AMS Lab, University of Arizona

<sup>5</sup>ETH Laboratory, AMS Lab, Zurich Switzerland

## Post-A.D. 1200/1250 Developments

Sometime around A.D. 1200, a new settlement pattern began to emerge within the central Ohio Valley, occurring initially in southwestern Ohio in the late Turnip phase (A.D. 1000-1250) (Cowan 1986), and then spreading differentially throughout the central Ohio Valley. This new pattern, as revealed in the Sunwatch site of the Anderson and the Philo site of the Philo phase (Carskadden and Morton 2000; Essenpreis 1982; Graybill 1981; Nass 1987), takes the form of nucleated, well-planned villages containing several rectangular, wattle-daub dwellings (Figure 2.11). This form of community, which is based on intensive maize agriculture, stands in marked contrast to the pre-A.D. 1200 pattern of dispersed household clusters (Church 1987; Graybill 1981; Nass and Yerkes 1995). That maize was an important staple is also reflected in the large number of shell hoes recovered at all post-A.D. 1200 sites (Nass 1987), dental pathology (Schneider 1984), and stable carbon ratios (Broida 1983; Conard 1985; Greenelee 1996). This settlement type is also sedentary (Rafferty 1985), and data by Shane and Wagner (1980) support the belief that at least part of the population remained at these villages throughout the entire year. Winter dispersal of at least part of the population has also been demonstrated to have been part of the settlement strategy for post-A.D. 1200 villages (Essenpreis 1982; Shane and Wagner 1980; Turnbow and Jobe 1984). Radiocarbon dates also support occupations exceeding 10 or more years at many of these post-A.D. 1200 sites.

But is nucleation the solution to or a causal agent of continued social and environmental risks initially brought on by dependency on cultigens? Would nucleation and sedentism ameliorate or exacerbate social and/or environmental perturbations? The definition of nucleation will facilitate the investigation of these questions and provide a context within which to examine the implications of risk.

The term nucleation denotes a situation in which previously dispersed households of a community are contained within a single, contiguous settlement (see Fuller 1981). The term community (which can take the form of a village) refers to a group of people who are socially, economically, and politically related to one another. According to Fuller's (1981) model, each community also exhibits a cohesive set of stylistic and other material traits from a single occupation.

The nucleated villages or communities that characterize the post-A.D. 1200, Philo, Baum, Anderson, and Schoemaker phases in Ohio (Carskadden and Morton

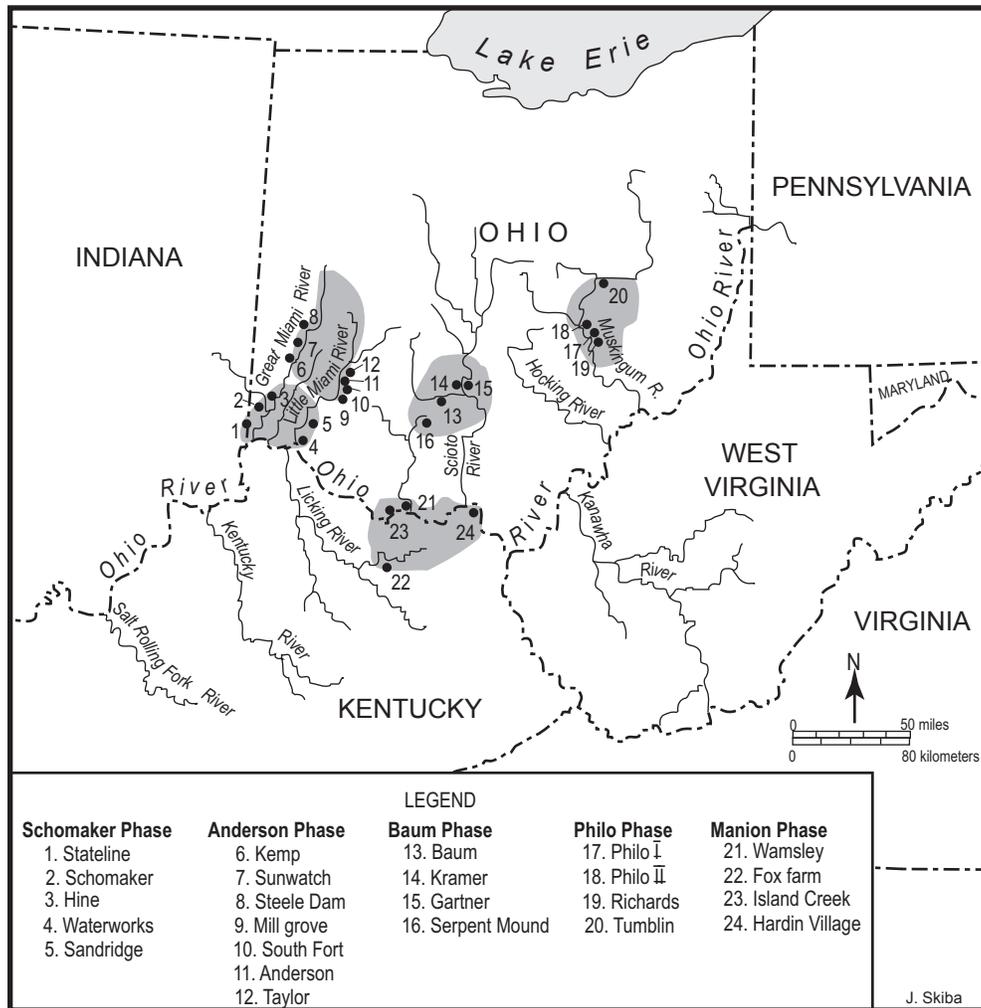
1977, 2000; Church 1987; Cowan 1986; Essenpreis 1982; Graybill 1981; Nass and Yerkes 1995) and the Manion phase in Kentucky (Sharp 1990) share a similar site plan. This consists of two distinct parts: a central plaza devoid of domestic architecture and trash, and an encircling domestic ring containing burials, dwellings, and storage/trash pits (Dunnell 1983; Dunnell et al. 1971; Graybill 1981) (see Figures 2.12-2.14).

Although data about the spatial and temporal variability in dwellings are imperfect, dwelling size in these communities is somewhat larger than the preceding transitional sites (Church 1987; Nass 1987). We therefore feel that there is a general trend toward larger dwellings. More importantly, if labor is an important ingredient for successful maize farming, then population nucleation could be a tactic to concentrate labor as opposed to biologically increasing the size of the individual family household.

Three different scales of household organization have been proposed for explaining the spatial arrangement of dwellings, pit features, and burials: the discrete household, the household cluster, and the village (Flannery 1976, 1981; Nass 1987; Nass and Yerkes 1995; Wilks and Netting 1984). The household or household unit (Flannery 1981) takes the form of a discrete dwelling and pit cluster that often includes burials (Figure 2.15). This contrasts with the household cluster, which takes the form of several coeval household units, and the village, which represents a single, contiguous settlement of several household units spatially arranged to a predetermined plan. Artifact content from one household unit (bone, shell, antler, and lithic tools) duplicates the same range of artifact types and domestic activities within another household unit (Nass 1987; Nass and Yerkes 1995).

Households also seem to form clusters within the villages. Evidence supporting this proposition occurs in the form of rim sherd refits (Figure 2.16). The quantity of refits (over 50) and the corresponding distances (between 2 and 20 meters) between refuse pits and burials from which rim sherds were recovered hints at economic cooperation between household units. Most likely these house/feature clusters represent the dispersed household clusters that characterized the Late Woodland and the pre-A.D. 1200 Fort Ancient sites such as Muir, Howard Baum, and Killen.

The arrangement of dwellings around the plaza-like area and the fact that doorways open onto it support the belief of community-wide cohesion, since the plaza would serve the entire community. This space would have been used for both daily social activities and village-wide ritual/ceremonial activities.



**Figure 2.11.** Map locating post-A.D. 1200/1250 Late Prehistoric sites.

Research at Sunwatch Village has identified two additional types of data that evince community-wide cohesion. These take the form of a probable men's house (Harold 1985; Heilman and Hofer 1980; Robertson 1984) and a village leader's dwelling which was an integrated part of the calendrical system at the site (Heilman and Hofer 1980; Nass 1987; Nass and Yerkes 1995) (see Figure 2.16).

The spatial arrangement of household units at post-A.D. 1200 sites supports the belief that the old household farming plots had been replaced by field agriculture. From an economic or subsistence point of view, field agriculture poses new risks to the occupants of nucleated communities, especially if fields are contiguous with synchronized yields. Likewise, with a population concentrated in one location, a large

er resource-sustaining area would be required than for scattered household clusters. Tactics to deal with this problem seem to have taken the form of predation on animals that afforded high caloric returns as well as winter dispersal of a portion of the population (Breitburg 1988; Shane and Wagner 1980; Turnbow and Jobe 1984). Shane and Wagner have identified winter trash deposits at Sunwatch Village that contained processed deer remains that were transported back to the settlement from hunting camps. Processing deer at outlying hunting camps allowed for greater ease of movement of meat over long distances than would the transportation of unbutchered carcasses.

The cultivation of 8-row northern flint maize (and minor amounts of 10-row and 12-row varieties) has

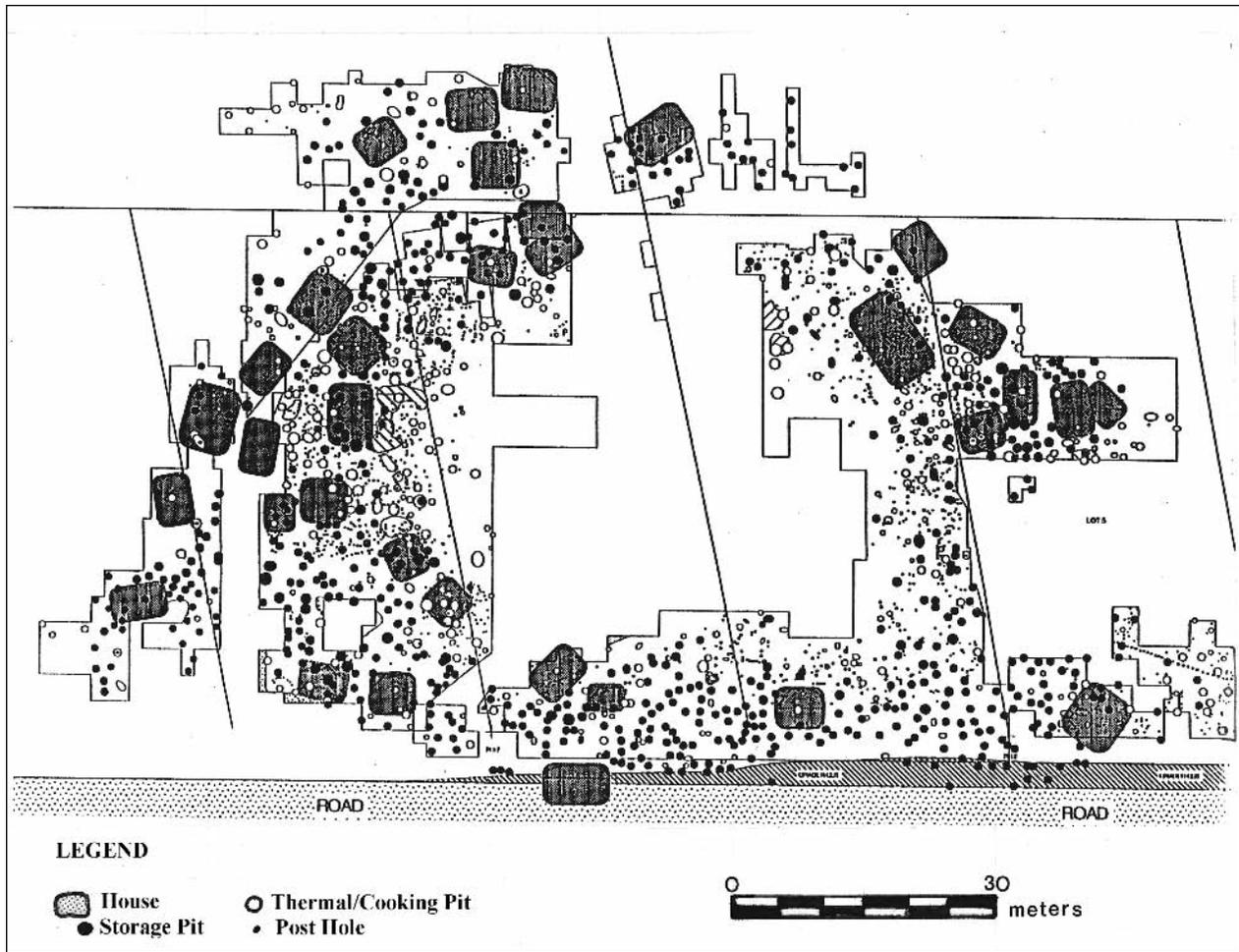
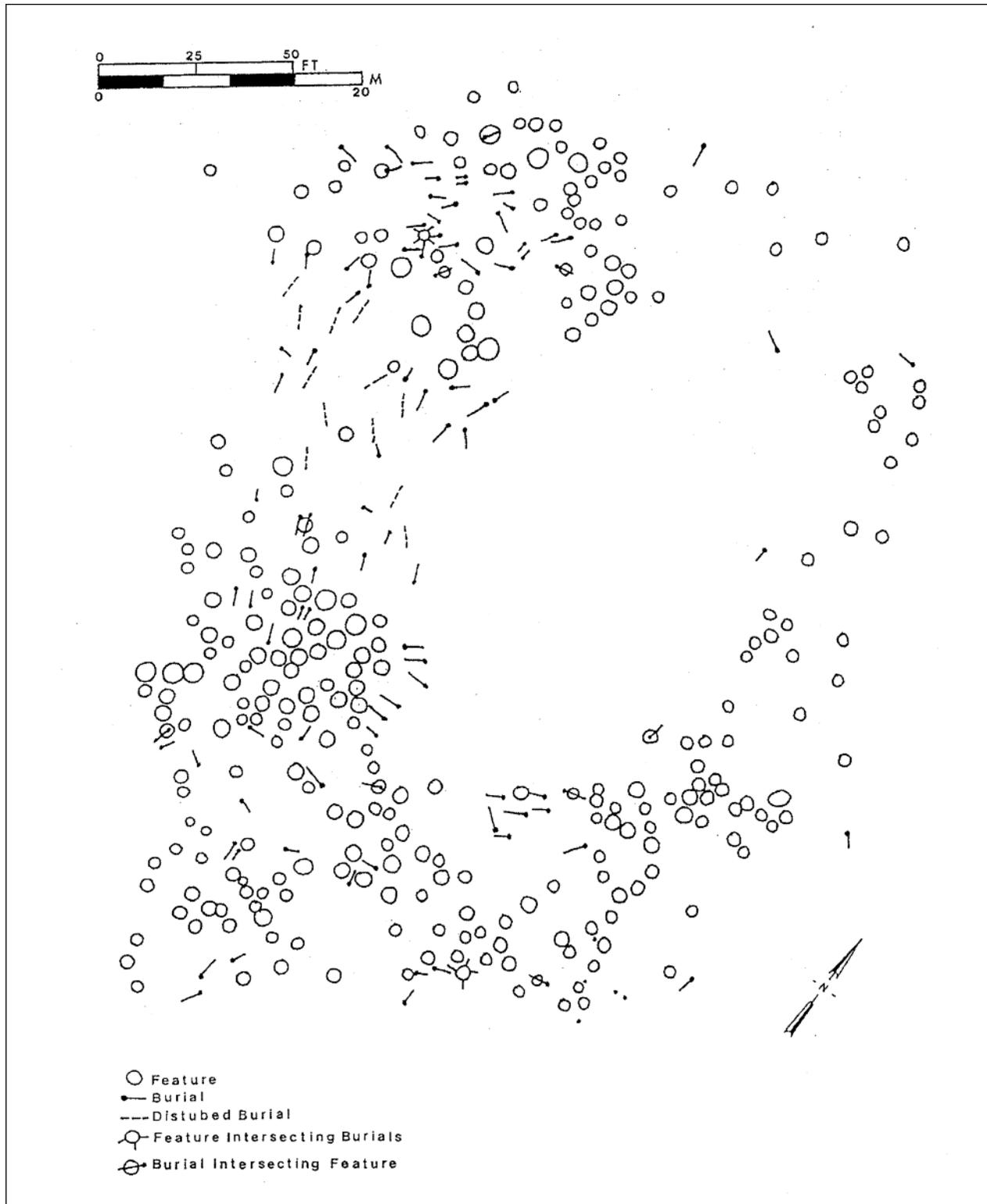


Figure 2.12. Map of the Late Prehistoric Philo II site (adapted from Caraskadden and Morton 2000).

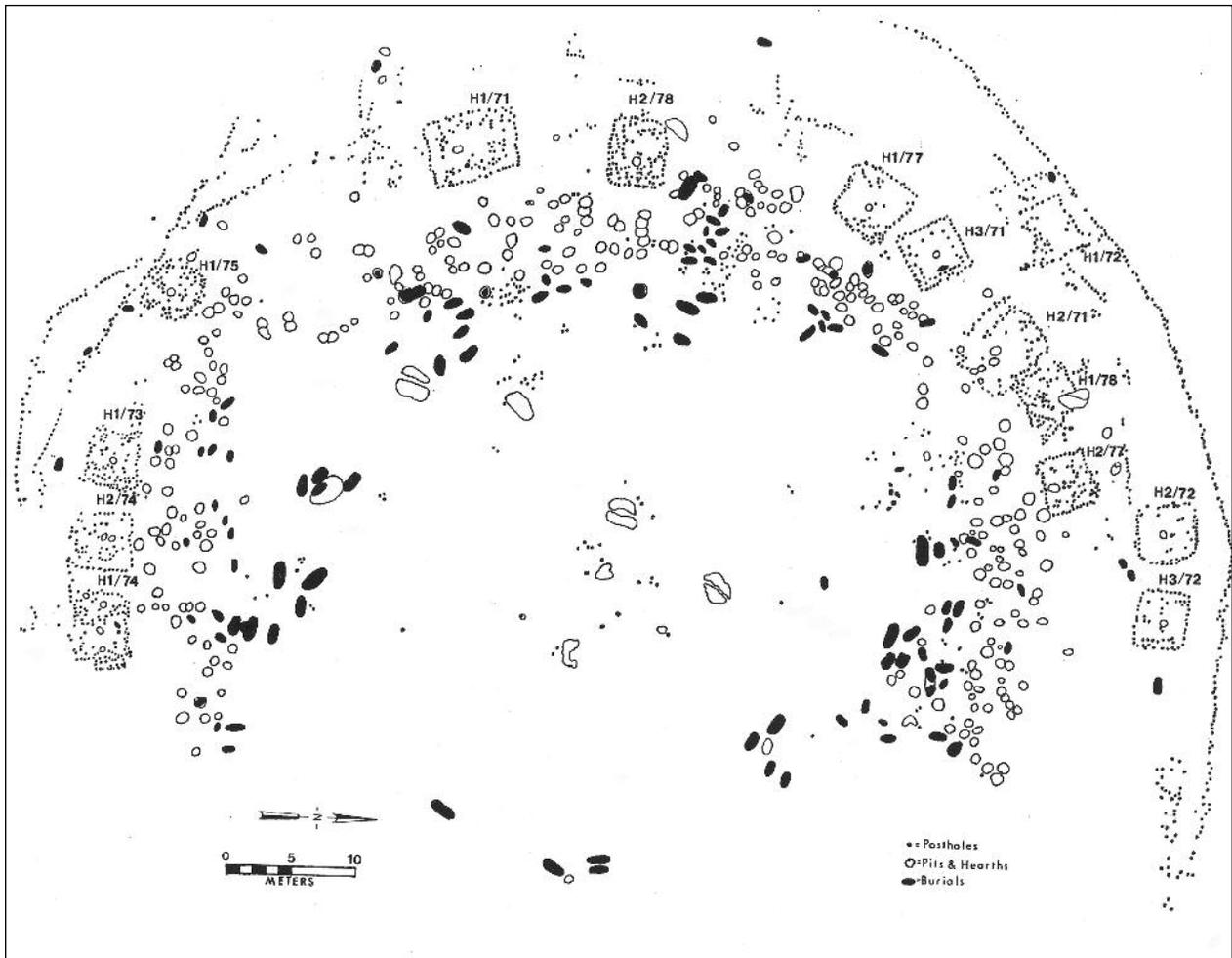
been well-documented (Rossen 1992; Wagner 1987; Watson 1988). Since harvested maize must be kept dry, Fort Ancient villages are dominated by large silo and bell-shaped pits that served as subsurface granaries (Figure 2.17). Many of these exceed 1,000 liters in volume (Nass 1987). Each household had several of these pits for storing its maize and any other perishable plant products. However, dependency on maize as the primary dietary staple made villagers susceptible to environmental risk and health-related problems (see Giesen 1992).

To ensure the success of the maize crop, the calendrical system evident at Sunwatch Village would

have played an important role in the cycle of planting and harvesting. Still, this system would not guarantee protection from unexpected environmental conditions such as drought, frosts, and too much rain. Producing a surplus of maize that would then be stored could offset environmental perturbations. The risk of resource shortages could also be mitigated if each household contributed a portion of its yield to the village leader, who kept it in storage pits around his domicile (Nass 1987; Nass and Yerkes 1995). This behavior might explain the large number of storage pits (>900 liters) found contiguous to the village leader's dwelling at Sunwatch Village.



**Figure 2.13.** Map of the Late Prehistoric Anderson Village site (taken from Essenpreis 1982).



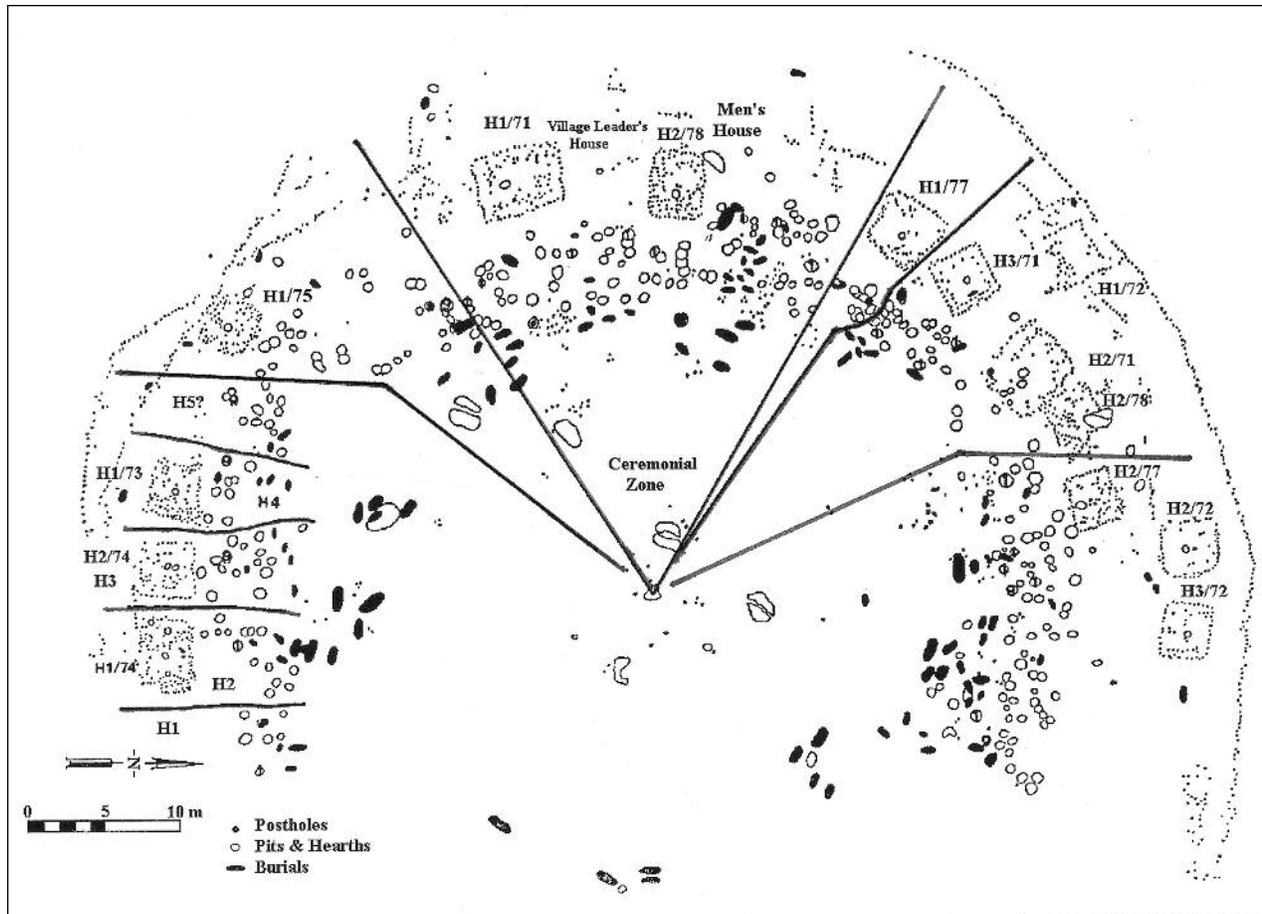
**Figure 2.14.** Map of the Late Prehistoric Sunwatch Village site.

## DISCUSSION

We suggest that the genesis for the settlement pattern of nucleated communities that emerged sometime after A.D. 500 can be traced back to the strategy of incorporating low ranking, low density resources into the diet during the Late Archaic/Early Woodland period. Over time, these resources — members of the Eastern Agricultural Complex (EAC) — increased in variety and density, were grown in small, multiple garden plots, and were managed and harvested by households arranged into dispersed communities (Johannesen 1993; Wymer 1987, 1992). Neither the size of communities nor the technology suggests large-scale field agriculture at this time. These communities engaged in reciprocities of labor during the Middle

Woodland period that provided in part for the construction of mound and earthwork complexes present in the central Ohio region (Dancey 1991; Pacheco 1988). Increased human management of EAC cultigens likely resulted in evolution of the plants themselves (cf. Rindos 1984), producing higher yields and thus pushing these resources higher up the rank of diet choices.

By the early Late Woodland period, these now high ranking, high density native cultigens provided for an increase in human population, as well as an increased level of productivity beyond immediate needs (Fuller 1981). Although sites lacked large household storage facilities, such as deep storage pits (Dancey 1992), Late Woodland ceramic containers were larger and more frequent (Dancey 1992). The convergence of



**Figure 2.15.** Map of households within the Late Prehistoric Sunwatch Village site (taken from Nass 1987).

these two trends resulted in the appearance of planned, nucleated communities at various locations across the central Ohio Valley. The number of these sites and their duration is still unclear. However, the speed and duration of nucleation would be dependent upon the strength of the benefits afforded by this strategy. Once concentrated, interhousehold economic cooperation would have been essential for the vitality of this settlement arrangement, especially if a tactic was interhousehold sharing of grown resources. With a massed population, the farming of cultigens would have shifted from individual household production to aggregated monocrop fields outside the boundaries of the community. However, all farmers are cognizant of the fact that farming (even of native cultigens) carries with it an uncertainty and that final outcomes are not predictable. During periods of high ranking resource shortages, fallback resources, such as low ranking wild

plants and animals, were exploited provided they occurred in the necessary densities, and the population possessed the necessary logistics to collect, process, and transport them in sufficient quantities. These nucleated settlements were also at risk in terms of pathogens and strained social relations. It is still unclear whether migration or social dispersion was a tactic to buffer localized resource shortages.

For reasons still unclear, the nucleated settlement pattern of the early Late Woodland in West Virginia, Ohio, and Kentucky disappears almost as quickly as it materialized. Settlement data based on site survey and excavation have documented the existence of smaller, dispersed concentrations of cultural remains across the central Ohio Valley, implying a return to a dispersed household settlement pattern more reminiscent of the Middle Woodland (Jefferies and Shott 1992; Seaman 1992b). This change in settlement strategy

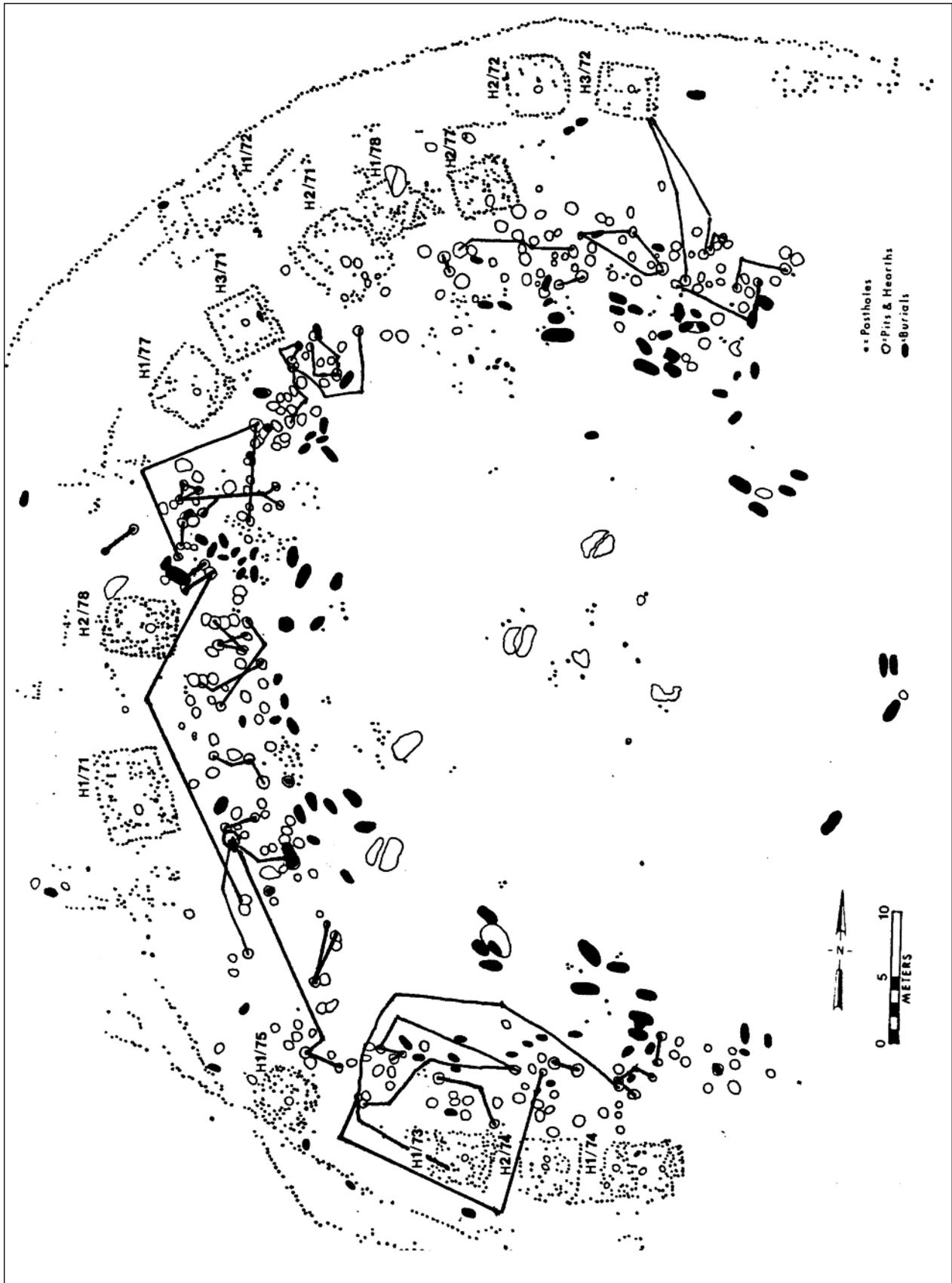
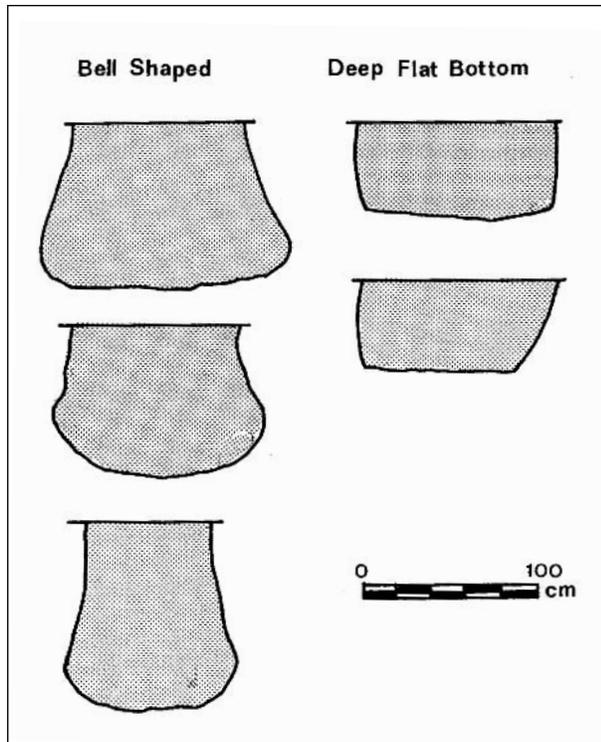


Figure 2.16. Household clusters within the Late Prehistoric Sunwatch Village site (taken from Nass 1987).



**Figure 2.17.** Sample of Late Prehistoric storage feature shapes from the Sunwatch Village site (taken from Nass 1987).

occurred in the absence of any subsistence change (Wymer 1992).

With a return to dispersed farming households, families would be able to take advantage of microclimatic variation to arrange their farming plots among patchy locations. This tactic would help maximize access to multiple planting sites with good soils, aspect, water availability, and ease of garden clearance, planting, maintenance, and harvesting. Although spatially separate, reciprocities of labor among households, when necessary, could have helped maximize resource harvesting. Storage was becoming more important, as evidenced by the occurrence of larger pit features at some sites. While such features could easily replace several ceramic storage containers, their occurrence may have more to do with advances in storage technology.

At the same time as the change in community pattern, a new technology, that of the bow and arrow, made an appearance across the region. The bow and arrow offered an improved hunting technique that increased its efficiency. This no doubt increased the availability of high ranking, low density meat

resources such as deer and wild turkey. The tactic of intensive predation, however, can lead to a localized reduction in the live weight of deer (Shott and Jefferies 1992). In turn, these strategies proved beneficial in that human population increased, as evidenced by the numerous late Late Woodland phases documented across the central Ohio Valley. This increase hints that, in contrast to earlier periods, migration and population dispersion were no longer feasible alternative buffering tactics for subsistence risks.

Sometime after A.D. 800, maize moved from a diet incidental to a high ranking dietary staple for some households and populations across the central Ohio Valley. Hart (1999b) has outlined a convincing model that states the conditions surrounding the adoption of maize by populations in the Eastern Woodlands. One important argument in this thesis is that, once the benefits of maize farming are able to outweigh the liabilities connected with its production (i.e., its planting, harvesting, and storage), it would then move up the order of high ranking resources. Based on data from the central Ohio Valley, Hart's model does account for the randomness of maize's presence and its rapid ascension after A.D. 800.

Although successful, this late Late Woodland pattern was short-lived in most places across the central Ohio Valley. Beginning around A.D. 1000, transitional Late Prehistoric sites (denoted by the addition of shell tempering) begin to appear within the archaeological record of the region (Church 1987). These were still small and variably situated in the same kinds of settlement locations as were late Late Woodland sites. Settlement and subsistence data support the proposition that the success of the late Late Woodland strategy carried over into the transitional Late Prehistoric. While maize is a ubiquitous component of the botanical record of these sites, its integration into the lives of populations also coincided with a set of linked or interconnected events that included a reduction in niche width (Breitburg 1992) and an increasing reduction in group mobility.

We believe that the tactic of intensifying maize farming was due to the success of the late Late Woodland dispersed settlements that were able to maximize the potential of EAC cultigens. Dispersed households aggregated to form household clusters, but this time, instead of depending upon the forager buffering strategy of interhousehold sharing of resources, the population relied upon reciprocities of labor to coordinate the planting, maintenance, and harvesting of crops from more concentrated but larger agricultural plots. Although a growing local and

regional population is assumed at this time, its verification cannot be unequivocally demonstrated given existing settlement data (Dancey 1992).

To offset possible economic perturbations caused by the fusion of maize into the subsistence system, at least one member of the starchy seed plants (*Chenopodium* sp.) and one member of the oily seed plants (sunflower) and nuts continued to be components of the diet (Rossen 1992; Wagner 1987). Successful harvests of maize and these two plants were made possible through the careful selection of soils that warmed early in the spring, were well drained, and easily tillable with the prevailing digging stick/shell hoe technology (Nass 1989). In addition, a more focused exploitation of fewer high yield resources, the construction of large subterranean storage facilities, and the expansion of garden plots into larger fields were strategies to help ensure the continued maintenance of the subsistence system. Since construction of wattle/daub structures such as those identified at Killen (Brose 1982), larger storage pits, and cleared garden plots require major energy expenditures, mobility would be further impaired for two reasons: (1) households would not want to rebuild these costly features anew on a yearly basis; and (2) although concealment of stored agricultural produce was a community-wide tactic, households would not want to leave stored resources unattended for long periods of time. The range of radiocarbon dates from individual early Late Prehistoric sites supports our contention that these household clusters were fairly stable over time, with some sites, such as Voss, experiencing a rhythm of abandonment and reoccupation over a long period of time (Table 2.3).

The strategy of incorporating domestic and ritual/ceremonial spaces (i.e., mounds) within the community, such as Killen, supports Braun's (1988) argument of interdependence among households when faced with decreasing group mobility, a growing dependency on a narrow range of resources, and the risks of food shortages due to environmental perturbations.

Finally, this continuing pattern of household aggregation is clearly seen in the post-A.D. 1200 Fort Ancient communities found across the central Ohio Valley during the Late Prehistoric period. These sites were larger, having from 12 to 25 discrete domestic dwellings. Social relations within communities were more complex, as indicated by the presence of specialized community structures (Nass 1987; Nass and Yerkes 1995). The role of ceremony as a strategy to mitigate subsistence risk seems indicated by evidence for archaeoas-

tronomical alignments, such as those found at Sunwatch. Although the presence of palisades surrounding most of these sites implies competition between groups for access to land for farming and hunting, as well as to protect stored resources, the presence of such features may also signify the social space of a population (Means 2000; Pearson and Richards 1994). Although entire populations could not abandon a site, the differential occurrence of faunal elements (Shane and Wagner 1980) and the presence of small, cold weather upland procurement sites distant to villages (Turbnow and Job 1984) are indicators of strategies and tactics to maintain a continued supply of necessary resources for all members of the community, especially those restricted to the immediate environs of the village.

In summary, an integrated set of strategies and tactics to counter ecological and social perturbations was developed and implemented beginning in the Late Woodland in central Ohio and continuing into the Late Prehistoric. A fluctuating pattern of population nucleation and dispersal characterizes settlement in the region, tied to changing economic and social activities as reflected in site location, community plan, and changing technology. The greatest effects of these strategies and tactics can be seen in the settlement, subsistence, and technological data of the Late Prehistoric populations inhabiting Ohio, Kentucky, and West Virginia.

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## CHAPTER 3

“ . . . to reconstruct these houses of men  
who lived in a stone age”:

### MODELING VILLAGE COMMUNITY ORGANIZATION USING DATA FROM THE SOMERSET COUNTY RELIEF EXCAVATIONS

Bernard K. Means

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#### INTRODUCTION

In this chapter, I analyze data obtained through archaeological investigations conducted in Somerset County, Pennsylvania, between 1934 and 1940 (Figure 3.1) (Augustine 1938a, b, c, d, 1940; Butler 1939; Cresson 1942). The majority of Somerset County is located in the Allegheny Mountains region of the lower Upper Ohio Valley River basin. These investigations were funded by the federal government to provide work for men who found themselves otherwise unemployable during the Great Depression (A.D. 1929 to 1941) (Means 1998a, 2000a). While a Pennsylvania Historical and Museum Commission Scholar in Residence during September 1999, I completed an inventory of all holdings related to the Somerset County Relief Excavations that are present in the archaeological collections of The State Museum of Pennsylvania, and I examined associated documents maintained by the Pennsylvania State Archives (Means 1999a). The main goal of this project was not to assemble esoteric facts related to an obscure chapter in the history of North American archaeology. Rather, this project was designed to demonstrate that data collected by the relief excavations are critical for addressing research issues raised by a modern generation of anthropological archaeologists.

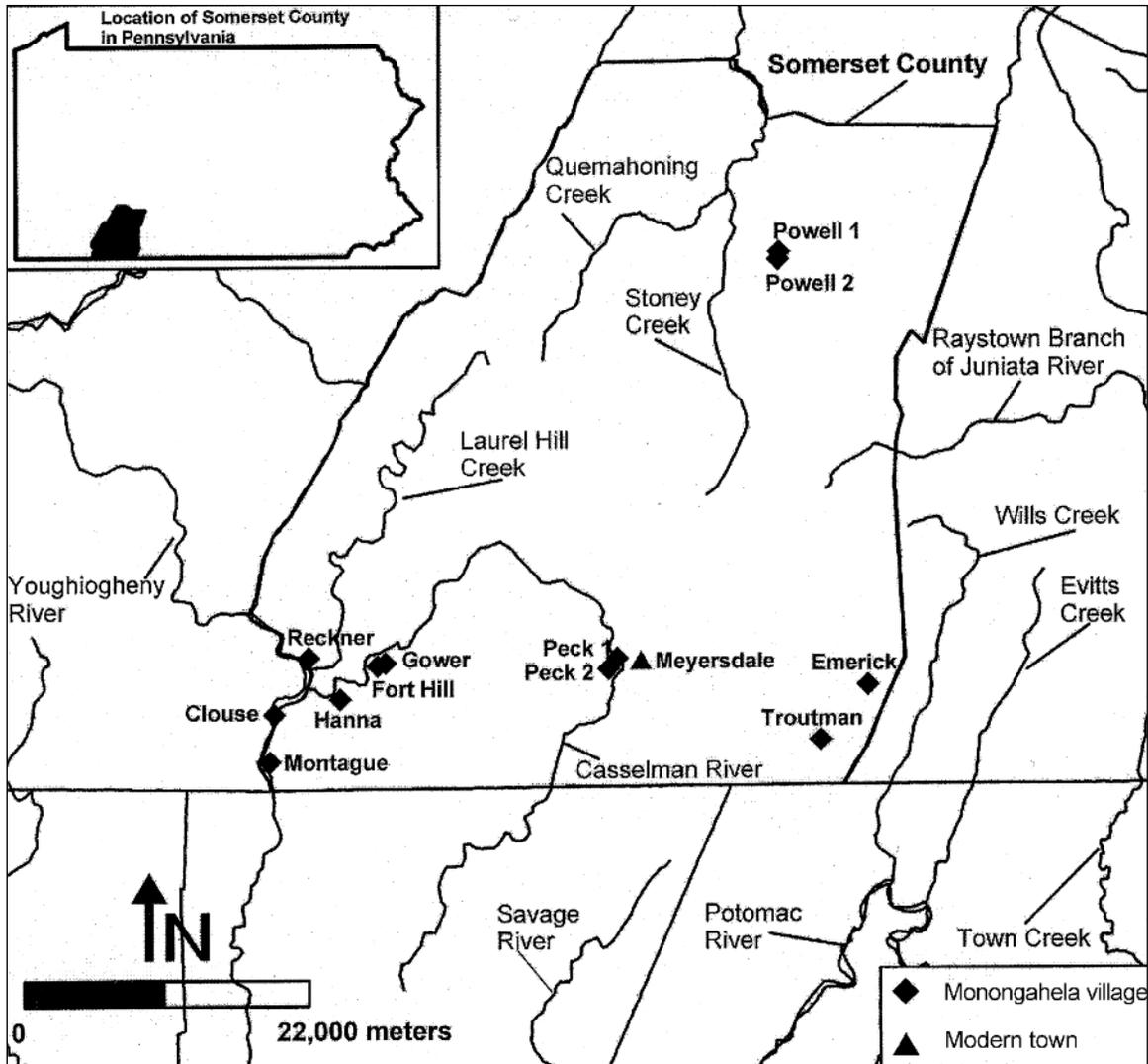
The relief excavations made several lasting contributions to the archaeology of the Upper Ohio Valley. Butler (1937, 1939) used relief excavation data to create the archaeological construct of the Monongahela culture taxon that is still widely used today, with minimal modifications. At its most basic level, the Monongahela culture taxon refers to the inhabitants of southwestern

Pennsylvania and portions of adjacent states during the Late Prehistoric period (A.D. 900 - ca. 1600s), who practiced a related set of adaptational approaches to the local environment, including intensive maize horticulture, and who resided at least seasonally in circular to oval palisaded villages (George 1983a; Hart 1993; Johnson et al. 1989). There is a growing recognition among some scholars that the Monongahela culture is an artificial construct that likely bears little relation to an actual aboriginal group (Hart 1992, 1993; Hart and Nass 2002; McHugh 1984; Means 1999b; Raber et al. 1989), though this is not a universally accepted position (George 1980, 1994; Johnson 1993; Johnson et al. 1989:3).

A key component of the Monongahela culture taxon, the basic description of a “typical” Monongahela village site, was initially developed during the relief excavations. While providing employment was a major goal of the relief excavations, the project supervisor, Edgar Augustine, focused his efforts “. . . to reconstruct these houses of men who lived in a stone age” (Figure 3.2) (Augustine 1935). Augustine even attempted this task literally at the Fort Hill site, where some dwellings were reconstructed using a framework of poles placed in postholes uncovered by the archaeological investigations (Means 1998a:44). By the time the relief excavations ended in 1940, the basic elements found in the description of a “typical” Monongahela village site as it existed during much of the Late Prehistoric period had been excavated. An additional six decades of archaeological investigations have added a few additional elements to the basic definition of a Monongahela village site, which consisted of a circular to oval occupation zone that contained activity areas, dwellings, pits, burials, and other features, and which,

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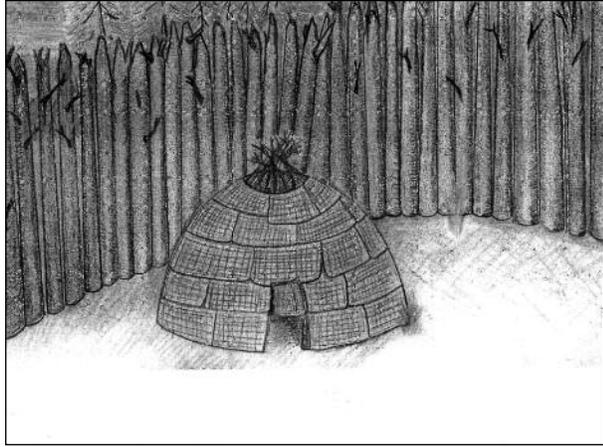


**Figure 3.1.** Village sites excavated in Somerset County between 1934 and 1940.

for most of the Late Prehistoric period, surrounded an open plaza area. Villages were frequently palisaded during most of the Monongahela sequence (Butler 1939; Cresson 1942; George 1974; Hart 1993; Johnson 1981; Johnson et al. 1989; Mayer-Oakes 1955).

While a large number of Monongahela village sites have been excavated over the last six decades, the archaeologically recovered aspects of most village layouts have not been examined within a theoretical framework that relies on anthropological and ethnoarchaeological studies of community organization. An understanding of community organization in the Upper Ohio Valley has been further hampered by widespread use of the overly broad Monongahela cul-

ture taxon. The Monongahela culture taxon subsumes a considerable amount of variation in the material expressions of cultural practices (Hart 1993; McHugh 1984; Raber et al. 1989:39), which differed over time and space. In particular, the use of the Monongahela culture taxon has led to an overgeneralization of similarities and a suppression of differences within and between village sites. Complex social relationships too often are reduced to a level of abstraction that has little explanatory value or are not considered at all. Further, the "typical" Monongahela village site described in the literature is actually a widespread, almost archetypal settlement form documented archaeologically and ethnohistorically throughout the Eastern Woodlands from



**Figure 3.2.** Artist's depiction of a Monongahela dwelling (illustration by Laura J. Galke).

New England and New York into Virginia and the Carolinas (Bushnell 1919; Griffin 1978:559).

This basic settlement form has been recorded ethnographically and archaeologically elsewhere in North America and throughout the world, including the camping circles once formed by some Native Plains groups during their annual buffalo hunts (Bushnell 1922:129; Dorsey 1884:215, 1894:523, 1897; Fletcher and La Fleshe 1911; Fraser 1968:20-21; Guidoni 1975:31-36; Lévi-Strauss 1953:528), and in villages located in New Guinea (Fraser 1968:31; Lévi-Strauss 1963a:136), Central Brazil (Bennett 1949:13; Fabian 1992:37; Gross 1979:329; James 1949; Lévi-Strauss 1953:528, 1963a:137; Lowie 1946a:383, 1946b:420, 1946c:482; Wüst and Barreto 1999), and Puerto Rico (Siegel 1997:109). In their examination of ethnographic and archaeological data from Central Brazil, Wüst and Barreto (1999) referred to the layout of village settlements that strongly resemble Monongahela village sites as “ring-shaped,” a term that will be adopted for the remainder of this paper.

It would seem there is little inherently Monongahela about the layout of a “typical” Monongahela village site. This does not mean that the village sites uncovered by the Somerset County Relief Excavations are unworthy of further consideration. Rather, the fact that the ring-shaped village is a basic settlement form that arose repeatedly and independently in different times and places suggests that the modeling of community organization from the archaeologically recovered remains of Monongahela village sites can lead to a greater anthropological understanding of small-scale societies in the Eastern Woodlands and elsewhere.

## IT TAKES A VILLAGE

The concepts of “village” and “community” are often conflated and treated interchangeably in the popular media and by some anthropologists and archaeologists. Therefore, it is important at the outset to define these concepts and how they are employed in this paper. Both the village and the community represent analytical constructs that vary in their scope and meaning depending on what questions researchers are asking and on the nature of the data at hand. Murdock’s (1949:79) definition of a community as “the maximal group of persons who normally reside together in face-to-face association” was once widely cited by archaeologists (Chang 1958:303; Wills and Leonard 1994:xv). One problem with this definition is that it applies principally to a residential group whose inhabitants occupy an aggregated or nucleated settlement. While tacitly accepting Murdock’s definition, Chang (1962:33-35) noted that many groups practice a form of seasonal mobility where they inhabit a nucleated settlement only part of the year and disperse into small camp sites the remainder of the year; but, at all times, they are members of the same integrated community. Communities that practice this form of seasonal mobility usually break into smaller groups that are based on social divisions existing within the nucleated settlement (Chang 1962:35). It is also possible to have communities that never aggregate into a single large settlement, but whose members are instead scattered among a number of smaller settlements that nonetheless have group consciousness and common interests (Chang 1962:29; Rice 1987:15). Fuller (1981a, b) distinguished between two types of communities: the nucleated community, in which all of its members live in a single settlement; and the dispersed community, in which multiple settlements compose a single community. The definition of community produced by Beardsley et al.’s (1956) study is sufficiently broad to encompass the nuances discussed here. They define the community “as the largest grouping of persons in any particular culture whose normal activities bind them together into a self-conscious corporate unit, which is economically self-sufficient and politically independent” (Beardsley et al. 1956:133). Using such a definition shifts the focus of community studies from a place or site to a human group (Chang 1962:33; Nelson 1994:1).

From a traditional perspective, a village might be defined as a discrete location on the landscape occupied by a local group forming a nucleated community. This traditional view, in which a village correlates

directly with a community, has a number of potential shortcomings. While the village itself might be recognized by the members of a community as being of central importance to maintaining the community and giving it an identity (Butt 1977:9; Fletcher and La Flesche 1911:198-217), not all members of a community necessarily reside within the village at any given time. In groups practicing a seasonal round, most members of the community would be expected to disperse part of the year to exploit seasonally available resources. However, some members might remain behind in the village due to infirmity, age, choice, or as guards (Bushnell 1922:103; Fletcher and La Flesche 1911:99). Thus, one can equate a village with a community only if the former is viewed in a very dynamic sense.

Given this, the layout of a village reflects the maximum ideal congregation of a community's members, and one which might only occasionally be realized. For small-scale groups such as those inhabiting Late Prehistoric southwestern Pennsylvania, most members of a community would likely inhabit a village consisting of several contiguous and contemporary dwellings arranged according to a preconceived plan (Chang 1958:303-305, 1962:33), though cases of single-dwelling villages are not unknown (Rivière 1995:189; Turner 1979:175). Chang's (1958:303) cross-cultural study of pre-urban agricultural villages in the New World indicates that villages with multiple dwellings also frequently have a chief's lodge and a communal locality, such as a plaza or a men's house. The presence of a communal locality or structure can prove useful in distinguishing a large hamlet (a residential settlement occupied by one or two families) from a small village (a residential site occupied by several families) (Butt 1977:6). The presence of a communal locality or structure indicates the need for the kinds of socially integrative institutions above the individual family level one would expect in a local group forming a self-conscious community. For a nucleated village community, the communal locality or structure will be coterminous with the village itself and, as will be shown later, can be a major factor influencing the planning and arrangement of the village.

### **BUILDING MODELS OF VILLAGE SOCIAL ORGANIZATIONS BASED ON VILLAGE SPATIAL ORGANIZATIONS**

The modeling of community organization from the remains of village sites follows from the premise that, in some circumstances, the layout of a village reflects

certain aspects of the social organization of the people who built and lived in it (Chang 1958, 1962:37; Fraser 1968:8; James 1949:109; Lea 1995:208; Lévi-Strauss 1953:533-534; Mindeleff 1902; Pearson and Richards 1994:3; Rapoport 1980a:289). This is particularly evident when the layout of a village shows regularity and patterning that was not created due to, or was created in spite of, topographic and other environmental constraints. In this paper, it is further argued that the layout of a village does not passively reflect social organizations, but actually plays an active role in their maintenance, perpetuation, and even creation (see Fabian 1992:46; Gregor 1977:35; Fletcher and La Flesche 1911:198). The configuration, or layout, of a village represents a strategy designed to integrate individuals into a social group or community (see Gross 1979:329; Hegmon 1989:5), while at the same time minimizing intragroup tensions that might disrupt the community (Gross 1979:337). As will be discussed later in this paper, ethnographically and ethnohistorically known ring-shaped villages were and are planned according to explicit and conscious geometric models—not infrequently with a cosmological basis—designed in reference to and intended to foster a village's social organizations (Fabian 1992:37; Fletcher and La Flesche 1911:138; Gregor 1977:35; Gross 1979:337; Guidoni 1975:36; James 1949:98; Lowie 1946a:389; Pearson and Richards 1994:12; Siegel 1996:313-324). In the definition of a "typical" Monongahela village (i.e., an occupation zone around an open central plaza), researchers have at least intuitively recognized that geometric models were used by Natives to plan villages.

Of course, various factors operating during the occupational history of a village may result in a layout that deviates from and obscures the Native models used in its initial planning, that is, the layout of a village may be modified in response to changes in group dynamics caused by new intra- or intergroup alliances, internal feuding, hostilities with neighboring villages, illness, accusations of adultery or witchcraft, increases or decreases in population, and so on (Bramberger 1979; Chagnon 1968; Dole 1966:74; Gross 1979:329-331, 1983:436-437; Maybury-Lewis 1979:312, 1989:107; Wüst and Barreto 1999:11). In addition to affecting the internal configuration of a village, these factors could cause a village to fission into two or more new settlements or, in extreme cases, lead its inhabitants to disperse and disband their community (Bramberger 1979; Gross 1983:435). Support for the assertion that a village's layout plays an active role in the maintenance, perpetuation, and even creation of

social organizations is drawn primarily from the literature on built environments (Hillier and Hanson 1980; Lawrence and Low 1990; Rapoport 1976, 1980a, 1980b, 1990a, 1990b, 1997) and the social and behavioral use of space (Kent 1987, 1990a, 1990b; Nass 1995; Oetelaar 1993; Portnoy 1981; Yellen 1977).

Ring-shaped (and other) villages arose around the world for various reasons, sometimes during a major shift in prehistoric economies toward a heavier reliance on agriculture. New economic arrangements led to new social arrangements as well. Unlike in earlier periods, when households were exclusively parts of dispersed communities, ring-shaped village settlements were discrete locations occupied by several households simultaneously. In the Upper Ohio Valley, the incorporation of maize into Native horticultural systems is seen as the main catalyst for the coalescing of scattered Late Woodland (A.D. 500 - 900) hamlets into Late Prehistoric Monongahela villages (Fuller 1980, 1981a, 1981b; Wymer 1993).

The interaction of multiple households in a nucleated community creates new opportunities and challenges that are not evident in dispersed communities. Eggan (1955:495) notes that social structures that integrate and organize small and scattered populations may be inadequate for larger and more concentrated populations. A village community represents a set of social groups that recurrently interact in interconnected sets of roles and that have internal organization (Keesing 1975:10).

Corporate descent first appeared in village-level societies as a way to deal with organizational challenges created when people began living in larger, more stable groups (Keesing 1975:16). Corporate descent groups often form in village communities as an adaptive solution to the problems of maintaining political order and defining rights over land and other resources across generations (Keesing 1975:18). This is a particularly important issue for horticulturists, who must move their village settlements once every generation, if not sooner, due to a variety of social and environmental factors (Bamann, et al. 1993:445; Chagnon 1968:118; Fenton 1951:39; Gross 1983; Jackson 1975:311; Wallace 1969:22). The establishment of new settlements is sometimes consciously recognized as an opportunity to alter village layouts to reflect changes in social relations (Fenton 1951:42; James 1949:56). When multiple descent groups inhabit a single settlement, each may be strongly corporate and form discrete areas within the settlement (Keesing 1975:41). This is because people in traditional societies most often choose where they live within a settlement based on social relation-

ships (Agorsah 1988:234-236).

Social relationships within a community often change over time (Agorsah 1988:234; Rocek 1995:3-5). The Late Prehistoric inhabitants of southwestern Pennsylvania and other similarly structured groups apparently had fairly flexible social arrangements and village settlements with fairly simple architectural elements (Flannery 1972:30; Means 1996; Wüst and Barreto 1999). Since the builders of a dwelling in a traditional village are frequently the individuals who use and maintain the dwelling, they can change the configuration, size, and location of their dwelling or build new dwellings as needed to meet changing social needs (Agorsah 1988:235-236; Eighmy 1981; McGuire and Schiffer 1983; Wüst and Barreto 1999:12).

Several researchers have argued that, at least for traditional societies, dwelling size correlates in some fashion to the number of people living within the dwelling and to different types of families, for example, nuclear versus extended (Chang 1958:303; Lea 1995:208). Nuclear families may have lived in smaller dwellings (Bennett 1949:2; Chang 1958:303; Watson 1978:141), as was characteristic of some Algonquian tribes of the Eastern Woodlands (Bushnell 1919:100). Larger dwellings may have been inhabited by extended or multiple families (Chang 1958:303; Guidoni 1975:48), with a classic example being the long communal dwellings, or longhouses, favored by the Iroquois (Bushnell 1919:100; Hayden 1977; Kapches 1990, 1994; Snow 1997) and some South American groups (Bennett 1949:2; Gregor 1977:57).

Household size varies along a number of parameters: mean household size is both culturally and regionally specific; within a specific region or culture, the average number of people per dwelling changes as communities increase in size; and mean household size changes through time as a function of typical family composition (Eighmy 1981:226). Wilk (1983:105) cautions that variation in a dwelling's size may not relate directly to the number of its occupants, but rather to ties of kinship or friendship that its builder draws upon to construct the dwelling. However, even if a dwelling is not built solely by its occupants, one can still argue for a correlation between a dwelling's size and the number of its occupants; a builder's ties of kinship and friendship are based in part on the builder's economic standing (Wilk 1983:108-113), which is related to the number of people living and working in the builder's household.

The apparent correlation between residential dwelling size and family type (nuclear versus extend-

ed) is by no means straightforward, since extended families can inhabit a cluster of smaller dwellings, rather than a single larger dwelling (Butt 1977:6; Wilk 1983:102). An extended family may build additional structures nearby when the original family dwelling becomes too crowded (James 1949:19; Wilk 1991:217). This is supported by ethnoarchaeological studies, which have shown that spatial proximity between dwellings usually indicates social proximity as well, suggesting that clusters or groupings of dwellings can represent residential corporate groups related along kin lines (Douglas and Kramer 1992:105; Wilk 1991:208-217).

Many village settlements in small-scale societies also have structures that are unusually large compared to residential dwellings within the settlement (Chang 1958:303). Other than being unusually large, these structures may be similar in design and construction to residential dwellings in the same village settlements (James 1949:54; Wallace 1969:22). These unusually large structures may function as a council house, a chief's lodge, or a men's house (Chang 1958:303; Fabian 1992:49; Wallace 1969:22).

Hayden and Cannon (1982) argue that individual households are difficult to define archaeologically and that one should instead look more generally for residential corporate groups: configurations of dwellings and associated features that represent the archaeological manifestations of cooperative economic or social groupings (see also Rocek 1995:10). Such a cluster may meet Ashmore and Wilk's (1988:6) definition of a household as a social unit that shares activities including production, pooling of resources, reproduction, and co-residence. Nonarchitectural features also concentrate around these clusters because, in traditional societies, mobilization of labor and access to goods is usually structured by kinship systems (Cobb 1993:47-48). Variation in the distribution of nonarchitectural features may indicate not only different economic, social, and reproductive strategies, but also differential economic success (Hart and Nass 2002).

Following from Johnson's (1978, 1982) discussion on information theory and scalar stress, a village consisting of more than about six households would likely need to form a level of suprahousehold decision making to remain stable; that is, a decision making level above individual households but below that of the entire village community would develop (see Lightfoot and Feinman [1982] for Southwestern cases). The development of suprahousehold decision making could be tied to the rise of sodalities, which cooperated not only for specific acts of ceremony and

labor, but in political decisions as well (Flannery 1972:47; Hill 1970:42-43). The heads of households would be likely candidates for suprahousehold decision-making roles, perhaps organized as a council or less formal network, since they already would be serving a similar role within their own households.

## **STUDIES OF MONONGAHELA VILLAGE ORGANIZATION**

Monongahela village organization has attracted the attention of a number of researchers. Fuller (1980, 1981a, b) explicitly considers the transition from dispersed hamlets to nucleated village communities, but does not expand on their respective social structures. Hart (1993) synthesized much of the extant data on the Monongahela and developed a sophisticated model on the sharing of risks related to the uncertainties inherent in following a horticultural lifestyle. While he discussed social organization to some degree, Hart's (1993) focus was on developing his divided-risk model to integrate hamlets and villages located in diverse ecological settings into a single subsistence-settlement system. Nass (1995) attempted to define discrete Monongahela activity areas at the Throckmorton (36GR160) village site, following approaches he used for his study of the Fort Ancient Incinerator site (Nass 1987, 1989). While not successful at delineating discrete activity areas, Nass' (1995) analysis suggests that household organization at this site was at the level of individual, independent households and not in clusters of dependent households. Hart and Nass have examined village layouts to explicitly consider aspects of village organization, particularly as related to the differential use of storage within and between village communities (see, notably, Hart 1995; Hart and Nass 2002; Nass 1995).

## **MODELING RING-SHAPED VILLAGE SPATIAL AND SOCIAL ORGANIZATION**

Approaches that focus on recognizing and defining individual household clusters through the distribution of features and artifacts within village sites are insufficient to interpret archaeological remains in terms of community organization. This is partly because the organization of activities and social relationships within and between households in any village community are directly influenced by the physical reality of the village itself—the architectural

elements of the village, the spaces they defined, and the pit features located in these spaces. Architectural elements in ring-shaped villages, which included dwellings, often an enclosing palisade, and sometimes post-enclosed features, can be envisioned as the three-dimensional manifestation of village community organization. Social space within ring-shaped villages ranged from the public space of the plaza, accessible to all, to the private, and relatively restricted, space within a dwelling. The social use of some spaces, such as the plaza, may have shifted throughout a year, depending on the scheduling of ceremonial and ritual events. Other spaces, such as those between or behind dwellings, were locations of semiprivate household activities that are represented in part by nonarchitectural features, including hearths, burials, palisade trenches, and other pit features, many of which were secondarily used for refuse disposal.

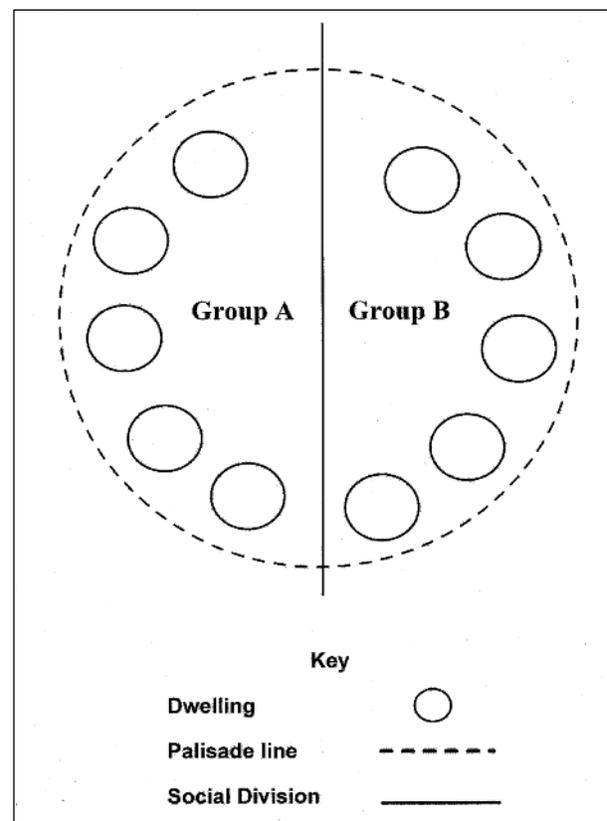
That an interrelationship exists between the physical layout of a village and social organizations within the community has long been recognized (Dorsey 1884, 1894, 1897; Fletcher and La Flesche 1911:137-138). For ring-shaped villages, village-wide planning principles exist that influence the organization of, and place certain constraints on, the intravillage patterning of architectural elements and social spaces. The distribution of individual architectural elements and the spaces defined by them are not simply an accumulation of economic, social, political, or ideological decisions made independently at the varying levels of social organizations present within a village (e.g., household, clan or lineage segment, moiety).

Fletcher (1977:64) argues that small-scale communities are most likely to use “a model of the horizontal dimensions of space” to structure the spatial layout of their settlements. Not surprisingly, given the *ring shape* of these villages, village-wide planning principles manifest as attempts to impose and maintain a geometric order on the layout of a village as it exists in a horizontal plane. In many societies that plan their villages according to geometric principles, the layout of the village itself is consciously created and interpreted by its inhabitants as an *imago mundi*, or image of the universe (Pearson and Richards 1994:12), forming a model of reality that ensures stability for the behavior of the group (Fletcher 1977:64).

Lévi-Strauss (1953:528, 1963a) recognizes the existence of village-wide planning principles that are geometric in nature. The layouts of some ring-shaped villages were socially and conceptually divided into two halves, each consisting of a separate moiety. In some cases, each moiety was divided into clans (and

even subclans) that paired on either side of the moiety line that divided the village in two (Lévi-Strauss 1963a:144, 1963b:128). Lévi-Strauss (1963a:146, 1963b:121) argues that the inhabitants of these ring-shaped villages were using conscious models of diametric dualism to configure the spatial organization of their villages in relation to these paired social organizations (Figure 3.3).

There is nothing intrinsic about a diametric model that relates to or accounts for the circular or oval shape of these settlements. Lévi-Strauss (1963b:135) proposes a second form of dualism, concentric dualism, that explicitly recognizes the radial or concentric structure inherent in ring-shaped settlements (Figure 3.4). Concentric dualism again is used as a conscious model by the inhabitants of ring-shaped villages to plan their settlements, and typically has an explicit ideological basis. The overall circular to oval form of ring-shaped villages may be related to cosmological associations, such as with the sun and moon (James 1949:34, 98) or the vault of the heavens (Gregor 1977:48). In addition,



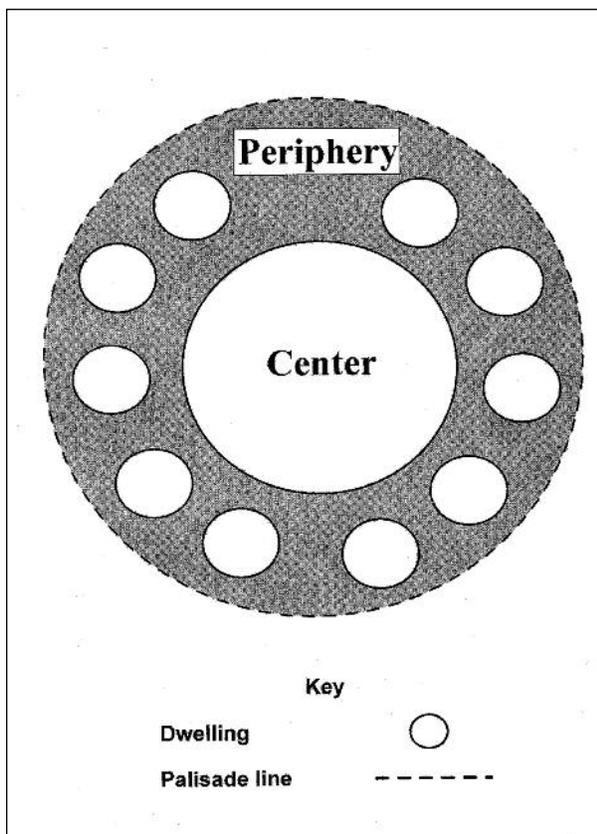
**Figure 3.3.** Diametric model of a ring-shaped village settlement.

the layout of the village as a whole may be seen as homologous to the plan of an ideal dwelling, with the entrance to the village compared to the doorway of the community's "home" (Fletcher and La Flesche 1911:137-138).

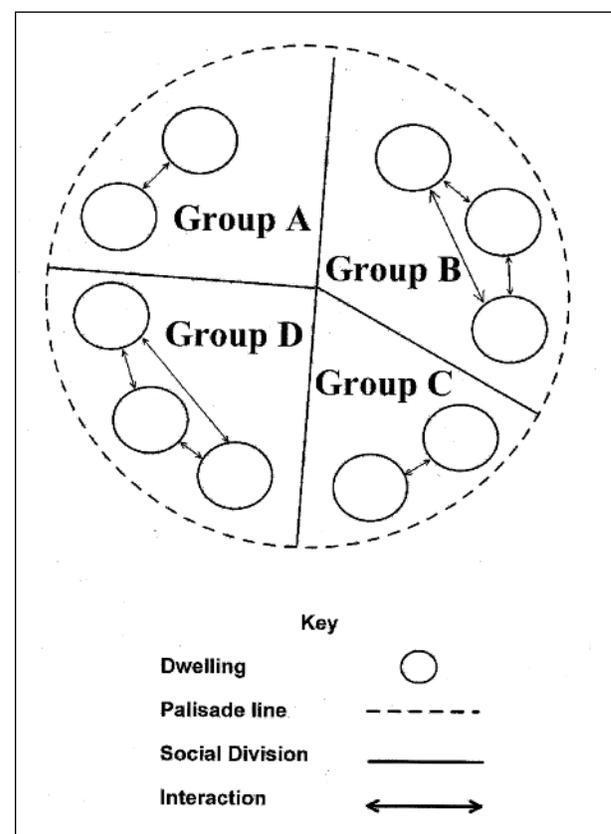
Settlements constructed according to models of concentric dualism usually have a centrally located open plaza area. Clearly, the plaza area is central to the spatial organization of ring-shaped villages not only because it has a sacred nature, but because its creation plays a central role in the establishment and planned layout of villages (Altman and Gauvin 1981:296). The plaza area in its entirety or a specific location within it may act as an *axis mundi*, or center of the world, linking the village to the cosmos. The attempts by villagers to replicate the *axis mundi* within their settlement could lead to the use of concentric models as a planning principle for ring-shaped villages (Pearson and Richards 1994:12; Siegel 1996:317). The *axis mundi* may take the form of a fire (Bushnell 1919:34, 58) or ritual post (Dorsey 1894:458) in the

plaza's center. Though they may operate on different levels, concentric models work in conjunction with, rather than in opposition to, diametric models as organizing principles for the layout of ring-shaped villages and the arrangement of social groups within them (Fabian 1992:63).

Dunnell (1983:147-148) points out that the distributions of activities and physical elements within ring-shaped villages (represented archaeologically by postholes, features, and artifacts) are not limited to concentric or radial patterning, but could also display circumferential patterning as well (Figure 3.5). In circumferential patterning, the components of a ring-shaped village are arranged along the circumference of its circular or oval occupation zone. The occupation zone may be divided into segments of equal or varying size, which Dunnell (1983:147) likened to pie "wedges." Lévi-Strauss' concept of a diametric model can be related to Dunnell's notion of circumferential patterning, if the binary division of a village is viewed as two "wedges."



**Figure 3.4.** Concentric model of a ring-shaped village settlement.

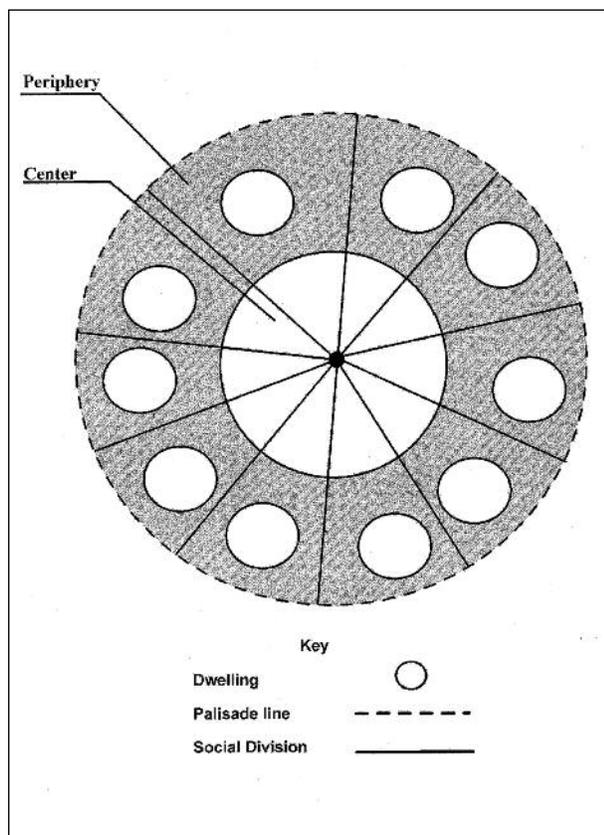


**Figure 3.5.** Circumferential model of a ring-shaped village settlement.

Diametric, concentric, and circumferential models can operate simultaneously or sequentially and on the same or different levels to influence the layout of a ring-shaped village from its initial establishment and throughout its occupational history. A general “hub-and-spoke” model has been developed that combines facets of these three models (Figure 3.6). The model’s name was inspired by one researcher’s observation that the Central Brazilian village of Ponto “. . . looks like a huge wheel, with the plaza at the hub and the spokes [paths] radiating to the houses which are on the circumference” (James 1949:27). In the hub-and-spoke model, the hub represents the central and sacred plaza and the spokes radiate out from the center to the periphery, which is the profane and domestic area. The spokes divide the periphery into a number of “wedges,” thus highlighting the existence of a circumferential model. The wedges can combine in different ways and on different levels as groups and subgroups of differing sizes form, depending on the strength of social, economic, and political ties. The

operation of a diametric model is evident if two major wedge groupings are present, which may include a variable number of subgroupings. The hub-and-spoke model is an heuristic construct designed to emphasize that the spatial layout of a village site must be examined in terms of diametric, concentric, and circumferential patterning.

Villages where households were fairly autonomous or linked informally are expected to have evenly spaced dwellings (see Nass 1995) and to have a fairly even distribution of pit features among the dwellings. Burial features, when present, will not form discrete clusters. Such a village would likely not have had a large enough population to have necessitated the development of suprahousehold organization. More formal economic, social, and political links between groups of households are inferable where dwellings are unevenly spaced and where dwelling size is more variable. Dwellings may form clusters within the village that represent discrete residential corporate groups that are linked along kin lines, as well as economic and political considerations. The number of dwellings, their size, and arrangement within such a cluster may suggest its social nature and measure its differential economic success compared to other such clusters. The presence of permanent, specialized, and bounded cemeteries within a village would probably indicate the presence of a corporate group structure in the form of a lineal descent system (Goldstein 1981:61). If the overall pattern of dwellings around a house ring is segmented into wedges (Dunnell 1983), each wedge could represent a different, lineage-based descent group or clan.



**Figure 3.6.** “Hub-and-spoke” model of a ring-shaped village settlement.

### SETTLEMENT AND SUBSISTENCE OVERVIEW FOR THE ALLEGHENY MOUNTAINS REGION OF THE LOWER UPPER OHIO RIVER BASIN

The majority of archaeological investigations in the Allegheny Mountains region of the Lower Upper Ohio River basin have occurred in an area coterminous with Somerset County, Pennsylvania, that is drained by the Youghiogheny and Casselman Rivers, which form a portion of the headwaters of the Ohio River Drainage system (Augustine 1938a:6; Flint 1965:14; Wall 1981:3). The Raystown Branch of the Juniata River, which is part of the Susquehanna River drainage, originates in Somerset County, as do several headwaters of the Potomac River (Flint 1965:14). This region’s geographic placement suggests that it

may have served as a crossroads between cultural developments occurring in different parts of the Northeast and Middle Atlantic regions.

Extensive excavations in the 1930s, 1970s, and 1990s completely or nearly completely revealed the community plans of more than a dozen Late Prehistoric villages, and tested several hamlet, rockshelter, and short-term resource procurement sites (Hart 1993; Means 1998a, 1998b, 2000b, 2000c, 2001; Means et al. 1998). Because of the premodern nature of the 1930s Somerset County Relief Excavations (e.g., prior to radiocarbon dating and the use of flotation) and the problematic nature of the chronology for the Gnagey No. 3 site (see below), our understanding of prehistoric subsistence economies for the early Late Prehistoric period and the preceding Late Woodland derives primarily from a series of CRM investigations in the vicinity of Meyersdale, Pennsylvania (Means 1998b). These investigations provide information from multiple localities along a small segment of the Casselman River and, in several cases, multiple components at individual localities. Despite the extensive nature of these CRM investigations, little macrobotanical evidence is available for periods predating the Late Prehistoric. Flotation recovery at six Late Woodland sites encountered evidence of edible wild seeds that appear to have been serendipitously gathered rather than intensively harvested (Raymer and Bonhange-Freund 1999:32). One of these six Late Woodland sites was interpreted to be a large ceremonial enclosure used over several centuries, extending back to the end of the Middle Woodland period (Coppock et al. 1998). The presence of taxa favoring edge zones at this site may have resulted from periodic clearing of this ceremonial enclosure and the timing of periodic gatherings “to coincide with the seasons of availability of these economically useful wild plants” (Raymer and Bonhange-Freund 1999:32). One other Late Woodland site may have been a gathering point for collecting nuts. The nature of the Late Woodland settlements and the macrobotanical remains could indicate that the local ecology was actively managed by the prehistoric inhabitants of the region to at least a limited degree (Raymer and Bonhange-Freund 1999:33).

Since radiocarbon assays for the Meyersdale CRM project were obtained from wood charcoal, all maize that was recovered from Late Prehistoric contexts in the region is indirectly dated by association. Maize was recovered from a hearth at the Railroad site that was conventionally dated to 1150±50 B.P. (cal 2σ A.D. 780 [890] 1000) (Boyd et al. 1998a), the earliest (albeit indirect) date for maize in the region. This site was initially

interpreted to represent a village site occupied over two centuries (Boyd et al. 1998a), but was reinterpreted as more likely representing a series of hamlets occupied repeatedly on a seasonal basis (Means 1999b:28) at least until the middle of the calibrated fifteenth century. This site has the latest documented maize remains in the region, dated by association with an assay of wood charcoal at 510±50 B.P. (cal 2σ A.D. 1325 [1425] 1460) (Boyd et al. 1998a). The large number of maize cobs used opportunistically for fuel throughout the occupation at this site suggests that a primary function was the intensive harvesting of maize and the removal of kernels for transport elsewhere (Raymer and Bonhange-Freund 1999:5). Also recovered from the site were 1 domesticated sunflower achene; a possible maygrass seed; 3 edible herbs; cucurbit rind fragments (probable gourd and unidentified squash/gourd rind); seeds from 17 fruit-producing trees, shrubs, and vines; and walnut and common bean residue on sherd fragments, the latter found in an undated feature context (Raymer and Bonhange-Freund 1999:4; Newman 1998:5).

The earliest confirmed date for maize and for a definite village site is 1080±70 B.P. (cal 2σ A.D. 800 [985] 1115) at the Petenbrink site. No distinct evidence for a palisade was encountered at this site, though an overlying occupation may have obliterated all traces of a palisade (Boyd et al. 1998b). Macrobotanical data for this site are otherwise limited because of poor preservation probably related to Native disposal into a conveniently located nearby stream and intensive modern farming practices (Raymer and Bonhange-Freund 1999:10). Excavations at Pony Farm Triangle East, a possible village site, encountered a storage feature below more than 2 meters of historic fill. Containing the largest quantity of maize from a single context in the region, and evidence for the cultivation of sunflower (Raymer and Bonhange-Freund 1999:8), this storage feature was dated to 770±60 B.P. (cal 2σ 1175 [1270] 1305) (Means and Fischler 1998). In contexts suggesting that they were consumed and not cultivated on site, maize was also recovered in small quantities from one camp or hamlet (Raymer and Bonhange-Freund 1999:25) and one rockshelter site — the latter in a mixed context (Raymer and Bonhange-Freund 1998). In total, the Meyersdale CRM project recovered maize from contexts dated to the calibrated tenth through fifteenth centuries in village and nonvillage contexts.

Maize has also been recovered from largely undated or poorly dated contexts at the nearby Gnagey No. 3 (Blake and Cutler 1983) and Peck No. 2 (Augustine 1937) village sites, as well as other village sites in the

region, including Reckner (Augustine 1938a:8), Emerick (Augustine 1938a:10, 1938b:42), Powell No. 1 (Augustine 1938c:62), Fort Hill (Augustine 1939a), and Quemahoning (George 1983b:93-97). The conclusion that the Late Prehistoric inhabitants of the Meyersdale vicinity were intensive maize horticulturists who supplemented their diet with cultivated sunflower and squash, seasonally available fruits, edible wild seeds, and hunting (Raymer and Bonhange-Freund 1999:34-35) might possibly be extended to all Late Prehistoric village sites in the region.

However, Raymer and Bonhange-Freund's (1999:34) conclusion that beans were an important dietary staple throughout this period has been challenged through direct AMS dating of beans, as detailed in Hart and Scarry (1999) and Hart et al. (2002). Their research shows that the common bean does not become prevalent on sites in the Northeast until after the end of the calibrated thirteenth century. This direct AMS dating has also led to a reconsideration of the occupational history of the Gnagey No. 3 site, once viewed as the earliest dated nucleated village in the region (George 1983a). In conjunction with the AMS dating of beans from this site (Hart and Scarry 1999), a review of the full suite of radiocarbon assays originally obtained from the site in the 1970s (Means 1998b) in terms of stratigraphic evidence and a reconsideration of the community patterns of the overlapping components (Means 2001) suggests that the first component dates to the second half of the calibrated thirteenth century and the second component dates to the first part of the calibrated fourteenth century. The proposed revised chronology for the Gnagey No. 3 site indicates that the lack of a central plaza in the first component cannot be attributed to this component representing an early village, especially since the early component at the Petenbrink village site does have a central plaza. This issue will be returned to in the Conclusions section of this chapter. Given the existence of a nonresidential ceremonial enclosure used throughout the Late Woodland period and the first part of the early Late Prehistoric period in the Meyersdale area as an integrative facility for dispersed camps and hamlets (Coppock et al. 1998), the presence of a central plaza at the first component of the Petenbrink village site suggests that the first villagers in the region recognized the importance of incorporating a socially integrative facility into their nucleated settlement.

The settlement history for the remainder of the Late Prehistoric period in the Allegheny Mountains region is unclear due to the paucity of radiocarbon assays for the majority of village sites excavated in the region.

Since Hart and associates have amassed such strong evidence that the timing of the adoption of the bean dates to no earlier than the end of the calibrated thirteenth century, we can use this information as a relative chronological indicator and assume that sites with beans date to after that period. However, the lack of beans documented at many sites may not result from their absence, but rather the fact that all contexts were not sampled or that, for many sites excavated in the premodern era, no flotation samples exist and the recovery of beans was fortuitous.

The following summary is based largely on a re-reading of Hart (1993), Means (1996, 1998a, 1998b, 1999, 2000b, 2000c, and 2001), Means et al. (1998), and Raymer and Bonhange-Freund (1999) in the context of ideas presented throughout this volume. By the end of the calibrated tenth century, if not earlier, nucleated settlements arose in the region as socially integrative facilities and multiple households became congruent within a single settlement. Hamlets and seasonally occupied specialized procurement camps continued to be used after the first villages arose, with the functions of some remaining unchanged. The location of some of these nonvillage sites at the boundaries of two or more ecotones suggests that they were placed to maximize the exploitation of wild resources and probably were part of a divided-risk strategy (see Hart 1993) that was continued and intensified after the cultivation of maize began. Maize may have been cultivated first at small hamlets that continued to function as harvesting centers after the rise of nucleated villages, though the evidence for this is equivocal at best. Perhaps in conjunction with increasingly complex social groupings, considerably larger villages appeared during and after the calibrated thirteenth century. Peck No. 1 apparently increased in size from the absorption of single-household hamlets that formed and maintained discrete clusters in the village's layout (Means 1998a). One of the larger villages in the region, the second occupation at Peck No. 2, has a relatively complex community pattern, and may date to after the calibrated thirteenth century, based on the recovery of beans from a single feature. This component has evidence for two large dwellings with a communal function (Hart 1993), segmentation of the house ring including the development of a discrete courtyard grouping (Means 1998a, 2001) and a discrete cemetery that may have been associated with a lineage group (Means 1999b). Other sites with similar discrete cemeteries include Gnagey No. 3, Reckner, Powell No. 1, and Troutman (Means 1999b).

Perhaps representing daughter settlements from larger communities, comparatively small villages are

seen throughout the Late Prehistoric period. Hart (1993) has already commented on this latter pattern, along with an apparent increase in the use of attached and detached semisubterranean storage facilities (Hart 1993, 1995). Overlapping hamlet and village components at several sites suggest that settlement movement was circumscribed, perhaps due to increasing notions of territoriality and the recognition of a sense of place. Finally, though it has been argued that the region was abandoned after A.D. 1250, clear evidence of settlement and the cultivation of maize is found in the Meyersdale area through the end of the calibrated fifteenth century. However, it is possible that village sites were abandoned at this time by aboriginal inhabitants of the region in favor of dispersed hamlets that continued to cultivate maize.

### FORT HILL VILLAGE SITE

The village sites excavated during the Somerset County Relief Excavations are ideal for the task of modeling village community organization, because their layouts were completely or nearly completely exposed. The majority of excavated village sites in the Eastern Woodlands are not suitable for model building because only a small portion of their community

plans were exposed, usually revealed through relatively small and discontinuous excavation blocks. Too many uncertainties would be generated if village layouts were projected from the excavated portions of this latter group of sites.

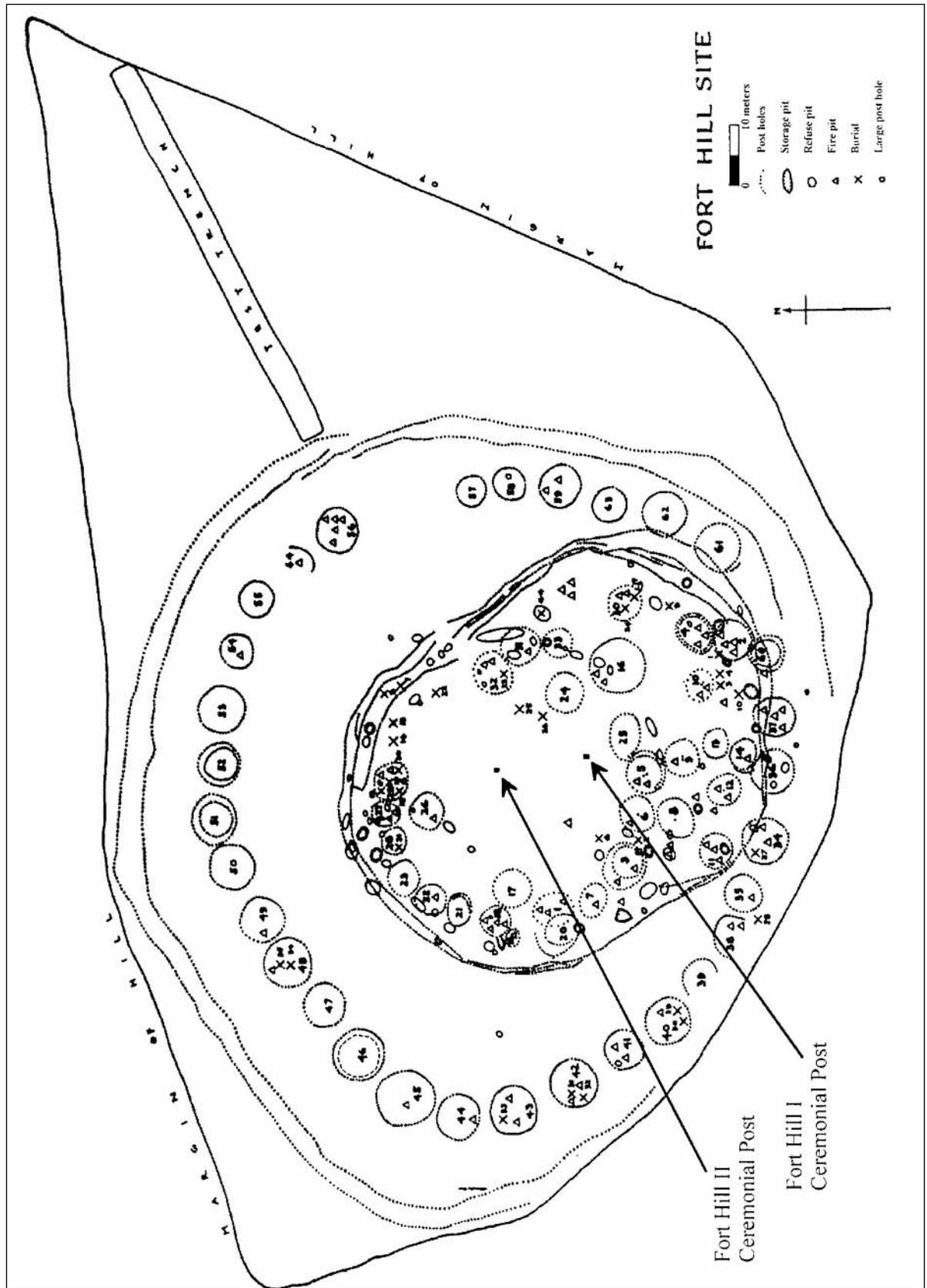
One village site investigated by the relief excavations will be examined here with respect to aspects of the general model of ring-shaped village community organization. In 1939 and 1940, a WPA field crew conducted excavations on Fort Hill, a mesa-like hill near Confluence that is one of the lesser peaks of Negro Mountain (Figure 3.7) (Augustine 1939a, b, 1940:51). They encountered two superimposed Late Prehistoric Monongahela village components on the summit of Fort Hill, which they collectively designated the Fort Hill (36SO2) site (Figure 3.8). The larger component, referred to here as Fort Hill II, covered most of the summit of Fort Hill, while the smaller component, Fort Hill I, was almost completely situated within the larger component's plaza.

### Topographic and Environmental Setting

An examination of Fort Hill and its immediate vicinity in terms of select topographic and environmental variables indicates that this imposing location was quite suitable for settlement by a village community



**Figure 3.7.** View of Fort Hill and its immediate surroundings (photograph courtesy of The State Museum of Pennsylvania, Pennsylvania Historical and Museum Commission).



**Figure 3.8.** Map of Fort Hill (36SO2) adapted from Cresson (1942). Possible ceremonial post locations indicated for Fort Hills I and II.

during the Late Prehistoric period. Clearly, Fort Hill is an ideal setting from a defensive perspective. The surrounding landscape is visible for kilometers in all directions from Fort Hill, and its steep sides would have made ascent difficult for anyone with—or even without—a hostile intent (Augustine 1939a:3). Except from the south, the smaller component would have been virtually invisible from the base of Fort Hill. Perhaps intentionally, the larger component would have been more readily visible from all directions. The palisade for Fort Hill II may have been purposely constructed along the edge of the summit to make the village appear larger than it actually was to outsiders and therefore, a more imposing feature on the landscape. In this manner, the inhabitants of Fort Hill II would have discouraged hostile attacks from anyone traveling through the area.

The summit of Fort Hill has well-drained soils with good potential for cultivation (Yaworski 1983:41), and it was an agricultural field at the time of the WPA excavations (Augustine 1939a:4). It is certainly conceivable that agriculture was practiced to some extent on this hilltop by its Monongahela inhabitants. The presence of each village component with its associated architectural remains, as well as spaces set aside for non-agricultural purposes, would have restricted the amount of land available for cultivation. Small garden plots could have been maintained throughout Fort Hill, especially on its eastern point, where no signs of prehistoric habitations or features were found. Freshwater springs located on the eastern and western slopes of Fort Hill (Augustine 1940:51) would have been a ready source of water for drinking, cooking, bathing, and, perhaps, for the maintenance of small garden plots. The majority of the fields needed to support the Late Prehistoric inhabitants of Fort Hill would likely have been spread throughout the surrounding countryside, where there are a limited number of discrete and noncontiguous areas suitable for cultivation (Yaworski 1983:41). These relatively level areas include a 0.8 kilometer-long ridge 61 meters below the summit of Fort Hill that was planted in maize when the WPA excavations were conducted (Cresson 1942:21).

In addition to scattered areas suitable for agriculture, the Monongahela inhabitants of Fort Hill had access to several other microenvironments located in close proximity. While the steep sides of Fort Hill and most of the surrounding hills are not well suited for any form of agriculture, they have a good potential for a variety of wild floral and faunal resources (Yaworski 1983:44,131-132). Additional resources are available along two permanent streams that are almost equidistant from Fort Hill: the Casselman River, 0.6 kilometers to the north;

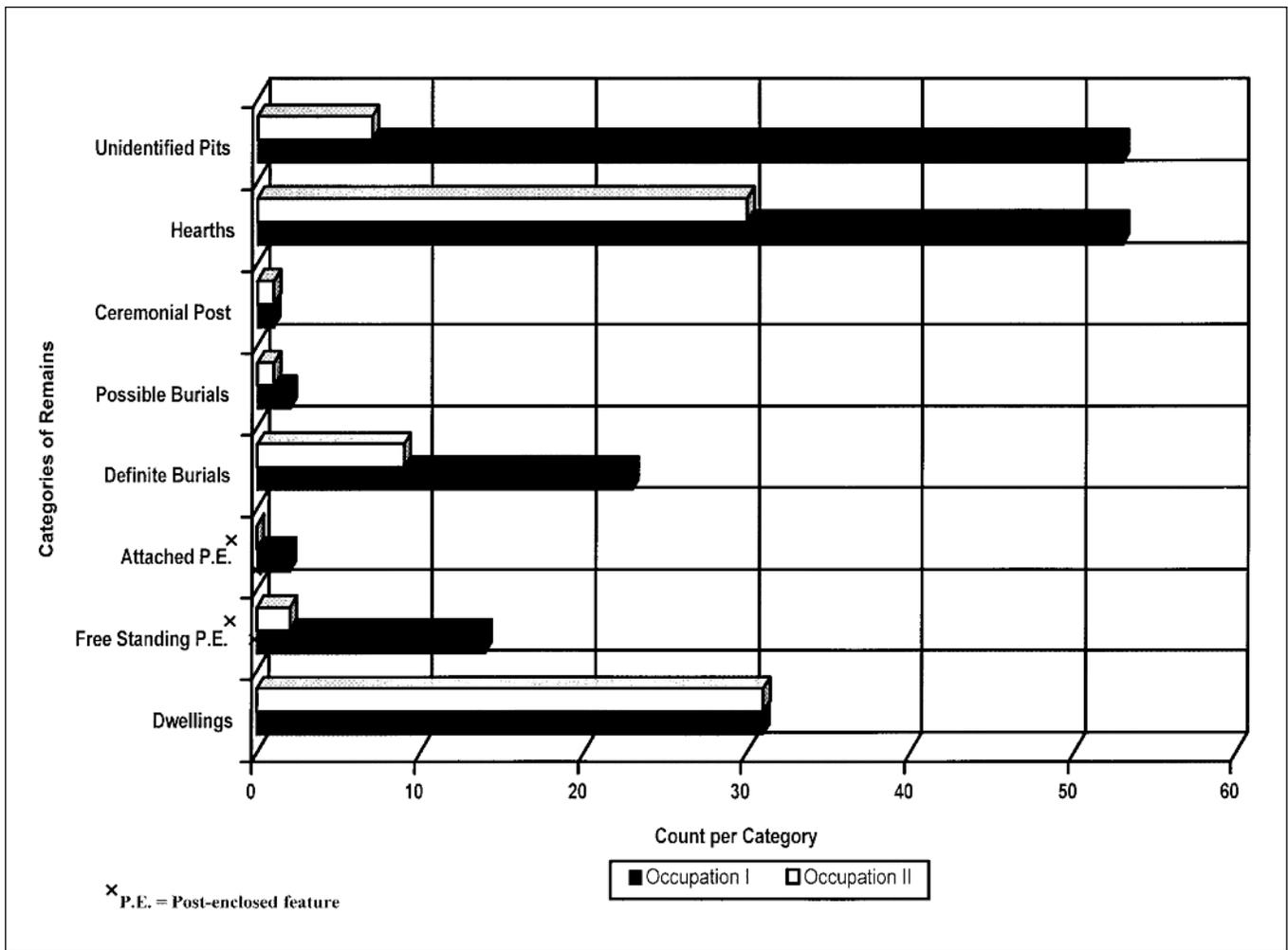
and McClintock Run, approximately 0.5 kilometers to the south. The presence of a bone fishhook at Fort Hill (Augustine 1939b) suggests that fishing supplemented the gathering of wild plants, the hunting of wild animals, and the cultivation of domesticated crops. It seems likely that the Late Prehistoric inhabitants of Fort Hill met the challenges of following a horticultural lifestyle by practicing a divided-risk strategy, as described by Hart (1993).

## Overview of Fort Hill I and Fort Hill II

The following overview of the two components at Fort Hill is based on a review of field records and unpublished documents located in The State Museum of Pennsylvania and a single short published article (Augustine 1939a, b, 1940; Cresson 1942). It should be briefly noted that a review of all the sites investigated as federal relief projects in Somerset County revealed that these sites were excavated and documented following standardized procedures not unlike those employed by much more recent excavations in Pennsylvania and elsewhere (Means 1998a). A number of discrepancies between published and unpublished sources on Fort Hill were reconciled by thoroughly examining the site map included with Cresson (1942) and reanalyzing field records, which contain information on the locations, dimensions, and contents of architectural and nonarchitectural features. This task was particularly important for developing an understanding of the occupational history of each individual component and their temporal relationship with respect to each other.

Fort Hill I was an oval, palisaded village site that enclosed several dwellings, which in turn demarcated an open plaza that was not centrally located within the village site. Several of the dwellings and the palisade itself show evidence for rebuilding. Dwellings seem almost haphazardly distributed around the plaza within Fort Hill I. Almost paradoxically, Fort Hill II, while larger, had a much simpler community pattern than Fort Hill I. Fort Hill II was apparently built to have the maximum possible dimensions, given the constraints of the mesa-like summit and the villagers adherence to a circular to oval settlement model. The house ring associated with the larger component consisted of a single row of houses surrounding a fairly large plaza area. Only three dwellings in the larger occupation show evidence for rebuilding and the proliferation of postholes seen at other Somerset County village occupations was not present in the larger occupation.

Though Fort Hill I was smaller than Fort Hill II, it



**Figure 3.9.** Architectural and nonarchitectural remains at Fort Hill.

had a greater number and a greater variety of architectural and nonarchitectural remains (Figure 3.9). While Fort Hills I and II each had 31 dwellings, Fort Hill I had more architectural remains in the form of 16 post-enclosed storage features, 2 of which were attached to dwellings. Fort Hill II had only 2 post-enclosed features, neither of which were attached to dwellings. Fort Hill I had more hearths (n=53) and more pits (n=53) of unidentified function than Fort Hill II. Of the 32 definite and 3 possible burials at Fort Hill, 23 definite and 2 possible burials were associated with Fort Hill I. The majority of burials represented infants and children, though a few adult burials were also encountered. Fort Hills I and II also each had a single feature that might have represented ceremonial posts (Figure 3.10). Cresson (1942:22) suggested that, overall, these data indicate that Fort Hill II was inhabited for a much shorter period of time relative to Fort Hill I.



**Figure 3.10.** Possible ceremonial post at Fort Hill I (photograph courtesy of The State Museum of Pennsylvania, Pennsylvania Historical and Museum Commission).

## Material Culture Recovered from Fort Hill I and Fort Hill II

Only a cursory examination has been made by the author of artifacts from Fort Hill, and therefore they cannot yet be linked to specific contexts within either Fort Hill I or II. Instead, this discussion of material culture relies largely on available published and unpublished sources. The artifact classes and types one would expect at a Monongahela site were recovered from both components at Fort Hill. The lithic tools were dominated by 35 triangular projectile points. Also recovered from the site were a bone fish hook and several bone awls, ground and pecked stone made into pestles, mullers, grooved axes and chunky stones, and items of adornment in the form of perforated teeth and stone and shell pendants. Stone and pottery tobacco pipes were also recovered (Augustine 1939b). The majority of ceramics were cordmarked and limestone tempered, followed in quantity by plain limestone-tempered ceramics. A smaller number of plain and cordmarked shell tempered ceramics were also recovered (Cresson 1942:108). George (1983:68) examined prehistoric ceramics from Fort Hill in collections maintained by The State Museum of Pennsylvania. He argued that the Fort Hill ceramics were identical to those recovered from the Gnagey No. 3 (36SO55) site, located further to the east in Somerset County.

## VILLAGE SPACE AT FORT HILL I AND FORT HILL II

Because some aspects of this analysis are still in a preliminary stage, the remainder of this discussion focuses on the types of spaces within each village component that were demarcated by palisade and dwelling postholes. Therefore, with a few exceptions, nonarchitectural features at either component are not mapped into the spaces defined by these architectural elements. While they also represent architectural remains, the spaces contained within post-enclosed features are not incorporated into the present analysis, since they represent a relatively small fraction of the total settlement area in Fort Hill I and are virtually absent in Fort Hill II.

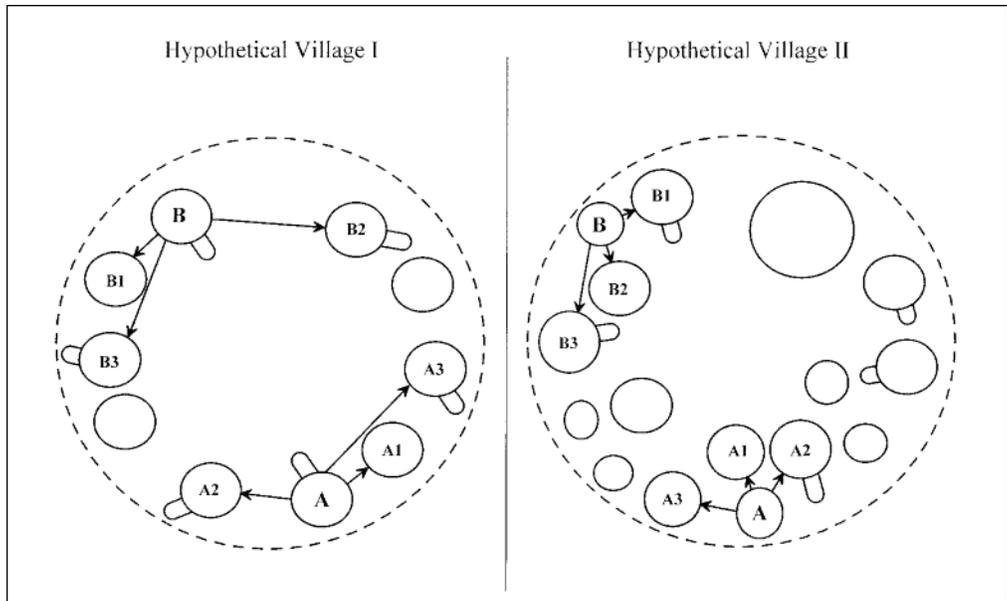
### Variables and Methods

The initial step in the analysis of the two components at Fort Hill was to translate the survey coordi-

nates used to record locational data into Cartesian coordinates that could be plotted using mapping software. Computer-assisted design (CAD) software was then used to measure the areas of various spaces created by the distribution of architectural elements, including the floor area of each dwelling, the area of the plaza, and the total village space demarcated by the encircling palisade.

The same CAD program was used to determine the geometric centers of each entire village component and their respective plazas, as well as to measure the distances between dwellings. The distance between any one dwelling and another was measured using the postholes associated with each dwelling, rather than from the geometric center of one dwelling to another. This approach was considered to more accurately reflect that these postholes represent remnants of once-standing structures. It is important to keep in mind that a two-dimensional map of a village layout depicts what was once a three-dimensional village settlement, where architecture played a role in shaping interaction between villagers. As Fritz (1978:40) noted, "One moves toward, around, through architecture and in so doing experiences changing morphologies and relationships."

The distance between a dwelling and its first "adjacent" neighbor was always measured as the shortest distance between adjacent dwellings. For Hypothetical Villages I and II in Figure 3.11, dwelling A's first "adjacent" neighbor is A1 and B's closest neighbor is B1. Deciding what to measure as a dwelling's second "adjacent" neighbor was less straightforward. Because ring-shaped villages are planned according to a circular to oval model, most dwellings are placed in reference to other dwellings located along the circumference of a circle or oval. Ideally, a dwelling's second "adjacent" neighbor was measured along the circumference of the occupation zone, thus more accurately reflecting how dwellings were placed with respect to one another. In Hypothetical Village I, B2 is the second "adjacent" neighbor to B as measured around the circumference of the village, though in reality B3 is B's second closest neighbor. In cases where dwellings are arrayed in a more amorphous pattern around the central plaza, as in Hypothetical Village II, a dwelling's second "adjacent" neighbor was measured as its second closest neighbor. A dwelling's third "adjacent" neighbor was defined as the closest dwelling that was not defined as its first or second "adjacent" neighbor using the criteria outlined above.



**Figure 3.11.** Measuring distances in ring-shaped villages. Arrows represent distances being measured.

### Results of Analysis

**Fort Hill I.** Fort Hill I had a maximum total settlement area of 4142.0 square meters. The plaza was the largest single space within Fort Hill I and, at approximately 1137.7 square meters, accounted for 27.5 percent of the total settlement area. Both direct and indirect evidence indicate that the plaza was once much larger. For a settlement built conforming to a circular or oval geometric model, one would expect the space set aside for the plaza to be more uniformly and centrally distributed. In most ring-shaped village settlements, the plaza is central to the ideology of its inhabitants; their dwellings would have initially been placed around an open and cleared area, thus generating and creating the plaza. The plaza area at Fort Hill II was certainly more uniformly and centrally distributed in relation to its total settlement space. While the geometric center of the plaza in Fort Hill I was almost 12.2 meters from the geometric center of the village component, a possible ceremonial post was only 3.7 meters from the village component's geometric center (Table 3.1). The post would have been ideally situated for ceremonial activities that occurred within a larger, more centrally distributed plaza. Presumably, settlement growth, either internally or through the influx of new members, led to the construction of additional

dwellings that encroached upon and reduced the overall size of the plaza and its central place within the village site. Even if this scenario is correct, the plaza at Fort Hill I retained an essentially circular shape throughout the component's occupation.

Collectively, dwelling floor area in Fort Hill I accounted for 834.5 square meters, or 20 percent of the total settlement area. Dwelling floor area steadily increased from the smallest dwelling at 15.3 square meters to the second largest dwelling at 38.7 square meters (Table 3.2) (Figure 3.12). However, there was an abrupt increase in floor area between the second largest dwelling and the largest dwelling. House 16, the largest dwelling in Fort Hill I, had a floor area of 67.1 square meters. The difference in floor area between the largest and second largest dwelling is slightly greater than the difference between the smallest dwelling and the second largest dwelling. As discussed earlier, the sizes of all but the largest structure are probably related to the number of occupants in the household and/or their economic and social standing within the village. House 16, on the other hand, was likely not a family residence, but rather functioned as a men's house/council house. It may have been built when the population of Fort Hill I increased to a size where a special structure was needed to house a growing number of unmarried men. The construction

**Table 3.1.** Intra- and Intercomponent Distances (meters) at Fort Hill.

Location	OCCUPATION I			OCCUPATION II		
	Village Center	Plaza Center	Ceremonial Post	Village Center	Plaza Center	Ceremonial Post
Occupation I	Village Center	11.83	3.66	20.24	14.23	12.16
	Plaza Center	0	14.72	8.41	4.48	5.03
	Ceremonial Post	3.66	0	23.10	17.59	15.67
Occupation II	Village Center	20.24	23.10	0	7.59	10.21
	Plaza Center	14.23	17.59	7.59	0	2.65
	Ceremonial Post	12.16	15.67	10.21	2.65	0

of a men's house within what was once a larger plaza area would have been consistent with the plaza functioning as a largely male domain, as has been recorded in Central Brazilian ring-shaped villages (Maybury-Lewis 1989:101). If the men's house also functioned as a council house, it would have represented the formal development of a level of suprahousehold organization between the heads of households within the village. This level of decision making may have developed in part as a response to scalar stresses caused by increases in population and corresponding increases in crowding. Following from Gummerman (1994:9), a viable village community could only have been maintained as population size and density grew if social organizations were modified or developed to accommodate increased interaction by larger numbers of people. Otherwise, cooperation and decision making within a village community would have degenerated.

Two areas within Fort Hill I each account for approximately 5 percent of the total settlement area. Both are located adjacent to House 16 and may have been related to its function as a men's/council house. One area to the southwest of House 16 represented a space whose access was restricted to the dwellings that surrounded it on all sides. This area resembles a potential courtyard group recognized at Peck No. 2, another village site in Somerset County (Means 1998a:58-59). It would have been created as dwellings encroached onto the original space set aside for the plaza within Fort Hill I. A second area located to the east of House 16 may have been set aside for specialized, possibly ritual activities during the entire period that Fort Hill I was occupied. This is suggested by the fact that (1) no dwellings were constructed here during the initial planning of the village or at any subsequent time in its occupational history; and, (2) the area is devoid of features except for three hearths that form a tight cluster. This is a somewhat tentative scenario, as no ritual or ceremonial items are known to have been found in this area and it is not clear if the three hearths were contemporaneous. This cluster of hearths is due east of the central post and may have been used in ceremonies to celebrate and acknowledge the vernal or autumnal equinox. Such ceremonies would have acted to reinforce the social order which, at least initially, may have been arrayed within the village according to geometric models that had a cosmological basis (Means 2001).

The remaining 43 percent of total settlement space in Fort Hill I was largely distributed unevenly and as fairly small spaces between adjacent dwellings or between dwellings and the surrounding palisade. These spaces are difficult to define and quantify, so the spacing

**Table 3.2.** Descriptive Statistics for Floor Area (square meters) of Dwellings at Fort Hill

Statistic	Occupation I	Occupation II
Range	15.29 - 67.07	21.24 - 68.45
Mean	26.90	38.69
Median	25.97	40.48
Standard Deviation	9.82	11.52

between dwellings was used as a proxy measure for characterizing the size and distribution of these smaller spaces. The spacing between dwellings can also be used as an indicator of the degree of crowding within a village settlement and of the strength of social and economic ties between households. The distances between each dwelling and its first “adjacent” neighbor were quite variable, ranging from 0.2 meters to 3.2 meters, though the majority of dwellings were within 1.5 meters of one another (Table 3.3). There is also considerable variation in the distance between each dwelling and its second “adjacent” neighbor, ranging from 0.5 to 7 meters, and its third “adjacent” neighbor, ranging from 1.5 to 11.6 meters. However, these three distance measures do not show a proportionate increase relative to each dwelling. That is, the distance of each individual dwelling to its second “adjacent” neighbor sometimes showed a slight increase over the distance to its first “adjacent” neighbor or was much greater. A similar pattern holds true for the distance between an individual dwelling and its third “adjacent” neighbor. Most dwellings within Fort Hill I were generally, but not always, very close to at least one other dwelling. Several households intentionally built their dwellings closer to one another than absolutely required by the limited amount of available occupational space, probably forming cooperative economic and social groups that manifested along kin lines. The degree of crowding within Fort Hill I is a relative measure best assessed in comparison to Fort Hill II.

**Fort Hill II.** Since part of Fort Hill II has eroded away, the outer palisade line was extrapolated to estimate its total maximum settlement area at 13,032 square meters. The single largest space within Fort Hill II was the plaza, which, at 6883.6 square meters, accounted for 53 percent of the total settlement area. The geometric center of the plaza was only 7.6 meters from the geometric center of the village component (Table 3.1). This distance is quite small relative to the maximum dimensions of both the plaza, 98.3 meters by

85.7 meters, and the entire village component, 135.5 meters by 121.8 meters. A possible ceremonial post that was located within Fort Hill I’s plaza and 5 meters from its center was only 2.7 meters from the center of Fort Hill II’s plaza, supporting Cresson’s (1942:23-24) assertion that this feature was associated with Fort Hill II.

In Fort Hill II, the total maximum dwelling floor area of 1241.4 square meters was estimated, because two dwellings were partly destroyed by erosion and one dwelling was partly obliterated due to modern farming practices. This represented approximately 10 percent of the total settlement area. Dwellings ranged in floor area from 21.2 square meters to 68.5 square meters, with all but two dwellings having a floor area less than 53.1 square meters (Table 3.2) (Figure 3.12). Dwelling floor area increased almost continuously from the smallest dwelling to the third largest dwelling, with the exception of a slight break at around 30.7 square meters. Pronounced abrupt increases in this range are noticeable between the third and second largest dwellings and the second largest and the largest dwellings. Until the second largest dwelling in Fort Hill II was expanded from its original size of 46.8 square meters to 60.7 square meters, the size difference between the largest dwelling and the next largest dwelling would have been more pronounced. As with the largest dwelling in Fort Hill I, the largest dwelling in Fort Hill II may have functioned as a men’s house/council house.

Other than the plaza and the space contained within each dwelling, there were no other discretely bounded areas within Fort Hill II. While destruction by erosion makes it difficult to estimate, the space between the two palisade lines minimally encompassed 1029.7 square meters, or at least 7.9 percent of the total settlement area. A larger portion of the total settlement area occurred in an arc between several dwellings and the inner palisade line. At 1619.6 square meters, this space behind these 17 dwellings represented 12.4 percent of the total settlement space,

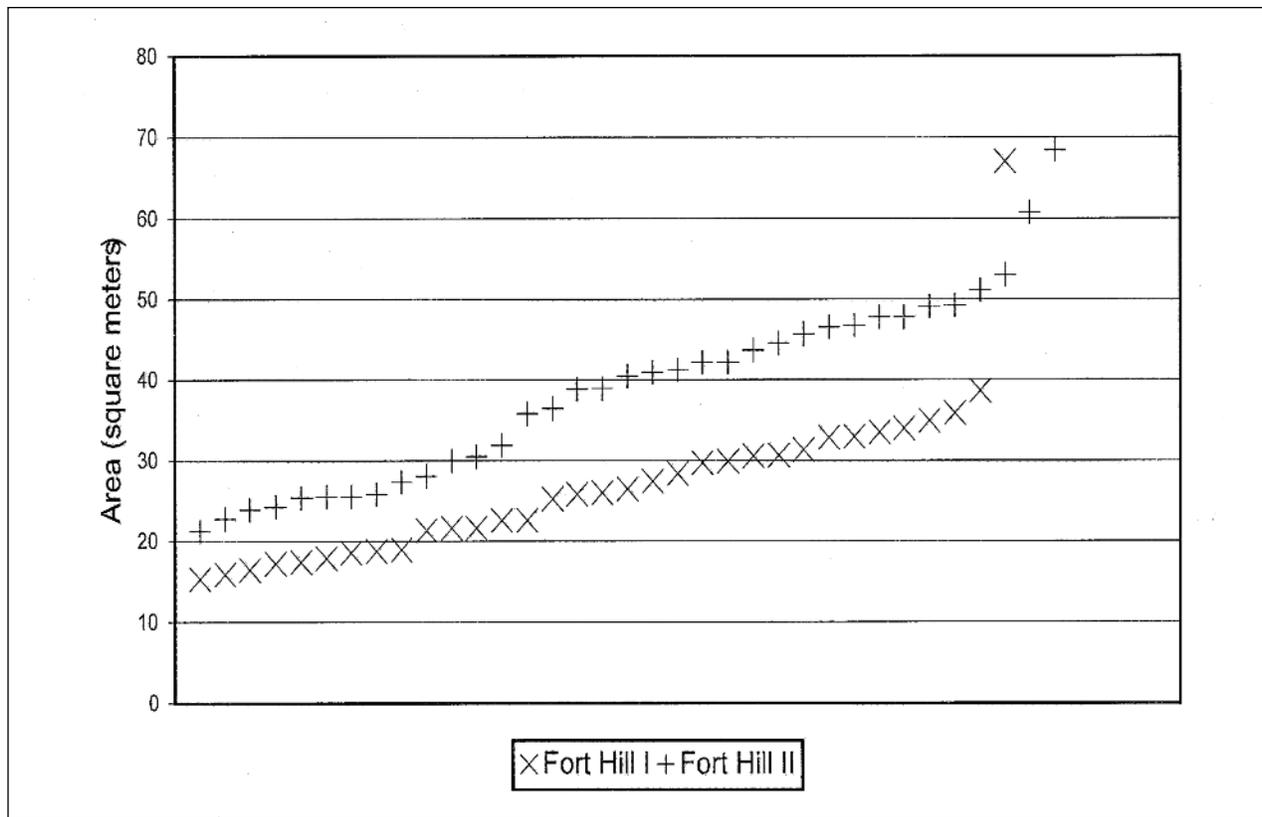


Figure 3.12. Range of floor areas for dwellings at Fort Hill.

which accounts for a greater proportion than the combined total dwelling floor areas. This space is created because the palisade line deviates along its length in its distance to the outer edge of the house ring. As noted earlier, the palisade line was built largely along the edge of the summit of Fort Hill, perhaps to give the village a larger “apparent” size and deter potentially hostile groups. However, the palisade was not constructed solely following defensive guidelines, since the eastern side of the palisade was not extended along the narrow edge of the summit, but rather, more closely paralleled the outer edge of the house ring. Defensive considerations were, apparently, balanced against the villager’s desire to adhere to the geometric model(s) used to plan their settlement. It should also be noted that, from a labor-management perspective, a palisade that paralleled the house ring was more efficient to construct than one that did not.

The remaining space at Fort Hill II was between adjacent dwellings and again, dwelling spacing is used as a proxy measure. Since the dwellings in Fort Hill II were arrayed as a single row around the central plaza, the distance between a dwelling and the two

dwellings on either side of it corresponded in most cases to its first and second nearest neighbors. The distance between a dwelling and its first “adjacent” neighbor ranged from 0.7 meters to 5.2 meters, while the distance to its second “adjacent” neighbor ranged from 1.4 meters to 18.8 meters (Table 3.3). With two exceptions, dwellings were usually greater than 1.5 meters from their nearest neighbor and not more than 3.1 meters from their second adjacent neighbor. The first exception is the spacing between Houses 56 and 57, which were located 18.8 meters apart, on either side of the entrance to the village component. The second exception is between Houses 60 and 61, located in the southeastern section of the village component, which were 12.7 meters apart. These two gaps in the house ring create a spatially discrete arc of dwellings, or wedge, that might have represented a localized residential corporate group, perhaps in the form of a lineage segment or clan. Further analysis will be required to evaluate whether there are any other less obvious but still significant differences in spacing between other dwellings that might have had some social and/or economic significance.

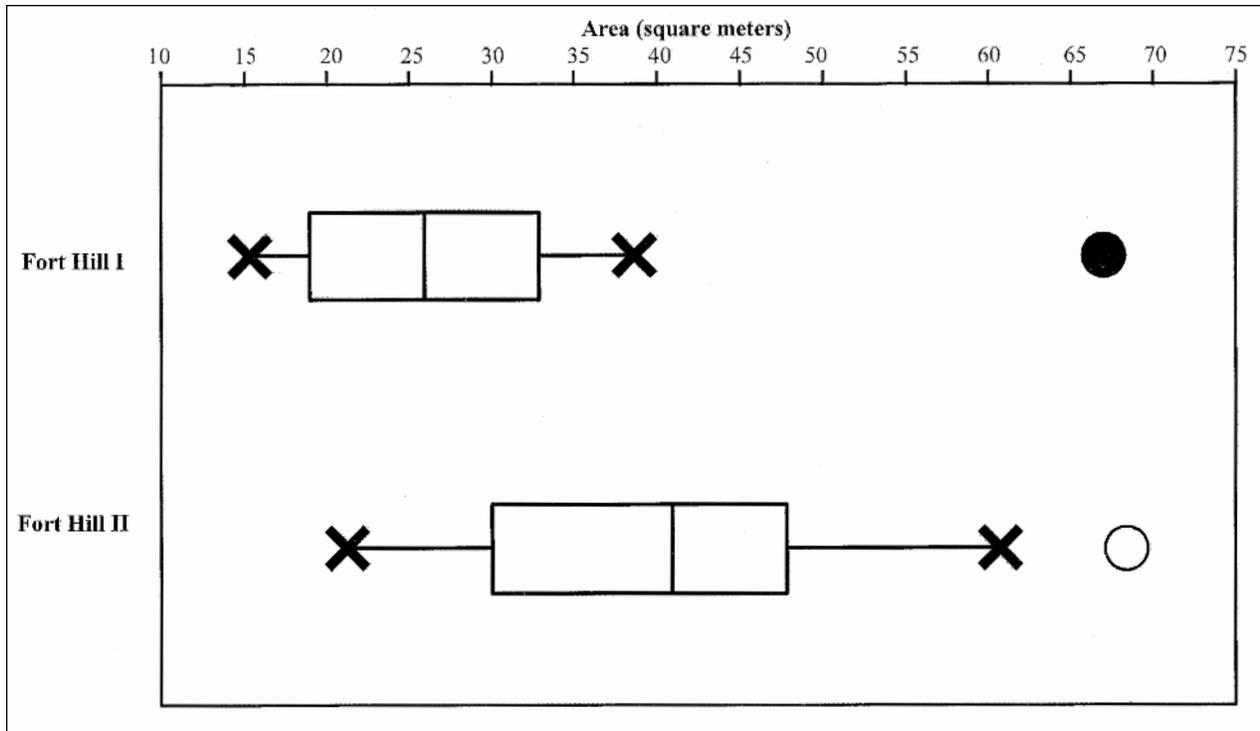
**Table 3.3.** Descriptive Statistics for Intracomponent Distances (meters) Between Dwellings at Fort Hill.

Statistic	DISTANCE FROM A DWELLING TO ITS:					
	Next Nearest Dwelling		Second Adjacent Dwelling		Third Nearest Dwelling	
	Occupation I	Occupation II	Occupation I	Occupation II	Occupation I	Occupation II
Range	0.15 -3.17	0.73 -5.18	0.48 -7.01	1.40 -18.81	1.46 -11.64	11.52 -20.18
Mean	1.22	2.38	2.74	4.75	5.00	15.24
Median	1.13	2.32	2.68	3.05	5.03	15.33
Standard Deviation	0.88	0.98	1.55	4.57	2.38	2.38

## DISCUSSION

There are both obvious and subtle differences between Fort Hills I and II. Fort Hill II, of course, was much larger than Fort Hill I, having a total settlement area that was over three times that of the smaller component. The disparity in the size of their respective plazas was proportionally even greater, with the plaza at Fort Hill II over six times the size of the plaza at Fort Hill I. If Fort Hill I's plaza was once larger, as discussed above, the proportional difference in plaza size would have been reduced somewhat. The proportional difference in total dwelling area shows less of a disparity, since Fort Hill II had slightly less than 1.5 times the total dwelling area of Fort Hill I. As is evident in the box-and-whisker plot<sup>1</sup> of dwelling areas for each component at Fort Hill, this is true despite the fact that more than half the dwellings in Fort Hill II are larger than every dwelling in Fort Hill I, with the exception of House 16 (Figure 3.13). Nonetheless, the ratio of total dwelling area to total settlement area at Fort Hill I is slightly more than twice that of Fort Hill II, providing one measure that the smaller component at Fort Hill was more crowded. The spacing of dwellings in the two occupations is a more direct indicator of crowding. The overall distances between each dwelling and any of its neighbors were much smaller for Fort Hill I than for the larger component (Figure 3.14).

Many differences in village structure between the two components are most parsimoniously accounted for if Fort Hill II was purposely planned to alleviate problems associated with scalar stresses caused when Fort Hill I's layout was no longer able to meet the challenges of a growing population. There would have been recognition that internal settlement growth was compromising the geometric model(s) used not only to structure the layout of the village, but was also adversely affecting how social groups localized within the village. In addition to internal pressures, it is also possible that enhanced hostilities in the region helped motivate the villagers at Fort Hill I to consider reconfiguring their settlement to one that formed a more imposing element on their cultural landscape. Whatever advantages led villagers to settle the summit of Fort Hill in the first place were sufficiently attractive that they apparently overrode conflicting pressures for the community to fission or relocate. That is, these advantages led the inhabitants of Fort Hill I to live in increasingly crowded circumstances before they could restructure their community. The reconfiguration of Fort Hill I into Fort Hill II depended not only on the desire or impetus to change the layout of the settlement, but also sufficient labor to



**Figure 3.13.** Box-and-whisker plot of dwelling areas at Fort Hill.

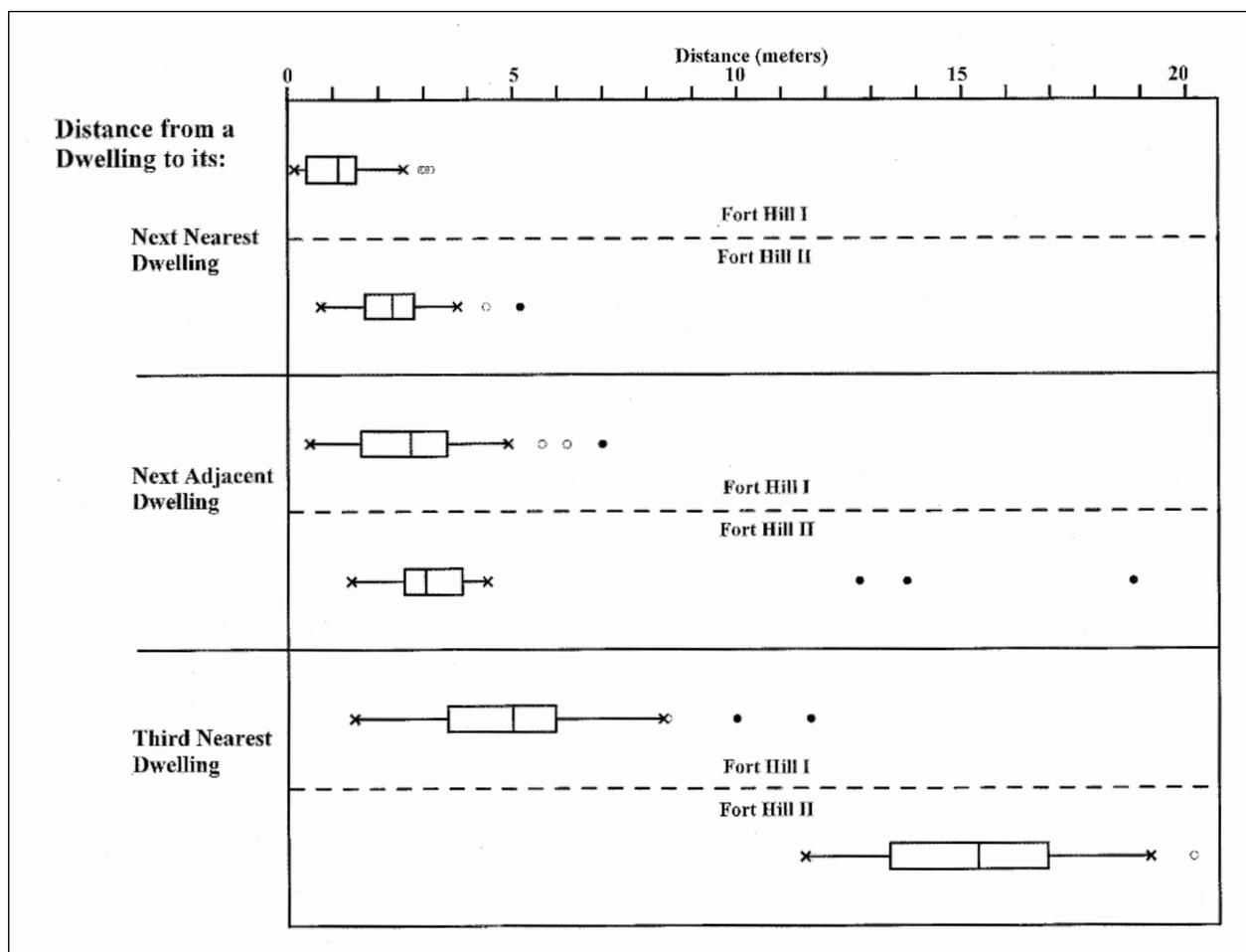
enact this change—that is, when the village population reached a certain size.

The much larger total settlement size evident in Fort Hill II allowed for greater spacing between adjacent dwellings. This greater spacing would have decreased activity overlap between households, a significant potential source of intra-household friction in Fort Hill I. The overall trend for an increase in dwelling size suggests that dwellings were enlarged to allow for internal growth within a household before necessitating the construction of additional or larger dwellings. However, since some studies indicate that the ratio of dwelling size to number of occupants is greater for larger settlements than smaller settlements, the overall population of Fort Hill II may not have been that much greater than Fort Hill I. Fort Hill II's proportionally much larger plaza ensured that the plaza itself acted as a better distance buffer between nonadjacent dwellings than Fort Hill I's plaza. The maximum distance between any two dwellings (e.g., dwellings on opposite sides of a plaza) was 99.2 meters for Fort Hill II but only 39.8 meters for Fort Hill I.

Finally, the increase in total settlement space and the much larger plaza at Fort Hill II could have accommodated considerable settlement growth and still have

ensured reasonable spacing between adjacent and non-adjacent dwellings. A second house ring could easily have been constructed inside the first at Fort Hill II and the village component still would not have approached the level of crowding seen in Fort Hill I. Thus, Fort Hill II's overall layout was designed to be fairly flexible in that it allowed for considerable growth within the village settlement before scalar stresses would have become an issue. The members of a suprahousehold decision-making group in the form of a council, which may have arisen partly in response to crowded conditions in Fort Hill I, would have played a significant role in the planning of Fort Hill II's layout.

These interpretations would be strengthened if it could be definitively argued that Fort Hill I preceded Fort Hill II, and that Fort Hill II represented a reoccupation that followed closely, if not directly, from Fort Hill I. However, as with the other village sites investigated by the relief excavations, no radiocarbon assays are currently available for Fort Hill. Despite this, there is evidence supporting the argument that the proposed occupational sequence is correct, and that there was little or no discontinuity between village occupations. First, as noted above, the possible men's/council houses at each component are nearly identical in size. The



**Figure 3.14.** Box-and-whisker plot of distances at Fort Hill from a dwelling to its: next nearest dwelling; next adjacent dwelling; and third nearest dwelling.

men's/council house was apparently not part of the original settlement layout in Fort Hill I, but was incorporated into the initial planning of Fort Hill II. Second, the geometric centers of each component's plaza are separated by only 4.5 meters, which could indicate that Fort Hill II's plaza was designed with reference to the plaza at Fort Hill I as it existed at the end of its occupational history (Table 3.1). Further, the geometric centers of each component's plaza were closer to each other than either was to their own component's geometric center. That Fort Hill II's plaza was seemingly built with reference to the plaza in Fort Hill I is not surprising, since plazas are usually the most significant shared cultural space within a village settlement and are critical to enhancing and maintaining group solidarity (Adler and Wilshusen 1990:135; Altman and Gauvin 1981:287; Moore 1996). The apparent congruence

between the two plazas may also relate to an attempt to maintain continuity with, and situate the community within, a cosmological landscape anchored physically in each village component through ceremonial posts that acted as *axis mundi* (Pearson and Richards 1994:12; Siegel 1996:317).

## CONCLUSIONS

The importance of geometric models in the layout and maintenance of nucleated villages in this region should not be overlooked. In addition to Fort Hills I and II, several other village sites and one nonvillage ceremonial enclosures had a centrally located post, hearth, or other feature that acted as an *axis mundi* around which they were planned and which likely

were “activated” on ceremonial occasions to reinforce a connection to the cosmos from which their geometric models for settlement organization were derived. Earlier in this chapter it was noted that the first component at the Gnagey No. 3 site lacked a central plaza, though sites with central plazas predate it. The lack of a central plaza at the first component at the Gnagey No. 3 site may represent a failed experiment in a new settlement form that was quickly rectified by expanding the settlement to include a plaza. The congruence between the geometric centers of the two components, which may have shared a central feature that acted as an *axis mundi*, adds credence to this argument (Means 2001).

A greater understanding of community organization for ring-shaped village settlements will be achieved by modeling Monongahela village sites through an analysis of their spatial layouts. The application of the hub-and-spoke model draws the researcher’s attention to diametric, concentric, or circumferential patterning in the arrangement of architectural and nonarchitectural elements at a village site. Some patterning might be subtle and different patterning might occur at varying levels. As the modeling process is extended toward village sites other than Fort Hill, it is expected that discrete social groups will be recognized from village layouts that resulted from cooperative social, economic, and political arrangements, ranging from informal to formal. The methodology and theoretical propositions employed and developed here can be extended to the analysis of other village-level community organizations throughout the Eastern Woodlands and beyond.

## Acknowledgments

I would like to thank John P. Hart and Christina B. Rieth for allowing me to participate in their “Early Late Prehistoric (A.D. 700-1300) Subsistence and Settlement Change in the Northeast” symposium at the New York Natural History Conference VI. Interaction with other presenters led me to clarify many of the ideas expressed in this paper. The Pennsylvania Historical and Museum Commission’s Scholars in Residence program provided significant support that allowed me to assemble data on Fort Hill and other relief-excavated village sites. I could not have been successful in this endeavor without the considerable aid graciously provided by the staffs of the Pennsylvania State Archives and the Division of Archaeology at The State Museum of Pennsylvania.

The comments from two anonymous reviewers helped strengthen and tighten the arguments set forth in this paper. Finally, I would also like to acknowledge the assistance and support provided by Laura June Galke.

## End Notes

1. Box-and-whisker plots indicate the essential nature of a distribution in a simplified graphical format. The rectangular box represents a distribution’s middle half (or midspread), the line dividing the box is its median, and the remaining half is divided equally on either side of the box. Values that are farthest from the box but still within one midspread are indicated by an “x” joined by a line (or whisker). Outliers to the distribution are indicated by circles that are solid if they are far outliers (Hartwig and Dearing 1979:23; Drennan 1996:39-41).

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## CHAPTER 4

# THE EARLY LATE WOODLAND IN THE SOUTHWESTERN LAKE ERIE LITTORAL REGION

David M. Stothers and Timothy J. Abel

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### INTRODUCTION

This chapter is an overview of the current early Late Woodland (ca. A.D. 500-1300) database in the southwestern Lake Erie littoral region, essentially the area lying in northwestern Ohio and southeastern Michigan. Our aim is to review data previously published elsewhere, present data previously unpublished or unsynthesized, and provide an interpretation of the early Late Woodland time period. This interpretation is influenced by our readings on the roles that politics, power, and resource distribution have had in history (Wolf 1997). Many will doubt the applicability of such concepts to nonstratified societies as the early Late Woodland societies in the Northeast were, but such forces have existed for much of human history (Cobb 1993) and no doubt influenced prehistoric societies — much more so, we believe, than many would acknowledge. The difficulty is not in the concepts but in our modern views of them, which are shaped by the society in which we live.

### CHRONOLOGY, TAXONOMY, AND CULTURE

At the A.D. 500 time level, the southwestern Lake Erie region was occupied by two contiguous archaeological cultures (Figure 4.1). The westernmost culture, occupying the coastal marshes surrounding the western Lake Erie shoreline, is called the Western Basin Tradition (WBT), consisting of the Gibraltar (A.D. 500-750), Riviere au Vase (A.D. 750-1000), Younge (A.D. 1000-1200), and Springwells (A.D. 1200-1350) phases. The cultural manifestation now attributed to the WBT Gibraltar phase was formerly subsumed into a poorly defined, noncontinuous and problematic “Wayne

Tradition” (cf. Stothers 1999). Stothers (1994, 1995) has argued that the Wayne Tradition, and its attendant “Wayne Mortuary Complex” (Halsey 1999), are integral aspects of the WBT, which show continuity into the Riviere au Vase and Younge phases, and that use of the term in the southwestern Lake Erie region is taxonomically unsound. The terminology used here is derived from the cultural chronology forwarded by Stothers (1999).

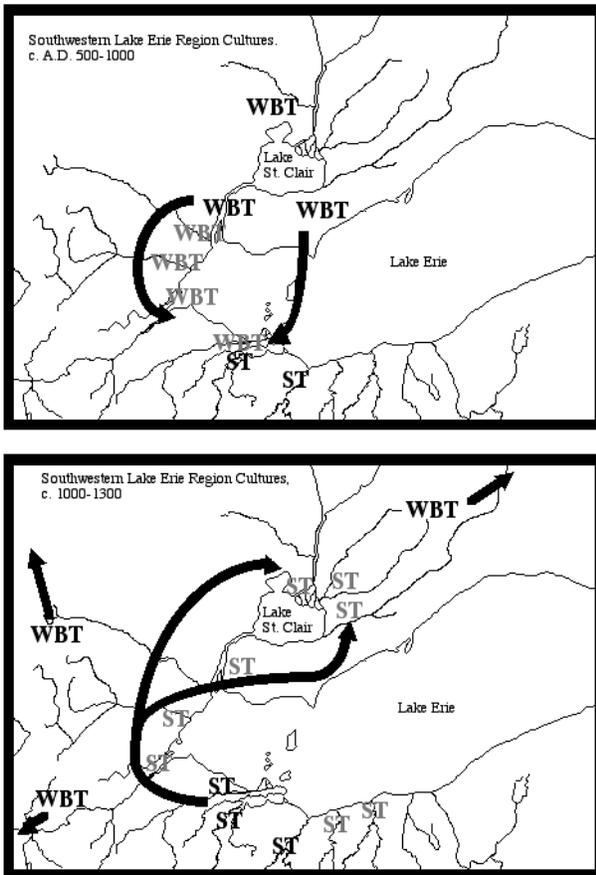
Present data suggest that this manifestation originated in southernmost peninsular Ontario and contiguous areas of Michigan (Murphy and Ferris 1990; Stothers and Bechtel 2000). The WBT appears to have been oriented to the stream estuaries and sand points of northwestern Lake Erie and Lake St. Clair, and by A.D. 700, this manifestation had spread around the western end of Lake Erie and across the Erie Islands to occupy the coastal marshes of the southwestern Lake Erie shore. In the Sandusky Bay region, they appear to have encroached upon the other cultural manifestation of the region, the Sandusky Tradition (ST), which appears to have originated in northcentral Ohio from a Middle Woodland Esch phase base. The ST consists of the Green Creek (A.D. 500-1000), Eiden (A.D. 1000-1250), Wolf (A.D. 1250-1450), Fort Meigs (A.D. 1450-1550), and Indian Hills (A.D. 1550-1650) phases, of which only the first three are discussed here. By A.D. 1200, the ST had shifted to inland semipermanent settlements along major lake-draining streams, and territorially expanded westward around the western end of Lake Erie into southeastern Michigan and southwestern Ontario, eventually replacing the WBT. By A.D. 1300, the WBT had been pushed into the upper reaches of the Maumee River in Indiana, the upper lower peninsula of Michigan, and the upper Sydenham River in Ontario (Figure 4.2) (Stothers 1995, 1999; Stothers and Bechtel 2000; Stothers and Schneider in press).

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*Northeast Subsistence-Settlement Change: A.D. 700–1300* by John P. Hart and Christina B. Rieth. New York State Museum © 2002 by the University of the State of New York, The State Education Department, Albany, New York. All rights reserved.

Time	Time Period	Sandusky Tradition	W. B. Tradition
AD 1650	Protohistoric	Indian Hills Phase	
AD 1550		Fort Meigs Phase	
AD 1450	Late Woodland	Wolf Phase	Dispersal into S W Ontario, N. Indiana, and N. Michigan
AD 1350		Eiden Phase	Springwells Phase
AD 1300			Younge Phase
AD 1250		Green Creek Phase	Riviere au Vase Phase
AD 1200			Gibraltar Phase
AD 1000	Middle Woodland	Esch Phase	
AD 700			
AD 500			

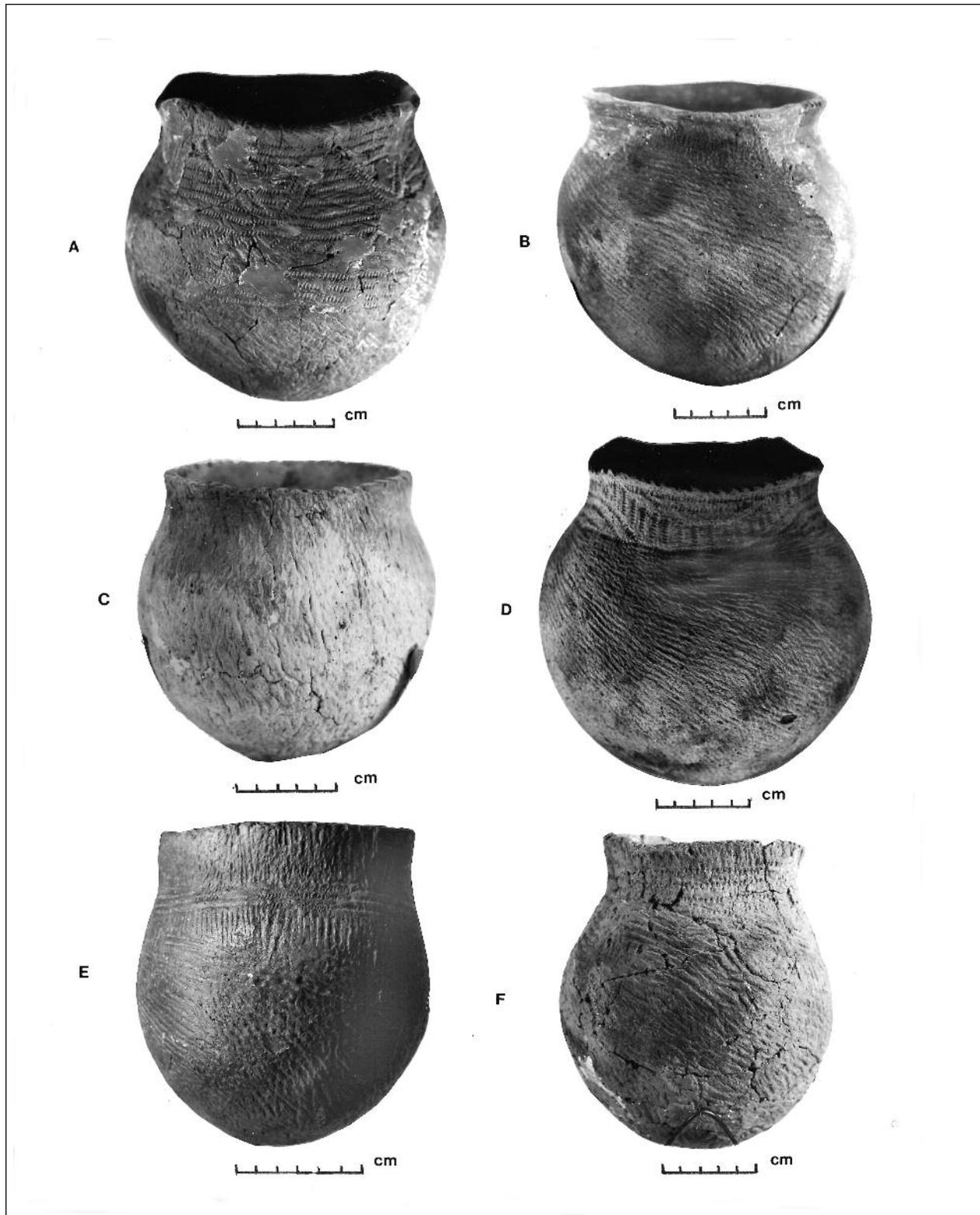
**Figure 4.1.** Middle and Late Woodland chronology of the southwestern Lake Erie drainage.



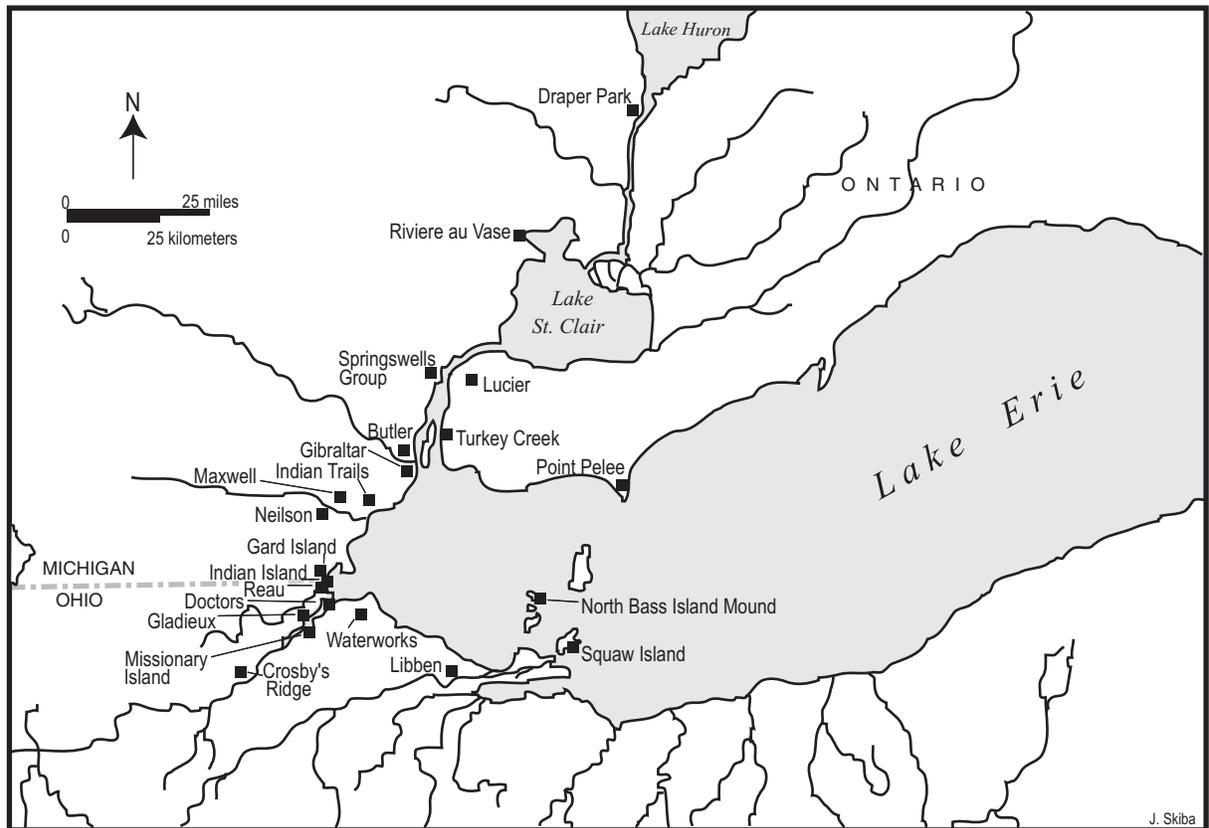
**Figure 4.2.** Cultural movements during the Middle and Late Woodland time periods.

The material culture of the Gibraltar phase (A.D. 500-750) is characterized by small, squat, collarless, and globular grit-tempered vessels embellished with cord-malleation over their entire surface, sometimes with overlying cord-impressed motifs (Figure 4.3). The Gibraltar ceramic series is associated with Jack's Reef and Levanna projectile points fashioned predominantly of local Pipe Creek chert, and the more regionally available Upper Mercer chert. Burials of the Gibraltar phase have been documented from the type site, the Riviere au Vase site and the Younge site (Figure 4.4) to consist of flexed and bundled burials in deep pits excavated into glaciolacustrine terraces. Where these glaciolacustrine terraces are absent, Gibraltar phase peoples appear to have built burial mounds. The burials of the Gibraltar phase are most commonly associated with exotic artifact assemblages including marine shell beads, nonlocal chert projectile points and pre-forms, platform pipes, and slate pendants. The burial sites are often associated with nearby habitation areas that occupy rich resource localities (Halsey 1999; Stothers 1995; Stothers and Bechtel 2000; Stothers et al. 1994:172). These mortuary districts and their attendant habitation and procurement facilities are directly analogous to the ethnographically documented hunter-gatherer trade fair districts (cf. Jackson 1991).

The Gibraltar phase settlement pattern is centered around warm weather base camps associated with cemetery areas and rich-resource procurement locales on the glaciolacustrine terraces overlooking Lake St. Clair and northwestern Lake Erie. Around the southwestern Lake Erie shoreline, predominantly in what are now the coastal marshes, Gibraltar phase warm weather settlements appear to be river-estuary oriented with associated burial mounds or cemeteries characterized by deep shaft burials. Stothers and Bechtel (2000) have proposed a model of warm weather coalescence followed by dispersal over the late fall and winter. Warm weather aggregations likely corresponded to springtime fish runs in the Sandusky and Maumee Rivers, which are even today widely renowned for their abundance of walleye, sauger, and white bass. In early historic times, first hand accounts speak of the rivers overflowing with fish, including at that time sturgeon, white suckers, redhorse suckers, and bowfin of enormous size. The fish were so plentiful, says more than one account, that "one could cross the river in springtime by walking on their backs" (cf. Lindley 1944; Simonis 1979; Wendler 1988). The fish harvest was also likely associated with springtime rituals of renewal involving burial and feasting as a mechanism of social reproduction among dispersed



**Figure 4.3.** Gibraltar Cordmarked ceramics of the Transitional Late Woodland Gibraltar phase; (A-D) Gibraltar site (20Wn9); (E) Creek site (33Sa40); (F) Riviere au Vase site (20Mb3).



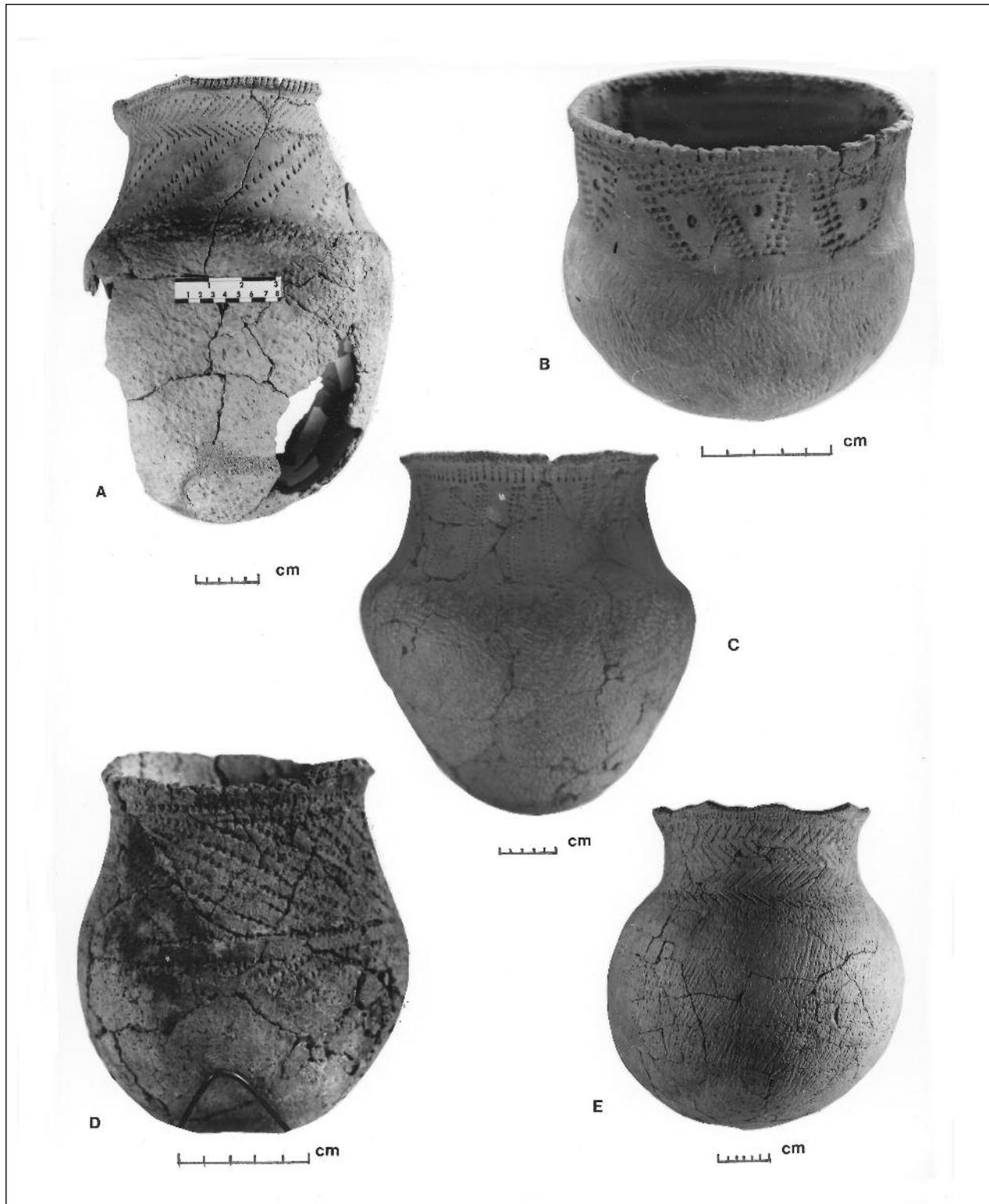
**Figure 4.4.** Site locations of the Western Basin Tradition mentioned in the text.

family groups. The feasting and burial rituals involved the conspicuous consumption of exotic goods, including marine (primarily *Natica* and *Marginella*) shell and cannel coal beads, cache blades, and finished bifaces of exotic chert, copper ornaments, and slate objects. Red ochre also appears to have been used. These locales served as base camps for the harvesting of punctually abundant resources (such as anadromous fish spawns) and for logistical forays to local resource procurement areas. The cold weather aspect of the Gibraltar phase is poorly known, but it is believed to be characterized by the dispersal of family groups into the interior, away from the Lake Erie shoreline area. The Missionary Island No. 1 site, in the Maumee River Valley, has revealed evidence of Gibraltar Phase settlement, and may illustrate this cold weather aspect (Bechtel and Stothers 1993).

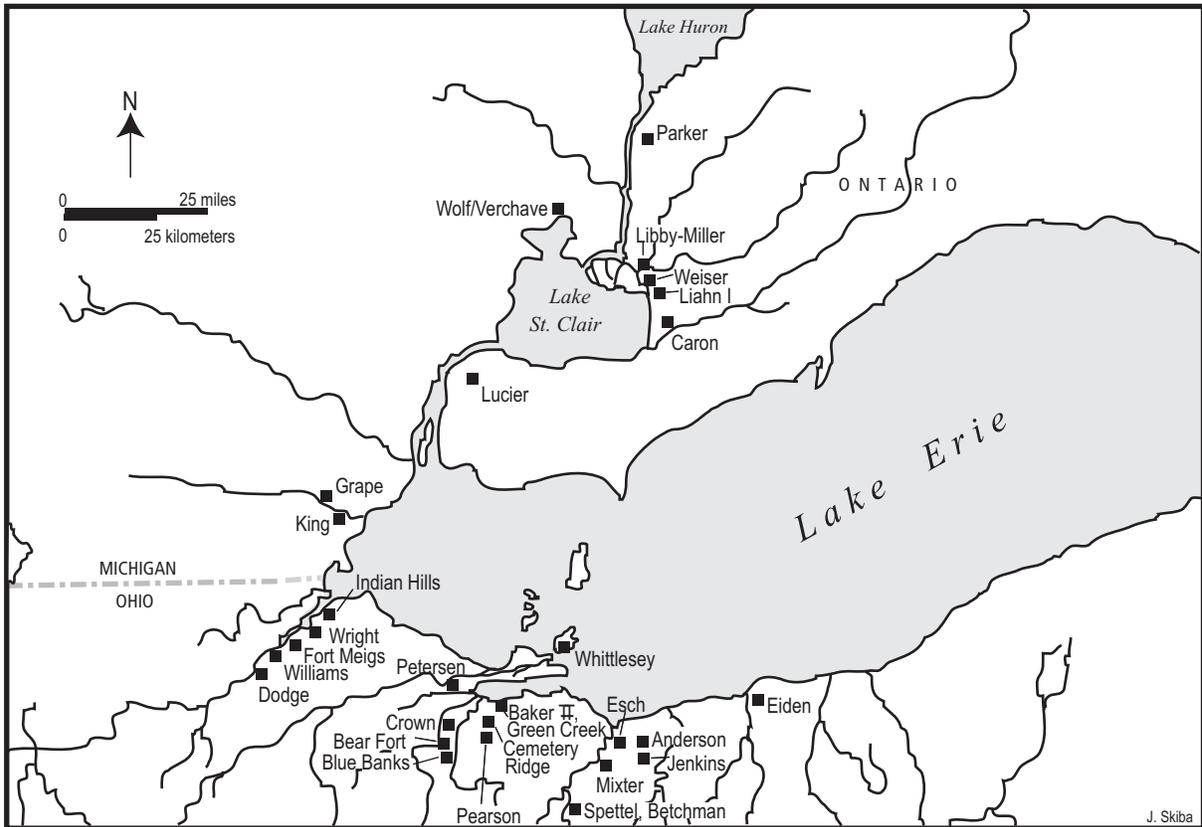
The material culture of the Riviere au Vase phase (A.D. 750-1000) in the Maumee River Valley (Figure 4.6) has recently been reviewed by Schneider (2000). The ceramic series is characterized by Riviere Ware, somewhat larger, globular, collarless and grit-tempered vessels exhibiting neck and rim smoothing and

elaborate dentate and linear stamp motifs (Figure 4.5). In difference to the Gibraltar ceramic series, Riviere Ware displays exterior folded lips, high rims and interior decoration. Riviere Ware is associated predominantly with Madison points, utilized flakes, and bone tools.

The burial program of the Riviere au Vase phase is characterized by a rapid decline in mound construction and regional social interaction, the latter of which is demonstrated by the decline of exotica in graves. Increased local interaction is attested to by numerous discrete "mortuary districts" around the southwestern Lake Erie rim. These site complexes are often characterized by expansive cemeteries with horizontally overlapping habitation areas, and include among many others the Younge and Riviere au Vase sites near Lake St. Clair, the LaSalle/Lucier site in extreme southwest peninsular Ontario, the Reau and Gard Island sites in Maumee Bay, the Squaw Island site in Sandusky Bay, and the Libben site. Burials from these locales are predominantly supine burials, some of which exhibit ceremonial disinterment and defleshing associated with bone perforation, skeletal rearticula-



**Figure 4.5.** Ceramics of the Gibraltar Phase/Riviere au Vase Phase transition; (A) MacNichol Site (33Wo10); (B) Missionary Island site (33Lu394); (C) Sissung site (20 Mr5); (D) Riviere au Vase site (20Mb3); (E) Plum Brook site, Erie County, Ohio.



**Figure 4.6.** Site locations of the Sandusky Tradition mentioned in the text.

tion, and skull plaque removal. This practice appears directly analogous to the historically documented Feast of the Dead rituals among the Huron, in which skeletons were rearticulated and hung from scaffolds prior to burial in an ossuary pit (cf. Greenman 1937; Redmond 1982; Stothers and Bechtel 2000; Stothers et al. 1994; Wilkinson and Bender 1991).

The Riviere au Vase phase settlement pattern is characterized by a continuation of intensified lake edge habitat exploitation (Bechtel and Stothers 1993; Murphy and Ferris 1990). Large mortuary districts, consisting of expansive cemetery areas and overlapping habitations, are located predominantly on fossil beach strands associated with secondary tributaries of the major western Lake Erie drainages. These areas were once covered by tall prairie grasslands (Veatch 1959; Gordon 1966, 1969), but are today referred to as sand points. Inundation and shoreline action has reworked most of these areas into lacustrine coastal marshes, unfortunately destroying a significant part of the Riviere au Vase phase archaeological record (Stothers and Abel 2001). Faunal remains at these sites

are unsurprisingly dominated by fish and aquatic mammal remains (Keenlyside 1978; Schneider 2000). The warm weather occupations are complemented by fall nutting and over wintering camps located in the interior. The Riviere au Vase settlement/subsistence program can thus be best summarized as a continuation of mixed harvesting strategies, despite the presence and sometimes intensive consumption of maize, as evidenced by archaeologically recovered maize and stable carbon isotope ratios (see below).

In stark contrast to Gibraltar phase ceramics, the ST Green Creek phase (A.D. 500-1000) is characterized by small, collarless, globular, inverted to vertical rimmed vessels with no interior decoration. Cord-malleation is restricted to the body, while the rim is embellished with vertical cording. There has been no documentation of cord-on-cord decoration on Green Creek series ceramics. Toward the end of the Green Creek phase, checkered, stamped motifs become common on smooth vertical rims, an obvious preview to Eiden phase Mixer Ware (Abel 1999). Green Creek phase ceramics often occur along with triangular Levanna

points and notched Chesser or Lowe points, bladelets of Flint Ridge chalcedony, and ground stone tools and ornaments (cf. Stothers et al. 1994).

Only a handful of Green Creek phase components are known. Perhaps the best documented of these occur along the south shore of Sandusky Bay, near the mouth of the Sandusky River. Three components (Baker II, Green Creek, and Hickory Island) here have produced material assemblages from wave-exposed deposits. These same components are littered with Middle Woodland Esch phase cultural materials, attesting to long continuous occupation by the Green Creek phase populations and their progenitors (Stothers 1992). The sites are believed to represent warm weather occupations, which are perhaps contemporaneous with Riviere au Vase phase components concentrated along what was once the north bank of the Sandusky River on Squaw Island (Stothers and Prael 1972) and perhaps farther east on now submerged Eagle Island (cf. Mosely 1905). In other words, it may be that the Green Creek and Riviere au Vase phases cohabitated the Sandusky River estuary during the warm season.

The Weilnau site (cf. Stothers and Abel 1993:63), located in the interior along the Huron River in north-central Ohio, disclosed two deep storage pit features associated with Green Creek series ceramics and numerous overlapping postmold lines. Charcoal from one of these pits was radiocarbon-dated to A.D. 540 (660) 790 (I-16,454). Excavations also disclosed what may be a single palisade line encircling an area of approximately one-half hectare. Based on the presence of the storage features, perimeter fortifications (crude as they are), and maize remains, this site may represent an early warm weather hamlet, a site type that comes to predominate the warm weather settlement aspect during the subsequent Eiden phase.

Cold weather dispersal to the interior seems probable, though is at this time poorly documented. At the Jenkins site (cf. Stothers et al. 1994:165-166), along Old Woman's Creek in north central Ohio, a single circular wall-trench house was found outside a cluster of similar-looking Wolf phase (A.D. 1250-1450) structures. Green Creek series ceramics were found within both the wall trench and interior features. No maize was associated with this component, possibly suggesting the absence of maize at interior settlements. A radiocarbon assay from the structure wall trench returned an A.D. 1450 intercept date (Beta 84967), which is unacceptable for this occupation.

Little is known of Green Creek phase mortuary practices, except that they appear to consist of multiple-

individual bundle burials with few artifactual inclusions. Middle Woodland mound complexes in the lower Huron and Sandusky River Valleys attest to a history of mound construction that does not appear to have continued into the Green Creek phase (Everett 1882; Stothers et al. 1979). Radiocarbon determinations from the Esch Mounds suggest their continued use into the early Green Creek phase; however, the predominant burial pattern seems to be of discrete cemetery areas adjacent to warm weather components. The Taylor site in the Huron River Valley has disclosed numerous bundled and cremated inhumations in a discrete cemetery area adjacent to a habitation area that contains pit features associated with Green Creek phase ceramics. Work at this component continues, but two pit features and one burial have been radiocarbon-dated to the Green Creek phase. The Baker II site disclosed a rare dual flexed burial associated with seven trapezoidal pendants, a stone celt set in an engraved bone handle, a bipointed stone pick, a butterfly bannerstone preform, two Snyders projectiles, and a Chesser/Lowe projectile. The burial feature was radiocarbon-dated to A.D. 220 (430) 660 (Beta-14758), placing it in the Middle/Late Woodland transition period (Abel and Edwards 1990).

## THE EVIDENCE FOR EARLY MAIZE INTRODUCTION

What was once believed to be the earliest maize in the region was derived from the Indian Island No. 4 site in Maumee Bay of northwestern Ohio. The Indian Island No. 4 site produced maize cob fragments and kernels (Table 4.1) from one pit and an associated cultural level (lower level). A radiocarbon assay on wood charcoal associated with the pit yielded a calibrated date of A.D. 440 (650) 780 (DIC-414) (Stothers 1975). Originally accepted as an uncalibrated date of A.D. 540, this was thought to represent the earliest date on maize in the Great Lakes region (Stothers and Yarnell 1977). Charcoal from the lower level, which was also associated with maize, was dated to A.D. 720 (970) 1150 (DIC-301) (Stothers and Yarnell 1977). In addition, wood charcoal from a nearby pit, which produced no cultigens, was dated to A.D. 630 (690) 890 (DIC-300). Still more maize was found in another excavation area, again, in the lower level, which was associated with charcoal, producing a calibrated date of A.D. 610 (670) 780 (DIC-415) (Stothers and Yarnell 1977). Maize was also recovered from another site on the island, Indian Island No. 3, which was associated with charcoal

Table 4.1. Available Cultigen Data for the Western Basin Tradition.

SITE	PHASE ASSOCIATION	Zea mays				DOMESTICATES			Phaseolus vulgaris	REFERENCES
		kernels	cupules	cob fragments	whole cobs	whole peduncles	cobs			
Gibraltar	Gibraltar		present						Fitting 1975	
Sissing	Gibraltar	2							Stothers and Yarnell 1977	
Dillon	Gibraltar			1(6 r.)					this report; cf. Stothers and Abel 1990	
Indian Island No. 5	Riviere au Vase	1		3 (10 & 12 r.)					Stothers and Yarnell 1977	
Indian Island No. 4	Riviere au Vase	19		2 (8 r.)					Stothers and Yarnell 1977; Fecteau 1977	
Indian Island No. 3	Riviere au Vase	74		5 (8 & 12 r.)					Stothers and Yarnell 1977	
Indian Island No. 2	Riviere au Vase	present							Stothers and Yarnell 1977	
Indian Island No. 1	Riviere au Vase	present							Stothers and Yarnell 1977	
Indian Island No. 11	Riviere au Vase	present							Stothers and Yarnell 1977	
Gard Island No. 2	Riviere au Vase	7							Stothers and Yarnell 1977; Fecteau 1977	
Gard Island No. 3	Riviere au Vase	4							Stothers and Yarnell 1977	
Reau	Riviere au Vase	1							Fecteau 1977	
Missionary Is. No. 1	Riviere au Vase	present							Stothers and Graves 1983	
Missionary Is. No. 4	Riviere au Vase	present							Stothers and Graves 1983	
Leimbach	Riviere au Vase	present							Prufer and Shane 1976	
Gladioux	Riviere au Vase	18							Fecteau 1977	
Birch Run Road	Riviere au Vase	1							Clark 1986	
Dodge	Riviere au Vase / Younge								Yarnell 1974; Fecteau 1977	
MacNichol	Riviere au Vase / Younge								Yarnell 1975; Fecteau 1977	
Doctors	Younge								Yarnell 1974	
Providence	Younge	104	present				present		Fecteau 1978	
Hartman	Younge	15	2						Fecteau 1981	
Brown No. 1	Younge	present							this report	
Brown No. 10	Younge	present							this report	
Gunn-Eberle No. 2	Younge								this report	
Martin	Younge	present							Fecteau 1978	
Morin	Younge	present							Prahl 1974	
Younge	Younge	present							Greenman 1937	
Petrie	Younge	present							Fecteau 1977	
Cufr	Springwells	9							Yarnell 1974	
Mikado Earthwork	Springwells	114		276	15	10	39		Carruthers 1969	
Patyi-Dowling	Springwells	3					5		Yarnell 1974	
Baden No. 1	Springwells	present							this report	
Crosby's Ridge	Springwells	present							this report	
Butler	Springwells	103+		8&10 row					Cutler 1962; Grogitsky 1957	

dated to A.D. 890 (1025) 1230 (DIC-413) (Schneider 2000; Stothers 1975).

Stothers dismissed the inconsistent radiocarbon chronology of the site as being due to contamination, stating that outside of assays DIC-300 and 301, the remaining two dates were consistent within the range of radiocarbon error (Stothers and Yarnell 1977). With calibration, however, DIC-300 falls within the temporal bracket of the other two assays. DIC-301, on the other hand, is clearly aberrant, and may have contained charcoal derived from the uppermost cultural layer. A sample from a pit feature originating from the upper level was recently dated to A.D. 1040 (1250) 1370 (GX-10749) (Stothers et al. 1994). The maize samples themselves have not been dated by direct AMS. Though the calibrated dates have altered perceptions about the temporal placement of this component somewhat, reanalysis of the associated cultural assemblages has suggested that even the calibrated assays are too early. The ceramic assemblages from the Indian Island sites are characterized exclusively by Riviere Ware, which dates to the Riviere au Vase phase, while Gibraltar Wares are completely absent (Schneider 2000). It appears, then, the occupations at Indian Island are associated with the Riviere au Vase phase, herein interpreted to date between A.D. 750 and 1000 (Stothers 1995).

Early maize was also reported from the Gard Island No. 2 site, located adjacent to Indian Island in Maumee Bay of northwestern Ohio. Radiocarbon dates from the site came from samples of human bone in two burial pits associated with the maize. Neither of the burial features had any other inclusions. The first of the two burials was dated to A.D. 590 (670) 880 (DIC-416), and the second to 90 B.C. (A.D. 70) 240 (DIC-417). The second date was rejected as being too early and possibly contaminated. A second sample run from this burial feature later produced a calibrated date of A.D. 780 (970) 1150 (DIC-418). Another burial was also dated to A.D. 660 (900, 910, 960) 1200 (DIC-419). None of the samples were corrected for stable carbon isotope ratios, since that technology was not available at the time. Though the site was originally interpreted as a component dating to the sixth century A.D. based on the first uncalibrated date of 1340±80 B.P. (Stothers and Yarnell 1977), the subsequent dates suggest a tenth century Riviere au Vase phase placement, a placement that is more congruous with the cultural assemblage (Schneider 2000). A recent stable nitrogen isotope analysis of 10 individuals from the Gard Island No. 2 cemetery suggested a high level of maize consumption among some members of this population, a situation

more congruous with a later tenth century temporal placement (Schurr and Redmond 1991).

Another site that was purported to yield evidence of sixth century A.D. maize in northern Ohio was the Leimbach site. Located on the Vermilion River in northcentral Ohio, the site produced maize from a Late Woodland pit feature associated with Riviere Ware ceramics and a triangular projectile point. Charcoal from the pit was radiocarbon-dated to 1375±180 B.P. (GX-1743) (Prufer and Shane 1976), which has a calibrated date of A.D. 270 (660) 1020. The ceramic assemblage, however, exclusively contains Riviere Ware, suggesting the component should be placed into the Riviere au Vase phase (A.D. 750-1000), not the Gibraltar phase (A.D. 500-750).

The Sissung site (cf. Stothers 1995:10; Stothers and Bechtel 2000), in extreme southeastern Michigan, is also probably best interpreted as a transitional Riviere au Vase phase component on the basis of ceramic associations and a radiocarbon assay on wood charcoal of A.D. 600 (780) 1020 (M-1519). A feature at this site produced two maize kernels identified by Yarnell as Northern Flint (Stothers and Yarnell 1977), in association with collarless Vase Dentate and Gibraltar Cordmarked ceramics, lithic artifacts, and faunal remains.

A six-rowed "sucker" cob was recently recovered from a pit feature at the Dillon site (Stothers et al. 1994) in northcentral Ohio, associated with a small grit-tempered Vase Dentate rim, an undecorated plain-smoothed rim, three cordmarked grit-tempered body sherds, and a Jack's Reef projectile point fashioned of Upper Mercer chert. The decorated rim displays an incipient folded collar embellished with a herringbone motif executed in oblique dentate-stamped impressions. The interior rim is plain and smoothed. A wood charcoal sample from the feature yielded a radiocarbon assay of A.D. 670 (820, 840, 860) 990 (Beta-30054). Ceramics from the site suggest a transitional Riviere au Vase phase component.

In summary, no maize has yet been clearly associated with an early Late Woodland context. The earliest clear associations of maize come from contexts post-dating A.D. 750, when it proliferates floral assemblages from lake estuary plain sites in Maumee and Sandusky Bays. The earliest maize from this region is yet to be documented, but when it is, we believe that dates of A.D. 400 or earlier should not be surprising.

Stable carbon isotope ratios seem to confirm that maize was a minor contributor to the earliest Late Woodland diets, but quickly grew in importance (Tables 4.2 and 4.3). Five  $\delta^{13}\text{C}\text{‰}$  values associated with

**Table 4.2.** Available Stable Carbon Isotope Ratios for the Sandusky Tradition.

Site	Lab No.	Corrected Age	C12/13	Calibrated Date	References	Phase Average
<b>Esch Phase</b>						
Esch	Beta-5664	1949±120	-21.85	B.C. 200 (A.D. 80) A.D. 380	Bowen 1986	
Esch	Beta-6762	1730±70	-24.13	A.D. 130 (270, 330) 450	Bowen 1986	-23.63
Libben	I-16.456	1750±90	-23.6	A.D. 80 (260, 290, 320) 540	Stothers et al. 1994	
Esch	Beta-5665	1680±90	-25.01	A.D. 140 (400) 600	Bowen 1986	
Baker II	Beta-14758	1610±110	-23.57	A.D. 220 (430) 660	Abel and Edwards 1990; Bowen pers. comm.	
<b>Green Creek Phase</b>						
Rock Creek Mound III	Beta-5904	1130±90	-12.3	A.D. 680 (900, 910, 960) 1150	Bowen 1986	
Baker I	I-15.667	1110±80	-18.8	A.D. 730 (970) 1150	Stothers and Abel 1990	
Taylor	Beta-4638	960±60	-9.4	A.D. 980 (1040) 1220	Bowen 1986	-13.5
<b>Eiden Phase</b>						
Hemminger	Beta-6764	840±50	-13.83	A.D. 1050 (1220) 1290	Bowen 1986	
Taylor	Beta-4639	680±70	-12.06	A.D. 1230 (1300) 1410	Bowen 1986	-16.42
Pearson	Beta-8382	390±90	-23.36	A.D. 1400 (1480) 1950	Stothers and Abel 1989	
<b>Wolf Phase</b>						
Muddy Creek	Beta-6765	770±80	-15.94	A.D. 1050 (1280) 1400	Stothers and Abel 1989	
Durmwald	Beta-23029	650±90	-20.2	A.D. 1230 (1310, 1370) 1440	Bowen pers. comm.; Stothers et al. 1994	
Black's Knoll	Beta-6172	680±80	-11.7	A.D. 1280 (1330, 1400) 1450	Stothers and Abel 1989	
Dodge	GX-11468	585±70	-15.7	A.D. 1290 (1400) 1450	Stothers et al 1994	
Kurtz	Beta-5902	560±60	-16	A.D. 1300 (1410) 1450	Bowen 1986	
Kurtz	Beta-5901	540±60	-11.8	A.D. 1300 (1410) 1460	Bowen 1986	
Cemetery Ridge	Beta-5909	540±70	-15.01	A.D. 1300 (1410) 1470	Stothers and Abel 1989	
Dodge	GX-11469	525±70	-15.01	A.D. 1300 (1420) 1480	Stothers et al. 1994	-14.52
Schaffer	Beta-13233	460±60	-17.54	A.D. 1400 (1440) 1630	Yingling 1987; Stothers and Abel 1989	
Pearson Cemetery	Beta-5913	430±50	-11.81	A.D. 1410 (1450) 1630	Stothers and Abel 1989	
Pearson Cemetery	Beta-5174	410±60	-13.21	A.D. 1410 (1460) 1640	Stothers and Abel 1989	
Pearson Cemetery	Beta-4990	410±60	-20.01	A.D. 1410 (1460) 1640	Stothers and Abel 1989	
Mixer	Beta-5908	400±70	-14.95	A.D. 1410 (1470) 1650	Stothers and Abel 1989	
Pearson Cemetery	Beta-5903	380±50	-12.42	A.D. 1440 (1480) 1650	Stothers and Abel 1989	
Mixer	Beta-5907	360±60	-9.82	A.D. 1440 (1510, 1600, 1620) 1660	Stothers and Abel 1989	
Pearson Cemetery	Beta-5910	310±70	-13.78	A.D. 1440 (1640) 1955	Stothers and Abel 1989	
Betchman	Beta-130047	270±40	-12.8	A.D. 1440 (1640) 1950	Unpublished	
Williams	Beta-6173	MODERN	-13.22	A.D. 1520 (1650) 1950	Stothers and Bechtel 1987; Stothers et al. 1994	
<b>Fort Meigs Phase</b>						
Baker I	Beta-11682	580±60	-11.79	A.D. 1290 (1400) 1440	Stothers et al. 1994	
Pearson	Beta-5912	MODERN	-19.45		Stothers and Abel 1989	-16.84
Miller's Ridge	Beta-5914	MODERN	-19.27		Stothers and Abel 1989	
<b>Indian Hills Phase</b>						
Petersen	Beta-65215	300±80	-16.4	A.D. 1530 (1680, 1750, 1800, 1930, 1950) 1955	Abel 1995; Stothers et al. 1994	
Indian Hills	GX-10264-G	490±125	-11.5	A.D. 1280 (1430) 1660	Stothers 1973, 1981; Graves 1984	
Indian Hills	Beta-6174	440±120	-9.92	A.D. 1300 (1450) 1950	Stothers 1973, 1981; Graves 1984	
Indian Hills	GX-10264-A	285±180	-6.4	A.D. 1310 (1660) 1950	Stothers 1973, 1981; Graves 1984	-9.89
LaSalle Ossuary	Beta-72462	330±60	-15.1	A.D. 1440 (1530, 1560, 1630) 1950	Unpublished	
LaSalle Ossuary	Beta-6171	570±100	-11.35	A.D. 1280 (1400) 1610	Stothers et al. 1994	

**Table 4.3.** Available Stable Carbon Isotope Ratios for the Western Basin Tradition.

Site	Lab No.	Corrected Age	C12/13	Calibrated Date	References	Phase Average
<b>Gibraltar Phase</b>						
Gibraltar	Beta-61459	1360±50	-23.4	A.D. 620 (670) 780	CAMS 5818; Stothers 1995	
Dillon	Beta-30054	1210±70	-25.9	A.D. 670 (820, 840, 860) 990	Stothers et al. 1994	-24.23
Gibraltar	Beta-84986	970±60	-23.4	A.D. 980 (1030) 1220	Unpublished	
<b>Riviere au Vase Phase</b>						
Speer	Beta-31590	1270±60	-26	A.D. 660 (730, 770) 890	Stothers et al. 1994	
Missionary Island No. 4	GX-10265-G	965±155	-15.5	A.D. 720 (1030) 1300	Stothers et al. 1994	
Missionary Island No. 4	T005		-15.5		Schurr and Redmond 1991	
Gard Island No. 2	T002		-13.06		Schurr and Redmond 1991	
Gard Island No. 2	T003		-14.8		Schurr and Redmond 1991	
Gard Island No. 2	T004		-13.65		Schurr and Redmond 1991	
Gard Island No. 2	T006		-12.64		Schurr and Redmond 1991	
Gard Island No. 2	T007		-13.84		Schurr and Redmond 1991	
Gard Island No. 2	T008		-14.37		Schurr and Redmond 1991	
Gard Island No. 2	T009		-12.61		Schurr and Redmond 1991	
Gard Island No. 2	T010		-17.42		Schurr and Redmond 1991	
Gard Island No. 2	T011		-13.3		Schurr and Redmond 1991	
Gard Island No. 2	T012		-15.29		Schurr and Redmond 1991	
<b>Younge Phase</b>						
Waterworks Mound	Beta-6176	930±130	-12.42	A.D. 880 (1050, 1090, 1120, 1140, 1160) 1300	Stothers 1973	
Gibraltar	Beta-130046	760±50	-13.7	A.D. 1210 (1280) 1300	Unpublished	
North Bass Island						
Burial Mound	GX-10746	910±115	-13.2	A.D. 890 (1160) 1300	Stothers et al. 1994	
Root	Beta-5911	860±50	-15.94	A.D. 1040 (1210) 1280	Bowen 1986	
Dillon	Beta-28448	850±50	-26.2	A.D. 1040 (1220) 1280	Stothers et al. 1994	
Birchard Library	Beta-23613	830±110	-19	A.D. 1000 (1230) 1390	Stothers et al. 1994	
Pelahatchie	Beta-6766	670±60	-25.67	A.D. 1260 (1300) 1410	Stothers et al. 1994	-17.95
Birchard Library	Beta-23336	580±70	-17.5	A.D. 1290 (1400) 1450	Stothers et al. 1994	
<b>Springwells Phase</b>						
Butler	Beta-131776	840±90	-14.5	A.D. 880 (1020) 1230	Unpublished	
Patyi-Dowling	GX-10742	700±125	-13.4	A.D. 890 (1170) 1380	Stothers et al. 1994	-15.68
Butler	Beta-84985	670±60	-18.3	A.D. 1170 (1280) 1370	Unpublished	
Patyi-Dowling	Beta-8691	1180±80	-16.51	A.D. 1260 (1310, 1350, 1390) 1440	Stothers et al. 1994	



where fishing and farming may have been practiced together (Bechtel and Stothers 1993). Excavations at the Gladioux, MacNichol, and Missionary Island sites (Schneider 2000; Stothers and Pratt 1981; Stothers et al. 1984) produced numerous overlapping large deep storage pits, hearths, and post mold patterns, Riviere Ware pottery, animal and fish bone, and maize. The Missionary Island site excavations produced a distinct ovoid habitation structure and Younger-phase burials (cf. Stothers and Bechtel 2000). The neighboring Dodge site (Stothers and Pratt 1981; Stothers et al. 1984), located on a terrace above the Maumee River, just downriver from the Missionary Island site, revealed deeply stratified deposits associated with Riviere Ware pottery and fish bone. Though poorly documented, a late Younger-phase unfortified hamlet has been proposed to be represented by the Crosby's Ridge site, located on Swan Creek, interior to both Maumee Bay and the Maumee River (Bechtel and Stothers 1993; Schneider 2000; Stothers et al. 1984). In Ontario, Murphy and Ferris (1990) have suggested that the Dymock site represents a similar occupation, although there may have been a single palisade encircling the occupation (Fox 1986). Numerous earthen enclosures around Lake St.

Clair and in southeastern and central Michigan attest to the development of interior-oriented, fortified seasonal villages by the Springwells phase (cf. Murphy and Ferris 1990; Stothers et al. 1994; Zurel 1999).

The burial program of the Younger phase again suggests transition. Communal aggregation and burial at large mortuary/interaction districts common during the Riviere au Vase phase appears to continue into the initial Younger phase. Younger populations appear to have interred some of their dead into Gibraltar and Riviere au Vase phase burial mounds. This has been demonstrated at the North Bass, Springwells, Whittlesey, and Waterworks Mound complexes (Halsey 1968, 1976; Stothers 1994; Stothers and Bechtel 2000). Terminal Springwells phase burial practices are characterized by ossuary burial, as suggested by the Turkey Creek Ossuary in southeastern Michigan (Stothers 1995).

In contrast, the ST Eiden phase is witness to the emergence of Mixer Ware from the small, squat, globular vessels of the Green Creek phase (Figure 4.10). Mixer Ware is characterized by large bag-shaped vessels with high rims and subconical bases. The rims are everted but not rolled or folded. There is no interior

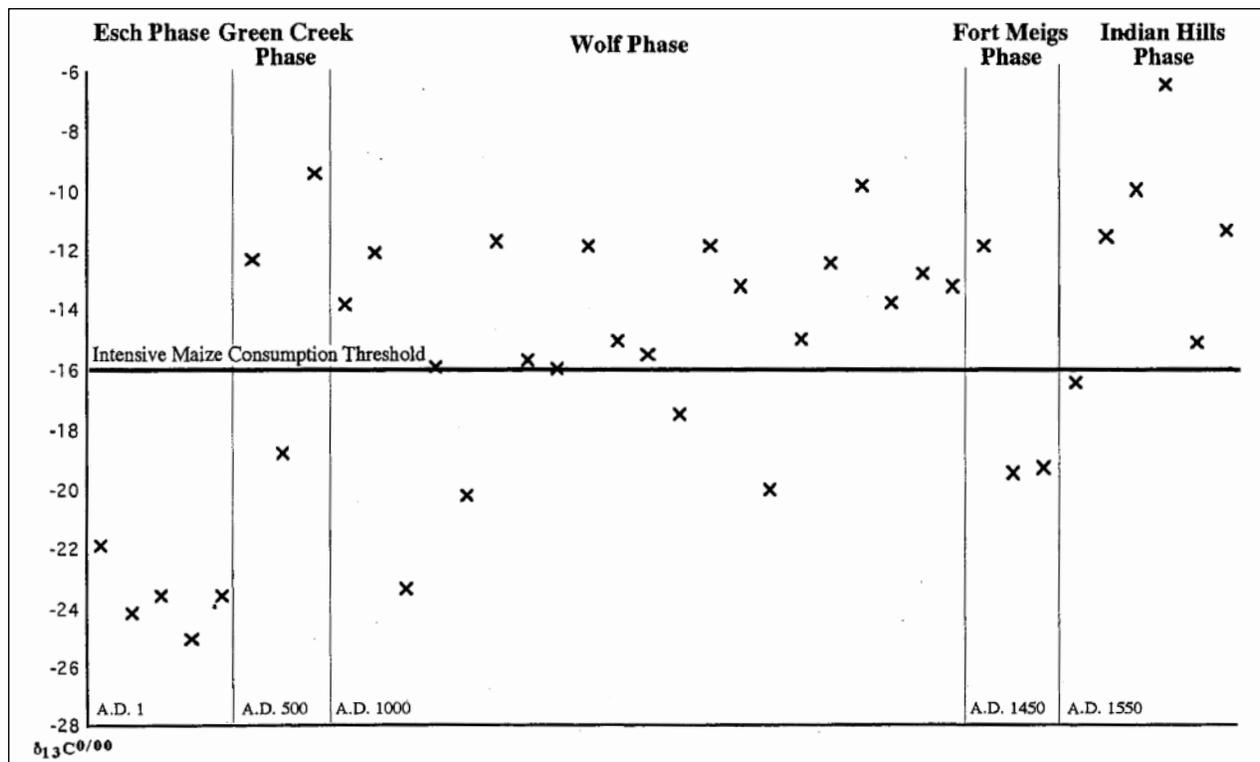
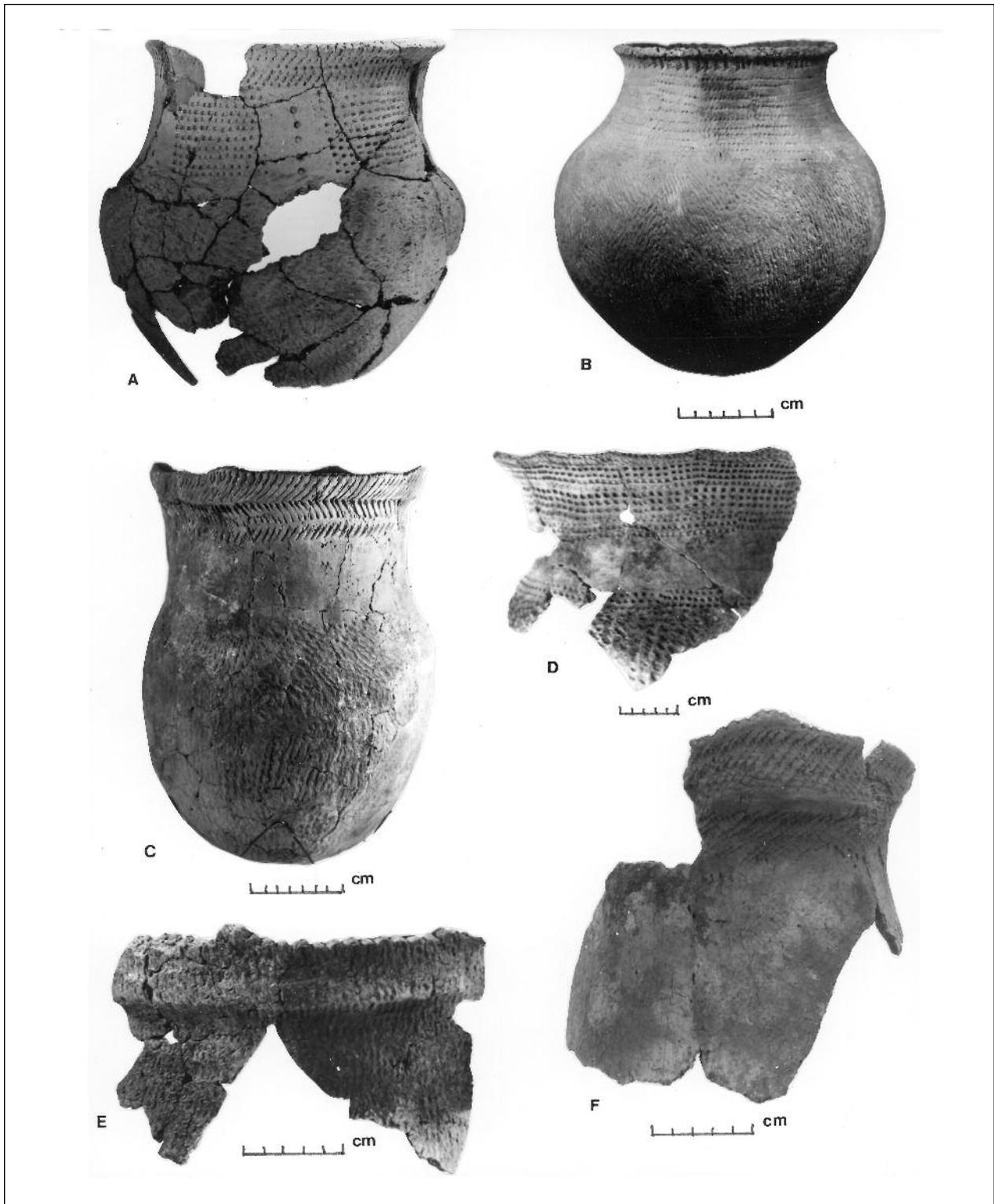
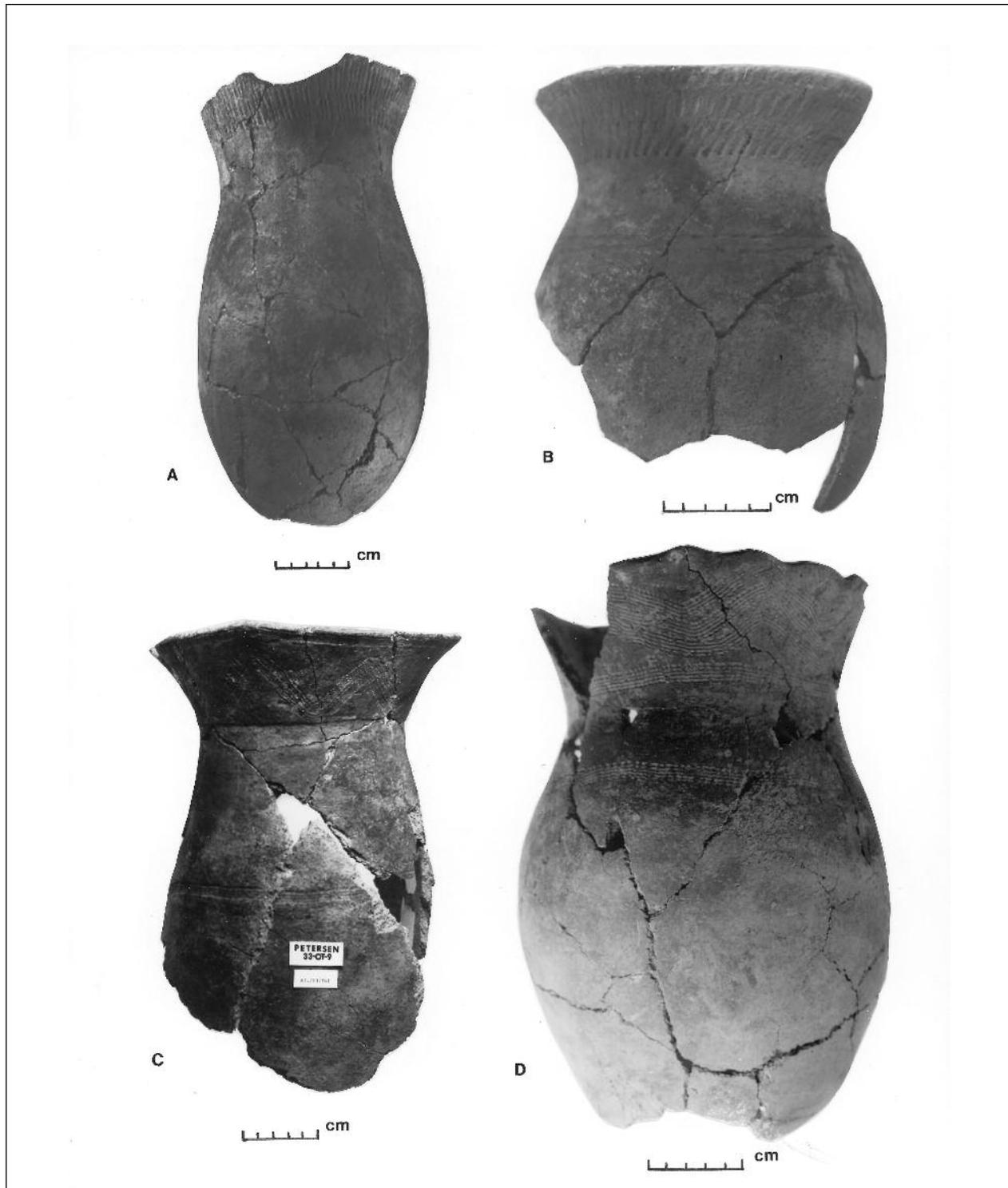


Figure 4.8. Distribution of available Sandusky Tradition stable carbon isotope ratios.



**Figure 4.9.** Ceramics of the Riviere au Vase phase/Young phase transition; (A) Gladioux Site (33Lu10); (B) Hickory Island site, Sandusky County, Ohio; (C) Riviere au Vase Site (20Mb3); (D) Reiger site (20Mr733); (E) Maxwell site, Monroe County, Michigan; (F) Rouge-Dix site, Monroe County, Michigan.



**Figure 4.10.** Ceramic of the Sandusky Tradition Eiden phase/Wolf phase transition; (A) Weilnau Site (UT-ER280); (B) Cemetery Ridge Site (33Sa13); (C) Petersen Site (33Ot9); (D) Cemetery Ridge site (33Sa13).

**Table 4.4.** Available Cultigen Data for the Sandusky Tradition.

SITE	PHASE ASSOCIATION	Zea mays				Phaseolus vulgaris			REFERENCES
		kernels	cupules	cob fragments	whole cobs	peduncles			
Bear Fort L. 7	Eiden	present						Stothers, Abel, and Schneider 1998	
White Fort	Eiden	present						Redmond 1999	
Anderson	Eiden/Wolf	present						Shane 1981	
Crown	Eiden/Wolf	8.2g	58.46g	745.2g (8 & 10 r.)	6 (8 r.)			Abel and Stothers 1998	
Pearson North	Eiden/Wolf	2.5g	.4g	3g				Bowen 1983	
Bear Fort L. 3	Eiden/Wolf	6.2g		31 (6, 8, 10 r.)				Stothers, Abel, and Schneider 1998	
Williams	Wolf	43						Yarnell 1974; Fecteau 1978	
Williams	Wolf	3						Yarnell 1974; Fecteau 1978	
Wright	Wolf							this report	
Dodge	Wolf							Yarnell 1974	
Cemetery Ridge	Wolf	4.6g	.4g	.5g		present		Abel, Koralewski, and Demuth 2000	
Petersen	Wolf	1260.8g	.9g	33.2g (8 r.)		.2g	13g	Abel 1995	
Pearson South	Late Wolf	30g		50g	present (8 r.)		1	Stothers and Abel 1989; Bowen 1979	
Jenkins	Late Wolf	2						this report	

decoration and body treatment becomes increasingly smoothed throughout the Eiden and early Wolf phases. Mixer Ware is commonly associated with triangular Madison points, small “miniature celts,” humpbacked or bifacial snub-nosed scrapers, and a rich bone tool inventory. Maize is abundant in Eiden and Wolf phase village contexts (Table 4.4) (Abel 1995; Stothers et al. 1994).

The settlement patterns of the Eiden and early Wolf phases are believed to characterize a transition from seasonally mobile to semipermanent village life (cf. Stothers et al. 1994). The Eiden phase (A.D. 1000-1250) settlement pattern is also poorly known, but a continuation of the Green Creek phase settlement pattern is predicted. There appears to be no intense settlement of the Sandusky Bay area during this phase. Rather, warm weather settlements may have shifted farther upriver to areas less prone to flooding. It is during the Eiden phase that agricultural hamlets become the primary warm weather settlement mode. Unfortified warm weather hamlets for the Eiden phase may be illustrated by the excavated Mixer site in the Huron River Valley (Shane 1967) and the north component of the Pearson site complex in the Green Creek estuary (Stothers and Abel 1989), while there have been several riverine sites in the Sandusky River Valley that have revealed surface and limited subsurface evidence of Eiden phase occupation.

Toward the end of the Eiden phase and the beginning of the subsequent Wolf phase (A.D. 1250-1450), examples of both unfortified and fortified hamlets can be illustrated. The Dillon and Mixer sites (Prufer and Shane 1976), on high bluffs overlooking the Huron River; the Crown (Abel and Stothers 1998) and Bear Fort sites (Stothers et al. 1998a), located on high bluffs overlooking the Sandusky River; and the Williams site (Stothers and Conway 1983), located on a lower terrace overlooking the Maumee River, all have received extensive archaeological excavation and appear to represent unfortified warm weather agricultural hamlets. The Anderson (Shane 1981), Cemetery Ridge (Abel et al. 2000), and Eiden sites (McKenzie and Blank 1976; McKenzie et al. 1972) have received extensive archaeological excavation and appear to represent fortified hamlets or seasonal villages associated with the early Wolf phase (cf. Abel 1995).

As with Eiden phase settlement little is known of burial patterns. A large cemetery was documented by excavations of the middle component at the Pearson Complex to consist of both Eiden and probably Wolf phase burials (Stothers and Abel 1989). Eiden phase burials were identified by their association with

singular Mixer Stamped vessels typical of Eiden phase material culture. Wolf phase burials within the cemetery were identified by radiocarbon determinations on a sample of burials having no inclusions, leading us to presume that at least the majority of unaccounted burials were probably associated with the Wolf phase. Both the Eiden and Wolf phase burials are predominantly extended supine interments, with an exclusive orientation to the east. Several burial row segments were suggested in the cemetery layout. A minority of burials are single flexed inhumations. This data suggests a program of discrete family plots within a communal cemetery lying outside and adjacent to a hamlet or village (Stothers et al. 1994).

## SUMMARY

These combined data suggest the long existence of a mobile life way in the southwestern Lake Erie littoral region, focused on warm weather aggregation at base camps in the relict estuary plains of the Lake Erie shore, followed by cold weather dispersal to small, family-oriented interior camps. The warm weather aggregations probably coincided with anadromous fish runs in the early spring, and were associated with rituals of social renewal that highlighted the conspicuous consumption of exotic goods, including maize, in the form of sumptuous food and burial offerings. Social integration was represented in the communal burial of the dead in a discrete cemetery area. This life way continued in the region, more or less unchanged, for at least five centuries despite the probable introduction of maize before A.D. 500.

Beginning about A.D. 1000, both WBT and ST populations appear to have shifted their warm weather focus out of the estuary plains to more upriver locations perhaps less prone to seasonal flooding. These locales are believed to function in the initial intensification of maize production, which took place within smaller, extended family units. The typical settlement type occurring at these locales is the unfortified and reoccupied warm weather hamlet, characterized by often chaotic and incomprehensible distributions of overlapping pits and postmold patterns. They were oriented toward upriver stream cataracts that could promote both farming and intensive fish harvesting. They were seasonal settlements abandoned after the fall harvest to smaller camps in the interior.

By A.D. 1200, the lake coastal occupations are abandoned altogether, except as a locus for continued seasonal fishing (Redmond 1984; Schneider 2000), and

warm weather settlement appears to be exclusively riverine in nature. By A.D. 1300, fortified hamlets and villages became the predominant warm weather settlement type, often represented in the archaeological record by single component sites. This suggests the year-round occupation of singular settlements with few returns to the location following settlement relocation. WBT villages of the Springwells phase are located in the interior along minor tributary streams, usually on the divide between major drainages. ST villages, on the other hand, are located on river mainstems. The most intensively repeated occupations appear to be at riverine sites, whose primary function was for continued riparian resource harvest to supplement maize cultivation.

The explanation of Late Woodland cultural development in the lower Great Lakes region has in the past, and until recently, relied on a model of causal chain systematics stemming from environmental degradation and the introduction of a supposedly superior mode of subsistence. An a priori assumption of this model is that cultural change is necessarily a product of demand, such that the question 'why intensification?' has often been reformulated as 'why increased demand?' (Bender 1978:206; see also Cohen 1977; Friedman 1975). With this assumption, far too much emphasis has been placed on demography, technology, and climate in explaining food production. Likewise, the development of food production has been given causal status in explaining the development of settled villages and warfare. Social factors that produce cultural change, however, have been given less attention, presumably because they are less archaeologically visible, and hence less testable (e.g., Flannery 1973).

The environment and demographic stress as prime movers in this case cannot be supported in the face of evidence that maize was grown in the lower Great Lakes region for approximately one-half to perhaps a whole millennium before its production was intensified to provide a staple food source. There can be found in this region no evidence for increased subsistence risk precipitated by increased population or a degrading climate. In fact, the evidence shows great stability and affluence continuing over three millennia, generated by riparian-based harvesting economies (see Stothers and Abel 1993). Sedentism as well, was not a Late Woodland innovation in northcentral Ohio. Earthwork-enclosed, semipermanent communities characterized by permanent dwelling structures and deep storage pits formed during the Early Woodland time period in the interior regions of central and northcentral Ohio, in the complete absence of a horticultural

economy (Stothers et al. 1998b).

Bender (1978) and Hayden (1990) both have suggested that the transition to food production took place in a context of wild resource harvesting and limited horticulture among relatively communal societies. They further suggested that food production was pursued by groups who specialized in the production of surplus, which they exchanged for other commodities and raw materials available elsewhere. Smith (1989) has suggested that food harvesting occurred relatively early in North American prehistory, producing a complex of indigenous domesticated starchy plants that required little tending, and in addition, grew well in the disturbed soils around reoccupied floodplain settings. While the evidence for these indigenous crops has been lacking for the most part in the lower Great Lakes and Northeast, their presence has been recently documented (Hart and Sidell 1997). Exotic domesticates were added slowly, and as we will argue, supplemented fishing and wild crop harvesting economies. The *technology* for agricultural intensification, then, predates even the introduction of maize in the Eastern Woodlands. Rather than environmentally or demographically induced need, we suggest that a prestige economy focused on competitive feasting and votive offerings to the dead promoted the intensified production of exotic domesticates, in this case maize, as sumptuary foods.

## THE POLITICAL ECONOMY IN NONSTRATIFIED SOCIETIES

It is axiomatic that no human kin group is autonomous—they depend on other kin groups to secure the resources they need to survive, not just physically, but as a society. They use local surplus (i.e., commodities) to secure desired or necessary resources outside their access. In this context, power is defined simply as the ability to manipulate people and resources. It need not be overt. In fact, it is often shrouded in myth and ritual that characterizes social inequality as a “natural” state. Politics is defined as the mode of manipulation. It need not be coercive, and in fact, may have some functionality in smoothing over the conflicts inherent in any relationship of trade (Hayden 1995b). The distribution of resources includes not only food, human labor, and land, but the also the material culture of social reproduction. “Things” are not only created by culture, they also have a role in *reproducing* the norms and ideals they symbolize (Hodder 1982). Their acquisition may be seen as just as

necessary for survival as food, and societies will go to great lengths to manipulate them.

Dispersed human populations seek opportunities for aggregation to negotiate exchanges of resources (Polanyi 1963; Sahlins 1972). These aggregations serve both economic and sociopolitical functions, and involve social rituals that serve to mediate potential conflicts, distribute resources, and encourage cooperation between socially and economically diverse groups (Godelier 1975). Numerous examples of these recurrent gatherings are present in the ethnographic literature (Jackson 1991; Polanyi 1963; Sahlins 1972).

A basic mechanism of resource distribution is the feast (Hayden 2001). It likely dates to the earliest stages of human culture, acting as a mechanism to regulate the distribution of limited food resources among a community. Clear rules of resource distribution promote solidarity within a community by creating roles of social and economic interdependence. It can also be competitive, and Hayden (1990, 1992, 1995a, 1995b, 1996) differentiates intracommunal (solidarity) and intercommunal (competitive) feasting. The first seems to occur predominantly in economies lacking surplus, such as exist among foraging and early sedentary horticultural societies, in which corporate groups seek to retain control of their limited food resources through redistribution among the producers themselves. The latter type of feasting often involves large surpluses, such as occur in advanced harvesting and agricultural societies, in which competing peer polities and their local leaders attempt to outdo their neighbors by hosting the most elaborate feast.

Hayden (1995b, 1996) suggests that the impetus for horticultural intensification may be found in the practice of competitive feasting among peer polities. He argues that in an environment of widespread and stable subsistence production, commodities, rather than subsistence resources, take over the primary function of reproducing social relations. They are surplus goods, usually of limited availability, which seal alliances through their distribution as gifts and bring the donors political prestige. Competing polities hosted feasts to draw large numbers of people together, influence them, and potentially gain their cooperation—thus extending their sphere of influence and strengthening their reproductive potential (Ford 1972; Rappaport 1968). Exotic and sumptuary foods were served during the feasts that gained the host group prestige among their peers. The feasts may be associated with elaborate communal burial rituals. The conspicuous consumption of valuable resources, either through feasting, votive destruction and burial, or

burial with the dead, broadcasted a polity's relative economic and political status among a community of competing "peer polities," gaining them prestige as an economically successful group. Alliances were secured with neighboring groups through marriage and trade partnerships (likely sealed with marriages) to extend a group's sphere of influence, bring in more exotica, and ensure their political influence into succeeding generations (Braun 1986; Renfrew 1986).

In many cases, the aggregated ceremonies were also arenas for the promotion of salient social inequality among subordinate followers and commodity brokers or "big men" (Hayden 1995b). During the rituals, commodity brokers served as focal points for the collection and redistribution of resources. They used the rituals to peddle their influence through gift giving, and gained personal prestige by redistributing exotic resources to the polity either through the offering of sumptuary foods to feasting ceremonies or the offering of exotic artifacts to the dead during communal burial ceremonies. In exchange for such generosity, the subordinate population committed labor to the production of surplus goods, which the big men used to secure far-reaching trade partnerships to perpetuate their status.

### **FEASTING WITH THE DEAD IN THE SOUTHWESTERN LAKE ERIE LITTORAL REGION**

Given the evidence from the southwestern Lake Erie littoral region, we argue that a model of competitive feasting explains the early Late Woodland archaeological record rather well. The occurrence of bundled or secondary mass burials has been linked by many to communal or corporate identities among dispersed populations (Hertz 1960; Jirikowic 1990; Metcalf and Huntington 1991; Saxe 1970). In the WBT, the persistence of extensive and seasonally reoccupied ceremonial centers, or "mortuary districts" (O'Shea 1988) (such as Riviere au Vase, Libben, Sandusky Bay, Maumee Bay, and others) suggests to us communal aggregations of dispersed mobile populations at several points around the shores of western Lake Erie and Lake St. Clair (Murphy and Ferris 1990; Stothers and Bechtel 2000). The locations of these centers along small streams in major river estuaries suggests the importance of fish harvesting to sustain aggregated communities of several families. These seasonal aggregations were a focus for social activities as well as surplus resource production (Jackson 1991; Polanyi 1957, 1963; Sahlins 1972; Saitta and Keene 1990; Sheehan 1985). We

suggest that the limited recovery of carbonized maize at these locales, coupled with its relative paucity at interior sites of the same time period, represents its consumption during renewal rituals involving feasting and burial of the dead.

The association of exotic artifacts with burial activity has been suggested by Hayden (1997) to represent a stable subsistence economy rather than a manifestation of increased risk buffering (cf. Binford 1968; Brose 1990; Lovis 1986; Winters 1968). In the absence of substantial subsistence risk, commodities, he argues, become more valued than subsistence resources, such that they replace food in contractual trade obligations (cf. also Wright 1967, 1968). The role of contractual reciprocity in maintaining the flow of resources is evident from very early times in the Great Lakes region, extending well back into the Archaic and perhaps Paleoindian periods (Brose 1979, 1990; cf. Abel et al. in press; Stothers and Abel 1991, 1993, n.d.; Stothers et al. in press). The incorporation of exotic artifacts as burial accouterments on Gibraltar phase sites suggests to us a flourishing harvesting economy, likely based on riparian resources, that afforded surpluses used in competitive feasting among peer polities. Surpluses in subsistence production afforded local populations opportunities to devote labor and resources to the acquisition of exotic goods that were used as votive grave offerings.

The same model is also believed to characterize the contemporaneous ST, then residing in northcentral Ohio. Communal aggregations of Middle Woodland Esch phase (A.D. 1-500) populations can be seen at the type site, located on the Huron River in northcentral Ohio, where burial ritual and exotic exchange is manifested in two burial mounds (Stothers et al. 1979). Burials from these mounds were in bundle form, and accompanied by artifacts of exotic source materials and origin. Radiocarbon dates and artifacts attest to their continued use during the succeeding Green Creek phase (A.D. 500-1000), when perhaps intrusive burials were placed into previously established mounds (as is the case with numerous Gibraltar phase mounds). The mounds were unfortunately excavated by amateur archaeologists long before any professional involvement was present in the region (Stothers et al. 1979). Other burial mound complexes are known from historic sources along the Sandusky River, but these were destroyed prior to the twentieth century (Everett 1882; Meek 1909). The Raccoon Farm site, located on the Huron River in northcentral Ohio, consists of 13 burial mounds that are believed to be associated with the Esch phase. This site, however, awaits further investigation.

Bundle, cremated, and flexed burials of Green Creek phase association have also been excavated at the Taylor site, which is now the focus of an intensive sub-surface investigation.

It is our belief that maize was likely to have been introduced into the Great Lakes region during the late Middle Woodland time period as a sumptuary food resource used primarily in feasting associated with warm weather aggregations. Unfortunately, it is these very contexts that have suffered the most from lake inundation over the last century, being turned from coastal prairies to marshes (Stothers and Abel 2001). This suggests that rather than being absent from southwestern Ontario during the Gibraltar phase (Smith and Watts, this volume), maize is likely to be recovered from the sites on the sand points of Lake Erie and Lake St. Clair, and the estuaries of the St. Clair, Sydenham, and Thames River Valleys, contexts that have also suffered from lake shore erosion.

The pattern of spring aggregation around the Lake Erie and Lake St. Clair rim and fall/winter dispersal to the interior remained generally consistent through the early Late Woodland time period. By ca. A.D. 750, however, the far-reaching trade and exchange networks had declined. While processualists have equated the decline of interregional trade with decreased subsistence risk, this has not been demonstrated (Hayden 1992). Political economy advocates, on the other hand, have argued convincingly that the decline of interregional trade is associated with *increased* subsistence risk, and cultural reorientation to a subsistence-based economy (Bender 1978, 1985, 1990; Hayden 1990, 1995a; Muller 1997). By A.D. 1000, the large communal estuary cemeteries were in decline, and the focus of warm weather settlement shifted to the riverine floodplains upriver from the estuaries. In the Maumee Valley, this transition is evident at the island cataracts, where fishing and farming may have been combined. Eiden phase settlements also appear to have shifted to open hamlets along the lower Sandusky and Huron River Valleys. This to us suggests the growing importance of maize production, which is evident in stable carbon isotope values of the period. Following Bender (1978), we suggest that increased food production required longer aggregation periods to fulfill the labor requirements of breaking fields, planting, tending, and harvesting, and that these long periods of aggregation placed significant stress on local subsistence production within economies dependant upon settlement mobility to dispersed resources. The acquisition of surplus commodities became more restricted as more labor was devoted to maize production, leading to a

decline in long-distance exchange by A.D. 750. The exchange of items based on *local* resources, in addition to feasting, continued through the development of villages around A.D. 1200. The decline of exotic artifacts in graves after A.D. 750 may represent a transition to “solidarity” feasting, rather than “competitive” feasting

## CONCLUSIONS

While we to date have no concrete evidence, we believe, based on regional data, that maize was utilized in the southwestern Lake Erie region by A.D. 400-500. It was not the immediate staple that everyone for so long assumed, but played a very minor role in what were essentially riparian-based harvesting economies until around A.D. 1200. The reasons for horticultural intensification have been in the past explained by reference to environmental degradation and demographic stress as sources of increased demand for subsistence production. On the contrary, we believe WBT and ST populations incorporated maize into their diets first as a sumptuary food item served exclusively during feasts. The feasts were one component of a complex of social renewal rituals that promoted cooperation and provided arenas to reproduce existing social hierarchies among peer polities. Nowhere is this more evident than at the several large social interaction sites associated with the Riviere au Vase and Younge phases. It appears evident that people gathered at these sites repeatedly to bury the dead and renew social relations and obligations with the exchange of gifts, competitive feasting, and probably marriage between polity groups. Conspicuous consumption was practiced in feasting and the burial of exotic items with the dead. The rituals likely took place during the spring, when dispersed groups aggregated to take part in harvests of anadromous fish.

We believe the intensification of maize production was likely influenced by peer polity interactions, rather than any crisis-induced need. We suggest that to successfully compete in peer polity interactions, community groups jockeyed to secure resources, foremost among them, external alliances. External alliances ensured the steady flow of exotic resources that were used in peer polity interactions. Peer polities sought to extend their influence well beyond their own corporate bounds, to bring in commodities convertible into influence and prestige. They manipulated trading alliances to restrict access by competing polities, and through that maximized their opportunities for social reproduction. The existence of a supralocal trade network

during the early Late Woodland time period (Halsey 1976; Halsey 1981; Stothers et al. 1994) provides the vehicle for the transmission of maize, and an impetus for its intensification.

Just when western Lake Erie populations became *dependent* on maize production is thus more a question of perspective. We must continually ask “dependent upon maize for what?”. If maize was a significant commodity used in early Late Woodland political economies, then a dependence on maize for social reproduction may have come quite early and contributed to the choice of local populations to commit their labor resources nearly exclusively to maize production. When dependence on maize production became a matter of survival is an interesting question. The commitment of labor to maize production conflicted with seasonal harvesting activities, and also required longer periods of aggregation that disrupted mobile subsistence patterns and traditional mechanisms of social reproduction involving contractual trade. Social interaction seems to have been increasingly reoriented around the schedule of maize production, which made it the new arena for peer polity interactions. With food production, however, came exponentially increased labor requirements and increased sedentism, which made settlement mobility much more difficult. This not only strained subsistence economies, but it also restructured interregional communication and surplus redistribution. The feasting rituals became more intensively localized as interregional communication decreased. At this juncture they ceased to be competitive, and became more a mechanism of local solidarity.

Lacking mechanisms for regional trade interaction, groups likely resorted to raiding in order to compensate for crop failures and shortages. The increasing need for defense, we argue, provided a further impetus behind village formation and contributed to community solidarity through the middle Late Woodland period (A.D. 1250-1450). The outward channeling of aggression, in addition to a regular pattern of village fission, alleviated internal community stress caused by a host of circumstances. In the southwestern Lake Erie region, “no man’s lands” were established between competing ST and WBT tradition community groups, creating distinct settlement areas. Village fortifications were elaborated with ditch enclosures, earthworks, and palisades. During the Late Prehistoric period (A.D. 1450-1550), villages fused once again, and were moved to defensively superior hogbacks and bluff-edge peninsulas. By the Protohistoric period in the region (A.D. 1550-1650), feuds escalated into endemic warfare, which united

neighboring groups including the Sauk, Fox, Mascouten, and Kickapoo into a Fire Nation confederacy that survived in the western Lake Erie region into recorded history.

A model of competitive feasting involving maize provides one explanation for numerous early Late Woodland phenomena, foremostly, the long period of maize utilization prior to its intensification around A.D. 1200. Considering the evidence in the region for the long existence of communal aggregation, extraregional exchange, and elaborate burial, the transition to maize horticulture cannot be viewed as simply the product of dietary needs. These phenomena alternatively suggest a long period of relative affluence and peer polity interaction among western Lake Erie populations, which came to an end only after the intensification of maize production. A reliance on maize was the cause for resource unpredictability and stress among Late Woodland populations, not its solution. Rather than requiring elaborate explanation, it was perhaps simply the overwhelming desire for control of an exotic food delicacy that laid the foundations for the developments of the Late Woodland period.

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## CHAPTER 5

# RECENT DEVELOPMENTS IN THE ARCHAEOLOGY OF THE PRINCESS POINT COMPLEX IN SOUTHERN ONTARIO<sup>1</sup>

David G. Smith and Gary W. Crawford

### INTRODUCTION

The origins of food production, especially plant cultivation, have received widespread and intensive consideration in recent years (see Cowan and Watson 1992a; Gebauer and Price 1992; Price and Gebauer 1995; Smith 1992, 1995). They signal, if not underly, significant economic, social, and other cultural changes. Intensive research over the past two decades has done much to clarify the origins and nature of the earliest plant cultivation and domestication in the North American Eastern Woodlands. This area is not homogeneous, but includes several cultural and ecological zones with diverse historical trajectories. In the southern Midwest, indigenous domestication of plants preceded the subsequent intensification associated with the success of corn in the late second millennium B.P. Through the interpretive work of Gayle Fritz, Kristen Gremillion, Bruce Smith, Patty Jo Watson, and others, this region is no longer viewed as an area of secondary origins through diffusion. Rather, it is a region of indigenous domestication (Fritz 1990; Smith 1987, 1992; Watson 1985, 1989). Horticultural origins in the Lower Great Lakes, central and southern New York and Pennsylvania as well as New England are, however, considered to be the result of "secondary origins;" that is, diffusion or migration or both (Cowan and Watson 1992b). The Lower Great Lakes region, in particular, lacks a cogent synthesis of agricultural origins based on rigorously collected and dated materials. To remedy this neglect, we have focused our research on the Princess Point Complex in southcentral Ontario (Figure 5.1) since 1993, and in this paper we report the contributions this program has made so far.

After conducting a review of agricultural origins, Gebauer and Price (1992:3) note that there is no single, accepted, general theory for the origins of agriculture.

Thus, we are turning in recent years to elucidating local processes to expand our database on the problem of agricultural origins. Southern Ontario is one region in the world that is surprisingly lacking in substantial information on the problem. Considering that horticulture became an important, if not predominant component of subsistence after A.D. 1000, this lack certainly hinders our understanding of Late Woodland Native economies in this region.

In 1993, we initiated a research program to address a series of issues pertaining to the shift to crop production in the Lower Great Lakes. Princess Point is generally viewed as the context in which the transition from strictly hunting and gathering to a mixed horticultural-hunter-gatherer way of life took place in southern Ontario. Princess Point is one of a number of archaeological cultures in the Lower Great Lakes region dating to between 1,000 and 1,500 years ago, and is possibly ancestral to later Iroquoian societies in this region (Crawford and Smith 1996; Crawford et al. 1997a; Fox 1990; Noble 1975; Smith and Crawford 1995; Stothers 1977; Trigger 1985; Wright 1984). Princess Point was originally defined as a "complex" (Stothers 1977), but for reasons discussed below, we believe that the term "complex" no longer applies, although, for lack of a better alternative, we continue to use the term "Princess Point Complex." Our research has removed any doubt that corn is associated with Princess Point contexts (Crawford et al. 1997a), and has provided the first detailed interdisciplinary examination of floodplains and agricultural origins in the Northeast (Crawford et al. 1997b; Walker et al. 1997). This paper summarizes past research on Princess Point, details the work that we have conducted over the past three years,

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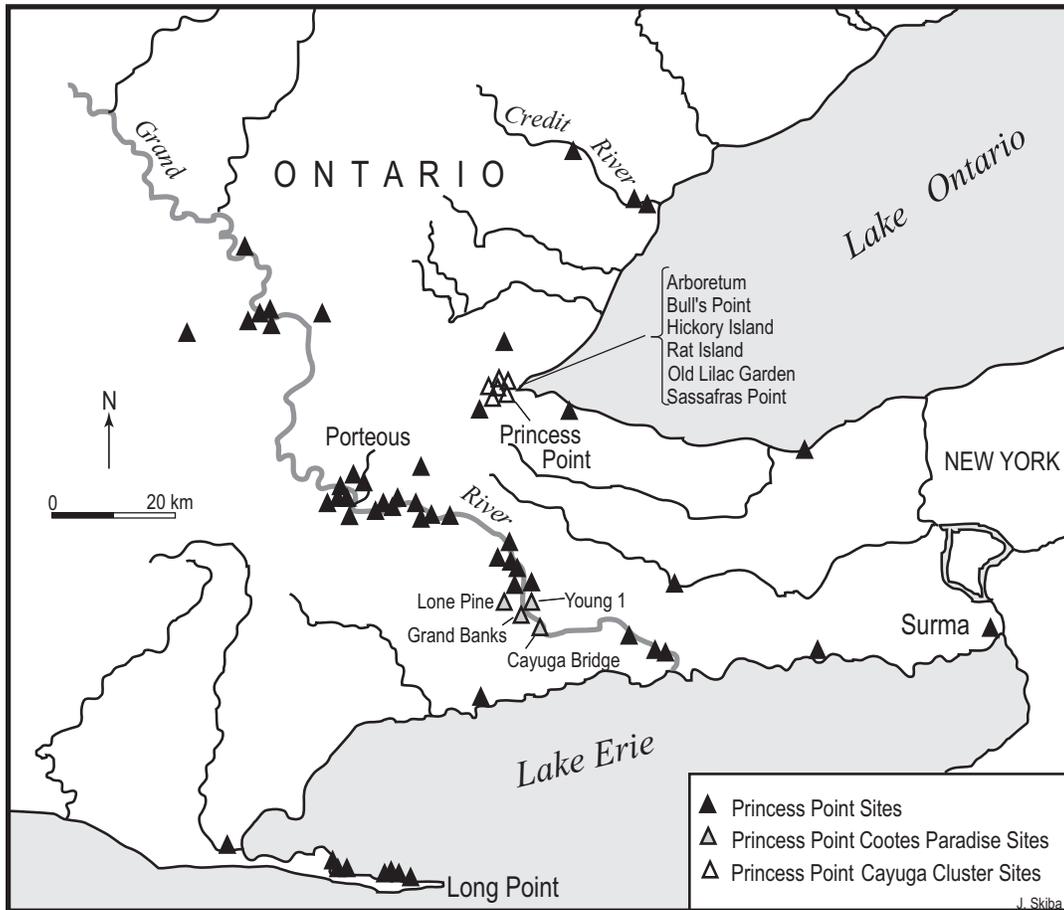


Figure 5.1. Southern Ontario and the Princess Point region.

and presents a revised overview of Princess Point and its implications for our understanding of the origins and development of food production in the Northeast Woodlands.

## SECONDARY AGRICULTURAL ORIGINS

In northern Europe and northern Japan, as well as the U.S. Southwest, data have enlightened us on processes of secondary agricultural origins. Historical trajectories must be detailed for the areas in question (Gebauer and Price 1992). In Japan, one of us (Crawford) has been examining the period from about 2000 B.P. to 800 B.P. There, the transition to agriculture occurred through diffusion, assimilation and migration (Crawford 1992b, 1992c; Crawford and Takamiya 1990; Crawford and Yoshizaki 1987; D'Andrea 1992). Local populations were eventually overrun by people with

agriculture. Overall, colonization, though, is the exception in secondary origins (Gebauer and Price 1992:8).

The move to agriculture in western Europe seems to involve a different process than it did in central Europe. In the former, local hunter-gatherers appear to have adopted agriculture, while in central Europe, there was a migratory intrusion (Dennel 1992; Keeley 1992; Price and Gebauer 1995). In northern Europe particularly, one view holds that hunting and gathering Mesolithic peoples engaged in a cooperative relationship with Neolithic newcomers (Gregg 1988). This model relies on ethnographic analogy and many untested assumptions (Crawford 1992a). Gregg (1988:7, 233) also has a lack of confidence in the archaeological record. (According to Gregg, charred cereal remains are not recoverable from Mesolithic sites, and radiocarbon dates are unreliable). Another view rules out cooperation in view of an archaeological record that, in fact, documents conflict and little

interest in exchange of service or commodities for domesticated resources (Gebauer and Price 1992; Keeley 1992). Nevertheless, in parts of Europe, interaction apparently took place. Where hunter-gatherers and farmers were interacting, domesticates (plants and animals) were incorporated into the subsistence regime, but initially they helped to sustain a fundamentally hunter-gatherer mode (Dennel 1992). Zvelibil (1986) argued that the shift to a dominant farming mode was a gradual and lengthy process that went through three stages: availability, substitution, and consolidation. This seems to be the case in Japan, where a complex intertwining of diffusion and migration took place (Crawford 1992c; Crawford and Takamiya 1990). The New World situation is documented less adequately, but the same pattern appears to apply: earliest agriculture did not necessarily disrupt hunter-gatherer lifeways when first introduced. In the American Southwest, for example, casual agriculture was adopted throughout the Desert Borderlands and effectively increased the economic security of Archaic peoples (Wills 1992, 1995).

Rather than corn being a prime mover in the late second millennium B.P. culture change in the Lower Ohio Valley, Muller (1987) proposes that new technologies lessened the interdependence of Middle Woodland peoples, and led to changed settlement patterns related to new resource procurement strategies that facilitated increased population. Increased localization of populations resulted, and the potential for local pressures on wild resources increased. The development and intensification of horticulture, including the addition of corn, would have been profitable under these circumstances (1987:266). Muller's (1987) model is multicausal and incorporates demography, sedentism, competition/cooperation. Braun (1987) also prefers a multifactorial approach. Wills (1995) adds competition as a major factor, in the context of circumscription.

A variant of the migration model tries to account for the spread of agriculture to the northern Midwest and Ontario (Stothers and Yarnell 1977). Consistent with data available in the 1970s, Stothers proposed that climatic amelioration in the mid-second millennium B.P. was the proximate cause of the spread of corn horticulture northward. The Hopewell interaction sphere existed to balance resource distribution throughout its domain. Peoples in widely separated regions were interdependent to some degree. With climatic warming and moistening, corn that was hitherto unsuccessful in the Midwest could grow well and could grow farther north. This productive resource lessened the need for

interaction, and ultimately led to a greater degree of local independence and thus the demise of the interaction sphere. The push northward by peoples from the Midwest ultimately led to agriculture in Ontario. The lack of evidence for cultural continuity between the southern Ontario Middle Woodland and Princess Point argued for a colonization of southern Ontario by corn horticulturists (Stothers 1977; Stothers and Yarnell 1977). We now know that so-called Hopewellian, and many other Middle Woodland peoples, had successful non-corn-based food production. In southern Ohio, early Late Woodland sites have cultigen assemblages that are qualitatively indistinguishable from Middle Woodland assemblages (including the absence of corn) (Wymer 1987). Thus, this initial migration model is inconsistent with present knowledge, but Stothers' observation that the transition to agriculture underlay the development of Iroquoian societies is still well accepted.

## PREVIOUS INVESTIGATION OF PRINCESS POINT

Princess Point was originally defined by David Stothers based on research conducted between 1969 and 1974. This included excavation at the Princess Point type site (AhGx-1) by Noble and Stothers in the late 1960s, survey and test excavation by Stothers around Cootes Paradise in 1969, survey of provincial parks in southern Ontario by Stothers in 1972, and survey and test excavation in the lower Grand Valley between 1969 and 1974 (Stothers 1977). At the Cayuga Bridge (AfGx-1) and Grand Banks (AfGx-3) sites, located on the banks of the Grand River, Stothers excavated sections of the riverbank, and at both sites the stratigraphy apparently showed three distinct periods of Princess Point occupation.

From this research, Stothers concluded that Princess Point was transitional between Middle Woodland and the Late Woodland Ontario Iroquoian Tradition in southern Ontario (Stothers 1977). He considered it intrusive into southern Ontario from the Western Basin region at the west end of Lake Erie, bringing with it incipient maize horticulture. The distribution of Princess Point sites led Stothers to isolate three contemporary regional concentrations in southwestern Ontario: the Point Pelee, Ausable, and Grand River foci. On the basis of a limited number of radiocarbon assays, pottery seriation, and stratigraphy he defined three phases: Early, A.D. 600-750; Middle, A.D. 750-850; and Late, A.D. 850-900 (Stothers 1977:113).

The features that Stothers used to characterize Princess Point include:

1. a material culture assemblage notably different from antecedent Middle Woodland in both manufacture and style, including:
  - a. "Princess Point Ware" pottery manufactured by the paddled vessel technique and decorated with cord impressions, and
  - b. triangular projectile points similar to the Levanna type;
2. presence of very limited quantities of maize, indicating incipient horticulture; and
3. settlements located in riverine/lacustrine environments, interpreted to be spring-summer seasonal aggregation camps.

Between 1974 and 1993 there was no large-scale research on Princess Point, although several researchers and institutions contributed both new data and interpretations. William A. Fox revised Stothers' synthesis of Princess Point, narrowing the scope of Princess Point both spatially and temporally (Fox 1984,

1990). He restricted the geographic distribution to what Stothers termed the "Grand River focus" (Figure 5.2), and revised the chronology for Princess Point to A.D. 700-900 (Fox 1990:182). Peter Timmins (1985) critically reexamined the radiocarbon dates recovered from Princess Point sites. This reevaluation emphasized the paucity of assays and lack of support for Stothers' three-phase chronology. In addition, Stothers himself rejected the intrusive origins of Princess Point in favor of an in situ model (Stothers and Pratt 1981). Cultural resource management operations added important new data from upland and lacustrine campsites (e.g., Lennox and Morrison 1990; Timmins 1992).

As it was interpreted as of 1993, then, the term "Princess Point" referred to an archaeological construct represented by sites concentrated along the eastern north shore of Lake Erie and the western end of Lake Ontario (Figure 5.2), and dating from ca. A.D. 700 to 900. In fact, due to limited research, Princess Point was poorly understood from all perspectives, including the nature of Princess Point itself, its chronology, its ancestors, its contemporaries, and its descendants.

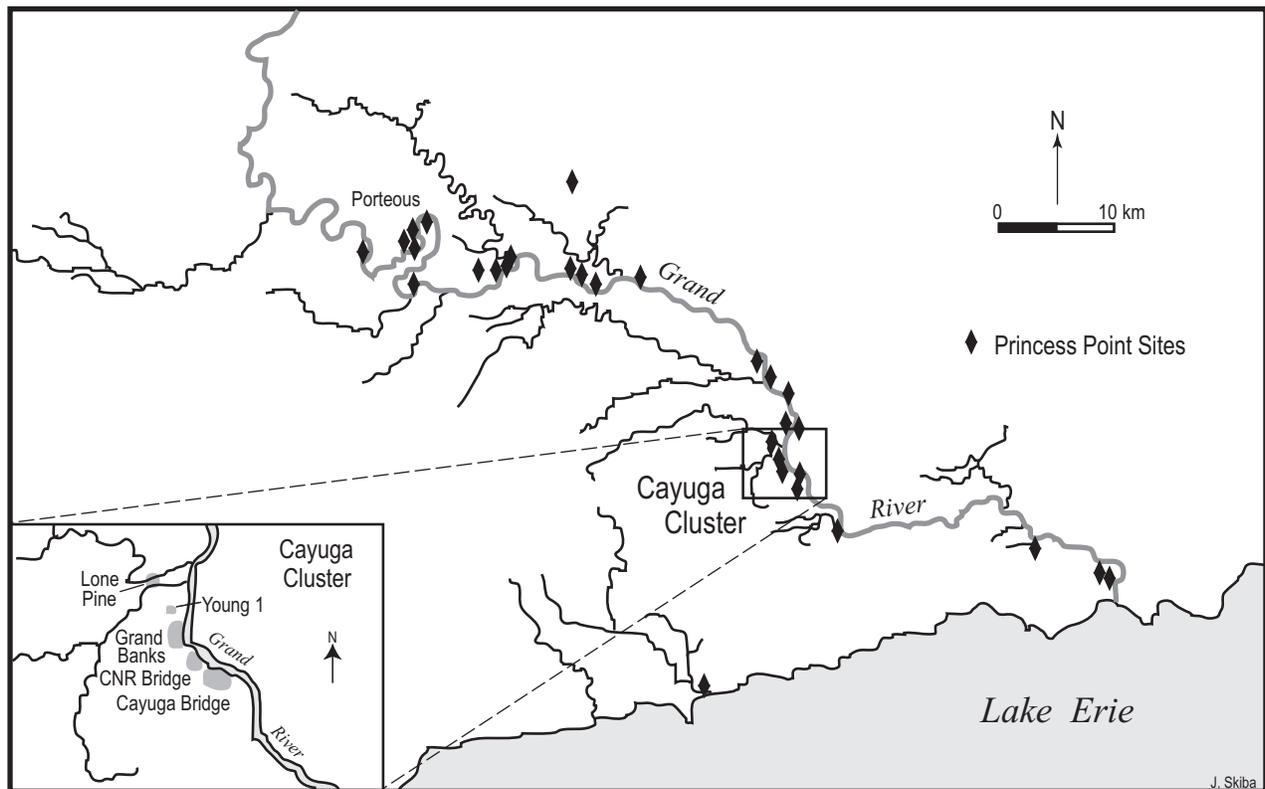


Figure 5.2. Grand River Princess Point sites.

## CURRENT INVESTIGATIONS

In view of the aforementioned, the specific objectives of the first stage of our research on Princess Point are to:

1. clarify the nature of Princess Point (e.g., chronology, settlement pattern, economy, technology);
2. examine the variation over time and space of this culture;
3. test hypotheses, particularly Muller's (1987) and Stothers' and Yarnell's (1977) regarding the origins of horticulture in secondary areas (i.e., areas where diffusion was the principal mode of spread);
4. provide the basis for the first detailed examination of horticultural origins and development in the Northeast;
5. provide data of comparative significance to other areas where good records of horticultural development exist (e.g., Illinois, Mississippi Valley, southern Ohio); and
6. examine the environmental context and impact of Princess Point, particularly the role of floodplains.

Nearly two-thirds of the known Princess Point sites are clustered into three locales: the Lower Grand River Valley, Cootes Paradise, and Long Point (Figure 5.2). These represent riverine, wetland, and lacustrine environments, respectively, and illustrate clearly the pronounced association of most Princess Point sites with major bodies of water. For the first three years of our project, we focused our excavations almost exclusively in the Lower Grand River Valley (LGRV), from Brantford to Lake Erie, because it offers the most abundant and varied source of data (about half the known Princess Point sites). In this part of the valley, the slope is gentle, the river is wide and shallow, and there are numerous river flats. The richness of archaeological resources in the LGRV does present some problems, however. There are hundreds of components dating from Palaeoindian times until the historic period. Many of the sites are multicomponent in nature, and the intensive Iroquois and Euro-Canadian agriculture practiced in the valley for the past two hundred years has resulted in mixed deposits. For Princess Point sites, this is mitigated under certain circumstances. The floodplain of the valley proper has undergone heavy flooding since the advent of forest clearing in modern times, and extensive silt deposition has sealed many components found close to the river.

There are a number of Princess Point site clusters in the LGRV. One cluster consists of five known sites in a

restricted area near the modern village of Cayuga. We concentrated our efforts on three occupation types in this cluster: Grand Banks, Young 1 (AfGx-6), and Lone Pine (AfGx-113). Grand Banks is a large site located on a lateral bar of the Grand River; Young 1 is a small site located on the river terrace above Grand Banks; and Lone Pine is a large upland site located on a tributary of the Grand about 2 km from the river.

In 1995, we expanded our research focus to include the site cluster at Cootes Paradise. To date, our work at this wetland is concentrated on small sites that are yielding important information about Princess Point settlement systems and seasonality. An overview of our work on the sites in both the LGRV and Cootes Paradise during the past four field seasons is provided in the following sections.

## METHODS

In line with the research objectives listed above, our research methodology has been geared to highly controlled recovery of fine-grained data, and our emphasis has been on quality over quantity in terms of simple measure of earth moved. A particularist approach to methods and techniques was employed at each site investigated, with an eye to accommodating local conditions. One meter square excavation units provided the requisite spatial control at each site. All undisturbed deposits were trowel excavated, while recent alluvium at Grand Banks and ploughed overburden at Young 1 were shoveled. Significant artifacts discovered while troweling were piece-plotted. Before digging significant areas, excavation units were excavated by trowel to subsoil or deep enough to reveal the local stratigraphy. Subsequently, the observed stratigraphy informed our testing. Young 1, a nearly completely ploughed locality, was tested with minimal vertical control in the ploughed section and a 1 m unit was excavated in relatively undisturbed fencerow in natural levels. Lone Pine has been disturbed only by bioturbation, freezing and thawing, and logging activity, so vertical controls conformed to a combination of natural and artificial levels. The O horizon was removed, then the A horizon was excavated in 5 cm levels until clay was reached; the clay was not included in the deepest artificial level. The deepest of the sites, Grand Banks, was similarly excavated following natural and artificial level distinctions. Natural soil distinctions take precedence because of the structure of the floodplain consisting of paleosols separated by alluvium. Each stratum was subdivided into 10 and sometimes 2-

5 cm levels to produce more or less detailed vertical contextual resolution. At Grand Banks, in particular, we expected to find complex stratigraphy in which cultigen remains might appear, so we elected to proceed with careful attention to stratigraphic detail.

Lone Pine is the only site we have systematically surface collected. The shallowness of the site has resulted in a high frequency of artifacts on the surface, a few of which mend with excavated artifacts in the same 1 m units. Several transects of the surface of Lone Pine have been piece-plotted in order to facilitate excavation location decisions. In general, however, 1 m square units were placed to allow some understanding of the spatial limits of the site and artifact distribution patterns over the site. Two areas were subsequently selected for more detailed examination. At Grand Banks, on the other hand, testing was only secondarily designed to clarify horizontal patterning and settlement information. In this first phase of research here, efforts concentrated on comprehending floodplain and site formation processes through time, while intensively flotation sampling.

All soils from cultural layers from Grand Banks and Lone Pine were routinely screened through 3 mm mesh if not collected for flotation. Plowed overburden at Young 1 was screened through 6 mm mesh. Paleosols at Grand Banks have generally been entirely sampled. In addition, features and posts are sampled in their entirety for flotation. Otherwise a minimum of 20 percent of the soil from particular contexts was collected for flotation. In the flotation process, heavy fractions were recovered with 2 mm mesh; light fractions were recovered using a 425 micron geological sieve.

Grand Banks has been the focus of geomorphological research in order to explore floodplain structure and development (Crawford et al. 1997a; Walker et al. 1997). More than 150 narrow-gauge auger holes were drilled at grid intersections over a 1,000 by 200 m area to provide topographic and lithostratigraphic data that set the archaeological excavations in a broader context. Sediment samples were taken from each bore hole. Riverbank cuts have also been logged and surveyed.

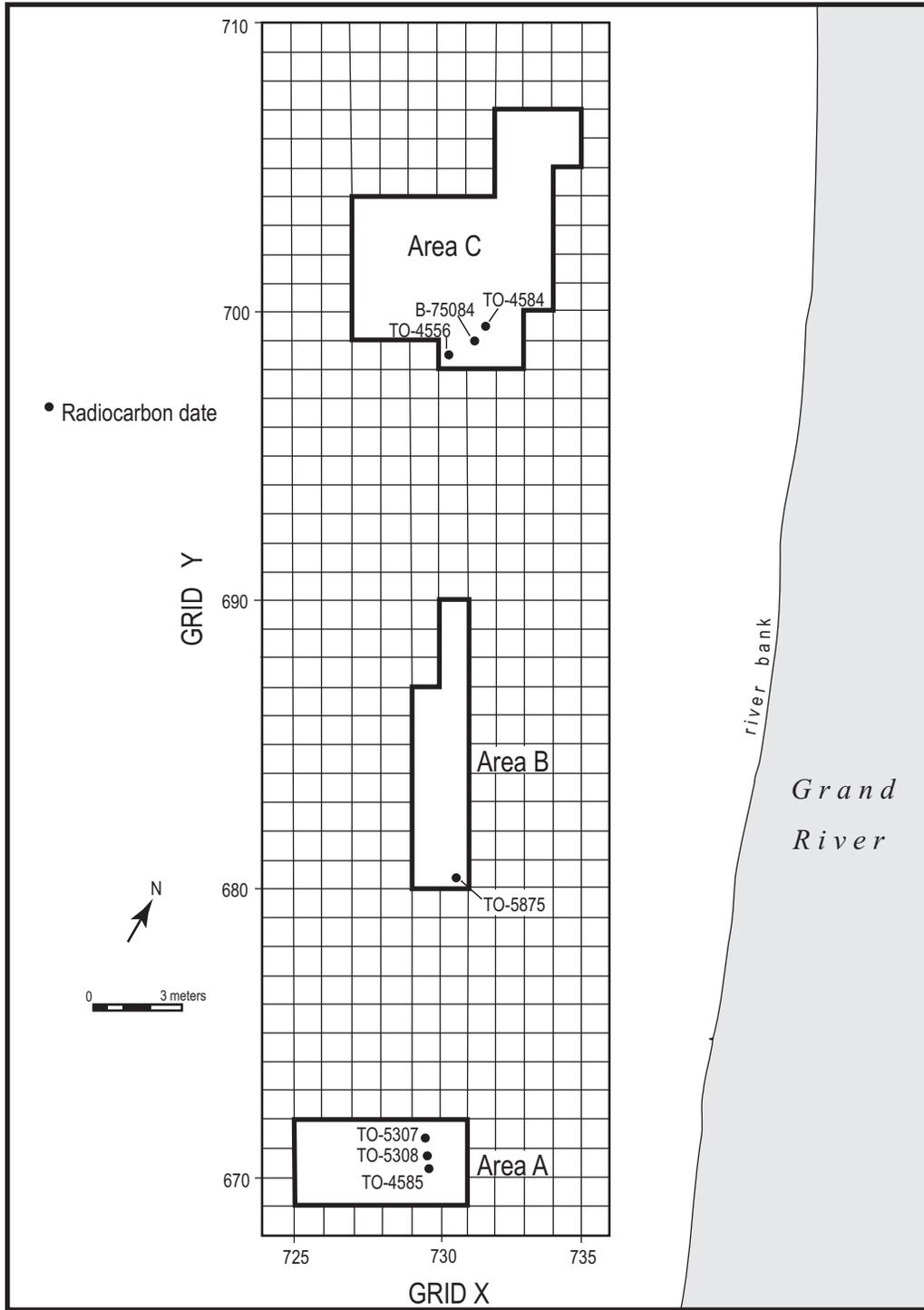
### **Grand Banks (AfGx-3)**

The Grand Banks site is situated on a 10 ha floodplain bar of the Grand River about 30 km from its mouth. Chert flakes and pottery fragments are scattered over much of the bar and are visible along about 1,000 m of river edge. The bar is eroding into the river and as a result, artifact-bearing deposits are most visible in an exposed palaeosol in the present riverbank for a distance of about 200 m. Geomorphological research

has determined that the floodplain is a vertically accreted lateral bar, that is, it was formed by successive deposits of riverine silt through superposition instead of being deposited horizontally (Crawford et al. 1997b; Walker et al. 1997).

From 1993 to 1995 we excavated a total of 80 square meters in a strip parallel to the riverbank at about 10-16 m from the present river's edge (Figure 5.3). The oldest occupation of the site, buried by about three thousand years of alluvial deposits, required excavations in some areas to more than 2 m below the surface. As a result, we have excavated an estimated 90 cu. m of fill. These excavations are in three localized areas (for now labeled A, B, and C in Figure 5.3).

Earlier test excavations by Stothers at Cayuga Bridge and Grand Banks indicated a complex stratigraphy that he interpreted as representing three episodes of Princess Point occupations in dark soil strata separated by alluvium and interspersed with pits. Thus forewarned, our research strategy was designed to investigate this complex stratigraphy in a detailed fashion. As it turns out, our interpretation of the stratigraphy at Grand Banks is quite different from what Stothers inferred. The coring by the geomorphologists has provided an important overview of the processes that resulted in the floodplain as it is structured today (Walker et al. 1997). In general, bedrock is at a depth of 2.5 m and is overlain by gray-colored gley. Above this is drier alluvium followed by a 20-30 cm thick palaeosol (PI). Overlying PI is about 1 m of alluvium followed by another palaeosol, PII. PII is capped by 50-60 cm of alluvium. We interpret this cap to postdate A.D. 1700, and it is typical of post-settlement alluvium (PSA) resulting from European land clearance found throughout riverine eastern North America (Crawford et al. 1997b; Walker et al. 1997). Although this is the standard lithostratigraphy at Grand Banks, it is not the only one. Excavations in Area A and the southern half of Area B exhibit the lithostratigraphy described above. Two clearly definable palaeosols are not evident in Area C and the north half of Area B. Instead, artifacts are concentrated in a 25-55 cm deep zone with little stratigraphic differentiation. This results from a combination of local subsurface topographic variation that brings PI and PII closer to the surface and recent plowing that has mixed the shallower portions of Areas B and C (Crawford et al. 1997b). PI, from the presence of two Kramer points, one in Area A and another from Area C, and a radiocarbon date of 3100 B.P., apparently contains a Late Archaic/Early Woodland occupation. In addition is a date of 3000 B.P. from Stothers' investigations. He rejected the date at the time, but it probably



**Figure 5.3.** Location of Grand Banks excavations (1993-1996) showing locations of radiocarbon samples.

also relates to the lower palaeosol, PI. PII contains only Princess Point artifacts, and where plowing has disturbed PII, historic artifacts are present (Crawford et al. 1997b). The lithostratigraphies do not indicate multiple Princess Point occupation episodes. PII is a homogeneous layer with no further subdivision possible.

To date, 18 sq. m have been exposed in Area A to recover a contiguous sample of PI and its contents as well as to provide detailed stratigraphic data. Part of Area A, the northeasternmost units 730-670 and 730-671, were excavated to below PI. The remainder of Area A was excavated to a depth of about 10 cm below PII or until there was no further evidence of Princess Point occupation (sterile alluvium above PI). PI was not further excavated here in order to preserve it. Artifact-bearing deposits were found to a depth of nearly 2 m, concentrated in PI and PII. The uppermost of these is a clearly defined dark layer 15-30 cm thick, which yielded Princess Point material. The lower palaeosol (PI) is a thicker and more amorphous stratum. Only 563 artifacts (368 g) have been recovered from PI. Only two pit features and no evidence of posts were found in Area A, PII, despite artifacts being distributed throughout PII. The features are all apparently Princess Point related.

Area B, a 17 sq. m trench, was exposed to explore the relationship between the Area A and C lithostratigraphies (Crawford et al. 1997b). High densities of artifacts are found throughout Area B. One cylindrical pit, Feature 210, and seven posts are the only structural features noted here. Feature 210 contains exceptionally well preserved pottery and plant and animal remains. In the center of this trench, we excavated until we reached sterile deposits at a depth of 2 m. The lower palaeosol abruptly rises to merge with the upper palaeosol, and then both "pinch out." The profile in Area B shows the relationship between the two paleosols in this area of the site. Plough scarring is prominent in this trench.

Area C has presented the most complex part of Grand Banks to excavate and interpret. Some 93 post molds that appear at least in two levels have been identified in this 45 sq. m excavation area. In addition are four probable hearths, two stone-filled features that are likely ovens, numerous small pits, artifact scatters/clusters, and soil stains. The aberrant stratigraphy described above has compounded the interpretive complexities of Area C. There is negligible vertical separation of the Princess Point and Late Archaic/Early Woodland horizons here. In addition is an historic component evidenced by at least three large charcoal-filled postholes, one of which has been radiocarbon-dated to

140±70 B.P. or cal A.D. 1650 (1690, 1730, 1810, 1930, 1950) 1955 (B-75094), a carbonized bean (*Phaseolus vulgaris*) AMS, dated to 210±60 or cal A.D. 1530 (1670, 1790, 1950) 1955 (TO-4558), and Historic period white clay pipe fragments. Finally, the Area C archaeological horizons, due to their shallowness, have likely received more plow damage than Areas A and B. However, this damage may not be extensive. At the top of Feature 1, about 25-30 cm below the surface, was a large piece of ground stone with a portion of a pottery vessel lying on it. The pit outline was also vaguely discernible at this depth.

Over 56,000 artifacts, not including bone and plant remains, totaling about 35 kg have been recovered from Areas A, B, and C, with a density of about 700 items per 1 sq. m excavation unit (Tables 5.1 and 5.2). Most are pottery fragments and chert flakes. The figures in the tables do not reflect the numbers of animal bones and plant fragments also recovered, but are still being analyzed. Flotation has so far produced a plant remains assemblage that includes one confirmed cultigen, maize; three types of nuts: acorn (*Quercus* sp.), butternut (*Juglans cinerea*), and a hickory (*Carya* sp.); four fleshy fruit taxa: American nightshade (*Solanum nigrum*), bramble (*Rubus* sp.), ground cherry (*Physalis* sp.), and strawberry (*Fragaria* sp.); grasses and greens, including chenopod (*Chenopodium* sp.), portulaca (*Portulaca oleracea*), switchgrass (*Panicum* sp.), and other grasses (Poaceae); probable arrowhead tubers (*Sagittaria latifolia*); cleavers (*Galium* sp.), and sumac (*Rhus* sp.). In general, artifact densities vary inversely with the density of posts and other features. That is, Area C has the lowest number and lowest density of artifacts, with only 14 percent of the total by number and 7 percent by weight.

We are not yet able to offer an interpretation of the settlement pattern and artifact distribution in Area C because of the limited view offered by the small excavation area and the complex post and feature pattern. Detailed interpretation must await results of our ongoing analysis and further excavation.

To summarize, our excavations confirmed Stothers' observation that deposits in the area next to the Grand River extend up to 1.5 m below the surface. We have determined that there were, in fact, three distinct pre-modern occupations at the Grand Banks site, but only one is Princess Point (Crawford et al. 1997b; Smith and Crawford 1995). The earliest occupation appears to date to the Late Archaic/Early Woodland, but we have not extensively investigated the deposits that are clearly this age. The next occupation is Princess Point, represented by the clearly defined PII. The third occupation

**Table 5.1.** Summary of Artifacts from the Grand Banks Site by Percentage (%) of Total Number and Weight.

	Area A (%)		Area B (%)		Area C (%)		Total	
	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)
Pottery	55	55	31	38	14	7	29,763	30,001.0
Chipped Stone	44	14	23	66	33	20	26,440	3897.9
Other Stone	8	4	12	21	81	75	26	932.2
Historic					100	100	19	92.8
Total	50	49	27	40	23	11	56,248	34,923.9

**Table 5.2.** Summary of Artifacts from the Grand Banks Site as Number and Weight per Square Meter.

	Area A		Area B		Area C		Total	
	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)	No.	Wt (g)
Pottery	908	915	550	668	90	48	372	375
Chipped Stone	648	30	354	151	194	18	331	49
Other Stone	-	2	-	12	-	15	-	12
Historic					-	2	-	1
Total	1,556	947	904	831	284	83	703	437

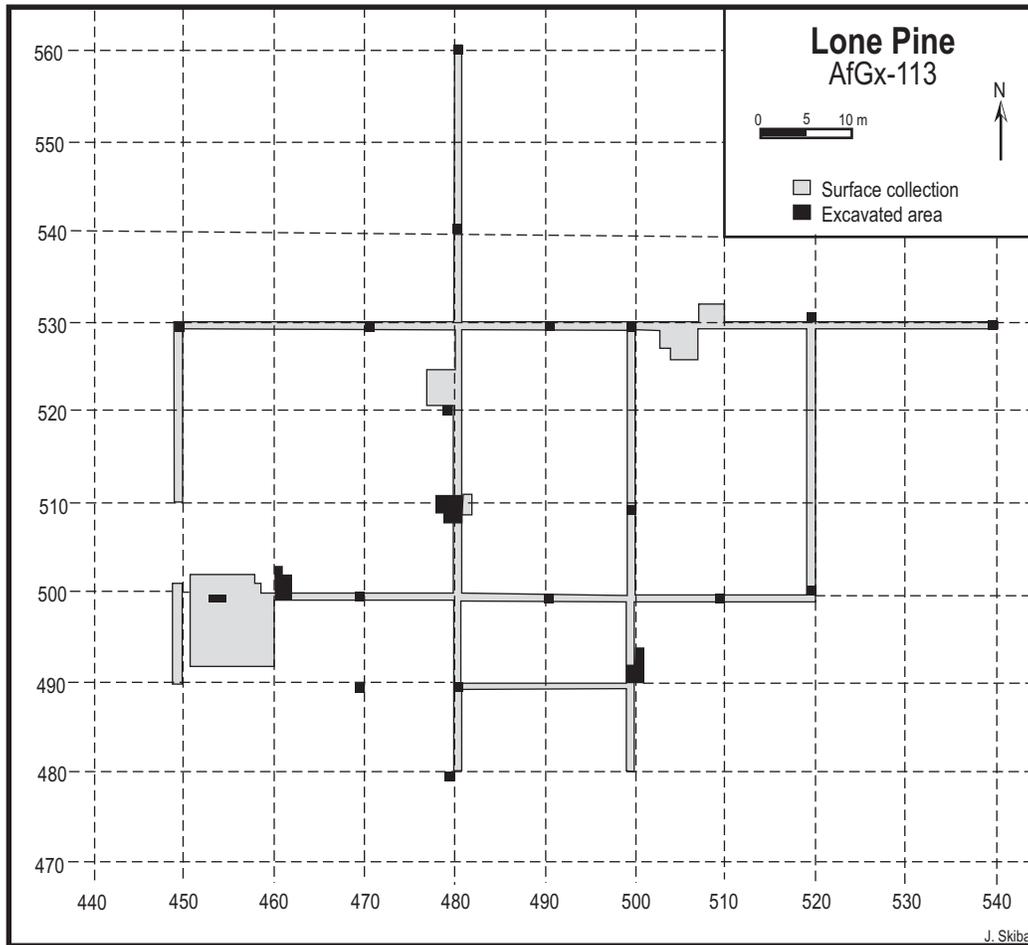
likely dates to about two hundred years ago. The Cayuga Iroquois settled on the Grand Banks flats during the late eighteenth century (Faux 1985).

### Lone Pine (AfGx-113)

The Lone Pine site was discovered in 1989 by F. Moerschfelder, a local avocational archaeologist. It is situated at the forks of a tributary of the Grand River, about 2 km from the Grand and the same distance from the Grand Banks site. It lies on a low plateau surrounded on three sides by creek banks. The artifact bearing deposits are distributed over about 0.5 ha, and generally consist of only 15 cm of clay-loam over a base of very heavy Oneida clay. Because the overburden is so thin, artifacts have been fragmented by frost and roots. The site has never been ploughed and has otherwise been subjected to very little modern cultural disturbance and no looting. As a consequence, artifacts are clearly visible on the surface of the forest floor.

The strategy of investigation at Lone Pine was directed toward discovering as much about the type of

site and the nature of cultural deposits without a huge investment of time and labor. To begin, a grid was established over the entire area of the plateau and 1 m test squares were excavated at 5 m intervals (Figure 5.4). This testing demonstrated that artifacts are distributed over an area of approximately 5,000 sq. m. We also discovered that settlement data, especially post molds, would be extremely difficult to discern in the heavy clay without opening up very large areas. We decided to take advantage of the thin overburden and undisturbed nature of the site by experimenting with surface collection of the forest floor. Controlled surface pickup of artifacts was conducted in 1 m wide transects (see Figure 5.4). This experiment was highly successful. It demonstrated clearly that surface artifacts were distributed variably over the whole extent of the site; several loci of more densely concentrated material were identified. Surface collection was then expanded in areas where surface-collected artifacts were densest. Subsequent excavation in four of these loci (Figure 5.4) confirmed that surface density reflected subsurface density.



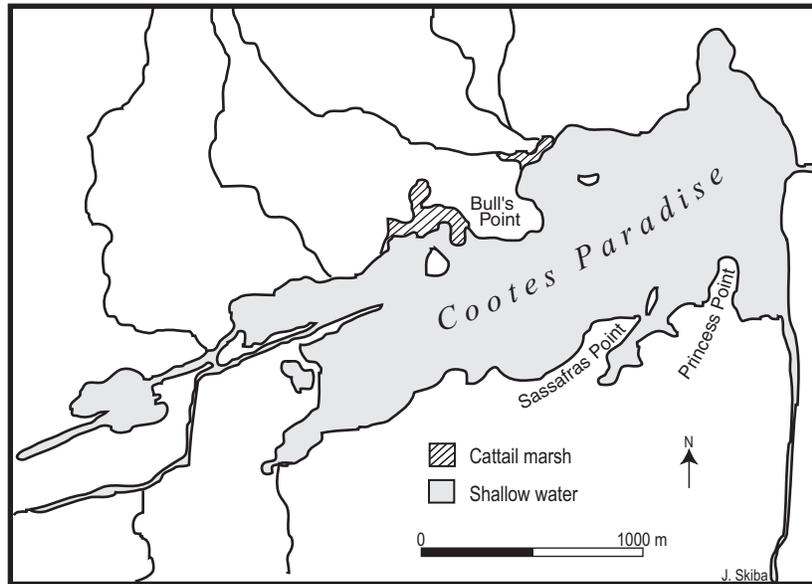
**Figure 5.4.** Excavations at the Lone Pine site (1993-1994).

The surface collection and excavations at Lone Pine yielded an artifact assemblage dominated by pottery and chert. The pottery is decorated primarily with cord-wrapped stick motifs. A seriation analysis of 26 rim sections (Bekerman 1995) demonstrates that the pottery is characteristic of the late part of the Princess Point period, and is most similar to the assemblage from the Porteous site; in fact, the seriation placed Lone Pine later than Porteous. Analysis of the flaked lithic material (Ormerod 1994) shows that the assemblage is largely made up of informal flake tools, with a small number of bifaces (including Levanna-like projectile points). Bone was present, but in small quantities. Ceramic smoking pipes were recovered in surprisingly large numbers (9 pipe bowls compared to 26 pottery vessels). Plant remains in the flotation samples are not particularly diverse and include maize, American nightshade (*Solanum americanum*), bramble (*Rubus* sp.), acorn (*Quercus* sp.), and sumac (*Rhus* sp.). Two radio-

carbon dates on maize are 1040±60 B.P. (cal A.D. 890 (1010) 1160) (TO-4586) and 800±50 B.P. (cal A.D. 1210 (1250) 1280) (TO-4083). The latter date would extend occupation of the site well into the later part of the Early Ontario Iroquoian period; if it is correct, it complicates our understanding of the relationship between Princess Point and Glen Meyer.

Settlement features include two hearth floors, but no definite post molds could be discerned in the heavy clay subsoil in the small areas that were exposed. We can infer that living structures were present on the site, but it is impossible to say from this limited evidence whether there are longhouses similar to those on the earlier Porteous site.

Interpretation of the nature of Lone Pine is hampered by the limited information available for this site and the current state of cultural classification in Ontario. We do not have enough settlement data to state unequivocally that Lone Pine is a village, but this



**Figure 5.5.** Cootes Paradise.

seems the most reasonable interpretation at present. Its geographic situation is typical of later Iroquoian village sites, and atypical of known Princess Point components. The radiocarbon dates for Lone Pine and its seriation later than Porteous suggest that Lone Pine could be considered a Glen Meyer site. On the other hand, the pottery styles from both Porteous and Lone Pine have clearer affinities with Princess Point than with later Glen Meyer ceramics. We will return to this thorny issue later in the paper.

### **Young 1 (AfGx-6)**

The Young 1 site was discovered during Stothers' survey of the lower Grand River Valley. It is a small site located on a terrace above the Grand River, on the edge of a knoll about 400 m from the river and about 0.5 km from the Grand Banks site. It is heavily plough disturbed except for a fencerow running over the knoll, and is underlain by heavy clay. The plowing has brought heavy clay through to the surface, making excavation exceedingly difficult and screening nearly impossible. Nevertheless, a number of shovel test pits were excavated as well as two 1 sq. m test squares in 1993. A very small and fragmentary artifact sample was recovered, including cord-wrapped stick marked rim sherd and a limited number of flakes. Young 1 may be a short-term seasonal camp, perhaps a spring refuge from minor flooding for inhabitants of the Grand Banks site, but data are too limited to be definitive.

### **Cootes Paradise**

Cootes Paradise is a sizable wetland at the western tip of Lake Ontario (Figure 5.5). Until about one hundred years ago, it was apparently a true marshland dominated by cattail and sedge. Modification through canal construction and the introduction of carp produced the present body of shallow open water (Figure 5.5). Excavations were conducted at the Princess Point type site by Stothers and Kenyon in 1968, and by Noble in 1969 (Stothers 1969). Also in 1969, Stothers conducted an archaeological survey around the periphery of Cootes Paradise and found an additional six Princess Point sites (Stothers n.d.). The Old Lilac Gardens site underwent mitigative excavation in 1984 to rescue a portion of it from impact by the construction of Highway 403 (Knight 1984). Smith directed two University of Toronto archaeological field schools, one in 1995 and another in 1996, in the Royal Botanical Gardens area of Cootes Paradise (Smith 1996c).

The Princess Point occupation of Cootes Paradise is represented by a variety of settlement locations and sizes, although estimates of site dimension for most of these is hampered by a lack of extensive investigation. Both the Princess Point (AhGx-1) and Sassafras Point (AhGx-3) sites are situated on low-lying peninsulas and appear to be the largest occupations at Cootes Paradise. The Old Lilac Gardens site (AhGx-6), is located on a peninsula higher above the water and is smaller than either Princess or Sassafras Point. The

Arboretum site (AhGx-8) is located on a terrace on the north shore. Smaller sites are located on both Hickory Island (AhGx-11) and Rat Island (AhGx-7) and, finally, two very small sites, Bull's Point (AhGx-9) and Bull's Cove (AhGx-365), are situated at the water's edge in glacial ravines on the northwest side of Bull's Point.

The 1995 and 1996 research was focused on the environs of Bull's Point (Figure 5.5). Bull's Point is another peninsula jutting into Cootes Paradise, but unlike Princess and Sassafras Points, it is a plateau of land about 25 m above the water. It is surrounded on three sides by steep banks cut by glacial ravines. Test pit survey was conducted on the heights of Bull's Point, with negative results. Survey in glacial ravines relocated the Bull's Point site, originally found by Stothers in 1969; in addition, three other sites were discovered. Two of the new sites produced chert flakes only, while the third, Bull's Cove, yielded Early Ontario Iroquoian pottery.

Excavations were conducted at the Bull's Point site in 1995 and 1996, and test excavations at Bull's Cove in 1996. Each site is situated at the bottom of a glacial ravine, beginning at the water's edge and running inland up a relatively gentle slope. At Bull's Point cultural material extends at least 30 m upslope from the shoreline of Cootes Paradise, whereas at Bull's Cove deposits are more limited in amount and appear to be concentrated within 5 - 10 m of the water. Thirty-four square meters were excavated at the Bull's Point site, yielding a sample of artifacts including rim sherds from 11 vessels, chipped lithic artifacts including cores, utilized flakes, and debitage, and fire-cracked rock. Almost no faunal material was recovered. All but one of the rim sherds is decorated with distinctive Princess Point cord-wrapped stick motifs. One rim sherd is decorated with a linear stamp motif and may indicate a later Iroquoian presence at the site. Several shallow features were uncovered in the excavations, but none yielded any artifacts. Over 80 post molds were discovered, and likely trace the outline of a small structure 4 by 3.5 m in size (Smith 1996c). Ongoing analysis of flotation samples has yielded one carbonized maize fragment. Twelve square meters were excavated at the Bull's Cove site, yielding a very small amount of pottery and chipped lithic material. No rim sherds were recovered, but other sherds show linear-stamped decoration. As was the case for the Bull's Point site, almost no faunal remains were recovered from Bull's Cove.

Because information is so limited, it is difficult to interpret the Princess Point occupation at Cootes Paradise, although exploitation of the wetland was likely quite intensive. The large sites at Princess and Sassafras Points may have been relatively large habita-

tions, but it is impossible to say whether they were occupied on a seasonal or year-round basis. They may have been seasonal sites occupied repeatedly over a long period of time by small groups of people. Stothers' interpretation of Princess Point settlement pattern argued for seasonal occupation of large macroband encampments on large bodies of water during the late spring and early summer, and small microband camps in upland environments during the fall and winter. Applied to the Cootes Paradise situation, this model suggests that the Princess and Sassafras Point sites, and perhaps the Lilac Gardens and Arboretum sites, were spring-summer macroband habitations. The site locations on Hickory Island, Rat Island and Bull's Point remain unexplained because they are not in upland settings. We have questioned Stothers' model, however, and have raised the possibility that the large Princess Point sites may have been occupied year-round (Crawford and Smith 1996; Crawford et al. 1997b; Smith and Crawford 1995). Alternatively, Princess Point and Sassafras Point may have been base habitations that were occupied for all or most of the year. Other areas of Cootes Paradise were then exploited by smaller groups of people at various times of the year. The data from the Bull's Point site suggests that it was a short-term camp for a small number of people, perhaps multicomponent, that may have been employed as a base for collecting plant food in the autumn.

## UPDATES

This research, although in its early stage, offers a basis for revisiting a number of issues pertaining to Princess Point. The following discussion updates our thinking on the classification of Princess Point, its geographical distribution, chronology, material culture, settlement pattern, subsistence, and crop diffusion. We are currently continuing to evaluate many of the issues outlined.

### Cultural Classification

Since its inception, Princess Point has been referred to as an archaeological "complex" (Crawford and Smith 1996). A review of the classification is due. The period of transition from Middle Woodland to Late Woodland in southern Ontario is difficult to characterize for a number of reasons. Research has been sporadic in its intensity and variable in its geographic coverage. In addition, no consistently accepted culture-

classification system has been applied. At present, there are three archaeological “manifestations” assigned to the period from A.D. 500 to 1000, each classified using somewhat different schemes:

1. the Riviere au Vase phase of the Late Woodland Western Basin Tradition in southwestern Ontario;
2. the Princess Point Complex in southcentral Ontario (not assigned to a tradition); and
3. the Sandbanks Tradition in southeastern Ontario.

Sandbanks is a nebulous entity that has not been formally defined; use of the term ‘Tradition’ here should be viewed as an interim device (see Fox 1990). Riviere au Vase is the first of four sequential phases in the recently defined Western Basin Tradition in Ontario (Murphy and Ferris 1990). The Princess Point Complex, which is our primary concern in this paper, has been the focus of more investigation than the other two, but its classification remains unclear.

As noted above, David Stothers identified and defined the Princess Point Complex in the southcentral and southwestern regions of the province (Stothers 1977). He divided it spatially into three foci (Point Pelee, Ausable, and Grand River) and temporally into three phases (Early, A.D. 600-750; Middle, A.D. 750-850; and Late, A.D. 850-900). More recently, Fox (1990) revised both the spatial and temporal parameters of Princess Point. He excluded the Ausable focus as too poorly known to classify, reassigned the Point Pelee focus to the Riviere au Vase phase of the Western Basin Tradition, and shortened the time period by dropping Stothers’ Late phase. Thus, the Grand River focus inherited the label Princess Point complex, although the rationale for using the term “complex” appears to have been eliminated.

Although Princess Point is not directly assigned to a more inclusive classification scheme, many researchers consider it most closely related to the Ontario Iroquoian Tradition (Wright 1966), and likely ancestral to it. The internal divisions of Wright’s framework are at variance with those of other systems defined for the Northeast, most notably the Western Basin Tradition (Murphy and Ferris 1990) and the New York Iroquois sequence. Both the Western Basin and New York Iroquois systems are divided into “phases” named after important sites, whereas the Ontario Iroquoian Tradition is divided into Early, Middle, and Late “stages.” Because of this, Princess Point is difficult to label and to slot into the Ontario Iroquois Tradition model. We cannot call it a “phase” because it does not relate directly to the Western Basin or New York Iroquois sequence and because this would violate the

nomenclature of Wright’s stage system. Using the term “stage” is also unsuitable unless the Ontario Iroquoian Tradition is revised to include an additional class such as the “Formative stage.” We resist this because the actual relationship of Princess Point to later Iroquoian societies in southern Ontario has not been established clearly; such ad hoc restructuring of an existing classification system is not appropriate in any case.

Another solution is to elevate the notion of “Transitional Woodland” (see Spence and Pihl 1984) to the status of a new period, as opposed to it simply being a bridging concept between the Middle and Late Woodland as it is presently used. There are numerous problems with this. To begin with, it is now clear that there is definite chronological overlap between what is called Middle Woodland and Transitional Woodland (Smith 1996b) that would be masked by another pigeonhole category. Second, the labeling of periods as Early, Middle, and Late is exclusive by definition. This applies to both the Woodland periodization and the Ontario Iroquoian Tradition. Third, the existing regime of Early, Middle, and Late Woodland is applied over a much wider area than Ontario, and even the Northeast; modifying it within a limited region violates its integrity over the larger area. Fourth, the label “transitional” by itself is not inherently applicable to the Middle to Late Woodland transition alone, but could equally be applied to Early to Middle, or even Archaic to Woodland. Finally, the current scheme is highly ingrained in archaeological consciousness, as is evidenced by previous attempts to revise it. Wright’s (1972) attempt to replace the three-period framework with Initial and Terminal Woodland met with mixed success. Mason’s (1981) scheme of Woodland I, II, and III has not seen wide application. In order for any revision to be effective, it must be seen as both necessary and useful by as many researchers as possible.

Thus, there is no clearcut solution to the issue of classification for Princess Point. The current state of culture classification in Ontario and the Northeast, with its historically derived mix of approaches, is simply not flexible enough to allow either redefinition of existing taxons or insertion of new ones. For the time being, we are forced to continue to refer to Princess Point as a “complex” within the nebulous “Transitional Woodland.”

### **Distribution and Chronology**

Our research does not modify Fox’s (1990) description of the geographical distribution of Princess Point (Figures 5.1 and 5.2), but clarifies Princess Point

chronology considerably. To date, we have collected six new radiocarbon dates, all AMS, that apply to the Princess Point period. These dates are discussed in detail elsewhere (Crawford et al. 1997a), and the results are simply summarized here (see Table 5.1). The most important new data are the two Grand Banks assays on corn dating to the sixth century A.D. These dates extend the inception of Princess Point back to A.D. 500-600, and demonstrate conclusively that maize was present and most likely being grown in southern Ontario much earlier than was previously appreciated (see Fox 1990; Snow 1995). They also suggest considerable chronological overlap of Transitional and Middle Woodland sites (Smith 1996b), raising the possibility that both Princess Point and Point Peninsula communities cohabited this region for up to three hundred years.

Chronology within the Princess Point period remains somewhat imprecise. One of the primary reasons for this imprecision is that all the sites for which radiocarbon dates are available appear to be multicomponent. The seriation study conducted by Bekerman (1996) was limited by several factors (discussed below), but did produce a relative ordering of seven sites. From earliest to latest this series is: Glass -> Varden -> Middleport -> Cayuga Bridge -> Grand Banks -> Porteous -> Lone Pine. This order basically confirms the one generated by Stothers (1977). However, we see no evidence for dividing the sequence into three phases at the moment.

The latest dates in the sequence, from Grand Banks and Lone Pine, pose questions about the terminal date of Princess Point and the inception of the Glen Meyer period. These dates suggest that Princess Point persisted until at least A.D. 1000. Dating of the Porteous site, admittedly controversial, places it at A.D. 900 (Fox 1995). This date is now supported by the A.D. 1010 date from Lone Pine and the pottery seriation of Lone Pine later than Porteous. If Lone Pine is also interpreted as an early Glen Meyer village, we have an overlap of Princess Point and Glen Meyer for at least one hundred years.

As mentioned above, we have some concerns about the attribution of cultural affiliation for Lone Pine and, by implication, for Porteous and other sites dating in the A.D. 900-1000 range. The general issues are chronology, settlement type and pottery styles; specifically, there is the question of whether Porteous and Lone Pine should be classed as Princess Point or Glen Meyer components, or as something else. The problem lies with how Princess Point and Glen Meyer are defined, a question with which Fox (1990) and

Williamson (1990) have previously grappled. For chronology, Fox (1990:181) and Williamson (1990:310) agree on A.D. 900 as the terminal date for Princess Point and the inception date for Glen Meyer. However, our research suggests that the transition from Princess Point to Glen Meyer was not abrupt, and that some Princess Point communities may have persisted until at least A.D. 1000.

Although many researchers (Fox 1990; Smith and Crawford 1995; Stothers 1977; Williamson 1990) have argued that Princess Point is Iroquoian and likely ancestral to the Glen Meyer branch of the Early Ontario Iroquoian stage (Wright 1966), the actual relationship between Princess Point and Glen Meyer is not clear. There is some disparity between Princess Point and "classic" Glen Meyer pottery. For example, Wright's typology for Glen Meyer ceramics cannot be applied to Princess Point pottery assemblages dating prior to A.D. 900, nor with any great success to the Porteous and Lone Pine assemblages. The settlement issue turns on the definition of Porteous as a village site, with the argument being made that the appearance of such habitations signals the beginning of the Early Ontario Iroquoian period (Fox 1990:173). If we accept a date of A.D. 900 for Porteous, then villages appeared at least in the LGRV by this relatively early time period. The ceramics from Porteous and Lone Pine, however, show no clear stylistic breaks with Princess Point. We are left with the question of whether imposing what now appears to be an arbitrary dateline and abrupt changeover from one cultural period to another does justice to the transitional nature of Porteous and Lone Pine, plus others sites such as Moyer Flats and Stratford Flats.

### **Material Culture and Settlement Pattern**

The hallmarks of Princess Point pottery are cord-roughened surface treatment, cord-wrapped stick decorative motifs arranged in horizontal bands, and the application of deep external punctates accompanied by internal bosses. These attributes occur in varying frequencies and combinations in all Princess Point pottery assemblages, and continue with decreasing frequency into the Early Ontario Iroquoian period. The pottery of any one point in time in the Princess Point continuum is, however, difficult to characterize. Bekerman's seriation study (1996) faced the limitation that, at present, no single Princess Point pottery assemblage can be identified unequivocally as representing a single component. It is now clear that the Grand Banks assemblage covers a period of up to five hundred years

(Crawford et al. 1997a). The same is likely true for Cayuga Bridge, and also for the Princess Point component at the Middleport site (Jamieson 1986). In addition, sample sizes for most sites are statistically small. Unfortunately, the pottery assemblages recovered from Grand Banks, Young 1 and Lone Pine do little to remedy this situation. The test excavations at Young 1 yielded only 2 rim sherds, and only 26 were recovered from Lone Pine. Grand Banks yielded a much larger sample, but it is now clear that this site was occupied for an extended period of time, perhaps for five hundred years. Little of the Grand Banks pottery can be limited to any particular point in time. The assemblage of roughly six to eight pots from Feature 210, now undergoing analysis, is an exception, and provides us with an interesting “snapshot” of pottery dating from the early eleventh century A.D. This sample is, however, too small to allow valid generalizations.

Ceramic smoking pipes are present on Princess Point sites, but their frequencies are low. (Fewer than 10 pipes have been recovered from pre-A.D. 900 Princess Point components to date.) Pipe bowls are, as a rule, either barrel or cylindrical in shape, stems are either round or D-shaped, and elbows are both right- and obtuse-angled. About half the pipe bowls are plain and the other half are decorated with rows of punctates or incised motifs. These pipes can be characterized as fully functional, if unelaborate. Since tobacco seeds have not been recovered from any Princess Point site to date, what was smoked in these pipes is unknown.

The frequency of smoking pipes at the Lone Pine site is surprising; there are more pipes from Lone Pine (nine) than for all the previous Princess Point sites combined. This anomaly is discussed elsewhere (Smith 1996a; Smith and Crawford 1995); suffice it to say here that this florescence may relate to increasing use of smoking pipes as a social mediator in villages or proto-villages. It may also accompany the first introduction of tobacco to Ontario, although evidence to support this association is generally lacking at present.

Flaked lithics are generally the most numerically common artifacts from Princess Point sites. The lithic assemblages include all aspects of chipped stone manufacturing: cores, shatter, primary flakes, core trimming flakes, biface trimming flakes, informal utilized flakes and formal tools. The latter include projectile points, bifaces, drills, and scrapers. The chipped lithic artifacts from Lone Pine and Grand Banks have been analyzed in detail (Ormerod 1994; Shen 1997). One of the most important general characteristics to emerge from these studies is that Princess Point lithic assemblages are dominated by informal flake tools, with

curated formal tools forming a small subset. As part of our examination of the relationship between technology and the emergence of the Iroquoian mixed economy, use-wear analysis is playing an important role. Shen’s study includes a comparison of use-wear between a Middle Woodland lithic sample and a sample from Grand Banks. This comparison documents a significant increase in the variety of use-tasks performed by lithic tools from Middle Woodland to Princess Point, and a decrease in the proportion of tools devoted to meat-preparation and/or butchering as opposed to plant-working (Shen 1997:273). Because of Muller’s suggestion that the bow and arrow played a critical role in the transition to the Late Woodland in the Midwest (1987), we have paid close attention to projectile points. So far, we have not been able to confirm that the bow and arrow played an important role at this time in Ontario, because the evidence points to all but three of the projectile points in the Princess Point assemblages having been used as generalized bifacial tools (Shen 1997).

Unfortunately, bone preservation on the four Princess Point sites we have been excavating is extremely poor. This anomaly cannot be explained at present, and will require future clarification. A range of taxa is represented in the small collection, and the most abundant elements appear to belong to fish.

Rigorous examination of the Princess Point settlement system is still in its infancy. Interpretation depends on ongoing analyses of animal bone, plant remains, site functions, materials procurement and site chronology. We have offered our evaluation of the status of settlement system interpretation elsewhere, based on the archaeological record as we currently understand it (Crawford and Smith 1996; Crawford et al. 1997b; Smith and Crawford 1995). We caution basing Princess Point settlement models on unsubstantiated Middle Woodland patterns. Furthermore, the particulars of riverine geomorphology must be worked out before concluding that specific natural cycles such as periodicity of flooding helped determine scheduling decisions on the part of Princess Point peoples. In addition, crop production logistics need to be properly factored into any proposed Princess Point settlement system. Resource procurement must also take into account other raw materials such as clay and stone. So far we have concentrated on chert extraction and have identified numerous outcrops of Onondoga and Bois Blanc cherts within a 40 km radius of Cayuga, Ontario. This study is in its early stages but there is a clear emphasis on Onondoga cherts, probably from the north shore of Lake Erie (Quin 1996). As a result, we are questioning

the generally accepted spring-summer macroband/fall-winter microband shift for this group (Stothers 1977). We are exploring alternatives, including a model that takes into account more annually stable communities as well as short-term, special-purpose sites (Crawford and Smith 1996; Smith and Crawford 1995).

## Subsistence

Documenting the introduction of food production in southern Ontario during Princess Point times and the degree to which this culture was dependent upon it in the context of general subsistence research is a primary concern of our project. Our intensive flotation efforts have recovered maize kernels and cupules from Grand Banks, Lone Pine, and Bull's Point. The AMS dates of cal A.D. 540, 570-600, and 780 on kernel and cupule fragments from Grand Banks are the earliest direct dates for corn in the Great Lakes area, and provides evidence that this crop was being cultivated in the Lower Grand Valley by the sixth century A.D. (Crawford et al. 1997a).

Northern Iroquoian crops were principally corn or maize (*Zea mays*), bean (*Phaseolus vulgaris*), cucurbit (*Cucurbita pepo*), sunflower (*Helianthus annuus* var. *macrocarpus*), and tobacco (*Nicotiana* sp. c.f. *rustica*). Their record in post-A.D. 1100 Ontario is quite extensive (Crawford and Smith 1995; Fecteau 1985; Monckton 1992; Ounjian 1997). None is native to the Lower Great Lakes. The crop complex of prehistoric Ontario Iroquoian societies was not as diverse as it was in the neighboring Fort Ancient, Mississippian, or Late Woodland cultures of the U.S. Midwest (Crawford and Smith 1995; Fritz 1990; Macaulay 1991; Wagner 1983), which included chenopod (*Chenopodium berlandieri* ssp. *jonesianum*), maygrass (*Phalaris caroliniana*), sumpweed (*Iva annua* var. *macrocarpa*), and probably erect knotweed (*Polygonum erectum*) and little barley (*Hordeum pusillum*). These plants were apparently not all grown in each area, or in the same proportions, either. Erect knotweed, chenopod, sumpweed, and little barley are found in archaeological collections (pre-historic Iroquoian) from Ontario, but their quantities are very low. The latter two plants are reported from only one site each in the province (Ounjian 1997).

By the Early Woodland period (by 3000 B.P.) in the southern American Midwest, successful gardening was based on cucurbit, chenopod, sumpweed, maygrass, erect knotweed, sunflower, and little barley (Fritz 1990; Smith 1987, 1989). By 1800 B.P., tobacco was present, but corn and beans were not. This crop assem-

blage supported relatively complex sociopolitical systems for at least a millennium and a half (e.g., Adena, Hopewell, and Mississippian). We have no evidence that Early and Middle Woodland populations in Ontario grew any of these crops. Sunflower may be present in Michigan by 3000 B.P. at the Eidson site, but so far, this is an isolated report in the Lower Great Lakes.

Between A.D. 900 and 1200, an intensification of food production systems occurred in much of the Northeast, paralleling a similar process taking place throughout the Eastern Woodlands. During this period, corn and beans became components of local cropping systems. In Ontario, tobacco and beans have not been rigorously demonstrated to be part of the archaeological record until about A.D. 1200 (Fecteau 1985; Ounjian 1997; Stothers and Yarnell 1977), the earliest coming from the Calvert site.

The record for corn in the East, including the early Grand Banks material, has been reviewed in detail elsewhere (Crawford et al. 1997a). With the AMS dates on corn from the lower Grand River Valley, a body of evidence is building for mid-first millennium A.D. corn in the Lower Great Lakes. We do not yet know the extent to which corn played a role in Princess Point subsistence ecology, but its presence at all three Princess Point sites tested intensively by us so far, Grand Banks, Lone Pine, and Bull's Point, and its regular occurrence at Grand Banks, suggests corn was becoming important well before A.D. 1000-1100 here. Feature 210 in Area B at Grand Banks has a particularly high density of corn. For the moment, isotopic analysis of human bone is not particularly helpful because of the lack of fine-scale chronological resolution and insecurely dated bone. The Surma site, in particular, is of interest because human bone there indicates relatively high C4 plant (presumably corn) use, yet the A.D. 700 date for the bone (Katzenberg et al. 1995) is surmised from pottery seriation. With the range of radiocarbon dates from Grand Banks and the highest densities of corn coming from the roughly A.D. 1000 period at the site, we believe the site represents occupations from the initiation of corn husbandry through the initial intensification of agriculture in the lower Grand River Valley.

The origin of Eastern Eight-Row corn is somewhat problematic in light of the known archaeological record. One suggestion popularized by Cutler and Blake (1973), and apparently still accepted by King as late as 1987, was that the Eastern Eight-Row variety descended from a Midwestern Twelve-Row corn (a type of popcorn) grown by Middle Woodland peoples. Sykes (1981) believed that the Twelve-Row corn

in Ontario was Middle Woodland-derived Midwestern Twelve-Row corn. Midwestern Twelve-Row corn was thought to be similar to the contemporary Chapalote corn of the Southwest. This is incorrect for two reasons: first, corn was rare during the Middle Woodland and the few extant examples cannot be classified (Fritz 1990); and second, Eastern Eight-Row corn normally includes 12-rowed cobs anyway (Conard et al. 1984; Crawford and Smith 1995; Crawford et al. 1997a; Fritz 1990).

For the moment, our working hypothesis is that Eastern Eight-Row maize developed in the Northeast, but the record for maize before 800 B.P. is inadequate to resolve how this type of corn appeared here (Fritz 1990). The recovery of corn remains in the second half of the second millennium B.P. is relevant to understanding not only the role of corn in early post-Middle Woodland Ontario, but to the evolution of the Eastern Eight-Row type of corn that was critical to northern Iroquoian horticulture.

Based on this evidence, our hypothetical scenario for the introduction of corn horticulture to southern Ontario is as follows. The cultigen itself was introduced through Princess Point communities, either by migration or diffusion, by as early as cal A.D. 500-600, but probably not much earlier than this considering the dates from areas to the south (Crawford et al. 1997a). At this time, we suggest that limited cultivation was practiced, coinciding with the development of the large river bar sites like Grand Banks. Cultivation gained in intensity so that, by 1,000 years ago, Princess Point society was dependent on food production as a subsistence regime, accompanying the development of more centered communities exemplified by Lone Pine and Porteous.

## CONCLUSIONS

Southern Ontario provides an example of secondary agricultural origins, particularly in a north temperate region. Other important examples include northern Europe and Japan as well as the U.S. Southwest. This paper has sought to outline the extent to which research on the Princess Point Complex is helping us come to understand the local historical trajectory as well as the extent to which the development of the Ontario Iroquoian mixed economy shares characteristics with other regions of secondary agricultural origins.

Pre-A.D. 800-900 Princess Point is critical to the issues at hand, and until now, our knowledge of this

period was based almost entirely on the examination of two small riverbank test excavations on the Grand River by David Stothers in the 1970s. Our developing views are based on excavations at four sites, including one that Stothers tested (Grand Banks) and the application of methodologies not previously employed in an integrated fashion at Princess Point sites, or many other sites in the province for that matter. The field and laboratory methodologies being employed are providing exceptionally fine-grained data with which we have little to compare in the Northeast for this time period. Wider application of these techniques in a research-oriented context is encouraged.

A series of AMS and regular radiocarbon dates aid the interpretation of the complex stratigraphy at Grand Banks, assist the establishment of a more rigorously defined chronology, and associate corn with the Princess Point Complex. We also have a new pottery analysis and a preliminary revised chronology from A.D. 500 to 1100. A detailed database of over 80 sites is beginning to tell us much about settlement circumstances during this period. Princess Point was, indeed, the founding agricultural group in the Grand River Valley, based on the presence of corn in some quantities at all three sites we have tested in detail. We now also have evidence for the range of wild plants used by Princess Point peoples. Unfortunately, bone is poorly preserved at our sites, but we have slowly put together a small, analyzable collection of animal bone. A wide range of taxa with a large number of fish is represented. We have undertaken a functional analysis of stone tools, which is giving us a look at the interrelationships between technology and the shift to food production. We have experimented with residue analysis on pottery. In addition, we have conducted the normal analysis of a large body of artifacts.

We are getting a somewhat better understanding of variation within Princess Point, but this is a long-term goal that will focus more clearly as research continues. We have a preliminary chronological order, based on pottery seriation, for the many sites in our area. We are comparing two regions, the Hamilton area and the Grand River Basin. As for testing hypotheses regarding agricultural origins in our area, this is proving, not surprisingly, complex. We are making headway testing these ideas, but the test will take time, particularly our assessment of settlement pattern and population. In secondary origins models, diffusion, assimilation, and migration are key concepts. For Ontario, each has been adopted and rejected at various times. At the moment, we are not prepared to rule out any of the three processes. In particular, there is some reason to assert

that migration was an important factor (Crawford and Smith 1996; Snow 1996). The range of sites and radiocarbon dates also indicates coexistence of at least two cultures, Princess Point and Middle Woodland, something that has not been properly documented previously (Smith 1996b). The tools we would normally call “arrowheads” have been analyzed for wear patterns as part of our check of the technology change concept. In fact, only one “projectile point” shows evidence of being used as a projectile. The rest show use-wear resulting from a variety of tasks — cutting, scraping, and so forth. Our database does not give clear evidence for more effective projectile technology. Something else is going on, and a doctoral thesis is exploring this aspect of the project. Whatever the case, Princess Point is, in our view, now among the best documented groups of its time period in the Northeast, particularly with radiocarbon dated cultigens. We now have a substantive base upon which to compare developments here with those elsewhere. Finally, through collection of floodplain geomorphological and on-site environmental data we have made significant headway in understanding the environmental context in which the shift to agriculture was occurring, particularly in the Grand River Valley.

Our major contributions so far have been to recharacterize Princess Point including the testing of preliminary hypotheses formulated in the 1970s. One hypothesis was that there were no year-round settlements on the Grand River at this time and sites in the lowlands and uplands represented seasonal occupations by the same populations. Our limited examination indicates that both zones probably had year-round occupations and that, in our research area, upland sites may be later ones indicating a shift to the Iroquoian pattern of upland villages. Additionally, we have been able to provide the first series of AMS dates (direct radiocarbon dates) on the earliest cultigen (corn) in Ontario, and it appears several centuries earlier than anticipated (sixth century A.D.); to provide the first detailed stratigraphic interpretation of a floodplain site dating to this period, which includes a first look at site formation processes on a floodplain in Ontario; to develop a methodology for examining the function of Transitional Woodland stone tools and to use the methodology to examine the interconnections of the shift to horticulture with technology; to develop an approach to chert sourcing; to develop and apply an analytical procedure for the cordmarked pottery of this period and apply the results to a temporal ordering (seriation) of Princess Point sites in the region; and to institute a paleoethnobotanical research program for

the Princess Point complex, which is giving us the first detailed look at its subsistence ecology. Finally, we have a much better understanding of culture history in the area.

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## CHAPTER 6

# EARLY LATE WOODLAND IN SOUTHERN ONTARIO: An Update (1996-2000)

Gary W. Crawford and David G. Smith

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### INTRODUCTION

Since publishing our earlier paper (Smith and Crawford 1997; this volume) we have continued a more broadly based assessment of interpretations developed during the first phase of our research (1993-1996). Substantial headway has been made on our original objectives. Interactions of early Late Woodland Princess Point people with their environment have been the primary focus of not only our earlier research but our current investigations. The first three years of our work focused on a fundamental reassessment of Princess Point material culture, chronology, and palaeoethnobotany (Bekerman 1995; Bowyer 1995; Crawford and Smith 1996; Crawford et al. 1997; Crawford et al. 1998; Dieterman 1997, 2001; Ormerod 1994, 1997; Shen 1999, 2000, 2001; Smith 1997a, 1997b, in press; Smith and Crawford 1995, 1997; Smith et al. 1996; Walker et al. 1998). We have also built on the fluvial geomorphologic study of the Grand Banks site by undertaking an examination of several floodplain locales along the lower Grand River (Figure 6.1). In addition, research in the Thames Valley drainage system to the southwest of the Princess Point region began in 2000 (Figure 6.1). An assessment of the poorly known early Late Woodland there is long overdue.

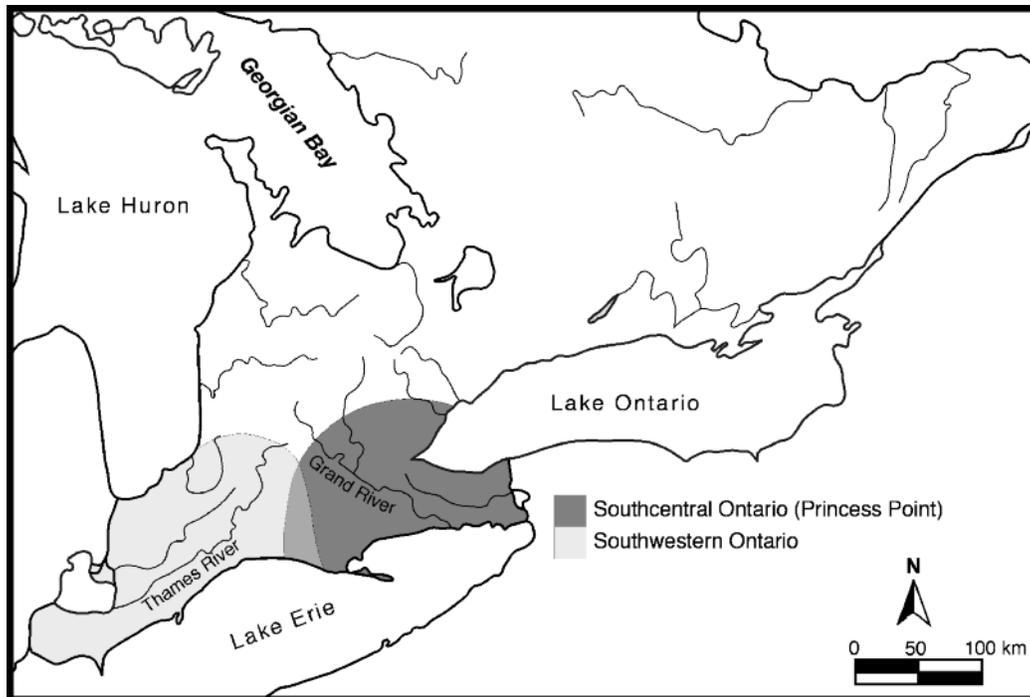
We have added to our site-specific database by systematically sampling the Cayuga Bridge, CNR Bridge, Bell Terrace, and Meyer sites, all located within an 8 km stretch of the Grand River between Cayuga and York where 12 Princess Point sites are located (Figure 6.2). Three of the sites have not been reported previously: Bell Terrace, Bell Flats, and Armstrong Flats. Canoe and pedestrian surveys are providing a detailed assessment of site distribution in the area. Further research has also been conducted at the Cootes Paradise wetland with excavations at the Sassafras Point and Princess Point

sites. The survey of the Thames River area is providing new insights challenging long-standing interpretations of early Late Woodland adaptations in southwestern Ontario.

### FLOODPLAIN RESEARCH

The Grand Banks floodplain appears to have formed through a combination of episodic accretion adjacent to a laterally stable river (Crawford et al. 1998; Walker et al. 1998). One stable period coincided with the Princess Point occupation found in, and extending through, the palaeosol. The palaeosol is buried under an undifferentiated alluvium with a mixture of historic and earlier artifacts. No aboriginal materials diagnostic of the post-A.D. 1100 precontact period have been found at Grand Banks. An understanding of the broader Grand River geomorphology is critical to our understanding of Princess Point settlement in the area.

Historic and anecdotal evidence from our study area document that the original riverside road was built on the river bar below the Meyer site (Figure 6.2) in the mid-nineteenth century. The road was moved to the terrace only after the forests had been cleared by the 1870s. A canal (Grand River Transportation Company, ca. 1850s) was built on the large river bar to bypass narrow straits around upstream islands. Oral history indicates that the river flats never flooded until the forests were cut back (Colin Bell, pers. comm. 1997). The now abandoned settlement of Indiana, dating from the 1840s, was situated on a large floodplain, presumably because, at the time, there was a much lower risk of flooding. Today, floods inundate the Grand Banks site (and, therefore, other river bars in the vicinity), on average, every 1.8 years. At least 32 one-to-three-day floods occurred between 1914 and 1990



**Figure 6.1.** Early Late Woodland (Late Woodland I) in southwestern Ontario.

(Walker et al. 1998).

Systematic coring of the Grand Banks site detailed the floodplain structure there (Crawford et al. 1998; Walker et al. 1998). In recent years we have turned to more efficiently surveying floodplain geomorphology using ground-penetrating radar. In general, stable floodplains have one or two back channels taking water away from occupations during high-water seasons. These channels also provide habitats for wetland plants and animals of economic importance to people. The large river bar below the Meyer site (Figure 6.2), with limited evidence of occupation, has evidence of complex channel braiding. The lack of stability, particularly in the downriver portion of the river bar would have discouraged human habitation there.

## RECENTLY INVESTIGATED SITES IN THE LOWER GRAND RIVER VALLEY

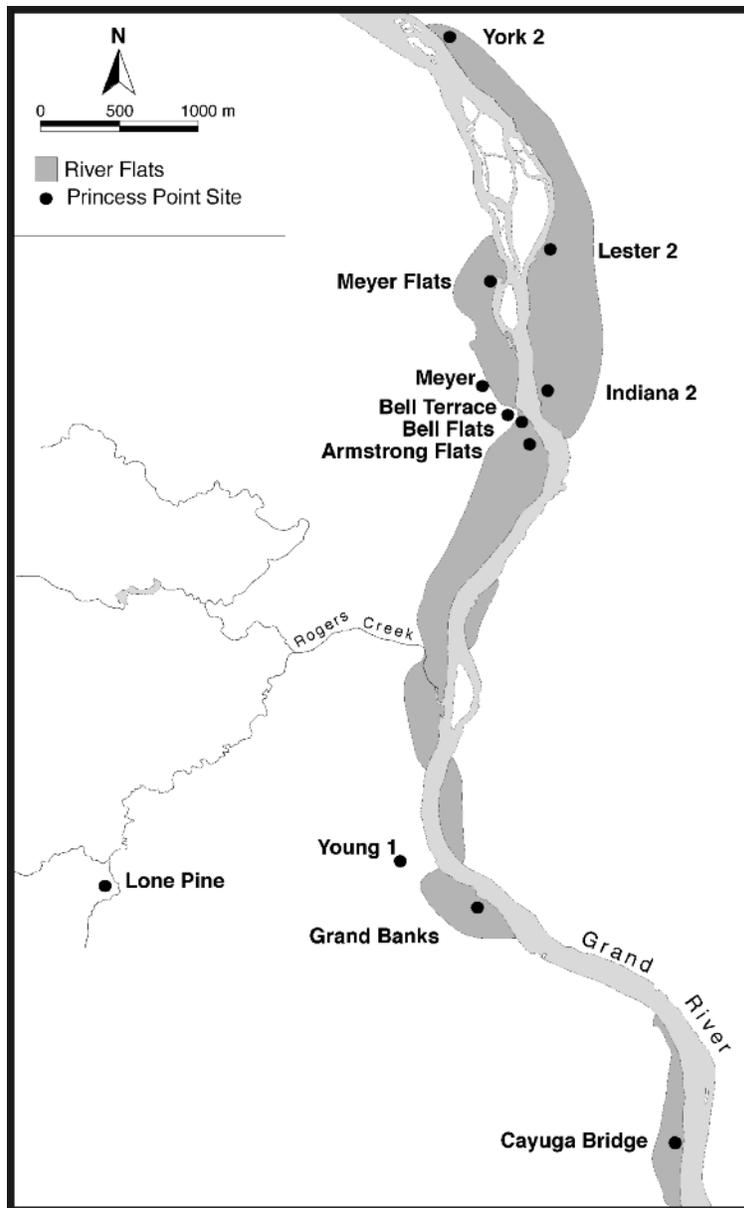
### Bell Flats (AfGx-151) and Armstrong Flats (AfGx-152)

Two sites discovered by our survey are Bell Flats and Armstrong Flats (Figures 6.2, 6.3). Bell Flats is on a narrow section of the pinched river flat at the base of a terrace. Preliminary investigations indicate the

presence of an artifact-bearing palaeosol about 40 cm below the surface. Recent alluvial deposition has created a smaller and lower second river bar, where Armstrong Flats is situated (Figure 6.2). The higher bar has a palaeosol at a depth of approximately 40 cm, from which artifacts have been recovered. Both sites appear to date no later than Princess Point due to the presence of cordmarked pottery only. A third locale, Meyer Flats, has not been investigated, but this appears to be another floodplain site associated with a well-defined palaeosol (Figure 6.2).

### CNR Bridge (AfGx-5)

The CNR Bridge site is situated on the upriver limit of a river bar (Figure 6.4). The soils here are predominantly clay. Closer to the river, an alluvial deposit is over 80 cm thick. Artifacts include nine core fragments, a stone pipe fragment, and a small collection of tools including a drill tip, three projectile point midsections, and a scraper. A single decorated rim sherd is among the 55 ceramic fragments. Two palaeosols are present at the southern extent of our excavations. An artifact bearing palaeosol is 40-60 cm below the surface, and a second sterile (to date) palaeosol is 80 cm below the surface.



**Figure 6.2.** Lower Grand River Valley (Cayuga to York) showing Princess Point Sites.

### **Cayuga Bridge (AfGx-1)**

The majority of the 1998 field season involved an investigation of the Cayuga Bridge site (Figure 6.2). Cayuga Bridge is located on a floodplain of the Grand River. David Stothers excavated 20 m of riverbank south of the Highway 3 bridge in 1974; the University of Toronto excavations were north of the bridge and 10 m from the riverbank. An undated photograph depicts

a wood-frame structure in the area of our excavation, opposite a small wharf or processing operation. Artifacts are abundant in an exposed palaeosol along the riverbank for most of the length of the river flat. Stothers originally identified the location north of the bridge as a separate site, Smith, which he considered to be Archaic; however, it is clearly a Princess Point occupation. Because the site is on the same floodplain and separated from the 1974 excavations only by a modern

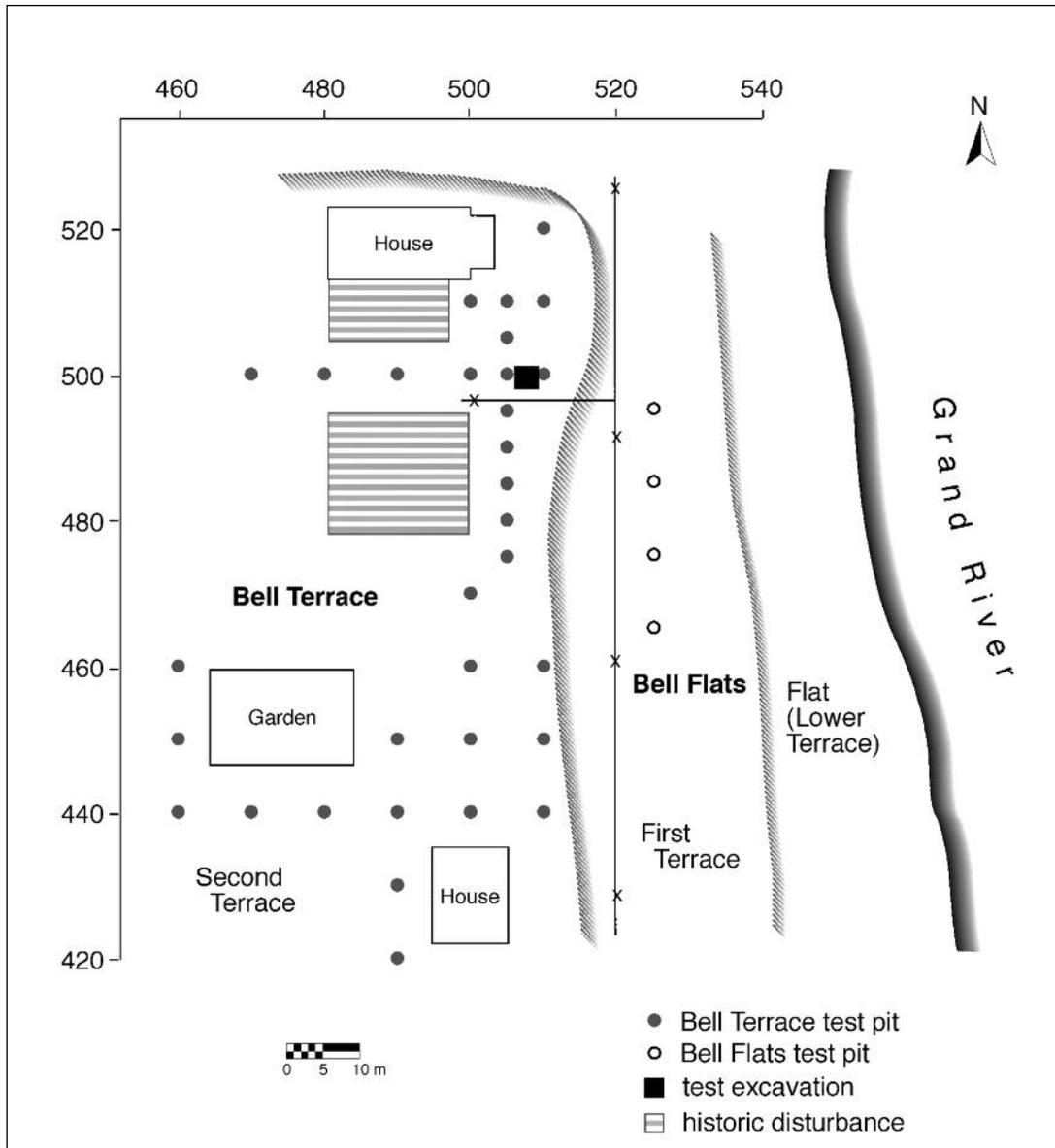


Figure 6.3. Bell Terrace and Bell Flats.

bridge, we consider the occupation part of the Cayuga Bridge site.

The soils at this locale are alternating layers of alluvium and palaeosol (Figure 6.5). This stratigraphy is similar to that reported at Grand Banks (Crawford et al. 1997; Crawford et al. 1998). No cultural remains were recovered from P1. A meter to a meter and a half of alluvium (A2) overlies P2, the palaeosol associated with the Princess Point occupation of the river bar. A few centimeters above P2 is a scatter of late nineteenth

century artifacts in a 1-2 cm thin lens above P2 and restricted to the southern half of the excavation. An AMS date on wood charcoal associated with the historic artifacts is recent (Table 6.1). Plow scars are visible in P2, much as they are at Grand Banks. Considering their nearly 1 m depth below the surface, these scars are likely as old as the eighteenth or nineteenth centuries A.D. Quite possibly they are historic Iroquois in origin, given that European settlement in the area post-dates 1850.

**Table 6.1.** Radiocarbon Dates from the Princess Point Project (1993-2000).

Site	Lab No.	Sample	Radiocarbon Date (B.P.)	Calibrated Date <sup>1</sup>
Grand Banks, 729-671	TO-53071	cupule	1570±90	A.D. 260 (440, 450, 470, 480, 530) 660
Grand Banks, 729-670	TO-53081	cupule	1500±150	A.D. 240 (560, 590, 600) 860
Meyer, 573-514	TO-81502	cupules	1270±100	A.D. 600 (720, 750, 770) 980
Grand Banks, 729-671	TO-45851	kernel	1250±80	A.D. 650 (780) 980
Forster	TO-70392	cupule	1150±100	A.D. 660 (890) 1150
Cayuga Bridge, Feature 5	TO-72932	butternut	1110±50	A.D. 780 (900, 920, 960) 1020
Grand Banks, Feature 1	TO-45842	kernel	1060±60	A.D. 790 (990) 1150
Lone Pine, 460-500	TO-45861	kernel	1040±60	A.D. 890 (1000) 1160
Grand Banks, Feature 210	TO-58751	cupule	970±50	A.D. 980 (1030) 1210
Bull's Point	TO-63411	kernel	960±60	A.D. 980 (1030) 1220
Cayuga Bridge, Feature 18	TO-74452	hickory nutshell	980±110	A.D. 780 (1030) 1280
Meyer, Feature 56	TO-89642	dog phalanx	890±60	A.D. 1020 (1160) 1280
Cayuga Bridge, A2	TO-74462	wood charcoal	120±50	A.D. 1660 (1690, 1730, 1810, 1850, 1860, 1920, 1950) 1950

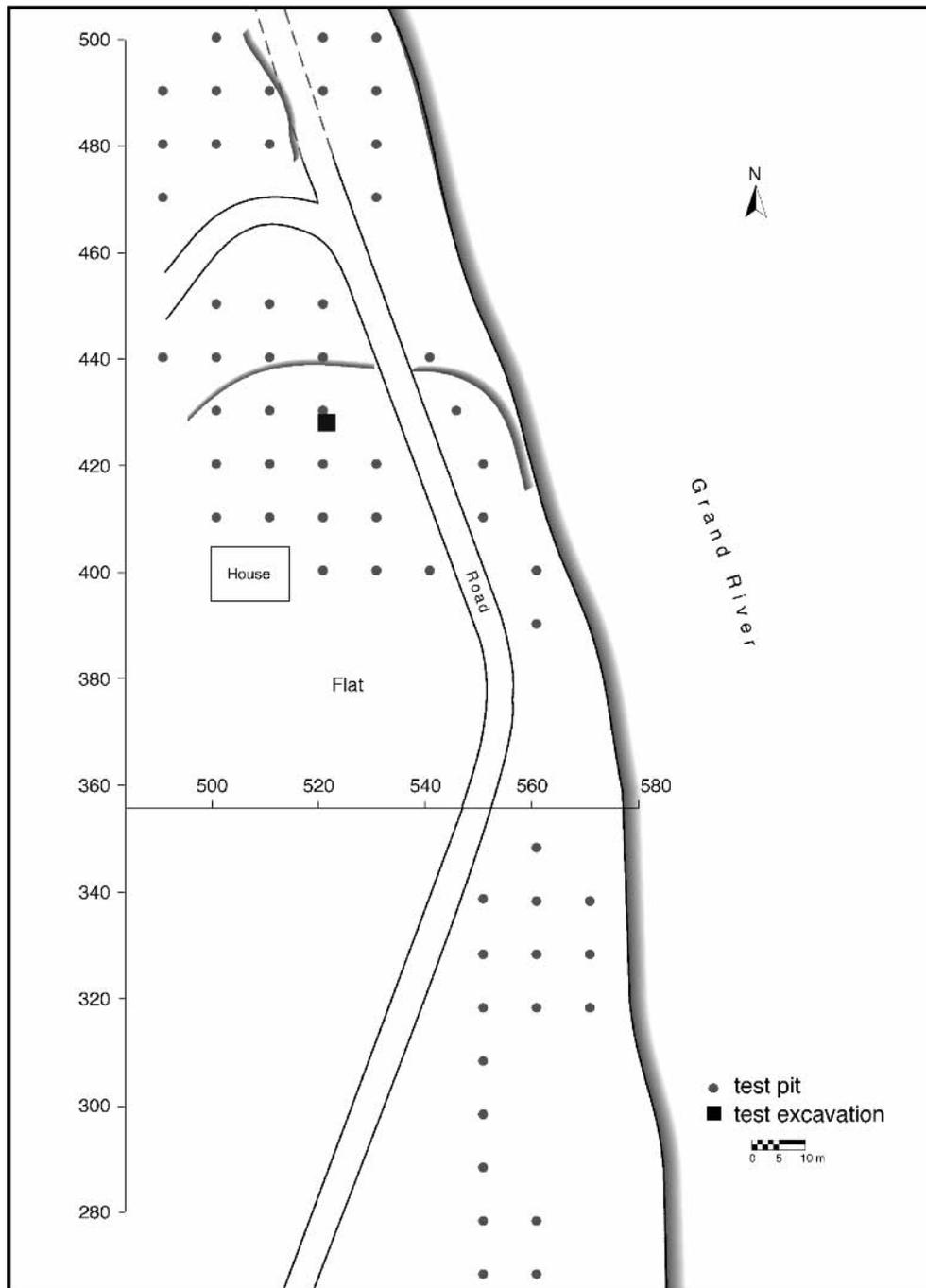
<sup>1</sup>Calibrated with CALIB 4.3 (Stuiver et al.1998).

A backhoe cleared the A2 alluvium to reach the Princess Point occupation in P2. We concentrated our efforts on a 10 by 9 m area. The site was excavated in 1 m squares following natural stratigraphy where possible. Ten 1 by 1 m units were randomly selected for 100 percent flotation. Except for the flotation samples, all soils were sifted through 1/8-inch mesh. The excavation exposed 59 posts and 14 other significant features. Among the features are 3 historic posts, while the remaining 11 are pits with ash fill, 2 hearths, and pits with high carbon content fill. Most artifacts are from P2, or immediately below P2 in the upper A1 stratum. Features and post molds often extend into A1, and a few posts are evident only at this level due to the difficulty in distinguishing them from the surrounding P2.

Two AMS dates on nutshell fragments from Features 5 and 18 (Table 6.1) are consistent with Princess Point.

Before backfilling, a backhoe test trench in the northern portion of the excavation exposed the stratigraphic sequence below P2. A1 is approximately 60 cm thick and overlies a second palaeosol, P1.

The excavation did not reveal any demonstrable individual houses. The settlement pattern of posts and features is complex. A total of nearly 6,000 artifacts have been cataloged to date. Diagnostic ceramics are solely cord-wrapped stick-decorated pottery diagnostic of Princess Point. The animal remains, yet to be formally analyzed, consist of a large number of deer lower limb bones, and the remains of small mammals, birds, and fish as well as mollusk shells.



**Figure 6.4.** CNR Bridge site.

### The Meyer Site (AfGx-26)

The Meyer site is on a 20 m high terrace overlooking a substantial river bar (Figures 6.2, 6.6, 6.7, 6.8). To date, 111 sq. m have been excavated. Over 800 post

molds and 70 features form an extremely complex pattern (Figure 6.8). The feature and post fill were saved for flotation. Artifacts include high densities of chipped lithics, animal remains, and pottery. Cord-wrapped stick-impressed pottery represents over 95



**Figure 6.5.** Cayuga Bridge excavation, view to south showing excavation floor after removal of the P2 palaeosol. The dark layer in the profiles immediately above the excavation floor is P2.

percent of the diagnostic ceramics. Princess Point pottery, identified on the basis of rim sherd attributes, comprises the majority of the pottery rims. Although Meyer is predominantly a Princess Point occupation, a few artifacts predate the Princess Point and a few pottery rim fragments belong to the later Ontario Iroquois Glen Meyer and Uren stages. Two glass beads typical of later Neutral Iroquois have been identified from the southern (downriver) portion of Meyer.

The complex pattern of posts and features make identification of settlement patterns difficult. One relatively large stratified feature measures approximately 1.5 by 1 m and is 80 cm deep. Pottery from this pit is primarily Princess Point, although the upper layers contain refuse from the Uren stage (ca. A.D. 1275-1325). Some of the 17 strata consist of only sterile nonoxidized sand, while other strata are oxidized sand or ash. Immediately overlying one layer of oxidized sand is a layer of completely articulated fish skeletons: bass, perch, drum, and sucker. At the bottom of the feature was an articulated dog skeleton. One AMS radiocarbon date has been obtained from a proximal phalanx (Table 6.1). Flotation sample processing and the analysis of the hundreds of thousands of artifacts from Meyer are expected to proceed for some time to come. The two radiocarbon dates from Meyer indicate that the occupation spans several centuries (Table 6.1).

#### **The Bell Terrace Site (AfGx-125)**

The Bell Terrace site is approximately 200 m south of the Meyer site (Figures 6.2, 6.3). The locale represents a

segment of the terrace that effectively pinches the river bar into two separate flats. The soil at this locale is a fine sandy loam overlying heavier clay subsoil with an overburden of 10 cm of humus. Artifacts from the 2 m test unit include chert tools, cord-wrapped stick-decorated pottery, animal remains, and historic European materials. Two pits contained diagnostic Princess Point ceramics.

#### **The Forster Site (AgGx-134)**

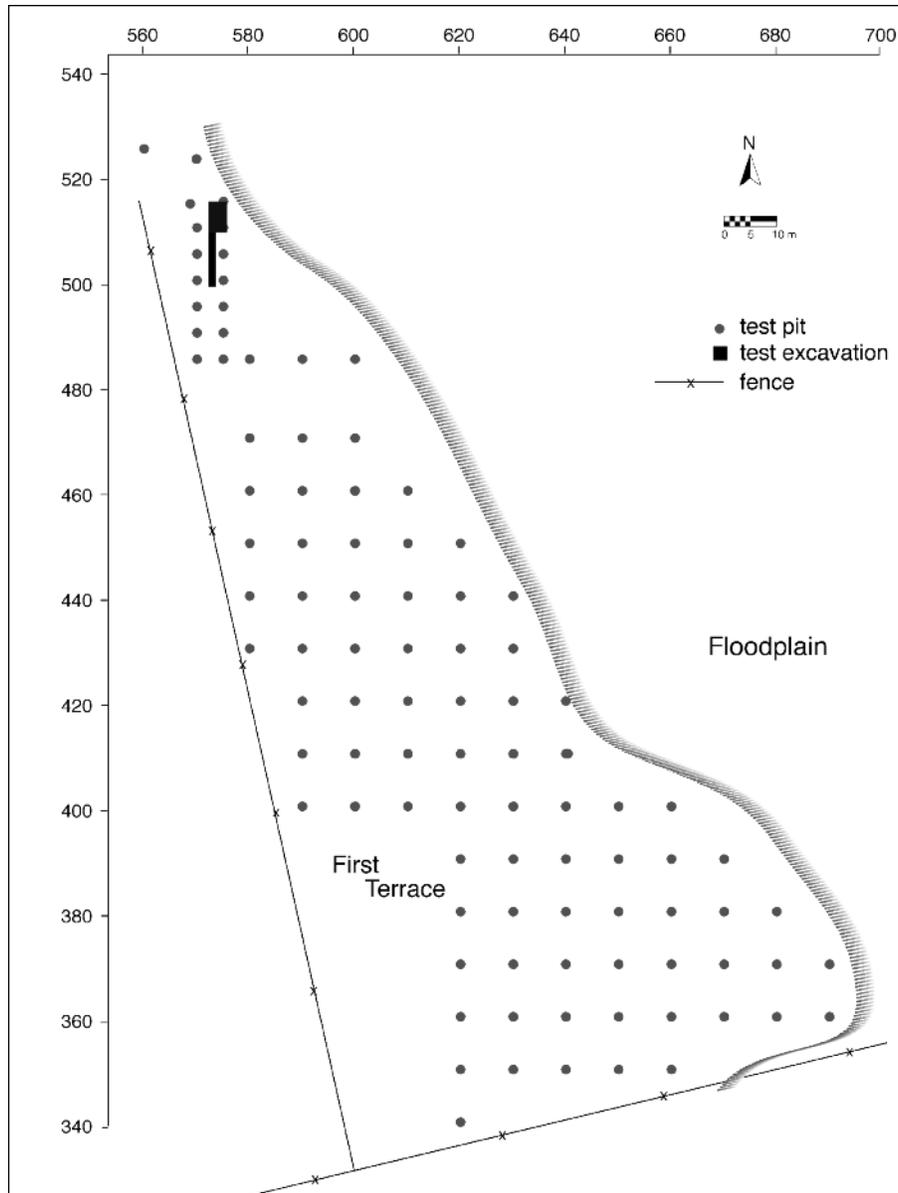
Forster is a multicomponent site in the town of Caledonia. It is situated on a terrace overlooking a point bar; only Early Archaic artifacts are found on the surface of the bar. Two Late Woodland components are located on the terrace: an Early Ontario Iroquoian (Glen Meyer) village and a Princess Point occupation. These two components appear to be horizontally distinct, with little overlap.

A salvage project was organized in 1997 under the direction of Jeff Bursey, because the property owners planned construction in the area of the Princess Point component. An excavation area of 148 sq. m revealed a double-rowed palisade line associated with the Glen Meyer village, as well as Princess Point post molds and features. A roughly circular pattern of post molds measures 6 m in diameter (see Figure 6.9). Inside this structure are several large post molds that may represent support posts, and four features. Three features are stratified and contain Princess Point pottery, as well as animal and plant remains. The largest pit is roughly cylindrical measuring 90 cm across and extending 65 cm below the plow zone. In the pit was roughly two-thirds of a medium-sized Princess Point vessel (Figure 6.10). An AMS date of a maize fragment from this feature dates the pit to the ninth century A.D. (Table 6.1).

Another structure, represented by only a corner of a wall, was also uncovered in the 1997 excavations (see Figure 6.9). It may be a small, rectangular structure or a longhouse. One hearth, several features, and a few fragments of Princess Point pottery were recovered in association with this structure.

### **RECENT INVESTIGATIONS AT COOTES PARADISE**

Our earlier paper (Smith and Crawford 1997, this volume) reported on work conducted by University of Toronto undergraduate field schools, directed by Smith, at the Cootes Paradise marsh in 1995 and 1996 (see also Smith 1997b, in press). Research continued



**Figure 6.6.** The Meyer site.

from 1997 through 2000 at two other sites at the wetland (the Sassafras Point, AhGx-3, and Princess Point, AhGx-1 sites).

The ravine sites at Cootes Paradise, such as those reported earlier at Bull's Point (AhGx-9) and Bull's Cove (AhGx-365), are unique to southern Ontario, but not unique to the wetland. An additional ravine location yielding cord-wrapped stick-decorated pottery (the Andrea site) was discovered in 1998 at Arnott's Point on the south shore of the marsh. In addition are

numerous other yet to be surveyed ravines that are potential locations for small Princess Point sites.

The Sassafras Point site was the focus of research in 1997 and 1998. This site is situated toward the tip of a promontory on the south shore of the marsh. Although Late Archaic, Princess Point and Middle Ontario Iroquoian components are recognized at the site, the deposits are not stratified and the Middle Ontario Iroquoian component completely covers the earlier two. The Princess Point component is located on a



**Figure 6.7.** Meyer site terrace, view to the north. The excavated area is in the background near the trees.



**Figure 6.8.** Meyer site excavation showing linear plow scars, features, and posts.

relatively low headland at the tip of the promontory, and covers roughly 2,500 sq. m. Artifacts are few, and no Princess Point hearths or middens have been discovered. Post molds may be either later Iroquoian or Princess Point.

In 2000, excavations shifted to the Princess Point type site, which had not undergone systematic investigation since 1969 (Stothers 1977). The site is on the northern half of a low promontory at the southeastern corner of the marsh. The site area consists of an upper area (about 5 m above the current water level) and a lower area (about 1 m above the present water level) at the tip of the headland. Middle Woodland through to historic Neutral Iroquoian components are represented at Princess Point. Diagnostic Middle Woodland pottery is limited to the upper area. Princess Point artifacts are also found in the upper area, but in an area distinct from that where the Middle Woodland artifacts are found. The Middle Woodland occupation appears to be discrete. Midden deposits containing Princess Point, as well as Early, Middle, and Late Ontario Iroquoian artifacts cover much of the lower area. Princess Point material is distributed over roughly 3,500 sq. m, including both upper and lower areas.

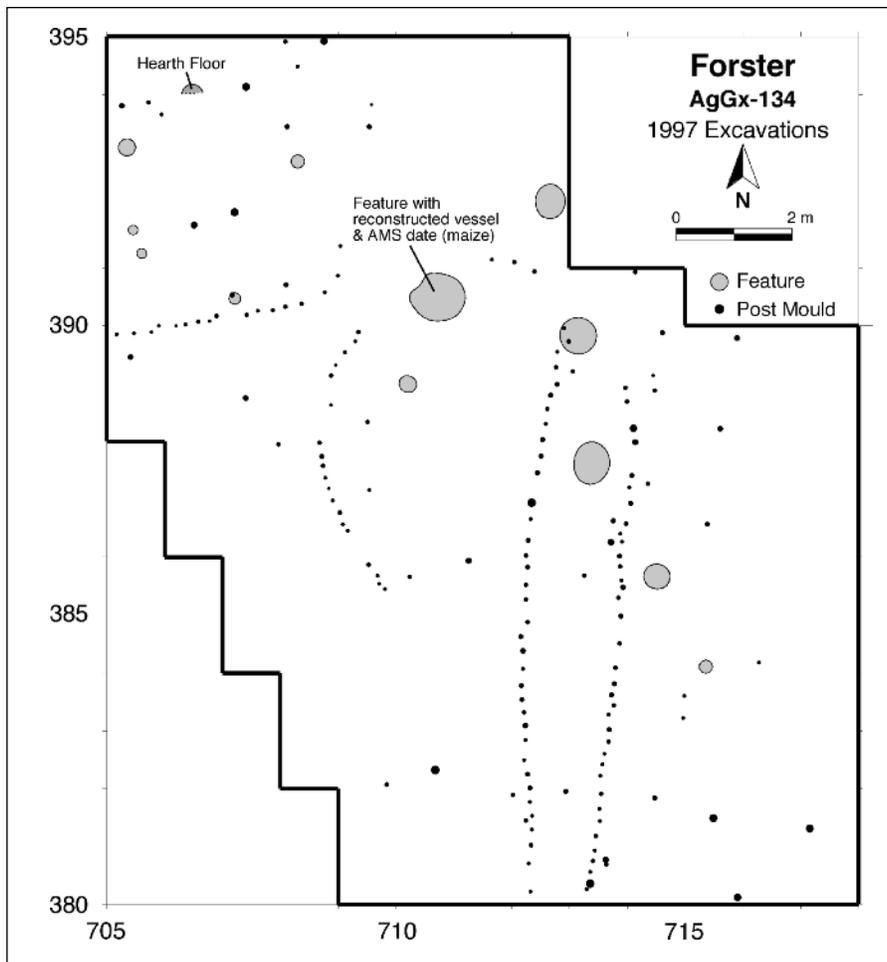
## EARLY LATE WOODLAND IN SOUTHWESTERN ONTARIO

In 2000, the scope of our research program expanded to include the region of southwestern Ontario, immediately to the west of the Princess Point area (Figures 6.1 and 6.11). This region includes the south-

eastern shore of Lake Huron, the eastern shores of Lake St. Clair, the northern shore of Lake Erie west of Long Point, the eastern portions of the St. Clair and Detroit River systems, and the entire Thames and Sydenham River drainage basins. Our knowledge of early Late Woodland societies in this region is extremely poor. Some systematic work was conducted in the 1970s (e.g., Keenlyside 1978; Reid 1979; Stothers 1972), but most site information has been recovered as the result of avocational interest and cultural resource management. By the 1980s, roughly 35 early Late Woodland components had been identified in southwestern Ontario. The data from these components are highly variable in quantity and quality, and many are from multicomponent sites. Nonetheless, the early Late Woodland of southwestern Ontario has figured in a number of interpretive frameworks and recently, two competing models have emerged.

Stothers (1977) included the early Late Woodland of southwestern Ontario as one of three regional foci (the Point Pelee Focus) in his initial definition of the Princess Point Complex. Fox (1982) subsequently separated the Point Pelee Focus from Princess Point, subsuming it in the Riviere au Vase phase of the southern Michigan Young Tradition (Fitting 1965). At the same time, Stothers and his associates renamed and redefined the Young Tradition as the Western Basin Tradition (Stothers 1978; Stothers and Graves 1983). They argued that it was ethnically Iroquoian and claimed that food production in the form of maize cultivation was practiced in the Western Basin region as early as A.D. 650.

Murphy and Ferris (1990) rejected Stothers'



**Figure 6.9.** Forster site settlement pattern (1997 excavations).

proposition that the Western Basin Late Woodland was ethnically Iroquoian, arguing instead for a central Algonkian affiliation. Furthermore, Murphy and Ferris claimed that the Western Basin Late Woodland subsistence economy and settlement system was based on a mobile hunting-gathering-fishing strategy, to which crop production was added significantly later (i.e., after A.D. 1000) than in other areas of the Northeast.

Stothers and his team have refined the chronology with new data from northwestern Ohio and southeastern Michigan. Their model now proposes the Gibraltar phase (A.D. 500-750), the Riviere au Vase phase (A.D. 750-1000), the Younger phase (A.D. 1000-1200), and the Springwells phase (A.D. 1200-1350) (Stothers et al. 1994; Stothers and Abel, this volume).

Our project in southwestern Ontario was initiated specifically to test the relative merits of the Stothers and Murphy-Ferris positions on subsistence and settle-

ment (we consider the debate over ethnicity irrelevant). Because of severe constraints on time and resources, we decided to focus our field efforts on one block of about 1,200 sq. km (40 km by 30 km) (see Figures 6.11 and 6.12). This block includes roughly 50 km of the middle Thames River drainage system, 10 km of the Sydenham River drainage area, a 15 km section of the north shore of Lake Erie, the drainage divides, and numerous tributaries. In addition, this block includes two major physiographic regions (sand plain and clay plain) and significant glacial features such as moraines. This block encompasses no major wetlands and no mouths of major rivers. In addition, there are no major towns or cities within the block; it is primarily rural, and the role of cultural resource management has been minimal. No prior systematic research on the early Late Woodland had been conducted in this block, although one of Ontario's most respected avocational



**Figure 6.10.** Forster site reconstructed Princess Point vessel with the following characteristics: collarless, outflaring rim, semiconical base; body is cord-impressed and decorated with cord-wrapped stick (right oblique lines) over cord-wrapped stick-horizontal lines, over left-oblique strings of cord-wrapped stick-punctuates ending at the vessel body's inflection point. The vessel is 24 cm in height.

archaeologists (Stan Wortner) lives within its boundaries. Mr. Wortner had recorded the locations of several early Late Woodland sites in the block and, just as important, is able to advise on areas where he has investigated but found no early Late Woodland sites.

Our efforts in the 2000 field season focused on survey and controlled surface collection in the section of the Thames drainage basin within our survey block. Survey consists of walking weathered fields at 5 m intervals where crop cover permits. Areas surveyed include floodplains and terraces on the Thames River itself, but also fields along tributaries within roughly 2 km of the Thames channel. The field crew recorded 35 early Late Woodland sites that had not been previously reported. The crew was able to “ground-truth” site situation for the 37 sites listed in Table 6.2. They were not able to establish site size for all of these because of crop cover.

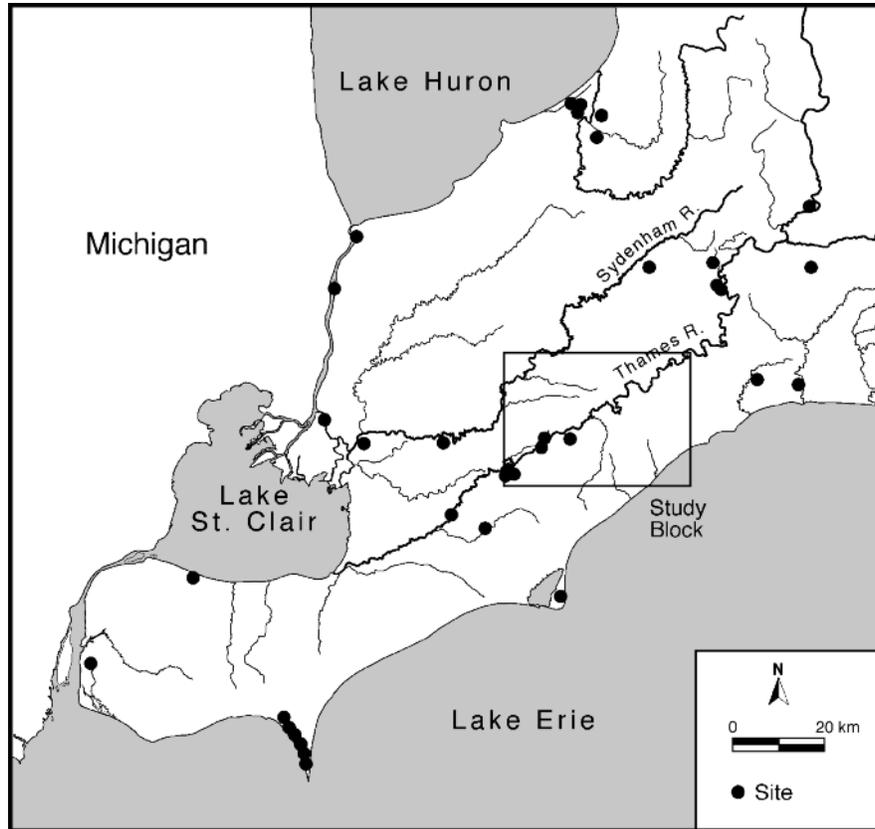
The early Late Woodland sites in the Thames drainage basin are found on a number of different topographic situations, including the Thames River floodplain (point bars) and riverine terraces, tributaries

and tributary terraces (see Figure 6.12). In contrast to Princess Point settings in the Lower Grand River Valley, where over 95 percent of the sites are focused directly on the river, the sites in the Thames drainage are more dispersed (Figure 6.13). The first two types of location (floodplain and river terraces) are similar to Princess Point; however, 65 percent of the sites are located on tributaries and tributary terraces, for which there are few Princess Point equivalents (Figure 6.13). In terms of site size, over 81 percent are under 0.5 ha in size. The sites associated directly with the Thames channel are all less than 1 ha (Table 6.3). This is a departure from the Princess Point pattern in the Grand Valley, where sites on the floodplain tend to be large (5 ha+).

Our research block includes none of the stream estuaries and sand points on the Lake Erie shoreline that Stothers and Abel (this volume) argue are the diagnostic settlement locations for their Gibraltar and Riviere au Vase phase sites in southeastern Michigan and northwestern Ohio. Fifteen of the 35 (43 percent) early Late Woodland sites in southwestern Ontario known prior to 2000 are situated in roughly equivalent locations. Adding our new data this proportion lowers to 15 of 72 (21 percent). While much work remains, the spatial distribution of the early Late Woodland sites in the Thames River Valley is quite different from that inferred for the same time period in Ohio and Michigan.

## OTHER RESEARCH

Three doctoral dissertations explore the stone assemblage of the Grand River Princess Point (Shen 2001), landscape archaeology of the Middle through early Late Woodland in the area (Dieterman 2001), and Princess Point palaeoethnobotany (Saunders 2001). Shen's work was directed to characterizing the pattern of Princess Point lithic production, and to exploring the transformation of lithic production during the Princess Point period (Shen 2001). In particular, Shen was interested in core reduction strategy and stone tool use patterning. His research documents a shift from a specialized to a generalized production strategy. Among the many other issues investigated are the reasons behind a unique core reduction sequence in the Grand Banks lithic industry, a strategy Shen terms “transformed” core reduction Shen (2001:70), an economizing technique somewhat unexpected in a region rich in raw material for stone tool production. Shen prefers a “time-stress” explanation as a consequence of the shift



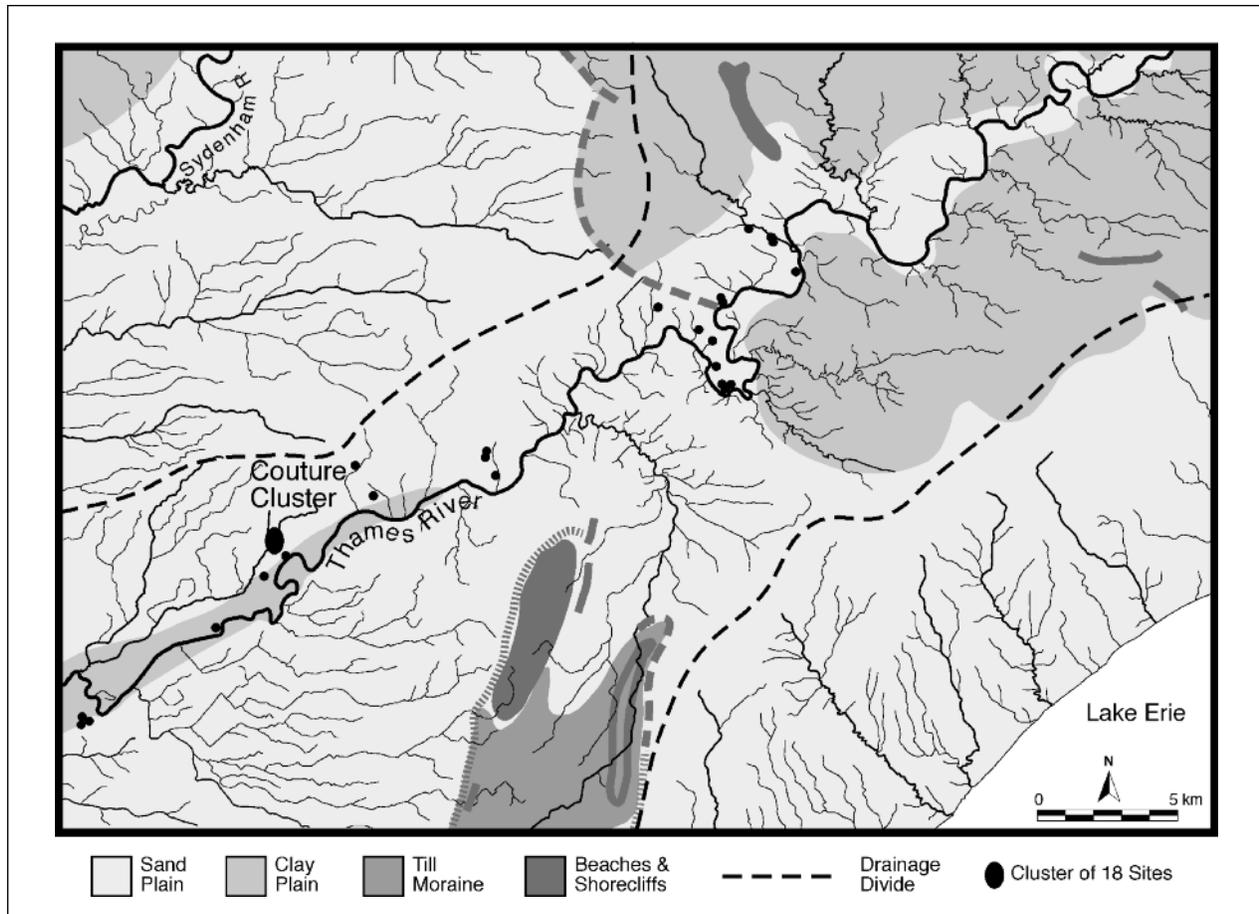
**Figure 6.11.** Southwestern Ontario showing Late Woodland 1 components known prior to 1999 and 2000.

to horticulture but admits that his findings need further testing (2001:171). Shen explores lithic production associated with the shift to food production around the world and feels that there is a “plausible relationship between the establishment of generalized lithic production and the emergence of food production during the Princess Point period in the study region” (2001:175).

The first empirically modeled Princess Point settlement system is presented in the second dissertation (Dieterman 2001). The system is contrasted with local Middle Woodland and Late Woodland systems. Dieterman’s approach is to “present an explanatory model of settlement by building on the evaluative nature of predictive and potential models” (2001:272). Clearly, Middle Woodland and Late Woodland Glen Meyer peoples interpreted their landscapes in a different manner from Princess Point (2001:290). The former (Middle Woodland) in Ontario is a foraging group, while the latter (Glen Meyer) is a food-producing group with substantial dependence on maize, sun-

flower, and cucurbit. Princess Point appears to occupy a place on a continuum between local foragers and food producers; it is an intermediate phase (Dieterman 2001:290).

Della Saunders (2001) employs multiple lines of evidence to explore the interrelationships between plants and Princess Point people. She relies on flotation sample data but has also been experimenting with pottery residue and phytolith analysis. Unfortunately, the pottery in the Princess Point assemblage is relatively clean, with little in the way of encrustations that contain phytoliths. Phytoliths have been recovered from cores taken in Cootes Paradise. Very little information is forthcoming from chemical analysis of residues because little is present in the pottery. The flotation sample analysis builds on previous work (Crawford et al. 1997) and research done on the immediately subsequent Glen Meyer (Ounjian 1998). Maize continues to be present in a variety of contexts dating from the sixth through the tenth centuries A.D. (Table 6.1). Density of plant remains at Princess Point sites is about half that



**Figure 6.12.** Middle Thames River 2000 survey block showing early Late Woodland sites, drainage systems, and physiographic regions.

of Glen Meyer sites. Nevertheless, in many ways, the plant remains assemblages resemble those from Glen Meyer sites. Fleshy fruits, seeds of weedy annuals, nuts and cultigens are common. Cultigens are so far limited to sunflower (*Helianthus annuus* ssp. *macrocarpus*) and maize. Chenopod (*Chenopodium* sp.) is common as well, but the seeds do not have clear morphological evidence of domestication.

## DISCUSSION

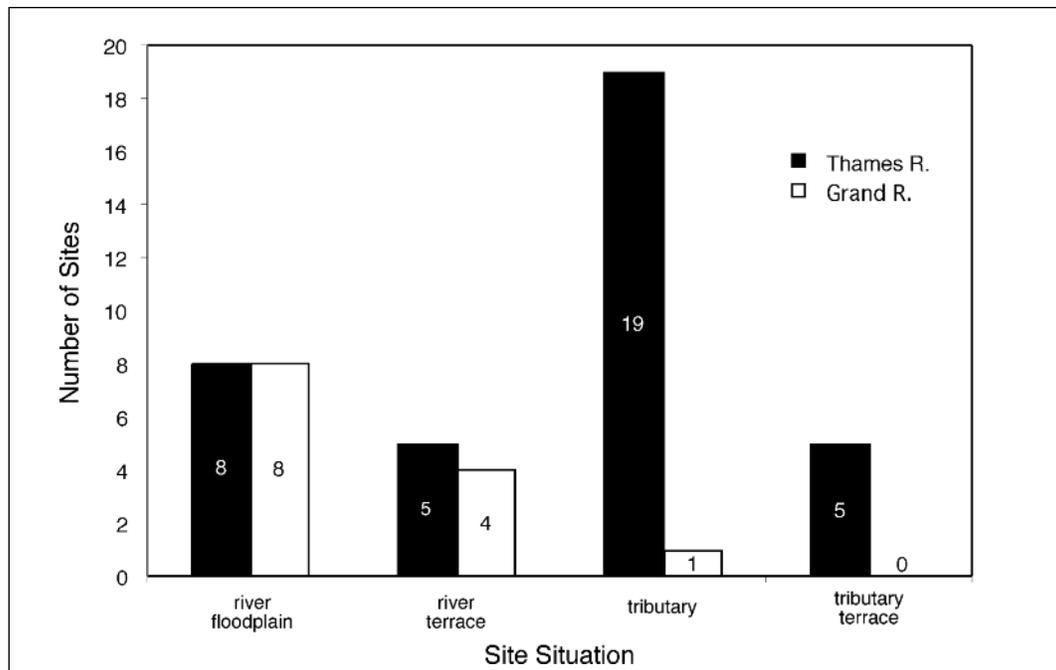
Among the many aspects of our early Late Woodland research, understanding the complex interaction among settlement, environment, and culture is critical. Our recent research suggests a more multifaceted settlement system for early Late Woodland sites in both southcentral and southwestern Ontario than predicted some 25 years ago. This work continues to

demonstrate the importance and popularity of both terrace sites and river bar locales to the Princess Point Complex. River bars were also occupied during the preceding Middle Woodland period of this area, as evidenced by sites like Roger's Creek (AfGx-24) and Tuscarora (AgGx-14), but they were less popular habitation choices in the overall settlement system than that of the Princess Point (Dieterman 2001; Ormerod 1997). Middle Woodland populations tended to prefer sites located adjacent to wetlands, particularly along creeks and rivers, as evidenced by the large cluster of Middle Woodland sites at the mouth of the Grand River. This difference in the settlement systems of Middle Woodland and Late Woodland groups also holds for other parts of northeastern North America. For example, in the lower/middle Delaware Valley, Stewart (1990) notes a changing preference from freshwater tidal marshes during the Middle Woodland period to river bars during the early Late Woodland period.

**Table 6.2.** Early Late Woodland Sites in the Middle Thames Drainage Basin.

Site Name	Cultural Period <sup>1</sup>	Site Situation	Size (m <sup>2</sup> )
Bicycle Flag	LW1	Thames floodplain	900
Fairfield Creek	LW1	Thames floodplain	undetermined
Perry Patterson	LW1	Thames floodplain	10,000
Rogue	LW1	Thames floodplain	300
Shanty	A, LW1	Thames floodplain	3,000
Tassel	LW1	Thames floodplain	300
Three Bolts	LW1	Thames floodplain	3,000
Tip	A, LW1, LW2	Thames floodplain	10,000
Lapienis	LW1	Thames terrace	750
Maple Drive	LW1	Thames terrace	200
River Drive	LW1	Thames terrace	undetermined
Rolling Thunder	LW1	Thames terrace	undetermined
Tecumseh Monument	LW1	Thames terrace	undetermined
Annette	LW1	tributary	3,000
Ask the Audience	LW1	tributary	2,000
Autumn	LW1	tributary	400
Blue Crop	LW1	tributary	300
Canadian National	LW1	tributary	1,200
Cornwall Creek	LW1	tributary	2,500
Couture	MW, LW1	tributary	1,000
Fifty-fifty	LW1	tributary	900
FTF	LW1	tributary	1,500
Intersection	LW1	tributary	1,600
Level Crossing	LW1	tributary	600
Luzerne	LW1	tributary	5,000
Marchand	A, MW, LW1	tributary	17,500
Northland	LW1	tributary	1,200
Park	LW1	tributary	undetermined
Protégé	LW1	tributary	2,000
Red Onion	LW1	tributary	2,400
Red Pepper	LW1	tributary	1,200
Swarm	LW1	tributary	600
Kihlberg Corner	LW1	tributary terrace	400
Redemption	LW1	tributary terrace	17,500
Tattooine	LW1	tributary terrace	1,500
Wally Marko	LW1	tributary terrace	2,000
Winn	LW1	tributary terrace	20,000

<sup>1</sup>Cultural Period: A=Archaic; MW=Middle Woodland; LW1=early Late Woodland 1; LW2=Late Woodland 2



**Figure 6.13.** Site situation: a comparison of the Thames River and Grand River Valley early Late Woodland.

Reasons for the importance of river bar locations to Princess Point groups and the subsequent shift away from them may be linked to any number of factors. In the Ohio Valley, Muller (1987) has argued that a shift from upland locations to lowland locations during Mississippian times is possibly linked to a combination of climatic, social, and cultural material changes. These factors, particularly the advent of agriculture and the introduction of the bow and arrow, are hypothesized to have lessened requirements for interdependence during the Middle Woodland. He also suggests that continued competition between groups occupying these lowlands led to more or less permanent occupation of these locales. Settlement locations along the Grand River do not shift from the uplands to the lowland after Princess Point. Nevertheless, a shift in site location preference occurs, generally from the floodplains to higher terraces and inland (Dieterman 2001). The evidence for the introduction of the bow and arrow during Princess Point is equivocal; technological changes in the stone tools is similar to changes seen elsewhere in the world at the onset of food production (Shen 2001). This correlation should not be taken to mean the technological changes have a causal effect. With the

shift to a mixed economy that included corn, we share Muller's view that social factors (e.g., increased competition and more complex political factors) were at play and were set in a context of environmental change. The environmental changes in the Grand River Valley are evidenced by a destabilization of the river bars that were among the preferred locales for Princess Point habitation.

Excavations at terrace sites have elaborated our knowledge of these locales and have also strengthened our view of their importance in the Princess Point settlement system. Our previous work at Young 1 suggested that terrace locales were both small in size and short-term in duration of occupation. Research at Bell Terrace and Meyer, however, indicates the pattern for terrace sites is more complex than originally proposed. Artifact density and their extent, combined with the recovery of settlement patterns attest to a longer and perhaps repeated occupation of terrace sites such as Meyer.

The research conducted in southwestern Ontario in 2000 raises a number of significant questions. First, it suggests that the database available to researchers prior to 2000 was unrepresentative. By surveying

**Table 6.3.** Early Late Woodland Sites in Thames Valley: Site Situation by Site Size.

m <sup>2</sup> x 1000	Thames floodplain	Thames terrace	Tributary	Tributary terrace
00.0-00.9	3 / 9.4%	2 / 6.3%	5 / 15.3%	1 / 3.1%
01.0-01.9			6 / 18.8%	1 / 3.1%
02.0-02.9			4 / 12.5%	1 / 3.1%
03.0-03.9	2 / 6.3%		1 / 3.1%	
04.0-04.9				
05.0-05.9			1 / 3.1%	
06.0-06.9				
07.0-07.9				
08.0-08.9				
09.0-09.9				
10.0-10.9	2 / 6.3%			
11.0-11.9				
12.0-12.9				
13.0-13.9				
14.0-14.9				
15.0-15.9				
16.0-16.9				
17.0-17.9			1 / 3.1%	1 / 3.1%
18.0-18.9				
19.0-19.9				
20.0-20.9				1 / 3.1%

within an area of roughly 150 sq. km, we doubled the number of known early Late Woodland sites in all of southwestern Ontario (a region of at least 15,000 sq. km) in one two-month survey season. Second, the density of occupation in southwestern Ontario during the early Late Woodland period is likely much greater than previously thought. Certainly, the density of sites from this period in the middle Thames River drainage basin is higher than anticipated. Finally, we suggest the need to reserve judgment on the cultural taxonomy of the early Late Woodland societies of southwestern Ontario, particularly in the Thames River drainage basin. Most researchers considering the problem accepted Fox's redefinition in the early 1980s. Considering the paucity of data available to support Fox's argument, however, we suggest that the association with the Riviere au Vase phase remains a hypothesis that requires further testing.

## Acknowledgments

This research has been supported by grants from the Social Sciences and Humanities Research Council of Canada, National Science and Engineering Research Council of Canada (NSERC), and the National Geographic Society. Anthony Davis and Joe Desloges (Department of Geography, University of Toronto) contributed geomorphological input. We would like to thank the Royal Botanical Gardens; and the Armstrong, Bell, Meyer, Smith, and Forster families for permission to work on their properties in the Princess Point region. The Princess Point area research team included Deborah Berg, Jeff Bursey, Frank Dieterman, Debbie Langer, Lisa Merritt, Scott Martin, Trevor Ormerod, Della Saunders, Kathy Schoenberger, Gary Warrick, and field school students in UTM ANT318F and ANT418F. We would also like to thank the numerous property owners in the Thames Valley region who gave us permission to conduct survey and test excavations on their properties during the 2000 field season. Fieldwork in this region was conducted by Chris Watts, Chris Mahood, and the Ontario Ministry of Citizenship, Culture and Recreation Summer Experience 2000 crew. In addition, Stan Wortner gave freely of his time and knowledge. We thank all for their cooperation and assistance.

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## CHAPTER 7

# EARLY LATE PREHISTORIC SETTLEMENT: A View From Northcentral Pennsylvania

Christina B. Rieth

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### INTRODUCTION

Archaeological investigations in northcentral Pennsylvania have produced a wealth of information relating to the early Late Prehistoric (A.D. 700-1300) occupation of the region. Derived largely from cultural resource management excavations, museum and academic field projects, and advocational “digs,” these studies have contributed to our understanding of the use and occupation of both small and large sedentary settlements (Bressler 1980; Custer et al. 1996:1-54; East et al. 1988; Garrahan 1990:5-13; Hatch 1980; Jones 1971; Lucy 1991a:172-179; Lucy and Vanderpoel 1979; Michaels 1994:28-40; Michaels and Huner 1968; Smith 1977:27-29; Stewart 1994:63-171), the exploitation of the local environment (Hart and Asch Sidell 1996; Hatch and Stevenson 1980:140-170; King 1999:18-20; Michaels and Smith 1967; Shaffer 1998:33-34), and short- and long-term changes in material culture (Hatch and Koontz 1983:18-19; Kent et al. 1971:329-330; Lucy 1991; McCann 1971). In many of these studies, ceramic types represent important units of analysis used to reconstruct prehistoric settlement and subsistence strategies.

In northcentral Pennsylvania, the early Late Prehistoric period is characterized by the Clemson Island and Owasco ceramic traditions. Similarities between Clemson Island and Owasco ceramics include the use of cord-wrapped stick and paddle impressions on the exterior surface (Hay et al. 1987; Lucy 1959; McCann 1971), the presence of a flat, slightly outflaring rim (Schwartz 1985), and the use of both paddle and anvil, and coiling techniques in ceramic manufacture (Lucy and McCann 1983:6-8; Lucy and Vanderpoel 1979; Prezzano 1986; Rieth 1997; Stewart 1994:139). Differences in decorative attributes (e.g., presence of nodes and punctates around interior and exterior rim, use of over stamping on container neck

and body, etc.), preparation of the ceramic paste, and firing techniques have also been recognized (McCann 1971; Smith, pers. comm. 1987 as cited in Stewart 1994:13).

The spatial distributions of Clemson Island and Owasco ceramics in northcentral Pennsylvania show a considerable overlap (Lucy 1959, 1991a; Shaffer 1998:31-32; Stewart 1990). As a result, archaeologists often consider similarities in decorative and form attributes to be indicators of interaction and information exchange between distinct cultural groups (Garrahan 1990; Lucy 1991a; Ritchie and Funk 1973; Stewart 1994). Despite similarities in decoration, several archaeologists have reported differences in the paste of these containers, suggesting that different resource deposits may have been exploited by the manufacturers of these vessels. If the use of different resources can be demonstrated, such information would not only signify the use of different resource procurement zones within a larger settlement system (Lizee et al. 1995), but would also provide information about the utility of culture-historic types within archaeology.

In this chapter, I explore the relationship between culture-historic types and manufacturing techniques by comparing the ceramic assemblages from four early Late Prehistoric sites in northcentral Pennsylvania: Fisher Farm, Tioga Point Farm, Wells, and St. Anthony's. Since these ceramic assemblages exhibit a high degree of stylistic similarity, trace element analysis was used to address three questions: (1) Are the ceramic sherds from these four sites manufactured from local or nonlocal clays?; (2) Is there a correlation between culture-historic types and the clays that were used in the production of these containers?; and (3) What are the implications for understanding early Late Prehistoric settlement?

## BACKGROUND

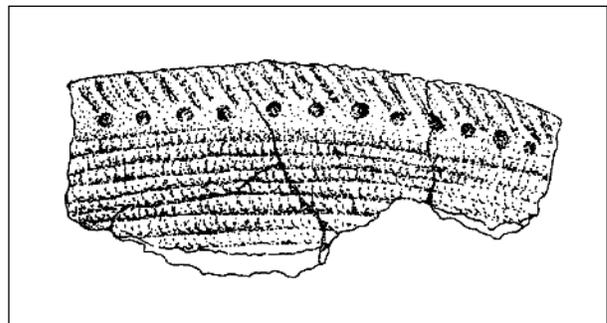
Before describing the methodology and results of this project, a brief description of the Clemson Island and Owasco traditions and their relationship to the prehistory of northcentral Pennsylvania is needed. The Clemson Island tradition dates between A.D. 700 and 1300 in northcentral Pennsylvania. Hay et al. (1987) suggest that the period can be divided into an early and late phase based upon differences in ceramic typology. Graybill (1984:12-16 as cited in Stewart 1990:82) argues that the early phase dates between A.D. 900 and 1100 and is characterized by the presence of mound burials, the occupation of small dispersed hamlets and camps, and a subsistence economy centered on seasonal fishing and the initial introduction of domesticated crops. The late phase dates between A.D. 1100 and 1300 and is characterized by the discontinuation of mound burials, occupation of large villages located along the floodplains of major rivers, and a subsistence economy centered on maize agriculture. Despite its explanation of change during the early Late Prehistoric period, this model has been criticized (Stewart 1990:82) because it is based on inconsistent radiocarbon dates, the presence of maize in both early and late assemblages, and an incomplete study of the stylistic changes in artifacts.

Sites associated with the Clemson Island tradition are found across much of northcentral Pennsylvania, with the largest concentration near the confluence of the north and west branches of the Susquehanna River in Lycoming and Clinton Counties (Hay et al. 1987). Hatch (1980b) speculates that the settlement patterns of these early Late Prehistoric groups were largely oriented around agriculturally based hamlets or villages, which were occupied for much of the year. Although these sites resemble Owasco sites in terms of their features and spatial arrangement, the presence of "key-hole structures" at later Clemson Island and Shenk's Ferry sites (Smith 1976:3-8; Stewart 1990:94), and the absence of fortification until A.D. 1300 (Stewart 1990:97) represent noticeable differences between the traditions. Supporting Clemson Island villages and hamlets were small resource procurement and satellite sites that were used on an as-needed basis for the extraction of resources located beyond the foraging radius of the hamlet or village (Hatch 1980b; Stewart 1990:97). Drawing on the work of Knight and Brown (1984, as cited in Stewart 1990:97), Stewart speculates that the average foraging distance for these prehistoric populations was 20 km. Collection of resources more than 20 km away probably required the establishment

of small camps to serve as a base for hunting, foraging, and resource processing activities. Unique to the Clemson Island settlement pattern is the presence of village and/or hamlet sites with mounds. Hay et al. (1987:60-62) speculate that these sites may have served an important role in the socioreligious behavior of these groups (see also Stewart 1990).

The Owasco tradition dates between A.D. 1000 and 1300. In New York, it has been divided into three phases, each lasting approximately one hundred years. The earliest is the Carpenter Brook phase (A.D. 1000-1100), which is followed by the Canandaigua phase (A.D. 1100-1200), and the Castle Creek phase (A.D. 1200-1300). Snow (1996) suggests that the Owasco tradition may be somewhat longer, extending from approximately A.D. 500/600 to 1350. Despite supporting radiocarbon dates, this view has not been widely adopted (but see Hart 2000; Schulenberg, this volume). Ritchie (1994) argues that the phases are characterized by specific artifact classes, subsistence patterns, and settlement traits. However, more recent research by Hart (2000), Miroff (this volume), Schulenberg (this volume), and Snow (1996) raises questions about this assertion and suggests that these traits may be more fluid, cross-cutting several phases.

The Owasco tradition is largely represented by sites dating to the early Late Prehistoric period in New York (Ritchie 1994:274), northern Pennsylvania (Lucy 1991a), and eastern Pennsylvania, where they have been called Pahaquarra by Kraft (1986; Marchiando 1972). The spatial distribution of Owasco sites in northcentral Pennsylvania show considerable overlap with Clemson Island sites, with numerous sites reported in Tioga, Luzerne, and Bradford Counties (Garrahan 1990; Lucy 1991:178-179, Figure 7.1; Shaffer 1998). Owasco settlement patterns resemble those of other Northeast groups with large agricultural villages, hor-



**Figure 7.1.** Drawing of Clemson Island punctate sherd from the St. Anthony's site.

ticultural hamlets, small and large camps, and resource procurement stations (Ritchie 1994; Ritchie and Funk 1973). Longhouses, often measuring upwards of fifty feet in length, represent striking features at early Late Prehistoric village sites in central and southern New York (Ritchie 1994). Radiometric dates on many of these longhouses indicate that larger houses were not occupied until the calibrated thirteenth century A.D. (Hart 2000). Although similar structures have been identified at Clemson Island sites, Lucy (1991a:177, 179) notes that in Pennsylvania, large longhouses are found in limited numbers during the Carpenter Brook (ca. A.D. 1000-1100) and Castle Creek phases (ca. A.D. 1200-1300). Small camp and resource processing stations also represent an important aspect of the Owasco settlement system. As discussed in Miroff (this volume) and Rieth (this volume), the settlement features of camps and resource processing sites are quite diverse, suggesting that they were used for a wide range of activities.

## EARLY LATE PREHISTORIC CERAMICS

Although archaeologists have suggested the Clemson Island and Owasco traditions can be identified on the basis of different settlement features (Hatch 1980; Jones 1971; Lucy 1991a:169-188; Lucy and McCann 1983; Smith 1977; Stewart 1990, 1994), subsistence remains (Shaffer 1998), and temporal affiliation (Hatch and Koontz 1983; Kent et al. 1971; Stewart 1994; Turnbaugh 1977), ceramic types remain one of, if not the most important criteria used to distinguish between these two traditions. The following section provides a brief description of the Clemson Island and Owasco ceramic traditions, followed by a discussion of the problems inherent in applying these types to the study of early Late Prehistoric settlement in northcentral Pennsylvania.

### Description of Clemson Island and Owasco Types

The earliest discussion of Clemson Island types is contained in McCann's (1971) description of pottery recovered from the Clemson and Book mounds. McCann comments on the difficulty in distinguishing between Clemson Island and Owasco sherds, stating that it is "difficult to distinguish sherds of this type from those of early Owasco vessels. Forms are very similar, and many of the same decorative designs are used . . . No reliable criterion can be given for distin-

guishing between Owasco and Clemson-Brook sherds in all or even a majority of cases . . ." (McCann 1971). Since the publication of McCann's article, archaeologists have attempted to distinguish between these traditions by establishing types that coincide with specific geographic regions and times.

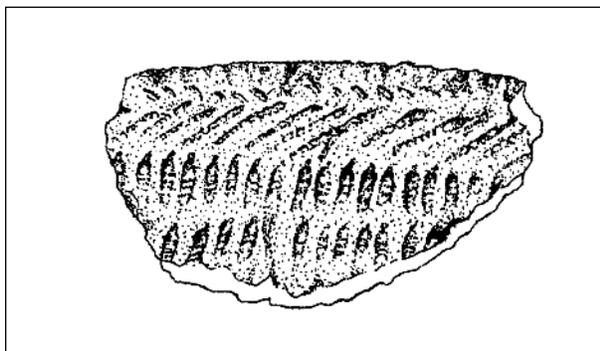
Hay et al. (1987) indicate that some early Clemson Island ceramics can be distinguished from Owasco ceramics by the presence of punctates and bosses around the rim (Figure 7.1). These rims may be straight, flared, or overhanging, and the exterior surface is frequently decorated with cord-wrapped stick and paddle impressions (Schwartz 1985:30). In some instances, the interior rim is also decorated with cord-marked oblique lines. Although the designs found on these containers resemble motifs found on Owasco vessels, some designs are created by over stamping (Stewart 1990:133, 139), resulting in motifs with a three-dimensional appearance. By the end of the early Late Prehistoric (ca. A.D. 1200-1300), ceramic vessels become collared and exhibit incised designs, leading some archaeologists (e.g., Bressler 1980; Schwartz 1985:30) to suggest that these changes represent the evolution of Clemson Island types into later Shenks Ferry types.

Aside from the presence or absence of punctates and nodes around the lower lip and rim, some archaeologists argue that Clemson Island and Owasco vessels can be distinguished by their ceramic paste (Smith 1987, as cited in Stewart 1990:84). Clemson Island ceramics exhibit a variety of tempers with quartz, chert, chert and quartz, and gneiss being materials commonly identified (Rieth 1997). Turnbaugh (1977:215) argues that shell tempering may have also been used in the manufacture of Clemson Island pottery. Although some archaeologists argue that shell-tempered materials were more commonly associated with later Monongahela and Susquehannock ceramics (Hatch and Koontz 1983:13; Kinsey and Graybill 1971:22), shell tempered Clemson Island sherds have been identified at early Late Prehistoric sites, including St. Anthony's (Stewart 1994:13) and Fisher Farm (Hatch 1980). Archaeologists have argued that differences in the preparation of the ceramic paste also exist. According to Smith (pers. comm. 1987, as cited in Stewart 1994:13), "classic Owasco ceramics have a more massive or denser and more well-integrated paste than do their Clemson Island look-alikes, which are often poorly fired and appear laminated in cross section."

The first systematic description of the Owasco ceramic type was provided by Ritchie and MacNeish in

1949 (Figure 7.2). In this publication, Owasco vessels are described as cordmarked containers with cord-wrapped stick and paddle motifs appearing on the shoulder, lip, and exterior rims (Lenig 2000; Ritchie and MacNeish 1949). Although Ritchie (1994:290) indicates that Owasco vessels were predominantly manufactured by the paddle and anvil method, fracture plains indicative of coiling have been identified on early Owasco ceramics in New York (Prezzano 1986; Rieth 1997, this volume), suggesting that more than one method may have been used in the construction of these containers. Ceramics found on sites dating to the Carpenter Brook phase generally exhibit elongated bodies and everted rims. Over time, the bodies become more globular and the rims outflaring. Most vessels were collared with rounded bases and incised exterior designs by the Castle Creek Phase (Prezzano 1986; Ritchie and MacNeish 1949).

Owasco vessels found on early Late Prehistoric sites in New York and Pennsylvania are largely grit (crushed rock) tempered. Quartz is often identified as the major constituent of grit, with gneiss, shale, and other crushed crystalline materials occurring in much smaller frequencies (Ritchie and MacNeish 1949:114-115). Although Lucy (1991a) indicates that chert-tempered containers are regularly found on Owasco sites in northern Pennsylvania, such containers are not regularly found on sites in New York (Rieth 1997; Ritchie and Funk 1973; Ritchie and MacNeish 1949). Shell tempering also does not appear to have been extensively used, as evidenced by the limited number of shell-tempered sherds from Owasco sites (Crannell 1970; Ritchie 1944). Changes in lateral pore spaces, temper density, and temper size are noted (Prezzano 1986; Rieth, Chapter 11, this volume), and suggest changes in the manufacture of Owasco containers over time.



**Figure 7.2.** Drawing of a Carpenter Brook Cord-on-Cord sherd from the Tioga Point Farm site.

## Problems Inherent in the Use of Ceramic Types

Northeast archaeologists have applied the type concept to the study of prehistoric ceramics since the first half of the twentieth century (e.g., Ritchie 1944; Ritchie and MacNeish 1949). Recently, however, some Northeast archaeologists (Chilton 1999; Lizee et al. 1995; Pretola 2000) have questioned the role and applicability of the type concept to the study of archaeological ceramics. As used here, a type is defined as “a group of objects exhibiting interrelated similar features which have temporal and spatial significance” (Ritchie and MacNeish 1949:98). Recently, Chilton (1999:98) has argued that ceramic types often serve as shorthand for a range of stylistic attributes and are often used to refer to distinct archaeological cultures eventually becoming conflated with specific ethnic groups.

There are several problems with the type concept and its application to the study of prehistoric ceramics in northcentral Pennsylvania. Among the most serious problems is the fact that Clemson Island and Owasco types (and its resulting classifications) are not derived from theory used to explain the past (Adams and Adams 1991:312-312; Dunnell 1986:180, 192-193; Hart 1999). Unfortunately, the belief that classification is equivalent to theory has resulted in the construction of units that are extensionally defined, often masking the unique attributes of archaeological assemblages, making it easy to argue for the continuity of types through time (Hart 1999; Pretola 2000:6). In central Pennsylvania, as ceramics with unique or diverse attributes are identified, they are often dealt with either by (1) introducing new types into existing classification systems, or (2) splitting existing types into smaller, more detailed units (i.e., Hay et al. 1987; Hatch 1980; Stewart 1990, 1994). The result is a classification scheme that is both cumbersome to use and subject to continuous revision (Hart 1999). As demonstrated in southern New England (Chilton 1999:100), continuous revision ultimately obscures existing typologies, making it difficult to place sherds within known types since they exhibit traits belonging to several types.

A second problem is that type names developed for specific geographic regions are often applied to similar types in other regions with little or no investigation of the timing and/or origin of such traits and often resulting in the false conclusion that one group was greatly influenced by another (Chilton 1999:100). In northcentral Pennsylvania, ceramic types belonging to the Owasco tradition (e.g., Levanna Cord-on-Cord, Carpenter Brook Cord-on-Cord, etc.) are often applied to Clemson Island containers, leading to the impression

that Clemson Island was greatly influenced by Owasco through social interaction, trade and exchange, and diffusion (Lucy 1991; McCann 1971; Ritchie and Funk 1973; Stewart 1990, 1994:203). In comparison, Clemson Island types (e.g., Clemson Island Punctate, Clemson Island Cord-on-Cord, etc.) are rarely if ever applied to cordmarked ceramics in New York, downplaying (and potentially denying) any role that Clemson Island groups may have played in the prehistoric occupation of the region (but see Snow 1995; Schulenberg, this volume).

One of the dangers of applying Owasco type names to Clemson Island ceramics is that established dates and periods of use in New York are automatically assigned to ceramics in northcentral Pennsylvania. This not only masks variation but may also have the effect of assigning incorrect dates of occupation to sites. Comparison of ceramic types and radiocarbon dates in northcentral Pennsylvania (East et al. 1986; Garrahan 1990:17-26; Hatch 1980; Hay and Hamilton 1984:Table 3; Kolb and Huner 1968:163; Lucy and McCann 1983; Mair and Geidel 1988) has shown that Owasco-like types often appear much earlier, in greater frequencies in different time periods, and have much longer presences than is generally reported for sites in New York.

Finally, problems associated with the use of ceramic types as chronological markers also occur in northcentral Pennsylvania. Chronological evidence for settlement pattern analysis rests to the extent possible on chronometric techniques. Radiometric and accelerator mass spectrometry dates provide the chronological framework for settlement studies within northcentral Pennsylvania (Hay et al. 1987; Hatch 1980; Stewart 1994). However, in instances where radiometric techniques are unavailable or have produced unreliable results, ceramic types are often used to date individual components or assess contemporaneity between sites (Lucy 1959, 1991a; Lucy and McCann 1983). One of the more serious problems in this technique occurs when "chronologically distinct types" are recovered from the same archaeological feature or context. As demonstrated at the Workman site (Kolb and Huner 1968:152), early types, such as Clemson Island Punctate, are often found in pit features with later types, such as Owasco Corded Oblique and Shenk's Ferry Incised Multiple Banded. Similarly, at the Minisink site in the Upper Delaware Valley of Pennsylvania, Kraft (1978:89, as cited in Stewart 1990:85) reports that Levanna Cord-on-Cord sherds were found in association with Owasco Corded Horizontal and Owasco Corded Oblique sherds dating to the thirteenth century. While a differential use-life may account for some this variation,

Schulenberg (this volume) and Watson (1991:86) caution us that more serious problems associated with the quality of the association between pottery and the charcoal from a nearby hearth may also be at work. Both argue that a more conclusive means of determining the age of sherds is dating the sherd itself by thermal luminescence dating or by dating the food encrustations on the sherd's surface using accelerator mass spectrometry.

## DEFINITION OF CLAYS AND THEIR USE IN NORTHEAST COMPOSITIONAL STUDIES

Trace element analysis of ceramic sherds was employed to determine if ceramic compositional profiles corresponded with culture historic types. Ceramic compositional analysis is a technique that is used to measure the physio-chemical construction of an artifact and is dependent upon the premise that "chemical changes associated with the geological processes of erosion, transportation, mixing, deposition, and weathering redistribute these elements [throughout clay deposits], creating a characteristic composition [or fingerprint] for the local deposit" (Bishop 1980:48-49). Successful completion of compositional analysis requires an understanding of the compositional make up of clays and their relationship to the surrounding environment.

Shepard (1995:6) defines clays as fine-grained (less than 2 mm, or 0.002  $\mu\text{m}$ ) material that develop plasticity when mixed with water, and whose primary constituents are silicon, aluminum, iron, calcium, magnesium, potassium, and sodium. Brownell (1951:111) describes the structure of clays as having a two-sheet (one tetrahedron and one octahedral) arrangement of atoms held together by strong bonds within the layers and relatively weak bonds between layers. As water is absorbed between the bonds, the matrix is lubricated, allowing the atoms to slide over each other as occurs in the plastic state. When water is removed through drying, the atoms once again come close to each other, allowing the matrix to become rigid.

Clays that form in place during weathering are called primary or residual clays. Residual clays often have a low organic content and plasticity, making them of limited value to prehistoric potters (Rice 1987:64). Clays that accumulate during the transport of weathering products are known as secondary or depositional clays. These clays are often transported through the flow of water and are often deposited some distance

from their parent material. As these materials are transported from one location to another they “pick up” various impurities (or trace elements) that effect the final composition of the clay. For this reason, the composition of the clay represents a combination of the specific stages of weathering as well as portions of the parent lithology. According to Bishop et al. (1982:294), “even in a region considered to be relatively homogeneous in its gross geologic characteristic, significant mineralogical and chemical differences may be discerned” as a result of these processes. Secondary clays are usually well sorted and exhibit a high degree of plasticity due to their high organic content, making them desirable to traditional potters (Rice 1987:37-38). According to Pretola (2000:64-65), depositional clays can be further classified based on the conditions of deposition and transportation. Included among these are glacial, lacustrine, and swamp clays.

The glacial lake clays that characterize the Northeast possess ideal qualities for traditional non-wheel manufacturing and firing (Brownell 1951:17; Pretola 2000). According to Rice (1987:37), glacial lake clays, which are characterized by their course, organic-rich texture, contain properties that are conducive to prehistoric manufacturing techniques, which involve repeated episodes of forming and drying. In addition, these clays are well suited for the open firing techniques preferred by prehistoric potters, since they require ceramic pastes that can withstand the thermal shock produced by uneven heating and cooling (Pretola 2000:65).

The selection of clays by prehistoric potters was probably not haphazard, but represented a balance between technical and nontechnical choices. Quality is one of the leading factors in the selection of clays. In their study of Kalinga ceramics, Aronson et al. (1994:90) indicate that potters preferred to use clays with little or no mineral inclusions and a high degree of plasticity. Accessibility and distance were also important factors in selection; potters preferred to procure materials from deposits near their house or within a familiar political region. This information seems to coincide with Arnold’s (1981:36) estimates that most clays were procured from deposits located less than 50 km from one’s residence.

Ceramics are composed of a clay matrix and nonplastic inclusions (or temper). Nonplastic inclusions often consist of larger (greater than 20  $\mu$ m or 0.02  $\mu$ m in diameter) minerals and rock fragments, such as quartz, feldspar, and gneiss, which are added to the clay matrix to counteract the effects of shrinkage during drying and firing. Inclusions less than 20  $\mu$ m (or 0.02 mm) in diameter (e.g., fine silt and sand) are usually

naturally occurring materials that were present in the clay deposit (Bishop 1980:49). It is usually difficult to determine whether the small inclusions found in pottery are naturally or intentionally deposited. According to Shepard (1995:161), the only sure way to know is to determine which materials do not occur naturally in the clay.

Because clay used in producing ceramics contains natural or intentionally added inclusions, compositional studies must take into consideration the effect that these inclusions will have on the larger compositional profile. Different inclusions will interact differently with the clay (Bishop et al. 1982:295; Cogswell et al. 1998). Some inclusions, including “pure” quartz sands, alter the chemical make up of the sherd, lowering trace element concentrations. Other elements (e.g., zircon) result in a complex interplay of elements, where the frequency of some elements is increased while that of others is lowered. Other inclusions, including quartz sand, calcite, limestone, and some kinds of vegetal fiber, appear to have little or no effect on the compositional profile.

Finally, other manufacturing activities may also affect the composition of the ceramic paste. Among the more problematic activities is the mixing of clays from several different deposits in order to achieve a desired plasticity (Arnold 1985; Aronson et al. 1994:90-91; Rice 1987; Shepard 1995). As discussed by Bishop et al. (1982:317-318), this often occurs when residual and depositional clays are mixed, resulting in a chemical “fingerprint” that often does not match the compositional profiles of known or naturally occurring lithological deposits.

Although compositional studies prove useful when analyzing prehistoric pottery, to date, only a handful of studies have been completed in the Northeast. Included among these are studies by Trigger et al. (1980:119-133, 1984:3-11), Crepeau and Kennedy (1990:64-65), and Stimmell et al. (1991:47-58), which focus on the production of ceramic vessels and their place of manufacture within isolated parts of Ontario, Quebec, and Manitoba. Studies of St. Lawrence Iroquoian pottery by Trigger et al. (1980) and Crepeau and Kennedy (1990) produced data that exhibit a high degree of compositional homogeneity within sites, suggesting that a limited number of clay deposits were exploited by the site’s occupants. Although the results of both of these studies indicate that St. Lawrence Iroquois pots were locally manufactured, Trigger et al. (1980:132) indicate that pots from different longhouses produced different compositional profiles, suggesting that different households may have exploited different

local deposits. Alternately, Stimmell et al. (1991:47-51) argue that not all ceramic pots were locally manufactured. In their analysis of Blackduck, Selkirk, and Laurel wares from Northern Ontario and Manitoba, the authors have shown that many of the pots from the Fort Nieu Savanne and Ouissinaougouk sites were not locally manufactured, but were probably traded into the region through interaction with groups living to the south and west of Hudson's Bay.

Kuhn (1985, 1986:9-21, 1987:305-315) used x-ray fluorescence analysis to address questions related to the trade and exchange of Mohawk pipes throughout New York and southern Ontario. The results of this study indicate that clay pipes were popular trade items, which served to reinforce social and political ties between geographically distinct communities. Although pipes were extensively traded between communities within Iroquoia, clay pipes were not traded with non-Iroquoian groups residing in the Hudson Valley, suggesting that linguistic and political divisions documented at the time of European contact may have been of prehistoric origin.

In southern New England, Lizee et al. (1995:515-530) used neutron activation analysis to confirm typological distinctions between Late Woodland (A.D. 1450-1600) and Contact period (post-A.D. 1600) Niantic, Hackney Pond, and Shantock ceramics. The results of their study indicate that multiple deposits were utilized by the Late Woodland and Contact period occupants of southern New England. Correlation of compositional profiles, ceramic types, and the spatial distribution of group members suggests that changes in settlement and maintenance of boundaries between later Contact period Mohegan and Pequot tribes may have had their inception during the Late Woodland period.

## METHODOLOGY

### Research Questions

This project addresses three questions relating to the relationship between culture-historic types and clay composition. First, this project addresses the question of whether the sherds recovered from these four sites were manufactured from local or nonlocal clays. Comparisons between the compositional profiles of these sherds and known clay deposits provide a basis for determining where these vessels were manufactured. This project also tested the hypothesis that there is a correlation between culture-historic types and the clays that were used in the production of these containers. Although many archaeologists have argued

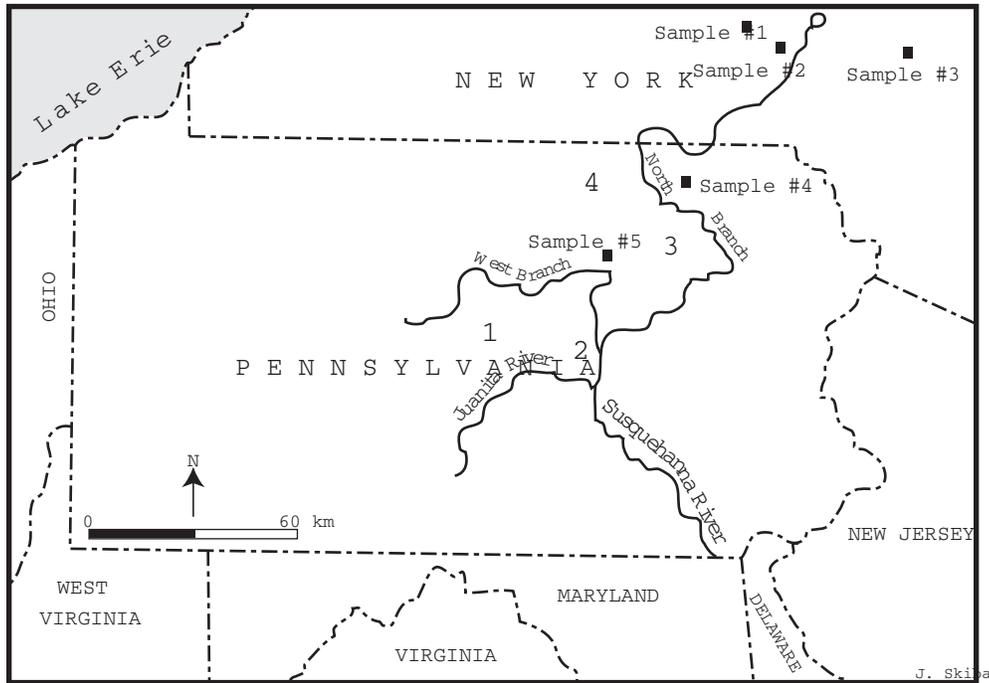
that Clemson Island and Owasco ceramics were manufactured in different geographic areas, this hypothesis has not been previously tested, and could provide important information about the utility of ceramic types in archaeology. Finally, this chapter discusses the implications of this research for understanding the settlement patterns of these early Late Prehistoric populations. Examination of the clays used by these groups not only provides information about the spatial arrangement of groups across the landscape, but also provides information about exploited resources.

### Sample Description

The ceramic assemblages from four early Late Prehistoric sites were studied (Table 7.1, Figure 7.3) and include Tioga Point Farm (Lucy 1991; Lucy and Vanderpoel 1979:1-2), Wells (Lucy and McCann 1983), St. Anthony's (Stewart 1990, 1994), and Fisher Farm (Hatch 1980). Tioga Point Farm and Wells are located in northcentral Pennsylvania near the border between New York and Pennsylvania. St. Anthony's and Fisher Farm are located in central Pennsylvania south of the West Branch of the Susquehanna River.

Tioga Point Farm and Wells are probably small camps, while St. Anthony's and Fisher Farm sites are more extensive hamlets. Tioga Point Farm and Wells are located in an area occupied by the Clemson Island and Owasco traditions, while the St. Anthony's and Fisher Farm sites are located in an area that was primarily occupied by Clemson Island groups. Tioga Point Farm site is classified as an Owasco site (Lucy 1991; Lucy and Vanderpoel 1979), while the Wells, St. Anthony's, and Fisher Farm are Clemson Island sites (Hatch 1980; Lucy and McCann 1983; Stewart 1994) (Table 7.1).

Forty-six sherds were analyzed from these four sites (Table 7.2). Fourteen (30.4 percent) from Tioga Point Farm, nine (19.6 percent) from Wells, nine (19.6 percent) from St. Anthony's, and fourteen (30.4 percent) from Fisher Farm. Each sherd was determined to have originated from a distinct vessel lot based on technological (temper size and type, color, manufacturing technique, etc.) and decorative attributes (surface decoration, rim and lip shape, etc.) (Rieth 1997:116-117). These sherds derived from containers associated with both the Clemson Island and Owasco traditions (Table 7.2). To ensure against mixing of sherds from different occupations and components, the Owasco and Clemson Island sherds were selected from features whose contents were radiocarbon-dated to the early Late Prehistoric period. In each of these features,



**Figure 7.3.** Map showing the location of the (1) Fisher Farm (36CE35), (2) St. Anthony's (36UN11), (3) Wells (36BR59), and (4) Tioga Point Farm Sites (36BR52, 36BR3), and clay samples (samples 1-5) analyzed during this study.

Owasco and Clemson Island sherds were found in association with each other and are considered to have been used by the same occupants of the site. Data were also collected on five raw clay samples from various locations throughout the Upper Susquehanna Valley (Figure 7.3). When used in conjunction with data from ceramic sherds, compositional profiles of these samples provide a basis for determining the local manufacture of containers (Bishop et al. 1982; Lizee et al. 1995).

### Analytical Techniques

All samples were analyzed using x-ray fluorescence at the Department of Physics Accelerator Laboratory at the University at Albany, State University of New York. X-ray fluorescence analysis was chosen because of its availability to the researcher and its nondestructive nature, allowing museum collections to be analyzed. Two spatially distinct readings were taken on each sample to ensure homogeneity within a single vessel (Rieth 1997). A similar technique was used by Stimmell et al. (1991:47-51) in their work on prehistoric pottery in Ontario and Manitoba.

The technique used in this study allowed proportional data about the relationship of the elements to be

collected. As discussed in Kuhn (1986:12), proportional data allow ratios, or the proportions of trace elements, to be measured in terms of "the number of characteristic x-rays observed in fixed time." Following bombardment of the sample with x-rays from a radioisotope, a sample emits fluorescent x-rays whose energies are characteristic of the elements present in the sherd (Kuhn 1986:12, 1989:26-27). The energy levels of each element are then recorded numerically, allowing concentrations (or peak counts) of specific elements to be determined.

Fifteen elements were measured for each sample—iron (Fe), rubidium (Rb), strontium (Sr), barium (Ba), lead (Pb), yttrium (Y), zirconium (Zr), zinc (Zn), vanadium (V), potassium (K), titanium (Ti), scandium (Sc), manganese (Mg), copper (Cu), and nickel (Ni)—to distinguish different clay deposits. Vanadium (V) and potassium (K) were removed from the final analysis due to low detection rates. Although these elements are sufficient for distinguishing regional clay profiles, in most cases, additional samples and elements are needed to identify the precise location of a specific clay deposit. Since that was beyond the scope of this project, the results are discussed only in terms of the regional clay profile. Principal components analysis,

**Table 7.1.** Radiocarbon Dates from Sites Used in the Study.

Site	Site Type	Site Tradition <sup>1</sup>	Radiocarbon Age Y.B.P (Lab No.)	Calibrated 2σ with intercepts (A.D.) <sup>2</sup>	Reference
Tioga Point Farm (36BR52, 36BR3)	Camp	Owasco	---	---	Lucy 1991a; Lucy and Vanderpoel 1979
Wells (36BR59)	Camp	Clemson Island	970+/-100 (I-2488) 880+/-100 (I-2489)	887(1029)1275 981(1163,1173,1180)1296	Lucy and McCann 1983
St. Anthony's (36UN11) <sup>3</sup>	Hamlet/village	Clemson Island	1150+/-90 (Beta 22696) 1140+/-130 (Beta 22693) 1100+/-50 (Beta 22695) 1100+/-140 (Beta 22694) 950+/-80 (Beta 22813) 920+/-60 (Beta 20368) 890+/-80 (Beta 21725) 890+/-120 (Beta 21726) 850+/-80 (Beta 20369) 850+/-80 (Beta 21980) 820+/-60 (Beta 20477) 760+/-90 (Beta 21982) 750+/-90 (Beta 21979) 670+/-90 (Beta 22692) 660+/-70 (Beta 22866)	671(892)1029 651(894,925,935)1183 782(904,910,976)1022 658(904,910,976)1022 901(1037,1143,1148)1260 999(1061,1086,1123,1138,1156)1257 996(1161)1283 896(1161)1379 1019(1212)1294 1019(1212)1294 1039(1221)1291 1040(1276)1398 1043(1278)1401 1211(1297)1431 1244(1299,1375,1375)1418	Stewart 1990, 1994
Fisher Farm (36CE35) <sup>3</sup>	Hamlet/village	Clemson Island	1245+/-70 (UGa 2683) 990+/-90 (UGa 2458) 875+/-125 (UGa 2676) 825+/-60 (UGa 2680) 820+/-110 (RL-702) 820+/-80 (UGa 2677)	656(776)976 887(1023)1242 898(1164,1169,1186)1386 1038(1220)1290 1000(1221)1393 1024(1221)1376	Hatch 1980

<sup>1</sup>Site Tradition denotes the tradition assigned to the site by the excavator.

<sup>2</sup>Calibrated using CALIB 4.2 (Stuiver et al. 1998).

<sup>3</sup>Other dates reported beyond the early Late Prehistoric period.

**Table 7.2.** Summary of Ceramic Vessels Analyzed from Each Site.

Site	Clemson Island		Owasco		Total	
	n	percent	n	percent	n	percent
Tioga Point Farm (36BR52, 36BR3)	4	8.7	10	21.7	14	30.4
Wells (36BR59)	6	13.0	3	6.5	9	19.6
St. Anthony's (36UN11)	3	6.5	6	13.0	9	19.6
Fisher Farm (36CE35)	11	23.9	3	6.5	14	30.4
Total	24	52.1	22	47.8	46	100.0

discriminant function analysis, and cluster analysis were applied to determine heterogeneity between samples.

## RESULTS

Five groups were identified (Table 7.3). Principal components analysis showed that 91.9 percent of the total variance in the data set could be explained by the first four components (Rb, Sr, Zr, and Y). Mapping these components as scatterplots provided further evidence of the spatial distribution of these groups, which was supported by single linkage cluster analysis (Figure 7.4). In this chapter, these five groups are referred to as Otsego, Upland, Tioga, West Branch, and Unknown (Table 7.3). Group descriptions and their relationship to the ceramic types and settlement characteristics of the sites are presented below.

Tioga is the largest group (Table 7.3). Of the 30 sherds in this group, 7 (23.3 percent) were from Tioga Point Farm, 9 (30 percent) from Wells, 2 (6.6 percent) from St. Anthony's, and 11 (36.7 percent) from Fisher Farm. Clay sample 4, which was extracted from a deposit in Bradford County, Pennsylvania, also clustered within this group. The sherds in this group belong to both the Clemson Island (n=18) and Owasco (n=11) types and are largely decorated with exterior cordmarking. Regardless of ceramic tradition, all but three vessels contained a small (<1 mm) or medium (1-2 mm) quartz and/or chert temper (Rieth 1997). Of the remaining three sherds, one exhibited an unidentified medium-crushed crystalline temper, one a small-grit temper, and the temper in the final sherd was unidentifiable.

All (n=9) of the sherds from the Wells site, 50 percent (n=7) from Tioga Point Farm, 22 percent (n=2) from St. Anthony's, and 79 percent (n=11) from Fisher Farm were in this group. Given that the Tioga Point Farm,

Wells, and clay sample 4 are located within 30 km of each other, it is not surprising that sherds from these two sites clustered in the same group. It is surprising, however, that such a large number of sherds from Fisher Farm clustered in this group, since the site is located approximately 80 km from clay sample 4. Although repeated movement of the hamlet/village away from the general location of clay sample # 4 may partially account for the large number of sherds in this group, it is unlikely that village movement is entirely responsible for these patterns, since models of Northeast village movement (e.g., Bradley 1987:28; Warrick and Molnar 1986:26 as cited in Sutton 1990:51) suggest that later Iroquoian groups did not usually relocate over such great distances, but rather moved approximately 2.5 km at a time. Grouping of the sherds from the Fisher Farm, Wells, and Tioga Point Farm sites in the same group suggests that a broader sampling of clay deposits in central Pennsylvania may also reveal additional deposits with similar profiles closer to the West Branch of the Susquehanna River. If such deposits were identified, this information could contribute to our understanding of village movement during the early Late Prehistoric period.

Temporally, this group includes contexts dating from the end of the tenth to the beginning of the thirteenth centuries A.D. (Table 7.1) indicating continuity in the selection and/or use of regional deposits during this three hundred-year period. When compared with the loosely clustered data points in Figure 7.4, the data suggest that many different deposits may have been exploited. This is especially curious, since the period dating from A.D. 1000 to 1300 is often characterized by increased sedentism, increased territoriality, and warfare (Ritchie 1994; Ritchie and Funk 1973; Stewart 1994). If this were true, we would expect tighter clusters, suggesting the use of only a few deposits at each site (Lizee et al. 1995:21). The loosely defined cluster suggests that the occupants of northcentral

Pennsylvania continued to practice a semisedentary settlement pattern during this time. Alternatively, warfare may not have been excessive, allowing prehistoric groups to move across clan and tribal territories to gather needed resources.

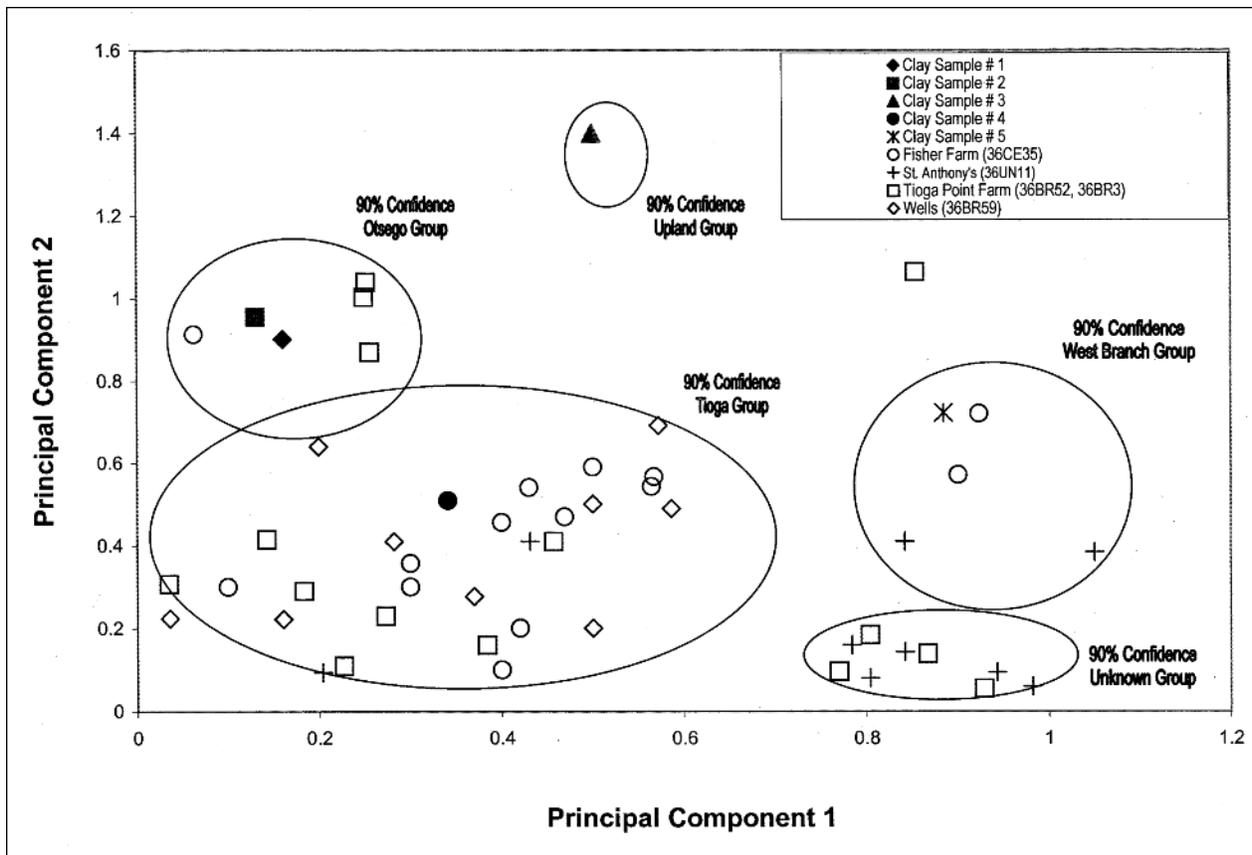
The Otsego group produced four sherds with one (16.6 percent) from Fisher Farm and three (50 percent) from Tioga Point Farm (Table 7.3). Clay samples 1 and 2, which were collected from deposits in Otsego County, New York, also clustered within this group. All of the sherds in this group were assigned to Owasco types and exhibited cordmarked exterior surfaces overprinted with cord-wrapped stick and paddle impressions. These sherds are more diverse than those assigned to the Tioga group, having quartz, flint, grit, and unidentified crushed-crystalline inclusions. The temper size was variable, with inclusions ranging from less than 1-3 mm in size. One container, of the Owasco Corded Horizontal variety, appeared laminated in cross-section.

The geographic distance between clay samples 1 and 2 and the Tioga Point Farm site is approximately 80 km, while the distance between these clay samples and the Fisher Farm site is approximately 120 km. Given the large distance and the limited number of sherds (21 percent and 7 percent of total sample, respectively), it seems unlikely that these sherds were manufactured by the occupants of these sites. They may instead represent the by-products of reciprocal exchange between groups residing in the larger Susquehanna Valley. While the social mechanisms behind such interactions are currently not understood, ethnohistoric and archaeological evidence among later Iroquoian groups suggests that material objects (and by extension, their contents) may have been regularly exchanged as a means of promoting alliances and solidarity between groups (Kuhn and Sempowski 2001; Trigger 1990: 131).

Of the four other groups defined in this study, the Otsego group appears to be most closely related to the Tioga Group (Figure 7.4). This is not surprising, since the sherds in these two clusters were recovered from sites in adjacent regions, and, with the exception of the ceramics from the Fisher Farm site, were all recovered from locations near the north branch of the Susquehanna River. Differentiation of the Otsego group from the other four groups is due in part to the high concentration of zirconium (Zr) found in these samples. The two clay samples and one of the samples from the Tioga Point Farm site produced the three highest concentrations of this element in this study. One possible explanation for the enrichment of zirconium in these sherds may relate to the presence of naturally

**Table 7.3.** Summary of Clay Groups from Sites in North-Central Pennsylvania.

Clay Group	Tioga Point Farm		Wells		St. Anthony's		Fisher Farm		Clay Samples (Samples No.)	Total
	Clemson Island	Owasco	Clemson Island	Owasco	Clemson Island	Owasco	Clemson Island	Owasco		
Otsego group	---	3	---	---	---	---	---	---	2(1,2)	6
Upland group	---	---	---	---	---	---	---	---	1(3)	1
Tioga group	2	5	6	3	1	1	9	2	1(4)	30
West Branch group	---	---	---	---	2	---	2	---	1(5)	5
Unknown	2	2	---	---	3	2	---	---	---	9
Total	4	10	6	3	6	3	11	3	5	51



**Figure 7.4.** Plot of principal component scores of the elemental compositions of ceramic vessels from northcentral Pennsylvania.

occurring zircon-rich igneous rock (e.g., quartz, feldspar, etc.) and sand inclusions in the paste.<sup>1</sup> Elam et al. (1992:95-96) argue that if a significant amount of zircon is present in the sand (as well as the igneous rock particles), the paste may exhibit a compositional profile that is enriched in Zr.

The West Branch Group consists of four sherds with two (40 percent) from St. Anthony's and two (40 percent) from Fisher Farm (Table 7.3, Figure 7.4). Clay sample 5, which is from north of the West Branch of the Susquehanna River, also clustered in this group. In this group, all of the sherds from the Fisher Farm and St. Anthony's sites were assigned to Clemson Island types, having cordmarked exterior surfaces with nodes and/or punctates around the exterior rim and neck. All of the sherds had a crushed-quartz temper that measured between 1-2 mm in size. One sherd from St. Anthony's is laminated in profile and one from Fisher Farm contains evidence of manufacture by coiling (Rieth 1997). St. Anthony's, Fisher Farm, and clay sample 5 are located in central Pennsylvania south of the

West Branch of the Susquehanna River. This area is commonly regarded as the "heartland" of the Clemson Island tradition. Therefore, it is not surprising that the members of this group all exhibit attributes consistent with Clemson Island types.

The Unknown group consists of nine sherds, four (44.4 percent) from Tioga Point Farm and five (55.6 percent) from St. Anthony's. Five (55.6 percent) were assigned to Clemson Island types and four (44.4 percent) to Owasco types. None of the five clay samples clustered in this group, making it difficult to determine where the vessels were manufactured. Although most of the sherds in this group are cordmarked and have a medium quartz and chert temper, one sherd from St. Anthony's is shell tempered. Small open cavities were visible, suggesting that pieces of shell (and/or other organic materials) may have either disintegrated during firing (Rieth 1997) and/or leached out after breakage.

The Unknown group represents a tightly clustered set of data points, which (at the 90 percent confidence

level) overlaps with the West Branch Group (Figure 7.4). Tight clustering of these data points suggests that a limited number of different clay deposits may have been exploited (Lizze et al. 1995), while the overlapping confidence levels of these two groups suggests that the source of the clay may be spatially related to that of the West Branch Group. In light of earlier statements regarding the semisedentary nature of these settlements, scenarios involving the repeated collection of high quality materials from one or two isolated deposits in central Pennsylvania seem plausible based on the present data.

Finally, the Upland group consists of clay sample 3 (Table 7.3). This sample, which was extracted from a clay deposit located at the northeast end of the Susquehanna Valley near the border between Otsego and Schoharie Counties, New York, appears to be most closely related to the Otsego group. Given that only one member was grouped in this category, it is difficult to say anything conclusive about the relationship between the manufacture of pottery and settlement patterns. However, in the most general sense, the failure of any sherds to cluster in this group suggests that either (1) the occupants of northcentral Pennsylvania probably did not maintain extensive interaction networks with groups residing in this part of New York State, or (2) they did not use that particular clay deposit.

In summary, this study suggests that the ceramic vessels from these four sites can be grouped into five clay groups: Tioga, West Branch, Otsego, Upland, and Unknown. The members of these groups do not correspond with a single ceramic tradition but include vessels belonging to both the Owasco and Clemson Island traditions. Grouping of Owasco and Clemson Island containers from the same features within the same group suggests that the manufacturers of these vessels exploited similar deposits. Correlation of compositional data from these vessels with similar data from known clay deposits suggests that most of these vessels are not the products of reciprocal exchange, but rather represent containers that were locally manufactured in northcentral Pennsylvania.

## DISCUSSION

Compositional analysis of ceramic sherds from these four sites contributes to our understanding of prehistoric pottery manufacture and its relationship to the exploitation of local resources in the region. The results of this project suggest that prehistoric potters exploited

several clay deposits along the north and west branches of the Susquehanna River. Grouping of the compositional profiles of vessels with known clay deposits suggests that most of these pots were locally manufactured in northcentral Pennsylvania and do not represent nonlocally produced wares. Small numbers of nonlocally manufactured ceramics are represented by the vessels in the Otsego group and may represent the by-products of reciprocal exchange between groups in the Upper Susquehanna Valley.

Current settlement models (e.g., Graybill 1984:12-16; Hatch 1980; Stewart 1990:97) suggest that agriculturally oriented hamlets or villages were occupied by some segment of groups for much of the year, with smaller resource procurement stations used for the collection of needed resources. Graybill (1984:12-16) argues that sometime around A.D. 1100, the intensification of maize horticulture resulted in settlements that were occupied for longer periods of time, leading to the use of fortified and planned villages around A.D. 1300. The data generated during this study partially supports these ideas. As represented by the presence of loosely clustered data points in the West Branch and Tioga groups, it appears that several clay deposits within a smaller geographic region were exploited (Figure 7.4). The exploitation of numerous clay deposits within a restricted period of time is largely facilitated by the nonsedentary nature of these sites. Through the regular movement of camps, the occupants of these sites may have come in contact with a different set of resources at each location.

Graybill (1984:12-16) argues for the occupation of more permanent settlements between A.D. 1100 and 1300. As demonstrated in New England (Lizze et al. 1995), if such patterns were occurring, we would expect a change from the use of numerous clay deposits to a restricted number of deposits located in the vicinity of the village. The data generated during this project do not support a change in resource procurement between A.D. 900 and 1300. Instead, as demonstrated by the Tioga group, the occupants of these sites appear to have maintained earlier practices centering on the exploitation of several different local deposits.

Although several deposits were exploited, there is some evidence to suggest that one or more high quality deposits may have been located and were repeatedly used by the prehistoric occupants of northcentral Pennsylvania. Tight clustering of the data points in the Unknown group of Figure 7.4, suggests that a few different clay deposits were exploited (Lizze et al. 1995). These activities are consistent with what we know

about the collection of resources among traditional potters. According to Aronson et al. (1994:89-90), a clay's properties (especially plasticity) and its relation to the production of the container are important criteria considered in the collection and repeated use of specific deposits. Although potters in Aronson et al.'s (1994) study preferred to procure materials from sources located within a few kilometers of their settlement, potters did indicate that they would change sources if better quality materials were located a slightly longer distance away.

One of the primary questions addressed during this project involved assessing the relationship between culture-historic types and ceramic composition. Before discussing the results of this work, it is important to briefly return to the discussion of the construction of types as presented at the beginning of this chapter. As previously discussed, one of the major problems with the use of culture-historic types is that types and their resulting classifications are not derived from theory, but rather represent extensionally defined sets of units that often mask the unique characteristics of diverse assemblages (Adams and Adams 1991:312-313; Dunnell 1986:180; Hart 1999:20). Since types are not formed by theory, a single well-established classification system is often used to address a wide variety of research questions. Hart (1999) argues that this approach is flawed, since "not all classification systems are the same...and a given object . . . may be assigned to different groups under different classification systems depending upon the theory, goals, and rules of those systems and the definition of classes." As a result, archaeologists may need to devise several classification systems depending upon the research problem(s) at hand (Dunnell 1986; Hart 1999:20).

Compounding this problem is the perpetuation of culture-historic types within an essentialist framework. Under an essentialist framework, internal variation and reinforcement of group boundaries are stressed (Hart 1999:20). Hart (1999:20) proposes that a more meaningful way of studying the early Late Prehistoric period can be achieved under a population metaphysic. Under a population metaphysic, variation between archaeological assemblages is real and subject to continuous change due to evolutionary forces at work within the population. Furthermore, Hart (1999:20) argues that when studied under population metaphysics, Clemson Island has no reality, but is reduced to a group of sites with similar traits.

With these thoughts in mind, I return to the data at hand. The results of this study suggest that many of the

Owasco and Clemson Island containers from the same sites exhibited similar compositional profiles. Of the 19 Owasco sherds analyzed, 11 (58 percent) grouped in the Tioga group, 4 (21 percent) in the Unknown group, and 4 (21 percent) in the Otsego group. If we assume that the Unknown group represents sherds manufactured from an unidentified deposit in northcentral Pennsylvania, 15 (79 percent) appear to have been manufactured in northcentral Pennsylvania. Quartz and chert represent the predominant inclusions in these containers and generally range from 1-2 mm in size. Although most of the Owasco vessels appear to have been manufactured in northcentral Pennsylvania, four sherds from Tioga Point Farm and Fisher Farm match the compositional profiles for the Otsego group. Two of these sherds have a grit temper—one a chert temper, and one a quartz temper. Given the large geographic distance between these two sites and clay samples 1 and 2, it seems likely that these artifacts were not manufactured by the occupants of the site, but rather represent items accumulated through reciprocal exchange.

Analysis of the Clemson Island sherds indicates the use of many of the same clay deposits as the Owasco sherds. Of the 27 Clemson Island samples analyzed, 18 (63 percent) grouped in the Tioga group, 4 (14.8 percent) in the West Branch group, and 5 (18.5 percent) in the Unknown group. Assuming that the Unknown group represents an unknown clay deposit in central Pennsylvania, all appear to have been manufactured in northcentral Pennsylvania. The paste characteristics of these vessels resemble those of the Owasco containers with quartz and chert inclusions.

Given these results, we are left to speculate about the usefulness of essentialism and population thinking for reconstructing the prehistoric settlement patterns of these populations. Under an essentialist framework, the discontinuities between ceramic types and composition are difficult to explain, since essentialism requires the boundaries between different taxa to be maintained reducing the likelihood that Clemson Island and Owasco groups would have exploited the same clay deposits. Furthermore, employing an essentialist framework is troublesome when explaining the recovery of both Owasco and Clemson Island ceramic types from the same archaeological context. The recovery of Owasco sherds from the same context as Clemson Island sherds has previously been explained as a result of interaction and trade. As demonstrated by this project, trade can be ruled out given that most of these vessels were locally produced.

Under a population metaphysic, the discontinuities between culture-historic types and composition can be viewed with less skepticism given the absence of stringent boundaries between taxa allowing for the coexistence of several different local populations within a limited geographic area. In northcentral Pennsylvania, evidence of the coexistence of different populations can be seen in the recovery of locally produced Owasco sherds from the same features as Clemson Island sherds. Under a population metaphysic, the work of Graybill (1989) has some utility in explaining the discontinuity between culture-historic types and ceramic composition. In his analysis of the later Shenks Ferry tradition, Graybill (1989) points out that the early Late Prehistoric occupants of Pennsylvania were culturally similar (and produced artifacts similar) to those of others in the adjacent Appalachian Highland zones. More specifically, Graybill (1989) argues that the early Late Prehistoric occupants of northcentral Pennsylvania and New York, as well as the Lower Susquehanna and Potomac drainage, probably derived from a rather “uniform Middle/Late Woodland base” along the eastern and northern fringes of the Alleghany Plateau between A.D. 850 and 1250. Under this scheme, Graybill (1989) emphasizes the importance of the “Middle/Late Woodland base” (or population) as the important unit of analysis, suggesting that variation between groups in southern Pennsylvania, along the West Branch of the Susquehanna, and in northcentral Pennsylvania exists and may represent an attempt by these local populations to adapt to the surrounding ecological niche.

When viewed as a single “population” and not as smaller culture groups, the results of this project make sense, eliminating the need to justify temporal and spatial concerns as to why the Clemson Island and Owasco groups came to occupy the same ecological niche. When treated as part of a population, the potters of northcentral Pennsylvania might expect to have made choices as to how to design and decorate pots. While some of these choices (e.g., cordmarking, oblique motifs, etc.), may represent characteristics associated with the larger population, other choices (e.g., punctates) may reflect the local population’s interest in distinguishing itself from its neighbors (Pretola 2000). As Pretola (2000:30-31) points out, it is these individual choices and their variation between local groups that make it difficult to use the same culture-historic types to compare groups residing in different parts of the same region.

## CONCLUSION

Changes in ceramic typology are often used to document spatial and temporal changes in early Late Prehistoric settlement patterns. In northcentral Pennsylvania, these changes center around two ceramic traditions: Clemson Island and Owasco. Despite efforts to do so, the high degree of stylistic similarity between these traditions makes it difficult to distinguish between types, thus limiting their usefulness in prehistoric settlement studies.

In this study, trace element analysis was employed to determine if compositional profiles of four ceramic assemblages correspond with identified stylistic types. The results of this study suggest that there does not appear to be a clear distinction between ceramic types and the clay deposits exploited by the early Late Prehistoric occupants of central Pennsylvania. Most of the Clemson Island and Owasco ceramics were manufactured from similar local clay deposits. Four sherds grouped in the Otsego group and probably represent nonlocally manufactured containers.

When viewed under a population metaphysic, differences in ceramic paste and the selection of one resource over another probably reflect the range of materials that were available within a particular resource collection zone around the village or camp. In the future, additional studies are needed to determine the diverse array of materials used in the construction of these pots and how the choices made by these potters reflect the settlement characteristics of these local communities.

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## END NOTES

1. Zircon is a mineral composed of silicon, oxygen, and zirconium. Zircon crystals occur in many naturally occurring materials, including granites and igneous rocks. Since Zircon is resistant to weathering, it is often found in gravel and sand particles produced during the erosion of igneous rocks.

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## CHAPTER 8

### NEW DATES FOR OWASCO POTS

Janet K. Schulenberg

*“ . . . how well do we understand the time dimension?  
Do we really have a handle on the temporal aspects of late prehistoric  
complexes in the Northeast and their rates of change?”*

(Starna and Funk 1994:51)

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#### INTRODUCTION

The idea that the Iroquoian tradition is deeply rooted in a long sequence of continuous cultural development in the northeastern United States and southern Ontario has dominated reconstruction of Iroquoian prehistory for the past 50 years. The Iroquois were considered relative newcomers to the Northeast until the mid-1940s, when Griffin (1944) suggested that archaeologists consider the possibility that the Iroquois were indigenous to the Northeast. Following a typological study of pottery from a number of supposed Iroquoian and pre-Iroquoian sites in Pennsylvania, New York, and Ontario, MacNeish (1952) argued that the ceramic stylistic continuity he saw from pre-Iroquoian to Iroquoian periods indicated that the Iroquois culture developed in place, forming the core of the *in situ* model. According to the model, Iroquoian prehistory spans over 1,500 years (Starna and Funk 1994:47). MacNeish (1952) put the temporal boundary between pre-Iroquoian and Iroquoian at about A.D. 1000, between the older Point Peninsula (pre-Iroquoian, foraging) tradition and the more recent Owasco (earliest Iroquoian, farming) tradition, but argued that there was ceramic continuity across this temporal boundary. Despite the fact that the cultural implications of the *in situ* model were never tested, the model has dominated the interpretation of archaeological remains in the Iroquoian region (Snow 1995:59).

The issue of chronology is central to any discussion of Iroquoian origins and the development of social complexity in the Northeast. The competing scenarios

of Iroquoian development have radically different implications for the social circumstances underlying the development of maize horticulture, village settlements, and matrilocality among the Iroquois. One obstacle to differentiating the models is the untested culture history underlying each model. The culture history of the Iroquoian region is in large part based on inferences made from the ceramic chronology developed in the 1940s. The basic chronology has not been substantially revised or tested either through excavation or direct dating of organic artifacts in unequivocal association with typed ceramics.

A reevaluation of radiocarbon dates from sites in Ontario has produced evidence for a three hundred-year overlap between Middle Woodland stage foragers and Late Woodland stage (Iroquoian) farmers (Smith 1997). A similar overlap that is masked by the current confusion of cultural stages and temporal periods could have existed in New York. Many sites from the critical transitional period were excavated in the mid-twentieth century and have museum collections that may provide additional information about the Point Peninsula to Owasco transition. Absolute dates are not readily and reliably available from ceramic sherds themselves, but AMS dating is particularly useful for dating the encrusted food residues in direct association with the sherds. This method provides absolute dates in unequivocal association with ceramic sherds, thereby allowing a test of the absolute chronology assigned to ceramic typologies. A limited series of AMS dates from food residues encrusted on ceramic sherds belonging to Point Peninsula and Owasco types from the Kipp Island, Hunter's Home,

and Levanna sites have offered an opportunity to reevaluate the ceramic and cultural chronology for the central region of New York.

## MODELS OF IROQUOIAN DEVELOPMENT

Models of the development of the Iroquois have alternated between models of incursions and models of in situ development. Several of those models have been adequately refuted. Other models, however, play a major role in modern interpretations of Iroquoian and pre-Iroquoian archaeological remains. There are currently three models of the transition from Point Peninsula to Owasco cultures under debate. These are the punctuated in situ model (Ritchie 1969), the gradual in situ model (Chapdelaine 1993), and the incursion model (Snow 1995, 1996).

As discussed above, the original in situ model was developed by MacNeish as an explanation for the perceived continuity in ceramics from the Iroquoian region across the ca. A.D. 1000 Point Peninsula to Owasco transition. In his summary of the prehistory of New York State, Ritchie (1969:301-2) explicitly adopted the in situ model as an explanatory framework for culture change in the Iroquoian region, and attempted to place a mechanism for change into the in situ model. Based on the ceramic chronology, he suggested changes began around A.D. 1000 with the introduction of maize cultivation (Ritchie 1969:301; Ritchie and Funk 1973:165). Ritchie (1969:276) believed that once maize was introduced its benefits were immediately recognized and exploited by the indigenous hunting-gathering-fishing peoples. Ritchie suggested that changes in subsistence, community organization, household organization, and political organization accompanied the shift from Point Peninsula to Owasco periods (Ritchie 1969:272-281). The changes in ceramics from Point Peninsula to Owasco styles presumably correspond with the general social changes taking place as village life and matrilineal residence brought female potters together.

During the mid-twentieth century, models of the inherent superiority of agriculture were prevalent. Archaeologists often assumed that maize horticulture would be adopted unless there was some obstacle to it, such as too few frost-free days (Hart 2001:155). Horticulture was equated with formal village life and vice versa (e.g., Braidwood 1964; Childe 1951; MacNeish 1964; Sears 1971; Struever 1971). It was not until the mid-1970s—after Ritchie published his

revisions to the in situ model—that Braidwood (1974) published his work from Jarmo, MacNeish (1971) published the results of his Tehuacan Valley project, and archaeologists began to realize that domesticates were not necessarily adopted rapidly and completely.

In considering archaeological sites in Ontario, Chapdelaine (1993) offered an alternative to Ritchie's punctuated model of in situ development, where he suggested that changes in settlement and social organization were taking place before the introduction of maize horticulture and that populations were gradually becoming increasingly sedentary. Because of the lack of evidence for a pre-maize horticultural system, he suggested the transition to maize horticulture required a period of experimentation. The introduction of maize augmented changes in settlement pattern and social organization, but these changes were part of a gradual continuum of change (Chapdelaine 1993:201). Drawing on regional similarities in ceramic styles, Chapdelaine suggested matrilineages were developing before the adoption of maize horticulture, perhaps through the development of female work groups on seasonally reoccupied sites (Chapdelaine 1993:198). He went further with this idea, suggesting that the development of these incipient matrilineages was a precondition for the successful adoption of the food-producing economy (Chapdelaine 1993:198).

This model is similar to the archaeological pattern of settlement and subsistence change observed for Midwestern and Southeastern North America, although neither of these regions appears to have required the development of matrilineal residence to accommodate maize horticulture. Chapdelaine (1993:174) specifically asserts that this process happened without the influx of new populations; however, a similar pattern of change could have resulted from the influx of enclaves of farming populations.

Snow (Snow 1992, 1994a, 1994b, 1995, 1996) offered an alternative to the in situ models where, rather than developing out of indigenous populations, the Iroquoian culture was initiated by Iroquoian migrants. Snow perceived a sharp discontinuity between Point Peninsula and Owasco patterns of subsistence, settlement, and social organization (Snow 1995:70-72). In this model, the Iroquois intruded into southern Ontario and New York, carried maize horticulture and village settlement patterns with them, and eventually displaced, absorbed, or annihilated the indigenous Point Peninsula populations (Snow 1995:76). Based on Divale's (1984) work on matrilineal residence, matrilineal social structure is suggested as one of the outcomes of the migration process (Snow 1995:71).

**Table 8.1.** Key Components of the Three Models of Iroquoian Development.

Model	Ceramics	Chronology	Subsistence	Social Organization	Settlement
Ritchie	Changes show continuity	Owasco follows Point Peninsula; no coexistence	Owasco people are farmers	Matrilocal residence accompanies adoption of maize (Owasco period)	Villages develop with adoption of maize (Owasco period)
Chapdelaine	Changes show continuity	Owasco and Point Peninsula are not readily differentiated	Both Owasco and Point Peninsula people are experimenting with maize	Matrilocal residence precedes adoption of maize (begins in Owasco or Point Peninsula period)	Villages develop with the adoption of maize (Iroquoian period)
Snow	Changes show discontinuity	Owasco and Point Peninsula are different and may coexist	Owasco people are farmers	Matrilocal residence accompanies Owasco people as a result of incursion	Villages accompany Owasco people

Snow did not believe this incursion happened in a single migration or a wave of advance like that proposed by Ammerman and Cavalli-Sforza for Europe (1973; 1979). Rather, he suggested the incursion happened as a result of several “branching and sequential” migrations in a fashion similar to the hiving off of communities seen in later Iroquoian times (Snow 1995:75). Immigrants interacting with the surrounding indigenous population initiated pockets of Owasco settlement in the Finger Lakes and Upper Susquehanna regions. Given evidence that the Iroquoian pattern appeared in Ontario as early as A.D. 500 (Crawford and Smith 1996), Snow (1996a) revised his model to allow for enclaves of horticultural Iroquoians to coexist with indigenous foragers from at least A.D. 600-900 before the Iroquoian culture began to dominate the region.

The basic premise of the incursion model is consistent with the adoption of domesticated plants and animals in other parts of the world. Most notably, the Iroquoian incursion model is similar to the adoption of domesticates throughout Europe at the beginning of the Neolithic. In Europe, the transition from an economy based on foraging to one based primarily on domesticates was not sudden (Bogucki 1995:113). The transition began with the establishment of enclaves of farming communities in areas already thinly occupied by foraging populations (Bogucki and Grygiel

1993:402). The coexistence of these two groups in close proximity continued for more than a millennium (Bogucki 1995:113). Bogucki suggests that foraging and farming populations in Europe at first interacted through the adoption of escaped livestock, followed by exchange of domesticated plants. At some point, the indigenous foragers adopted economies based on domestic plants and animals, but only after a millennium of interaction with intrusive farmers and their domesticates (Bogucki 1995:108).

The gradual in situ model implies that changes in settlement, subsistence, and social organization are disjointed, and are occurring at different rates (Table 8.1). Changes in settlement pattern begin before the introduction of maize horticulture, and the shifting of social organization begins after its introduction. The punctuated in situ model suggests that changes in subsistence, social organization, and settlement are happening roughly in concert, but that maize is clearly the trigger for those changes. This model predicts the appearance of maize before the changes in social organization evident by multifamily longhouses appear. Finally, the migration model predicts that there is a tight correspondence between maize horticulture, nucleated sedentary villages, and longhouse dwellings. According to the migration model, on any Iroquoian site, all these characteristics should co-occur.

The ceramic chronology becomes critical in this argu-

**Table 8.2.** Ceramic Sherds AMS Dated.

Cultural Affiliation	Number of Sherds	Ceramic Type	Site Name	Approximate Date based on ceramic chronology (Ritchie and MacNeish 1949)
Point Peninsula	1	Wickham Incised	Kipp Island	A.D. 400-800
	2	Point Peninsula Corded	Kipp Island	A.D. 700-900
	1	Carpenter Brook Cord-on-Cord	Kipp Island	A.D. 950-1200
	1	Carpenter Brook Cord-on-Cord	Hunter's Home	A.D. 950-1200
Owasco	1	Levanna Cord-on-Cord	Hunter's Home	A.D. 950-1200
	1	Levanna Cord-on-Cord	Levanna	A.D. 950-1200
	1	Owasco Herringbone	Kipp Island	A.D. 1200-1350
	1	Owasco Corded Oblique	Kipp Island	A.D. 1200-1350
	1	Owasco Corded Horizontal	Kipp Island	A.D. 1200-1350
	1	Owasco Corded Horizontal	Hunter's Home	A.D. 1200-1350
Unaffiliated	1	Cordmarked	Kipp Island	

**Table 8.3.** Radiocarbon Dates from Kipp Island (Ritchie and Funk 1973:155).

Component	Radiocarbon Date	2- $\sigma$ Calibrated Date <sup>1</sup>	Context
Kipp Island No. 2	A.D. 310 $\pm$ 100	cal A.D. 134 (417) 638	Hearth with Point Peninsula Rocker Stamped pottery
Kipp Island No. 3	A.D. 630 $\pm$ 100	cal A.D. 542 (683) 959	Earth oven with Kipp Island phase pottery
Kipp Island No. 4	A.D. 895 $\pm$ 100	cal A.D. 725 (995) 1211	Cremated burial

<sup>1</sup>Calibrated with CALIB 4.3.

ment. The chronology developed for ceramics in New York State was created under a model of continuity. Recently, Snow (1994:16-19, 1995:65) has argued that this continuity is an artifact of the grouping of archaeological components, and the chronology does not reflect real historical continuity. It is not clear if the current ceramic chronology holds up to this separation. Empirical dates that would test whether or not Owasco types postdate Point Peninsula types have not been available. It is also not clear if Owasco ceramics are associated with Early Iroquoian style settlements and evidence of maize horticulture as the incursion model suggests. The first step toward resolving these problems is to directly date typable ceramic sherds.

## SAMPLE SELECTION

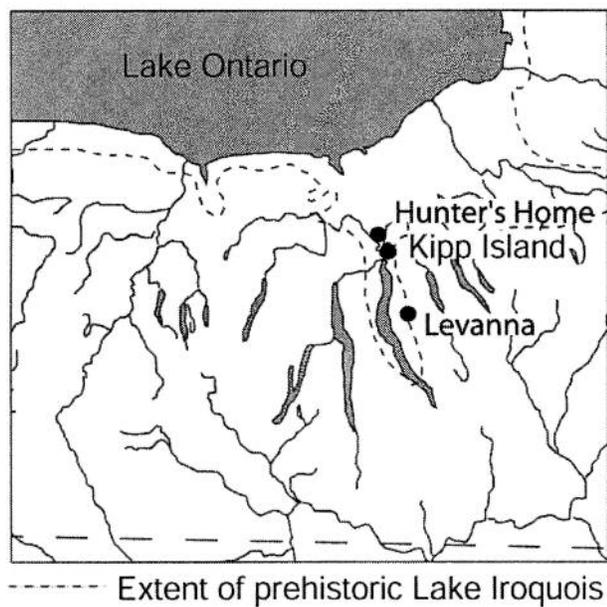
As part of a larger project designed to address subsistence issues from the Point Peninsula-Owasco

transition, a series of 12 AMS dates on carbonized food residues was obtained from the interior wall of ceramic sherds from the Kipp Island, Hunter's Home, and Levanna sites (Table 8.2). These sites are located at the northern end of Cayuga Lake near the Montezuma marshlands, and represent the critical period from A.D. 600 to 1200 (Figure 8.1).

## Kipp Island Site

Kipp Island is located in a marshy area at the confluence of the Seneca and Clyde Rivers near the Montezuma wetlands. The island is a drumlin near the old shore of the wetlands, which were drained in the last century for canal and road construction. During floods, the marsh fills to become a shallow extension of Cayuga Lake, replicating predrainage water levels.

Ritchie identified several components on Kipp Island (Ritchie and Funk 1973:155). Kipp Island No. 1 is a small Middlesex cemetery, No. 2 is a small



**Figure 8.1.** Location of the Kipp Island, Hunter's Home, and Levanna sites.

Hopewellian burial mound dating to the fourth century A.D., No. 3 is a major habitation component dated to the seventh century A.D., and No. 4 is a Late Point Peninsula/Hunter's Home habitation and cemetery component. Based on three radiocarbon dates from Ritchie's excavations at Kipp Island, the occupation of this drumlin spans about six hundred years (Table 8.3) (Ritchie and Funk 1973:155).

Ritchie spent several weeks during the summer of 1963 excavating Kipp Island No. 4 (NYSM 2084), which includes a cemetery of over 125 individuals and a habitation area. The excavators found a small number of carbonized seeds in the habitation area, some of which Ritchie tentatively identified as *Chenopodium* (Ritchie 1969:241; Ritchie and Funk 1973:161). Based on the evidence for Hopewell corn production, Ritchie expected that the Hunter's Home people might also have corn, although he did not find evidence of maize at the site (Ritchie 1969:241). According to Ritchie's publications (Ritchie 1969:243) and the field notes kept by D. Barber (RMSC files), there is good evidence for use of aquatic foods such as mollusks, fish, turtles, and waterfowl. At Kipp Island the animal bone was found in refuse pits and middens that appear to have been formed over some period of time (Ritchie 1969:242).

The excavations of the habitation component at Kipp Island No. 4 exposed 3,000 sq. ft of the habitation area. The excavators identified hundreds of postmolds, and

numerous pits and hearths. The ceramics found in the trash pits and hearths are both Point Peninsula and Owasco, leading Ritchie to suggest the site was occupied by a Point Peninsula-Hunter's Home continuum (Ritchie and Funk 1973:161). The postmolds are dense, obscuring house outlines and indicating much reuse of the site. Ritchie tentatively identified three houses (Ritchie and Funk 1973:160). None of the structures outlined by Ritchie is obvious from the published map. It is possible that the field-identified structures have postmolds consistent in width and depth, but this information has not been preserved. Ritchie identifies a round house about 6 m in diameter and suggests this structure resembles dome-shaped wigwam-type dwellings found in Algonquian areas of the Northeast. He considers it a Point Peninsula phase structure (Ritchie and Funk 1973:160). Another possible house outline is rectangular, with rounded corners and a doorway on a short side of the house. This structure encloses about 20 sq. m. Ritchie proposes it is a prototype to the larger Owasco longhouses in the region (Ritchie and Funk 1973:160). This house has a width: length ratio of 1:>2.0, a proportion seen in later Iroquoian houses (see Kapches 1984). Finally, the most tenuous structure is one wall of a longhouse at least 12 m long. Ritchie interprets these houses as evidence for a continuum of development from Point Peninsula, through Hunter's Home to Early Owasco (Ritchie and Funk 1973:160). Based on the questionable nature of the Hunter's Home phase as a true transitional phase (Snow 1995:65) and the presence of substantial amounts of Early Owasco pottery it appears that this site was also used by both Point Peninsula and Early Owasco people in some fashion.

The northern two-thirds of the Kipp Island drumlin was removed for gravel use during construction of the New York State Thruway, destroying all but Kipp Island No. 4. Kipp Island No. 4 lies along the southern margin of the drumlin, where there is an extensive refuse deposit that has been known to collectors for decades. A number of sherds in this study are from Charles "Bill" Breen's collection from this area of the Kipp Island site. Breen has been collecting the southern midden area of the Kipp Island drumlin for over fifty years. Artifacts from Ritchie's excavations are housed at the RMSC.

### Hunter's Home Site

Hunter's Home A (NYSM 1538) is one component located on an archaeologically rich terrace overlooking Montezuma Marsh in Wayne County, New York. In

published literature, Hunter's Home is often described as a specific site, while in reality, it is an area encompassing four or five adjoining farms and several archaeological sites from different periods. The richest occupation appears to be on the Hunter's Home farm and the adjoining Rogers Farm.

Hunter's Home A is located on Hunter's Home Farm and was first excavated in 1948 by Harold Secor and Arthur Seeley (RMSC files). Their excavations indicated that the area contained two strata, one with remnants of Point Peninsula occupations, and one of Owasco occupations. Based on Secor and Seeley's excavations, Ritchie initiated investigations at several locations on Hunter's Home farm in 1960. Ritchie concentrated his 268 sq. ft (25 sq. m) trench over a refuse midden, which was named Hunter's Home A. This midden is located at the edge of a terrace that overlooked prehistoric Lake Iroquois (Ritchie 1969:258). Ritchie's excavations at Hunter's Home A produced archaeological remains that he attributed to both the late Point Peninsula and the early Owasco periods. Ritchie used these remains to argue that the Hunter's Home A site indicated a smooth transition between Point Peninsula and Owasco occupations. However, his proposed continuity is based more on interpretations of ceramic stylistic change than real stratigraphic continuity. Ritchie (1969:258) describes the stratigraphy of the excavation unit as an 8-inch layer of sand containing Owasco-style sherds and decorated pipes, and a layer of darker sand containing Point Peninsula pottery with similarities to the later Owasco styles separated by a 20-40-inch thick sterile deposit. A barn now covers Hunter's Home A, prohibiting new excavations at the exact location.

### Levanna Site

Levanna (NYSM 2092) is a village and cemetery located on a hill overlooking Cayuga Lake in Cayuga County, New York. A. C. Parker conducted preliminary excavations at Levanna during 1923 (RMSC files). Based on the preliminary results, Parker returned to Levanna in 1927 with a junior assistant (Ritchie), to conduct formal excavations.

The habitation area is approximately 150 m long by 30 m wide, and is situated on a triangular, naturally fortified location (Ritchie 1928). Steep embankments protect the north and south sides of the site. The gullies on the north and south converge on the western edge of the site, forming a constricted neck facing the lake. The eastern edge of the site is bounded by a shallow gully, which was probably filled with water before

modern land drainage. The site is located over a mile away from the lake. Water for the site was available from the springs located at the base of the gullies. The site is located on well-drained sandy soil.

The excavations exposed middens along the northern, eastern, and southern margins of the site, some approaching 30 m in length (Ritchie 1928). The most substantial midden was located on the southeastern margin of the site. The midden contained Owasco pottery, stone mortars, pipe fragments, and bone from deer, birds, and fish (Ritchie 1928).

Twenty-two possible structures, or "lodge sites," were identified by the excavations (Ritchie 1928). Unfortunately, it is not clear what evidence was used to identify these locations. Based on Ritchie's description of these houses, it seems that the basis was a concentration of darker soil and an increase in artifact density. No mention is made of post molds in any of the records of the excavations. The unpublished field map (RMSC files) shows "lodge sites" where there are multiple fire pits, so perhaps their locations are based on the location of hearths. The "lodges" appear to vary from 4-6 m in length, and would have encompassed roughly 30 sq. m. These structures are small compared to other early Owasco houses (Table 8.4).

From 1932 to 1948, H. C. Follet and G. B. Selden, members of the original excavation party, continued excavating at Levanna and charged admission. Eventually they found several animal effigies, including a thunderbird. Parker campaigned against these excavations with little success. The RMSC file contains extensive correspondence by A. C. Parker concerning these excavations. The work destroyed the portion of the site not excavated by Parker.

### AMS Testing

Seven food residues from sherds from Kipp Island, three from Hunter's Home, and one from Levanna were submitted to Geochron Laboratory for AMS dating (Table 8.2). The sherds included in this analysis are housed in two collections. The sherds from Hunter's Home and Levanna are housed in the Rochester Museum and Science Center collection. The sherds from Kipp Island are from Breen's private collection of Kipp Island materials. The Breen collection is ideal for this project because the sherds were never cleaned and have retained substantial amounts of carbonized food residue (Figure 8.2). Because of the extraordinary condition of the Breen collection, the AMS dating focuses heavily on sherds from Kipp Island. The physical characteristics of each sherd are summarized in Table 8.5.

**Table 8.4.** Carpenter Brook Phase Houses in Central New York (adapted from Hart 2000:19; 2001:175).

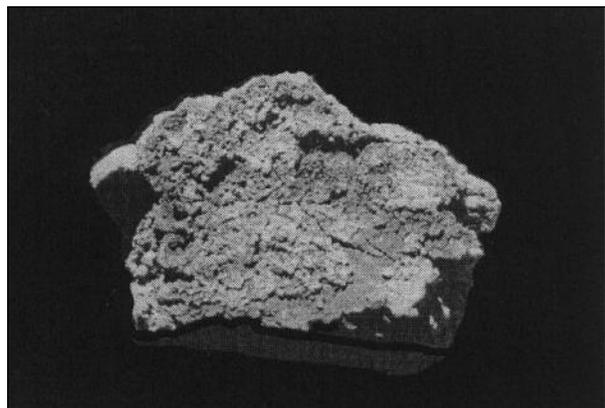
Site	House Dimensions (m)	House Area (m <sup>2</sup> )	Reference
Levanna	5 × 4-6	20–30	(Ritchie 1928)
White	6.9 × 11.4	78	(Prezzano 1992)
Port Dickinson	ca. 3– 4 diameter	ca. 7–12.5	(Prezzano 1992)
Maxon-Derby	7 × 9-11	63-77	(Hart 2000)
Boland	6 × ca. 14, 5.5 × ca. 15.5	ca. 84–85	(Prezzano 1992)
Bates	6.7 × 11.6	78	(Hart 2000)

### Point Peninsula Sherds

Three sherds, all from Kipp Island, are Point Peninsula pottery types. These sherds represent ceramic types spanning the period from A.D. 400 to 900. One sherd is from a Wickham Incised vessel (No. 1, Table 8.5; Figure 8.3), a Middle Point Peninsula type (Ritchie and MacNeish 1949:104). The other two sherds (Nos. 12, 15, Table 8.5; Figure 8.3) are Point Peninsula Corded-rim sherds. Point Peninsula Corded type ceramics are common throughout the Point Peninsula period, but increase in frequency later in the period (Ritchie and MacNeish 1949:102).

### Early Owasco Sherds

Of the eight Owasco type sherds, four are from Kipp Island, three are from Hunter's Home, and one is from Levanna. These sherds are from types common throughout all three phases of the Owasco

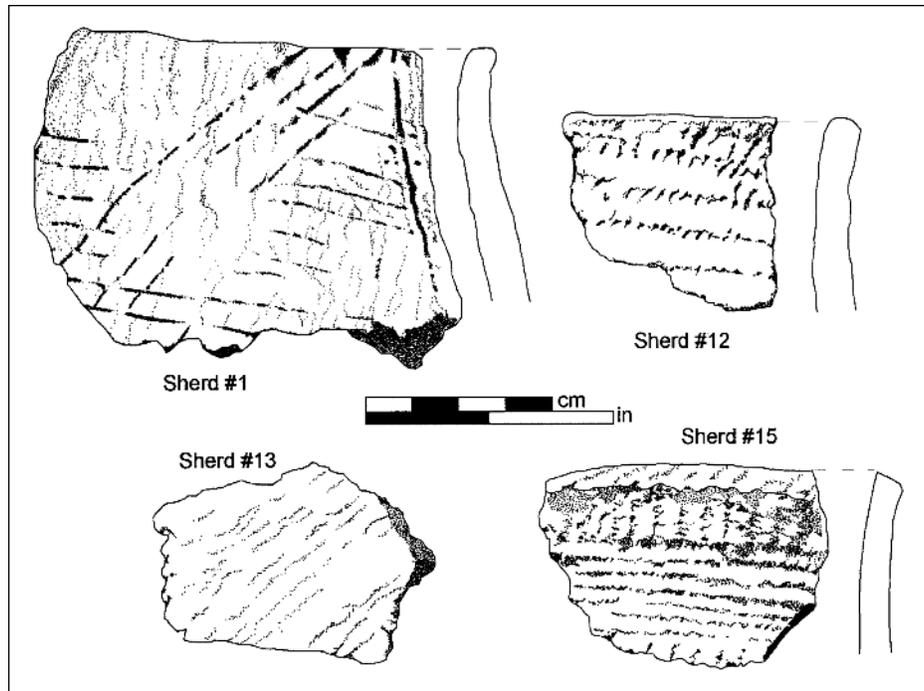


**Figure 8.2.** Residue encrusted on interior of Sherd No. 13.

period. The Owasco Herringbone rim sherd from the Kipp Island site (No. 6, Table 8.5; Figure 8.4) is the only Owasco type that Ritchie and MacNeish (1949:111) thought might also be present during the Late Point Peninsula period. According to the typology, this type increases in popularity until the Middle Owasco period (Ritchie and MacNeish 1949:111). Two sherds—one from Kipp Island, the other from Hunter's Home—are Carpenter Brook Cord-on-Cord (Nos. 4, 137, Table 8.5; Figure 8.4). Carpenter Brook Cord-on-Cord is common during the Early Owasco period (Ritchie and MacNeish 1949:108). Levanna Cord-on-Cord is also an early Owasco-type ceramic (Ritchie and MacNeish 1949:110). Residues from two Levanna Cord-on-Cord sherds (Nos. 40, 99, Table 8.5; Figure 8.5) were collected from Hunter's Home and Levanna. An Owasco Corded Oblique rim sherd from Kipp Island (No. 7, Table 8.5; Figure 8.4) is a type that was common throughout the Owasco period, but peaked in popularity during the Middle Owasco period (Ritchie and MacNeish 1949:112). Two sherds are from Owasco Corded Horizontal vessels (Nos. 23, 107, Table 8.5; Figure 8.5). Owasco Corded Horizontal appears during Early Owasco times and increases in popularity throughout the Owasco period (Ritchie and MacNeish 1949:112).

Finally, the cordmarked body sherd is from Kipp Island and is not typable to any period or ceramic type (No. 13, Table 8.5; Figure 8.3). It has a coil break, suggesting that it belonged to a Point Peninsula phase.

The residues encrusted on these sherds were removed under magnification with a stainless steel scalpel. Each sample of residue was wrapped in aluminum foil and sent to Geochron Laboratories, Inc., in Cambridge, Massachusetts for AMS dating.



**Figure 8.3.** Point Peninsula sherds Nos. 1, 12, and 15, Untyped sherd No. 13.

## RESULTS

The AMS radiocarbon dates returned on the residue samples are summarized in Table 8.6 and Figure 8.6. The results bear importantly on the three models of Iroquoian development.

### Point Peninsula Sherds

According to the classic typology, all three Point Peninsula sherds were expected to predate A.D. 950. The Wickham Incised sherd (No. 1) was expected to have an absolute date in the range of Middle Point Peninsula (ca. A.D. 400-800). The lab returned a date of  $1280 \pm 40$  B.P., or a calibrated date in the seventh or eighth century A.D. (Table 8.6; Figure 8.6). I expected the residues from the Point Peninsula Corded sherds to date in the Middle to Late Point Peninsula periods (ca. A.D. 400-950). The Point Peninsula Corded sherds had dates of  $1240 \pm 40$  B.P. or cal A.D. 776 (No. 12) and  $1210 \pm 40$  B.P., which calibrates to the late eighth century A.D. (No. 15). All three of these calibrated dates are consistent with the expected results; each produced a solid Late Point Peninsula date.

### Owasco Sherds

All of the Owasco-type sherds were expected to postdate A.D. 950 since this is the beginning of the Owasco period. As expected, the Carpenter Brook Cord-on-Cord sherds produced dates of  $960 \pm 40$  B.P. or cal A.D. 1034 (No. 4) and  $1130 \pm 40$  B.P. or the early tenth century A.D. (No. 137) and the Levanna Cord-on-Cord sherd from Levanna produced a date of  $1090 \pm 40$  B.P. or cal A.D. 979 (No. 40). However, these were the only Owasco sherds to date in the classically defined Owasco time range. The Owasco Herringbone sherd (No. 6) returned a date of  $1410 \pm 40$  B.P. or cal A.D. 646. This was the earliest date of all the Owasco-type sherds, and can be considered consistent with the chronological placement of Owasco Herringbone in the ceramic chronology. However, the Owasco Corded Oblique sherd (No. 7), produced an almost equally early date of  $1360 \pm 40$  B.P. or cal A.D. 662 (Figure 8.6). The remaining three dates from Owasco-type sherds (Nos. 23, 99, 107) fall between A.D. 660 and 977, and consistently predate the Late Woodland period. In all, five of the eight Owasco pottery types yielded AMS dates that are traditionally considered to be in the Point Peninsula period in central New York.

**Table 8.5.** Physical Characteristics of Sherds Selected for Dating.

Sherd No.	Ceramic Type	Temper	Thickness (mm)	Body treatment	Decoration	Rim diameter (cm)
1	Wickham Incised	Quartz (2 mm)	8	Smoothed over cordmarking	Incised horizontal lines, crossed with incised lines at a 45° angle	42
4	Carpenter Brook Cord-on-Cord	Grit (1 mm)	6	Cordmarked	Horizontal cord impressed lines around neck	NA
6	Owasco Herringbone	Grit (1 mm)	9	Smooth	Herringbone of cord impressions, oblique cord impressions on rim interior	16
7	Owasco Corded Oblique	Grit (1-2 mm)	8	Smoothed over cordmarked	Plats of oblique cord impressions, which continue over rim to interior	12
12	Point Peninsula Corded	Grit (1 mm)	9	Smooth	Cordwrapped stick impressions in horizontal lines around rim and neck	16
13	Untyped	Quartz (4 mm)	11	Cordmarked	NA	NA
15	Point Peninsula Corded	Grit (1 mm)	7	Cordmarked	Horizontal lines of cordwrapped stick impressions, series of vertical impressions along rim	22
23	Owasco Corded Horizontal	Grit (1 mm)	8	Smooth	Horizontal cord impressions, short oblique impressions around neck	20
40	Levanna Cord-on-Cord	Grit (4 mm)	7	Cordmarked	NA	16
99	Levanna Cord-on-Cord	Grit (2-4 mm)	8	Cordmarked	NA	28
107	Owasco Corded Horizontal	Grit (2-4 mm)	7	Cordmarked	Horizontal cord impressions around neck, continuing over rim to interior	14
137	Carpenter Brook Cord-on-Cord	Grit (1-2 mm)	11	Cordmarked	Horizontal lines of cord impressions along neck and rim	20

The cordmarked body sherd (No. 13) was dated to 1170±40 B.P. or cal A.D. 877 (Figure 8.6). Although this falls into the classically defined Point Peninsula periods, given the discrepancies between expected dates for the Owasco sherds and the actual dates, this untypable sherd cannot be affiliated with either the Point Peninsula or Owasco archaeological culture.

## DISCUSSION

Contrary to the pattern predicted by the current ceramic chronology, the oldest absolute date from these sites came from a classic Owasco-type sherd. While this was considered a possible outcome of this portion of the study, I did not expect the dates to be so drastically

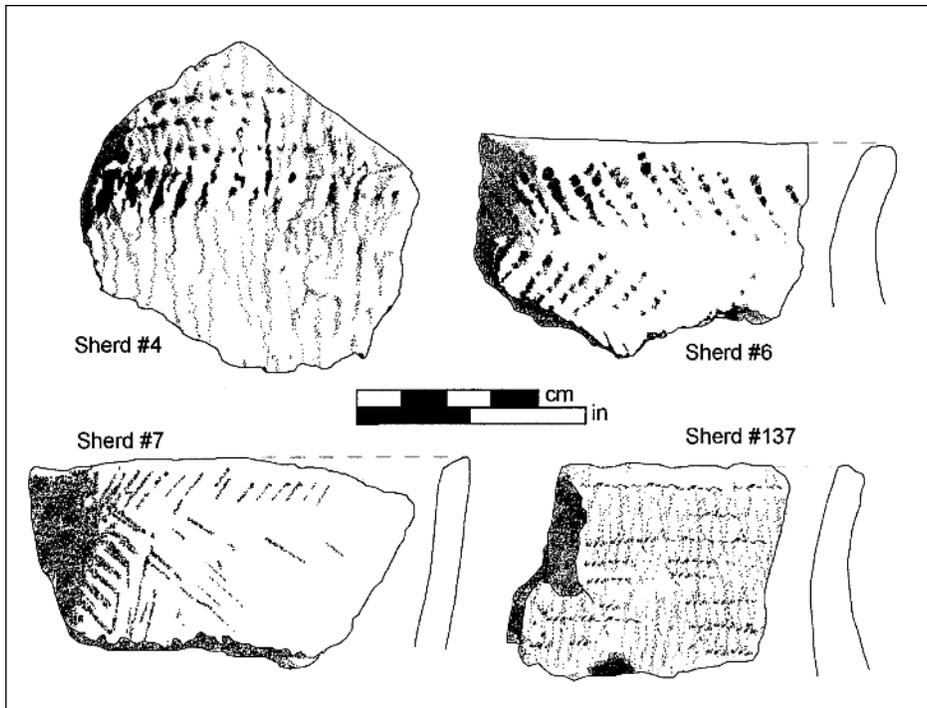


Figure 8.4. Owasco sherds Nos. 4, 6, 7, 137.

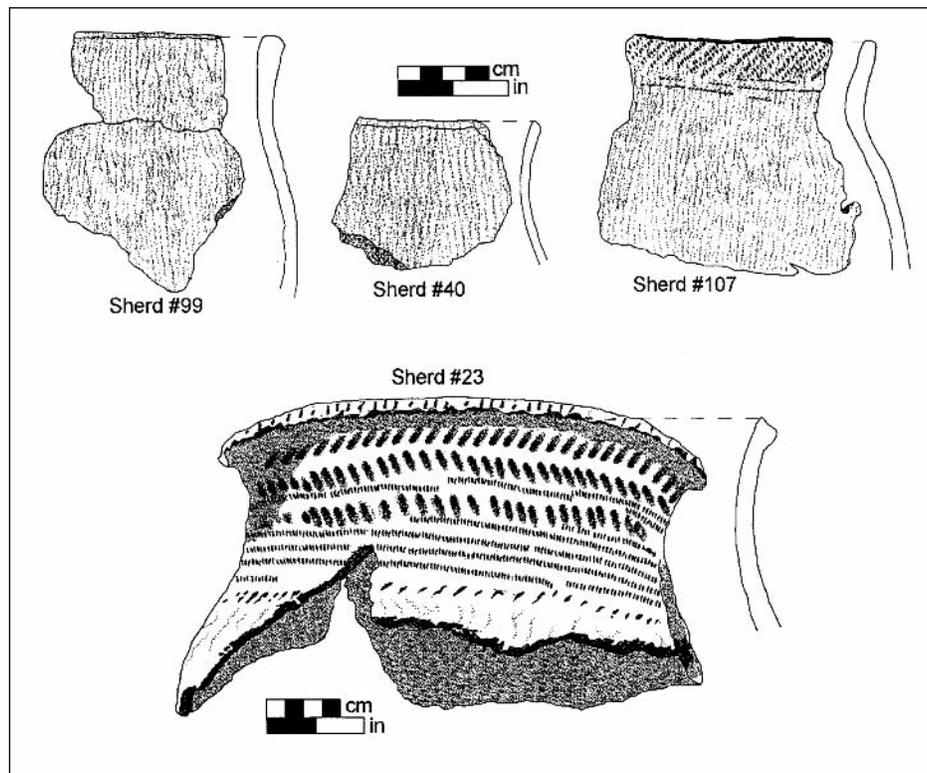


Figure 8.5. Owasco sherds Nos. 40, 99, 23, 107.

**Table 8.6.** AMS Dates and Calibrated Two-Sigma Ranges on Sherd Residues.

Sherd No.	Site Name	Type	Lab number	Uncalibrated Date B.P.	Calibrated Dates AD Two (intercepts) sigma <sup>1</sup>
1	Kipp Island	Wickham Incised	GX-26448-AMS	1280±40	660 (693, 699, 715, 749, 764) 863
4	Kipp Island	Carpenter Brook Cord-on-Cord	GX-26449-AMS	960±40	999 (1034) 1186
6	Kipp Island	Owasco Herringbone	GX-26450-AMS	1410±40	563 (646) 681
7	Kipp Island	Owasco Corded Oblique	GX-27558-AMS	1360±40	619 (662) 766
12	Kipp Island	Point Peninsula Corded	GX-26451-AMS	1240±40	676 (776) 891
13	Kipp Island	Cordmarked body	GX-26452-AMS	1170±40	729 (887) 980
15	Kipp Island	Point Peninsula Corded	GX-27559-AMS	1210±40	689 (781, 793, 802) 956
23	Kipp Island	Owasco Corded Horizontal	GX-26453-AMS	1220±40	687 (779) 939
40	Levanna	Levanna Cord-on-Cord	GX-28193-AMS	1090±40	886 (979) 1020
99	Hunter's Home	Levanna Cord-on-Cord	GX-27484-AMS	1180±40	722 (885) 977
107	Hunter's Home	Owasco Corded Horizontal	GX-27485-AMS	1280±40	660 (693, 699, 715, 749, 764) 863
137	Hunter's Home	Carpenter Brook Cord-on-Cord	GX-27486-AMS	1130±40	780 (897, 922, 942) 998

<sup>1</sup>Calibrated with CALIB 4.3.

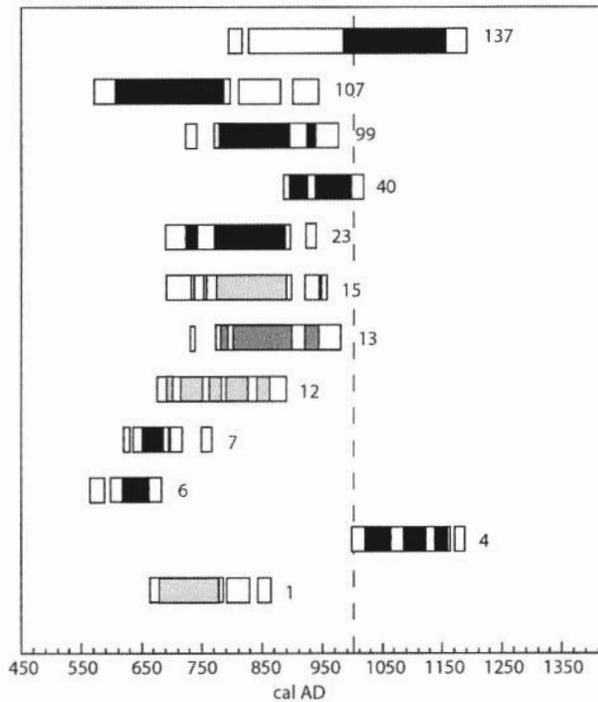
different from the accepted chronology. This is not the first study to produce absolute dates associated with Owasco material that date to the Middle Woodland period. Several dates from other Owasco components have been disregarded as too early (Snow 1996:793). These dates are from sites whose artifact assemblage and settlement characteristics place them within the Owasco tradition. Radiocarbon dates from Street, Chenango Point, and Boland calibrate to the seventh and eighth centuries A.D. (Funk 1993; Snow 1996; Wurst and Versaggi 1993), as do the dates from Kipp Island and Hunter's Home presented here. The existence of several dates in this early range from other sites suggests that the AMS dates on the Owasco ceramics from Kipp Island and Hunter's Home should be taken at face value. It is clear that the early dates are not the result of a systematic bias; none of the dates from Point Peninsula sherds are earlier than expected.

While the dates from Kipp Island and Hunter's Home suggest culture occupations that are traditionally considered Owasco during a Point Peninsula time range, the single AMS date from Levanna corresponds to the expected range of occupation. Unlike Kipp Island and Hunter's Home, Levanna appears to be an Owasco village with no Point Peninsula occupation.

Although the absolute dates push the appearance of Owasco-style ceramics several hundred years earlier than expected, they do not resolve the issue of how the dates are interpreted, that is, how the ceramic

styles relate to ethnic groups. Does the overlap of Point Peninsula and Owasco ceramics at the two campsites indicate cultures in contact, or an emerging Owasco culture? It appears that the ceramic chronology developed in the 1940s and the cultural affiliations made on the basis of the ceramic chronology need revisions. The three latest dates, however, are all from Owasco ceramics, and Owasco-style ceramics are the only ceramics at Levanna, a village site. These dates seem to suggest that Point Peninsula styles, and therefore, Point Peninsula culture, had declined by the late tenth century A.D., and that by this time, Owasco populations were establishing fairly substantial villages on higher ground.

The primary difference between these sites is the probable subsistence system being practiced at each site. The Levanna site is well situated for maize farming, and is occupied during a cultural period where maize horticulture is supposed to have been practiced. Kipp Island and Hunter's Home, on the other hand, are not located on soils conducive for maize farming (although they are near good agricultural land). In addition, the Kipp Island and Hunter's Home sites are occupied during a period of cultural transition. Owasco ceramics have traditionally been interpreted as indicating the presence of Iroquoians. However, at these two sites, the Iroquoian and pre-Iroquoian populations appear to coexist. Consequently, the validity of considering Point Peninsula and Owasco ceramics indicators of different ethnic groups is questionable.



**Figure 8.6.** 2- $\sigma$  calibrated AMS dates and intercepts from encrusted residues. Owasco type sherds (Nos. 137, 107, 99, 40, 23, 7, 6, 4) are shaded in black, Point Peninsula (Nos. 15, 12, 1) in light gray. The dashed line delineates the classically defined break between the Point Peninsula and Owasco periods.

## CONCLUSION

These 12 dates in combination with other known early dates from Owasco sites, suggest that the Owasco culture may have its origins well before A.D. 900. If ceramic types indeed indicate different cultures, these dates also suggest that Point Peninsula and Owasco cultures overlapped in central New York, perhaps much like Middle and Late Woodland cultures overlapped in southern Ontario (Smith 1997). Both Chapdelaine's in situ model and Snow's incursion model allow for an overlap between Point Peninsula and Owasco cultural traditions, while Ritchie's in situ model does not. The in situ models suggest that the Iroquoian pattern developed either gradually or rapidly from a Point Peninsula base. While the overlap in Point Peninsula- and Owasco-type ceramics seems to support the gradual in situ model, that model remains unsatisfactory in several ways not addressed in this

project. Neither of the in situ models explains why the Iroquoian language, a unique language in the Northeast, became dominant (Fiedel 1991), or why the Iroquois are genetically different from their Algonquian-speaking neighbors (Langdon 1995). Snow's (1996) revised incursion model allows for an overlap in Point Peninsula and Owasco ceramics and explains the appearance of a unique linguistic and biological population in the Northeast.

The transition from a primarily foraging economy to one dominated by food production in other parts of the world may shed some light on these new data. Theoretical contributions made by Gregg (1988, 1991) and Bogucki (1995) suggest the transition to farming in Europe was often a long, multilayered process of interaction between foragers and farmers. With intensive radiocarbon dating, we now know that foragers and farmers in Europe coexisted for over 1,000 years (Bogucki 1995). A recent review of radiocarbon dates from Ontario also shows Middle Woodland foraging cultures overlapping with Late Woodland farming cultures for at least 300 years (Smith 1997). It is likely that overlapping of subsistence adaptations also occurred in the Finger Lakes region. The possibility of this situation does not resolve the in situ versus migration debate, but it does suggest the Iroquoian area of New York shares developmental similarities with other parts of the world.

Regardless of which model of Iroquoian origins one accepts, the AMS dates presented here indicate that the ceramic chronology developed in the 1940s and the cultural affiliations made on the basis of the ceramic chronology need revisions. Ceramic studies in the future need to address the issue of how strong the linkage is between ceramic types and ethnic groups or cultures. Given the data presented here, it appears the Iroquoian adaptation may have roots several hundred years earlier than is generally accepted.

## Acknowledgments

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## CHAPTER 9

# PITS, PLANTS, AND PLACE: Recognizing Late Prehistoric Subsistence and Settlement Diversity in the Upper Susquehanna Drainage

Timothy D. Knapp

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Historically, variation in Late Prehistoric subsistence and settlement has been downplayed while anthropologists and archaeologists working in the Northeast have focused on explaining the island-like distribution of Northern Iroquoians (the Five Nation Iroquois, the Huron, the Petun, the Neutral, the Wenro, the Erie, and the Susquehannock) in what is otherwise an Algonquian sea (Griffin 1943; Hewitt 1892; Lenig 1965; Morgan 1990; Niemczycki 1984, 1987, 1988; Ritchie 1980; Ritchie and Funk 1973; Snow 1994, 1995, 1996; Tuck 1971). Seventeenth-century Northern Iroquoians differed from their Algonquian-speaking neighbors in several key respects: matrilineal descent and matrilineal residence; a sedentary settlement system focused on semipermanent year-round villages; longhouse residential structures; heavy reliance on maize horticulture; and distinctive languages. Scholarly explanations for this distribution fall into one of two camps: some propose an in-migration of proto-Iroquoian agriculturists who displaced resident populations (Morgan 1990; Parker 1916; Snow 1994, 1995, 1996), while others posit an in situ development of Iroquoian societies out of antecedent local Middle Woodland (ca. A.D. 0-900) hunter-gatherer groups (Funk 1993; Griffin 1943; Lenig 1965; MacNeish 1952; Ritchie and Funk 1973; Tuck 1971). Migration scenarios search for abrupt cultural discontinuities, viewing these as evidence of a population influx (e.g., Snow 1995). In contrast, in situ models seek data that demonstrate cultural continuity, although often these data are limited to a single cultural trait—typically ceramics or settlement patterns (e.g., MacNeish 1952). Both models of Late Prehistoric development envision rather rapid change at the beginning of the Late Prehistoric period (A.D. 800-1000), followed by a long period (at least five centuries) of relative stasis, which continued until the arrival of Europeans in

the Northeast (Funk 1993; Ritchie 1980; Ritchie and Funk 1973; Snow 1994, 1995; Tuck 1971, 1978; but see Trigger 1990).

Two factors working in tandem have encouraged static views of the Late Prehistoric period: (1) the homogenizing influence of temporal classifications, and (2) a heavy reliance on the direct historic approach. Temporal classifications, one of the most basic of archaeological tools, divide time in a way that emphasizes heterogeneity between periods and homogenization within periods (Dunnell 1971, 1982; Hart 1999; O'Brien and Holland 1990). Recognition of a Late Prehistoric period as distinct from the preceding Middle Woodland requires an emphasis on the differences between periods and a masking of within-period variation. When archaeologists talk about Late Prehistoric subsistence and settlement, we often conflate spatial and temporal variability into a single essence, thereby obscuring potentially important diversity.

Coupled with the homogenizing effect of temporal periods has been a heavy reliance on the direct historic approach. The Direct Historical Approach, an important form of analogic reasoning, was first used in the Southwest at the end of the nineteenth century, and became prominent in the mid-twentieth century, when archaeologists applied this technique on the Plains (Cushing 1886; Fewkes 1896, 1900; Strong 1933, 1935; Wedel 1938). Archaeological research by its nature must rely on analogy (Ascher 1961; Stahl 1993; Wylie 1985, 1988). The selection of appropriate analogies is guided by a set of relevancy criteria (Stahl 1993; Wylie 1985, 1988), in the case of the direct historical approach, “proximity in physical time and space” (Stahl 1993:242). Historically minded anthropologists have repeatedly demonstrated the significant changes to

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Native societies wrought by European exploration and colonization (Comaroff 1985; Comaroff and Comaroff 1992; Roseberry 1988; Sahlins 1985, 1992; Stahl 1994; Trigger 1985; Wolf 1982). If non-Western societies changed as they articulated with the world system, anthropologists must be wary of projecting historically recorded “traditional” behaviors into a more distant past (Stahl 1994; Trigger 1985). This has significant ramifications for prehistoric investigations. The preeminent Iroquois ethnohistorian William N. Fenton applied a form of the direct historical approach to write Iroquois history (Fenton 1949, 1952, 1962). Fenton’s method of “upstreaming” pivoted on the assumption that “major patterns of culture tend to be stable over long periods” (Fenton 1949:236). This stress on the immutable nature of structure is implicit in most traditional applications of the direct historical approach (but see Stahl 1994). Because this analogic form focuses on the historical connection, *historic* patterns are often uncritically projected onto the archaeological past (Stahl 1993).

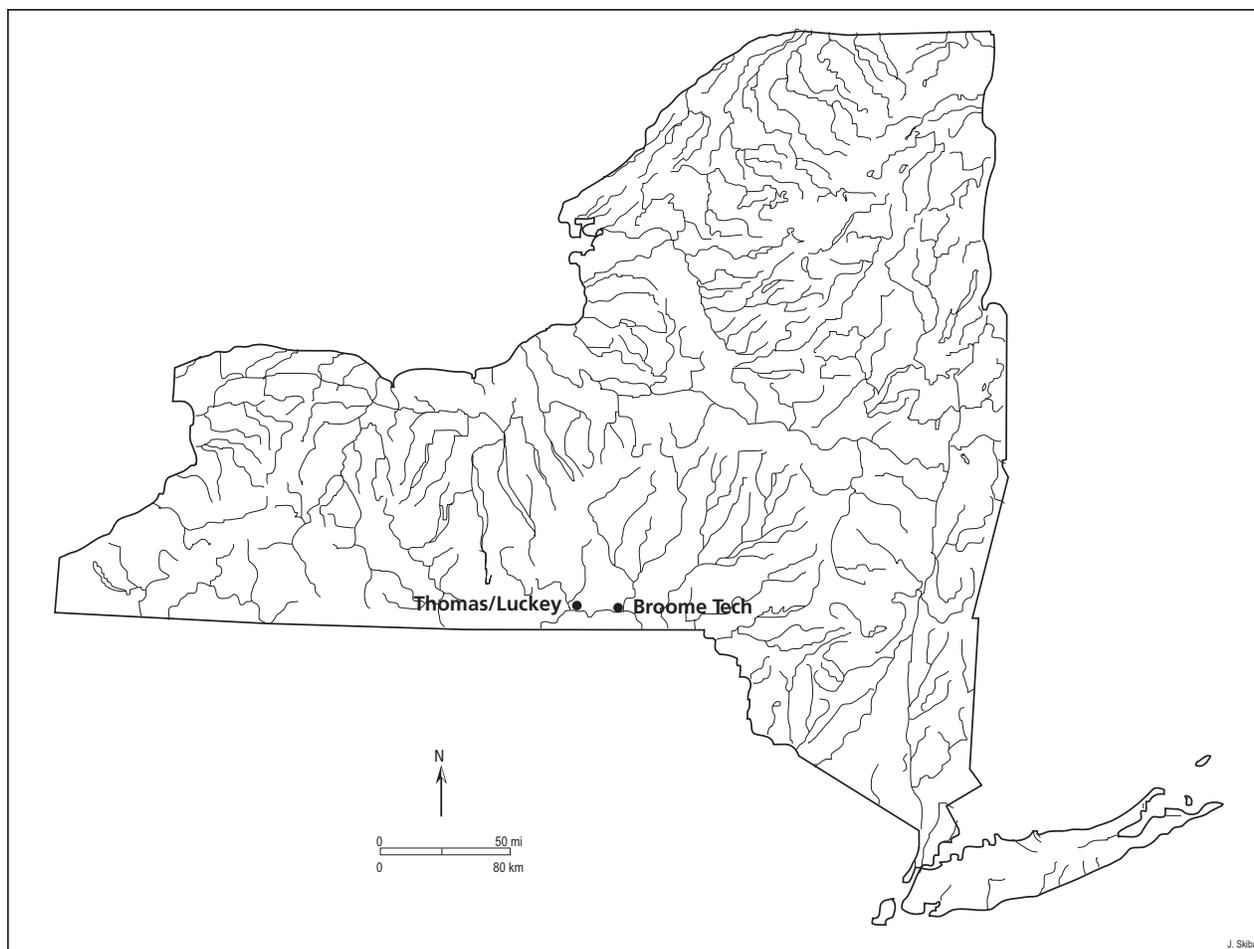
By conflating historic patterns with the earliest portion of the Late Prehistoric period, we have shaped our perceptions of the period in two fundamental ways: First, the beginning of the Late Prehistoric period is marked by the rapid appearance of a fully developed horticultural economy; and second, once the practice of horticulture appeared, subsistence economies remained essentially static for more than half a millennium. Rather than assume that Late Prehistoric subsistence and settlement is unchanging, we must treat this as a research question. This is precisely the theme the editors of this volume challenge archaeologists to address. Specifically, the problem posed is how did subsistence-settlement strategies change (or remain stable) in the Northeast during A.D. 700-1300?

Change can be usefully defined as a relational difference between states. Change, therefore, implies variability; with the absence of variability between states, there is no change. Hence, a focus on change first requires explicit attention to outlining variation. The most commonly used sense of change in archaeology implies a temporal difference between states. For example, an interesting research problem for the Northeast is how and why over time, people changed their subsistence strategy from an exclusive focus on hunting, gathering, and collecting to the incorporation of gardening activities and ultimately a heavy reliance on agriculture. However, temporal change is only one source of variability in the archaeological record; other relational differences may embody cultural, functional, and/or spatial variation. Given the diverse factors

structuring archaeological variability, it is critical that we focus on variation and explore the potentially multidimensional factors underlying this diversity. By recognizing a more dynamic Late Prehistoric period animated by spatial and temporal variability we will ultimately be better able to model the important transition from food collector-hunter-gatherer to food producer.

Therefore, to gain a more variegated picture of Late Prehistoric subsistence and settlement, we must begin collecting appropriate data from a number of sites from different temporal and regional contexts. In this vein, I explore Late Prehistoric variability by comparing subsistence-settlement systems for two sites located in different Upper Susquehanna River tributary valleys (Figure 9.1). Thomas/Luckey, a Late Prehistoric village on the Chemung River floodplain, contains at least two longhouses and over 150 pit features (Knapp 1996; Miroff 2000). Broome Tech, a lower Chenango Valley multicomponent site, contains an artifact-rich early Late Prehistoric midden and associated features, which, based on field impressions, was provisionally identified as the remains of a seasonally reoccupied camp (Knapp 1998). The selection of these two sites for an initial comparison of Late Prehistoric variability grew largely out of fortuitous circumstances presented by two separate data recovery excavations that I directed for the Public Archaeology Facility (PAF) at Binghamton. Although the differences between these sites may appear to be evident, this was not really the case. From the onset, it was clear that Thomas/Luckey, with its multiple longhouses, indicated the presence of either a village or hamlet. The picture was murkier for Broome Tech, where the presence of post molds, a relatively large number of features, and an artifact-laden midden seemed to preclude interpreting this site as a camp. At the same time, the lack of structures, the presence of a single large storage pit, and the site’s relatively small size seemed incompatible with a hamlet or village. This chapter, therefore, grew largely from my attempts to understand and explain the differences between these two sites.

At first blush, the differences between these two sites may lead some to question the utility of a comparison of a hamlet or village (Thomas/Luckey) with a site that somewhat resembles a large seasonally reoccupied site (Broome Tech). Why compare two sites that already appear to differ? Isn’t this comparing apples and oranges? What can be gained from such an exercise? Yes, these sites are different. However, I believe that a detailed comparison of these two Upper Susquehanna Valley sites is a productive and necessary endeavor. We must begin to explore the variation manifested in the



**Figure 9.1.** Location of Thomas/Luckey and Broome Tech.

Late Prehistoric period, whether it be temporal, cultural, functional, or spatial, before we can address change over time. Elucidating this variation requires archaeologists to compare a number of sites. By contrasting Thomas/Luckey and Broome Tech, I will highlight the underlying structure of some of these differences that should shed light on how and why these two sites differ.

For this study I analyze three primary data sets to explore this variation: features, botanical remains, and spatial organization. Having highlighted variation in these data sets, I will provide possible explanations as to why Thomas/Luckey and Broome Tech differ, but more definitive conclusions will ultimately require a larger number of detailed comparisons in order to sort out whether or not this variability relates to subregional, temporal, or functional differences. What I hope to

accomplish is to add to the database on Late Prehistoric subsistence-settlement variation, for it is this variation that will ultimately serve as the building blocks for addressing temporal change.

### THE THOMAS/LUCKEY SITE

Thomas/Luckey (SUBi-888) is a Late Prehistoric village located on the north bank of the Chemung River in the Town of Ashland, Chemung County, New York (Figure 9.2). The Chemung River drains a portion of the glaciated Appalachian Plateau, a physiographic region dominated by high flat-topped divides separated by steep-sided U-shaped valleys (Fairchild 1925:13; Fenneman 1938:312). Thomas/Luckey lies approximately 24 km upstream from the Chemung's

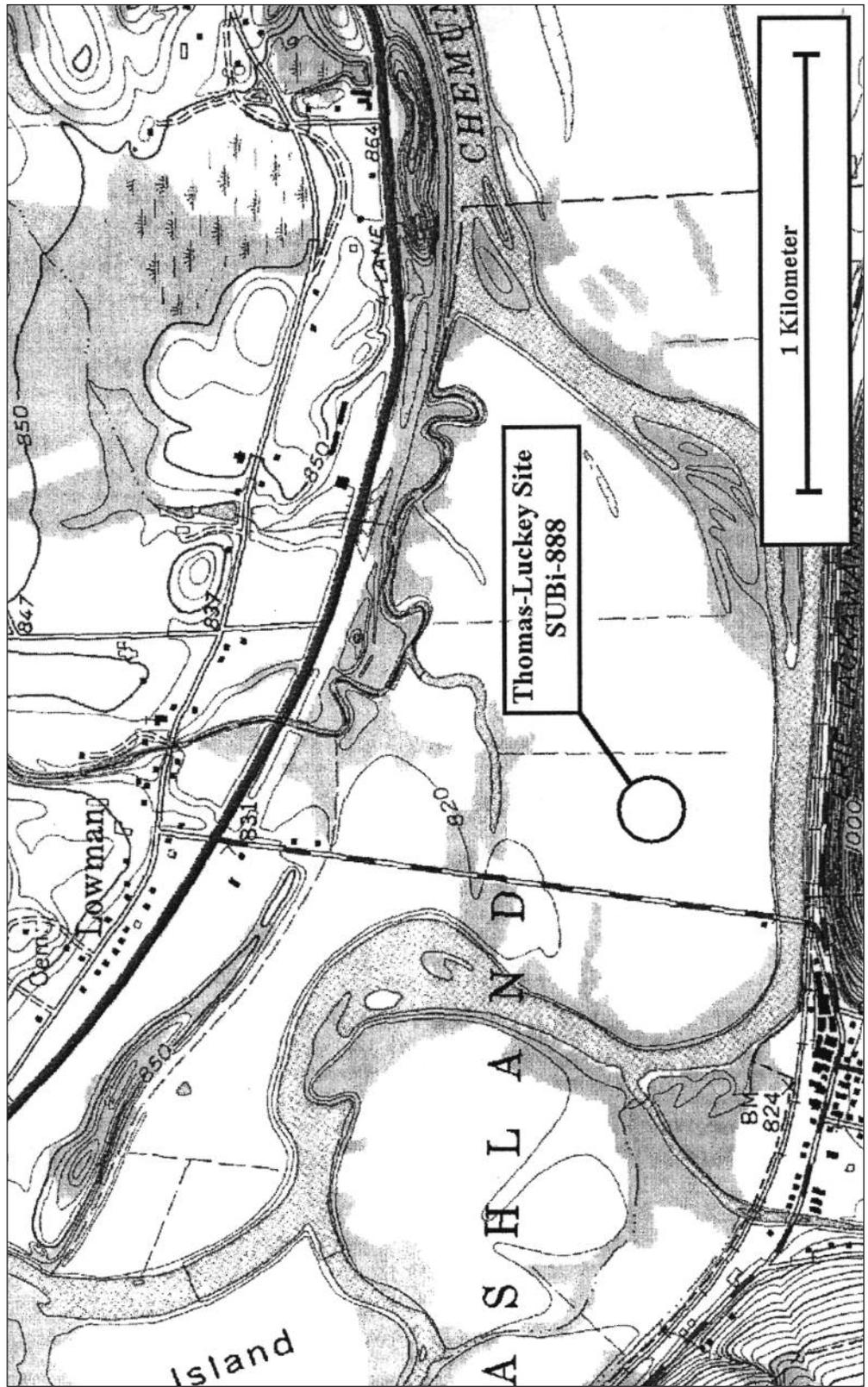


Figure 9.2. Topographic map of Thomas/Luckey.

confluence with the Susquehanna River. The site, located approximately 300 m north of the current river channel, falls on an extensive peninsular section of floodplain created by a large meander. Periodic flooding of the river flats deposited deep, well-drained fine sandy loams (USDA 1973:84). This meander plain lies at an elevation between 810 and 820 ft asl. Despite the general levelness of the floodplain, cross-cutting Thomas/Luckey in an east-west direction is a series of swales and flat ridges. Moving away from the floodplain, the southern bluffs climb to over 1,700 ft asl, while those to the north rise to greater than 1,500 ft asl.

The geology and drainage patterns of the Chemung Valley influence the distribution of local forest types. Distinctive forests are mapped onto the active floodplain and the dramatically rising bluffs of the Chemung River, producing a forest contact setting. Thomas/Luckey falls in a fingerlike northward extension of the Oak and Oak-Chestnut Forest (Braun 1950:233-242, 408). Chestnut, red oak, and white oak are the primary trees composing this forest; also present, but in fewer numbers, are hickory, sugar maple, hemlock, tulip, and beech. These Southern Forest projections follow major drainage lines, and are surrounded by the upland Hemlock-White Pine-Northern Hardwoods Forest dominated by sugar maple, beech, yellow birch, hemlock, and white pine (Braun 1950:393-410).

Excavations conducted by PAF and Binghamton University's Field School in 1994 completely uncovered a single longhouse and 72 features (Knapp 1996).<sup>1</sup> Cooking and/or heating features documented at Thomas/Luckey include hearths and earth ovens. Although each feature type may serve to cook food, each implies a distinctive cooking technology. Cooking hearths involve the use of an open-fire kindled on the ground surface or within relatively shallow basins. In contrast, earth ovens are typically deeper cooking features

. . . in which preheated rocks were used as a source of heat. Food would be placed amidst layers of grass, vegetation, and earth piled atop the oven. Cooking would take place slowly; presumably, the heat produced in such a context was not as intense as that produced by an open fire. (Stahl 1985:122)

Two classes of storage features were identified at Thomas/Luckey based on size, shape, and presumed functional distinctions. Large deep-storage features, with a volume greater than 0.3 cu. m, are believed to have served as food-storage receptacles, while small

(less than 0.3 cu. m), relatively shallow storage pits may have served as personal caches. The 0.3 cu. m threshold was arrived at from other research in the Eastern Woodlands (Stahl 1985:135) and empirically by comparing Thomas/Luckey feature volumes to ratios of pit length/depth (Knapp 1996:125). Increasing pit size while minimizing surface-area-to-volume ratio enhances preservation of stored grains (DeBoer 1988:3; Reynolds 1977:127). Therefore, large deep pits with relatively narrow openings function to more effectively preserve grain.

Nine botanical samples derived from feature contexts at Thomas/Luckey have been radiocarbon-dated (Table 9.1). In the initial site report, five wood charcoal samples were dated using the standard radiocarbon method, and provided mixed results (Knapp 1996). The calibrated intercepts for these standard dates range from A.D. 662-1439, with the maximum calibrated  $2\sigma$  range covering more than a millennium (A.D. 561-1622). Several of these dates were believed to be incompatible with the associated pottery types (Knapp 1996). Recently, a series of four AMS dates on maize and bean remains have clarified the age of Thomas/Luckey by avoiding some of the problems associated with standard radiometric dating of wood samples. The calibrated AMS intercepts display a much tighter range of A.D. 1292-1434, with the three maize dates forming a very tight cluster between A.D. 1409 and 1434. The maximum AMS  $2\sigma$  range includes A.D. 1260-1483. The probabilistic nature of the radiocarbon technique tends to disperse dates, often creating a chronological range that overestimates a site's occupation length (Asch and Brown 1990; Ottaway 1987; Shott 1992). Given this, and setting aside the problematic wood dates, it appears that Thomas/Luckey most likely dates between A.D. 1300 and 1450.

## THE BROOME TECH SITE

Broome Tech (SUBi-1005) is a stratified multicomponent site located on the west bank of the Chenango River, approximately 5 km from its confluence with the Susquehanna River (Figure 9.3). Excavations conducted by PAF in 1997 and 1998 documented four distinct occupations, including two Transitional, one Middle Woodland, and one Late Prehistoric (Knapp 1998; Versaggi and Knapp 2000). The Chenango River also falls in the glaciated portion of the Appalachian Plateau. The site lies approximately 85 m west of the former location of the main river channel prior to rechanneling associated with the construction of

**Table 9.1.** Thomas/Luckey and Broome Tech Radiocarbon Dates.

Lab #	Context	Technique	Material	<sup>13</sup> C/ <sup>12</sup> C	<sup>14</sup> C Age (BP)	Calibrated 2σ Range and Intercepts (A.D.) <sup>1</sup>	Source
<b>Thomas/Luckey</b>							
Beta-82470 <sup>3</sup>	Feature 4	radiometric	Wood	-27.8	1360±70 <sup>2</sup>	561 (662) 780	Knapp 1996
Beta-82471	Feature 36	radiometric	Wood	-26.3	460±60 <sup>2</sup>	1331 (1439) 1622	Knapp 1996
Beta-82472	Feature 40A	radiometric	Wood	-28.7	960±60 <sup>2</sup>	981 (1034) 1217	Knapp 1996
Beta-82473	Feature 57	radiometric	Wood	-28.6	1100±80 <sup>2</sup>	723 (904, 910, 976) 1152	Knapp 1996
Beta-82474	Feature 75	radiometric	Wood	-26.7	780±60 <sup>2</sup>	1159 (1263) 1376	Knapp 1996
Beta-144728	Feature 22	AMS	Maize	-8.5	480±50 <sup>2</sup>	1331 (1434) 1483	This study
Beta-144729	Feature 21	AMS	Maize	-8.7	530±50 <sup>2</sup>	1304 (1412) 1446	This study
Beta-144730	Feature 3	AMS	Maize	-8.5	540±50 <sup>2</sup>	1302 (1409) 1443	This study
AA29122	Feature 78	AMS	Bean	-27.7	695±45 <sup>2</sup>	1260 (1292) 1392	Hart and Scarry 1999
<b>Broome Tech</b>							
AA31005	Feature 7	AMS	Maize	-9.1	705±40 <sup>2</sup>	1260 (1288) 1387	This study
AA31006	Midden	AMS	Squash	-25.2	820±40 <sup>2</sup>	1159 (1221) 1281	This study
Beta-121977	Midden	radiometric	Wood/Nut	-25.0 <sup>4</sup>	920±80	981 (1061, 1086, 1123, 1138, 1156) 1277	This study

<sup>1</sup>Calibrations done with CALIB 4.3 (Stuiver et al. 1998).<sup>2</sup>Corrected for isotopic fractionation.<sup>3</sup>Small sample required extended counting time.<sup>4</sup>Lab estimated.

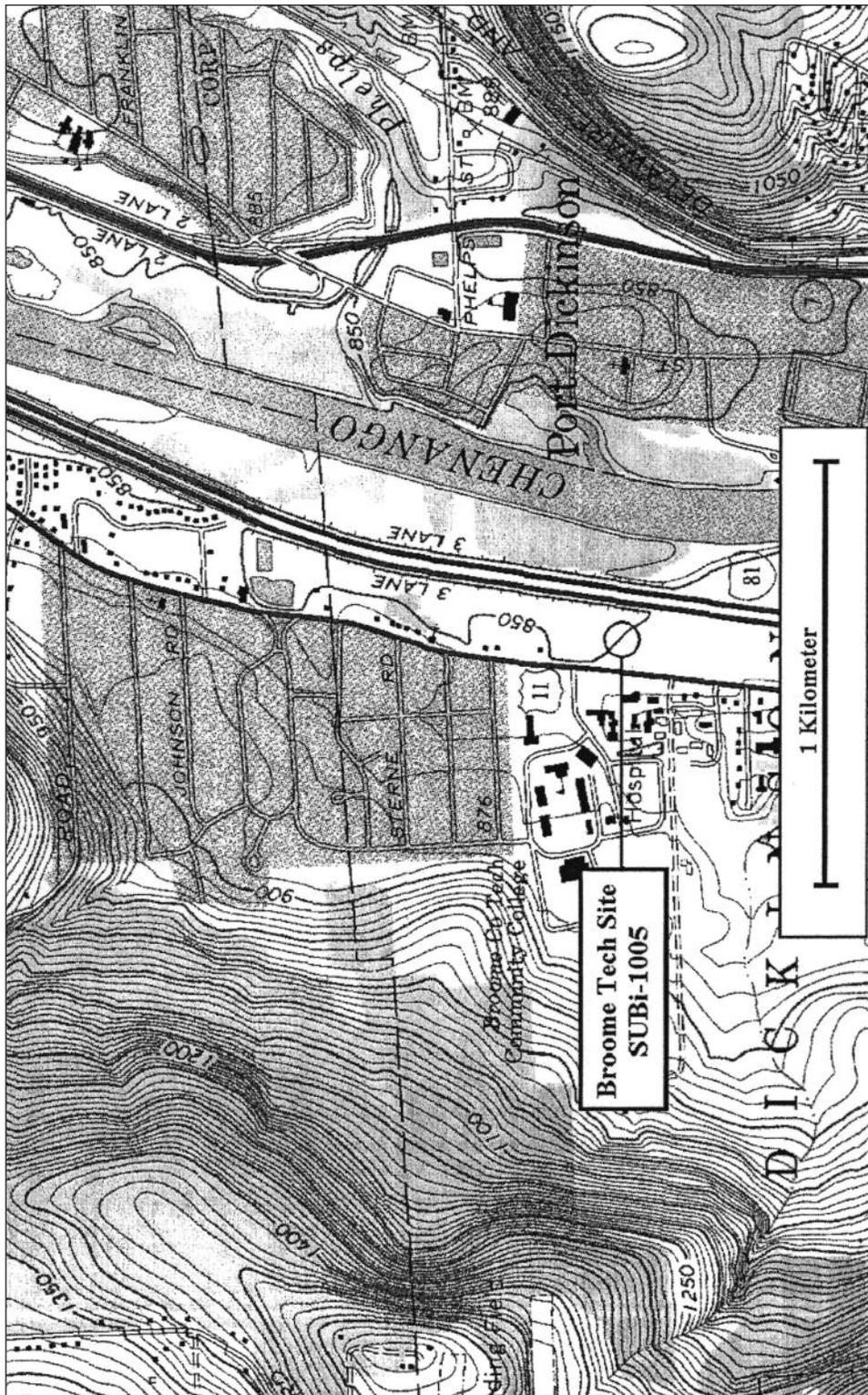


Figure 9.3. Topographic map of Broome Tech.

Interstate Highway 81. Before historic modification, the Chenango River was split by a number of islands at the location of Broome Tech. The largest of these, Nash Island, diverted a portion of the stream flow to the west along a meander that brings the river near Broome Tech. The site topography is quite varied, with the site beginning on an outwash terrace, extending across a long escarpment, and continuing onto an abandoned river channel.

A rather extensive early Late Prehistoric midden distinguishes the most recent occupation. The soil matrix is a dark black silt with a high density of carbon and calcined bone and is marked by an artifact concentration greater than any other area of the site. This feature lies on the gradually sloping surface of the escarpment connecting the glacial outwash terrace and the floodplain adjacent to the abandoned channel. The Late Prehistoric midden and associated features cover only a small portion of the site, measuring at least 21 m long and at least 16 m wide, conservatively covering an area of 201 m<sup>2</sup>.

Three types of features were identified at Broome Tech: hearths, large storage pits, and small storage pits. The most common feature type associated with the early Late Prehistoric occupation is a series of thin, fire-reddened stains that appear toward the base of the midden. These features tend to have concentrations of charcoal and calcined bone throughout and appear to be hearths that functioned for heating and/or cooking. The most unique feature associated with the midden is a large storage pit measuring approximately 1.5 m in diameter and 70 cm deep. This feature, which begins toward the base of the midden, exhibits rather complex stratigraphy, suggesting reuse.

Three radiocarbon samples date the midden and its associated features to the Late Prehistoric period (Table 9.1). The earliest of these is a standard assay of carbonized wood and nutshell that may suffer from the "old-wood" problem. The overlap in the calibrated 2 sigma range suggests that this component likely dates to the thirteenth century A.D. Although the ceramic analysis is still in progress, the ceramic types appear to be consistent with this age. Importantly, no Late Prehistoric collared ceramics were recovered, suggesting that Broome Tech predates Thomas/Luckey, where collared ceramics represent 34.7 percent of the ceramic assemblage from features.

## SITE COMPARISONS

Having broadly set the context of these two Late Prehistoric occupations, I now turn to a more detailed

examination of subsistence-settlement variability by exploring variation in features, botanical remains, and site organization.

### Features

Features, permanent or semipermanent facilities that require variable degrees of planning and labor investment, may highlight significant functional and/or social differences between these two Late Prehistoric sites. At a basic level, feature type provides functional data on the intensity and kinds of activities practiced at a site. Because feature preparation may involve significant labor inputs, the types of features a group constructs may shed light on a site's role in a larger settlement system. A site's features embody the degree of mobility practiced by a group. Sedentary villages occupied year-round will have different features than short-term single-use or seasonal sites where occupants plan for periodic returns to a favored spot. In addition to functional questions, the types and frequencies of features present at a site may shed light on social dynamics. Feature data can address control of resources, ceremonial activity, sharing ethos, and the relative importance of communal/corporate versus individual activity.

*Feature Types.* The number of distinct feature types provides a useful axis for intersite comparisons. Thomas/Luckey has double the number of feature types found at Broome Tech (Table 9.2). Six distinct feature types have been defined for Thomas/Luckey, compared with only three feature types at Broome Tech. Thomas/Luckey features include graves, smudge pits, hearths, earth ovens, large storage pits, and small storage pits. At Broome Tech the only feature types identified are large storage pits, hearths, and small storage pits. The presence of twice as many feature types at Thomas/Luckey suggests that a greater diversity of activities occurred at the site relative to those at Broome Tech. Particularly noteworthy is the absence of graves, smudge pits, and earth ovens from Broome Tech.

At Thomas/Luckey, six human burials, representing 8 percent of the total features, were recovered in and around the longhouse identified as Structure 1<sup>2</sup>. Only one of these burials was identified as a feature that had as its original and sole purpose the interment of human remains. This feature is a relatively shallow pit containing the remains of an adult female interred in a flexed position atop a layer of charred wood. The remaining five burials were highly fragmentary, but

**Table 9.2.** Feature Types at Thomas/Luckey and Broome Tech.

	Thomas/Luckey		Broome Tech	
	n	%	n	%
Hearths	9	12.5	14	77.8
Grave	1	1.4	0	0
Smudge Pit	1	1.4	0	0
Large Storage Pits	25	34.7	1	5.6
Small Storage Pits	28	38.9	3	16.7
Earth Oven	8	11.1	0	0
Total	72	100	18	100

likely represent subadult remains that were placed at the base of large pits originally constructed for storage. The interment of six individuals at Thomas/Luckey stands in stark contrast to Broome Tech, where no human remains were recovered. Several explanations might account for the differences in the number of interments. One obvious explanation is that the Broome Tech dead may have been buried in a separate cemetery outside of the excavated area. Another possibility is that the human bones were not preserved in the Broome Tech soils. This is a distinct possibility given that only calcined animal bone was recovered from Broome Tech, although the same is largely true for the animal bone recovered from Thomas/Luckey. The absence of interments at Broome Tech might also be explained if the site was only seasonally occupied. The number of seasonal deaths would only be a fraction of those of a given year and individuals who died during the seasonal occupation of Broome Tech may even have been returned to a more permanent village site for interment.

One smudge pit was tentatively identified at Thomas/Luckey, while this feature type was absent from Broome Tech. Smudge pits were designed to produce large amounts of smoke for either hide preparation or for smudging the interiors of ceramic vessels (Binford 1967; Munson 1969). The single smudge pit at Thomas/Luckey was located away from Structure 1, likely in an attempt to distance this smoky feature. The absence of Broome Tech smudge pits may relate to the limited amount of excavation away from the central area of the Late Prehistoric occupation.

At Thomas/Luckey, eight earth ovens were documented, while none were encountered at Broome Tech. The lack of earth ovens suggests that this form of baking activity was not part of the cooking repertoire practiced at Broome Tech, while it clearly constituted an important activity at Thomas/Luckey.

**Feature Frequency.** In addition to differences in the variety of activities implied by the presence of twice as many feature types at Thomas/Luckey, the relative proportions of the shared feature types also show marked variation between the two sites. Nearly three-quarters (74 percent) of the Thomas/Luckey features functioned as storage containers, which contrasts sharply with Broome Tech, where only 22 percent of the features involved in-ground storage. Clearly, residents of Thomas/Luckey invested much more labor in the construction of subterranean storage facilities. Possible reasons for the greater emphasis on storage features at Thomas/Luckey are numerous, some of which are: (1) pit excavation may have been easier at Thomas/Luckey, although this is unlikely given the easily worked silt deposits that dominate each site; (2) the use of above-ground storage at Broome Tech; (3) the size of the resident population at each site; and/or (4) a perceived difference in the anticipated need for stored products. It is the last two that I find most compelling. If Thomas/Luckey represents a year-round village, there would have been a need to store large amounts of food to feed a large population during lean seasons. At a seasonally occupied site like Broome Tech, there may have been fewer occupants targeting a seasonally abundant resource. Storage may have been a lesser concern at temporary seasonal camps.

The precise distinctions in storage behavior are brought into sharper focus by breaking down the specific types of storage pits present at each site. Small storage pits, which may have served as personal caches, are more than twice as common at Thomas/Luckey, where 39 percent of the features were so classified, compared with only 17 percent of the features at Broome Tech. Although the precise function of this class of small features is equivocal, their small size (<0.3 m<sup>3</sup>) and the absence of in situ burning has been used to tentatively assign these features to

an unspecified storage role. Assuming that these features may have served as personal caches suggests that this form of storage behavior occurred much more regularly at Thomas/Luckey than was the case at Broome Tech. Again, the possible reasons are varied and include all of the above, but may also reflect a greater emphasis on personal or nuclear family storage at Thomas/Luckey and/or a focus on corporate storage at Broome Tech.

Perhaps more telling is that the percentage of large storage pits, features assumed to have held food products, is more than six times greater at Thomas/Luckey, demonstrating that large-scale in-ground storage of agricultural surpluses was an important concern at this Late Prehistoric village. The presence of such a high percentage of large storage facilities at Thomas/Luckey suggests a longer length of occupation with old pits filled and capped as new pits were dug; a larger resident population; year-round site occupation with a greater need for stored surplus during the lean season; or, more likely, a combination of these factors.

The two Late Prehistoric sites not only differ in the frequency of storage facilities, but also show marked differences in relative numbers of features that functioned as cooking and/or heating facilities. Hearths, the numerically dominant features at Broome Tech, account for more than three-quarters (78 percent) of the features present. This represents six times more than the 13 percent of Thomas/Luckey features that were classified as either hearths or earth ovens. Clearly the primary feature activity at Broome Tech involved thermal functions. Because hearths may serve as either cooking or heating facilities, it is difficult to address the specific activities associated with the hearths at either Broome Tech or Thomas/Luckey. Although researchers have estimated Late Prehistoric village population based on numbers of hearths (e.g., Snow

1995), the higher frequency of hearths at Broome Tech, where the number of site occupants is undoubtedly smaller, is related to the seasonal reoccupation of the site. As will be seen, Broome Tech hearths display little investment in formal feature preparation and were kindled in slightly different spots upon seasonal reoccupation of the site. In contrast, the hearths at Thomas/Luckey, particularly those within the long-house, represent fixed loci that remained constant through most of the site's occupation.

**Feature Size.** In addition to variation in the types and relative frequencies of features, striking differences in feature size also distinguish these sites (Table 9.3). Features at Broome Tech tend to be very shallow, with an average depth of only 10 cm, much smaller than the 41 cm average depth at Thomas/Luckey. A histogram of feature depths reveals that Broome Tech features, in addition to being shallower, also have a discontinuous distribution of depths (Figure 9.4). All but one of the 18 Broome Tech features are less than 15 cm deep, with 89 percent having a maximum depth of less than 10 cm. The only feature that is not shallow is the lone storage pit that has a depth of 87 cm. It is noteworthy that no Broome Tech features have a depth between 14 and 87 cm, which stands in stark contrast to Thomas/Luckey, where feature depths assume a more continuous distribution. Examination of Figure 9.4 suggests the presence of three depth modes (21-30 cm, 41-50 cm, and 61-70 cm), indicative of the variety of feature sizes at Thomas/Luckey.

While the contrasts in feature depths between the two sites is no doubt in part related to the differences in diversity and frequency of feature types, closer scrutiny of average depths by feature type also reveals variation between the sites. Hearths at Thomas/Luckey average 34 cm in depth, much deeper than the average depth of 6 cm at Broome Tech. This

**Table 9.3.** Average Feature Metrics at Thomas/Luckey and Broome Tech.

	Thomas/Luckey	Broome Tech
Length	112.0	69.3
Width	99.3	53.9
Depth	40.9	10.3
Volume	0.348	0.096
Length/Width (L/W)	1.16	1.33
Length/Depth (L/D)	3.3	11.2

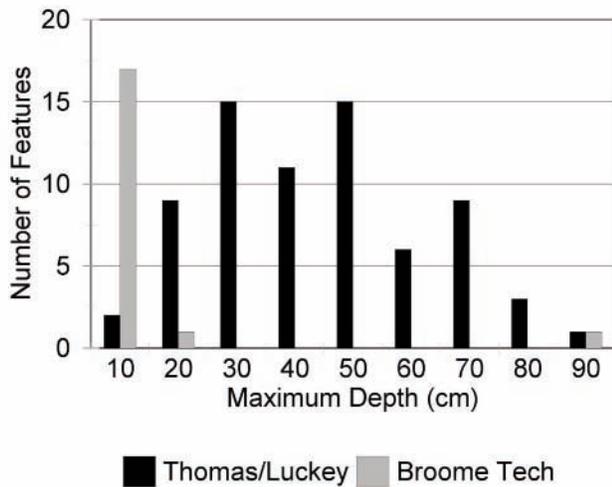


Figure 9.4. Histogram of feature depths.

suggests either the presence of different types of hearths at the two sites, or reflects differing levels of hearth preparation. Following the same pattern, small storage pits at Broome Tech average only 8 cm deep, less than a third of the 28 cm Thomas/Luckey average. Interestingly, the 87 cm depth of the lone storage feature at Broome Tech is much greater than the 59 cm average depth for Thomas/Luckey, but approaches the 90 cm upper limit for Thomas/Luckey storage pits.

Estimated feature volumes reinforce the size distinctions noted for feature depths (Figure 9.5). The volume of Thomas/Luckey features have an average volume

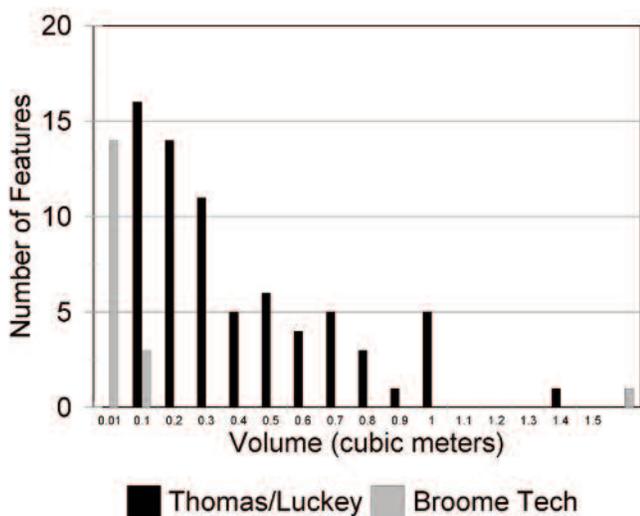


Figure 9.5. Histogram of feature volumes.

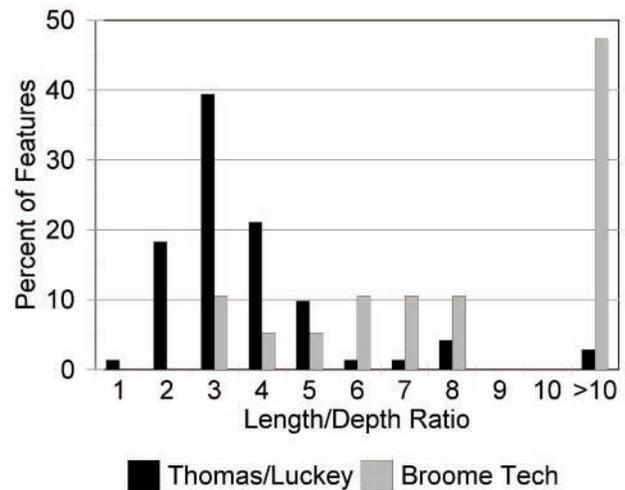


Figure 9.6. Histogram of feature length-to-depth ratio.

of 0.348 cu. m, nearly four times the 0.096 cu. m average for Broome Tech. Ninety-four percent of the Broome Tech features are less than 0.1 cu. m, compared with only 23 percent at Thomas/Luckey. A closer examination of these small features reveals that 78% of the Broome Tech features are less than 0.01 cu. m, while none of the features identified at Thomas/Luckey are this small. All of these data point to the clearly smaller size of features at Broome Tech. A potential very important contrast to this general pattern is the single large Broome Tech storage pit, with an estimated volume of 1.568 cu. m, 20 percent larger than the biggest Thomas/Luckey storage feature.

**Feature Shape.** In addition to variation in feature size between the two sites, there are also subtle differences in feature shape (Figure 9.6). To gauge variation in profile shape, a maximum length-to-depth ratio (L/D) was computed for each feature. Features with a high score tend to have a large surface area relative to depth, and indicate shallow features. A perfectly hemispheric profile would have an L/D of 2. Features at Broome Tech have an average L/D of 11.2, more than triple the 3.3 L/D for Thomas/Luckey (Figure 9.6). Nearly 70 percent of the Broome Tech features are at least six times longer than they are deep, while only 8 percent of the Thomas/Luckey features are so proportioned. The relatively high ratio at Broome Tech is largely driven by the numerous ephemeral hearths, which have an average L/D of 13.1, compared with the single storage feature with a 2.2 L/D. The lower L/D ratio for Thomas/Luckey appears as a largely unimodal

distribution, with 39.4 percent of the features having an L/D ratio between 2 and 3. This unimodal distribution suggests that there may have been an ideal length-to-depth ratio for Thomas/Luckey features. No clear modes are apparent for L/D at Broome Tech, which indicates that many of the Broome Tech features lack formal construction.

To evaluate feature plan shape, a maximum length-to-width ratio (L/W) was calculated for each feature. Perfectly circular features score 1, and increasing values indicate more oblong, or irregularly shaped features. Thomas/Luckey features more closely approximate a circle, with an average score of 1.16, compared with the 1.33 score for Broome Tech. The noncircular features at Broome Tech again highlight the irregularly shaped surface hearths, which have a very high average length-to-width ratio of 1.46. The single storage pit nearly approximates a circle, with a score of 1.08, very similar to the L/W average for all Thomas/Luckey features.

Data on feature type, frequency, size, and shape taken together suggest very different sets of behaviors occurred at these two Late Prehistoric sites. Only three feature types (hearth, large storage pit, and small storage pit) were used at Broome Tech and are numerically dominated by very shallow, irregularly shaped surface hearths. These thermal features lack formal construction and were apparently lit upon largely unmodified surfaces. This contrasts with the single storage pit, which was clearly planned and involved excavation of a large amount of soil for construction. This large pit is nearly circular in plan view and is approximately twice as long as it is deep, which approaches the "ideal" pit profile noted at Thomas/Luckey. In contrast, features at Thomas/Luckey include a greater variety of types (large storage pit, small storage pit, hearth, earth oven, grave, and smudge pit) and are overwhelmingly dominated by in-ground storage facilities. Features are on average much larger, implying a greater labor investment, and exhibit a much higher degree of planning. Residents constructed features that approximate a circle in plan view and, regardless of feature size, there appears to have been a model of pit proportions where features should be approximately twice as long as they are deep.

### Plant Data

One of the most direct approaches for exploring subsistence and settlement variability is the detailed identification and analysis of macrobotanical remains.

Recovery of flotation samples was an integral component of the research design for both Thomas/Luckey and Broome Tech. Over one hundred soil samples have been secured and processed from Thomas/Luckey features; of these, 14 samples from 7 features have been analyzed (Scarry 1995). A very intensive program of flotation sample recovery was undertaken for the multicomponent Broome Tech site, with over 1,400 samples collected and processed. Samples recovered from the early Late Prehistoric occupation include samples from features and from the midden. Ninety-seven samples collected from 19 early Late Prehistoric features have been examined and are included in this study (Asch Sidell 1999)<sup>3</sup>.

The raw counts of plant remains recovered from Thomas/Luckey and Broome Tech are presented in Table 9.4. Given that botanical remains are subject to a number of potential biases, including differential preservation and differences in sample size and sample abundance, the raw quantities of specific plant remains should not be used to directly assess dietary contribution. However, archaeobotanists have developed quantitative methods for interpreting plant data that provide useful tools for gauging intersite variation in plant use (Miller 1988; Pearsall 1989; Popper 1988). Potentially important methods include comparison of burning activities, percentage composition, densities, and ratios.

The density of plant weight (calculated as carbon weight divided by processed soil volume) at Thomas/Luckey (.45 g/l) and Broome Tech (.52 g/l) are almost identical (Table 9.5). At sites where the only preserved plant remains of any antiquity are carbonized, as is true for these sites, similarity of charred plant densities indicates like amounts of burning activities occurred at the two sites (Pearsall 1989:197). According to Pearsall (1989:197), "demonstrating that the level of burning activity is similar among contexts, components, and sites reduces concern about preservation biases in data." Following from this, the nearly identical plant densities suggest similar botanical preservation at Broome Tech and Thomas/Luckey, thereby reducing the concern for potential preservation biases and facilitating intersite comparisons.

Where the two sites dramatically differ is in the ratio of non-wood plants to carbonized plant weight (Table 9.5). At Thomas/Luckey there are 33.8 non-wood plant remains per gram of carbon, more than seven times the 4.6 non-wood plants per gram at Broome Tech. If we accept that the two assemblages were subject to similar preservation conditions, then the dramatic difference in these ratios indicates that non-wood plant resources

**Table 9.4.** Plant Remains from Thomas/Luckey and Broome Tech.

Common Name	Taxonomic Name	Thomas/Luckey	Broome Tech
<b>Crops</b>			
Maize	<i>Zea mays</i>		
Cupule		484	67
Embryo		0	4
Glume		0	3
Kernel		125	240
Squash	<i>Cucurbita pepo</i>	0	P
Bean	<i>Phaseolus vulgaris</i>	6	0
<b>Nutshell</b>			
Acorn	<i>Quercus sp.</i>	58	62
Acorn meat	<i>Quercus sp.</i>	4	0
Bitternut hickory	<i>Carya cordiformis</i>	0	5
Butternut	<i>Juglans cinerea</i>	179	589
Hazelnut	<i>Corylus sp.</i>	0	2
Hickory	<i>Carya sp.</i>	262	220
Walnut family	<i>Juglandaceae</i>	53	56
<b>Noncrop Seeds</b>			
<i>Fleshy Fruits</i>			
Hawthorn	<i>Crataegus sp.</i>	7	12
Blueberry	<i>cf. Vaccinium sp.</i>	0	4
Elderberry	<i>Sambucus sp.</i>	2	0
Bramble	<i>Rubus sp.</i>	0	38
<i>Grasses</i>			
Wild rye	<i>Elymus sp.</i>	0	2
Grass family	<i>Poaceae</i>	35	1
Bluestem cf.	<i>Andropogon sp.</i>	83	0
<i>Medicinal/Beverage</i>			
Bedstraw	<i>Galium sp.</i>	0	1
White vervain	<i>Verbena urticifolia</i>	1	69
Dock	<i>Rumex sp.</i>	0	1
Sumac	<i>Rhus sp.</i>	3	1
<i>Economic/Weed</i>			
Hog peanut	<i>Amphicarpa bracteata</i>	0	0
Tick trefoil	<i>Desmodium sp.</i>	0	1
Sunflower	<i>Helianthus annuus</i>	3	0
Amaranth/chenopod	<i>Amaranthus/Chenopodium (C. berlandieri)</i>	79	3
Smartweed/knotweed	<i>Polygonum sp.</i>	1	0
<i>Other</i>			
Blue curls cf.	<i>Trichostema sp.</i>	1	0
Plantain	<i>Plantago sp.</i>	1	0
Unknown/unidentified		101	16

P = present in 0.5-2 mm fraction.

**Table 9.5.** Plant Indices for Thomas/Luckey and Broome Tech.

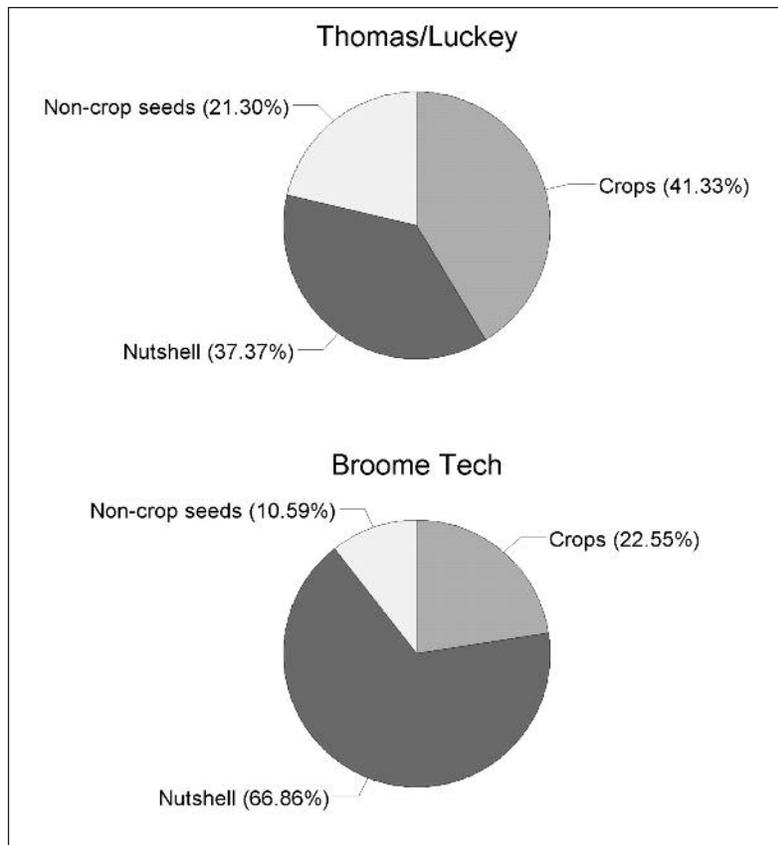
Index	Thomas/Luckey	Broome Tech
Total Plant Weight (g)	44.06	307.87
Soil Matrix Volume (l)	99.00	595.30
Total Plant Weight/Soil Volume	0.45	0.52
<b>Weight-Controlled Ratios</b>		
Maize Count/Plant Weight	13.82	1.02
Nut Count/Plant Weight	12.62	3.03
Seed Count/Plant Weight	7.19	0.48
Total Count/Plant Weight	33.77	4.54
<b>Volume-Controlled Ratios</b>		
Maize Count/Volume	6.15	0.53
Nut Count/Volume	5.62	1.57
Seed Count/Volume	3.20	0.25
Total Count/Volume	15.03	2.35
<b>Comparative Ratios</b>		
Maize count/Nut count	1.10	0.34
Maize/Seed	1.92	2.11
Nut/Seed	1.75	6.27
<b>Percentage Maize Composition</b>		
Edible portions (kernels and embryos)	20.5%	77.7%
Cob fragments (cupules and glumes)	79.5%	22.3%

were incorporated into archaeological contexts in relatively far greater amounts at Thomas/Luckey given the very low ratio of non-wood plants to total carbon weight represented in the Broome Tech assemblage.

While it is clear that greater relative amounts of non-wood plant remains are associated with Thomas/Luckey, this does not address differences in sample composition between the two sites. To facilitate comparisons, plant remains were initially grouped into one of the following categories: crops, nut remains (shells and meats), and seeds (excluding crops). Arranging the data in these gross divisions and evaluating their percentage composition suggest clear differences in the plants recovered from these two sites (Figure 9.7). Crop foods are the most numerous remains at Thomas/Luckey, with maize and beans representing 41 percent of the total plant remains<sup>4</sup>. This is significantly more than Broome Tech's maize and squash, which account for only 23 percent of the plant assemblage. At Broome Tech, nutshell represents the most abundant plant remain, accounting for two-thirds (67%) of the identified plants, whereas only slightly more than a third (37 percent) of the Thomas/Luckey plants are nuts. These data suggest that crop foods played a relatively larger role in the Thomas/Luckey diet vis-à-vis Broome Tech, while nutshell assumed a

relatively larger role at Broome Tech. Seeds were recovered from both sites in small proportions. However, seeds at Thomas/Luckey account for twice as much of the non-plant assemblage when compared with Broome Tech (21 percent vs. 11 percent), indicating that seeds played a more important economic role at Thomas/Luckey. Although it is clear that crops, nuts, and seeds vary between these two Late Prehistoric sites, it is important to more closely examine these categories and their constituent plants to produce a richer understanding of subsistence variation.

While cultivated plants were present at both sites, clear distinctions in the types of domesticates recovered are apparent. Residents at each site consumed maize; while the assemblage from Thomas/Luckey includes beans and sunflower, and Broome Tech includes squash<sup>5</sup>. Despite very intensive flotation of Broome Tech features and midden matrix, no beans were recovered from an early Late Prehistoric context. The absence of beans from Broome Tech's early Late Prehistoric component is in line with the recent suggestion that beans were introduced into the Northeast after A.D. 1300 (Hart and Scarry 1999)<sup>6</sup>. While the absence of beans from Broome Tech may reflect temporal trends, the lack of squash remains at Thomas/Luckey more likely relates to the poor preservation of these very fragile remains and/or the total



**Figure 9.7.** Sample composition of non-wood plants.

volume of analyzed samples. The scarce squash fragments identified at Broome Tech were recovered from 595.3 liters of processed soil, 6 times the 99 liters of soil examined from Thomas/Luckey. The odds of recovering rare plant remains decreases with diminishing sample size, which may account for the apparent absence of squash from Thomas/Luckey.

One common quantitative approach to botanical analysis is the use of ratios to standardize plant data as a means to control differences in preservation and/or soil sample size and abundance (Miller 1988; Pearsall 1989). Two frequently used ratios normalize raw data by dividing plant counts by either total carbonized plant weight or total volume of processed soil. A series of these ratios was calculated for Thomas/Luckey and Broome Tech plant remains (Table 9.5). Importantly, neither site has evidence for burned structures. We can, therefore, assume that carbonized wood recovered from each site derives from intentional fuel burning and does not represent burned structural remains. Although the absolute values of volume and weight-controlled ratios differ, the patterns remain largely

unchanged regardless of the ratio employed.

Given that maize is the only crop food recovered in any abundance, an attempt to quantify the relative importance of maize was made by calculating the ratio of maize count to total carbon weight for each site (Table 9.5). At Thomas/Luckey this ratio was 13.8, nearly 14 times greater than the 1.0 ratio at Broome Tech, indicating a much greater emphasis on maize consumption at Thomas/Luckey. Not only is there a striking difference in the importance of maize, the form in which this crop appears at the two sites is also significantly different. Cob fragments (cupules and glumes) represent 80 percent of the maize recovered from Thomas/Luckey, whereas only 22 percent of the corn from Broome Tech includes these inedible parts. High proportions of kernels and low representation of cob fragments have been interpreted as travel food (Asch Sidell 2000) or as evidence of tribute (Pauketat 1994). Asch Sidell (1999:9) suggests that at Broome Tech “the presence of such a high proportion of burned kernel fragments may indicate that this location was used to parch maize for storage.” While this may be the case,

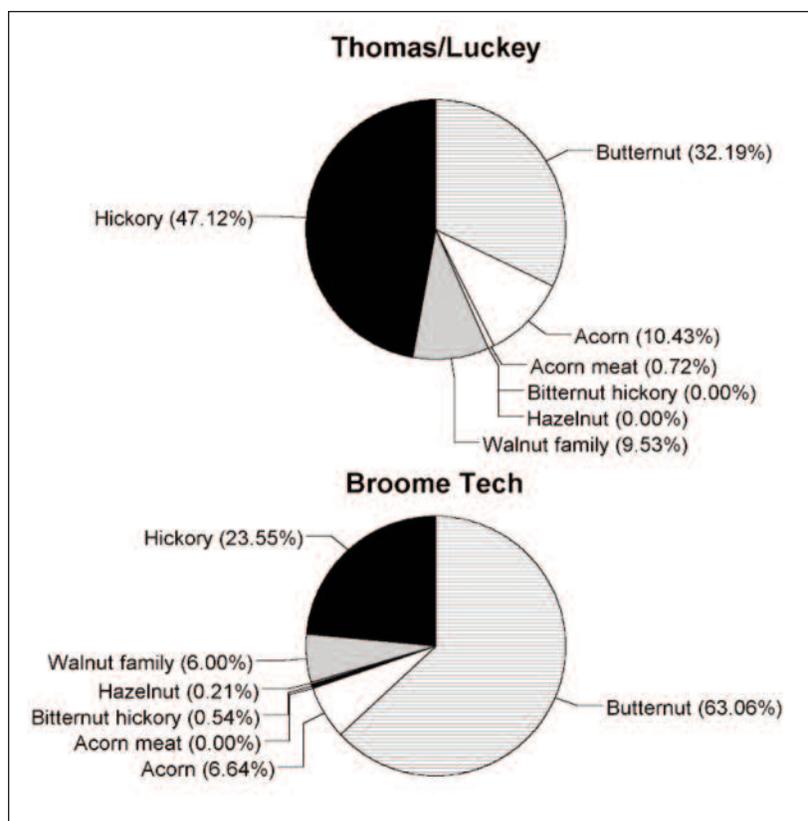


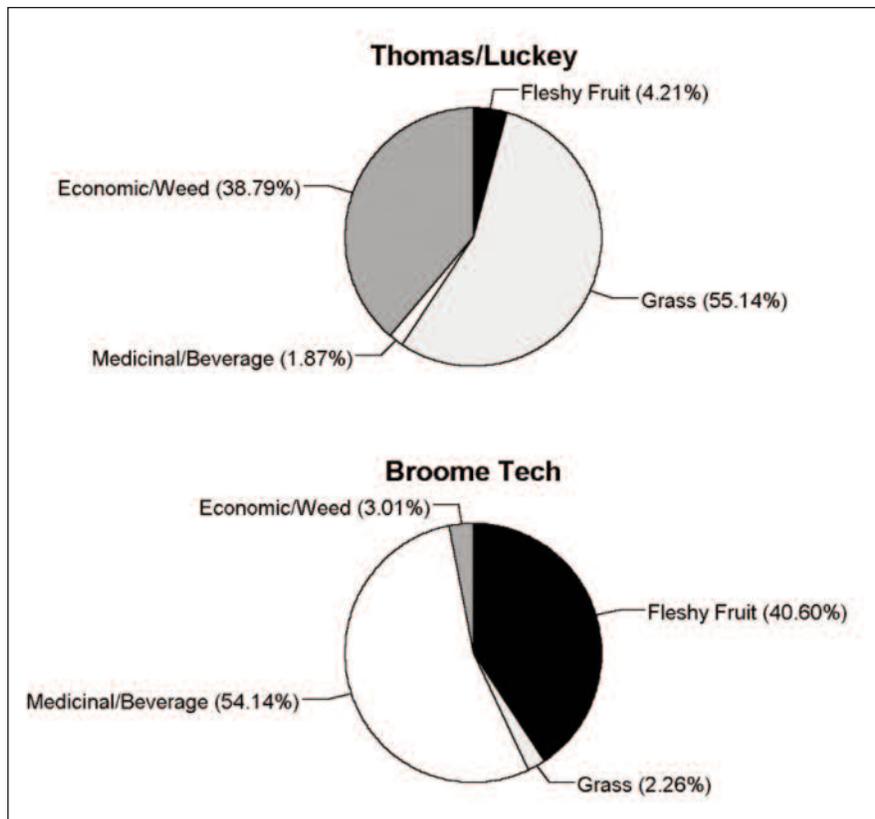
Figure 9.8. Nutshell composition.

the striking difference in the proportion of cob fragments may also indicate that maize was cultivated at Thomas/Luckey but not at Broome Tech. This would particularly be the case if Broome Tech was only seasonally occupied and did not represent a village or hamlet, as is the case for Thomas/Luckey. If Broome Tech was only seasonally utilized, then detached maize kernels may have been transported to the site from another location.

Earlier it was noted that, based on percentage composition, mast products assumed a greater economic role at Broome Tech when compared to Thomas/Luckey. In an apparent contradiction, nutshell indices that divide total nutshell by total carbon weight indicate that the density of nutshell at Thomas/Luckey is 12.6, 4 times greater than the 3.0 ratio at Broome Tech (Table 9.5). However, the greater relative contribution of mast products at Broome Tech is masked by the relatively greater abundance of all non-wood plants at Thomas/Luckey. Examination of the compositions of the nutshell assemblage suggests that butternut (63 percent) was the most important

most resource at Broome Tech, followed by hickory, representing 24 percent of the assemblage (Figure 9.8). At Thomas/Luckey the pattern is reversed, with hickory (47 percent) the favored nut and butternut representing nearly one-third of the mast remains. Acorn (*Quercus* spp.) shells are important, but minor, constituents accounting for 10 and 7 percent of the Thomas/Luckey and Broome Tech nutshell, respectively. Trace amounts (less than 1 percent) of bitternut hickory (*Carya cordiformis*) and hazelnut (*Sorylus* sp.) were recovered from Broome Tech, but were absent from Thomas/Luckey.

The recovery of relatively large amounts of butternut shell from both sites is intriguing, given that butternut is believed to have been only a minor constituent of the forest environment in the Upper Susquehanna Valley (Asch Sidell 1999; Braun 1950; Versaggi 1987:93). It is intriguing that less than 1 percent of the wood charcoal recovered from Broome Tech was identified as butternut (Asch Sidell 1999)<sup>7</sup>, yet butternut mast was clearly an important high-fat and high-calorie food targeted by the residents of these two



**Figure 9.9.** Seed composition (excluding unidentified seeds).

sites, a pattern noted by Funk (1993:47) throughout the Upper Susquehanna and Hudson Valleys.

Seed count, normalized by total charcoal weight, indicates that seeds were incorporated into feature contexts nearly 15 times more frequently at Thomas/Luckey (Table 9.5). Not only were seeds more common at Thomas/Luckey, but grouping seeds by economic category also reveals differences between the sites (Figure 9.9). Identified Thomas/Luckey seeds primarily consist of grass (55.1 percent) and economic weed (38.8 percent) seeds, with lesser amounts of fleshy fruit (4.2 percent) and medicinal/beverage seeds (1.9 percent)<sup>8</sup>. In contrast, identified Broome Tech seeds are dominated by medicinal plants (54.1 percent) and fleshy fruits (40.6 percent), with minor representation of economic weed (3.0 percent) and grass seeds (2.3 percent).

The Broome Tech medicinal/beverage seeds are almost exclusively (96 percent) white vervain (*Verbena urticifolia*), the vast majority (80 percent) of which were recovered from the single large storage pit. The only other possible medicinal plants recovered from

Broome Tech are a single seed of bedstraw (*Galium* sp.) and a single seed of dock (*Rumex* sp.). Although the Iroquois are known to have used these two plants as medicines (Herrick and Snow 1995), the recovery of only a single seed of each taxon leaves their medicinal use at Broome Tech an open question. Only four possible medicinal seeds were recovered from Thomas/Luckey—a single white vervain seed, and three from sumac (*Rhus* sp.) whose fruits, according to Iroquois informants, were used historically to cure consumption, falling of the womb, measles, and other ailments (Herrick and Snow 1995:187-189).

The fleshy fruits recovered at Broome Tech include bramble (*Rubus* spp.: raspberry, blackberry, and dewberry), hawthorn (*Crataegus* sp.), and blueberry (cf. *Vaccinium* sp.). At Thomas/Luckey the only fleshy fruits recovered were hawthorn and elderberry. Analysis found a total of 118 seeds, representing at least 5 distinct grass-family (*Andropogon*) members present at Thomas/Luckey (Scarry 1995). These seeds may come from grasses gathered for storage pit linings (Scarry 1995). Interestingly, two of the three features

with grass seeds are classified as large storage pits; the third is a small storage pit. Other Owasco sites have produced carbonized grass remains that have been interpreted as pit linings intended to retard mold (Ritchie 1980:280).

The Thomas/Luckey economic weed seeds are almost exclusively wild chenopod (*Chenopodium berlandieri*), although one knotweed (*Polygonum* sp.) and three wild sunflower (*Helianthus* sp.) seeds were also recovered. All three are part of the indigenous crop complex identified elsewhere in the Eastern Woodlands. However, none of the Thomas/Luckey specimens show morphologic characteristics of domestication. Nearly all (95 percent) of the chenopods are associated with one stratum of a single large storage feature. The concentration of a relatively large number of morphologically wild chenopod seeds in a secure archaeological context suggests that Thomas/Luckey horticulturists also collected starchy grains. Sunflower represents the only oily seed recovered from Thomas/Luckey. At Broome Tech the only economic/weed taxa recovered include three amaranth/chenopod seeds and a single tick trefoil (*Desmodium* sp.) seed, a bristly weed legume that has also been recovered in association with a large quantity of cultivars at Cloudsplitter Rockshelter in Kentucky (Asch Sidell 1999:14; Cowan 1985:240; Fritz 1990:405).

Another form of ratios used by ethnobotanists are those that compare the quantities of two mutually exclusive plant categories (e.g., maize/nutshell). These ratios should not be used to evaluate the absolute dietary contributions of specific food resources. They are, however, useful for evaluating shifts in the relative use of broad plant categories through time or across space. For this study I calculated three comparative ratios: maize count/weight; nutshell count/weight; and seed count/weight (Table 9.5; Figure 9.10). Three patterns are highlighted in Figure 9.10: (1) the relative proportions of maize and seeds differ only very slightly between Thomas/Luckey and Broome Tech; (2) the proportion of nutshell to seed at Broome Tech is more than triple that at Thomas/Luckey; and (3) the ratio of maize to nutshell at Thomas/Luckey is triple that at Broome Tech. The last two patterns are likely driven by a single trend—the greater relative representation of nutshell at Broome Tech. This confirms the difference noted earlier in the percentage composition of plants (i.e., 67 percent nutshell at Broome Tech vs. 37 percent at Thomas/Luckey). One explanation that might account for the higher compositional representation of nutshell is if nutshell were used as a fuel at Broome Tech to a greater degree than at Thomas/Luckey.

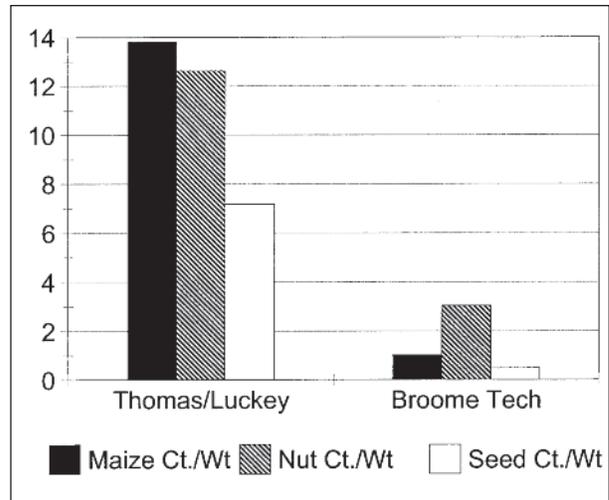


Figure 9.10. Plant comparative ratios.

However, this is unlikely given that hearths at Thomas/Luckey actually contain a higher percentage of nuts (86 vs. 70 percent) and a far higher nutshell/carbon weight ratio (9.8 vs. 3.7) than at Broome Tech. Consequently, nutshell appears to have been more likely used as a fuel at Thomas/Luckey rather than at Broome Tech. All of this supports a pattern of higher relative nut consumption in the Broome Tech diet when compared to Thomas/Luckey.

Taken together, the plant data suggest that the subsistence activities at Thomas/Luckey and Broome Tech are significantly different. The most striking pattern is the clear difference in the relative amounts of non-wood plant remains recovered from each site. At Thomas/Luckey more than seven times as many non-wood plants were recovered per gram of carbon than was the case at Broome Tech, indicating that plant-related activities occurred with greater frequency and/or intensity at this Late Prehistoric village. A second clear trend is that, while the proportion of maize to seeds is remarkably similar at the two sites, nuts were a relatively much more important resource at Broome Tech. Maize and squash remains were recovered from Broome Tech, while Thomas/Luckey horticulturists grew maize, beans, and sunflower. Grasses and economic weeds are the predominant seeds at Thomas/Luckey, while Broome Tech seeds are primarily from medicinal plants and fleshy fruits. The greater representation of grass seeds, likely associated with storage pit linings, reflects the greater reliance on stored food products at Thomas/Luckey, while the presence of a concentration of starchy chenopod seeds

suggests that the gathering of wild grains was also practiced at Thomas/Luckey. While residents at both sites collected nuts in the fall, hickory was favored at Thomas/Luckey and butternut at Broome Tech.

### Spatial Organization

Spatial information furnishes insights into the functional arrangement of activities and may also reflect elements of a community's social organization. In this vein, it is interesting that the use of space clearly differentiates Thomas/Luckey and Broome Tech.

Occupation of the eastern portion of Thomas/Luckey centers on Structure 1, a substantial longhouse (Figure 9.11). When originally constructed, the house was 6.5 m wide and 19.5 m long. At some point in its use-life, the occupants of Structure 1 expanded the house to the west for a final length of 32 m, which represents a 64 percent expansion of interior space.

Historically, these structures housed a single matrilineal-matrilocal descent group made up of a core of mother, sisters, and daughters (Fenton 1978; Trigger 1985). It is generally believed that as this household of related women grew in size, the longhouses were expanded to accommodate this demographic change. The transgenerational growth of the household and concomitant expansion of Structure 1 indicates that Thomas/Luckey served as sedentary settlement for at least several generations.

On Late Prehistoric and Historic sites a common refuse disposal practice involves the removal of garbage to the village's edge and/or along palisades (Heidenreich 1971:147; Jones and Jones 1980:194; Latta 1985; Prezzano 1992; Ritchie and Funk 1973:170). Notable for its absence in the immediate vicinity of Structure 1 is any evidence for midden deposits. This is likely the result of the areas tested, which concentrated on the longhouse and the ridge on which it lies. The



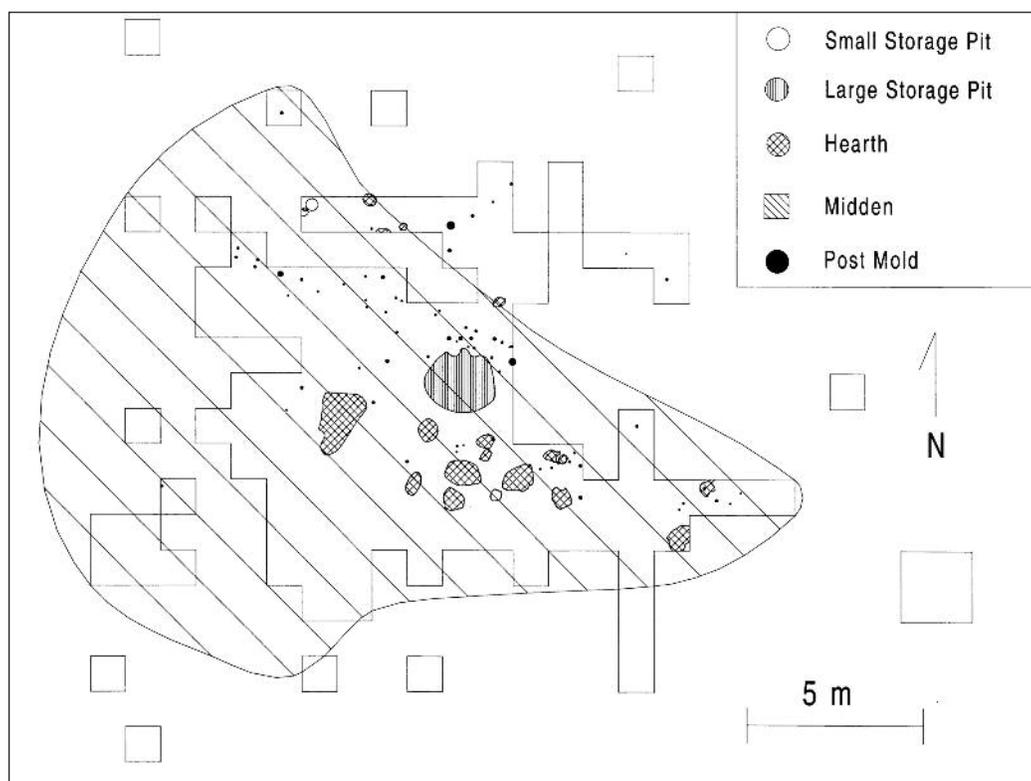
Figure 9.11. Organization of space around Structure 1 at Thomas/Luckey.

immediate surroundings of the longhouse may have been kept clean, with garbage deposited at some distance from the house. It is also clear that some of the storage pits that dot the area saw their final use as garbage receptacles. A relatively deep swale located to the south of the longhouse and a shallower one to the north would have provided excellent natural and easily accessible locations for garbage disposal. Excavations at the Late Prehistoric Boland site in the lower Chenango Valley documented the use of low-lying areas located away from structures as middens (Prezzano 1992).

Examination of the distributions of features in the vicinity of Structure 1 suggests several interesting patterns. The most striking feature is the high density of features in the eastern third of the longhouse. The packing and occasional overlapping of features within the walls of the original portion of the house may simply reflect the longer use of this portion of the house. Alternatively, the eastern end of the longhouse may have been marked as storage space (see Miroff 2000 for a similar argument for Structure 2). This concentration of storage facilities in a segment of the longhouse may reflect household control over agricultural surplus.

A second pattern is the location of features both within and outside of the longhouse walls in roughly equal frequencies. I have argued elsewhere that this may reflect seasonal shifts in the location of activity areas, particularly cooking tasks (Knapp 1996). Open air hearth and earth oven cooking may have been favored during warm seasons, while these activities are more likely to occur indoors in the winter. While a large number of in-ground storage facilities are located within the eastern portion of the longhouse, a cluster of features also occurs immediately to the south of the longhouse. These outdoor storage pits may have stocked surpluses intended for use during milder months. Some features and their associated activities may have been so unpleasant that residents located these features at greater distances from the longhouse. One feature identified as a smudge pit is located well to the north of the longhouse, thereby removing this excessively smoky activity from the immediate proximity of the longhouse.

The spatial organization of the Broome Tech site is strikingly different. Although a number of post molds are associated with the Late Prehistoric occupation, no structures are clearly apparent (Figure 9.12). Locations



**Figure 9.12.** Organization of space during the Late Prehistoric occupation of Broome Tech.

of posts may mark remnants of temporary shelters, windbreaks, or processing facilities. The primary area of the Late Prehistoric occupation lies along a gentle north-facing slope that bridges the outwash terrace and floodplain. Although Broome Tech lacks clear evidence of dwellings that may have structured the use of space, the single large storage pit appears to have anchored occupants' activities. The majority of the shallow amorphous hearths are concentrated in an arc immediately to the south of this storage facility. On average, the centers of these surface hearths were only 4 m away from the center of the storage pit.

The most striking aspect of the Late Prehistoric occupation of Broome Tech is the presence of a discrete midden that encompasses nearly all of the area covered by the Late Prehistoric occupation. The midden is dark black in color with rich deposits of carbonized plant remains, calcined bone, and artifacts that, taken together, represent undifferentiated refuse cast as a sheet midden across this relatively small component. The midden covers approximately 201 m<sup>2</sup>, although the western boundary is uncertain. All of the Late Prehistoric features fall within the limits of the midden, suggesting a relatively small, tightly focused activity area.

## DISCUSSION

Synthesizing data on features, plant remains, and spatial organization highlights the rather dramatic differences in the subsistence and settlement behaviors practiced at Thomas/Luckey and Broome Tech.

Thomas/Luckey is a Late Prehistoric village situated on the floodplain of the Chemung River. Residents built longhouses that may have sheltered groups of related women and their immediate families. These households grew over time, requiring the expansion of Structure 1. Although satellite sites were undoubtedly an important element in the settlement system, this village represents a year-round occupation that may have spanned several generations. Villagers tended maize, beans, sunflower, and, quite likely, squash in Native gardens that would have thrived in the Chemung Valley's rich alluvial deposits. Residents collected nuts—favoring hickory—and gathered wild starchy and possibly oily seeds to supplement horticultural products. Annual harvest surpluses were stored in grass-lined subterranean storage facilities concentrated in two areas: immediately to the south of the longhouse, and within the structure's eastern end. The array of features documented indicates that villagers engaged

in a high diversity of activities, and that the location (inside vs. outside) of these activities varied seasonally. The absence of middens near the longhouse indicates that trash was cleaned and redeposited away from the longhouse. The structured removal of refuse should be expected at sites intended for long-term use. The labor involved in the construction of longhouses, the careful planning and preparation of features, and the removal of garbage all support a long-term occupation.

In contrast, the Late Prehistoric occupation at Broome Tech represents a seasonally reoccupied camp located on the Chenango Valley floodplain. The relatively small site size and apparent lack of structures suggest that this site more likely represents a large camp rather than a hamlet or village. The location of the site, only 85 m from the former oxbow meander around Nash Island, would have provided an ideal spot for fishing. Although the only direct evidence for Broome Tech fishing is a few net sinkers, Brumbach (1986:62) argues that in the Northeast:

Fragile bones, acid soils, and discard behavior probably account for the small amounts of remains regularly recovered. Fishing gear, such as net sinkers, hooks and gorges, are also rare or absent altogether. Instead, the use of weirs or natural obstructions like falls, reefs, or shallows would have been more efficient methods of capturing large numbers of small to medium-sized fish.

Therefore, even in the absence of overwhelming direct evidence for fishing, it is plausible that Broome Tech served as a seasonal fishing camp. The narrows formed by Nash Island would have channeled spawning fish, further condensing this seasonally concentrated resource and facilitating capture.

Historically, bass, brook trout, eel, pickerel, shad, and suckers are known to have frequented the Upper Susquehanna during spawning runs (Versaggi 1987:81). Occupation during at least the fall is indicated by the presence of relatively large amounts of nutshells, primarily butternut and hickory, available in October (Versaggi 1987:95). Fall occupation would have corresponded with trout and eel runs (Versaggi 1987:91). It is also possible that the site was reoccupied in the spring when perch, shad, suckers, and bass could have been targeted. Occupants constructed a very narrow range of feature types that likely reflect the more restricted set of activities that occurred at the site. Features are dominated by a series of shallow amorphous surface hearths that required minimal investment of labor. Juxtaposed against this is the single

large storage pit that embodies much higher energy input. Visitors to Broome Tech appear to have periodically cleaned and reused this large storage facility. It is possible that this pit cached food needed during fall and/or spring occupation. Maize grown in fields located elsewhere, perhaps near a hamlet or village, ripe in late August or early September, may have been dried and shelled or parched to facilitate preservation and then cached at Broome Tech. Upon returning to the site, the inhabitants constructed simple hearths, typically to the south and on average only 4 m away from this storage pit. Occasionally, new hearths melded with earlier thermal features, blurring individual boundaries. Horticultural products used at the site include maize and squash. Nuts, primarily butternut, were an important resource. The accumulation of a midden deposit centered on the storage pit, and its arc of associated hearths suggests that trash removal was not a primary concern, which might be expected if occupation was intended to be short-term. The intensive but seasonal use of this site may indicate communal cooperation in the targeting of a highly concentrated but temporally restricted resource, most likely spawning fish given the site location along a backwater chute. Clearly, the subsistence settlement behaviors played out at Broome Tech and Thomas/Luckey are vastly different.

Several possible explanations can be offered to account for this diversity. Although both sites fall within the Upper Susquehanna drainage, each falls within a different major tributary, and a distance of approximately 80 km separates these sites. The sharp differences in subsistence-settlement behavior may reflect regionally distinctive patterns, although this is the weakest argument, given the ease of travel, communication, and interaction along the Upper Susquehanna. Alternatively, these two occupations may represent functionally distinct site types that operated within a larger subsistence-settlement system, with Broome Tech representing a seasonally occupied satellite camp attached to an as yet unidentified village site that may have a set of behaviors that mirrors those from Thomas/Luckey. This may be the most conventional explanation for the differences given its fit with prior models of Late Prehistoric subsistence and settlement (e.g., Funk 1993). However, to evaluate this we will need to either link the people seasonally visiting Broome Tech to a hamlet or village (or link the people of Thomas/Luckey to an intensively revisited camp similar to Broome Tech), or demonstrate that for a group of coeval sites from a relatively small region these two site types do not coexist. Either of these tests will require expanding comparisons to additional sites

in order to flesh out Late Prehistoric variability. A third, and more provocative, possibility is that these sites do in fact occupy different temporal positions within the Late Prehistoric period, and represent different points along a continuum from hunting/gathering/collecting to agriculture. Broome Tech predates Thomas/Luckey by approximately a century and may represent an earlier moment in the development of horticulturally based village life. The later Thomas/Luckey site shows more investment in features, structures, and spatial organization reflective of a more sedentary lifestyle. Maize horticulture at Thomas/Luckey clearly contributes more to the diet than the earlier Broome Tech, and gardens appear more diverse with the addition of beans. Broome Tech may represent a time when settlement was semisedentary with seasonal movement between a number of seasonal bases. The relatively short-term use of these bases mitigated any investment in substantial structures. We might expect some form of horticulturally transitional site, possibly similar to Broome Tech, during the early Late Prehistoric period. Otherwise, we must accept the premise that full-blown agriculture appeared suddenly in the Northeast as a complete, fully developed subsistence-settlement package. Again, exploration of this hypothesis will require detailed comparisons of a diverse range of well-dated Late Prehistoric sites to supplement the existing database.

The precise explanation of the diversity documented at Broome Tech and Thomas/Luckey awaits more intensive exploration of Late Prehistoric variability at a greater number of sites. Detailed comparisons of subsistence and settlement behaviors highlight potentially important variation. The challenge now is to seriously address the problem of detailing early Late Prehistoric subsistence and settlement variability through more comparisons of “apples and oranges.” By envisioning a more diverse Late Prehistoric period, we are able to portray this important period as the dynamic time that it must have been, which will allow us to more effectively model the transition to a food-producing economy.

## Acknowledgments

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## END NOTES

1. Subsequent excavations documented the presence of a second longhouse and associated features (Miroff 2000). This paper deals only with Structure 1 and surrounding features excavated in 1994.
2. Treatment of human remains followed the guidelines of the federal Native American Graves and Repatriation Act and included consultation with Chief Paul Waterman of the Onondaga Territory near Syracuse, N.Y. Remains were repatriated under the supervision of Chief Waterman.
3. Botanical remains recovered from the midden are still under review and have not been included in this paper. A focus on feature data from Broome Tech provides similar contexts to Thomas/Luckey, where the only botanical remains analyzed were recovered from features.
4. Wood and its associated categories (bark, twigs, pitch, and buds) were not included in the analysis of sample compositions.
5. A scan of features not subject to detailed analysis identified sunflower seeds representing domesti-

cated forms (Scarry 1995).

6. Beans recovered from Broome Tech and AMS dated to A.D. 1570±40 (Hart and Scarry 1999:656) were recovered from a context believed to post-date the early Late Prehistoric component.
7. Wood charcoal was not analyzed at Thomas/Luckey.
8. Seeds identified as “other”, which largely consist of unidentified seeds, were excluded from calculations of seed composition.

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## CHAPTER 10

# UPLAND LAND USE PATTERNS DURING THE EARLY LATE PREHISTORIC (A.D. 700-1300)

Laurie E. Miroff

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### INTRODUCTION

So much attention has concentrated on competing hypotheses of Iroquois origins that research on the early Late Prehistoric is primarily focused on macro-scales of analysis. The ultimate goal in much of this research is supporting or refuting in situ or migration hypotheses of Iroquois origins (Crawford and Smith 1996; Dincauze and Hasenstab 1989; Hasenstab 1990; Morgan 1962 [1851]; Parker 1916; Snow 1995, 1996; Starna and Funk 1994; Tuck 1971; Wykoff 1988). With the exception of a few community level studies, data on early Late Prehistoric household and community patterns are limited from southcentral New York. (However, see Prezzano 1992; Whallon 1966, 1968.) Local level analyses focusing on households and communities add balance and complement large-scale studies (Cobb 1993; Marquardt and Crumley 1987). Local level analysis must, however, embrace more than the village and recognize a full land use system.

A local level of analysis, focused on the household and community, is vital to understanding the dynamic social relations that accompanied a shift in subsistence and settlement during the early Late Prehistoric period in the Northeast. However, not all activities related to a household or community took place within the village; the uplands were also an important factor in land use throughout prehistory. Until recently, the uplands were largely ignored in settlement and subsistence studies in the Northeast (Versaggi 1999). This paper focuses on settlement diversity during the early Late Prehistoric (A.D. 700-1300). To move beyond the village proper, I will examine patterns identified at an upland camp, the Park Creek II site, located in the Susquehanna Valley (Figure 10.1). Emphasizing a local level approach, I outline the merits of looking beyond the village and offer a baseline for understanding

settlement and subsistence in the Upper Susquehanna Valley during the early Late Prehistoric. Furthermore, I demonstrate why we need more detailed analyses of nonvillage sites to understand settlement and subsistence during this period.

### HOUSEHOLD STUDIES

Recently, several Iroquois scholars have noted the importance of research at the household and community levels for understanding the development of the Iroquois (e.g., Allen 1992; Prezzano 1992, 1996, 1997). By focusing on the local level, we can explore variability in production and consumption of subsistence and nonsubsistence goods within and between households at a single site and compare sites over time (Allen 1992; Ashmore and Wilk 1988; Byrd 1994; Hart 1995; Nass 1989; Wilk 1989; Wilk and Ashmore 1988; Wilk and Rathje 1982). While recognizing the numerous scales at which social and economic interaction occur, examining these relations at the local level allows researchers to better understand the interactions of individuals. Changes in the lives of these individuals are not only affected by changes at larger scales, but also impact larger-scale political and economic development (Brumfiel 1992; Cobb 1993; Cobb and Garrow 1996; Marquardt and Crumley 1987; Prentice 1985; Prezzano 1996, 1997; Roseberry 1989).

The early Late Prehistoric period presents interesting challenges to our understanding of social and economic change in the prehistoric Northeast. Subsistence and settlement patterns differ greatly from those of the previous period (A.D. 200-700). Multifamily longhouses, sedentary villages, greater and more substantial in-ground storage facilities, and horticulture are all hallmarks of the early Late Prehistoric (Funk 1993;

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Ritchie and Funk 1973). Accompanying these shifts are changes in village and household organization, social relations, labor allocation, and sociopolitical organization, especially as related to production and consumption. These changes are, in part, the result of choices made by individuals and a household or local level site analysis focuses attention on these actors (Tringham 1991).

Ritchie and Funk (1973:359) and Funk (1993:280, 291) outlined early Late Prehistoric settlements as including villages and hamlets<sup>1</sup>; large and small hunting, fishing, and gathering camps; camps associated with agricultural fields located at a greater than typical distance from a village; and ceremonial sites, cemeteries, and workshops. Thus far, only the first of these—villages and hamlets—have received much attention (Funk 1993; Knapp 1996; Prezzano 1992; Ritchie and Funk 1973; see also Versaggi 1987, 1996a, 1996b). Data from these sites aided in constructing culture histories and chronologies, which enhanced their appeal for researchers. Given their small size, low visibility, and meager quantities of data, nonvillage camps and workshops have been left under-researched (but see Abel 2000; Abel and Weiskotten 2000; Bradley 1987; Funk 1993; Lennox 1995; Montag 1998; Oskam 1999; Tuck 1971).

While most people lived in the village year-round, many left periodically. Historical accounts relate that while the household and community were associated with women, men were absent from the village for long periods—engaged in warfare, trade, or diplomacy (Heidenreich 1971; Morgan 1962 [1851]; Thwaites 1896-1901 [1915]; Tooker 1964; see also Funk 1993; Perrelli 1994; Wallace 1969). Snow (1994:39) stated that the male arena was “a lodge turned inside out.” Women’s “domain” was the village, and men’s the forest. However, women were not tethered to the village, and nonvillage work locations may have been occupied by *either* men or women *or* both. Versaggi’s (1996a) analysis of upland sites in eastern New York revealed microwear patterns on expediently manufactured flake and block tools. Microwear analysis provided evidence for meat, antler, and bone processing. Many of the tools also exhibited polishes of plants, wood, reeds, and grasses, the raw materials used for textile, cordage, basket, and mat production. While these products rarely survive in our acidic soils, expedient tool analysis provided evidence for what, historically, were women’s activities. These activities may otherwise be invisible at nonsedentary locations. Iroquois women, as well as children and the

elderly, have been viewed in the literature as primary foragers for edible resources and firewood, but, as Versaggi noted, are seldom depicted as foraging for raw materials other than clay for pottery manufacture (Versaggi 1996a; Versaggi et al. 2001; see also Gero 1991 and Sassaman 1992). These perishable raw materials may have been used by women in the production of culturally important status items (Claassen 1997, 2001).

Resource processing that occurred beyond the village limits was examined in detail at the Plus site, an Early Iroquois (A.D. 1350-1400) upland remote camp in Dryden, New York. Artifact, faunal, and microwear analysis indicated that the primary activities at the site were hunting and processing deer (Abel 2000; Abel and Weiskotten 2000). Microwear analysis provided data that site occupants were also, possibly, processing plant materials. Botanical analysis identified butternut, hickory, fruit seeds, and maize (kernels and cupules). In contrast to many temporary upland sites, the Plus site contained a large storage/refuse feature, hearths, post molds, and numerous ceramics.

Examining these nonsedentary locations tells us about collecting and processing of resources that may not have occurred within the village (see Pilon and Perkins 1997). Task groups, possibly divided along gender or age lines, may have occupied these locations temporarily to acquire resources at a substantial distance from a village/hamlet. Adding data from temporary camps to that obtained from village/hamlet sites provides a fuller picture of the settlement and subsistence patterns of the Upper Susquehanna Valley by describing how these two contemporary but very different site types were related. In turn, these analyses can aid in our understanding of the political and economic changes that occurred during the early Late Prehistoric. In discussing the state of research in Ontario, Canada, Lennox (1995:6) considered a hypothetical village occupied for ten years with a population of one thousand. In that time, many individuals would occasionally leave, performing various tasks in the fields and forests, thus creating numerous small sites that represent “about 10,000 person years of extra-village activity” (Lennox 1995:6). These sites “represent individual, special purpose or limited use activity areas,” which are often difficult to see “in such a pure form” at a village where activities often overlap over time. Given the quantity, range, and data potential of nonvillage sites, their role in early Late Prehistoric settlement and subsistence cannot be ignored.

## LOCAL LEVEL ANALYSIS

Local level analysis of the Park Creek II site provided baseline data for modeling settlement and subsistence in the Upper Susquehanna Valley. The identification of activity areas, based on artifact and feature types, artifact densities and attributes, and their locations within a site, can inform upon activities performed by groups and individuals at a site or in a particular structure (Flannery and Winter 1976; Jamieson 1988; Kapches 1979; Kent 1984, 1987, 1990; Nass 1989; Nass and Yerkes 1995; Newell 1987; Prezzano 1992; Seymour and Schiffer 1987; Stahl 1985; von Gernet 1982; Warrick 1984; Yellen 1977). When interpreted with care, activity areas can tell us about size and composition of households and communities, defense, interaction with other groups, crafts, production, and exchange (Allison 1999; Cameron 1993; Hayden 1982; Hitchcock 1987; Lyman 1994; Rogers 1995; Schiffer 1987, 1995). From community layout one can understand “the more intangible aspects of past cultural behavior (residence patterns, socio-political organization and ceremonial activity)” (Warrick 1984:1; see also Jamieson 1988:308). In addition to artifact types and densities, features are important artifacts in that their functions and organization can tell much about community activities and social relations. Although identification of feature function is problematic in that not all feature contents represent the feature’s original function, features are important in identifying activity areas, as many activities may have centered around particular feature types (e.g., hearths) (Schiffer 1987:32; Stewart 1977:17).

Activities of groups and/or individuals at a site are reflected in the types and locations of artifacts, features, and structures. The spatial organization of a site provides insights into aspects of the economic and political organization of a given society in a given historical context (Matson 1996:107). The Park Creek II site was an ideal site for examining intrasite variability and community organization. Excavation methods were designed to obtain a variety of data types, including spatially controlled artifact distributions and feature data. Block excavations provided information on artifact patterning and the nature of occupation.

## THE PARK CREEK II SITE

Archaeologists from the Public Archaeology Facility (PAF) identified the Park Creek II site (SUBI-1464) in 1993 during a cultural resource reconnais-

sance survey in advance of proposed improvements to New York State Route 17. At this time, a site examination was also conducted (Lain et al. 1993). The Park Creek II site was declared eligible for the National Register of Historic Places and construction plans could not be modified to avoid impacting the site. During the fall of 1998 and spring of 1999, PAF archaeologists performed data recovery excavations (Versaggi et al. 1996). The combined site examination and data recovery units covered an area of 24 m<sup>2</sup> at the site (Figure 10.2).

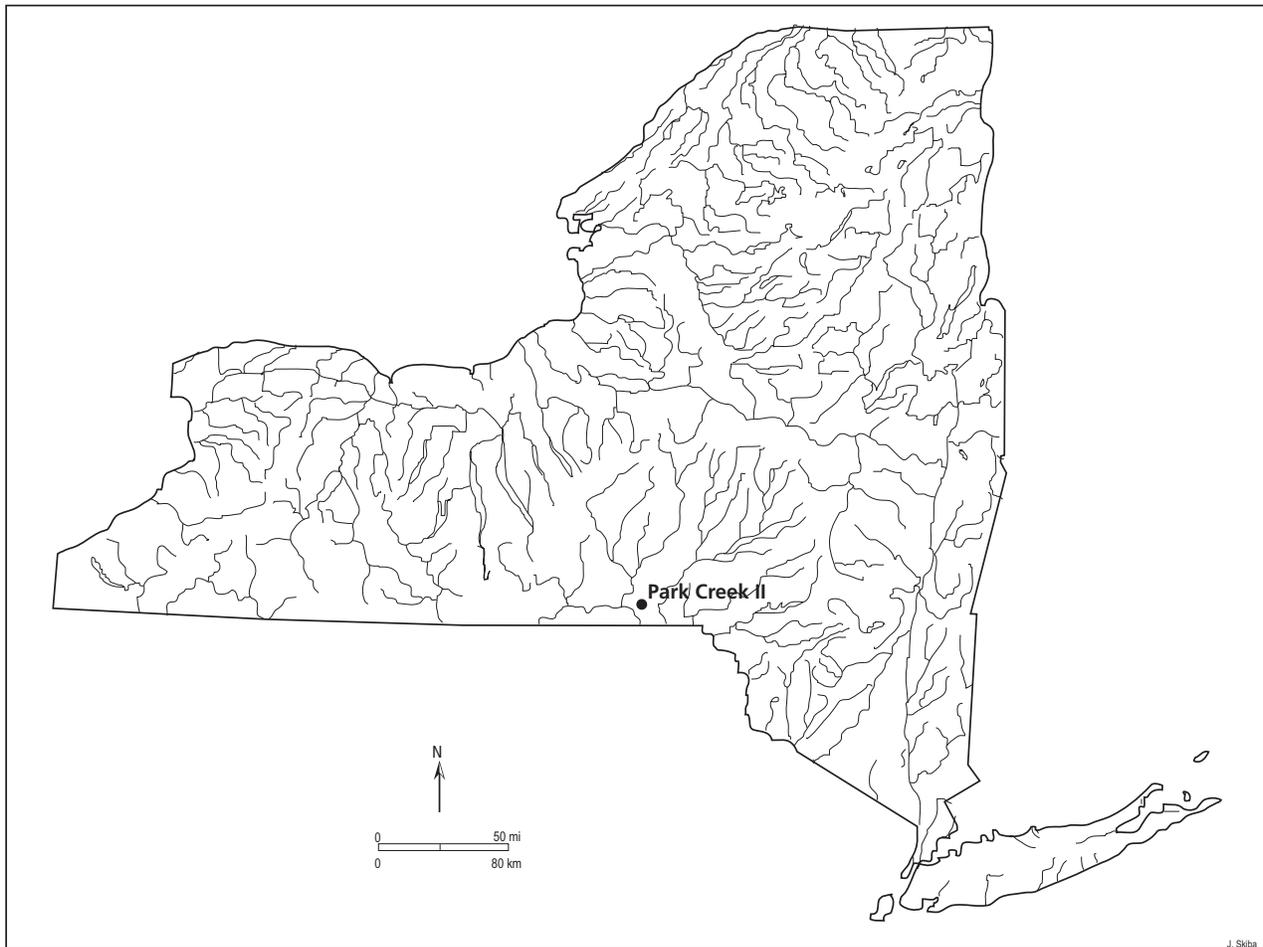
Park Creek II was situated in an upland valley of the Susquehanna River, near West Windsor, New York (Figure 10.1). The site occurred in a long, narrow east-west hollow, surrounded on two sides by steep ridges and was drained by Park Creek. This upland area consists of glacial till deposits that have been cut and eroded by creeks since glacial retreat.

Site stratigraphy was complex, and, in brief, consisted of four A horizons (Cremeens 1999). The first two A horizons, A1 and A2, contained very low artifact densities and no features. Therefore, this analysis concentrated on the two lowest horizons, A3 and A4, respectively. The B2 horizon, which separated the A3 and A4 horizons, was excluded from analysis given the difficulty of assigning the artifacts to either the A3 or A4 horizons with any confidence. Four radiocarbon dates were obtained from feature contexts associated with the A3 and A4 horizons (Table 10.1). One radiocarbon assay returned a date of 2170±60 B.P., far too early for the early Late Prehistoric. However, this was also the only conventional radiocarbon assay, and a feature from the same horizon contained maize and produced an early Late Prehistoric date. Given these dates and the presence of maize, I believe that the A4 horizon represented a fourteenth century occupation and the A3, an early fifteenth century occupation.

### The Fourteenth Century Occupation at the Park Creek II Site

Archaeologists identified 23 artifacts from feature and nonfeature contexts associated with the fourteenth century occupation (A4 horizon). Artifacts included cortical and noncortical flakes, one graver on a flake, and one ground-stone flake.

Unlike most campsites, Park Creek II yielded a wealth of feature data. Feature function was interpreted using the variables of size and shape (Stewart 1977), types of artifacts present (including floral and faunal remains), density of artifacts (particularly tools), and the presence of oxidized soil and/or



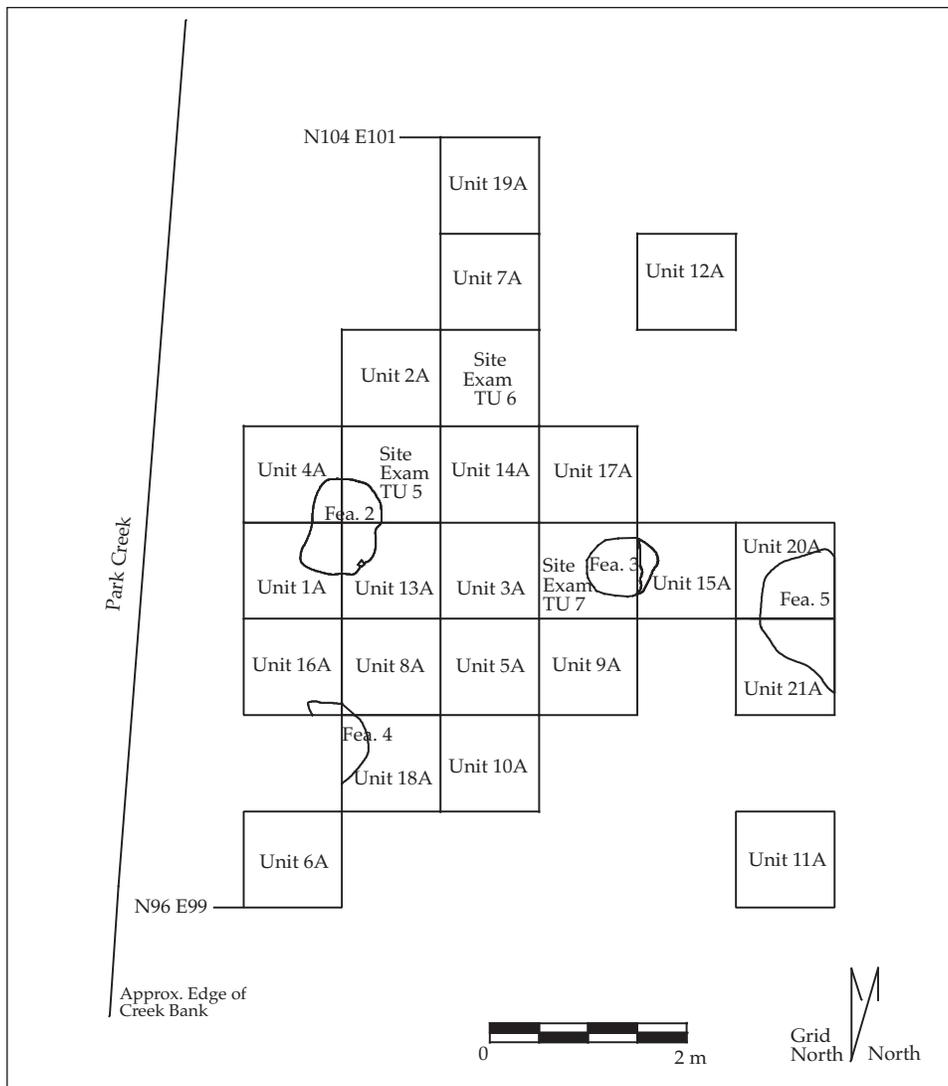
**Figure 10.1.** Location of the Park Creek II site.

burned rock (Stahl 1985). Four hearths were identified at the site. Two hearths, Features 3 and 4, were associated with the earliest occupation (Table 10.2). Feature 3 contained burned soil, charcoal, and calcined bone. It was elliptical in plan with a length of approximately 70 cm and a width of 60 cm. In profile, the feature was basin-shaped and had a maximum depth of 7 cm. Only two pieces of lithic debitage were identified in the feature. Feature 4 was small and contained charcoal and burned earth. The feature extended to the southwest of the excavated area, but, due to time constraints, the entire feature was not exposed. The feature was elliptical in plan (by extrapolation from the excavated portion) and was 87 cm in length. The profile was irregular in shape and had a maximum depth of 15 cm. No artifacts were identified in this feature.

Pope (2000) conducted microwear analysis on the

single curated tool associated with the fourteenth century occupation. This flake graver showed well-developed use traces on its point and two lateral edges. A polish similar to hide polish was identified on the point and the edge adjacent to the point. Polish on the distal end was similar to wood polish. While this wood polish may be the result of hafting, polish on the dorsal surface resembling that of soft tissue suggested that the tool was hand-held. Thus, this graver was possibly used to process both plant and animal materials.

Asch Sidell (2000) analyzed 22 botanical samples from the 4 hearths at Park Creek II. These data provided significant information on site function and subsistence practices. Nutshell (acorn [*Quercus* sp.] and hickory [*Carya* sp.]), maize (*Zea mays*; cupule and kernel), and wild seeds (sumac [*Rhus* sp.], bramble

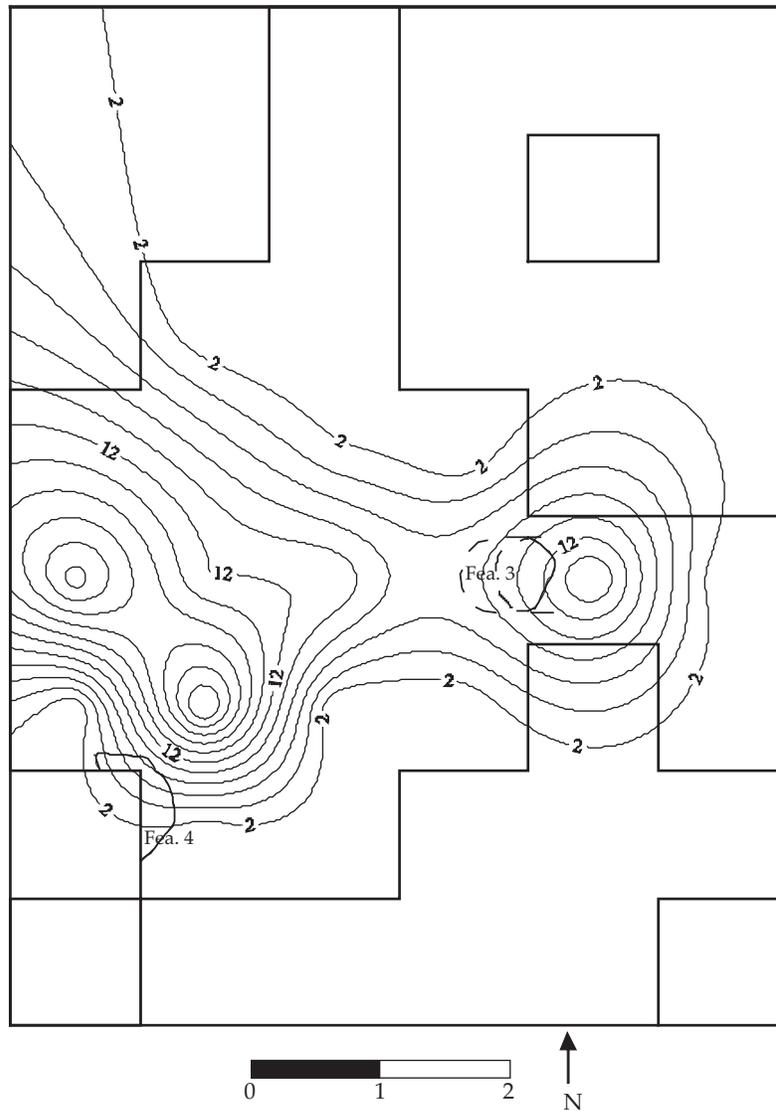


**Figure 10.2.** Excavations at the Park Creek II site.

[*Rubus* sp.], and dock [*Rumex* sp.], and wild sunflower [*Helianthus* spp.] were identified in features associated with the A4 horizon (Table 10.3). While it is uncertain if the nuts were used for food, given their low presence, Asch Sidell suggested that the lack of hickory wood at the site may indicate that hickory trees did not grow nearby and that the nuts were consumed (Asch Sidell 2000:5, 6). The presence of inedible maize cupules suggested that “some maize may have been grown near the site and processed” (Asch Sidell 2000:5). If maize was brought to the site from a village, it would more likely have been as parched kernels or cornmeal (Asch Sidell 2000:5). The bramble seeds may have been from blackberries, raspberries,

or dewberries collected for food, and sumac may have been used as an acidic drink (Asch Sidell 2000:6).

To better understand the use of space and activities conducted at the site, artifact data from the A4 horizon were plotted per cubic meter (Figure 10.3). Feature data were not included. Artifacts and debitage concentrated around Features 3 and 4 and just northwest of Feature 4. The single chipped stone tool (unifacial graver) was located adjacent to Feature 3. No cores, bifaces, or fire-cracked rock were associated with the A4 horizon. However, one ground-stone flake was identified near Feature 3. Given these data, activities appear to have concentrated around hearth features.



**Figure 10.3.** General artifact patterning at the Park Creek II site, fourteenth century occupation (A4 horizon).

**Table 10.1.** Radiocarbon Dates from the Park Creek II Site.

Fea. #	Horizon	Beta Sample #	Material	Analysis	$\delta^{13}\text{C}$	$^{14}\text{C}$ (B.P.)	Calibrated $2\sigma$ Range and Intercepts <sup>1</sup>
3	A4	B140973	Maize	AMS	-9.4	650±40	A.D. 1281 (1301, 1372, 1378) 1402
4	A4	B140974	Charred Material	radiometric	-25.0	2170±60	388 (200) 45 B.C.
2	A3	B140975	Maize	AMS	-9.3	560±40	A.D. 1302 (1403) 1436
5	A3	B140976	Maize	AMS	-9.0	480±40	A.D. 1402 (1434) 1474

<sup>1</sup>Calibrated using CALIB 4.2, Stuiver (et al. 1998).

**Table 10.2.** Park Creek II Feature Attributes.

Feature	Length (cm)	Width (cm)	Depth (cm)	Plan	Profile	Artifacts
3	70	60	7	Elliptical	Basin-shaped	Debitage (2)
4	87	N/A	15	Elliptical	Irregular	None
2	100	75	12	Elliptical	Basin-shaped	Debitage and utilized flakes (2); Pottery (1)
5	141	76	14	Unknown	Basin-shaped	Debitage and utilized flakes (27); Biface fragment (1)

### The Fifteenth Century Occupation at the Park Creek II Site.

The A3 horizon represented an early fifteenth century occupation at Park Creek II. Archaeologists identified 376 artifacts from feature and nonfeature contexts associated with this occupation. Artifacts included cortical and noncortical flakes (including utilized pieces), projectile points (one Levanna point, one Snook Kill-like point, and one Lamoka-like point), two bifaces, one unifacially retouched piece, one pottery fragment, and fire-cracked rock. Only the Levanna point type fits into the early Late Prehistoric time frame. However, the presence of a Snook-Kill and a Lamoka point may indicate collection and reuse by later peoples or sporadic use of the site area through time. The single pottery fragment, identified in Feature 2, had a mostly eroded exterior and a smoothed interior. Given the small size of the fragment (0.4 gm), its location on the vessel could not be determined.

Features 2 and 5 (Table 10.2) were associated with the A3 horizon. Feature 2 consisted of reddened earth and charcoal. It was approximately 100 cm in length and 75 cm in width. Its longest axis was north-south and it was elliptical in plan. The profile was basin-shaped with a depth of only 12 cm. Two pieces of lithicdebitage and calcined bone were recovered from Feature 2. Feature 5 appeared on the surface as a dense concentration of charcoal. Approximately 5 cm below the feature's surface, the matrix was heavily burned and was a bright-red color with some blackened soil. Due to time constraints, the eastern portion of Feature 5 was not exposed. The excavated portion of the feature was 141 cm by 76 cm. Approximately one-half of the feature was excavated. The profile was basin-shaped, with a maximum depth of 14 cm. Artifacts identified in the feature matrix included 25 pieces of lithicdebitage, 2 utilized flakes, 1 biface fragment, and calcined bone.

Microwear analysis was conducted by Pope (2000) on 3 bifaces, 1 unifacial piece, and 64 unmodified flakes (debitage and macroscopically identified utilized flakes) from the A3 horizon. Of the three bifaces examined, only the Snook Kill-like point possessed well-developed use traces, use polish, and haft traces. Meat polish was present along the lateral blade edges. Evidence suggested that the tool was used as both a projectile and a knife, for hunting and butchering. The hidelike polish indicated that the biface was, possibly, sheathed in hide. No use traces were present on the unifacial piece (retouched flake). The majority of the expedient flake tools were used on soft materials, most likely plants or woody plant fibers. Some of these expedient tools were also used to cut or process animal materials, probably small game, given the size of the tools.

Microwear analysis demonstrated that while formal tools maintained and discarded at the site were used for animal processing, unmodified flakes were mainly used for processing soft plants and, rarely, meat. Expedient tools were used to shave, slice, scrape, perforate, or engrave. These expedient tools were both hafted and hand-held. Hafting may have improved tool efficiency (Versaggi et al. 1996). The microwear analysis suggested that formal tools (often a focal point of lithic analysis) may reflect only a small percentage of site activities. Combining microwear analysis of formal tools with that of unmodifieddebitage provided a fuller image of activities at Park Creek II.

Features associated with the A3 horizon contained wood and acorn, hickory, and beechnut (*Fagus grandifolia*) (Asch Sidell 2000) (Table 10.3). As with the A4 horizon, nutshell most likely represented a consumed resource, given the lack of hickory trees in the vicinity of the site (Asch Sidell 2000:6). Maize (cupule, glume, and kernel) was identified in both features. The presence of inedible cupules and glumes suggested that maize may have been grown nearby (Asch

**Table 10.3.** Park Creek II Botanical Data.<sup>1</sup>

Common Name	Taxonomic Name	Feature 3, A4 Horizon	Feature 4, A4 Horizon	Feature 2, A3 Horizon	Feature 5, A3 Horizon
<b>NUTSHELL</b>					
Acorn	<i>Quercus spp.</i>	-	1	1	-
Beechnut	<i>Fagus grandifolia</i>	-	-	p <sup>2</sup>	-
Hickory	<i>Carya spp.</i>	1	-	-	1
<b>MAIZE</b>					
Cupule	<i>Zea mays</i>	2	-	1	9
Glume		-	-	-	4
Kernel		1	-	10	23
<b>SEEDS</b>					
sunflower	<i>cf. Helianthus spp.</i>	1	-	-	-
sumac	<i>Rhus spp.</i>	-	2	-	-
bramble	<i>Rubus spp.</i>	-	1	2	-
dock	<i>Rumex spp.</i>	-	1	-	-

<sup>1</sup>Wood excluded.<sup>2</sup>P=present in 0.5-2 mm fraction.

Sidell 2000:6). Bramble seeds may be from blackberries, raspberries, or dewberries collected for food (Asch Sidell 2000:6).

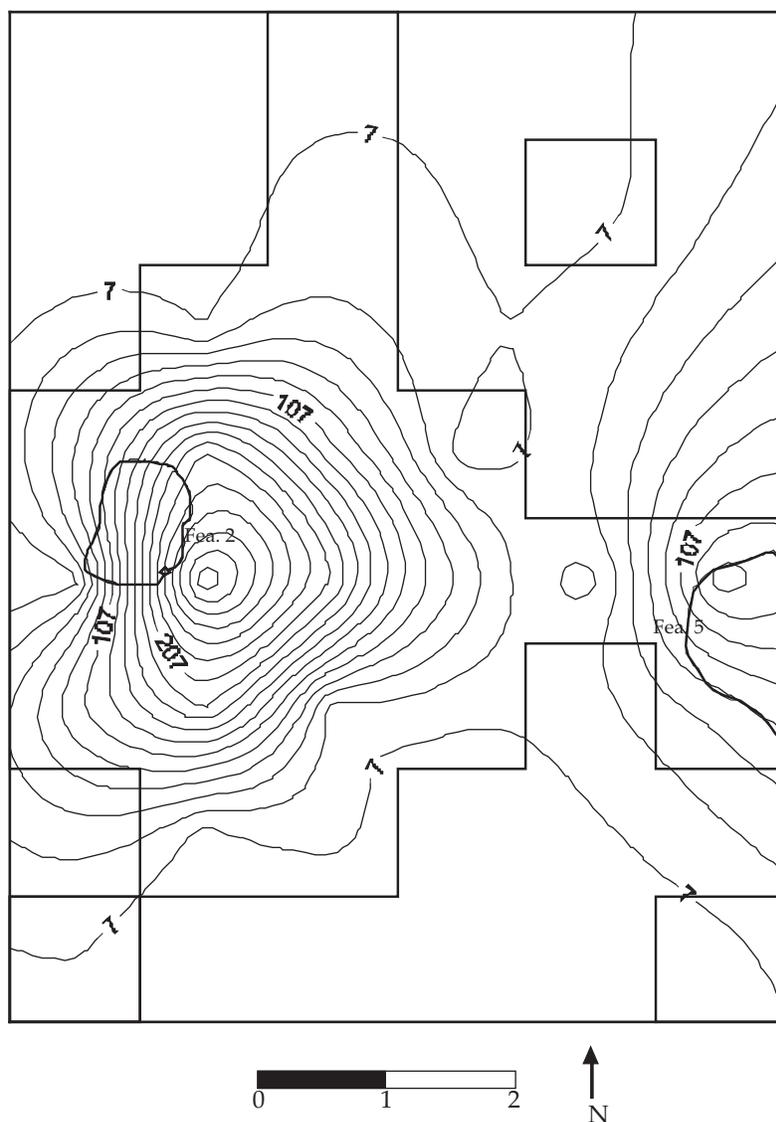
When unit artifact data from the A3 horizon were plotted per cubic meter, a pattern similar to that of the A4 horizon was noted. Artifacts concentrated near features (Figure 10.4). This pattern held for debitage and for other chipped-stone artifacts and tools (utilized flakes, projectile points, and one unifacially retouched piece). One biface was identified in the A3 horizon and it was located near Feature 2. A second biface was recovered from Feature 5. Fire-cracked rock, plotted by weight, concentrated around Feature 5. The single pottery fragment identified at Park Creek II was located in Feature 2. From these data, it appeared that the multiple activities associated with this later occupation concentrated around the two hearths.

### A Summary of the Park Creek II Site

The focus of the Park Creek II site was procuring and processing multiple dispersed resources. The site was likely occupied during the late summer/early fall (evidenced by the seeds, nuts, and maize). If maize was grown nearby, the site may also have been occupied in early summer during planting.

Comparing flakes between horizons (feature data are not included) revealed similarities and differences

in site use between occupations (Table 10.4)<sup>2</sup>. Nine flake attributes were measured to determine stage of production and lithic technology (bifacial or expedient): presence/absence of cortex, cortex type, dorsal-scar count, size, platform angle, platform type, average flake weight, presence/absence of heat treating/burning, and presence/absence of utilization<sup>3</sup>. Lithic attributes suggested that site occupants (both components) were practicing both early- and late-stage reduction at the site. The majority of flakes lacked cortex and had two or more dorsal scars, indicating late-stage reduction and/or bifacial thinning (tool maintenance). In terms of size, at least 49 percent of the flakes from both components were less than 0.25 inch in size. Flake size, combined with the low average flake weight, further suggested that late-stage reduction and/or tool maintenance/resharpening and not tool manufacture, occurred at the site. In contrast, the majority of flake platform angles (A4 and A3 horizons) ranged between 45° and 90° and at least half of the flakes in both components had flat platforms, indicating early-stage reduction. While both components contained flakes with faceted platforms, often a product of late-stage reduction/bifacial thinning, only the A3 horizon contained platforms that measured  $\leq 45^\circ$ , another indicator of late-stage reduction/bifacial thinning. Debitage attributes and the presence of bifaces and flake tools suggested that site occupants used curated



**Figure 10.4.** General artifact patterning at the Park Creek II site, fifteenth century occupation (A3 horizon).

and expedient tools. The presence of early-stage reduction flakes and smooth cortex indicated that the occupants may have tested locally available cobbles. However, no cores were identified. While utilized flakes were present in the A3 assemblage, none were associated with the A4 horizon.

The presence of hearths associated with both the A4 and A3 horizons suggested either an overnight camp or the need for heat to process resources. Multiple tasks centered on hearth areas, suggesting that warmth may also have been a factor. The presence of heat-treated/burned flakes may be related to raw

material quality or availability or to the hearth-centered activities at Park Creek II that increased the potential for accidental burning.

While ephemeral structures may have been used, they left no traces behind. Short-term occupation was evidenced by low artifact and feature densities, small quantities of maize, nuts, and seeds, and the absence of post molds.

Shallower and smaller hearth features, lower overall density of artifacts, and fewer artifact types associated with the earlier occupation (A4 horizon) suggested a shorter-term occupation or less reuse of the

**Table 10.4.** Comparison of Flake Attributes, A4 and A3 Horizons, Park Creek II.<sup>1</sup>

Attribute	Subtype	Park Creek II, A4 Horizon	Park Creek II, A3 Horizon
Presence/ Absence of Cortex	Cortical	10.5%	38.4%
	Noncortical	89.6%	61.6%
Cortex Type	Smooth	100.0%	100.0%
Dorsal Scar Count	Two or more	80.0%	67.9%
Flake Size	<0.25 inch	73.7%	49.0%
Platform Angle	45° to 90°	75.0%	75.0%
	≤45°	0.0%	14.3%
Platform Type	Flat	50.0%	70.5%
	Faceted	25.0%	13.4%
Average Flake Weight		0.17 gm	0.4 gm
Heat-treated/Burned Flakes	Present	40.0%	15.2%
Utilization	Present	0.0%	15.2%

<sup>1</sup>Percentages within a given attribute do not total 100, because all attribute subtypes are not presented.

site than during the later period. Activities associated with the A4 horizon<sup>4</sup> included plant processing, biface maintenance, possibly expedient tool production, cooking, and, possibly, hide-working, wood-working and/or meat processing. The low average flake weight and small size of flakes in the A4 horizon, along with the absence of bifacial tools, suggested that formal tools were carried to the site, used, resharpened, and removed from the site.

Several activities were implied by the artifacts recovered from the later occupation associated with the A3 horizon<sup>5</sup>: plant processing, biface production and/or maintenance, expedient tool production, hunting, cooking, and, possibly, hide-working, wood-working and/or meat processing. It is possible, given the presence of a single ceramic sherd, that ceramic vessels were brought to the site to be used as containers for collected materials (maize, berries, nuts, seeds, or meat) or for processing materials and then brought back to the village, leaving virtually no ceramics at the upland site.

## DISCUSSION

One of the few available settlement models that can be used to interpret the function of nonvillage sites was created by Versaggi (1987, 1996b). She analyzed 27 distinct Late Archaic through Middle Woodland components located above the confluence of the Unadilla River with the Susquehanna River to estab-

lish baseline models of prehistoric hunter-gatherer settlement in the area. A k-means cluster analysis (Kintigh 1985) was used to group sites based on the following site variables: site size, artifact composition (lithics only), artifact diversity, the presence and number of spatial clusters created by activities, and the diversity of items used and left in these clusters.

Versaggi's (1987, 1996b) analysis identified four site clusters. Comparing these site groupings to ethnographic literature, Versaggi suggested how sites may have functioned and articulated with other elements of a larger settlement system. The site clusters identified by Versaggi were translated into widely used classifications, such as base camps, single-task field camps, multitask field camps, temporary processing locations, and encounterlike hunting/butchering stations. Using these site clusters, Versaggi (1987, 1996b) then created a regional settlement model using both logistical and forager systems of organization. For logistically organized systems, this model predicted that residential base camps would occur at major confluences, mostly near winter deer aggregation areas and dense spring fish runs. Small single- and multitask camps occur in a wide variety of topographical and seasonal contexts. Some are widely scattered within the valleys of major and secondary drainages during dispersed resource seasons, and others are mapped onto specific resource patches located at a significant distance from the residential base. Larger multitask and large single-task camps concentrate in major valleys. Temporary processing areas and

encounterlike hunting/butchering stations occur within the daily foraging radius of base camps as well as around dispersed single- and multitask camps. During the early Late Prehistoric, villages are encountered in the valleys of major rivers (Versaggi 1996b). Expected upland site types for the early Late Prehistoric are relatively unknown. However, possible site types include, activity areas associated with short-term use of the uplands for hunting, gathering and fishing, short-term habitation and resource processing sites, and upland camps.

Funk (1993) outlined a settlement model for the early Late Prehistoric similar to that described by Versaggi. Funk defined several site types for the early Late Prehistoric, including horticultural villages, horticultural hamlets, small and temporarily occupied camps, quarries and workshops, ceremonial sites, cemeteries, and camps associated with cornfields at a greater than expected distance from villages. Horticultural villages are expected on floodplains, outwash terraces, kame terraces, ridges and knolls on and back from the river, and on upland saddles. They are occupied year-round and contain structures, storage areas/facilities, and evidence for numerous activities. Horticultural hamlets are similar to villages, but smaller. Small (0.5 ac or smaller), temporarily occupied camps are expected on floodplains, valley walls, and in the uplands. These include camps for hunting, fishing, fowling, nut-harvesting, kill sites, and camps associated with nonsubsistence activities. Quarries and workshops are mainly identified on upland saddles. Seasonally available food resources, such as nuts, fish, or fowl, were obtained by work parties, who would often temporarily camp at the location of the resource. In the fall and winter, work groups left to obtain acorns at oak tree stands or hunt for deer. In the spring, summer, or fall, community members may have traveled to productive fishing or fowling locations (Funk 1993).

The Park Creek II site is interpreted as either a temporary processing location, encounterlike hunting/butchering station (Versaggi 1996b), or small camp (Funk 1993). Temporary processing location and encounterlike hunting/butchering station sites are small, with the lowest number of artifacts, tools, and intrasite clusters. There is mixed tool and intrasite cluster diversity. Generally, these sites are expected within the daily foraging radius. They are created when scattered resources, such as plants or game, are encountered, processed, and immediately returned to the main camp (Versaggi 1996b). This category also includes some small single- and multitask field camps

that could occur in the uplands of major drainages (Versaggi 1987). Single-task field camps are intermediate in size and contain large numbers of artifacts and tools. However, there are fewer intrasite clusters, indicating less redundancy. These intrasite clusters are similar in composition, indicating that a single or limited range of tasks were performed. Tool diversity is low. These camps were occupied by a few people for a short period of time, thus making it unnecessary to organize and divide space. Multitask field camps are intermediate in size, have fewer artifacts and tools, and fewer intrasite clusters. There is mixed tool and intrasite cluster diversity. Occupants moved frequently, pursuing low density, dispersed resources.

Given the presence of features (hearths), the Park Creek II site was probably used overnight and thus was less ephemeral than most sites of these types. While the characteristics of the fourteenth century occupation (A4 horizon) fit those described for temporary processing locations or single/multiple-task field camps, a greater than expected diversity of activities occurred during the early fifteenth century occupation (A3 horizon). That this occupation does not match expectations suggests that there is great diversity among nonvillage sites and detailed local level analyses of upland sites need to be added to existing models.

To begin to model a more holistic picture of early Late Prehistoric people's settlement and subsistence, future studies will benefit from comparing the types and locations of artifacts, features, and structures at village sites to those identified at nonvillage sites. One recent study comparing lithics at an early Late Prehistoric floodplain village with an upland camp in the Susquehanna Valley revealed that an expedient technology using locally available raw materials and a bipolar reduction strategy may be more characteristic of villages than remote camps, where a bifacial strategy predominated (Montag 1998). A bifacial technology may indicate curation when raw materials are scarce, or may relate to the types of tools used for specific tasks at different locations. Bifacial technology may further relate to mobility, site type, or gender-specific task groups (Montag 1998; Oskam 1999; Versaggi 1996b). An expedient technology is commonly related to mobility reduction (Parry and Kelly 1987). Analysis of village sites reveals that "sedentary" people maintained both lithic technologies side-by-side (Miroff 1997, 1999, 2000). A bifacial technology is not unexpected at the Park Creek II campsite. However, the relatively high percentage of expedient tools used at the camp during the early fifteenth cen-

ture (A3 horizon) deserves further investigation and may be related to gender-specific work groups (Claassen 2001).

While it is known that village/hamlet inhabitants periodically left the settlement to hunt for and/or gather resources located at some distance from the sedentary site, nonsedentary location inhabitants are given little attention. The village/hamlet has been the central focus of early Late Prehistoric studies, for it is at village sites that the whole range of activities associated with settled life, such as resource processing and craft production, is expected. Associated with these sedentary locations are substantial structures, definite areas of refuse disposal, and long-term storage. Nonsedentary, upland sites were an integral part of village/hamlet inhabitants' seasonal activities. These sites may have been occupied by task groups of one or more households associated with a village or hamlet. While many types of campsites presumably existed during the early Late Prehistoric, the Park Creek II site served as a specific example for this model. The two occupations at Park Creek II suggested that the site was reoccupied during the early Late Prehistoric, possibly by the same lineage over generations. While at the camp, the inhabitants sharpened bifacial tools and produced flakes for expedient use. The evidence showed that they also hunted and collected wild foods, such as berries and nuts, and may have tended remote horticultural fields. Microwear analysis provided additional evidence that site inhabitants collected and processed plants and small animals. Spatial analysis revealed that site activities were patterned, focusing on the hearths. Although several possibilities exist for the composition of the Park Creek II inhabitants, artifact and floral data, combined with the ethnohistoric record, may suggest that the site was inhabited by groups organized and composed of women (Claassen 1997).

## SUMMARY

In this chapter I have noted that a local level of analysis can aid our understanding of the various roles played by the household and community. Understanding the variability within and between these social units will not only address this scale of analysis, but can also broaden our understanding of cultural change at the regional and inter-regional scales. Data pertaining to the early Late Prehistoric

are limited in both quantity and quality and research concerns are rarely focused at the local level of analysis or consider social relations. Not all individuals who comprised households were present in the village or hamlet at all times. Individuals left for resource procurement, trade, and alliance building. Thus, village/hamlet sites cannot be understood in isolation. Data obtained from sedentary settlements must be combined with that obtained from nonsedentary sites to understand settlement and subsistence during this period.

In the past, temporary upland sites were believed to contain limited data for creating and refining settlement/subsistence models. Analysis of the Park Creek II site has proven the opposite. Park Creek II provided valuable data that, when combined with similar studies in the future and compared to data obtained from village/hamlet sites, will enhance our picture of early Late Prehistoric settlement and subsistence. The wealth of information that can be obtained from previously neglected upland camps has been demonstrated. Nonresidential sites should not be studied as being separate from the village or hamlet, but as extensions of the social relations that define early Late Prehistoric organization. To truly understand social relations at the household level, we need to look beyond the village limits.

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## END NOTES

1. A village is defined as two or more houses; a hamlet is defined as typically one house only.
2. The only attribute recorded for flakes <0.25 inch in size was cortical/noncortical. Dorsal-scar count, platform angle and type, cortex type, heat treatment/burning, and utilization were not recorded.
3. No shatter or cortical chunks were included in the Park Creek II analysis.
4. The following lists the activities associated with the A4 horizon and the evidence: plant processing (ground-stone flake, graver, seeds, nuts, and berries, and maize), biface maintenance (noncortical flakes, flakes with two or more dorsal scars, flakes with faceted platforms, flakes <0.25 inch in size, and small average flake weight), possibly expedient tool production (flakes with flat platforms), cooking (hearths and maize), and, possibly, hide working, woodworking, and/or meat processing (graver and microwear and micropolishes).
5. The following lists the activities associated with the A3 horizon and the evidence: plant processing (seeds, nuts, berries, and maize), biface production and/or maintenance (noncortical flakes, flakes with two or more dorsal scars, flakes with faceted platforms, flakes <0.25 inch, small average flake weight, and bifaces), expedient tool production (utilized flakes and flakes with flat platforms), hunting (projectile points), cooking (hearths, FCR, pottery, and maize), possibly hide working, woodworking, and/or meat processing (utilized flakes, one unifacially retouched piece, and microwear and micropolishes).

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## CHAPTER 11

# EARLY LATE PREHISTORIC SETTLEMENT AND SUBSISTENCE DIVERSITY IN THE SOUTHERN TIER OF NEW YORK

Christina B. Rieth

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### INTRODUCTION

Northeast archaeologists often view the early Late Prehistoric period (A.D. 700-1300) as a homogeneous entity in which specific settlement and subsistence features can be applied uniformly across the entire region (Ritchie 1944; Ritchie and Funk 1973). As a result, subsistence and settlement models developed for specific river valleys and/or drainage basins have been applied (or misapplied) to contemporaneous groups living nearby (Ritchie 1944). The result of this practice has not only led to the simplification of complex settlement and subsistence systems but has also resulted in erroneous interpretations about early Late Prehistoric settlement and subsistence systems.

Equally problematic is the relative absence (until recently) of detailed intraregional settlement and subsistence studies. In his analysis of subsistence patterns in southern New England, Bendremer (1999:134) argues that regional and subregional studies are important and should be undertaken, since they can “detect and assess the full range of strategies” employed by prehistoric populations. Likewise, Trigger (1981:32) in his summary of Iroquoian social and settlement organization argues that regional studies are needed to determine “what sorts of patterns of behavior these differences represent and what local traditions some of them may signify.”

An important aspect of these intraregional studies involves the examination of both large and small sites within the larger settlement and subsistence system (Lennox 1995). In the past, archaeologists working in the Susquehanna Valley have focused their research on large multiacre village sites located near the junction of the Susquehanna, Chemung, and Unadilla Rivers (Prezzano 1993; Prezzano and Rieth 2001;

Ritchie 1934, 1939, 1973; Wurst and Versaggi 1993). As a result, smaller camp and resource procurement sites located at the northern end of the valley are often forgotten or, at best, viewed as peripheral components to the regional settlement and subsistence system.

This chapter contributes to our understanding of the prehistoric occupation of the region by examining a cluster of small sites located near the confluence of the Schenevus and Otego Creeks with the larger Susquehanna River (hereafter the Oneonta-Worchester area). I summarize what is known about the settlement and subsistence features of these sites and attempt to integrate data from more recent excavations into regional models of settlement and subsistence.

### SMALL SITE ARCHAEOLOGY AND ITS RELATIONSHIP TO THE EARLY LATE PREHISTORIC CULTURES OF THE NORTHEAST

Small sites are defined as “. . . sites whose size and artifactual assemblage suggest a limited temporal occupation by a small group of people, gathered at the locality to carry out a specific, seasonally oriented set of activities” (Piles and Wilcox 1978:1). Although small sites are regularly integrated into regional settlement and subsistence models elsewhere (e.g., King and Potter 1994; Piles and Wilcox 1978; Schwartz and Falconer 1994; Ward 1978), in the Northeast, such sites are often viewed as unimportant when considered in relationship to larger semipermanent villages that have become the hallmark of the early Late Prehistoric period. While this bias can be partially attributed to the implementation of academic research problems centering on the reconstruction of culture history, equally

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important problems have also resulted from the absence of optimal survey and excavation strategies needed to locate such sites as well as a failure on the part of archaeologists to understand the relationship between small sites and the larger settlement system (Lennox 1995a; Pihl 1997:100). Studies by Black (this volume), Brumbach and Bender (this volume), Diamond (1995), Feder (1990), Lacy (1999), Lennox (1995), Means (1999), Miroff (this volume), Pendergast (1997), Pilon and Perkins (1997), Smith (1997), and Smith et al. (1997) represent notable exceptions.

The archaeology of the early Late Prehistoric period is often characterized as one in which large multi-family villages dominate the landscape. While the occupation of these villages undoubtedly played an important role in the settlement and subsistence systems of these prehistoric populations, small and large camps, resource processing stations, and horticultural hamlets played a critical role in the survival of the pre-Iroquoian populations of the Northeast. According to Lennox (1995:6), "villages must have been a hive of activity . . . with the demands . . . on local resources being incredible . . . Satellite communities as well as fishing and hunting camps and isolated activity areas must have diffused this environmental drain over a broader area . . . lessening the likelihood of failure." Descriptions of small fishing, food procurement, and cabin sites in ethnohistoric descriptions of the Huron (Sagard 1939; Tooker 1991:62-67; Trigger 1990:30-39), Mahican (Jameson 1959; see also Brumbach and Bender, this volume), and Five Nations Iroquois (Van den Bogaert 1988) further highlight the important role that these small sites played in the daily survival of Native populations.

While descriptions of early Late Prehistoric small sites are regularly found in published articles and unpublished CRM reports, it is important to note that not all small sites contain the same sets of settlement features nor do they function in the same way (Piles and Wilcox 1978:1-2; Ward 1978). As studies by Smith et al. (1997:87-96), Lennox and Hagerty (1995:8-76), and Pihl (1997:97-111) have shown, small sites within a limited geographic region can be quite diverse and represent a wide range of functions, many of which may be unknown to archaeologists. Only by comparing the individual characteristics of these sites (e.g., spatial arrangement, types of artifacts, number and types of features, site size, geographic location, etc.), can archaeologists hope to gain a more complete picture of the role of these small sites in complex settlement systems.

## EARLY LATE PREHISTORIC SETTLEMENT AND SUBSISTENCE STUDIES IN THE ONEONTA-WORCHESTER AREA

Since the first half of the twentieth century, archaeologists have recognized that the Oneonta-Worchester area was extensively occupied by the pre-Iroquoian populations of New York (Bailey 1961; Funk 1993; Funk and Rippeteau 1977; Moorehead 1938; Parker 1922; Ritchie 1944:89-90). However, despite the large number of sites identified, only a limited number of early Late Prehistoric sites have been systematically studied, and archaeologists have offered different viewpoints regarding the occupation of the Oneonta-Worchester area between A.D. 700 and 1300.

In the mid-1970s, Snethkamp (1975) and Weide (1975) commented on the apparent absence of early Late Woodland (A.D. 800-1300) occupations near the confluence of the Schenevus Creek and the Susquehanna River. According to Snethkamp (1975:75), "should the apparent absence of Late Woodland material be substantiated by thorough excavation, we would have the interesting prospect that . . . Late Woodland [occupations] did not occur in the area of the junction of Schenevus Creek and the Susquehanna River. This situation poses the question of the effects of ecological and/or social limitations on the distribution of Late Woodland . . . [occupations] . . . in the upper Susquehanna."

Versaggi (1987:303-305) suggests that during the Middle Woodland period (A.D. 100-800), hunter-gatherers tethered seasonal base camps to optimal locations for extended periods. As a result, summer, multitask foraging sites were not commonly occupied, leaving the prehistoric occupants of the Susquehanna Valley to exploit a wide range of resources through the seasonal movement of residential bases. Over time, the seasonal movement of these sites culminated in the occupation of semisedentary villages during the early Late Prehistoric period. However, Versaggi (1987:305) concurs with Snethkamp (1975), stating "east of the Unadilla, the upper Susquehanna contains few sites of the late Woodland period."

Drawing on data from a multi-year study of the region, Funk (1993b:291) similarly argues that the Oneonta-Worchester area was not extensively occupied during the early Late Prehistoric period, stating that although a wide variety of sites can be found in the larger valley extending from Binghamton to Otsego Lake, the portion of the valley encompassing the Oneonta-Worchester area has not produced an

**Table 11.1.** Upper Susquehanna Site Types (after Funk 1993:281).

Settlement Type	Size	Description
Villages	>1 acre (4,032 sq. m)	Site includes structural evidence, hearth, food storage, and refuse features along with a diverse array of artifacts. Villages were usually occupied year-round.
Horticultural Hamlets	<1 acre (4,032 sq. m)	Similar to villages. Possibly seasonally occupied.
Camps	Variable	General habitation sites with large amounts of refuse and features. Often contain evidence of wide range of tasks. Large camps measure more than 1/2 acre (2,016 sq. m), while small camps measure less than 1/2 acre (2,016 sq. m). Seasonal occupation.
Industrial Sites	Variable	Sites characterized by industrial activity, such as workshops and quarries. Low quantities of settlement-subsistence debris.
Ceremonial/Mortuary Sites	Variable	Sites associated with a particular or seasonal ceremonial or mortuary activity. Low quantities of settlement-subsistence debris.

impressive number of Late Woodland sites. Of those sites identified, the largest number of sites date to the Carpenter Brook phase with limited numbers of sites appearing during the Canandaigua, Castle Creek, and subsequent Oak Hill-Chance phases.

Despite the limited number of Late Woodland sites identified in this area, Funk (1993b:291-292) indicates sites identified in the Oneonta-Worchester area were probably part of a larger settlement and subsistence system that not only included the occupation of sites in the immediate area but may have involved the year-round occupation of nearby horticultural hamlets and villages. During productive times of the year, smaller resource procurement groups were discharged to surrounding areas (such as the Oneonta-Worchester area) to collect nuts, berries, and other resources that were needed during the winter months. Hunting parties were probably also discharged during the fall to search for aggregates of deer (Funk 1993:291). Evidence of these activities is represented by the occupation of a diverse array of site types during the late Middle and early Late Woodland Periods (Table 11.1).

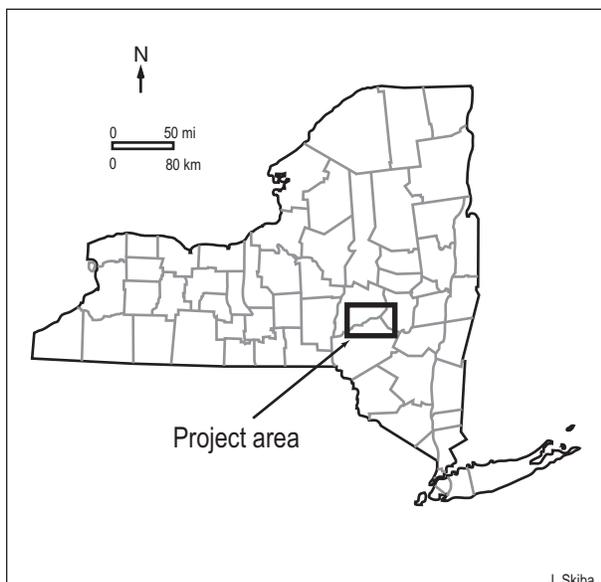
### Description of Study Area

This chapter focuses on 13 prehistoric sites located at the northern end of the Susquehanna Valley near

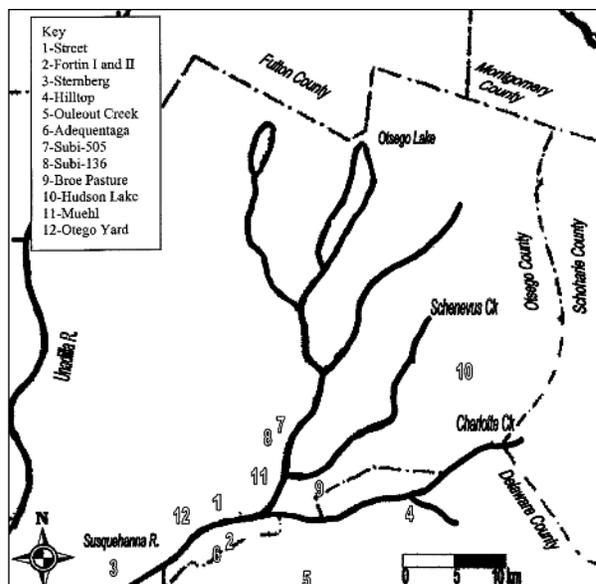
the villages of Oneonta and Worchester in southern Otsego and Delaware County, New York (Figure 11.1). The sites that are discussed in this paper were identified during cultural resource management projects (Hartgen Archaeological Associates 1988, 1989; Wanser 1978; Weide 1974, 1975), museum and university projects (Funk 1993, 1998; Raemsch 1970; Ritchie 1938), and local archaeological society “digs” (Table 11.2). While I am personally familiar with some of these sites, I have drawn the vast majority of the information used here from published articles, unpublished cultural resource management reports, and undergraduate and graduate theses. Other sites are known to be located in the Oneonta-Worchester area, but the absence of written reports and/or more extensive excavations at these sites has prevented me from including these sites in this study.

Since the settlement and subsistence patterns of this region are largely influenced by the local and regional topography, a brief description of the local environment is presented at this time. The Oneonta-Worchester area is part of the Appalachian Plateau region of New York (Mitchell 1978:3-6). Although the Susquehanna River is the primary waterway through the region, within a space of 15 miles, the river is joined by the tributaries of the Schenevus, Charlotte, and Otego Creeks.

At the northern end of the valley in between the



**Figure 11.1.** Map showing the location of the project area.



**Figure 11.2.** Map showing the location of the sites discussed in the text.

Schenevus and Charlotte Creeks is a unique combination of upland hills and valley floors. In this area, the valley floor is very narrow, measuring less than a quarter mile wide. Several smaller microenvironments (such as those at Hudson Lake and Worchester Bog) are located nearby and would have allowed the prehistoric occupants of the region to exploit a wide range of floral, faunal, and aviary specimens (Mitchell 1978).

The valley floor is transformed from a narrow corridor to an expansive floodplain measuring more than a mile wide in between the Charlotte and Otego Creeks. Nearby, several small terraces surround the valley floor. The entire Oneonta-Worchester region is enclosed by the smoothly undulating Appalachian mountain system, and the tributary valleys of the Schenevus, Charlotte, and Otego Creeks would have provided access to these upland areas (Mitchell 1978).

### Chronology

The sites that are discussed in this chapter bridge the gap between the late Middle Woodland (ca. A.D. 700-800) and the early Late Woodland (ca. 800-1300) periods. In the upper Susquehanna Valley, the late Middle Woodland period includes sites dating to the Kipp Island phase (A.D. 700-800) and has been associated with the occupation of the region just prior to

the introduction of maize horticulture. According to Ritchie (1994), the Kipp Island phase is best described as a transitional phase between the earlier Point Peninsula occupations and the Late Woodland cultures that dominated the region between A.D. 800 and 1300.

Most of the sites that are discussed in this paper are associated with the early Late Woodland period and have produced calibrated radiocarbon dates between A.D. 1000 and 1300 (Table 11.2). The early Late Woodland period has traditionally included sites dating to the Hunter's Home (A.D. 800-1000), Carpenter Brook (A.D. 1000-1100), Canandaigua (A.D. 1100-1200), and Castle Creek (A.D. 1200-1300) phases. In the Southern Tier region of New York, this period is marked by the transition from a mobile hunter-gatherer subsistence economy to a subsistence economy that involved the adoption and eventual intensification of maize horticulture (Ritchie 1994). Coinciding with this transition were equally important changes in the use, size, and internal organization of prehistoric settlements, material culture, and the reconfiguration of earlier social relations.

Several sites in the project area produced erroneous radiocarbon dates and/or were not previously dated (Table 11.2). When possible, these sites were assigned to the late Middle or early Late Woodland period

**Table 11.2.** Summary of Late Middle and Early Late Woodland Sites in the Oneonta-Worchester Region.

Site Name	Provenience	Radiocarbon Age B.P. (Lab No.)	Calibrated 2σ with intercepts (A.D.) <sup>2</sup>	Reference
<b>Late Middle Woodland Occupations</b>				
Fortin II	Occupation 3	1390±55 (Dic-209)	560 (656) 765	Funk 1998a
Adequentaga	Layer 2	1120±90(I-6565)	688 (899, 920, 958) 1152	Raemsch 1970
		1345 (I-4557)	---	
		1300 (I-3931)	---	
		1190 (I-3732)	---	
		1080 (I-4445)	---	
Sternberg	Zone 3	None reported	---	Funk 1998b
Subi-136	---	None reported	---	Wanser 1978
Street	Locus 1, Zone B	1250±150 (QC-100)	536 (775)1148	Wellman 1998
		1425±150 (QC-1001)	262 (642) 956	Funk 1993
Subi-505	---	None reported	None reported	Wanser 1978
<b>Early Late Woodland Occupations</b>				
Outleat Site <sup>1</sup>	---	1180±80	665 (885) 1019	Hartgen Archaeological Associates 1989
		1160±80	679 (890) 1022	
		1150±80	686 (892) 1023	
		1020±80	785 (1018) 1210	
		1000±70	894 (1021)1210	
		990±60	901 (1023)1206	
		990±120	778 (1023)1279	
		970±60 (Beta 19682)	978 (1029)1214	
		960±80 (Beta 19933)	899 (1034)1256	
		840±90 (Beta 19666)	1018 (1216) 1379	
Street	Locus 2, Zone A	1000±45 (Dic-989)	978 (1021) 1159	Wellman 1998
		800±50 (Dic-990)	1156 (1256) 1291	
		270±140	1405 (1645) 1955	
Hudson Lake	Locus 7	870±75 (Dic-166)	1018 (1165,1166,1188) 1285	Snethkamp 1975, 1976
Fortin III	Occupation 4	None reported	None reported	Funk 1998a
Fortin I	Locus 1, Zone 1	None reported	None reported	Funk 1998a
Hilltop	---	None reported	None reported	Ritchie 1938
Sternberg	Zone 1	None reported	None reported	Funk 1998b
Otego Yard	Locus 1 & 4	1750±90	74 (258,283,287,300,320) 531	Hartgen Archaeological Associates 1988
		1180±90	661 (885) 1022	
		1020±110	776 (1018) 1256	
		810±80	1027 (1224,1231,1239) 1379	
		570±60	1292 (1334,1336,1400) 1441	
		510±60	1304 (1421) 1478	
		280±80	1442 (1642) 1949	
		260±60	1479 (1648) 1948	
Broe Pasture	---	None reported	None reported	Weide 1974
Muehl	---	None reported	None reported	Weide 1975

<sup>1</sup>Additional radiocarbon dates reported for this site, but these dates fall beyond the A.D. 700-1300 period of this chapter.

<sup>2</sup>Calibrated using CALIB 4.2 (Stuiver et al. 1998)

based on diagnostic artifacts (e.g., ceramics, projectile points, etc.) recovered from features and/or living floor contexts.

Three of the thirteen sites in this study also produced multiple occupations dating to the period A.D. 700-1300. For the purpose of this study, I have chosen to treat each of these occupations as its own unit. Therefore, it is important to note that in the following sections, the settlement and subsistence characteristics that are described relate to a specific occupation and do not necessarily represent the overall patterns of the site.

### Settlement Patterns

Settlement patterns are “the arrangement of sites across the landscape, their place in specific seasonal economic systems, and their internal structure” (Funk and Rippeteau 1977:38). Despite their small size, sites in the Oneonta-Worchester area were used for several different functions and exhibit a wide range of settlement attributes. A summary of the settlement features of these sites is presented in Table 11.3.

The majority of the sites were identified as camps (Table 11.3). Campsites are described by Funk (1993:281) as general habitation sites that contain large quantities of refuse and numerous features (Table 11.1). Large (or long-term) camps often measure more than a half acre (2,016 sq. m) in size and are generally characterized by a wide range of activities. Small (or short-term) camps are much smaller and have less refuse and fewer features than large camps. These sites are occupied for a shorter period of time and can often be associated with a narrow range of activities, such as hunting or nut gathering.

Small camps dating to the late Middle and early Late Woodland Periods were identified at the Street, Fortin II, Ouleout, Hudson Lake, Sternberg, Muehl, Adequentaga, Subi-505, Subi-136, and Broe Pasture sites (Table 11.3). With the exception of the Subi-505, Subi-136, and Sternberg sites, all of these small camps measure less than 2,016 sq. m and fewer than three features were identified. Although these sites encompass a greater area, each are described here as small camps due to the limited range of activities and small number of features that have been identified.

There does not appear to be a significant change in the size of these small camps over time. Instead, the primary differences between these sites appear in the number and types of features. As shown in Table 11.3, all of the late Middle Woodland sites in the region

produced only a single feature. At four of these sites, this feature was a small hearth, while at the fifth, this feature consisted of a series of small post molds. In comparison, early Late Woodland camps often contained multiple features, such as hearths, living floors, activity areas, storage pits, and post molds. As discussed below, these differences suggest that the prehistoric occupants of the region were using these sites in different ways.

The location of sites across the landscape is also an important attribute of prehistoric settlement systems. Of particular importance is the location of the sites along the valley floor, valley walls, and in upland areas. According to Funk (1993a:65-68), valley floor sites can be found along major waterways in areas that are flat and have an elevation of less than 330 m (1,100 ft). Examples of valley floor sites discussed in this chapter include Fortin II, Street, and Sternberg. Valley wall sites can be found in areas with a more diverse topography and include sites located along the steeply rising slopes as well as sites located in the small stream valleys. Such sites are often found at elevations of 330-450 m (1,100-1,500 ft) (Funk 1993a:68). Examples of valley wall sites include Subi-505, Subi-136, and Otego Yard. Upland sites are found in areas with elevations ranging from 450-900 m (1,500 to 3,000 ft). Unlike the valley floor and valley wall sites, upland areas often display abrupt changes in elevation and topography caused by the alternation of erosion-resistant bedrock knolls and hills. Examples of upland sites include the Hilltop and Ouleout sites.

In the Oneonta-Worchester area, late Middle Woodland camps are most commonly located along the floodplains and terraces that align the valley floor and walls (Table 11.3). Although early Late Woodland camps continue to be located in these areas, sites in upland areas appear to have been more commonly occupied. As shown in Table 11.3, many of these upland sites are located along secondary waterways such as the Schenevus River and Ouleout Creek. The concentration of late Middle and early Late Woodland sites on the valley floor and valley walls near the junction of the Susquehanna and Schenevus Creeks is probably not accidental, but related to the use of the area as an important fishing and deer aggregation site (Funk 1993; Versaggi 1987).

Limited evidence of prehistoric architecture has been recovered from these small sites. A few post molds were reportedly identified at Subi-136. However, given the limited excavations at this site, the final dimensions of this Middle Woodland structure

**Table 11.3.** Settlement Features of Late Middle and Early Late Woodland Sites in the Oneonta-Worchester Region.

Site	Site Type	Location	Environment <sup>1</sup>	Drainage	Site Size (m <sup>2</sup> ) <sup>2</sup>	Features	Structure	Reference
<b>Late Middle Woodland Occupations</b>								
Fortin II	Small Camp	Floodplain	Valley Floor	Susquehanna	150	1	No	Funk 1998a:76
Adequantaga	Small Camp	Floodplain	Valley Floor	Susquehanna	---	1	No	Raemsch 1970
Sternberg	Small Camp	Terrace	Valley Floor	Susquehanna	3555	1	No	Funk 1998b
SUBI-136	Small Camp	Floodplain	Valley Wall	Susquehanna	8400	2	No	Wanser 1978
Street	Small Camp	Floodplain	Valley Floor	Susquehanna	5000	1	No	Wellman 1998; Funk 1993
SUBI-505	Small Camp	Floodplain	Valley Wall	Susquehanna	7500	1	No	Wanser 1978
<b>Early Late Woodland Occupations</b>								
Ouleout Site	Small Camp	Floodplain?	Upland	Ouleout	8.65	1,2,5	Yes	Hartgen Archaeological Associates, Inc., 1989
Street	Small Camp	Floodplain	Valley Floor	Susquehanna	5000	1	No	Funk 1993: Table 31c
Hudson Lake	Small Camp	Knoll	Upland	Schenevus	1500	4,5	No	Snehtkamp 1975, 1976
Fortin II	Small Camp	Floodplain	Valley Floor	Susquehanna	324	1,7	No	Funk 1998:78
Fortin I	Small Camp	Floodplain	Valley Floor	Susquehanna	---	2	No?	Funk 1998a
Hilltop	Industrial site	Knoll	Upland	Ouleout	---	---	Unknown	Ritchie 1938
Sternberg	Small Camp	Terrace	Valley Floor	Susquehanna	3556	1	No	Funk 1998b
Broe Pasture	Small Camp	Floodplain	Upland	Susquehanna/ Schenevus	42	7	No	Weide 1974
Muehl	Small Camp	Floodplain	Valley Floor	Susquehanna	2500	4	No	Weide 1975
Otego Yard	Large Camp	Alluvial fan/ Terrace	Valley Wall	Susquehanna	4000	1,2,36,8	No	Hartgen Archaeological Associates, Inc. 1989

Key: 1-Hearths, 2-Post molds, 3-Roasting Platform, 4-Small Pits, 5-Living Floor, 6-Large Pits, 7-Task or Activity Area, 8-Shallow Pit Hearths.

<sup>1</sup>Designation of sites as being located in valley floor, valley wall, and upland environments generally followed the definitions for such locations as outlined in Funk (1993a:68-71).

<sup>2</sup>Information for late Middle Woodland and early Late Woodland occupations is not available for all sites. Instead, total site size is provided when available.

could not be determined (Wanser 1978). Funk (1993:273, 1998a:60, Plate 27) indicates that a curved line of 10 post molds was also identified in Zone 2 of the Fortin I site. However, despite careful excavation of the area around these post molds, the remaining walls of the potential structure were not found.

A small lean-to or windbreak structure was identified at the Ouleout site. According to Hartgen Archaeological Associates, Inc. (1989:32-35), this structure consisted of 15 to 20 small and large post molds arranged in a semicircle that measured approximately 2-3 m wide. The prehistoric living floor that surrounded the structure was strewn with small lithic flakes, charred botanical remains, and pieces of calcined bone. A carbon sample taken from the living floor produced an uncalibrated date of A.D. 990±80 (cal 2  $\sigma$  A.D. 899 [1034] 1256). Located adjacent to the structure was a concentration of charcoal (which may represent the remains of a hearth feature) and two small pit features.

An important aspect of prehistoric settlement research involves determining the function and/or range of activities that were performed at these small camps. These are determined largely on the basis of the range of artifact classes, site size, and feature types. The recovery of numerous projectile points, utilized flakes, scrapers, and unifacially worked tools from the Ouleout and Broe Pasture sites suggest that the occupants of these sites were probably involved in hunting and hunting-associated tasks (Hartgen Archaeological Associates, Inc., 1989:49; Weide and Murray 1974). The presence of a diverse floral assemblage and large quantities of food processing tools (e.g., bifaces, nutting, netsinkers, and hammer-stones, etc.) indicates that the occupants of some sites (including Street, Fortin II, Subi-136, and Subi-505) were probably also engaged in tasks related to the procurement of wild plants and fishing.

The Otego Yard site is the only large or long-term camp included in this study (Table 11.3). This site, which is located on a small alluvial fan overlooking the northern bank of the Susquehanna River, produced early Late Woodland deposits in Locus 1 and 4 (Hartgen Archaeological Associates, Inc., 1988:117-120). Together, these two loci measured approximately 4,000 sq. m in size. An analysis of the artifacts from this site suggests that activities associated with hunting, plant gathering, and fishing, as well as other domestic activities (e.g., cooking, repair of tool kits, etc.), were being completed.

Small circular and roasting hearths were the most numerous early Late Woodland features identified at

the site (Hartgen Archaeological Associates, Inc., 1988:46-48). As exemplified by features 22C, 158, and 152, these small features ranged from 80-340 cm in length and often were characterized by a reddened and charcoal-stained soil. Variable quantities of fire-cracked rock, utilized and nonutilized flakes, calcined bone, charred botanical remains, and other cultural materials were recovered from these hearths.

In addition, large pit features were also identified at the Otego Yard site (Hartgen Archaeological Associates 1988:53). One of these, Feature 79A, measured 165 cm by 125 cm in diameter and contained a depth of 68 cm. Artifacts recovered from the feature included fire-cracked rock, debitage, a biface, and utilized flakes. Four Archaic projectile points were also recovered suggesting that the occupants of the site were either curating tools found on the site or earlier Archaic features were being reused by the site's Late Woodland occupants (Hartgen Archaeological Associates, Inc., 1988:53). Wood charcoal from the feature produced an uncalibrated radiocarbon date of A.D. 1140±80 (cal 2  $\sigma$  A.D. 1027 [1224,1231,1239] 1379) (Table 11.2).

A few scattered post molds were also identified during excavation, suggesting the presence of a small structure at the site (Hartgen Archaeological Associates, Inc., 1988:58). One of these features (Feature 55) measured approximately 17 cm in diameter and produced chert flakes, pieces of fire-cracked rock, and a broken biface. While none of these features have produced radiocarbon dates, the location of several of these post molds near hearth and pit features dating between A.D. 800 and 1400, may ultimately indicate their use during the early Late Prehistoric period.

The Hilltop site is the only industrial site identified in the study area (Table 11.3). According to Funk (1993), industrial sites are characterized by one or more industrial activities (e.g., flint-knapping, hide working, pottery manufacture, etc.) and are generally occupied for a very short period of time (Table 11.1). This site, which is located atop a steep hill overlooking a tributary of the Ouleout Creek, was initially identified as a workshop based on the predominance of lithic debris at the site (Ritchie 1938:1, 6). Northeast archaeologists have suggested that the recovery of ceramics and other "non-workshop related items" may indicate that the site was repeatedly occupied as a small camp during the early Late Woodland period (Funk 1993:282).

Unfortunately, we know very little about the internal structure of this site. Although large quantities of lithic debris are reported within an area measuring

approximately 1,000 sq. ft, there is no mention of features or well-defined activity areas (Ritchie 1938, 1944). Based on the limited excavations at the site, many archaeologists (Moorehead 1938) indicate that it was probably much larger than that reported by Ritchie (1938) and probably also contained many important settlement features.

Noticeably absent in the Oneonta-Worchester are the large semipermanent villages and horticultural hamlets that characterize early Late Woodland populations downstream (Prezzano 1993; Prezzano and Rieth 2001; Ritchie 1994). While several theories (e.g., previous destruction of sites, inability to find these sites, unsuitability of local landscape, etc.) have been offered to explain the absence of such sites, more recent explanations, such as the location of these sites in unconventional settings (Funk 1993:289), may provide important avenues for future research.

### Subsistence Remains

Reconstruction of prehistoric subsistence strategies is determined by the types of the floral and faunal remains that are recovered from individual contexts. While these remains are often retrieved using flotation, it is important to point out that flotation was not systematically employed in the upper Susquehanna Valley until the 1970s. Furthermore, when employed, there was a great deal of variation in the selection of features and the types of sites that were subjected to flotation (Weide 1975). Consequently, data from older sites such as Hilltop and Adequentaga are missing from the following discussion.

Twenty-one different plants were recovered from late Middle and early Late Woodland sites in the Oneonta-Worchester area. These plants are summarized in Table 11.4. Detailed paleoethnobotanical data for the Street, Fortin II, and Sternberg sites is provided in Table 11.5. With the exception of maize, all of the plants that were identified are noncultigens and can be found in floodplain and upland contexts along the Susquehanna River. Fourteen different seed-bearing plants are represented and indicate that these sites were probably occupied year-round. Spring and summer plants include grapes (*Vitus* sp.), sumac (*Rhus* sp.), knotweed (*Polygonum* sp.), wood sorrel (*Oxalis* sp.), wild cherry (*Prunus* sp.), raspberry (*Rubus* sp.), amaranth (*Amaranthus albus*), and possibly wild strawberry (*Fragaria* sp.). Fall-winter plants include chenopodium (*Chenopodium* sp.), elderberry (*Sambucus canadensis*), and hawthorn (*Crataegus* sp.). Sedge (*Cyperus* sp.), pulse (*Leguminosae* sp.), and

clover (*Trifolium* sp.) are found in fall and spring contexts and were not assigned to a particular season of use. While archaeologists often assume that most of these plants were collected as food items, it is important to note that several of these plants (sumac, chenopodium, pin cherry, raspberry, amaranth, elderberry) represent important medicinal plants among the Iroquois (Herrick and Snow 1995) and may have also been used in similar ways by Native populations.

Four different types of nuts were identified and probably point to the importance of the region as a “nut-gathering” area during the fall (Funk 1993). Included in these assemblages were butternuts (*Junglans cinerea*), walnuts (*Junglans nigra*), hickory nuts (*Carya* sp.), and hazelnuts (*Corylus* sp.). In addition to nuts, these hardwood trees may have also been an important source of firewood and construction materials for the early Late Prehistoric occupants of the Oneonta-Worchester region. Ethnographic descriptions of the Iroquois (Morgan 1962:367-368; Tooker 1991:23) further suggest that the bark of the butternut tree was regularly used in the construction of canoes, while “splints of hickory” were often used in the construction of bark trays.

One type of local grass (*Gramineae* sp.) was identified at the Ouleout site (Hartgen Archaeological Associates, Inc., 1989:34). Since this specimen could not be identified to a specific taxon it is currently impossible to determine during which season the plant was used. Although little information is available concerning how this plant was used, Herrick and Snow (1995:242-243) indicate that the roots of certain types of grasses were used in medicinal teas. Longer grasses may have also been used in the construction of mats, woven baskets, and as cordage. Although these perishable industries have not been recovered from sites in the Oneonta-Worchester area, examples of matting and cordage from early Late Prehistoric sites in the larger Susquehanna Valley exist (see Ritchie 1944:87-88; Whitney and Travers 1987:1-9).

The late Middle and early Late Woodland occupants of the Oneonta-Worchester area may have exploited the local landscape in different ways. Evidence of this is represented in the recovery of different plants from late Middle and early Late Woodland sites. As shown in Table 11.4, hickory, sedge, pulse, sumac, and grapes were only identified at late Middle Woodland sites. Goosefoot, hawthorn, spike rush, certain types of grasses, wood sorrel, cherry, clover, amaranth, elderberry, and maize were only identified at early Late Woodland sites. Plants appearing at both late Middle and early Late Woodland sites

**Table 11.4.** List of Wild and Domesticated Plants Identified at Late Middle and Early Late Woodland Sites.

Taxonomic Name	Common Name	Late Middle Woodland	Early Late Woodland	Sites
<b>Wild Plants and Nuts</b>				
<i>Carya sp.</i>	Hickory	x	---	2,7
<i>Corylus sp.</i>	Hazelnut	x	---	1,2,7,9
<i>Cyperus sp.</i>	Sedge	x	---	6
<i>Fabaceae</i>	Pulse Family	x	---	6
<i>Rhus sp.</i>	Sumac	x	---	6
<i>Vitis sp.</i>	Grape	x	---	1
<i>Junglans cinerea</i>	Butternut	x	x	1,2,3,4,5,8
<i>Junglans nigra</i>	Walnut	x	x	1,3
<i>Polygonum sp.</i>	Knotweed, Smartweed	x	x	3,6
<i>Rubus sp.</i>	Raspberry	x	x	1,3,5,6,9,8
<i>Amaranthus sp.</i>	Amaranth	---	x	8
<i>Chenopodium sp.</i> <sup>1</sup>	Goosefoot	---	x	2,3,8
<i>Sambucus canadensis</i>	Elderberry	---	x	8
<i>Crataegus sp.</i>	Hawthorn	---	x	3
<i>Eleocharis sp.</i>	Spike rush	---	x	3
<i>Gramineae sp.</i>	Grass Family	---	x	3,9
<i>Oxalis sp.</i>	Wood Sorrel	---	x	9
<i>Prunus sp.</i>	Cherry	---	x	3
<i>Prunus pensylvanica</i>	Pin cherry	---	x	8
<i>Trifolium sp.</i>	Clover	---	x	3
<b>Domesticated Plants</b>				
<i>Zea mays</i>	Maize	---	x	5

<sup>1</sup>Floral remains have not been analyzed to determine if they represent domesticated or wild specimens. In the absence of such information, it is assumed that they are wild.

Key:

- 1-Fortin II, late Middle Woodland component (Funk 1998a).
- 2-Street, late Middle Woodland component (Starna and Gutierrez 1980; Wellman 1998).
- 3-Ouleout Creek (Hartgen Archaeological Associates, Inc., 1989).
- 4-Street, early Late Woodland component (Starna and Gutierrez 1980; Wellman 1998).
- 5-Fortin II, early Late Woodland component (Funk 1998a).
- 6-SUBi-505, Middle Woodland occupation (Wanser 1977).
- 7-Sternberg, Middle Woodland component (Funk 1993, 1998b).
- 8-Otego Yard, Late Woodland component (Hartgen Archaeological Associates, Inc., 1988).
- 9-Hudson Lake, Late Woodland component (Weide 1975; Snethkamp 1976).

include butternut, hazelnut, walnut, knotweed or smartweed, and raspberries. While this disparity was initially thought to represent different seasons of exploitation, plants associated with spring-summer and fall-winter occupations are present in both the late Middle and early Late Woodland assemblages. In the future, additional work is needed to determine whether these patterns are real or if they represent a sampling bias.

The early Late Woodland period is largely defined by the use and gradual intensification of maize horticulture. Maize has been recovered from the western and central portions of the Susquehanna Valley as early

as the eighth century A.D. (Hart and Sidell 1996) and from the upper Susquehanna Valley during the eleventh century A.D. (Prezzano 1993; Prezzano and Rieth 2001; Ritchie 1994; Wurst and Versaggi 1993). Despite this, little direct evidence of maize horticulture has been identified in the Oneonta-Worchester area. Currently, only the Fortin II site has produced charred corn kernels. According to Funk (1993b, 1998a:78), two charred corn kernels were recovered from features in Occupation Zone 4. These corn kernels appear to have been found in association with cordmarked pottery (Funk 1998a) and probably date to the occupation of the site during the twelfth century A.D.

**Table 11.5.** Summary of Seed Identifications from Sites in the Oneonta-Worchester Region.<sup>1</sup>

Site	Occupation	Identification	Type of Remains		No. Carbonized	No. Uncarbonized
Street <sup>2</sup>	Late Middle Woodland (Locus 1, Zone B)	<i>Polygonum</i> sp. (Knotweed)	Seed (fragment)	1	---	---
		<i>Scirpus</i> sp. (Bulrush)	Unidentified	---	---	6
		<i>Junglans</i> sp. (Butternut or Walnut)	Nut (fragment)	1	---	---
		<i>Junglans cinera</i> (Butternut)	Nut (fragment)	13	---	---
			Shell (fragment)	1	---	---
		<i>Carya</i> sp. or <i>Junglans cinera</i> (Hickory or Butternut)	Nut (fragment)	1	---	---
		<i>Corylus</i> sp. (Hazelnut)	Nut (fragment)	1	---	---
		Unidentified	Seed (whole)	1	---	---
			Seed (fragment)	1	---	---
Fortin II <sup>3</sup>	Early Late Woodland (Locus 2, Zone B)	<i>Chenopodium</i> sp. (Goosefoot)	Seed (whole)	3	---	---
		<i>Rubus</i> sp. (Raspberry)	Seed (whole)	---	---	3
		<i>Junglans cinera</i> (Butternut)	Nut (fragment)	2	---	---
		<i>Junglans</i> sp. or <i>Carya</i> sp. (Butternut or Hickory)	Shell (fragment)	1	---	---
		<i>Junglans cinera</i> (Butternut)	Nut (fragment)	24	---	---
		<i>Junglans cinera</i> or <i>Junglans nigra</i> (Butternut or Black Walnut)	Nut (fragment)	6	---	---
		<i>Junglans</i> sp. (Butternut or Walnut)	Nut (fragment)	4	---	---
		<i>Corylus</i> sp. (Hazelnut)	Nut (fragment)	5?	---	---
		<i>Vitis</i> sp. (Grape)	Seed (fragment)	1	---	---
		<i>Rubus</i> sp. (Raspberry or Blackberry)	Seed (fragment)	2	---	---
Early Late Woodland (Occupation 4)		<i>Zea mays</i> (Maize)	Kernels (whole)	2	---	---
		<i>Junglans cinera</i> (Butternut)	Nut (fragment)	3	---	---
		<i>Junglans cinera</i> or <i>Junglans nigra</i> (Butternut or Black Walnut)	Nut (fragments)	3	---	---
		<i>Rubus</i> sp. (Raspberry or Blackberry)	Seed (whole)	1	---	---
Sternberg <sup>4</sup>	Late Middle Woodland	<i>Carya</i> sp. (Hickory)	Nut (fragment)	2	---	---
		<i>Corylus</i> sp. (Hazelnut)	Nut (fragment)	2	---	---

<sup>1</sup>Uncarbonized seeds are not included in Table 11.4.

<sup>2</sup>Information based on floral report prepared by Moeller (n.d.), South (1976 as cited in Wellman 1998:Table 71), and Wellman (1998:136).

<sup>3</sup>Information derived from Funk (1998a:75-78) and field notes at the New York State Museum.

<sup>4</sup>Information derived from Funk (1998b) and field notes at the New York State Museum.

**Table 11.6.** List of Mammals Recovered from Late Middle and Early Late Woodland Sites.

Taxonomic Name	Common Name	Sites
<i>Marmota monax</i>	Woodchuck	2
<i>Odocoileus virginianus</i>	White-tailed deer	1,2
<i>Procyon lotor</i>	Raccoon	2
<i>Sciurus spp.</i>	Squirrel	2
<i>Sylvilagus sp.</i>	Rabbit	2
<i>Ursus americanus</i>	Black Bear	1
Land Snail	---	2
Unidentified Bird	---	1,2
Unidentified Bone	---	3,4,5
Unidentified Fish	---	5

Key:

1-Fortin II, Middle Woodland component (Funk 1998a).

2-Street, Middle and early Late Woodland components (Moeller n.d.; Starna and Gutierrez 1980; Wellman 1998).

3-Fortin II, early Late Woodland component (Funk 1993, 1998a).

4-Sternberg, Middle Woodland component (Funk 1993, 1998b).

5-Otego Yard, Late Woodland component (Hartgen Archaeological Associates, Inc., 1988).

Charred chenopodium seeds were recovered from the Ouleout, Street, and Otego Yard sites (Hartgen Archaeological Associates, Inc., 1989:34, 1998:109; Wellman 1998). Although archaeologists currently believe that chenopodium was domesticated in the American Midcontinent by 3000 B.P. (George and Dewar 1999:133), there is currently no evidence to suggest that chenopodium was a prehistoric cultigen in the Upper Susquehanna Valley. Rather, these plants probably represent wild specimens that were collected by local populations during the late fall and/or early winter months. Despite their presence elsewhere in the Susquehanna Valley, other crops (such as squash and beans) are also absent in the floral assemblages of the sites in the Oneonta-Worchester area. While we cannot say for sure why squash does not appear in the floral assemblages of these sites, the absence of beans is probably related to its late appearance in the Susquehanna Valley (see Hart and Scarry 1999).

The acidic soils of the region have severely limited the amount of animal bone and shell preserved at these sites (Table 11.6). As a result, only general statements about the types of animals that were hunted can be made at this time. Among the identifiable specimens recovered from these sites were woodchuck (*Marmota monax*), white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), squirrel (*Sciurus spp.*), rabbit (*Sylvilagus sp.*), and black bear (*Ursus americanus*). Although many of these animals would have been available year-round, Funk (1993) and Versaggi (1987) suggest that the local exploitation of white-tailed deer probably occurred during the fall,

since the junction of the Schenevus and Susquehanna Rivers would have been a prime aggregation site.

Calcined bone from one or more avian specimens was recovered from the late Middle Woodland component at the Fortin II site and the late Middle and early Late Woodland components at the Street site. However, due to their small size and poor preservation, identification of these remains to species could not be made (Funk 1993; Funk 1998a:76). It seems likely that their absence is a result of the region's acidic soils and not a lack of exploitation, since the local environment around Worchester would have supported many aquatic and avian species.

### Artifacts

Artifacts from late Middle and early Late Woodland sites also provide us with information about prehistoric settlement and subsistence patterns. Chipped- and ground-stone tools comprise the majority of the artifacts recovered from these small sites. Overall, the tool kits indicate that tasks associated with hunting and hide processing were occurring at several of these sites. Tool kits composed of Jack's Reef and Levanna projectile points, small end- and side-scrapers, knives, and other chipped-stone tools were recovered from the Ouleout (Hartgen Archaeological Associates, Inc, 1989:33), Hudson Lake (Snethkamp 1976), Fortin II (Funk 1998a), SUBi-136 (Wanser 1978:64-65), Sternberg (1998b), Adequentaga (Raemsch 1970:10), and Broe Pasture sites (Weide and Murray 1974), and point to the

importance of hunting and hunting-related tasks at these sites. Household or “in-camp” activities, such as the manufacture of tools and the processing of food remains, are also reflected in the presence of pitted and hammer stones at several sites (Funk 1998a:72-77, 1998b:384; Hartgen Archaeological Associates, Inc., 1989:33, 1998:115; Starna and Gutierrez 1980:5; Wellman 1998:132). Despite the absence of aquatic specimens in the faunal assemblage, the recovery of netsinkers from the Fortin II site (Funk 1998a:72, 77), Hudson Lake (Snethkamp 1976), and Otego Yard site (Hartgen Archaeological Associates 1988) suggests that fishing was not restricted to the valley floor but also occurred in upland areas.

Chipped-stone tools and debitage comprise the largest number of artifacts recovered from these small sites. The chipped-stone tools recovered from these sites include but are not limited to bifaces; knives; end-, side-, and thumbnail scrapers; drills; Levanna, Jack’s Reef Corner Notched, and Pentagonal Projectile points; strike-a-lights; and unifaces (Funk 1998a, 1998b; Hartgen Archaeological Associates, Inc., 1988, 1989; Raemsch 1970; Ritchie 1938; Snethkamp 1976; Wanser 1978; Weide 1974; Wellman 1998). With the exception of the Middle Woodland component at the Fortin II site, worked and unworked cores were not recovered in large numbers. At Occupation Zone 3 of the Fortin II site, 16 cores and 38 core fragments were recovered (Funk 1998a:74).

While several different flake classes are represented in the assemblages of these early Late Prehistoric sites, secondary and retouch flakes, which are associated with late-stage tool manufacture and are characterized by their small size and lack of cortical material, predominate the artifact assemblages at the Fortin II (Funk 1998a:74-77), SUBi-505 (Wanser 1978), Ouleout (Hartgen Archaeological Associates, Inc., 1989:33), Sternberg (Funk 1998b:384-385), and Otego Yard sites (Hartgen Archaeological Associates 1988). When combined with the limited number of cores recovered from these sites, it appears that the production of new tools was not a primary activity at these sites. Instead, the predominance of secondary and retouch flakes suggests that the occupants of these sites were engaged in tasks associated with the sharpening and the curation of existing tools.

Many archaeologists believe that with the advent of a sedentary village lifestyle, lithic technologies changed from a bifacial to a bipolar technology, resulting in the use of more expedient tool kits (Parry and Kelly 1987) that were used by both men and women (see Miroff, this volume; Versaggi 1996, as

cited in Oskam 1999:28). In her study of the Hudson Lake site, Montag (1998) compared the lithics recovered from this small upland site with those recovered from the Boland site, an early Late Prehistoric village site located near Binghamton. The results of her study suggest that the occupants of this small site employed a bifacial technology, which emphasized the production of formal tools that served the specific needs of their users over a bipolar technology that merely created tools with a usable edge. While detailed studies of the ratio of bifacial to bipolar tools at all of these sites has not been completed, the limited number of utilized flakes and expedient tools recovered from the Street, Ouleout, and Sternberg sites (Funk 1998b; Hartgen Archaeological Associates, Inc., 1989; Wellman 1998) suggests that the patterns observed at the Hudson Lake site may not represent an isolated case, but may represent more widespread patterns during the early Late Prehistoric period.

Local and nonlocal materials are represented in the lithic assemblages from these sites. The majority of the lithics were manufactured from Eastern Onondaga chert, which is known to outcrop in the Oneonta-Worchester vicinity (Funk 1998a:72, 1998b:382; Weide 1975; Wellman 1998:133). Nonlocal materials, including western Onondaga (Funk 1998a:72, 1998b:382), Esopus (Funk 1998b:384-385), and Knauderack (Funk 1998b:384-385) chert, Pennsylvania jasper (Wellman 1998:133), and (possibly) Flint Ridge chalcedony (Funk 1998b:384-385), were also present, and represent a small portion of the chipped-stone tools and debitage from these sites. Of the total number of nonlocally produced artifacts described in the archaeological literature, 85.7 percent were from late Middle Woodland occupations, while 14.3 percent were from early Late Woodland occupations. These data suggest that interaction with groups in other regions may have been most prevalent at the beginning of the early Late Prehistoric period.

A detailed analysis of the ceramics from these sites also provides insights into subsistence and settlement practices. According to Braun (1983), as prehistoric communities intensified their use of indigenous crops, the construction of ceramic vessels changed to support the extended cooking time of such plants. According to Prezzano (1985:iv), when compared with Middle Woodland vessels, we should expect Late Woodland vessels to show paste and morphological characteristics associated with greater thermal shock-resistance, rather than mechanical strength. Specific changes in the construction of these containers should include a reduction in vessel wall thick-

**Table 11.7.** Summary of Ceramic Attributes from Late Middle Woodland and Early Late Woodland Vessels.

Site	Occupation	Wall Thickness (Mean)	Wall Thickness (Range)	Standard Deviation	Primary Temper	Average Temper Size
Fortin II	Late Middle Woodland	11.04 mm	8.31-14 mm	1.83	Grit	0-1 mm
Street	Late Middle Woodland	11.75 mm	10-13 mm	1.17	Grit	0-1 mm
Ouleout Site <sup>1</sup>	Early Late Woodland	7.5 mm	6.2-8.5 mm	1.14	Grit	1-2 mm
Street	Early Late Woodland	8.98 mm	6.19-11 mm	1.42	Grit	1-3 mm
Fortin II	Early Late Woodland	9 mm	8-14 mm	2.11	Grit	1-3 mm
Hilltop	Early Late Woodland	8.66 mm	6-10 mm	1.17	Grit	1-2 mm

<sup>1</sup>Low vessel wall thickness probably related to small sample size.

ness, an increase the temper size and density, as well as a gradual shift toward materials with a low thermal expansion.

An analysis of the late Middle and early Late Woodland ceramics from the Street, Fortin II, Hilltop, and Ouleout sites shows a decrease in the vessel wall thickness of these containers, from 11.75 mm to 7.5 mm during the late Middle and early Late Woodland Periods (Table 11.7). The reduction in vessel wall thickness directly affects thermal shock, since vessels with thinner walls are less likely to crack when subjected to longer cooking times (Braun 1983). Changes in temper size and density were also noted and further support the idea that Late Woodland populations were producing containers that withstood the long cooking time needed to transform maize from an inedible to an edible food item.

## DISCUSSION

The results of this study suggest that the late Middle and early Late Woodland inhabitants of the Oneonta-Worchester area occupied many small camps, large camps, and industrial sites. The large number of small camps suggests that the region probably functioned as an important resource procurement area. According to Knoerl (1978:114), the diverse microenvironment that surrounded the Oneonta-Worchester area (e.g., shoreline, swamp, bog, floodplain, dry knoll) would have provided the prehistoric occupants opportunities to exploit a vast array of plant and animal species.

Although the sites in this study do not contain the impressive features that are found on larger sites downstream, they (and the activities that occurred on them) were equally important to the overall settle-

ment and subsistence system. During this time, maize probably represented a small part of the prehistoric diet and was probably grown in small garden plots (Dincauze 1990:30, as cited in Chilton 1999; Prezzano 1996). Consequently, food items collected during seasonal foraging and hunting expeditions were needed to satisfy the dietary needs of the group. Although Funk and RippetEAU (1977:39) argue that early Late Woodland groups probably completed foraging and hunting activities during the spring and summer months, the floral assemblages from these sites indicate that the region's resources were exploited year-round.

There is some evidence to suggest that more extensive occupations, such as those identified at the Otego Yard site (as well as the Otsdawa site [Funk 1993]), were also present in the region during the early Late Prehistoric period. From the limited excavations at the Otego Yard site, this site probably did not possess many of the typical characteristics (Ritchie 1994) that we normally equate with early Late Woodland sites dating to the eleventh century. Rather, the site probably resembled smaller settlements, such as White (Ritchie 1994) and Port Dickenson (Beauregard 1986; Beauregard et al. 1993), which were occupied by small kin-related groups whose primary economic pursuits were based on hunting and gathering and not maize horticulture.

Although Chilton (1999) cautions us that the quantity of maize at a site cannot be interpreted as a direct reflection of the importance of this particular plant in a community, we are still left with the puzzling question of why maize repeatedly appears in larger camp and village sites downstream but rarely occurs on sites in the Oneonta-Worchester area. I propose that this question may be explained by one of two competing hypotheses. First, it seems possible that in this

portion of the Susquehanna Valley, maize was not important due to the diverse array of aquatic and avian specimens that were available from local lakes and streams. Instead, when maize was grown, it may have been grown simply as a dietary supplement and not as an economic staple.

Second, if the Oneonta-Worchester area continued to be occupied as a resource procurement area throughout the early Late Woodland period, it seems reasonable to expect that corn may have been grown elsewhere and carried to the area for consumption at a later time (Chilton 1999). This theory would certainly account for the apparent absence of such remains on early Late Woodland sites and would be consistent with changes in ceramic technology that were occurring during this time period. Although a study of the trace element composition of the early Late Woodland vessels from the Fortin II, Street, and Ouleout sites does not suggest that ceramic containers were regularly moving across the Susquehanna Valley (Rieth 1997), it is plausible that some other woven or perishable container could have been used to transport maize into the Oneonta-Worchester area.

An important aspect of this research relates to the timing and the duration of use of the Oneonta-Worchester area during the late Middle and early Late Woodland periods. As discussed at the beginning of this chapter, archaeologists (Snethkamp 1975; Versaggi 1987) often suggest that the Oneonta-Worchester area was virtually abandoned as a result of the coalescence of prehistoric populations into larger multifamily units during the late Middle and early Late Woodland periods. In fact, the results of this project indicate just the opposite. Assuming that the calibrated radiocarbon dates for these sites are accurate, we can conclude that the region remained an important hunting and gathering area long after the initial introduction of maize into the valley during the tenth century A.D. The fact that four of the seven (57 percent) dated components produced calibrated radiocarbon dates between A.D. 1000 and 1300, may further suggest that these groups not only continued to use the region as a resource procurement area, but may have intensified their use of the area following the initial introduction of this cultigen.

Between A.D. 700 and 1300, archaeological evidence suggests that the prehistoric occupation of the Oneonta-Worchester area remained relatively unchanged despite events occurring in other parts of the Upper Susquehanna Valley. During this time period, the region continued to be occupied as a small resource procurement area with the location of camps

initially confined to the floodplains of the Susquehanna River. Valley floors, valley walls, and upland areas were incorporated into the seasonal settlement round during the early Late Woodland period, allowing the region's occupants the opportunity to exploit a diverse array of plants and animals. Despite a shift in the location of these sites, the size of these camps remained fairly constant suggesting that the composition and organization of hunting and resource procurement groups was not altered during this period.

## CONCLUSION

In order to adequately understand the complex settlement and subsistence patterns of these prehistoric populations, we must assess the role of both large and small sites within the larger system. This chapter examines a group of short-term occupations located at the northern end of the Susquehanna Valley near the confluence of the Susquehanna River with the Ouleout and Schenevus Creeks. Despite their small size, these sites have provided important information about the seasonal occupation of the region, the range of settlement activities, and the types of resources that were exploited by these prehistoric populations during the early Late Prehistoric period.

Analysis of these small sites is important in understanding early Late Prehistoric settlement and subsistence patterns in the Southern Tier of New York. In the Oneonta-Worchester region, analysis of the settlement features of these sites suggests variation in the size, spatial arrangement, and organization of small and large camps. The artifacts from these sites suggest that tasks associated with hunting, fishing, and gathering were important tasks completed at the sites. Analysis of the floral and faunal remains from these sites suggests that the Oneonta-Worchester area, although primarily occupied by short-term occupations, was probably utilized as a resource procurement area for much of the year.

Archaeologists often consider the Oneonta-Worchester area to have been abandoned during the early Late Prehistoric period. Although the region was not occupied as extensively as other parts of the Susquehanna Valley, radiocarbon dates from these sites suggest that the region remained an important resource procurement area throughout the fourteenth century. Continued documentation of these small sites in the future will not only contribute to our understanding of the occupation of the Oneonta-

Worcester region, but will also contribute to our understanding of the diverse subsistence and settlement patterns practiced by the Native populations of the Northeast.

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## CHAPTER 12

# WOODLAND PERIOD SETTLEMENT AND SUBSISTENCE CHANGE IN THE UPPER HUDSON RIVER VALLEY

Hetty Jo Brumbach and Susan Bender

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### INTRODUCTION

In September 1609, when Henry Hudson made his historic voyage up the “North,” or Hudson River, the people living at the head of navigation near present-day Albany were those we later came to know as the Mohican. Hudson and his party obtained food from the residents, which they noted to include maize, beans, pumpkins, and fish. These observations constitute our first records of Mohican subsistence and settlement patterns. The remainder of this chapter expands this vision by synthesizing currently available ethnohistoric, archaeological, and ecological information to suggest that at some point in the Middle to Late Woodland transition, the aboriginal inhabitants of the upper Hudson Valley (the Mohican) refocused the centerpiece of their mixed economy from fishing to maize (*Zea mays*) cultivation with subsequent consequences of settlement location—if not type.

### ETHNOHISTORIC ACCOUNTS OF MOHICAN GARDENING

In the early seventeenth century, the Algonquian-speaking Mohican occupied lands on both sides of the Hudson River from northern Dutchess County on the south to Lake Champlain on the north (Figure 12.1, after Dunn 1994; Brassler 1978). The western boundary included the drainages of the Catskill and Kaaterskill Creeks, occupied by the Catskill, who Dunn (1994:54-55) identifies as a band of the Mohican. North of the Catskill Mountains, the boundary somewhat approximates the western margin of Albany County. Continuing north, the boundary ran several miles west of the city of Schenectady, crossed the Mohawk River near present-day Hoffman’s Ferry, and continued into

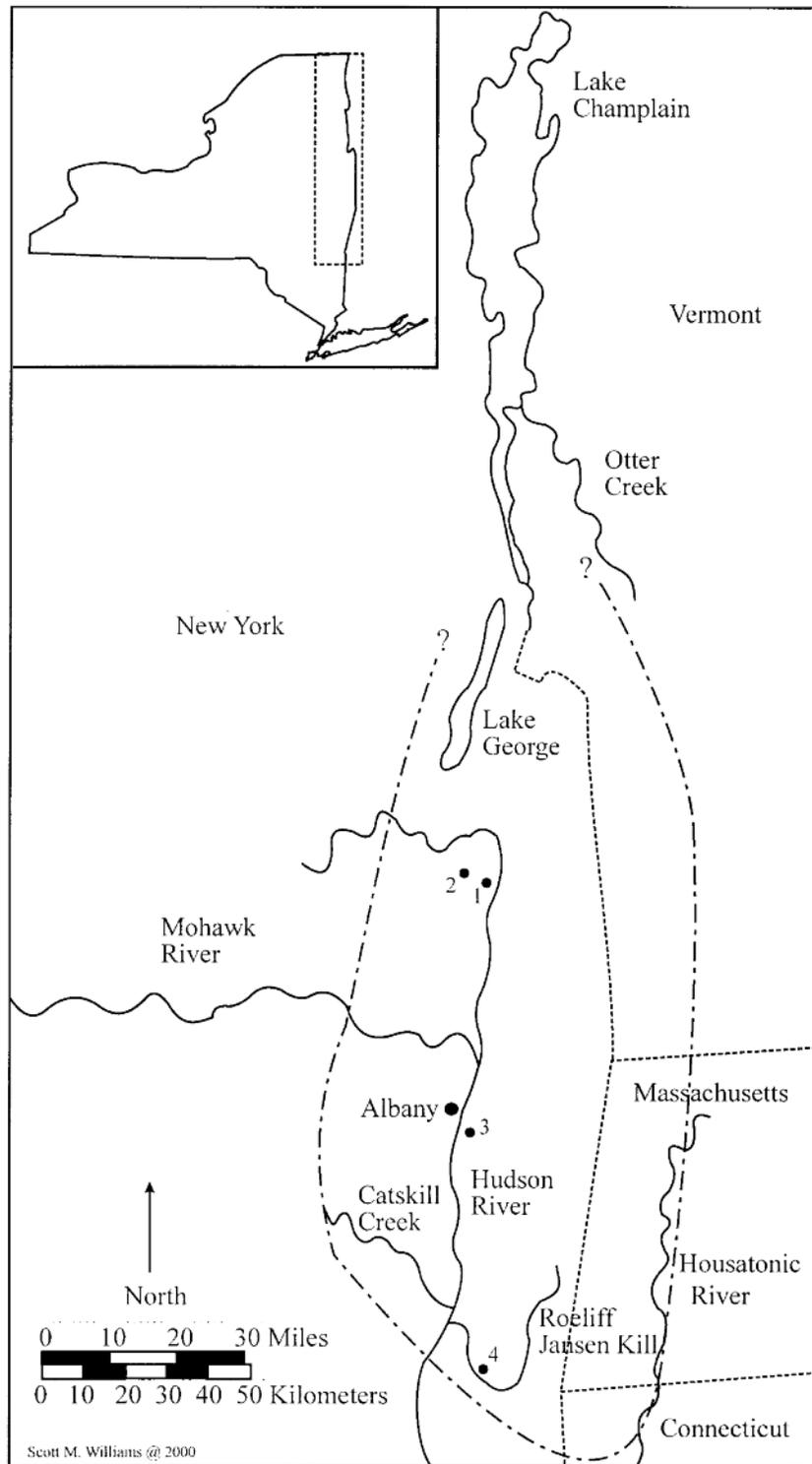
Saratoga County, including all of Saratoga Lake. North of this point, the location of the pre-Contact boundary, having been highly contested by the Mohawk, is unclear, but probably included the western limits of Lake Champlain (Dunn 1994:57-58). The eastern boundary included lands in western Vermont south of Otter Creek and along the eastern shore of Lake Champlain (Brasser 1978:198; Dunn 1994:59). Dunn (1994:60-62) continues the eastern boundary to encompass the drainage of the Housatonic River of western Massachusetts and northwestern Connecticut, thus including the Housatonic River Indians as Mohican. In contrast, Brassler (1978:198) regards the Housatonic as originally a different tribe, which allied itself with the Mohican confederacy in the early post-Contact period.

Starting in 1630, the Mohican and the Dutch settlers entered into a series of agreements in which Mohican land was deeded over to Dutch ownership (Dunn 1994). By the end of the 1600s, the Mohican had signed 85 land transactions and more were signed in the eighteenth century. Dunn’s (1994) study of these documents provides a detailed and illuminating picture of Mohican land use, geography, and settlement in the early years following European contact.

Similar to land tenure arrangements in southern New England (Cronon 1983), the Mohican lineages (the landholding units) focused on arable lands. Study of the land transactions reveals that the Mohican had an abundance of cleared garden lands, much of them on the extensive islands and floodplains of the Hudson and its tributaries and along lakes (Dunn 1994:225-226). The first recorded transaction, dated August 13, 1630, transferred land on the west side of the Hudson River from below the mouth of the Normanskill to south of Cohoes, including Castle Island, now the location of the present Port of Albany, and additional lands on the east shore of the Hudson. No inland

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**Figure 12.1.** Distribution of Mohican lands in the upper Hudson River drainage in the 1630s (after Dunn 1994) showing sites discussed in text: (1) Schuylerville, (2) Winney's Rift, (3) Goldkrest, (4) 211-1-1.

boundaries were given. According to Brassler (1978:200), the off-river boundaries of these lineage tracts were vague, since “. . . no one would consider laying out a garden in the rocky hinterlands, and there exist no indications of separate ownership of hunting territories.” In the following year, 1631, additional lands along the Hudson from “. . . below Beeren Island north to Smack’s Island, later called Shad Island . . .” were transferred. The western boundary was described only as a “two-day’s journey inland” (Dunn 1994:279).

In 1634, the Dutch estimated that, despite the land transfers, the Mohican still retained over 2,400 acres of cleared land along both sides of the Hudson River in Albany and Rensselaer Counties, including islands and flats in the river (Dunn 1994: 225-226). The Mohican also had additional cleared lands along the Hudson north of Cohoes, and along major tributaries of the Hudson, including the lower Mohawk, Catskill, and Hoosic, among others. The amount of land cleared for gardens can be compared to the Iroquoian Huron of Ontario, who Heidenreich (1971:163,195-200) estimated planted about one acre per person, and obtained about two-thirds of their sustenance from maize and an additional 15 percent from beans and squash. Comparable data concerning amount of land planted each year, crop yield, etc., are not available for the Mohican. However, since the Huron maintained large permanent villages with significant accommodation for food storage, we can conclude that they relied more extensively on horticulture than did the Mohican, who had access to a variety of fish and other riverine resources. Like the Mohican, the Huron also relied heavily on fish, focusing on the freshwater species of Georgian Bay and Lake Simcoe (Trigger 1969:30). Hunting was of less importance than either gardening or fishing for the Huron (Trigger 1969:31) and the same might have been true for the Mohican, but additional data are needed to come to any reasonable conclusion.

Population size for the Mohican at Contact is reported at 5,300 by Snow (1980:33), but this may not include the Housatonic or the Catskill. Based on Dutch records, Brassler (1978:200) estimates 4,000 to 4,500, while Dunn (1994:257-259), also based on Dutch records, estimates 8,000 for all the Mohican. In order for the Mohican to have obtained two-thirds of their sustenance from maize (assuming similar crop yields), they would have had to have planted between 4,000 and 8,000 acres annually, an amount that may be too high.

How much of the cleared lineage land was in use

during any one year is unknown. Maize, unlike some of the domesticates native to the Eastern Woodlands (chenopodium, etc.), is a heavy feeder on soils. Continued cropping of maize in one location can result in greatly diminished yields, as well as insect infestations. The Mohican were reported to practice land rotation, allowing cleared lands to lie fallow or return to secondary-growth forest for periods of time, thus making it unlikely that all garden lands were planted at one time. Dunn (1994:225) reports that the Mohican kept the maize plantations open by annual burning, a practice followed by other Northeastern Native peoples.

Seventeenth century documents provide other interesting observations on socio-spatial behavior: The Mohican were said to have three villages, all located close to the Hudson but above the floodplains; the men spent the summer fishing, worked at the fish weirs, and collected freshwater mussels, while the women planted maize or gathered wild plants; a Green Corn Ceremony was held in late August; families dispersed for hunting in the fall; and in mid-winter, people returned to the villages, “. . . perhaps to attend a Bear Sacrifice ritual” (Brassler 1978:199).

While the Mohican had many acres of cleared garden lands along the rivers, neither the ethnohistoric nor the archaeological record yield data that suggest that they maintained year-round settlements in close proximity to gardens located on floodplains. The reason for this may be periodic flooding. The Hudson River is prone to late winter-early spring flooding even today, and in the past, before the construction of Sacandaga Lake as an upriver catch-basin, flooding along the Hudson was more extensive. Even today, many of the river’s tributaries are prone to flooding from seasonal runoff or heavy rains, while late winter-early spring ice jams cause flooding along the Hudson and Mohawk Rivers. In the past, this seasonal flooding must have made the land more desirable for gardening, since it helped renew the soil, and because the lands were above the salt-wedge of the Hudson (which could extend as north as Poughkeepsie), flooding would not contaminate the soil with salt as it might in its downriver stretches. Thus, all currently available data argue against year-round occupation of the floodplain by the Mohican. But, it is equally unlikely that the Upper Hudson’s Native residents resided at great distances from their gardens, since maize requires a great deal of care during the growing season, as well as protection from predators. Because maize is extremely attractive to deer, raccoon, and other animals, it cannot be planted and left on its own until harvest, unlike

many of the native Eastern domesticates. Undoubtedly, seasonal residences were established in proximity to the gardens, while cold weather residences were on higher elevations protected from floods.

### ARCHAEOLOGY OF UPPER HUDSON VALLEY GARDENING AND FISHING, A.D. 700-1500

Although the ethnohistoric records support a focus on maize horticulture during the Late Woodland period (after A.D. 1000) (Funk 1976:306), the archaeological evidence is strikingly absent. Few sites have produced remains of maize, and those that have, have produced only sparse fragments. Further, there is no clear archaeological imprint of the sedentary villages ordinarily associated with a subsistence system based on horticulture similar to those of the Huron or Five Nation Iroquois, despite the ethnohistoric references to the villages cited above.

One of the few maize-producing sites attributable to the Mohican, or their ancestors, is the Goldkrest site, located on Kuyper Island, Rensselaer County, on the east side of the Hudson River across from the city of Albany. The site was discovered in 1993 during investigation for a natural gas transmission pipeline corridor (Largy et al. 1999:69). Goldkrest produced fragments of maize, maize cobs, and other botanical remains from several features, as well as the remains of a pole-frame structure. The maize remains and the structure were dated to  $340 \pm 50$  B.P. (cal 2 $\sigma$  A.D. 1442 [1519, 1594, 1622] 1656). Additional food remains included fish, freshwater shellfish, and mammals available within the floodplain (Largy et al. 1999:78). The excavators interpret the site as the remains of an unfortified seasonal summer-fall hamlet of the Late pre-Contact period. The recovery of cobs suggests the gardens were nearby (Largy et al. 1999:78).

A second site (no. 211-1-1), located on the floodplain of the Roeliff Jansen Kill in the southeast corner of historic Mohican territory, also produced carbonized maize remains from dated contexts (Cassedy and Webb 1999). Two prehistoric features containing maize were radiocarbon-dated to  $1100 \pm 70$  B.P. (cal 2 $\sigma$  A.D. 776 [904, 910, 976] 1145) and  $1050 \pm 60$  B.P. (cal 2 $\sigma$  A.D. 887 [997] 1155), while a third context was found to date to the Contact period (Cassedy and Webb 1999:87). The second date was confirmed with a direct AMS date on maize remains, while maize from the

first feature was direct-dated to  $390 \pm 50$  B.P. (cal 2 $\sigma$  A.D. 1428 [1476] 1640) (Cassedy and Webb 1999:87, 89). Again, the recovery of cobs and cob fragments suggests that maize was grown nearby. No squash remains and only a few questionable bean (*Phaseolus vulgaris*) fragments were found (Cassedy and Webb 1999:95). These early dates fit in with dates obtained elsewhere in the Northeast, suggesting that maize became increasingly prominent in the diet after A.D. 800 (Hart and Sidell 1996:1). Princess Point sites in Ontario have produced maize AMS dated as early as A.D. 540 and 570 (Crawford and Smith 1996:785), and Clemson Island sites in Pennsylvania have also produced dates associated with maize in the range of A.D. 800 (Hart and Sidell 1996:7, 15).

Based on these and other data, it would appear that by the end of the time period under review—A.D. 700-1300—the residents of the upper Hudson Valley, believed to be the ancestors of the historic Mohican, were living in small settlements, hamlets, villages, or clusters along the major rivers in the middle and upper parts of the valley. Habitations were probably not year-round but consisted of both a warm weather occupation near the garden lands, and a fall-spring occupation at a higher elevation along the Hudson or its major tributaries. Although the Dutch referred to the early seventeenth century settlements as “castles,” there is no evidence of large fortified sites comparable to those described for the Iroquois. Subsistence is thought to have been based on domesticated maize, beans (but see Hart and Scarry 1999; Hart et al. 2002), and squash, as well as a variety of native plants, fish, shellfish, bird, and mammal species. The proportion of maize and other domesticated plants in the diet is unknown, although testing of ceramic residues or skeletal remains might help resolve this question.

Settlement and subsistence at the beginning of the time period under review, A.D. 700, was somewhat different in that there is little evidence to support a role for domesticated plants in the diet. Prior to the emphasis on gardening, settlement and subsistence appears to have been focused on the harvesting of fish, primarily the Hudson’s anadromous species, which provided a reliable, seasonally and spatially predictable, and often abundant food supply. Examination of this resource, and the role it played in Hudson Valley subsistence and settlement systems, will help us understand the cultural context into which domesticates were later introduced.

Two multicomponent sites on Fish Creek in Saratoga County have produced data relevant to this

**Table 12.1:** Selected Radiocarbon and TL Dates from Sites Discussed in the Text.

Site	Lab Number	Radiocarbon/ TL Age (B.P.)	Radiocarbon/ TL Age	Calibrated 2 $\sigma$ Range (intercepts <sup>1</sup> )	Reference
Schuylerville	SI-3127	2200±160	250 B.C.	763 B.C. (349, 318, 221, 218, 207 B.C.) A.D. 128	Brumbach 1978
	SI-3126	1765± 130	A.D. 185	39 B.C. (A.D. 225, 304, 316) A.D. 595	
Winney's Rift	Alpha 2324	640±75 (TL date)	A.D. 1310	TL dates are not calibrated	Brumbach 1995
Paris No. 2	Beta 118372	1790±60	A.D. 160	A.D. 81 (240) 402	Brumbach 1996
Mechanicville Road	DICARB 1567	1740±165	A.D. 210	87 B.C. (A.D. 260, 281, 291, 297, 322) A.D. 647	Hartgen Archaeological Associates, Inc., 1983

<sup>1</sup>Calibrations done with CALIB 4.2 (Stuiver et al. 1998).

time period (Brumbach 1978, n.d.; Brumbach and Bender 1986; Bender and Brumbach 1992). Fish Creek, which has been described as “one big site from source to mouth,” is the outlet for Saratoga Lake and from there flows on a generally eastward course 21 km to its confluence with the Hudson River just east of the village of Schuylerville and about 50 km north of the city of Albany. The prehistoric Schuylerville site is located within the village of Schuylerville downstream from the first falls on Fish Creek, and approximately 300 m west and upstream from the Hudson River. About 9 km upriver on Fish Creek, a number of occupations on both sides of a shallows or rift and on several islands in its abraded channel are known as the Winney's Rift site.

Excavations were carried out at Schuylerville in 1975 and 1976 by the University at Albany, and at Winney's Rift in 1984, 1985, and 1986 by Skidmore College and Rensselaer Polytechnic Institute. Two additional collections from Winney's Rift, made by the Auringer-Seelye Chapter of the New York State Archaeological Association and by Schuylerville resident, Lou Follette, were also studied. The site at Schuylerville is estimated to have been close to a hectare or more in size before encroachment by riverbank erosion, nineteenth century industrial activities, and the Champlain Canal and its features. Winney's

Rift is larger, approximately 1.4 ha, with cultural material found along both sides of the Creek for several hundred meters.

Occupational history at Schuylerville began between 1900 and 1600 B.C., but a number of seasonal re-occupations dating to the Middle Woodland (A.D. 1-1000) (Funk 1976:306) represent the major components discussed here (Table 12.1). Radiocarbon dates from Middle Woodland features and in association with Point Peninsula ceramics include 1765±130 B.P. (cal 2 $\sigma$  39 B.C. [A.D. 255, 304, 316] 595), and an even earlier date of 2200±160 B.P. (763 B.C. [349, 318, 228, 221, 207] A.D. 128) (Brumbach 1978). Ceramics similar to those at Schuylerville were recovered from another site in Saratoga County (Mechanicville Road) and dated by an overlying feature to before 1740±165 B.P. (cal 2 $\sigma$  87 B.C. [A.D. 260, 281, 291, 297, 322] 647) (Hartgen Archeological Associates, Inc., 1983:81).

Schuylerville produced stone and ceramic artifacts, various types of features, and numerous post molds, some of which derive from small curved structures measuring 3-4.5 m in diameter. Two-liter samples were selected from each of the 53 features recovered from all levels at the site to be floated and wet screened. Faunal remains consisted of fragments of calcined bone that could not be identified to species and a modest collection of fish vertebrae (no scales

were noted), which also could not be identified to species, but based on size and configuration, are believed to represent one or more of the small anadromous species. Floral remains included pin-cherry (*Prunus pensylvanica*), carbonized nutshell (species not identified), and unidentified seeds. Fish vertebrae were the most commonly recovered food remain that could be assigned to the Middle Woodland period, while several pre-Middle Woodland features produced seeds tentatively identified as chenopodium.

The location of the site downstream from the falls suggested fish were harvested with the use of a weir, set net, or baskets. Net sinkers, fishhooks, gorges, leisters, and other artifacts traditionally considered to be indicative of a fishing orientation were infrequent or nonexistent. The absence of large storage pits as well as any quantity of mammalian bone, and the relatively restricted variety of artifact forms and the small number of projectile points in comparison to other categories of chipped stone tools, are evidence for a limited-purpose occupation with a low emphasis on the hunting of land animals. Still, the very dark and organically rich soils of the features and living floors, with relatively high content of phosphorus, magnesium, and calcium, argue for the presence of decomposed food remains. (For a more complete discussion, see Brumbach 1978:138-143.) Fish harvesting and processing would have deposited large accumulations of refuse onto the site, and could have accounted for the soil characteristics.

### ECOLOGICAL CONTEXTS FOR A MIDDLE WOODLAND FISHING ECONOMY ALONG THE UPPER HUDSON

Schuylerville's location, like other sites in the upper Hudson River drainage (see Funk 1976), was likely to have been selected because it offered easy access to migratory fish. Although fish can be taken from almost any place along rivers or within lakes, they are most readily taken in large numbers at natural obstructions such as falls, shallows, or reefs (Rostlund 1952). These features function like man-made traps, since they impede the progress of the migrating fish that tend to mill around in the pools before ascending upriver. Located adjacent to a shallows or fording place and immediately downstream from the first of a set of falls on Fish Creek, the site is positioned for harvesting migratory fish after they enter the smaller creek from the Hudson River but before they begin to ascend the falls.

### The Fish Population

According to several nineteenth century documents, Fish Creek received its name “. . . because of the myriads of herrings which used to swarm up through it in the spring of the year into [Saratoga Lake]; and secondly because of the intensive fish weirs which the Indians constructed at the outlet of the lake for catching herring” (Brandow 1900:8). Also, “It is a well known fact that in Colonial times, before the mills and dams were erected at Schuylerville by Gen. P. Schuyler in 1760, herring and shad in immense schools were in the habit of running up the Hudson in the spring into Fish Creek (hence the name) and thence through Lake Saratoga and the Kayaderoseras even to Rock City Falls” (Stone 1880:35-36, quoted in Ritchie 1958:11).

While few fish species do not perform some kind of migration during part of their life cycle (Nikolsky 1963:231), the anadromous fish (and catadromous eel, which reverses the direction of migration) are best known for their migrations, which may bring them far inland in search of suitable spawning grounds. Anadromous fish do most of their growing at sea, where food supplies are greater, and when mature return to fresh or brackish water, where spawning and nursery grounds are more protected. This pattern becomes more marked in the northerly latitudes because of the cooler environment. Here, primary productivity of lakes and rivers is not high, especially during the colder months, and the ability of these lakes to support resident fish populations is limited (Schalk 1977:211). The movement of fish into inland waters for spawning, at which time most anadromous species do not feed, brings large numbers of fish into an environment suitable for reproduction although not for year-round support. Seasonal changes in water temperature trigger both the inland migrations and spawning. Since the fish do most of their feeding in the marine ecosystem, the migrations represent an energy “bonus” to the interior. By coordinating their own patterns of mobility and aggregation with those of the fish species, human populations can benefit from this natural abundance. The importance of the fish to the prehorticultural subsistence system, therefore, lies not only in their abundance, but also in their spatial and temporal predictability.

The major species involved in the Hudson River fishery include two species of sturgeon of the family Acipenseridae (the short-nosed sturgeon, *Acipenser brevirostrum*, and the common or sea sturgeon, *A. oxyrinchus*, also classified as *A. sturio*), several of the

shads and herrings of the family Clupeidae (the alewife, also called grayback or branch herring, *Alosa pseudoharengus*; blueback herring, *Pomolobus aestivalis*, and the shad, *Alosa sapidissima*), the striped bass (*Morone saxatilis*), and the (catadromous) American eel (*Anguilla rostrata*) (Table 12.2) (Bigelow and Schroeder 1953; Boyle 1969; Drahos 1954; Hildebrand 1963; Leggett and Whitney 1972; Vladykov and Greeley 1963). Contrary to some misperceptions, the Atlantic salmon (*Salmo salar*) was not native to the Hudson River. While salmon probably did inhabit the salty lower Hudson estuary during some part of their life cycle, there is no evidence that they reproduced in the river or its tributaries (Cheney 1897; Netboy 1968:336).

### Hudson River Fish Productivity

Although it is not possible to reconstruct accurate figures for the amount of fish in the Hudson River drainage during the Middle Woodland period, figures from nineteenth and twentieth century commercial fishery catches can be employed to make inferences concerning past productivity. Rostlund (1952) has estimated the potential fish production of the historic period Hudson River Valley at between 140 and 175 kg of fish annually per square kilometer (between 800 and 1000 pounds per square mile). Based on pre-Contact conditions, when available spawning and nursery areas would have been more than double that of the twentieth century, it has been estimated elsewhere that the Hudson River drainage could have produced 1.4 million kg of shad, 2.4 million kg of alewife and/or "summer" (blueback) herring (these species are often not separated in commercial catch statistics), 6.15 million kg of striped bass, and 680,000 kg of sea sturgeon annually (long-term commercial catches for American eel and short-nosed sturgeon are not available) (Brumbach 1978).

These figures add up to an estimated annual productivity of 10.63 million kg of anadromous species plus additional amounts of eel and freshwater fish in the Hudson River. Obviously, the fish were not distributed evenly throughout the river system. The lower Hudson estuary would have been more productive than the middle and upper stretches, especially since schools of predominantly ocean fish can also be found in the brackish water. However, in terms of harvesting efficiency, the middle part of the river, and especially the mouths and lower stretches of the spawning tributaries, would have been the most advantageous for a population using a technology

based on nets and weirs. While some of the species are present year-round, the period of late March to June, when the fish are ascending the rivers and spawning, would be the most productive. Some of the depleted and spent shad and herrings would be available until cold weather in October and November (Table 12.2). Adult eels, although present at all times, are most easily taken from August to November during their down-river migration.

There is no good way to parcel out the productivity figures for the entire drainage system. Either calculating an average productivity per square kilometer of territory, or dividing total productivity by the linear miles of the Hudson and the tributaries that hosted fish runs, presents problems. However, despite the obvious problems, if we divide the productivity figures by the size of the Hudson drainage (exclusive of the Mohawk River system) of 24,800 sq. km (Busby 1966:135-136), we obtain a figure of 429 kg of fish per sq. km. This figure is more than double Rostlund's, mainly because he omitted the striped bass from his calculations. In contrast to our estimates for the migratory species, the contribution of freshwater fish in the Atlantic coastal region is estimated at about only 43 kg per sq. km (Rostlund 1952:250). These figures emphasize the significance of migratory fish as an abundant resource, and also help explain observations that the historic Mohawk and some of the central Iroquois concentrated their fishing activities on rivers and lakes visited by anadromous species.

### MIDDLE TO LATE WOODLAND POTTERY, FEATURES, AND FOOD PREPARATION

Prior to the introduction of the major horticultural domesticates, the Middle Woodland population focused on the reliable and abundant fish runs. Certainly, other resources were exploited, but the predictable temporal and spatial distribution of the migratory species contributed to seasonal aggregations at sites like Schuylerville and others. In addition to the fish vertebrae, enriched soils, and locations adjacent to favorable fishing locales, archaeological materials in the form of features and poorly fired ceramics can be interpreted as evidence for intensive fish exploitation and processing.

At Schuylerville there are significant differences between the features of the Transitional period (1200-1000 B.C.) and those of the Middle Woodland occupation. One of the Transitional period feature types

**Table 12.2.** Anadromous and Catadromous Fish in the Upper Hudson River and its Tributaries.

Species	Adult Size (cm)	Adult Weight	Spawning Location	Spawning Period	Estimated Precontact Productivity (kg)
Short-nosed sturgeon <i>Acipenser brevirostrum</i>	45-90	3-4 kg	Hudson River, some tributaries	April	?
Common or Sea sturgeon <i>Acipenser oxyrinchus</i> (also <i>A. sturio</i> )	180-240 (to 300)	100 (to 275) kg	Hudson River	April-June	680,000
Alewife, Grayback, or Branch Herring <i>Alosa pseudoharengus</i>	26-38	227-255 g	Smaller tributaries, rivulets, ponds	April-early July	2,400,000 <sup>1</sup>
Blueback Herring, Summer Herring <i>Pomolobus aestivalis</i>	28-38	200 g	Hudson River, some tributaries, ponds	Late May-June	?
Atlantic Shad <i>Alosa sapidissima</i>	41-51 (to 76)	0.7-3.7 (to 5.5) kg	Hudson River, some tributaries, ponds	May-June	1,400,000
Striped bass <i>Morone saxatilis</i>	50-120	1.4-16 (to 18) kg	Hudson River, some tributaries	Late April-June	6,150,000
American eel <i>Anguilla rostrata</i>	60-107 (to 120)	5-7.5 kg	Eels do not spawn in the Hudson River	Downriver migration August-November	?
<b>Total</b>					<b>10,630,000</b>

<sup>1</sup>This figure includes both the alewife and the blueback herring, since fisheries' statistics often don't separate the two species.

consists of large concentrations of fire-cracked rocks, charcoal flecks and charcoal-saturated soil, and fire-reddened soil, as well as small amounts of artifacts. The largest of these measured 117 by 145 cm and up to 15 cm thick. Flotation samples produced fragments of calcined bone and some seeds (tentatively identified as *chenopodium*). The rock beds might have functioned as roasting or steaming platforms for the cooking of fish, meat, or plant food. Later, during the Middle Woodland, the fire-cracked rock concentrations were no longer utilized. Instead, hearth features were smaller and contained significantly fewer rocks. The most likely explanations for the change in feature structure and content are a change in patterns of food consumption or the technology of food processing. Rather than roasting or steaming foods in hearths, where the numerous rocks would retain the heat like an earth oven, food was being processed in a different manner. We suggest the smaller features were the remains of smoky fires, which did not require the use of rocks, in which fish and possibly meat were smoke-dried for storage.

The smoke-dried meat and fish could be stored for winter use, or could have been further processed by grinding and mixing with either fat, berries, or other fruits, a common method of food storage among Native Americans. Dried fish or meat pemmican can be eaten without further preparation. Unground smoke-dried fish or meat is easily prepared by brief boiling, and the cooking liquid consumed as a warming cold weather drink. The poorly fired, thin-walled Middle Woodland pottery would make suitable boiling pots, especially for more mobile peoples who needed to carry a small pot for quick cooking. According to Reid (1989:170), poorly fired "meat pots" were used by several peoples in northwestern North America, including the Blackfoot, Kutenai, and Sarsi, among others. The vessels, which were not fired well enough to achieve a hard ceramic fabric, were intended for simmering meat or fish, or rendering oils or fat from bone fragments or blubber. These vessels were used in hot stone cooking, or were placed near the fire or in the embers, rather than over open flames. Some of these vessels were fragile and easily broken, while others were vulnerable to disintegration with prolonged exposure to dampness (Reid 1989:171-172).

The early Middle Woodland pottery at Schuylerville, dated between 2200±160 B.P. (cal 2σ 763 B.C. [349, 318, 221, 218, 207 B.C.] A.D. 128) and 1765±130 B.P. (cal 2σ 39 B.C. [A.D. 225, 304, 316] 595), was not well fired, nor was it well made, when compared to later pottery. Even more poorly fired was the contemporaneous

and similarly decorated and manufactured pottery from the Paris No. 2 site, Town of Berne, Albany County (Brumbach 1996), which was AMS-dated by associated hearth charcoal to 1790±60 B.P. (cal 2σ A.D. 81 [240] 402). The poorly fired sherds from this site appeared to be not much harder than the alluvial silt and clay matrix in which it was found. Paris No. 2 is believed to have been a special purpose site for mobile task groups, who perhaps otherwise seasonally nucleated at fishing stations similar to Schuylerville. The appearance of such soft pottery at a dispersion site lends support to the idea that Middle Woodland populations were using poorly-fired "meat pots" similar to those described by Reid (1989).

The reliance on fish and other lacustrine and riverine resources by the populations in the upper Hudson Valley continued throughout much of the Middle Woodland. By the end of the Middle Woodland (ca. A.D. 750-900), there are some major changes in the archaeological record of this area. The site at Schuylerville was no longer as heavily utilized. Instead, a major episode of occupation began about 9 km upriver on Fish Creek at the site of Winney's Rift. While this location is also favorable for harvesting anadromous fish (the "rift" or shallows in the river impedes the upriver progress of the fish), at this location the river occupies a level floodplain composed of light, sandy soil, which is still regularly planted with maize. We suggest that this shift in occupation location during the late Middle Woodland to early Late Woodland transition signals a process in which cultigens were probably introduced into the subsistence systems of the upper Hudson Valley. Exactly when maize was first introduced and when reliance on maize was increased is difficult to determine at this time due to a scarcity of maize remains that have been either directly dated or recovered from well-dated and undisturbed contexts.

Ceramics change greatly during this time period as well, and we believe these signal changes in patterns of food preparation relating to an increasing reliance on cultigens in the diet. At Winney's Rift, the thin-walled Middle Woodland vessels with predominantly smoothed surfaces and stamped decorations are gradually replaced by larger, thicker-walled vessels with smoothed, corded, smoothed-over-corded, or fabric-impressed exterior surfaces, and flat, rounded, or thickened lips. Some vessels bear applied collars. Decorations, when present, consist primarily of corded-stick impressions arranged in oblique or vertical bands on lips, collars, or exterior surfaces, often in association with conical punctates (Brumbach 1995:57).

The appearance of the thicker-walled pottery during the late Middle Woodland to early Late Woodland transition period suggests this might have been a period of initial experimentation with maize and its cooking. Subsequent to this, thinner-walled vessels begin to appear, and some of these resemble the Middle and Late Owasco types (Ritchie and MacNeish 1949). As Braun (1980:96, 1983:118-119) has argued, changes in ceramic manufacture during the Woodland period may reflect changes in dietary patterns, such as a shift to the greater use of starchy seeds, which are best cooked through long simmering or boiling in order to increase palatability and digestibility. Thinner, denser walls and finer temper would increase the vessel's performance in these circumstances. The later Middle and Late Woodland vessels from Winney's Rift were better suited to withstand thermal shock due to longer boiling than were the earlier Middle Woodland vessels, which were produced to withstand breakage from mechanical stress.

In addition to the large component at Winney's Rift, the transitional Middle to Late Woodland vessels have been recovered from several sites in Saratoga County. The combination of both Middle Woodland and Late Woodland ceramic traits in the same component, and often on the same vessel, appears to be characteristic of the upper Hudson River area on this time level. Because of this, the stage division between the Middle and Late Woodland based on Ritchie and MacNeish's (1949) ceramic typology does not resemble that reported elsewhere in New York State (Brumbach 1995:58). Thermoluminescence (TL) and radiocarbon dating place these vessels at A.D. 1200-1300, and contemporaneous with early Late Woodland Owasco ceramics found elsewhere in New York (Brumbach 1995:58). A sherd from Winney's Rift, dated by TL to A.D. 1310±75 (Alpha-2324), was constructed and decorated with a combination of attributes of the Middle Woodland type Jack's Reef Corded Collar and the Late Woodland type Levanna Corded Collar (Ritchie and MacNeish 1949). Carbon samples from a feature and an associated living floor at the Mechanicville Road site in Saratoga County containing similar pottery, produced dates of A.D. 1220±70 (DICARB 1565) and A.D. 1300±40 (DICARB 1567), both uncorrected (Hartgen Archeological Associates, Inc., 1983:227).

After ca. A.D. 1200-1300, there were additional changes in ceramic manufacture: Vessel walls become progressively thinner, presumably because the technology necessary to construct a larger vessel without greatly increasing the thickness of the wall was

achieved. The appearance of these vessels seems to signal concurrent changes in the diet with an increased reliance on maize, eventually leading to the focus described in the early 1600s documents.

The Late Woodland pottery of the upper Hudson River continues to undergo major changes in manufacturing technique, and by A.D. 1400, came to resemble both in style and technology the pottery produced at the Mohawk Iroquois villages to the west (Bender and Brumbach 1992; Brumbach 1975, 1995), and to a lesser degree, pottery recovered from Late Woodland Delaware sites of New Jersey and southern New York (Kraft 1986). These large Late Woodland vessels tend to be globular in shape with modeled collared rims and incised decorations. Walls are extremely thin and the paste is very compact with fine aplastics. Exterior surfaces are smoothed and often finished by polishing or burnishing. Coiling as a building technique appears to have been replaced by another hand-building method termed "drawing" (Rice 1987:124-125).

That fish continued to be an important dietary staple in the upper Hudson Valley even after A.D. 700 is demonstrated by the recovery of hundreds of small fish vertebrae from flotation samples at Winney's Rift. Additionally, Late Woodland features recorded at this site include a large hearth with charcoal-saturated soil, but few rocks. We interpret it as a feature that might have served for the smoke drying of fish. However, even as fishing remained an important economic activity, changes in harvesting technology apparently were taking place. Winney's Rift produced a number of net sinkers, an artifact type almost absent from Schuylerville. The shift to a different location for fishing, combined with inferred changes in labor allocation (as we argue below), appears to have had consequences for the technology involved in fish harvesting. Perhaps this period saw a shift away from the use of fixed weirs and natural impediments alone to an increase in the use of more portable set nets.

These data on the technology of fish harvesting, resource processing, and ceramic production thus indicate that significant but gradual changes were taking place in upper Hudson Valley subsistence systems. In addition, shifts in settlement geography from prime fishing locations (Schuylerville) to locations favorable to both fishing and gardening (Winney's Rift), and later during the middle Late Woodland to locations in proximity to more arable garden lands on the islands and floodplains of the major rivers, support our arguments. The shifts in settlement locations along Fish Creek mirrors large-scale settlement shifts for this period identified in Bender and Curtin's

(1990) survey of recorded sites in the upper Hudson Valley. We can only conclude that throughout the period under discussion, A.D. 700-1300, choices were being made about resources that substantially affected decision making in task allocation and settlement location.

## **SOCIAL AND SETTLEMENT SYSTEMS, POST-A.D. 700**

Based on currently available data from these sites, a model of subsistence change during the Middle to Late Woodland periods is beginning to emerge. Some of these processes will be briefly discussed here. Exploitation of seasonal fish runs would have permitted/required sedentism for as long as fresh or preserved fish were available. Decisions concerning fishing may have been greatly influenced by the timing of the fish runs. In the upper Hudson, the anadromous species begin to appear at the end of April and by a few weeks later in May, fish were abundant in many of the rivers. The planting of maize could have been accomplished without upsetting the already established schedule of seasonal settlement and movement. Suitable soil and weather conditions for planting maize will occur in May. Field preparation and planting would not necessarily conflict with fish harvesting but might conflict with fish drying and processing, since these are time-consuming activities (Schalk 1977). Initially, possible scheduling conflicts between fish and maize could be resolved by a sexual or generational division of labor. In order to minimize the labor of land clearing, desirable places for gardening would include the floodplains of the same tributaries that hosted the fish runs. Since maize must be cared for and protected from competing birds and mammals, it would be convenient to plant and care for the gardens while the population was otherwise at its spring-summer aggregation site. After June, the major fish runs were over but some fish, eels, late runners, and freshwater species continued to be present in the rivers until the onset of cold weather. Maize can be eaten "in the milk" in August and will ripen in early to mid-September. Thus, upper Hudson populations already adapted to riverine fishing would be well positioned to engage in casual planting.

A shift from casual to village horticulture might have occurred when a growing conflict between maize planting and fish preserving came to be resolved in favor of maize. The critical choice is between dried fish for *summer-fall* consumption and

dried maize for *fall-winter* consumption. While there may have been many reasons why maize was selected over fish, the timing of the fish runs might have played a role here too. Schalk (1977) has pointed out that the critical factors in fish utilization are not only the amount of fish but also the period of availability and a population's ability to process the fish for storage within this time. Because the Hudson River's anadromous fish are available in the spring and early summer, before the onset of hot summer weather, preservation of these species would be more difficult than, for example, the preservation of Pacific Coast salmon, which are available for harvest from late August until September, after the peak of hot weather (Schalk 1977), and were therefore more easily preserved for winter use. In contrast, maize preservation is far less labor-intensive (although preparation for consumption is more labor-intensive than for dried fish), and in addition, maize provides variety in the diet and a suitable weaning food for infants when prepared as a gruel (Crown and Wills 1995:249).

A final shift in settlement location seems to have occurred during the Late Woodland. Locations that afforded access to larger or better garden areas, such as the island flats and floodplain of the Hudson River as described by Dunn (1994), appear to have been preferred for warm weather aggregation sites. The selection of these locations suggests that settlement geography was redefined in terms of horticultural potential rather than easy access to fishing stations alone. While the percentage of fish or maize in the diet, and how this percentage shifted during the Middle and Late Woodland, is still unresolved, the shift in settlement geography lends support to our hypothesis that the individuals involved had made conscious decisions about resource management and the allocation of labor.

Decisions may have been made by women who chose to allot less of their labor to fish preservation and more to the preparation and tending of gardens. This decision might have been affected, in part, by women's conscious decisions to allocate more labor to food resources that were stored more efficiently and in which they played the predominant role and controlled. By opting for maize and other domesticates, the amount of fish, as well as spatially unpredictable white-tailed deer and small game necessary to support the population during the cold weather months was reduced. This in turn could lead to a reduction in a community's foraging mobility during the colder months, and to an increase in the period of warm weather aggregation and sedentism. Other factors

undoubtedly played a role in this process.

Such changes may have been accompanied by shifts in social organization at this time, specifically a shift from a pattern of patrilineality typical of many Northeastern Algonquian populations to a preference for matrilineality and matrilineal post-marital residence. According to the early Dutch records, at the time of contact the landholding units of the Mohican were matrilineages (Brasser 1978:200). The focus of these lineage tracts appears to have been the garden lands in proximity to the Hudson River and its major tributaries rather than the lands in the interior used for hunting. Although we are not invoking Late Woodland period “big women” to explain these changes in subsistence and settlement behavior, we must consider that the sociospatial arrangements termed matrilineality and matrilineality, while attributed to the Mohican as well as the Munsee (Brasser 1978:200), were not typical of the Algonquian-speaking populations of the Northeast. In contrast, these patterns do appear to have been common among the New York Iroquois and their linguistic relatives and might well have predated their adoption of horticulture. Like our current knowledge of maize, we don't know when or from where the Mohican adopted these practices. However, the increased focus on horticulture during the Late Woodland period turned garden lands and crops into valuable resources controlled by women and their families.

While the model of subsistence change presented here has been only briefly described, it is apparent that it derives more from settlement geography, ceramic production, and site features than from the floral and faunal remains themselves. Future research in the Hudson Valley hopefully will be directed to filling in these gaps through greater attention paid to flotation of feature and midden samples. The recovery of additional dated samples of maize, as well as bean and squash, will help refine, and if necessary, redraw this model. Additionally, our study of subsistence and settlement change has brought into focus interesting questions relating gender, social organization, and the processes through which foragers become horticulturists.

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## CHAPTER 13

# PALEOETHNOBOTANICAL INDICATORS OF SUBSISTENCE AND SETTLEMENT CHANGE IN THE NORTHEAST

Nancy Asch Sidell

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### INTRODUCTION

Early Late Prehistoric subsistence and settlement changes in the Northeast are expressed in archaeobotanical assemblages as differences in wood charcoal, nutshell, and seed assemblages through time. There are changes in proportions of wild and domesticated plants as well as other indications of changes in plant communities. Interpretation of differences between regions must take into account inherent differences in the native vegetation and how that vegetation is likely to be affected by human activities, or anthropogenesis. Reviewing the first comprehensive summary of paleoethnobotany in the Northeast, Crawford (1999) observed that none of the papers had addressed the topic of anthropogenesis. To correct that deficiency, this chapter will focus on anthropogenesis using data on plant remains accumulated from quantitative analysis of Archaic through Contact period (ca. 4400 B.C.-A.D. 1760) sites in Maine, New York, Connecticut, and Pennsylvania, concentrating on the period of initial agriculture, ca. A.D. 750-1300.

In 1964, Yarnell's landmark study of aboriginal influences on the distribution, habitat, and genetic variation of plants in the upper Great Lakes region provided a baseline for later paleoecological work. Based upon the ethnobotanical literature, he estimated that Indians made use of at least 20 percent of the plant species that grew in the area (Yarnell 1964).

Minnis (1978) demonstrated the potential for using macroplant remains from archaeological contexts as a relative measure of vegetational disturbance resulting from human activity in southwestern New Mexico. Minnis noted that all agricultural systems share a similar general model for the effects on local vegetation, with three stages in the cycle of disturbance. First, the pristine vegetation is cleared. Second, a less diverse

ecosystem of cultivated fields must be maintained. Plants adapted to disturbed habitats thrive in the fields and in some cases are encouraged or tolerated because of their economic potential. And third, after abandonment, a successional cycle is set in motion. Minnis used wood charcoal and seeds as indicators of agricultural disturbance. The wood charcoal assemblage revealed a reduction of floodplain species during the population peak in the Classic Mimbres period because of the location of fields in the floodplain. With increased agriculture, the effect on archaeological seeds was an increase in weed species adapted to disturbed soils.

Yarnell (1984), in his study of the Late Archaic McIntyre site from southern Ontario, grouped food plants according to the biotic community in which they would most likely be collected. Indicating degree of disturbance on a scale of 1 to 4, from most disrupted to most mature, he characterized habitats as (1) open degraded; (2) clearings and thickets; (3) open woods; or (4) mature forest. At McIntyre, most of the plant foods came from open woods and clearings, including the borders or intermediate zone between the two types of communities. He envisioned a site layout that was similar to the Algonquin summer camps he observed in western Quebec during 1964 to 1979:

Typically, these people occupy sizeable clearings directly on lake shores. One does not live in the forest during the late spring and summer because of the insufferable hordes of black flies and mosquitoes. It is essential to have the benefit of any available breeze and the desiccating sunshine which are more vital to comfort than is shade. Generally, there is not much woody vegetation directly on the site, especially in the activity areas. There are various forbs and grasses but few trees, though some work areas are shaded.

Herbaceous and shrubby vegetation increases at the camp margins, giving way to general disclimax forest which provides firewood. Winter trapping camps are in more protected locations. [Yarnell 1984:108]

Crawford (1997) used weed seeds as an indicator of anthropogenesis in prehistoric northeastern Japan. He pointed out that anthropogenesis is a critical factor in the success of human cultures. By removing trees from a habitat, humans set in motion processes that change the character of the ecosystem, taking the system back to less mature successional stages. Young successional stages are characterized by rapid reproductive rates, short life cycles, and a high ratio of production to respiration, resulting in greater quantities of fruit and vegetal materials, as well as greater numbers of animals, such as deer and rodents (Crawford 1997:87). Crawford identified patterns involving relative abundance of annual weeds (indicative of regular short-term disturbance) and perennial weeds (indicative of early successional stages that would be associated with forest edge or village edge communities).

Quantitative analysis of archaeological plant remains makes it possible to draw inferences about the degree of anthropogenic disturbance of plant communities in the vicinity of a site through time. This paper will use a variety of indicators to trace changes in plant assemblages in the Northeast from the Archaic through the Contact periods. This approach is essential to understanding the particular changes in plant communities that are associated with the adoption of agriculture and may make it possible to recognize occupations that represent early experimentation with agriculture, as hypothesized by John Hart (1999) in his Darwinian perspective on the evolution of maize agriculture in the Eastern Woodlands.

To recognize evidence of anthropogenesis, it is first necessary to consider what the undisturbed vegetation of northeastern sites would have been like and how it may have differed from south to north.

## FOREST REGIONS OF THE NORTHEAST

A comprehensive account of the original forest pattern of eastern North America was constructed by Lucy Braun in 1950. According to her model, much of northern New England and New York State at settlement was covered with a hemlock–white pine–northern hardwoods forest (Figure 13.1). Northward, the shorter growing season and low win-

ter temperature extremes eliminated one after another of the deciduous forest species. Maine archaeological sites fall within the New England section and most of the New York sites lie within the Allegheny section of the hemlock–white pine–northern hardwoods forest (Figure 13.2). In New York, the chestnuts, oaks, and hickories of the southern forests extended up the major river valleys into the state (Braun 1950:395). Many of the New York sites in the present study are located in the Susquehanna drainage, some in the valleys and some in the uplands. The Memorial Park site in the Susquehanna River Valley in Pennsylvania is at the edge of Braun's oak–chestnut forest region, which extends up into southern New England and the Hudson River Valley in New York. The present study includes three sites from the oak–chestnut forest region in Connecticut and adjacent New York State.

Latitudinal differences in the number of tree species are significant in the case of those with edible nuts, particularly oaks and hickories. In Maine there are only three species of nut trees that are widespread—red oak, beech, and beaked hazelnut—out of a total of 14 species of nut trees found in the state (see maps in Asch Sidell 1999d:196). In New York, this increases to seven widespread species, and in Pennsylvania, eight (Table 13.1). In southern New England, there are 15 species of nut trees that are widespread (Little 1971, 1977).

## INDICATOR SPECIES

Keeping in mind that tree species occur in different combinations in different regions and that the ecological significance of a species may vary between regions (Braun 1950:37), the archaeological wood species can be grouped to form indicators of several plant communities or habitats. For Northeastern sites, some communities that can be inferred from archaeological wood are mesic forest; dry, open woods; disturbed woods or thickets; and bottomland forest (Table 13.2).

The first group of species, labeled “mesic forest,” is indicative of a mature northern hardwoods–hemlock–white pine forest. Sugar maple, beech, and hemlock were important components of that forest (Braun 1950). These species grow in rich soil, are shade tolerant, and thrive in a closed forest with moderate moisture. Yellow birch (*Betula alleghaniensis*) and sweet birch (*B. lenta*) are also shade tolerant and common in rich soil of moist woods and slopes (House 1924:270). White pine formerly was a

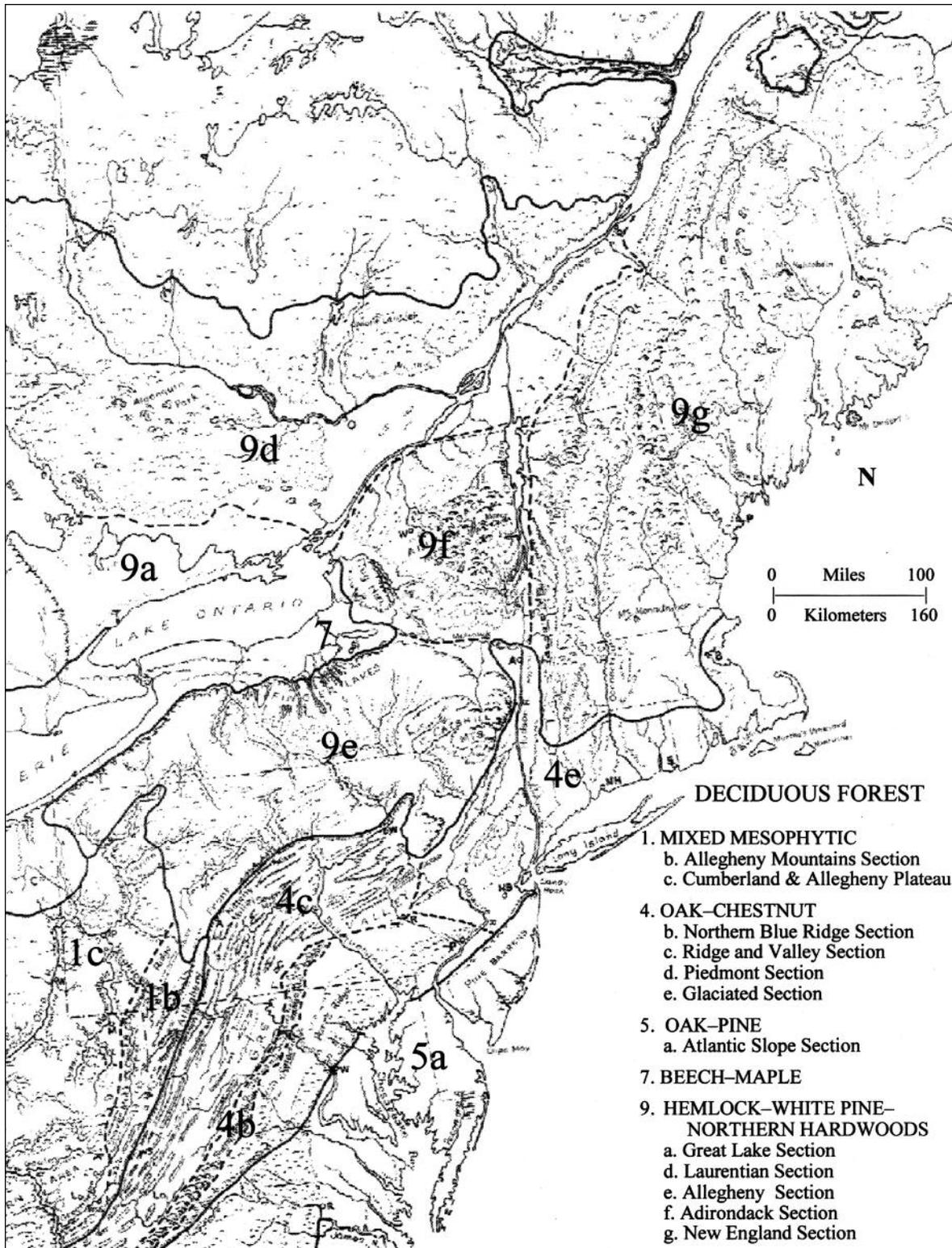


Figure 13.1. Forest regions of the Northeast (based on Braun 1950).

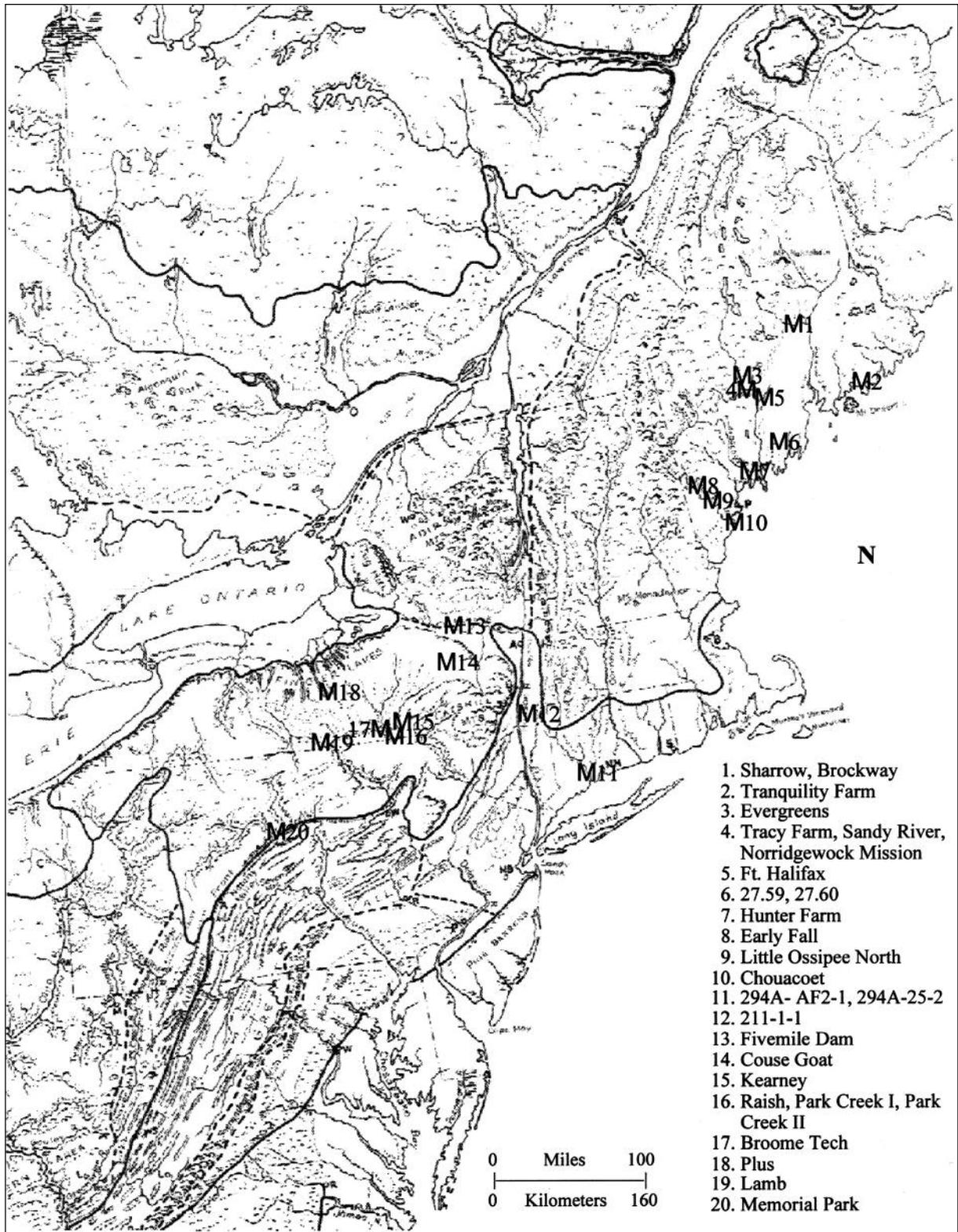


Figure 13.2. Site location map.

**Table 13.1.** Distribution of Nut Trees (based on Little 1971, 1977).

Species	Common Name	Maine	Southern New England	Southern New York	Pennsylvania
<i>Carya cordiformis</i>	bitternut hickory		X	X	X
<i>C. glabra</i>	pignut hickory		X	(x)	(x)
<i>C. laciniosa</i>	shellbark hickory			(x)	(x)
<i>C. tomentosa</i>	mockernut hickory		X	(x)	(x)
<i>C. ovata</i>	shagbark hickory	(x)	X	X	X
<i>Castanea dentata</i>	American chestnut	(x)	X	(x)	X
<i>Corylus cornuta</i>	beaked hazelnut	X	X	X	X
<i>Fagus grandifolia</i>	beech	X	X	X	X
<i>Juglans cinerea</i>	butternut	(x)	X	X	X
<i>J. nigra</i>	black walnut		(x)	(x)	(x)
<i>Quercus alba</i>	white oak	(x)	X	X	X
<i>Q. bicolor</i>	swamp white oak	(x)	X	(x)	(x)
<i>Q. coccinea</i>	scarlet oak	(x)	X	(x)	(x)
<i>Q. ilicifolia</i>	bear oak	(x)	X	(x)	(x)
<i>Q. imbricaria</i>	shingle oak				(x)
<i>Q. marilandica</i>	blackjack oak				(x)
<i>Q. macrocarpa</i>	bur oak	(x)	(x)	(x)	(x)
<i>Q. muehlenbergii</i>	chinkapin oak		(x)	(x)	(x)
<i>Q. palustris</i>	pin oak		(x)	(x)	(x)
<i>Q. prinus</i>	chestnut oak	(x)	X	(x)	(x)
<i>Q. rubra</i>	northern red oak	X	X	X	X
<i>Q. stellata</i>	post oak		(x)		(x)
<i>Q. velutina</i>	black oak	(x)	X	(x)	(x)
<b>TOTAL WIDESPREAD</b>		<b>3</b>	<b>15</b>	<b>7</b>	<b>7</b>

X = widespread; (x) = locally abundant.

substantial constituent of Northeastern forests (House 1924:41), although it is not a shade-tolerant species. Hop hornbeam (*Ostrya virginiana*) and hornbeam (*Carpinus caroliniana*) are both shade-tolerant understory trees. Hop hornbeam is a frequent subdominant in beech-maple communities, but southward it is often a tree of open, xeric slopes. Hop hornbeam is common in the oak forests of southern New England, growing in moist sites on the lower slopes (Jorgensen 1978). Hornbeam (*Carpinus caroliniana*) grows in moist woods and along streams throughout much of southern New York State and southern New England (House 1924:267; Little 1971).

“Dry, open woods” are indicated archaeologically by an assemblage high in oak, hickory, and chestnut wood charcoal (Table 13.2). The chestnut and many of the oak and hickory species also grow in rich woods, but they differ from the mesic forest indicators by being fire tol-

erant. After a forest fire, chestnut, oak, and hickory will regenerate from stump sprouts, unlike the sugar maple, beech, hemlock, and yellow birch. In New York, chestnut was frequent or common in all of the valleys of the Southern Tier counties bordering on Pennsylvania (House 1924:273). Chestnut was additionally a component of dry upland deciduous woods in southern New England (Magee and Ahles 1999:409).

Trees that colonize areas disturbed by clear-cutting or fire have been grouped into a category labeled “disturbed woods or thickets.” These successional species include pin-cherry, chokecherry, wild black cherry, hawthorn, poplar, sassafras, and pitch pine.

Indicators of floodplain or bottomland forest include ash, elm, butternut, alder, and willow. American elm was common in moist soil, especially along streams and in swampy lowlands (House 1924:278). White ash grows in rich woods, and green ash is found on hill-

**Table 13.2.** Indicator Species in Prehistoric Forests of the Northeast.

TREE TYPE	HABITAT			
	Mesic Forest	Dry, Open Woods	Disturbed Woods	Floodplain Forest
Coniferous				
Cedar	o			
Fir	X			
Hemlock	X			
Pitch Pine			X	
White Pine	X			
Spruce	X			
Nut Trees				
Beech	X			
Butternut				X
Chestnut	X	X		
Hickory		X		
Red Oak group	o	X		o
White Oak group	o	X		o
Fruit Trees				
Cherry			X	
Hawthorn			X	
Understory				
Hop hornbeam	X			
Hornbeam	X			
Other				
Alder				X
Ash				X
Basswood	X			
Birch	X			
Elm				X
Poplar			X	
Sassafras			X	
Sugar Maple	X			
Willow				X

X = most common association

o = other association

sides and riverbanks or wet woods (House 1924:563). Butternut grows in rich or rocky woods, often along streams. It is frequent or common across New York State (House 1924:253).

### ARCHAEOLOGICAL CHARCOAL

Sites selected for inclusion in this study are in general ones that have been subjected to extensive water flotation or fine water screening and have been analyzed using uniform archaeobotanical methods

developed at the Center for American Archeology in 1971 (D. Asch and N. Asch 1985a). All of the sites were analyzed under contract to universities, state agencies, or consulting firms throughout the Northeast; analysis is ongoing at some of the Maine sites. Sampling strategies varied among the sites. If numerous features were excavated, at least one flotation/water-screened sample from each was analyzed. Often, all the charcoal from a feature would be lumped to make one large sample that was subsampled to economize on analysis time. At sites with only a few features, several samples from each may have been analyzed to determine vari-

ation in feature contents. For multicomponent sites, several components have been included in this summary, even if sampling was not uniform among the components. Table 13.6 at the end of this chapter lists the number of samples and weight of charcoal examined from each component.

## Wood

Wood charcoal from most archaeological sites is presumed to be the result of everyday cooking fires, using deadwood collected near the site. Therefore, the species composition of the wood charcoal can be used to gain a rough idea of the nature of the vegetation in the vicinity of a site.

Looking at charcoal composition grouped by indicator species (Figure 13.3), it is evident that there are regional differences in charcoal composition that relate to the vegetational differences described by Braun. In Figure 13.3, wood charcoal from each site or component was grouped as follows: (1) beech-maple-birch-white pine (includes mesic species, basswood, hornbeam and hop hornbeam, and all coniferous wood except pitch pine); (2) oak-hickory-chestnut; (3) bottomland forest (ash, elm, butternut, alder, and willow); (4) disturbed woods or thicket (cherry, hawthorn, poplar, sassafras, and pitch pine); and (5) other (ring porous, diffuse porous, and unidentifiable).

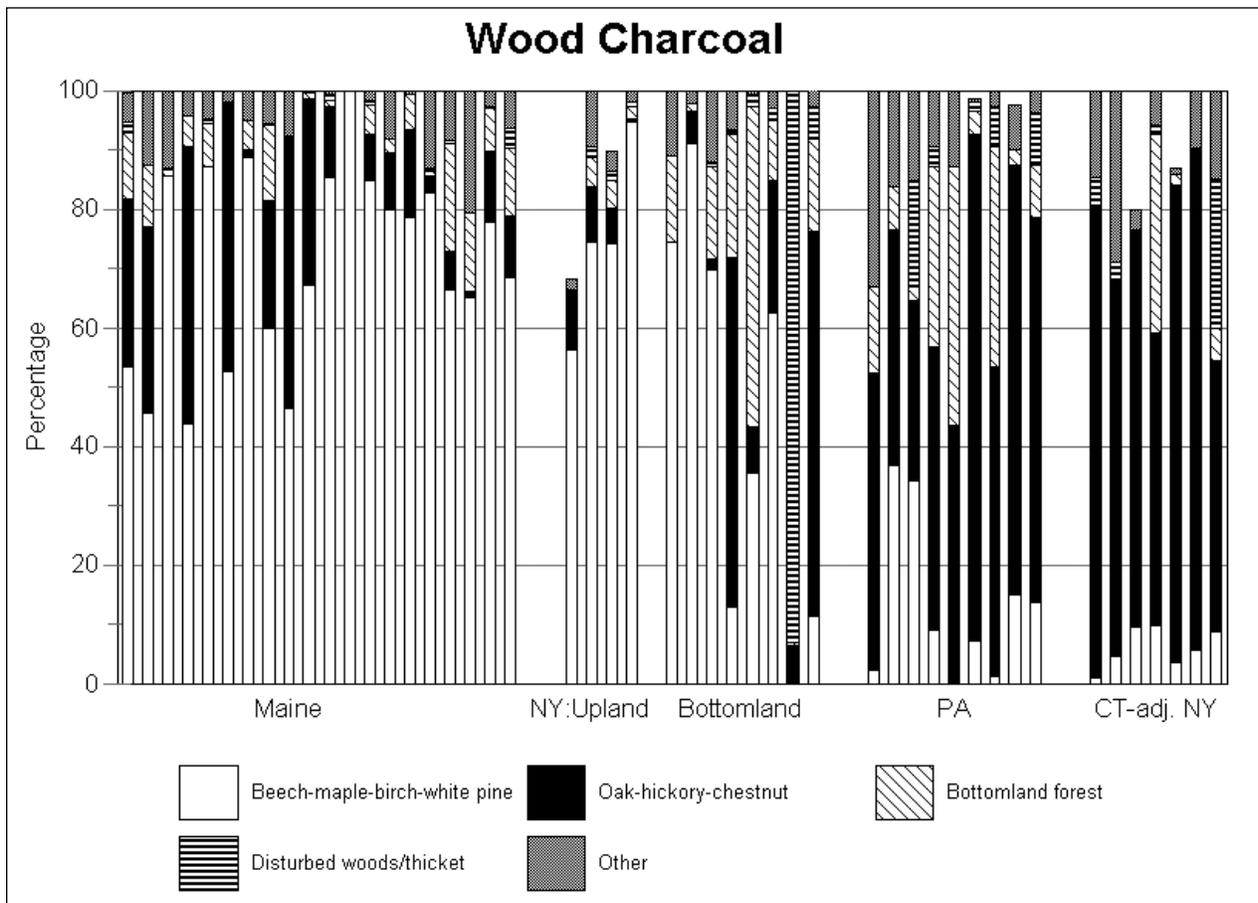
In Maine most sites have more than 50 percent wood charcoal, typical of a mature northern hardwoods-hemlock-white pine forest—namely beech, maple, birch, basswood, and coniferous wood.<sup>1</sup> In contrast, southern New England and southeastern New York sites, in the oak-chestnut forest region, have less than 10 percent beech, maple, and other trees that characterize the northern hardwoods-hemlock-white pine forest. At the southern Connecticut and southeastern New York sites, the majority of wood charcoal was composed of oak, hickory, and chestnut. There was also abundant oak and hickory to the south in Pennsylvania. There is more variability in New York sites, where southern species have migrated into the state via the large river valleys. There is more beech-maple-birch-white pine in the upland sites (Raish, Park Creek I, Park Creek II) and at sites that are in the uppermost reaches of the large river valleys (Couse Goat, Fivemile Dam). At two New York bottomland sites (Broome Tech, Lamb), there is evidence both from wood charcoal and food remains that human activities may have altered the natural vegetation of the area through time. This evidence of

anthropogenesis will be discussed later.

## Nut Trees and Nutshell

Various types of nutshell are routinely found in small quantities at archaeological sites in the Northeast. Gardner (1997) considers factors that might have entered into mast exploitation strategies in the Eastern Woodlands, including management of nut trees. In the Northeast, where there is so much variation in the number of widespread species of nut trees and in the proportion of wood from nut trees represented at archaeological sites (as discussed above), the data on nutshell density can be used to test the idea that use of nuts at a particular site might be related to the availability of nut trees in the vicinity of the site. The percentage of oak and hickory wood charcoal was compared with a nutshell index based on the number of shell fragments larger than 2 mm per gram of total charcoal (Figure 13.4). The use of an index based on charcoal weight rather than soil volume eliminates differences that may relate to excavation technique, such as selection of charcoal concentrations instead of random sampling within cultural horizons. It was found that there is a direct correlation between percentage of oak and hickory wood charcoal and nutshell concentration at sites in the oak-chestnut vegetation zone in southern New England and southeastern New York State in the Hudson River Valley. At the edge of the oak-chestnut zone at the Memorial Park site in Pennsylvania there is also a rough correlation between percentage of oak-hickory charcoal and density of nutshell.

At the four small New York upland sites in this study, there were very few oak and hickory fragments in the wood charcoal and a corresponding very low density of nutshell fragments. At four of the five bottomland sites in New York, there was less than 10 percent oak and hickory trees, and three of those four sites had a very low percentage of nutshell. An exception to this pattern was the Fivemile Dam site in the middle Mohawk River Valley, where the Late Archaic to Terminal Archaic occupations engaged in collecting all kinds of nuts in the area, particularly butternuts. The focus upon nut collecting at that site may mean that there was a butternut grove located nearby. Within the part of New York that Braun (1950) mapped as having southern species in the major river valleys, the Broome Tech site showed variation in the percentage of oak-hickory trees through time that may relate to anthropogenesis.



**Figure 13.3.** Wood charcoal from archaeological sites arranged by site/component, from oldest to youngest (left to right) within each group. Time interval is about 6000–225 BP for Maine sites, 4500–500 BP for New York upland sites, 5600–850 BP for New York bottomland sites, 6000–650 BP for the Memorial Park site in Pennsylvania, and 3500–300 BP for the Connecticut and adjacent New York sites.

In Maine, where there was no hickory charcoal identified, there appears to be little correlation between percentage of oak trees and frequency of nutshell, in part because there is scarcely any nutshell recovered from sites dating prior to two thousand years ago.

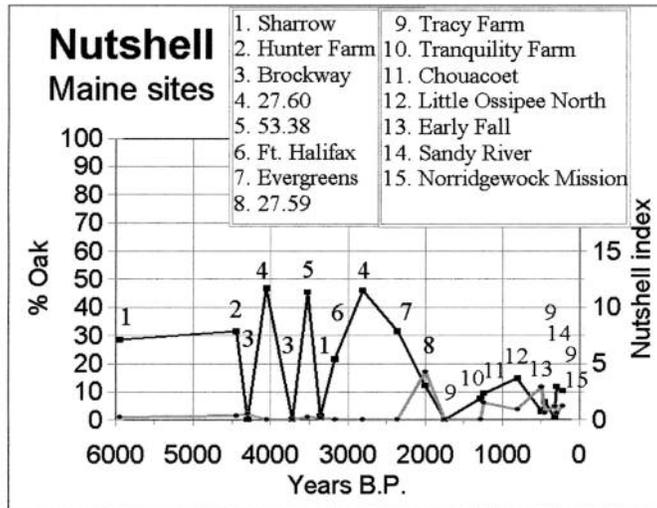
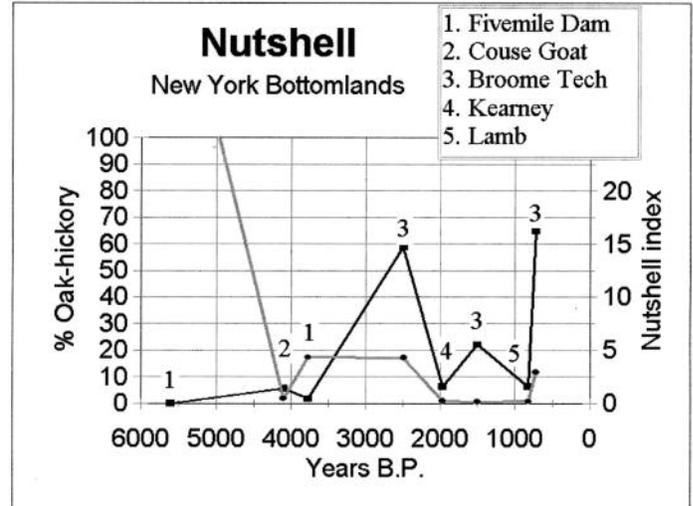
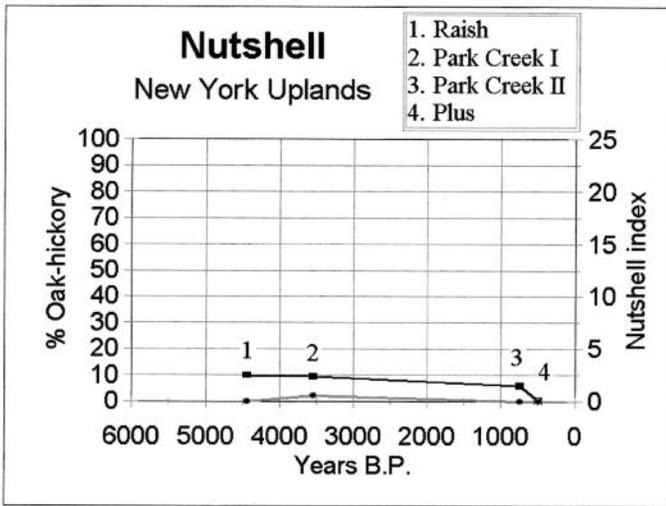
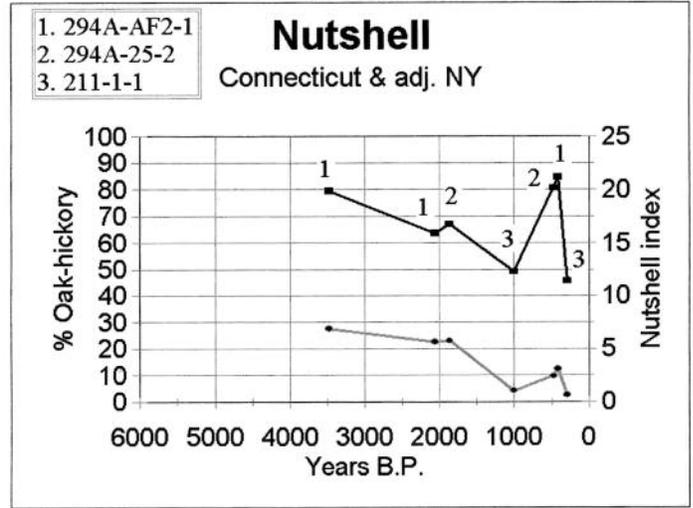
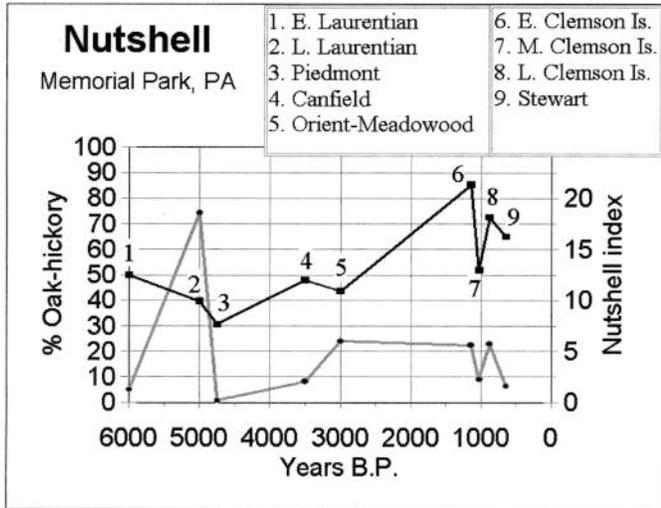
### Maize and Seeds

In many parts of the Northeast, the archaeological data suggest a direct correlation between adoption of maize agriculture and an increase in the ratio of seeds per gram of total charcoal (Figure 13.5). This correlation is found at the Memorial Park site in Pennsylvania, at several Maine sites, and perhaps at the Connecticut and southeastern New York sites. At the Memorial Park site, numerous seeds of native cul-

tivated plants were found in association with maize, but at the Connecticut, New York, and Maine sites none of the seeds were domesticates.

At sites 294A-AF2-1 and 294A-25-2, located in the oak-chestnut zone in Connecticut, there was an increase in seed density associated with maize agriculture, but the increases were relatively small. At site 211-1-1 in eastern New York, also in the oak-chestnut forest zone, seed densities associated with maize were quite high, but there were no pre-maize components for comparison. The density of maize at these three sites was very low—far less than one fragment per gram of charcoal. At all other New York sites included in this study, except Broome Tech, the correlation between maize agriculture and seed density is less clear, because the overall maize and seed densities are low.

In Maine, the cultivation of maize started by 570 B.P.



**Figure 13.4.** Nutshell density (gray line) in relationship to percentage of oak and hickory wood charcoal (black line). The nutshell index is the number of nut fragments larger than 2 mm per gram of total charcoal.

or earlier in interior southwestern Maine in the Saco River Valley. In Figure 13.5, the data point for maize (0.01 frags. >2 mm/g) at 810 B.P. at the Little Ossipee North site represents a mean date; a direct date for maize at that site was 570 B.P. for a fragment found in a feature dating to 1010 B.P. A greater quantity and variety of seeds is generally recovered from Maine sites after about 1000 B.P., which is an indication that the activities associated with agriculture had an effect on the surrounding plant communities (Asch Sidell 1999d).

Indicator species that may be associated with maize agriculture are considered in more detail in the Memorial Park site and Tracy Farm site discussions below.

## EVIDENCE OF ANTHROPOGENESIS

Many archaeological sites provide evidence of anthropogenesis, since plant foods tend to be most concentrated and most easily collected from open or disturbed areas. Focusing upon changes that may have occurred with the adoption of maize agriculture, there are certain indicator species that are associated with maize at the Memorial Park and Tracy Farm sites. Selected data are also presented from two sites in southcentral New York, for which there is possible evidence of landscape alteration by the use of fire.

### Memorial Park Site

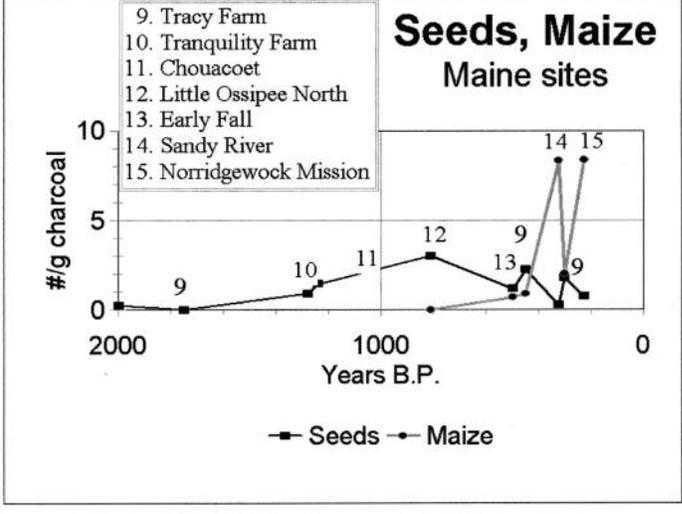
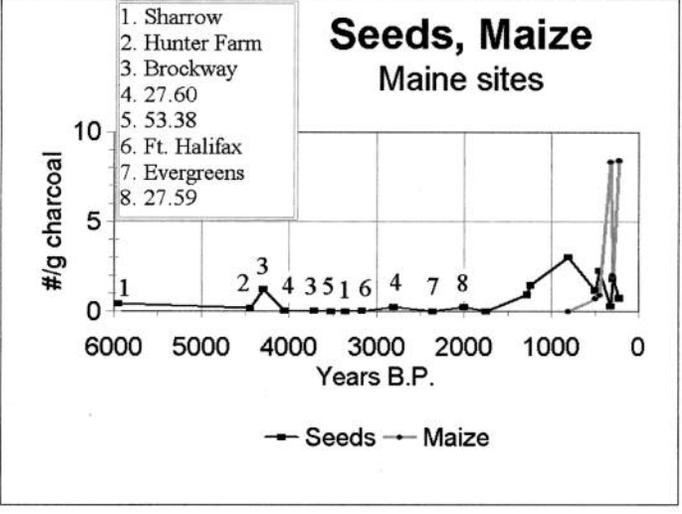
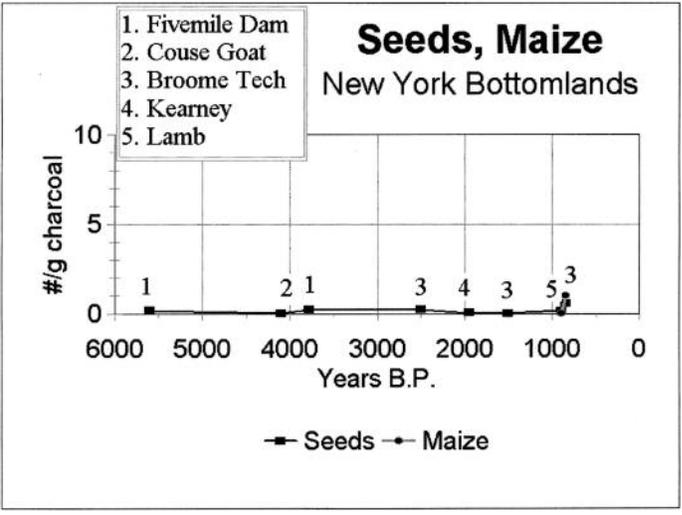
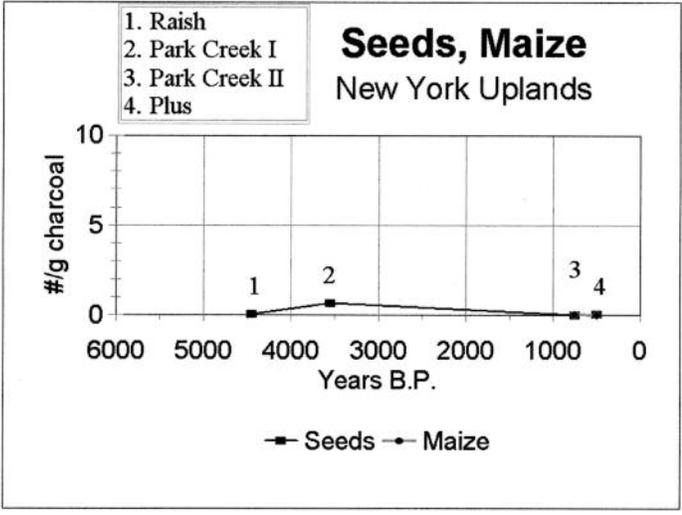
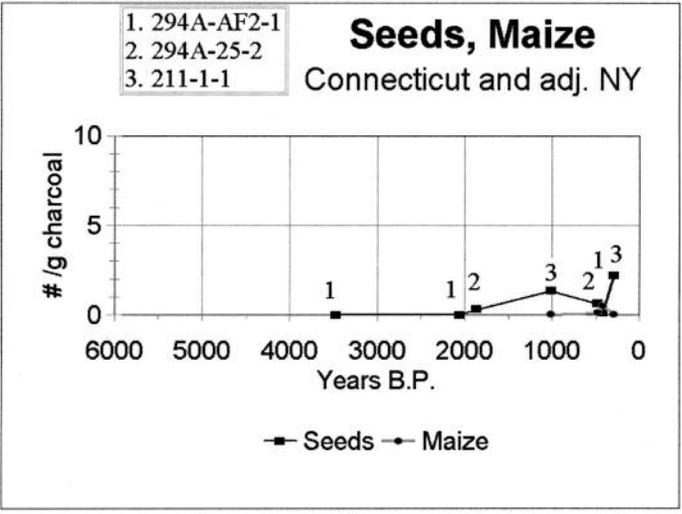
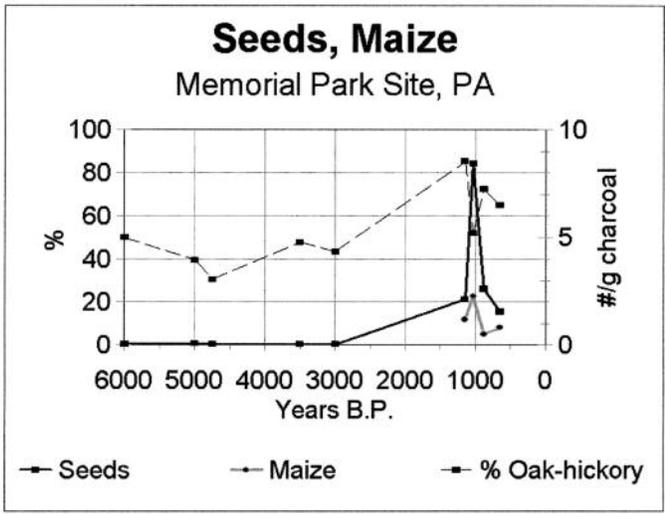
The clearest evidence of anthropogenesis is found at the deeply stratified Memorial Park site in Pennsylvania, where a large increase in seed density is associated with the presence of maize agriculture and the growing of some species of the Eastern Agricultural Complex (Figure 13.5). Of the Late Woodland (A.D. 760-1385) seeds, two-thirds were those of native cultivated plants, including little barley, two domesticated forms of *Chenopodium berlandieri*, tobacco, and possibly sunflower, although the single sunflower kernel was wild-sized. Altogether 64 percent of the identifiable seeds were little barley (*Hordeum pusillum*), which occurred in more than half of the 46 samples containing seeds. Among the fleshy fruits and berries was black nightshade (*Solanum americanum*). Black nightshade was associated with a period of intensive agriculture in westcentral Illinois and the American Bottom (D. Asch and N. Asch 1985a:388-389). Since it has not been recorded from Archaic sites, it is presumed that distur-

bances associated with prehistoric agriculture permitted an increase in the abundance of black nightshade. Today, black nightshade is widely distributed in open and disturbed habitats (Magee and Ahles 1999). At the Memorial Park site, black nightshade represented 52 percent of the fruit and berry seeds in the Late Woodland features.

Another possible indicator of anthropogenesis at the Memorial Park site is a substantial increase in the percentage of oak and hickory wood charcoal coincident with the appearance of maize agriculture. Sample size is not equal for each data point in Figure 13.5. The largest samples of wood charcoal are 605 fragments for the Terminal Archaic Canfield (2100-1640 B.C.) component and 150 fragments for the Early Clemson Island (A.D. 760-830) component. The amount of oak and hickory wood charcoal for these components is 47.93 percent and 88.33 percent, respectively. The increase in oak and hickory wood is accompanied by an increase in the nutshell index from 2.05 in the Terminal Archaic Canfield to 5.61 in the Early Clemson Island, as predicted by the nut tree–nutshell model presented earlier. There was also an increase in the seed index from 0.03 to 2.12 seeds per gram of charcoal, indicating more open habitat for seed collection in the Early Clemson Island occupation.

### Tracy Farm Site

In Maine, the Norridgewock Mission study compared archaeobotanical evidence with historic accounts of plant use to serve as a baseline for assessing prehistoric plant assemblages (Asch Sidell 1996a). At the Tracy Farm site across the river from Norridgewock Mission, there were differences in the plant remains through time (Asch Sidell 2000d). Among the three features that were unquestionably attributed to the Middle Woodland (200 B.C.-A.D. 600)<sup>2</sup> occupation, there was a lack of nutshell, seeds, and domesticated plants. However, because of collection techniques, only one of the samples could have been expected to contain seeds or nuts. Most of the Late Woodland/Contact (A.D. 1300-1690)<sup>2</sup> features at the Tracy Farm site contained a mixture of various seeds and nutshell. All types of nuts that grew in the area were recovered in small quantities from the Late Woodland and/or Contact occupations of the Tracy Farm site, and the nutshell occurred ubiquitously in 81 percent of the features. Of 32 Late Woodland or Contact features, 21 (or two-thirds) contained maize, 5 had squash/pumpkin rind, 3 had wheat, and 1 contained bean. One wild-sized sunflower seed was also



**Figure 13.5.** Seed density and maize density. The seed index is the number of seeds larger than 0.5 mm per gram of total charcoal. The maize index is the number of maize fragments larger than 2 mm per gram of total charcoal.

found. Seeds of at least 10 kinds of fleshy fruits were identified from the Late Woodland and/or Contact occupations.

The Tracy Farm site had more than 1,100 seeds from the Late Woodland and Contact occupations. The seed assemblage was particularly interesting because of the frequent occurrence of edible seeds of the weedy plants *Amphicarpa bracteata* (hog-peanut), *Chenopodium berlandieri* (chenopod), *Desmodium* spp. (tick-trefoil), and *Helianthus* spp. (wild sunflower). These seeds represented 37 percent of all seeds identified, including unknown and fragmentary seeds. Grass seeds, mostly wild rye (*Elymus* spp.), were also very abundant.

Tick-trefoil (*Desmodium* spp.) was the most abundant (32.8 percent) and ubiquitous seed found in both the Late Woodland and Contact features at Tracy Farm. Altogether, 373 seeds were identified from 17 features. Small quantities of tick-trefoil were found in association with maize agriculture at three other Maine sites—Little Ossipee North, Sandy River, and Norridgewock Mission. There are references to the use of the entire plant or the roots for medicine, but there are no historic references to the use of tick-trefoil for food (Moerman 1998). However, at Cloudsplitter Rockshelter in Kentucky, tick-trefoil loment was found stored in a small pit with 7 liters of cultivated sumpweed, sunflower, goosefoot, maygrass, and erect knotweed (Cowan 1985:240; Fritz 1990:405).

A total of 11 hog-peanut (*Amphicarpa bracteata*) seeds were found in 4 features at the Tracy Farm site. Three of the features contained maize. Two hog-peanut seeds were identified at the nearby Sandy River site. Hog-peanut is “. . . a slender-stemmed vine which climbs or twines over other plants and shrubs . . . grows along shadowy lanes in damp woods or moist thickets . . .” (Dwelle 1977). *Amphicarpa* produces small seeds in pods as well as fleshy, single-seeded subterranean fruits (Kindscher 1987).

Thirty-two reticulate, biconvex seeds of *Chenopodium berlandieri* (goosefoot, lamb's-quarters) were recovered from three Late Woodland or Contact features from the Tracy Farm site. Twenty-one *C. berlandieri* seeds were also found in two features at the Norridgewock Mission site. The chenopod could have grown as a weed in the maize fields, and the seeds could represent a food that was used when the maize supply was exhausted.

One achene resembling sunflower (*Helianthus* spp.), but too small to be the cultivated or weedy common sunflower (*H. annuus*), was recovered from a Contact feature at Tracy Farm in association with maize, cucur-

bit rind, wild rye, and tick-trefoil seeds. There is only one species of wild sunflower, *Helianthus decapetalus*, a perennial that grows in woods and along streams in Somerset County. The Tracy Farm achene has not been compared with specimens of *H. decapetalus*.

Grass seeds made up about 11 percent of the seeds at the Tracy Farm site, the most common being wild rye (*Elymus* spp.), with 126 seeds from 8 features. Although wild rye seeds were eaten by western Indians (King 1984), there are few ethnographic references to the use of grass seeds for food in eastern North America. The Iroquois used wild rye and other plants as medicine to soak corn seeds before planting (Moerman 1998:208-209). The grass seeds may be present as a by-product of using grass stems and leaves for technological purposes such as thatching, pit lining, matting, and fire starting. In support of this idea is evidence of grass stems in six of the eight Tracy Farm features with wild rye seeds. The two features lacking grass stems each contained only one wild rye seed. Of the seven features containing grass stems, only one did not also contain grass seeds. Each of the pits containing grass stems was classified as a storage pit that had been reused for refuse disposal. Wild rye seeds have not been specifically identified at other Maine sites.

In the Northeastern U.S., big bluestem (*Andropogon gerardii*) is the grass species that was used for lining maize storage pits (Bendremer, Kellogg, and Largy 1991). A single seed of big bluestem, was identified in Feature 20 at Tracy Farm. As in the case of wild rye, the big bluestem seed was probably introduced as a by-product of using the stems for technological purposes. Big bluestem seeds have not been specifically identified at other Maine sites.

The great variety of Late Woodland/Contact food remains at Tracy Farm indicates that nuts and fruits were an important part of the diet and that there were thickets and openings in the vicinity, probably related to agricultural activities. All of the weedy plants and grass plants identified from seeds at Tracy Farm are perennials, with the exception of *Chenopodium berlandieri*. An interesting question is, can this unusual assemblage of seeds that are associated with agriculture at Tracy Farm and other Maine sites (Table 13.3) be used as an indicator of probable agriculture at sites where there is no direct evidence of domesticated plants?

### Broome Tech Site

The Broome Tech site is located in the wide floodplain of the Chenango River in southern New York

**Table 13.3.** Seed Indicators–Maine Sites.

Habitat	Rich woods	Open, dry woods	Thickets, clearings	Open, degraded	Archaic sites	Assoc. maize
<b>FLESHY FRUITS</b>						
Blackberry / raspberry / dewberry		X	X	X	X	X
Blueberry		X	X			X
Bunchberry	X		X		X	X
Canada plum			X			X
Cherry			X	X	X	X
Elderberry			X		X	X
Grape		X	X		X	X
Hawthorn		X	X		X	X
Huckleberry		X	X			
Strawberry			X			X
Viburnum	X	X	X		X	
<b>MEDICINAL/BEVERAGE</b>						
Bayberry			X			
Bedstraw			X	X	X	
Bristly sarsaparilla		X	X		X	X
Wild sarsaparilla	X	X				X
Buttercup	X	X	X	X		
Common lousewort	X	X	X	X		X
Lily family	X		X			
Sumac		X	X		X	
Sweetfern		X	X	X	X	
<b>ECONOMIC/WEED SEEDS</b>						
Chenopod			X	(X)	X	
Hog peanut	X		X			X
Tick-trefoil		X	X	X		X
Wild sunflower		X	X			X
<b>GRASS SEEDS</b>						
Big bluestem		X		X		X
Grass family		X	X	X		X
Wild rye	X	X	X	X	X	
<b>OTHER SEEDS</b>						
Bean family						
Dogwood			X		X	X
Sedge family	X		X	X		X
Smartweed				X		
Spruce	X					

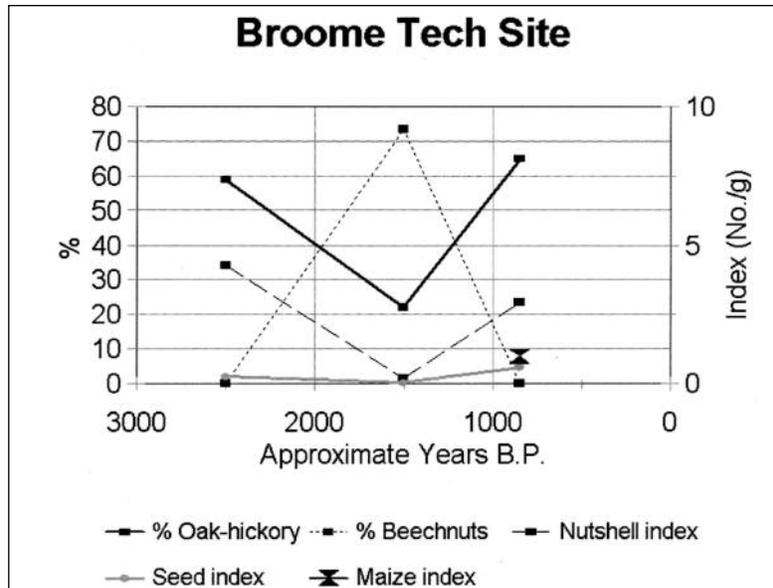


Figure 13.6. Broome Tech Site selected plant remains.

where Braun's (1950:395) map indicates intrusion of southern species along the major river valleys. The Transitional (ca. 950-200 B.C.) and Late Woodland (ca. A.D. 1000-1250) components at Broome Tech had a high percentage of oak and hickory wood charcoal (Figure 13.6). Those components also had a high nutshell index of 4.3 and 3 fragments of nutshell larger than 2 mm per gram of charcoal. In contrast, the early Middle Woodland (ca. 10 B.C. - A.D. 900) component at Broome Tech had a much higher percentage of beech and maple wood charcoal, with a very low nutshell index (0.2). This was the only component with beechnut shells, which represented 73 percent of the nutshell.

Gardner (1997) proposes that Late Archaic foragers may have had incentives to manage local mast-producing trees to increase yields by girdling nonproductive trees. An open canopy favors increased nutshell production and growth of fruit-producing shrubs, berries, and herbaceous plants. The resulting openings in the canopy would have increased available habitats for sun-loving weeds, with the likely consequence that the diet expanded to include alternative foods such as weed seeds (Gardner 1997:177).

The seed assemblage in the Broome Tech Transitional component (Table 13.4) was dominated by weedy species that can be of economic importance, *Ambrosia trifida* (giant ragweed), *Chenopodium berlandieri* (goosefoot), *Desmodium* spp. (tick-trefoil), *Iva* spp. (marshelder), and *Polygonum scandens* (false buckwheat). Although similar species were cultivated and

collected in other parts of the eastern United States at that time (Fritz 1990), none of the Broome Tech seeds were domesticated varieties. The *C. berlandieri* and marshelder were wild type annual seeds. The false buckwheat (*Polygonum scandens*) is a twining perennial (up to 5 m) rather than a low annual plant (up to 50 cm) like the *Polygonum erectum* that was cultivated and perhaps domesticated in Illinois and the Ozarks (N. Asch and D. Asch 1985; Fritz 1990). Giant ragweed seeds are found repeatedly in third and fourth millennium B.P. contexts that implicate giant ragweed as a cultivated annual plant or a utilized garden weed in eastern Kentucky, westcentral Illinois, and the Ozarks (D. Asch and N. Asch 1985b; Cowan 1985; Fritz 1990). Tick-trefoil, as previously mentioned, is a perennial legume with tiny edible seeds that was associated with cultivated native seeds at Cloudsplitter Rockshelter in Kentucky (Cowan 1985) and with maize agriculture in Maine (Asch Sidell 1999d). It is difficult to interpret the presence of minor amounts of the above assemblage of economically important weedy species in the Broome Tech features in a nonagricultural context, particularly since there are no native species of marshelder that grow in southcentral New York today (House 1924).

The presence of economically important annual and perennial weedy species in the Transitional levels in combination with the unusual abundance of nutshell and oak wood suggests that the landscape may have been an open woodland. The presence of hawthorn wood and seeds as well as a yellow star-

**Table 13.4.** Broome Tech Site: Selected Plant Remains.

	Transitional	MW	LW
<b>SUMMARY STATISTICS</b>			
Total charcoal (g)	356.8	368.6	491.5
Number of samples	68	14	110
Oak and hickory wood (%)	58.89	22.18	64.69
Nutshell index (# nuts >2 mm/g charcoal)	4.27	0.17	2.95
Seed index (# seeds >0.5 mm/g charcoal)	0.24	0.03	0.58
Maize index (# fragments >2 mm/g charcoal)	-	-	0.99
<b>Cultivated seeds</b>	-	-	5
<i>Cucurbita pepo</i> , squash	-	-	(1)
<i>Phaseolus vulgaris</i> , bean	-	-	(4)
<b>Fleshy fruits</b>	8	4	150
<i>Crataegus spp.</i> , hawthorn	(1)	(1)	(28)
<i>Fragaria spp.</i> , strawberry	-	-	(1)
<i>Rubus spp.</i> , blackberry / raspberry / dewberry	(7)	(3)	(110)
<i>Sambucus spp.</i> , elderberry	-	-	(7)
<i>cf. Vaccinium spp.</i> , blueberry	-	-	(4)
<b>Economic/weed seeds</b>	38	3	11
<i>Amaranthus/Chenopodium</i> , amaranth / chenopod	-	-	(4)
<i>Ambrosia trifida</i> , giant ragweed	(3)	-	-
<i>Amphicarpa bracteata</i> , hog peanut	-	(3)	(2)
<i>Chenopodium berlandieri</i> , goosefoot	(18)	-	-
<i>Desmodium spp.</i> , tick-trefoil	(4)	-	(2)
<i>Iva spp.</i> , marshelder	(2)	-	-
<i>Polygonum scandens</i> , false buckwheat	(11)	-	(3)
<b>Medicinal/beverage plants</b>	13	-	94
<i>Galium spp.</i> , bedstraw	(4)	-	(2)
<i>Liliaceae</i> , lily family	(1)	-	-
<i>Oxalis spp.</i> , wood sorrel	(1)	-	-
<i>Rhus spp.</i> , sumac	-	-	(4)
<i>Rumex spp.</i> , dock	(2)	-	(3)
<i>Solanum americanum</i> , nightshade	-	-	(1)
<i>Verbena urticifolia</i> , white vervain	(5)	-	(84)
<b>Grass seeds</b>	2	5	6
<i>Elymus spp.</i> , wild rye	-	(5)	(2)
<i>Poaceae</i> , grass family	(2)	-	(4)
<b>Other seeds</b>	23	-	21
<i>Cornus spp.</i> , dogwood	-	-	(1)
<i>Hypoxis hirsuta</i> , stargrass	(1)	-	-
Unknown/unidentifiable	(22)	-	(20)
Total seeds (>0.5 mm)	84	12	287
<b>Percentage Composition</b>			
Cultivated seeds	-	-	1.74
Fleshy fruits	9.52	33.33	52.26
Economic/weed seeds	45.24	25.00	3.83
Medicinal/beverage plants	15.48	-	32.75
Grass seeds	2.38	41.67	2.09
Other seeds	27.38	-	7.32
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

grass seed provides supporting evidence that part of the landscape was open. The paucity of fleshy fruits in the Transitional occupation indicates the area may have lacked underbrush. Such a landscape could have been maintained by ground fire to keep down the underbrush and promote the growth of "grass and herbage" (Cronon 1983:48-51). On the Cumberland Plateau in eastern Kentucky, an increase in charcoal accumulation rates and in fire-tolerant oaks, chestnut, and pines in pollen diagrams after 3000 B.P. coincides with human occupation of rockshelters and cultivation of native plants (Delcourt et al. 1998).

It is difficult to interpret the presence of minor amounts of the above assemblage of economically important weedy species in Broome Tech features in a nonagricultural context. One explanation for this pattern is that fire may have been used to keep the floodplain terrace forests open for optimum mast production (and easier hunting) during the Transitional occupation, but the landscape reverted to the regional climax (northern hardwoods-hemlock-white pine) before the early Middle Woodland occupation, then, with the opening up of fields for maize agriculture during the Late Woodland, the oak and hickory trees may have been selectively left to produce mast, or the renewed use of fire may have effected the change.

The change to a more mesic closed forest assemblage in the early Middle Woodland at Broome Tech site is signaled by the abundance of beech and sugar maple in the wood charcoal, a decrease in oak wood, and a decrease in nutshell to only 0.4 percent of all the plant remains. The nutshell was 73.4 percent beechnut, an unusually large amount for a nut that is seldom represented at archaeological sites. Most of the beechnut was concentrated in one feature, but three other features also contained beechnut shell, making it as ubiquitous as butternut and hazelnut. Presumably, occupation and burning of the site had ceased for a period of time prior to the early Middle Woodland settlement, long enough for the shade-tolerant (and fire-intolerant) beech and sugar maple to fill in the gaps in the hypothesized oak-hickory woodland.

During the Late Woodland occupation, with the presence of maize agriculture, there was a return to dominance by oak and hickory wood charcoal with an admixture of many other species. The nutshell assemblage was again dominated by butternut and hickory as in the Transitional levels, and the overall percentage of nutshell as well as nutshell density increased above early Middle Woodland levels. Acorn was ubiquitously distributed in the midden and fea-

tures, and there were minor amounts of hazelnut and bitternut hickory. Although trace amounts of beech and chestnut wood were identified, no beechnut or chestnut shells were recovered. The opening up of the landscape for agriculture was evidently favorable for mast production. Seed density also increased to 0.58 from a low of 0.03 seeds per gram of charcoal during the early Middle Woodland. About half of the Broome Tech Late Woodland seeds were from fleshy fruits, including hawthorn, strawberry, blackberry / raspberry, elderberry, and possibly blueberry, but there were few seeds of the economically important weeds identified in the lower Transitional. Hog-peanut (*Amphicarpa bracteata*), another perennial legume that was found in association with maize agriculture in Maine, was identified in the Middle Woodland and Late Woodland occupations at Broome Tech. Perhaps the addition of maize and squash to the diet in the Late Woodland made it unnecessary to collect weed seeds as a dietary supplement at this site.

### Lamb Site

The Lamb site was unique in terms of plant remains and provides further possible evidence of the use of fire for landscape alteration in southcentral New York during the Late Woodland (ca. A.D. 800-1300). Braun's (1950:394-395) maps of New York suggested the Lamb site would be located in a chestnut-oak-hickory forest in the broad Chemung River Valley. However, the analysis of wood charcoal, nut, seed, and cultigen remains indicates the environment in the immediate vicinity of the site was quite different from Braun's model. Most unusual was the abundance of pitch pine cone scales and needles in the two largest features (Table 13.5). Assuming that the pine bark and pine wood at the site was also pitch pine (as opposed to white pine), the site was notable for (1) the specialized use of pitch pine wood charcoal in all five features and (2) the predominance of pitch pine bark charcoal in a large feature that also contained maize, five types of nutshell, three or more types of seeds from fleshy fruits, as well as pitch pine cone scales and needles. The two largest features contained small amounts of white oak group, red oak group, hickory, elm, and birch charcoal. Nutshell recovered from Feature 5 indicated the availability of butternut, shagbark or pignut hickory, acorn, beechnut, and bitternut hickory in the vicinity of the Lamb site. Other nuts that could have grown nearby are chestnut, black walnut, shellbark hickory, and mockernut hickory.

Nutshell was found in all samples in Features 1 and

6, and it occurred in 58 percent of the samples from Feature 5. However, the nutshell index was very low, only 0.2 fragments of nutshell per gram of charcoal for the site as a whole. The maize index of 0.01 fragments of maize for every gram of charcoal at the Lamb site was also very low. It compares with 0.06 fragments per gram of charcoal at the upland Park Creek II site and 0.99 in the Late Woodland (ca. A.D. 1000-1250) component of the Broome Tech site. The Lamb site seed index of 0.17 seeds per gram of charcoal compares with 0.01 at Park Creek II and 0.58 at Broome Tech. Seeds from fleshy fruits constituted 95 percent of the seed assemblage at the Lamb site.

Pitch pine is a successional species that comes in after disturbance by fire. It survives repeated burning because it is the only pine with the ability to sprout from stumps. It is one of the few species that can sprout in mineral soil without humus, such as a sandy deposit in a floodplain (Jorgensen 1978). The soil at the Lamb site is mainly silt with sand and a great deal of rock and gravel (Laurie Miroff, pers. comm.). Pitch pine can also colonize abandoned maize fields, although white pine is the more common species in old field situations. The abundance of pitch pine wood, bark, needles, and cone scales in the Lamb site charcoal indicates that fire may have been used for landscape alteration during the Late Woodland. However, the predominance of seeds from fleshy fruits at the Lamb site suggests that the groundcover near the site consisted of a variety of shrubs rather than grasses and weeds. In this respect, the seed assemblage resembles the Late Woodland at Broome Tech, which had 52 percent seeds from fleshy fruits, but few grass or weed seeds.

## CONCLUSIONS

The effect of anthropogenesis on plant communities in the Northeast was assessed by quantitative analysis and comparison of carbonized plant remains from Maine, southern New England, New York, and central Pennsylvania components dating from ca. 4400 B.C.-A.D. 1760. First, the original vegetation of each area was examined, relying principally upon Braun's (1950) model of the deciduous forests of eastern North America. Then, all archaeological plant remains were assigned to plant communities similar to the way in which Yarnell (1984) grouped food plants according to the biotic community in which they were most likely to be collected. All types of nutshell were grouped together to determine if any vari-

**Table 13.5.** Lamb Site Carbonized Plant Remains.

SAMPLE COMPOSITION (>2 mm ct.)	n
Nutshell	
Acorn	3
Beechnut	1
Bitternut	1
Butternut	74
Butternut/hickory	20
Hickory	10
Wood	20,494
Bark, pine	6,168
Twig	339
Pitch	3,583
Pitch pine cone scales	502
Pitch pine fascicles & needles	19
Rhizome	3
Gall	2
<i>Zea mays</i> , maize cupule	6
maize kernel	1
Fungi	1
Unknown	8
Flower buds	20
Seeds >2 mm	1
Seeds <2 mm	91
Total >2 mm	31,256
<b>SEED IDENTIFICATIONS</b>	<b>n</b>
<i>Gaylussacia</i> spp., huckleberry	4
<i>Helianthus</i> spp., wild sunflower	1
<i>Rhus</i> spp., sumac	3
<i>Rubus</i> spp., raspberry, dewberry	7
<i>Sambucus</i> spp., elderberry	75
Fruit skin	1
Unidentifiable	1
Total	92
<b>WOOD IDENTIFICATIONS</b>	<b>n</b>
<i>Betula</i> spp., birch	1
<i>Carya</i> spp., hickory	3
<i>Pinus</i> spp., pine	510
<i>Quercus</i> spp., oak	1
Red oak group	11
White oak group	20
<i>Ulmus</i> spp., elm	3
Ring porous	1
Total	550
<b>SUMMARY STATISTICS</b>	
Sample weight (g)	745.89
# of samples	28
Nutshell index (# >2 mm/g charcoal)	0.20
Maize index (# >2 mm/g charcoal)	0.01
Seed index (# >0.5 mm/g charcoal)	0.17

Table 13.6. Summary of Data Points, Dates, and Sample Sizes Used in Constructing Figures.

Site	Uncalibrated Date B.P. Component	Mean date B.P. (no. dates)	Sample size (no./g)	Nutshell index (# >2 mm/g)	Seed index (# >0.5 mm/g)	Miaze index (# >2 mm/g)	Reference
<b>MAINE</b>							
Sharrow (90.2D)	6320-5695: Middle Archaic	5947 (5)	44/152	.25	.43	-	Asch Sidell 1989b Petersen 1991
Hunter Farm (15.110)	4730-4160: Late Archaic	4445 (2)	31/74	.37	.19	-	Asch Sidell 1989c
Brockway (90.3)	4370-4220: Moorehead	4297 (3)	53/81	.58	1.21	-	Asch Sidell 1989a; Bartone & Petersen 1992
27.60	4140-4020: Moorehead, Susquehanna	4055 (4)	44/160	.03	.05	-	Asch Sidell 1993b
Brockway (90.3)	3740-3670: Susquehanna	3715 (3)	17/75	-	.04	-	
53.38	3520: Susquehanna	3520 (1)	2/7	.27	-	-	Asch Sidell 1993a
Sharrow (90.2D)	3650-3060: Late Archaic	3355 (2)	3/36	.17	-	-	
Ft. Halifax (53.35)	3280-3100: Late Archaic	3168 (4)	75/322	.03	.03	-	Asch Sidell 1990c
27.60	3150-2410: Early Ceramic	2808 (4)	6/64	.06	.25	-	
Evergreens (69.6)	2360: Ceramic	2360 (1)	10/330	0	0	-	Asch Sidell 1990d
27.59	2000: Early Middle Ceramic	2000 (1)	4/58	4.26	.23	-	Asch Sidell 1993b
Tracy Farm (69.11)	2150-1840: Middle Woodland	1750?	4/14	-	-	-	Asch Sidell 2000d
Tranquility Farm (44.12A)	1280: Early Middle Ceramic	1280 (1)	5/102	.04	.91	-	Asch Sidell 1997b
Little Ossipee North (7.7)	1010-570: Late Ceramic	810 (3)	6/336	.95	3.01	.01	Asch Sidell 1990a Will et al. 1996
Chouacoet (5.06)	1390-1090: Middle Ceramic	1240 (2)	4/41	1.51	1.43	-	Asch Sidell 2000a
Early Fall (7.13)	570-460	497 (3)	20/101	2.91	1.15	.70	Asch Sidell 1990b
Tracy Farm (69.11)	130 (900?-500?): L W/Contact	450?	5/167.8	.62	2.23	.89	
Sandy River (29.24)	300-40 (400?-250?): Contact	325?	7/88	1.2	0.28	8.3	Asch Sidell 1992a
Tracy Farm (69.11)	1140-102 (350?-250?): Contact	300?	18/404	.6	1.79	1.99	
Norridgewock Mission (69.2)	530 (260?-190?): Contact	225?	32/381	1.23	.72	8.39	Asch Sidell 1992a, 1996
<b>NEW YORK (upland)</b>							
Raish	4950-3950: Brewerton	4450	4/29	-	.07	-	Asch Sidell 2000c
Park Creek I	3650-3450: Snook Kill	3550	14/24	.57	.65	-	Asch Sidell 2000e
Park Creek II	1050-400: Late Woodland	750	22/782	.01	.01	.06	Asch Sidell 2000f
Plus	550-450: Chance phase, Cayuga Iroquois	500	60/2212	.001	.03	.004	Asch Sidell 1999a

Continues

**Table 13.6.** *Continued*

Site	Uncalibrated Date B.P. Component	Mean date B.P. (no. dates)	Sample size (no./g)	Nutshell index (# >2 mm/g)	Seed index (# >0.5 mm/g)	Maize index (# >2 mm/g)	Reference
<b>NEW YORK (bottomland)</b>							
Fivemile Dam (130-10-1) <sup>1</sup>	6260-5230: Otter Creek, Brewerton	5613 (4)	7/38	43.4	.21	-	Asch Sidell 1992d Cassedy 1998
Couse Goat <sup>1</sup>	4450-3750: Lamoka, Normanskill	4100	34/195	.5	.02	-	Asch Sidell 1999c
Fivemile Dam (130-10-1) <sup>1</sup>	4300-3180: LA-Terminal Archaic	3778 (10)	71/218	4.34	.25	.02	
Broome Tech	2900-2150: Transitional	2500	68/356.8	4.27	.24		Asch Sidell 1999b
Kearney	2050-1890	1950	8/126	.26	.07	-	Asch Sidell 2000b
Broome Tech	1960-1050: Middle Woodland	1505?	14/369	.17	.03	-	
Lamb	1150-650	900	28/746	.2	.17	.01	Asch Sidell 2000g
Broome Tech	950-700: Owasco	850	41/492	2.95	.58	.99	
<b>PENNSYLVANIA</b>							
Memorial Park	5790-6355: Early Laurentian	6000	27/19	1.26	.05	-	Asch Sidell 1995
	5200-4900: Late Laurentian	5000	17/40	18.6	.07	-	Hart & Asch Sidell 1996
	4410-4050: Piedmont	4750	6/77	.22	.04	-	
	4050-3590: Canfield	3500	55/238	2.05	.03	-	
	3095-2830: Orient-Meadowood	3000	12/30	6	.03	-	
	1190-1120: Early Clemson Island	1154 (5)	16/99	5.61	2.12	1.19	
	1030-985: Middle Clemson Island	1015 (4)	6/10	2.27	8.44	2.27	
	900-860: Late Clemson Island	883 (5)	4/28	5.73	2.60	.52	
	660-565: Stewart Phase	610(4)	12/52	1.61	1.55	.82	
<b>CONNECTICUT-adj. NY</b>							
294A-AF2-1	3800-3230	3476 (5)	8/53	6.91	-	-	Asch Sidell 1992c; Millis et al.1995
294A-AF2-1	2060	2060 (1)	12/12	5.66	-	-	
294A-25-2	1930-1760	1870 (3)	9/40	5.79	.30	-	Asch Sidell 1992c; Millis et al. 1995
211-1-1	1100-850: Late Middle Woodland	1013 (4)	11/190	1.05	1.34	.04	Asch Sidell 1992b Webb and Dowd 1995
294A-25-2	790-220	483 (8)	11/66	2.45	.64	.14	
294A-AF2-1	440-430	420(2)	7/115	3.11	.14	.52	
211-1-1	390-240: Late Late Woodland-Contact	297 (3)	15/195	.67	2.19	.06	

Notes: Nutshell and seed indices may not be accurate for Evergreens site because of charcoal collection methods.

<sup>1</sup>Bottomlands outside of migration area for southern species, as mapped by Braun (1950).

ations in overall nutshell frequency between sites and between occupations at the same site might be related to the types of trees that grew near the site rather than to cultural differences in the way nutshell was collected or processed. Frequency and diversity of seeds—particularly weedy species—were used as an indicator of vegetation disturbance, as in Minnis (1978) and Crawford (1997). Finally, annual and perennial weeds associated with maize agriculture in the Northeast were described so that, in the future, the presence of an assemblage of these plants might be used as a proxy measure to recognize occupations engaging in early experimentation with agriculture. Hart (1999) argues that, at first, maize was probably a minor crop, which would not be represented in the archaeobotanical record because of its low level of use, but that pollen studies and stable carbon isotope analysis of large samples of human bone collagen could be used to detect low levels of maize use. Presence of a distinctive assemblage of weedy plants could be used, as well, as a signal that further study of plant remains at a particular site/area would be a worthwhile investment of resources to possibly detect minor levels of maize use.

This study of plant remains from northeastern sites found that:

1. There are regional differences in frequencies of wood charcoal that relate to Braun's hypothesized forest regions. Sites in Maine and New York had a high frequency of species characteristic of the mature northern hardwoods-hemlock-white pine forest region. Sites in and adjacent to the oak-chestnut forest region in southern New England, southeastern New York, and Pennsylvania had a much higher percentage of oak and hickory wood charcoal.
2. There was generally a direct relationship between the amount of oak and hickory charcoal and the frequency of nutshell in each area except Maine, where there are fewer species of oak and hickory. Evidently, nut resources were used for food whenever they were available near a site, whether the nut trees were naturally occurring or encouraged by anthropogenesis.
3. There was an increase in the density and variety of seeds with the presence of maize agriculture in Maine and Pennsylvania and probably at the Connecticut and southeastern New York sites. The increase was related to the opening up of the landscape to create fields, thereby increasing the area for both sun-loving weeds and fruit-bearing

shrubs. However, most of the "weed" seeds at these sites were from perennial plants. In Maine, these consisted of tick-trefoil, hog-peanut, and wild sunflower, as well as the annual *Chenopodium berlandieri*. In Pennsylvania, most of the increase in seed density could be attributed to cultivated native seed crops and the annual weed, black nightshade. At southern New England and New York sites in this study, maize and seed densities were generally quite low.

4. There was some evidence of anthropogenesis involving the use of fire in southcentral New York State. In New York at the bottomland Broome Tech site, there was an elevated oak-hickory wood charcoal ratio in the Transitional occupation and in the Late Woodland occupation compared to other upland and bottomland sites in the central part of the state and compared to the Middle Woodland component at the Broome Tech site. The Transitional and Late Woodland occupations also had a higher ratio of annual and perennial weeds and grasses as well as nutshell, indicating a more open landscape that could have been achieved with the use of fire. The use of fire would result in an increase in the availability of nuts, edible weeds, fruits, and game (Cronon 1983). Another indication of the possible use of fire was the abundance of pitch pine wood, bark, cone scales, fascicles, and needle fragments at the Late Woodland Lamb site, in a bottomland location where the regional climax vegetation would not be expected to include the pioneer species pitch pine.
5. Evidence of early experimentation with horticulture might be present at the Broome Tech site. Although probably too early for maize agriculture, the Transitional component had an assemblage of annual and perennial weeds and grasses (including giant ragweed, *Chenopodium berlandieri*, tick-trefoil, marshelder, and false buckwheat), which are often associated with agriculture. It is possible that the people were experimenting with the cultivation of plants that were part of the Eastern Agricultural Complex, since marshelder is not native to southcentral New York. Further careful examination of Transitional sites in this part of New York would be warranted to study the possibility that some villages were engaging in horticulture at this early date.

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## END NOTES

1. Figure 13.3 does not include sites from the Rumford area in westcentral Maine, which document a significant decline in oak wood through time while consistently maintaining more than 50% wood charcoal from species of the northern hardwoods-hemlock-white pine forest (Asch Sidell 1997a). Among 212 fragments dating 9700 to 8000 B.P., 33 percent were red oak group; among 239 fragments dating 7500 to 5800 B.P., 24 percent were red oak group; and among 207 fragments dating 2500-300 B.P., 5.3 percent were red oak group.
2. The five radiocarbon dates for the Tracy Farm site do not reflect the span of occupation (Cowie, Bartone, and Petersen 2000:106-111). The ceramic sample of 6129 specimens included examples from Ceramic Periods 1-7 in Maine. Middle Woodland plant remains were associated with CP2/3 ceramics (200 B.C.-A.D. 600) and with radiocarbon dates of 200±50 B.C. and A.D. 110±80. The majority of the ceramics were assigned to Ceramic Period 6/7, dating ca. A.D. 1300-1750. European contact began sometime after A.D. 1550. Dates on two maize kernels from features lacking European trade items yielded a modern date and a calibrated date with a 2 sigma range of A.D. 1670-1950, with intercepts at 1695, 1725, 1815, and 1920. Based on the distri-

bution of CP6/7 ceramics at Tracy Farm, it is possible that ceramic manufacture was abandoned in the mid 1600s. When the village moved from Tracy Farm to the Norridgewock Mission site on the east side of the river in the 1690s, no ceramics were moved to or manufactured at the new site (Cowie, Bartone, and Petersen 2000).

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## CHAPTER 14

# FROM HUNTER-GATHERER CAMP TO HORTICULTURAL VILLAGE: Late Prehistoric Indigenous Subsistence and Settlement

James B. Petersen and Ellen R. Cowie

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### INTRODUCTION

Native populations in northeastern North America, or the Northeast, demonstrated various subsistence and settlement patterns during the 1500s and 1600s at the time of first contact with European intruders. For the purposes of this chapter, the Northeast is roughly defined as the woodlands region to the north of the Carolinas, to the east of Ohio, and to the south of the Gulf of St. Lawrence in Quebec. In the colder, more restrictive latitudes of the Northeast, indigenous groups were hunter-gatherers who moved seasonally across the landscape when first recorded by Europeans. In the more southerly latitudes, including eastern New York and the Middle Atlantic area, for example, the Natives who first met Europeans were farmers, living for longer periods—even permanently—in large substantial settlements. By the 1600s, southern Quebec and northern New England clearly formed the rough border between these generalized patterns, although local variations existed across the broad region. Yet, uncertainty remains about just when and where regional differences between farmers and nonfarmers existed, to what degree farming transformed Native societies, and whether European contact and/or indigenous factors were responsible for its introduction. Also, we might ask what it is about farming that led to its adoption in the Northeast and elsewhere. What were the historical and environmental factors that brought it to the region and structured its prehistoric distribution?

This chapter addresses at least the more “simple” of these questions from the perspective of northern New England, with emphasis on the transition zone between hunter-gatherers and horticulturalists, and the archaeological correlates that accompanied the local introduction of farming. As defined here, northern New

England includes Maine, New Hampshire, and Vermont. We suggest that the seeds of substantial change occurred regionally in terms of settlement patterns during the Middle Woodland period, before ca. A.D. 1000, at least in some settings. Subsistence change perhaps began by this time or more clearly during the subsequent early Late Woodland period, ca. A.D. 1000-1300, as Native peoples adopted subsistence farming extensively and began to settle for longer periods in larger settlements. Although differentially distributed, these changes occurred in much of the Northeast, especially in areas to the south and west of northern New England. These progressively more substantial changes became widespread during the final portion of the Late Woodland, ca. A.D. 1300-1550/1600, and produced the early historic societies known through ethnohistory and archaeology.

We use the terms “farming” and “horticulture” interchangeably in this chapter, distinguishing them from “agriculture” per se following one anthropological convention. This convention recognizes “horticulture” as “simple” farming undertaken using solely human labor without the use of draft animals and irrigation and in most cases, little or no fertilizer. “Shifting,” “swidden,” or “slash and burn” are used synonymously for this sort of farming, among other terms, to denote its relatively extensive land use. “Agriculture” employs several or more innovations relative to “horticulture,” sometimes including draft animals, irrigation, and/or fertilizer, among others things and is more consistently based on intensive, rather than extensive, land use.

In any case, we believe that the adoption of maize-beans-squash horticulture was a significant event for most northeastern Natives and that it rather quickly brought some of the largest changes ever to affect indigenous societies before the arrival of the

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Europeans. This interpretation differs from recent suggestions made by some researchers who contend that farming was a “non-event,” that is, it was not of much importance in terms of subsistence and settlement, and it became prevalent in some coastal and other areas only due to European contact. We make the case that this transformation predated European contact in most, if not all, cases, except in portions of the far north, where farming only arrived later during the Contact period, ca. A.D. 1550/1600-1750. Recent archaeological and limited (but long available) ethnohistoric evidence from the region are summarized herein to support these suggestions.

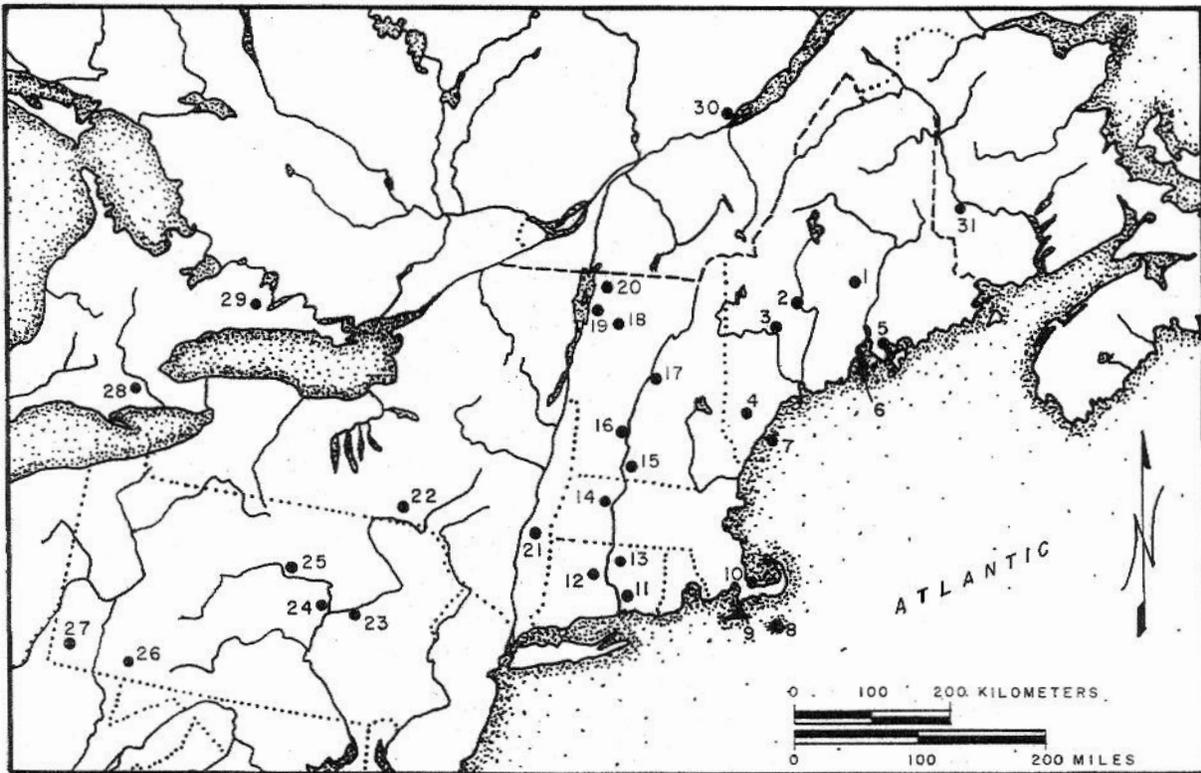
The setting of our individual and collaborative research, along with others, lies in northern New England toward the middle and southern reaches of what we call the far Northeast, the extreme northeastern portion of the region south of the Gulf of St. Lawrence. The far Northeast stretches from New England northward and eastward through southern Quebec and the Maritime Provinces of Canada. Farming was represented prehistorically in western Maine and other portions of northern New England before European contact, but the indigenous peoples of eastern Maine and the Maritime Provinces were essentially nonhorticultural at Contact, on the basis of all available evidence (Bourque 2001:87). Historically, horticulture was introduced in some northern areas, as at Meductic on the St. John River in New Brunswick (Prins 1992) (Figure 14.1). This was, in effect, a continuation of the prehistoric pattern of the progressive introduction of farming northeastward until it reached its ecological limit, or near limit, but in this case, European factors were at least partially responsible for its spread. Looking broadly, if we can document that horticulture had transformed Native societies at its northeastern, pre-contact limit, then it is safe to presume that similar things had happened to the south and west, for example, in southern New England, New York State, Pennsylvania, and southward. Moreover, we may be better able to identify the reasons behind its adoption and nonadoption in local and regional contexts.

In southern New England and southwestward into the Middle Atlantic and beyond, all indigenous societies were at least in part horticultural at the time of European contact (e.g., Bragdon 1996; Custer 1996; Dimmick 1994; Potter 1993; Snow 1980). However, in a few limited coastal areas, such as southern New England and nearby Long Island, New York, and perhaps the eastern Delmarva Peninsula, for example, some researchers have suggested that the introduction

of farming was inconsequential or even a “non-event” on local and sometimes broader levels. They suggest that farming was of little consequence to some pre-contact Late Woodland societies, especially those on the Atlantic Coast. It may have had a very late, even European-induced, arrival there (e.g., Bernstein 1992, 1999; Bragdon 1996; Ceci 1977, 1980, 1990; Chilton 1999; Chilton et al. 2000; Custer 1988, 1989; Little and Schoeninger 1995; McBride and Dewar 1987; Williams and Bendremer 1997).

In this view, traditional subsistence and perhaps settlement patterns of the Middle Woodland period (and earlier periods) persisted into the Late Woodland period, and cultivated crops were variably adopted with little consequence. Although nowhere made fully explicit, this scenario is seemingly based primarily on the paucity of unequivocal domesticates, predominantly maize (*Zea mays*), squash (*Cucurbita pepo*), and beans (*Phaseolus vulgaris*), found in southern New England and Long Island sites attributable to late prehistory. In addition, some scholars suggest that there was little, if any, shift in settlement patterns during late prehistory, at least locally (cf. Custer 1988:131, 1996:263-264). Many explicitly recognize significant variation in settlement and subsistence across this portion of the Northeast, from coastal to noncoastal (or interior) riverine settings. However, they downplay horticulture overall among late prehistoric societies in favor of local, non-cultivated food resources from land and sea. They further suggest that marine resources were heavily emphasized on the coast and cultigens were unimportant there during late prehistory, in spite of ethnohistoric evidence to the contrary, as briefly described below. According to the horticulture as a “non-event” scenario, crops were raised in some noncoastal settings and details about this small-scale farming have been overgeneralized to the entire region, including the coast, on the basis of early historic accounts.

Alternatively, we suggest that the horticulture as a “non-event” scenario has not been conclusively demonstrated, although this may be possible in the future under more rigorous testing. We do not expect to confirm this or any other competing hypothesis any time soon on the basis of available evidence. Profound difficulties work against the recovery of prehistoric cultigens in the archaeological record for various reasons, including Native processing and disposal factors and post-depositional preservation. Consequently, the frequency and distribution of cultigen remains in the archaeological record may grossly under-represent their indigenous usage during late prehistory. We



**Figure 14.1.** Distribution of selected prehistoric and historic Native American archaeological sites in northeastern North America.

- |                                   |   |                              |
|-----------------------------------|---|------------------------------|
| 1—Sharrow                         | 13—Burnham-Shepard                      | 24—St. Anthony               |
| 2—Norridgewock sites              | 14—Pine Hill                            | 25—Fisher Farm/Memorial Park |
| 3—Conant                          | 15—Fort Hill                            | 26—Gnagey                    |
| 4—Early Fall/Little Ossipee North | 16—Skitchewaung                         | 27—Meadowcroft               |
| 5—Goddard/Nevin                   | 17—Ingalls                              | 28—Grand Banks               |
| 6—Crocker/Turner Farm             | 18—Rogers Farm/VT-CH-619                | 29—Dawson Creek              |
| 7—Great Moshier                   | 19—Donohue/Shelburne Pond/Winooski      | 30—Place Royale              |
| 8—Nantucket sites                 | 20—Bohannon/Headquarters/Highgate Falls | 31—Meductic                  |
| 9—Hornblower II                   | 21—Roeliff Jansen Kill (211-1-1)        |                              |
| 10—Sandy's Point                  | 22—Boland/Roundtop                      |                              |
| 11—Mago Point/Selden Island       | 23—Catawissa                            |                              |
| 12—Morgan                         |   |                              |

suggest that too few samples have been carefully collected, analyzed, and reported to yet dismiss horticulture as a non-event in the Northeast. In fact, if anything, the rapid accumulation of cultigen data over the past 15 years or so suggests that farming arrived earlier and in a more complicated, nonsynchronous fashion than was remotely recognizable just 20 years ago in the Northeast.

Prehistoric processing and disposal and archaeological preservation certainly limit the recovery of fragile cultigens in the first place and thus, we see only tiny, if sometimes representative, samples in many cases (e.g., Hart 1999b:159-163; Lopinot 1992:55-59; Moncton 1992:12-24; Yarnell 1982). For example, Yarnell (1982:2) notes: "Seed foods that were pulverized prior to any processing near fires are likely

to be poorly represented; but where parching of whole seeds was practiced, and it seems to have been common, representation may be excellent to excessive." Secondly, unless fine screening and flotation are systematically and routinely employed, we will not have adequate samples to properly address the question of horticultural dependence. Even where past or current research has employed fine-grained recovery techniques, one other factor must be considered: Trained analysts, including paleoethnobotanists are needed to do the critical identifications and contribute to interpretations. Most archaeologists and many botanists will not recognize highly fragmentary cultigens (and other floral remains) among what are merely "charcoal" samples to most of us. Horticulture (and other indigenous plant usage) will remain grossly underappreciated all across the region until fully trained paleoethnobotanists routinely study carbonized floral samples.

Thus, we feel that most past research and even some recent efforts may not be fully representative of the indigenous dependence on cultivated crops and other plant foods, for both methodological and archaeological reasons. Even where it is ultimately documented that local crop raising was of limited importance, the strong likelihood of intergroup trade in cultigens still may have allowed local dependence on them and also left them more or less invisible in the archaeological record. Trade in cultigens may have occurred on the Atlantic Coast in southern New England, for example, and in eastern Maine beyond the limit of historically documented crop cultivation (e.g., Bragdon 1996; Dimmick 1994:245-246; Williams and Bendremer 1997; cf. Spiess and Cranmer 2001:20-22).

We also suggest that there may be a bias against discovery and investigation of Late Woodland and Contact settlements in some regional settings. Like others before us, we hope to see this bias rectified through future regional research. In our northern New England experience, Late Woodland and later sites are relatively rare compared to many sites from earlier periods, at least beyond the coast. One factor may be that Late Woodland and Contact groups lived in a smaller number of settlements and these were larger and more permanent than settlements of their predecessors. Obviously, our suggestion here is simplistic, since we have unequivocal evidence of smaller, contemporaneous sites on or near the Atlantic Coast (e.g., Bragdon 1996; Hasenstab 1999; Thorbahn 1988). Other forms of bias potentially work against discovery of these sites too, including historic disturbance and deep burial in floodplains. Thus, it remains unclear if we have repre-

sentative settlement samples for this critical period.

Evidence primarily from Maine and Vermont is summarized herein to support our assertions, and information from other areas of the Northeast is addressed, as appropriate. Limited settlement-pattern data, presumed storage pits and some artifact data specifically related to pottery and textiles, support the tentative interpretation of significant subsistence and settlement change during the Late Woodland period. Each of these data classes is very briefly summarized after further discussion of the idea of horticulture as a "non-event." In the end, our disagreement with those who postulate that the arrival of farming was a "non-event" is probably a minor dispute. We all seem to recognize that horticulture had prehistoric origins across much of the broad Northeast. Whether actual crop raising was widespread or isolated, horticultural products were certainly available through one means or another during late prehistory in the Northeast.

## MIDDLE-LATE WOODLAND PERIOD SUBSISTENCE AND SETTLEMENT

### Horticulture as a "Non-event"

Research across New England and surrounding areas to the north, south, and west has been hampered in the past by rather crude excavation and recovery techniques, incomplete analyses, and even more incomplete reporting of data. Dena Dincauze has repeatedly noted that northeastern archaeology has suffered from much neglect. The present challenge is to see New England and the broader Northeast better "centered," working to modernize and shift our research from the periphery of broad North America toward its very center (Levine et al. 1999). However, we also need to avoid replacing simplistic past models with simplistic contemporary ones, as may result when models are based on single sites and small, sometimes inconsequential samples.

For example, we can applaud the early attempts made by Lynn Ceci (e.g., 1977, 1980, 1990) to address subsistence and settlement patterns for the Middle Woodland, Late Woodland, and Contact periods in coastal New York, and the more recent efforts her work has spawned. Ceci suggested that very few cultigens were used in coastal New York prehistorically and thus, that horticulture was unimportant to coastal peoples after her careful review of the then-available evidence. This hypothesis can no longer be accepted at face value, however. The carbonized floral samples

available to Ceci were simply too limited and their recovery too poorly controlled to determine if they are truly representative of late prehistoric plant usage, including crops, on Long Island. The case is only slightly better today in the broad Northeast, on both the coast and in the interior, although we have begun to make rapid progress in some circumstances (e.g., Cassedy and Webb 1999; Crawford 1999; Largy et al. 1999; Lavin 1988a). It is important to recognize that Ceci changed her views about the timing of coastal sedentism (but not necessarily horticulture) over the course of her research, pushing sedentism back into the Middle and Late Woodland periods, even though she first recognized it only during the Contact period. In fact, it is remarkable that Ceci had any prehistoric cultigen samples to work with at all, given their origin in coarsely excavated and incompletely analyzed site samples, as she recognized herself, along with the aforementioned preservation bias.

Time, money, and patience for teasing details from the northeastern record have been all too rare to date. This bias is particularly the case when and where it comes to large-scale excavations and extensive sampling of individual sites. Researchers have begun to rectify the situation where sites are relatively small and/or a representative sample can be readily obtained from them. Some periods predating the Late Woodland have produced relatively substantial samples, where settlements were small to modest in size, and these have been reasonably well outlined over the past 20 to 30 years of research. For example, Middle Woodland components at the Winooski and Besette sites in Vermont (see Figure 14.1) are reasonably well understood, given sizeable excavations there. Other Middle Woodland components are known on the Atlantic Coast in Connecticut, Maine, Massachusetts, and New York, among others (e.g., Lavin 1988a; Lightfoot et al. 1987; Petersen and Power 1983; Thomas et al. 1996). It may be more difficult to argue that we have as many adequately studied and reported samples for the occasionally larger settlements of the Late Woodland period, as seemingly became more the norm, at least in the interior (e.g., Cowie et al. 1999; Custer 1996; Lavin 1988a, 1988b; Waller 2000). Samples from small coastal sites are also known for the Late Woodland period (e.g., Bernstein 1992, 1999; Funk and Pfeiffer 1993; Lightfoot et al. 1987; Ritchie 1969a, 1969b). Overall, adequate samples of carbonized floral remains from both coastal and noncoastal sites are rare for the Late Woodland period (but see Asch Sidell, this volume). In the case of Fisher's Island, near the Connecticut coast, for example, only 6 out of 27 (or 22

percent) prehistoric sites produced carbonized floral remains, but of these, 5 sites produced maize remains (Funk and Pfeiffer 1993; see Bernstein 1999:111-112). Are these adequate samples, and if so, what does it mean that 83 percent of the sites producing charcoal produced maize as well? Is this a significant, insignificant or indeterminate representation?

Of the small number of carefully controlled samples, a still smaller number have been analyzed by paleoethnobotanists. A trained botanist (who has not necessarily had experience studying carbonized floral samples) may not be able to discern cultigens among carbonized floral remains (e.g., Lightfoot et al. 1987). We know this firsthand from having worked with both paleoethnobotanists and botanists over many years. In other cases, carbonized floral remains are more or less completely absent in both coastal and noncoastal settings due to "poor preservation, absence of behaviors that lead to the discard and deposition of plant remains, or sampling problems" (Bernstein 1999:103).

Fortunately, paleoethnobotanical evidence has begun to accumulate over the past 10 to 20 years for most periods of prehistory and early history, largely through the work of a small, devoted cadre of paleoethnobotanists. People such as Tonya Largy, Nancy Asch Sidell, and Cindy McWeeney, among others (see Hart 1999c), have begun to tackle the mountain of "charcoal" newly accumulating across the region as a consequence of more exacting excavations and recovery techniques. Nonetheless, paleoethnobotany is laborious, time-consuming, and often very expensive, well beyond the means of many researchers, except where consulting archaeology funds are available. Perhaps even more unfortunately, too few researchers even realize what they may be missing without paleoethnobotanical research (cf. Hart 1999c).

We may be presumptuous here in making broad suggestions about how this situation might be rectified, but we will be brief. For example, it has been the standard practice of the UMF Archaeology Research Center for over a decade now that all radiocarbon samples be analyzed by a paleoethnobotanist before submission for radiocarbon dating. If we have the money for dating, then we also must find the money for paleoethnobotanical analysis of particular samples. Likewise, it has been our practice for over 16 years that all feature fill from all cultural features recognized in the field is minimally wet-screened in the laboratory through 1/8 inch and 1/16 inch mesh screen. Some subsamples have been floated as well in recognition of the increased recovery of small seeds and other macrofloral remains retrieved through flotation (e.g.,

Asch Sidell 1999; Cowie et al. 1999). This has already cost many thousands of dollars at this one institution alone, probably well over \$100,000 to \$150,000 cumulatively. These costs are related to the retention of feature fill during fieldwork, its processing in the laboratory, and payment for analysis of samples.

How will such labor-intensive and potentially very expensive research be possible for those of us who only do nonconsulting research? It probably will not be possible in many cases for various reasons. Consequently, without systematic recovery and processing of Middle and Late Woodland samples and correlative paleoethnobotanical analysis, we should be cautious regarding pronouncements about the nature of regional subsistence patterns during these (and other) periods. Likewise, past samples derived from excavations screened using only 1/4 inch mesh, or those left completely unscreened, cannot be used to reliably reconstruct subsistence, generally, no matter how carefully they were excavated and analyzed.

### **Paleoethnobotanical Data**

Moving on to the results of the regional research of paleoethnobotanists, a wide range of domesticates and native, noncultivated plants have been identified over the past decade. We need not fully repeat these results here, given other chapters in the present volume and the recent volume edited by Hart (1999c). Nonetheless, the available paleoethnobotanical evidence alone suggests that Late Woodland peoples used a wide variety of cultivated and wild plant resources, along with wild animal foods. We believe that minimally cultigens were commonly raised and perhaps became important in riverine settings across New England and to the south and west during early Late Woodland times, that is, ca. A.D. 1000-1300 (uncalibrated), and more certainly by A.D. 1300 (e.g., Chapdelaine 1993; Fritz 1990; King 1999; Smith 1989:1570). Although still relatively rare, divergent dates are available for maize at various sites in the broad Northeast, in some cases only generally associated and in others directly dated, among other cultigens and more diverse wild plant remains (Table 14.1).

Details from recent paleoethnobotanical research and absolute dating, if taken on face value, suggest that maize took more than 1,500 years to spread from Ohio and Pennsylvania to its prehistoric limit in the Northeast and far Northeast, with pertinent dates still older farther south and west. Beans seemingly arrived later and squash arrived much earlier, although relevant data are scarce. Here we are tentatively assuming

that the general associations between radiocarbon dates and cultigens we have included in our review are correct (see Table 14.1) and that cultigens were grown locally where they have been recovered and dated. More conservatively, using direct AMS dates alone, it appears that it took 500 to 1,000 years for maize horticulture to spread from Ohio and southern Ontario into northern New England, but this time span may not be fully representative due to the small number of available dates. In any case, the relevant AMS dates for cultigens are as early as ca. A.D. 380-450 (A.D. 442, 448, 468, 482, 530 and A.D. 562, 592, 596 calibrated) at Grand Banks in southern Ontario.

In northern New England, the few direct AMS dates on Late Woodland cultigens range from ca. A.D. 1110 to 1380 (A.D. 1216, 1275 and A.D. 1334, 1336, 1400 calibrated) combined. These direct dates are based on maize at the Headquarters site on the Missisquoi River in Vermont, a bean at Skitchewaung on the Connecticut River in Vermont, and maize at Little Ossipee North on the Saco River in Maine, for example. From the Hudson River eastward to Maine, maize apparently spread over this same period, between A.D. 1110 (A.D. 1216 calibrated) in the west and A.D. 1380 (A.D. 1334, 1336, 1400 calibrated) in the east, using the few available direct AMS dates (see Table 14.1; cf. Crawford et al. 1997:Table 1; Hart 1999b:Table 1, 1999c). Maize-beans-squash horticulture also appeared more widely and perhaps more rapidly in various other nearby areas, including the full breadth of the Middle Atlantic region by ca. A.D. 900-1200 (uncalibrated), or so various researchers have argued (e.g., Custer 1996:263-264; Dent 1995:254, 268; Potter 1993:143, Table 9; but see Hart and Scarry 1999; Hart et al. 2002). As noted above, however, there are apparently notable exceptions such as along much of the Delmarva Peninsula, coastal New York on Long Island, and some of the southern coast of New England, where cultigens are rare or have yet to be commonly identified (e.g., Bernstein 1999; Stewart 1994:Figure 82).

Additional data from New England are relevant here. In the Connecticut River drainage of Vermont, maize apparently appeared by at least A.D. 1100±50 (A.D. 1212 calibrated), as represented at the Skitchewaung site, with beans and squash roughly contemporaneous at Skitchewaung or soon thereafter. However, most of the Skitchewaung dates are only general associations (Heckenberger et al. 1992). Several recent AMS dates for beans from Skitchewaung include A.D. 1185±50 (A.D. 1275 calibrated), along with A.D. 1280 (A.D. 1297 calibrated) and A.D. 1350 (A.D. 1327, 1346, 1393 calibrated) (Hart and Scarry 1999). Notably,

the AMS date of A.D. 1185 (A.D. 1275 calibrated) on a bean helps confirm the general association of A.D. 1100 (A.D. 1212 calibrated) with cultigens at Skitchewaug, since it provides a statistically indistinguishable date for the same storage pit feature.

Recent direct and generally associated dates for maize from northwestern Vermont lend additional support for its relatively early arrival in interior northern New England. As sampled by the UMF Archaeology Research Center, deeply buried, stratified deposits at the Headquarters site on the Missisquoi River delta in Swanton, Vermont, document a long prehistoric sequence, with a series of Late Woodland dates on maize, ca. A.D. 1110-1540 (A.D. 1216-1452 calibrated). Overall, these include one direct AMS date for maize of A.D. 1110±40 (A.D. 1216 calibrated) at Headquarters, which is statically indistinguishable from the earliest general maize date from Skitchewaug. Three other dates from stratified Late Woodland contexts with general maize associations at the Headquarters site include A.D. 1330±50 (A.D. 1315, 1354, 1387 calibrated), A.D. 1370±70 (A.D. 1332, 1340, 1398 calibrated), and A.D. 1540±40 (A.D. 1452 calibrated).

The University of Vermont Consulting Archaeology Program recently dated another general association for maize at the single-component Bohannon site, just across Lake Champlain from the Missisquoi delta in Alburg, Vermont. A general maize date of A.D. 1250±60 (A.D. 1290 calibrated) was obtained from a Bohannon pit feature (Mandell et al. 2001; J. Crock, pers. comm. 2001). In addition, the Donohue site on the lower Winooski River in western Vermont previously produced a general association for maize as early as A.D. 1440±115 (A.D. 1421 calibrated) (Bumstead 1980; Thomas and Bumstead 1979).

The Pine Hill site near the Connecticut River in Massachusetts has produced a direct AMS date on maize of A.D. 1550±60 (A.D. 1450 calibrated) (Chilton et al. 2000). The Burnham-Shepard site, farther south in the Connecticut portion of the drainage, produced a direct AMS date of A.D. 1330±70 (A.D. 1315, 1354, 1387 calibrated) on maize and A.D. 1400±60 (A.D. 1407 calibrated) on a bean (Bendremer and Dewar 1993). Still other contemporaneous dates are known from the Mago Point, Morgan, and Selden Island sites, among others, but these are only general associations (Bendremer and Dewar 1993; Cassedy and Webb 1999).

The earliest general Skitchewaug date and the direct AMS date from Headquarters in Vermont roughly match the reassessed and earliest maize at the Roundtop site in the Susquehanna River drainage of

New York State (Ritchie 1969b). The Roundtop association has been confirmed by one of a series of AMS dates obtained by Hart (1999a, 2000). However, farther south and west maize may be as old as A.D. 705-965 (A.D. 776-1024 calibrated) at the Catawissa, Fisher Farm, and Memorial Park sites, among others, in the Susquehanna drainage of Pennsylvania, along with older squash and younger beans based on other recent research (see King 1999:Table 2.3). However, of the maize-related later components at these sites, only maize from Memorial Park has been directly dated using the AMS technique, including dates of A.D. 965 (A.D. 1024 calibrated) and A.D. 1530 (A.D. 1448 calibrated) (e.g., Hart and Asch Sidell 1996; King 1999). Thus, as elsewhere except where AMS dates are available, the precise dating of these domesticates remains uncertain.

Squash, or gourd, is much older than maize and beans in the Northeast, dating back to 675±45 B.C. (801 B.C. calibrated) at Memorial Park on the basis of a direct AMS date. It is perhaps much older there, also directly AMS dated to 3454±552 B.C. (4318, 4298, 4251 B.C. calibrated). Squash/gourd is slightly older still at the Sharrow site in Maine, where it has been directly AMS dated to 3745±110 B.C. (4522, 4509, 4503 B.C. calibrated) (Hart and Asch Sidell 1996, 1997; King 1999; Petersen 1991; Petersen and Asch Sidell 1996). The significance of these early finds has yet to be fully appreciated and the potential implications are quite diverse.

In the Hudson Valley of New York, recent dates on maize include general and direct associations at the Roeliff Jansen Kill site (211-1-1). Using only associations that seem reliable, we find maize directly AMS dated to A.D. 1140±50 (A.D. 1224, 1231, 1239 calibrated) at Roeliff Jansen Kill (Cassedy and Webb 1999). A general association for maize is also known from the Hornblower II site on Martha's Vineyard at A.D. 1160±80 (A.D. 1259 calibrated) (Ritchie 1969a).

Farther to the north and east, maize is represented by A.D. 1380-1490 (A.D. 1334, 1336, 1400-1439 calibrated) in general associations at the Early Fall site on the Saco River, again with squash and beans. Asch Sidell (1999:213) tells us: "It was unexpected to find that 70 percent of the water-screened samples from Early Fall site contained the remains of cultivated plants in low frequencies, a percentage that is comparable to Mississippian sites in the Midwest where maize is thought to have been an important part of the diet."

At the nearby Little Ossipee North site, also on the Saco River, an AMS date of A.D. 1380±40 (A.D. 1334, 1336, 1400 calibrated) provides another direct association for maize, and this equals the oldest general

**Table 14.1.** Selected Radiocarbon Dates in Direct and General Association with Cultigens in the Northeast.

Site	Lab Number	C14 Age	Calibrated 2σ with intercepts <sup>1</sup>	Material Dated
Bohannon	Beta-154528	700±60 a	A.D. 1220 (1290) 1399	charcoal
Boland	Beta-21533	940±80 a,b	A.D. 904 (1040, 1100, 1116, 1141, 1151) 1264	charcoal
Burnham-Shepard	Beta-27676	620±70	A.D. 1275 (1315, 1354, 1387) 1435	maize
	Beta-29619	550±60	A.D. 1297 (1406) 1445	bean
Conant	Beta-103493	390±60 a	A.D. 1419 (1476) 1645	charcoal
	Beta-103494	260±60 a	A.D. 1479 (1648) 1948	charcoal
	Beta-103495	220±60 a	A.D. 1519 (1662) 1950	charcoal
Dawson Creek	S-2207	1405±60 a	A.D. 540 (649) 762	charcoal
Donohue	GX-6299	510±115 a	A.D. 1280 (1421) 1642	charcoal
	GX-6298	250±115 a	A.D. 1433 (1652) 1954	charcoal
Early Fall	Beta-29671	570±70 a,b,c	A.D. 1286 (1334, 1336, 1400) 1445	charcoal
	Beta-29079	460±60 a	A.D. 1331 (1439) 1622	charcoal
Fisher Farm	UGA-2683	1245±70 a	A.D. 656 (776) 976	charcoal
	UGA-2676	875±125 a	A.D. 898 (1164, 1169, 1186) 1386	charcoal
	UGA-2276	600±105 a	A.D. 1223 (1327, 1346, 1393) 1478	charcoal
Gnagey	GAK-5150	1070±80 a	A.D. 778 (984) 1158	charcoal
Grand Banks	TO-5307	1570±90	A.D. 258 (442, 448, 468, 482, 530) 657	maize
	TO-5308	1500±150	A.D. 238 (562, 592, 596) 860	maize
	TO-4585	1250±80	A.D. 645 (775) 979	maize
	TO-4584	1060±60	A.D. 785 (991) 1152	maize
	TO-5875	970±50	A.D. 983 (1029) 1207	maize
Headquarters	Beta-156907	840±40	A.D. 1045 (1216) 1278	maize
	Beta-156911	620±50 a	AD. 1283 (1315, 1354, 1387) 1418	charcoal
	Beta-156909	580±70 a	A.D. 1284 (1332, 1340, 1398) 1443	charcoal
	Beta-156908	410±40 a	A.D. 1427 (1452) 1627	charcoal
Hornblower II	Y-1653	790±80 a	A.D. 1037 (1259) 1385	charcoal
Little Ossipee North	Beta-102060	570±40	A.D. 1300 (1334, 1336, 1400) 1433	maize
Mago Point	Beta-21234	840±80 a	A.D. 1021 (1216) 1296	charcoal
Meadowcroft	SI-2051	2325±75 a	758 (396) 201 B.C.	charcoal
	SI-1674	2290±90 a	757 (387) 119 B.C.	charcoal
	SI-2487	2155±65 a,c	386 (198, 188, 180) 2 B.C.	charcoal
	SI-2362	2075±125 a,c	396 (89, 78, 57 ) B.C. - A.D. 221	charcoal
	SI-1668	2820±75 c	1255 (973, 956, 941) 816 B.C.	charcoal
	SI-1665	2815±80 c	1256 (979,957,939) 807 B.C.	charcoal
Memorial Park	AA-19127	985±45	A.D. 282 (1024) 1161	maize
	AA-19126	420±40	A.D. 1423 (1448) 1622	maize
	AA-19127	5404±552	5477 (4318, 4298, 4251) 2902 B.C.	squash/cucurbit
	AA-19128	2625±45	887 (801) 764 B.C.	squash/cucurbit

*Continues*

**Table 14.1.** *Continued*

Site	Lab Number	C14 Age	Calibrated 2σ with intercepts <sup>1</sup>	Material Dated
Morgan	Beta-20147	630±70	A.D. 1267 (1304, 1367, 1385) 1431	charcoal
	Beta-20146	590±70	A.D. 1281 (1329, 1343, 1395) 1441	charcoal
Norridgewock sites	Beta-43974	300±80 a,c	A.D. 1438 (1637) 1948	charcoal
	Beta-104792	130±40	A.D. 1675 (1689, 1729, 1810, 1922, 1948) 1953	maize
Pine Hill	GX-21994	400±60	A.D. 1414 (1468) 1642	maize
Place Royale	Beta-26467	930±65 a	A.D. 989 (1043, 1091, 1119, 1140, 1155) 1257	charcoal
	RL-1831	790±100 a	A.D. 1023 (1259) 1396	charcoal
	Beta-26468	715±70 a	A.D. 1193 (1285) 1400	charcoal
Roeliff Jansen Kill (211-1-1)	Beta-53451	1090±60 a	A.D. 780 (979) 1030	charcoal
	Beta-84969	810±50	A.D.1069 (1224, 1231, 1239) 1288	maize
	Beta-84970	590±60	A.D. 1286 (1329, 1343, 1395) 1437	maize
	Beta-53238	250±50 a	A.D. 1494 (1652) 1947	charcoal
	Beta-84971	170±50	A.D. 1645 (1676, 1764, 1770, 1775, 1802, 1939, 1946) 1952	maize
Roundtop	AA-26541	830±45	A.D. 1045 (1218) 1281	maize
	AA-21979	675±55	A.D. 1260 (1297) 1403	maize
	AA-21980	670±55 a	A.D. 1262 (1297) 1404	charcoal
	AA-23106	658±48	A.D. 1276 (1299, 1374, 1376) 1404	bean
	AA-26539	440±45	A.D. 1411 (1443) 1616	maize
	AA-21978	330±45	A.D. 1447 (1522, 1573, 1627) 1656	maize
	AA-26540	315±45	A.D. 1453 (1528, 1551, 1633) 1661	bean
Sharrow	Beta-18234	6320±110 c	5481 (5303) 4998 B.C.	charcoal
	AA-7491	5695±100	4775 (4522, 4509, 4503) 4341 B.C.	squash/cucurbit
Selden Island	Beta-5312	1060±70 a	A.D. 782 (991) 1157	charcoal
Skitchewaugh	Beta-39175	850±50 a,b	A.D. 1036 (1212) 1279	charcoal
	Beta-24210	830±60 a,b,c	A.D. 1036 (1218)1288	charcoal
	AA-29120	765±50	A.D. 1188 (1275) 1299	bean
	Beta-34057	760±50 a,b	A.D. 1190 (1276) 1376	charcoal
	Beta-29831	730±60 a	A.D.1195 (1282) 1391	charcoal
	AA-29119	670±45	A.D. 1274 (1297) 1399	bean
	Beta-34058	630±50 a	A.D. 1281 (1304, 1367, 1385) 1414	charcoal
	AA-29121	600±50	A.D. 1289 (1327, 1346, 1393) 1428	bean
St. Anthony	Beta-22813	950±80 a	A.D. 901 (1037, 1143, 1148) 1260	charcoal
	Beta-21982	760±90 a	A.D. 1040 (1276) 1398	charcoal
	Beta-22692	670±90 a	A.D. 1211 (1297) 1431	charcoal

<sup>1</sup>Calibrated with CALIB 4.3 (Stuiver et al. 1998).

Key: a- general association of maize; b- general association of beans; c- general association of squash/cucurbit.

Dates considered erroneous by researchers have been omitted.

(For sources see Adovasio and Johnson 1981; Asch Sidell 1999; Bendremer and Dewar 1993; Bumstead 1980; Cassedy and Webb 1999; Clermont et al. 1992; Crawford et al. 1997; George 1983; Hart 1999a, 2000; Hart and Asch Sidell 1996, 1997; Hart and Scarry 1999; Hatch 1980; Heckenberger et al. 1992; King 1999; Lavin 1988b; Petersen and Asch Sidell 1996; Ritchie 1969; Stewart 1994).

association date for maize at the Early Fall site. Maize seemingly appeared later still at or near its Contact period limit in central Maine. It is dated ca. A.D. 1580-1730 (A.D. 1476-1662 calibrated) at the Conant and several Norridgewock sites in the Androscoggin and Kennebec River drainages, respectively (Asch Sidell 1999; Corey et al. 1997; Cowie et al. 1999; Cowie and Petersen 1990, 1992). However, the earliest maize dates from Maine may be ultimately pushed back, since maize is known as early as A.D. 1020-1235 (A.D. 1043, 1091, 1119, 1140, 1155; A.D. 1259; and A.D. 1285 calibrated) in a general association at Place Royale, Quebec City, on the St. Lawrence River (Chapdelaine 1993; Clermont et al. 1992).

### Isotope Analysis Data

Isotope analyses of human bone and carbonized residue on pottery are another way to help establish late prehistoric diets in the region. Isotope research elsewhere in eastern North America has delineated the advent of a dietary dependence on maize horticulture by ca. A.D. 1000 or earlier (e.g., Hart 1999b:Figure 4; Hutchinson et al. 1998; Katzenberg et al. 1995; Milner and Katzenberg 1999:Figure 15.1; Sciulli 1995; Vogel and van der Merwe 1977). Although few in number, published isotope analyses from New England using human bone directly support the idea of some sort of dietary shift among regional Late Woodland (and Contact) period indigenous peoples relative to their predecessors, although the details are incomplete. Isotope data suggest that this dietary shift occurred by ca. A.D. 1000-1300 in several areas where farming was adopted before European contact.

Seven human burials from Late Woodland contexts on Nantucket studied by Little and Schoeninger (1995) show an overall emphasis on oceanic and near-shore fauna. A possible emphasis on maize may be represented in these isotope data, but this is unclear, since the isotope signature for maize may be alternatively attributed to marine eelgrass feeders, such as lobsters and eels. Consequently, Little and Schoeninger use their equivocal isotope data and the rarity of archaeological maize in Nantucket and other coastal sites to tentatively dismiss the importance of maize on the coast until the Contact period, when it was historically recorded. These data may or may not be widely representative for the region, given the offshore setting of Nantucket, nor do they allow us to rule out an emphasis on horticulture in Nantucket and other coastal settings during the Late Woodland period.

An even broader isotopic analysis by Bourque and

Krueger (1994) used human bone samples of different ages from various sites in western and central Maine, including coastal settings near or beyond the limit of horticulture at European contact. This study demonstrates considerable variation among Maine coastal samples over time. An overall emphasis on marine protein is evident in local diets throughout time, but with some important changes in late prehistory. Late Woodland and early Contact period samples from western and central Maine again show a possible emphasis on maize or perhaps eelgrass feeders whose isotope values resemble those of maize, although the authors seemingly are not supportive of the maize possibility. Perhaps most significantly, the late prehistoric and early historic samples from coastal Maine are different than those from earlier contexts on the coast and the interior, suggesting some subsistence innovation at this time, perhaps horticulture. This supports the idea that some fundamental change occurred between the time of known hunting and gathering and that of possible farming in Maine, that is, from the Middle to Late Woodland periods; so late prehistoric maize use cannot be ruled out in westcentral coastal Maine on the basis of the isotope samples from the Crocker and Great Moshier sites and some from the Nevin and Turner Farm sites, among others. Obviously, more such isotopic research is needed, but on the grounds of these few studies alone we can see its potential.

### Settlement Patterns

Settlement patterns for the Middle Woodland and Late Woodland periods have been proposed for various portions of the Northeast, including the area of emphasis here, northern New England, and nearby portions of the far Northeast (e.g., Petersen and Power 1983; Ritchie and Funk 1973; Sanger 1979; VDHP 1991). These data are enigmatic and recalcitrant, perhaps even more so than the paleoethnobotanical subsistence data cited above. Broad-scale, systematic regional surveys are still rare across much of the region, and this helps account for the paucity of settlement data in many areas. There are some exceptions, however, in coastal settings and along a few interior rivers and lakes, where significant samples have been collected through research and/or consulting archaeology studies (e.g., Cowie and Petersen 1990, 1992; Funk and Pfeiffer 1993; Kellogg 1982, 1994; Sanger 1996; Thomas et al. 1996). Along with a general paucity of regional surveys, large-scale excavations at particular sites are rare and this too hampers our understanding of site-specific settlement patterns. Settlement pattern variation

within single settlements remains elusive, where houses, related activity areas, and other distribution patterns can be discerned.

Most researchers agree that Middle Woodland (and earlier) groups were seasonally nomadic hunter-gatherers across much of the broad region, except perhaps in portions of coastal New England and Long Island (e.g., Ceci 1990; McManamon and Bradley 1988; Ritchie and Funk 1973; Sanger 1979, 1996; see Custer 1989:277-280; Dent 1995:240-242; Potter 1993:138-141). In coastal settings, longer-term and larger hunter-gatherer settlements may have occurred and/or the degree of annual mobility may have been very limited by the Middle Woodland period. Coastal dwellers were largely confined to marine settings throughout their annual cycles, as seen using seasonal indicators among faunal remains, such as tooth and shell sectioning (Sanger 1996), as well as material culture evidence, namely cordage twist and twined weft slants preserved on pottery (Petersen 1996). Coastal people did not necessarily move into the interior, but they could have and apparently did live year-round on the coast, perhaps moving only among various marine environments.

Interpretations differ much more widely for the subsequent Late Woodland period, ca. A.D. 1000-1550/1600, for reasons alluded to above. For this period some scholars see an incipient or a full-blown regional transformation toward sedentary settlements based on horticulture, while others see a continuation of mobile hunting-gathering camps as were characteristic earlier. The "truth" probably combines elements of each, as may have been typically the case across eastern North America at this time. Here, some maintain that the flexible, mobile hunter-gatherer component was dominant, while others (including us) suggest that the more sedentary, horticulture component dominated. Something profound had happened in settlement patterning as well as in subsistence. Clearly, settlement heterogeneity is evident across the region, just as for subsistence, but an increased reliance on horticulture fostered an established trend toward sedentism, whether slowly or rapidly. Unequivocal evidence of food storage and large, concentrated settlements is present. Some researchers see the relatively new and widespread reliance on storage pit features as directly correlated with horticulture, which may have tethered Native groups to a degree rarely known (but not impossible) before the advent of farming. Settlement sizes also clearly increased during the Late Woodland period in some cases. Settlement locations on high ground above seasonal flooding became common as well, in some cases potentially defensible, at least by

A.D. 1500, if not earlier (e.g., Bendremer 1999; Chapdelaine 1993; Heckenberger et al. 1992; Mulholland 1988:146-147; Ritchie and Funk 1973; Snow 1980:307-308, 333; Waller 2000).

Instead of dozens of occupants, as inferred for the typical camp of regional hunter-gatherers, some later Late Woodland settlements, after ca. A.D. 1200-1300, were likely occupied by hundreds of people. The Contact period Fort Hill settlement, which was clearly dependent on horticulture, included 500 or more Sokoki residents and this likely provides an analog for at least some late prehistoric settlements (Thomas 1979). Correspondingly, Ritchie and Funk (1973:224, 331) have estimated Owasco settlements as large as 300 to 350 people during the early portion of the Late Woodland period before A.D. 1300, while as many as 600 to 700 inhabitants were present in some later Late Woodland prehistoric proto-Iroquois villages in New York State after A.D. 1300. Snow (1980:320) has noted for the Late Woodland period in New England:

[S]ites were now larger, particularly those located at heads of estuaries. For the last few centuries of prehistory, the settlement pattern was heading toward the A.D. 1600 pattern in which major nucleated villages were located on main streams, often at the head of estuaries, while smaller satellite sites such as shell middens served as special-purpose camps. The most unfortunate aspect of the Late Prehistoric settlement pattern is that the large central village sites were virtually all located at the very places most favored by Europeans settlers. Few if any of these important sites have survived well enough to yield much information through excavation.

In some cases, late prehistoric peoples in New England away from the coast lived in longhouses like those of their Iroquoian neighbors (e.g., Cowie et al. 1995, 1999), as known from adjacent regions (e.g., Snow 1980:313-314, 317). These longhouses certainly represent a greater degree of sedentism than earlier house forms, as do the stockades and other fortifications that also appeared regionally during late prehistory. The archaeological record shows that smaller settlements also persisted during this period, likely representing seasonal dispersal of small, kin-based groups across different environments (e.g., Bernstein 1999; Bragdon 1996; Petersen et al. 1985; Thomas et al. 1996). Both of these settlement types apparently occurred in coastal and interior settings, but with the exception of the Goddard site on the central coast of Maine (Bourque and Cox 1981), the larger settlements

were seemingly more common in the interior, not directly on the coast. Coastal sites nonetheless may have been occupied multiseasonally or year-round (e.g., McManamon and Bradley 1988; Sanger 1996).

This pattern was represented when the French, English, and Dutch, among other Europeans, first visited and then colonized the region ca. A.D. 1525-1625 (e.g., Bragdon 1996; Salwen 1978). Archaeological evidence summarized herein at least tentatively suggests that coastal sedentism began well before contact, during Middle and/or Late Woodland times (e.g., Ceci 1990). Other interpreters would suggest that such an increase in village size and permanence, along with warfare and other related developments, were due to contact itself and that they were not truly prehistoric. In this view, large, sedentary villages were not typical, if present at all, until European transformations were wrought on Native groups (e.g., Ceci 1977, 1980; Chilton 1999). These scholars downplay indigenous settlement changes before the Contact period, at least in some coastal areas. Late prehistoric evidence from across the region figures into our alternative interpretation, as do Contact period archaeological and historical data, the latter allowing linkage with the ethnohistoric record. Again, we emphasize the archaeological data that we know best, those from Maine and Vermont and lesser so New Hampshire.

Evidence suggests that some Middle Woodland settlements, particularly those in optimum settings adjacent to rivers and marshlands, were occupied by extraordinary groups seasonally, at least by late Middle Woodland times, after ca. A.D. 700-800 (e.g., Petersen and Power 1983; Thomas and Robinson 1979; VDHP 1991). These hunter-gatherer camps were larger than those typically found during earlier periods and they somewhat resembled sites associated with early horticulture during the subsequent Late Woodland period, except that storage pits were very uncommon at Middle Woodland sites. Local examples in Vermont include the Winooski site and others on the Missisquoi delta, such as the Headquarters site. Unlike their predecessors in these settings, the later Middle Woodland settlements stretched over hundreds of meters and available paleoethnobotanical analyses establish multi-seasonal habitation. Many other Middle Woodland sites, however, represented small camps like those of their Early Woodland and Archaic period predecessors, even upstream on the same rivers, as on the Missisquoi and the Winooski Rivers in western Vermont, for example.

With the arrival of farming during early Late Woodland times, some settlements effectively went

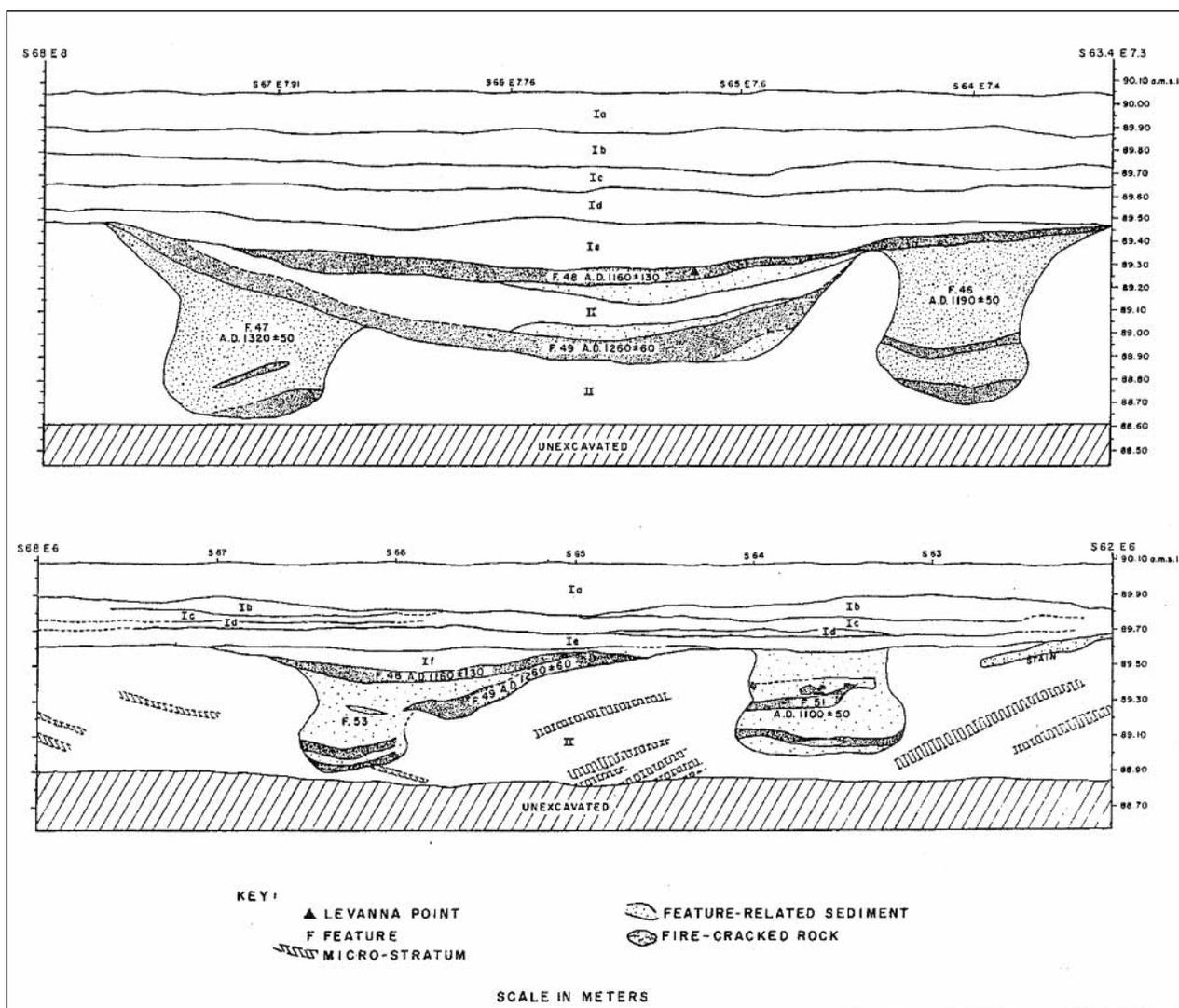
unchanged and these Natives continued to reside in small camps within the floodplain, indicating that their camps were still of seasonal duration. This pattern of seasonal utilization of small settlements during the Late Woodland period has been demonstrated through excavations conducted at Highgate Falls on the Missisquoi River and at Shelburne Pond in Vermont, for example. In both cases, small camps persisted from the Middle through the Late Woodland period, and even into the Contact period at Shelburne Pond (Petersen et al. 1985; Thomas 1997; Thomas et al. 1996). At Highgate Falls and Shelburne Pond, the small Late Woodland sites continued to serve as "extractive camps," where resources, such as deer, were killed and processed for use elsewhere, presumably downstream at larger aggregation settlements near Lake Champlain. Recent work in the Missisquoi delta may represent just those larger settlements. The Late Woodland deposits in the delta extend over a kilometer in overall length, significantly larger even than the extensive ones of Middle Woodland time there. On the basis of subsistence remains, including significant quantities of maize, as noted above, and other plant foods, the Late Woodland deposits represent multiseasonal to year-round occupations along the Missisquoi delta.

Other large sites are also known regionally, where early Late Woodland settlements grew sizeable and even large in some cases, as at the Skitchewaung site on the Connecticut River in Vermont. Among coastal settlements, the Goddard site in central Maine may be the most dramatic example of a large site. Goddard was occupied most extensively around A.D. 1000-1300 and presumably served as a trading center. It is clearly attributable to the early Late Woodland period on the basis of a huge artifact assemblage, including many aboriginal trade goods from the north and a possible association of a Viking coin (Bourque 2001:92-94; Bourque and Cox 1981; Snow 1980:337). We surmise that horticulture did not extend much east of the Saco River and Casco Bay during this period, nowhere near as far east as Goddard, so farming was not responsible for the character of the Goddard settlement; trade likely was. After A.D. 1300, however, horticulture spread a bit farther eastward to its prehistoric eastern limits in the Androscoggin and Kennebec River drainages, as noted above. The seeds of social complexity were at work by this time and intergroup contacts in northern New England were considerable in some cases, as seen with the St. Lawrence Iroquoians to the north and with the proto-Micmac to the east, for example.

The common presence of storage pits at many

noncoastal residential sites certainly denotes an important change regionally during the early Late Woodland period and later (Figure 14.2) (e.g., Bendremer 1999; Bendremer and Dewar 1993; Chilton et al. 2000; Hart 1995, 1999b:161; Hart and Sidell 1996:23-24; Heckenberger et al. 1992; Ritchie and Funk 1973). Assuming that at least some foods were also stored above ground, the frequency and widespread distribution of subterranean pit features suggests a significant change in economic activities and sedentism at this time relative to all earlier periods.

However, these facilities may represent semi-sedentary, rather than fully sedentary settlements in some cases. In other words, storage pits may have been correlated with the need to conceal food surpluses during periods of settlement abandonment and/or the need to conceal coveted goods from inquisitive neighbors in sedentary settlements, and thus, we cannot say pits demonstrate full sedentism (DeBoer 1988). Moreover, we should be careful not to necessarily equate all pit features with food storage (e.g., Green and Sullivan 1997), but it seems highly likely that many such pits



**Figure 14.2.** Stratigraphic profiles from the Skitchewaug site, showing several probable storage pits on top and bottom, and semisubterranean houses on top. Cultigens were recovered from many of these features.

do, in fact, represent food storage facilities, given their consistent size and form, and their co-occurrence with maize and other cultigens. Certainly, probable storage pits were represented regionally during the Archaic and earlier Woodland periods long before the advent of maize horticulture (e.g., Cox et al. 2000; Petersen 1991; Petersen and Sanger 1986), but these early examples are nowhere near as ubiquitous as those at various Late Woodland and Contact sites. Thus, in spite of cautionary tales and healthy skepticism, we believe that Late Woodland pit features directly support the idea of increased sedentism, at least in relative terms, and food storage including cultigens by this time.

After A.D. 1300, selection for habitation outside of floodplains and well beyond the effects of annual flooding due to settlement longevity seemingly became more characteristic, both locally and regionally, and defensibility also pertained in some cases. Along with various other researchers (e.g., Ritchie and Funk 1973:359-368; White 1963), Chapdelaine (1993) has recognized a similar shift toward sedentism and a differential emphasis on defensibility across a large portion of the Northeast by ca. A.D. 1300, using data on site location, longhouses, pits, and other variables. This shift pertained to archaeological evidence for proto-Iroquoian groups in New York State, as well as in neighboring areas such as Quebec and Ontario.

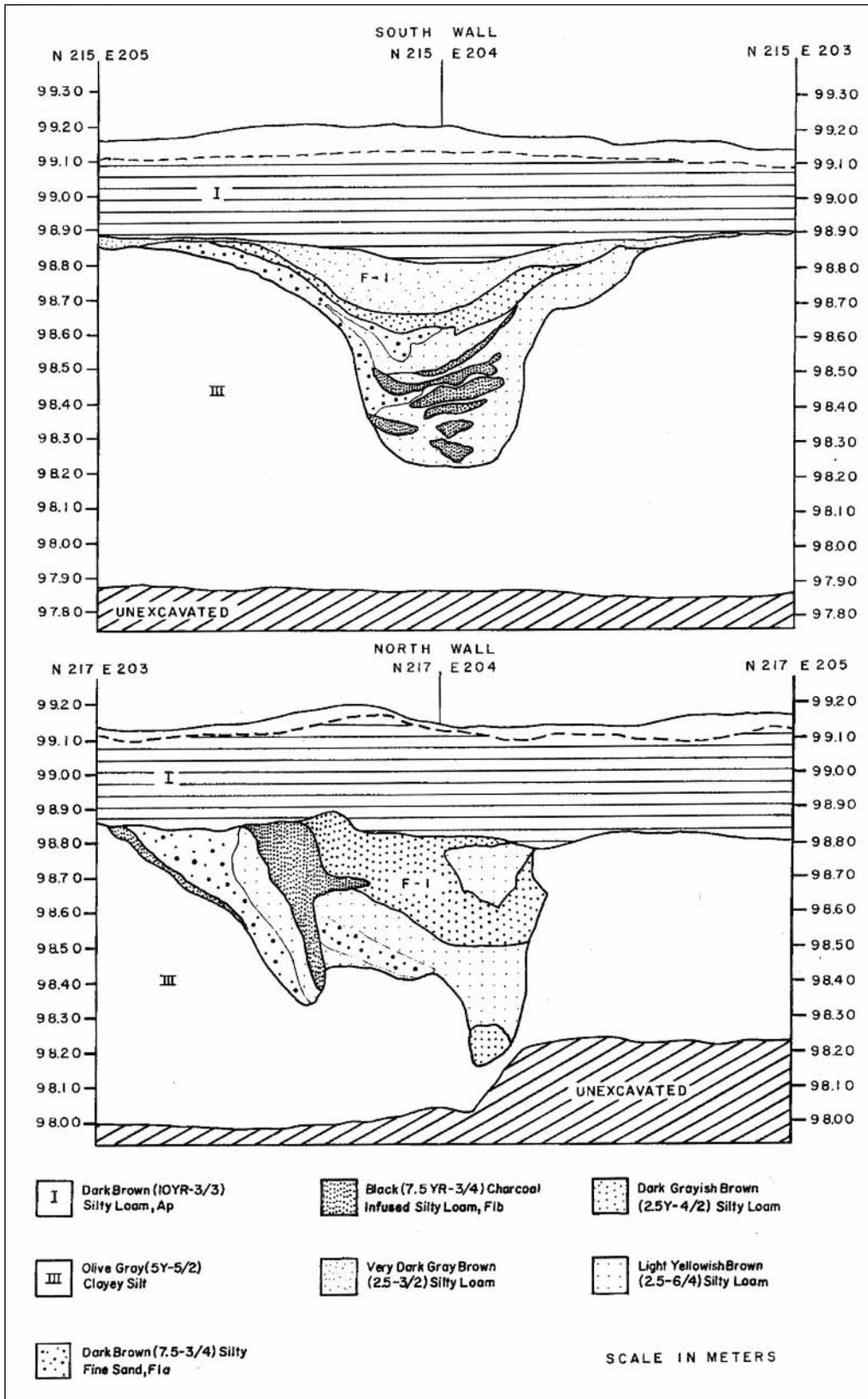
Although the dating is somewhat uncertain, sedentism is represented at the Tracy Farm site on the Kennebec River in Maine, where at least one longhouse and numerous storage features are attributable to late prehistoric and early historic times. This settlement became the historically known village of Norridgewock (I) in the early-mid-1600s and it was apparently recorded by Champlain ca. 1605. Indigenous cultigens and introduced wheat are known from Tracy Farm, the latter from a Contact period context (Cowie et al. 1999). In fact, maize (with lesser amounts of beans and squash) was identified in varying quantities from all 19 storage pits sampled at Tracy Farm. The Tracy Farm storage pits ranged in capacity from 1.6 to 20 bushels and included at least three bark-lined examples, actually containing stitched bark barrels. Clearly, evidence of sophisticated subterranean storage is present at Tracy Farm, located near the northeastern climatic limit of Native maize cultivation.

Other less well-known sites of late prehistoric and Contact attribution include the Ingalls site on the Connecticut River and the Hormel site on Ossipee Lake, both in New Hampshire (Boisvert et al. 1995; R. Boisvert, pers. comm. 1997). In Vermont, several sites

within the Burlington Intervale, including the Donohue site, and the nearby Rogers Farm site and site VT-CH-619 elsewhere along the Winooski River, are also relevant (Bumstead 1980; D. Frink, pers. comm. 1997; Thomas and Bumstead 1979; Thomas et al. 1997). Site VT-FR-134 at Highgate Falls on the Missisquoi River is another Vermont example, among others (Thomas 1997; Thomas et al. 1996). The Early Fall site on the Saco River in Maine is directly contemporaneous with these New Hampshire and Vermont sites (Cowie and Petersen 1990). Of these, only Early Fall in Maine and Rogers Farm in Vermont are situated in somewhat protected upland settings, and so defensibility was not always a primary location determinant during this time.

The Early Fall site also provides a clear example of Late Woodland storage of cultigens, as at the Skitchewaug and Donohue sites in Vermont. The Early Fall, Donohue, and Skitchewaug sites were all apparently small or medium-sized farming hamlets during late prehistory, like various other contemporaries to the south and west, although Skitchewaug may have been larger than most others (e.g., Bendremer 1999; Hart and Sidell 1996; Hatch 1980; Stewart 1994). The Early Fall site may also preserve semisubterranean house floors, as clearly seen at Skitchewaug (see Figure 14.2). A stockade trench is also represented at Early Fall (Figure 14.3). Along with its defensible position, the stockade trench at Early Fall suggests that defense was indeed a concern in some settings during late prehistory.

By the time of the Contact period, or ca. A.D. 1600, if not earlier during the Late Woodland period, the Tracy Farm settlement, or Norridgewock (I) in central Maine, was relatively sizeable and it represented a village. It was also situated in a defensible position above the effects of annual flooding. These conditions also pertained later during the 1600s and later still after the village was relocated for political reasons across the Kennebec River to a comparable defensible setting at the Old Point Mission site, or Norridgewock (II), where a palisade was constructed (Cowie et al. 1995; Cowie et al. 1999). Dramatic evidence of another Contact period fortified settlement is represented at the Fort Hill site in Hinsdale, New Hampshire. Situated on a strategic hilltop above the Connecticut River, Fort Hill is historically dated to a very brief spell, ca. 1663-1664 (Thomas 1979). All of these sites demonstrate cultigens and storage pits, although preservation is quite uneven (see Asch Sidell 1999; Thomas 1979). Some may disagree, but we argue that historic Norridgewock and Fort Hill support late



**Figure 14.3.** Two stratigraphic profiles of Feature 1, a presumed stockade trench, at the Early Fall site. Feature 1 contained maize, beans, and squash, which were generally dated to A.D. 1380±70 (A.D. 1334, 1336, 1400 calibrated).

prehistoric origins for sedentism and defensible locations in northern New England, dating well before European contact, as seen at the Early Fall site.

### Technological Data

Technological data also support the idea that a fundamental transformation occurred during the Late Woodland period before A.D. 1300 across much of the Northeast. To begin this brief review, ceramic and perishable fiber artifacts provide evidence of both continuity and change between the Middle and Late Woodland periods. We have presented considerable details about Middle and Late Woodland ceramics and fiber perishables elsewhere. To summarize, locally distinctive ceramic styles first became widespread during the Late Woodland period and there are local differences across most of the region well before European contact (e.g., Chilton 1998; Cowie and Petersen 1999; Goodby 1998; Lavin 1998; Petersen 1990; Petersen and Sanger 1991; Petersen and Toney 2000). In general, late northeastern ceramic styles commonly shared thin vessel walls, relatively small vessel size in most cases (except among unequivocal Iroquoian examples), and typically elaborate incised, punctate, and other zoned decoration with and without collars.

We believe that these widely distributed ceramics show crystallization of Native ethnicity well before the Contact period during the Late Woodland period, clearly by ca. A.D. 1300. These changes are quite likely a consequence of horticulture, social aggregation, and increased sedentism. Social identity may have become increasingly important in the context of these broad transformations. We argue that late prehistoric farming transformed local pottery styles or traditions less (or not at all?) for “functional” reasons, as Braun (1987) and others have argued, but instead, primarily because of sociopolitical factors related to social signaling and identity.

Fiber perishables, or “textiles,” are typically very incomplete for any one specimen and are so rarely analyzed that we know much less about them relative to ceramics. Nonetheless, they are potentially important because cordage twist and twining weft slant, among other attributes, are normally population-specific, as well established through many previous archaeological and ethnographic analyses (e.g., Petersen 1996; Petersen et al. 2001; Petersen and Wolford 2000). New textile forms such as interlinking appeared during the Late Woodland period, along with the continuation of predominant twining forms (Petersen 1996; Petersen and Sanger 1991). Although most often reconstructed

using impressions on pottery, Late Woodland textiles show a continuation of regional differences between coastal and noncoastal groups around the Gulf of Maine in the U.S. and Canada, with continuity between the Middle and Late Woodland periods. We see the continuation of distinct coastal and noncoastal New England patterns in other words. The noncoastal, “interior” New England textile pattern also can be differentiated from most, if not all Iroquoian textiles, as well (Petersen 1996; Petersen and Wolford 2000). With the exception of the Goddard site (the location of a presumed warm season trade fair), strong patterning continued to differentiate the New England coast and interior during and after the Late Woodland period. In other words, Z-twist and Z-weft slant differentiated coastal and Iroquoian textiles from the S-twist and S-weft slant of noncoastal New England textiles. In some Late Woodland contexts, artifact evidence unequivocally documents long-distance trade or direct transport of ceramics made on the coast far into the interior, as on the Connecticut, Androscoggin, and Penobscot Rivers, among others, on the basis of pottery temper and associated textile evidence. The co-occurrence of coastal cordage twist and weft slant on shell-tempered pottery at sites far away from the coast allows us to make this inference at various interior sites, including, for example, Skitchewaung on the Connecticut River.

### ETHNOHISTORIC DATA ABOUT NATIVE SUBSISTENCE AND SETTLEMENT

Ethnohistoric and archaeological information for the Contact period in the Northeast, ca. A.D. 1550/1600-1750, are important to the present discussion because they provide a critical “endpoint” for the processes of cultural evolution that we recognize during the preceding Late Woodland period and likely earlier. Again, we do not want to belabor this point, but we feel that interpretation of this information is closely related to interpretation of the prehistoric data, and disagreement about the effects of European contact has led to disagreement about the importance of prehistoric horticulture in the Northeast.

Some critics will disagree about the nature of Contact period subsistence and settlement across the region as it is portrayed here, including northern New England, suggesting that the early European explorers and colonists inevitably misrepresented the Native peoples they met. These scholars would suggest, for example, that such misrepresentation includes records for various coastal groups from the St. Lawrence River

to the Maritime Provinces on the Gulf of St. Lawrence and all the way down the coast to southern New England and Long Island, as for other areas. Conversely, we argue that Cartier and Verrezano in the 1500s, and later, Champlain in the early 1600s, among others, clearly documented differential degrees of dependence on horticulture and hunter-gathering subsistence across the region (e.g., McManamon and Bradley 1988; Salwen 1978; Trigger and Pendergast 1978). For example, long before European influence, Verrazano reported farming in southeastern coastal New England as early as the 1520s, while Cartier clearly reported it among the St. Lawrence Iroquoians during the 1530s on the St. Lawrence River, well before substantial European contact.

Champlain made a point to emphasize that there were farmers directly resident on the coast at the mouth of the Saco River in Maine during the early 1600s, where the Almouchiquois lived. Champlain described and depicted those coastal farmers and others farther south, such as at Plymouth and Nauset on Cape Cod in Massachusetts. These details are germane here and help counter hypotheses that downplay the usage of and dependence on horticulture in coastal New England during the Late Woodland period. In 1605-1606, Champlain reported that the Cape Cod Natives "are not so much hunters as good fishermen and husbandmen" (Champlain 1906:127). Champlain further reported:

All the people here are very fond of tilling the soil, and store Indian corn for the winter, which they preserve in the following way: they make trenches on the hillsides in the sand, five or six feet, more or less, deep; put their corn and other grains in big sacks made of grass, and throw them into these trenches and cover them with sand three or four feet above the surface of the earth. They take from their store at need (Champlain (1906:126).

Quite clearly these and other details suggest a dependence on farming and storage pits among coastal groups by this time, if not before, and these were not developed strictly in response to European incursions, trade, and settlement, since we have dated them earlier elsewhere in the region.

Recent archaeological discovery of a maize field on Cape Cod directly confirms that at least some coastal people were not only using maize, but were also growing maize directly on the coast, as documented by Champlain, albeit in small, dispersed settlements ("hamlets" ?). Likely dated to the 1600s, this farm field

may have also been farmed prehistorically (Mrozowski 1994). Further, in 1609, when Champlain traveled on the interior lake that bears his name, he recorded extensive farm fields in the lower river valleys along the Vermont side of Lake Champlain, as he previously reported, on hearsay, for parts of interior Maine (Champlain 1906:207; Haviland and Power 1994). Following McManamon and Bradley (1988), we suggest that Champlain's early accounts accurately reflect indigenous patterns before substantial contact disruption occurred, as supported by recent archaeological evidence.

Recorded details of the Native American annual subsistence round on the central Connecticut River in Massachusetts substantiate the prime importance of Native horticulture during the early-mid-1600s, and this likely had prehistoric origins locally and regionally. For example, at least 6 of the 12 names for annual seasons among the Pocumtuck people include references to horticulture. Likewise, their settlement mobility and other recorded details support the importance of horticulture to them and other nearby tribes (Thomas 1976, 1979). On the basis of the deep intertwining of horticulture in various recorded accounts for the Pocumtuck, Sokoki, and other Native groups, it is difficult to believe that farming became important in New England only after the arrival of Europeans. Instead, again we suggest that most, if not all, New England Natives to the south and west of central Maine were unequivocally horticultural before the time of European contact, that is, before the 1500s and 1600s. Sizeable numbers of horticulturalists were seemingly resident at contact in favorable settings across much of the region. This was apparently the case in nearly all of Vermont and New Hampshire, and also pertained to western Maine, with a rough boundary between horticulturalists and hunter-gatherers present in central Maine. A dual or tri-partite system of large, long-term settlements, or "villages," and smaller, sometimes short-term "hamlets" and "camps," likely was present in most cases, as best can be determined using the available ethnohistoric and archaeological evidence.

Obviously, other site types were present as well, rather than just large and small residential settlements. During late prehistory (and the early historic period), settlement diversity may have been greater than ever before during regional prehistory, in part because of the new, large villages based on farming and related changes. Comparison of ethnohistoric and archaeological data from the region supports the idea that the biggest change in settlement and subsistence over time

was the development of horticulture and the resultant social aggregation and sedentism it brought. This undoubtedly occurred at some point during the Late Woodland period, although it may have occurred differentially across the region, earlier in the south and west, and later in the north and east.

## CONCLUSIONS

In conclusion, we suggest that the most profound changes to ever occur among Natives in the Northeast prior to the arrival of the Europeans were those related to the local arrival of maize-beans-squash horticulture. More specifically, we believe that there must have been considerable economic and settlement variation within local and broader regional contexts during late prehistory and early history. In most settings to the south and west of its prehistoric limit in central Maine, maize-centered horticulture was likely adopted because it reduced subsistence risk and crops could be raised within the frost-free period. Ultimately, it also led to increased social aggregation and sedentism across much, if not all of the region. Adoption of maize horticulture was attractive for reasons of subsistence predictability and risk reduction, even if it was labor-intensive in terms of field maintenance and crop harvesting. It ultimately transformed most regional Native societies, at least in terms of their sedentism and settlement patterns. Crop storage became ubiquitous where farming occurred, although storage pits may or may not reflect fully sedentary settlements. Even where late prehistoric crop use has been interpreted as minimal, the use of some cultigen foods cannot be ruled out on the basis of the limited isotopic evidence that seems to show a regional subsistence shift during Late Woodland times. This avenue obviously needs further assessment in the future.

Comparison of ethnohistoric data from the Contact period and available archaeological samples suggests that the archaeological evidence is very incomplete relative to the recorded details. For example, comparison of very limited cultigens recovered archaeologically at the Contact period Fort Hill site and the known emphasis on crop foods by the historic Sokoki residents shows the magnitude of the preservation bias working against cultigens and other plant foods, likely also pertaining to most other archaeological contexts. In fact, the historic Sokoki stored an estimated 3,200 to 4,000 bushels of maize at Fort Hill in 1663-1664, using pits identical to those known from the Late Woodland period, but only very limited cultigen samples were

preserved archaeologically at Fort Hill (Thomas 1979).

As noted above, recovery of any identifiable cultigens from archaeological contexts is quite remarkable. It seems unlikely that we will ever be able to properly quantify paleoethnobotanical remains with complete reliability, given the typical degree of preservation bias against them. This bias is due partially to the fact that many indigenous cultigens were destroyed at the time they were prepared and eaten as food, and only trace amounts were then discarded. The extreme fragility of all carbonized floral remains in the archaeological record also contributes to this bias. Additional bias results from the necessity of using fine-grained techniques to recover such remains and having trained paleoethnobotanists identify them.

More tentatively, our understanding of late prehistoric settlements across the region may well be biased, too, as other scholars have suggested before. If greater social aggregation and sedentism occurred among farmers during the Late Woodland period, fewer settlements may well be represented for late prehistory relative to earlier periods, at least as they relate to crop storage. Moreover, at least some of the late prehistoric settlements were larger than those occupied earlier and these late prehistoric settlements were situated in more selective settings. They are rare to begin with and are also difficult to sample adequately due to their large size. Of these, only a few villages have been located and excavated extensively enough to establish late prehistoric site patterning regionally, at least in New England. Again, it is quite likely that some or many such sites have been destroyed by historic development.

In summary, we believe that no one has yet fully envisioned the subsistence and settlement variation that characterized the Late Woodland period in the Northeast. We have argued here that regional Natives were transformed during late prehistory by the advent of horticulture and its correlates, social aggregation and sedentism. As a result of recent research from central Maine westward, most interior river valleys have produced evidence of storage pits and related cultigens dating to the Late Woodland period, although perhaps differentially from west to east and south to north. Some will argue that there was a differential of a few hundred years for the advent of maize farming across New England, although crop raising of some kind is likely much, much earlier. Others will argue that some or all Natives in New England only dabbled with farming prehistorically, rather than vigorously pursuing it. Regardless of these different hypotheses, we believe that are too few samples to fully understand these and

other related questions yet, and so we look forward to future research and further application of AMS dating of cultigen samples.

We suggest that late prehistoric horticulture centered on maize-beans-squash may have arrived in the Northeast even more rapidly and more synchronously than we currently envision, but the data are so limited that this is mere speculation. Moreover, it seems likely that farming was more pervasive among indigenous peoples in the Northeast than we currently understand and it was much more ancient than the late prehistoric records would suggest. Although it was only during late prehistory that it substantially transformed Native societies in the Northeast, farming had its origins in the Archaic period, before 1000 B.C. In any case, we submit that horticulture brought dramatic changes to indigenous societies in the Northeast during late prehistory, changes that went beyond mere subsistence. Horticulture certainly affected subsistence, but it also transformed the size, duration, and fundamental character of Native settlements. Moreover, it ultimately transformed aspects of indigenous technology, ideology, and politics, among various other facets of Native lifeways.

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## CHAPTER 15

### “towns they have none”: DIVERSE SUBSISTENCE AND SETTLEMENT STRATEGIES IN NATIVE NEW ENGLAND

Elizabeth S. Chilton

*The theoretical issues that have emerged in recent analyses of southern New England Native society makes this region one of intense interest, particularly to those concerned with the origins of, and relations between, agriculture, sedentism, and social inequality.*

(Bragdon 1996:32)

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#### INTRODUCTION

Over the past twenty years there has been increased interest in the history and prevalence of maize use by Native peoples in New England. Much of this interest can be attributed to improved recovery techniques, particularly soil flotation, which have heightened our awareness of the use of tropical cultigens in the region. However, along with new data have come new challenges—and debates—in our understandings of the complexity of Native American subsistence systems. The goal of this chapter is to present a summary of the maize debate in New England, to pinpoint some of the sources of that debate, and to suggest ways that archaeologists might move from debate to cooperation in sorting out such an exciting and complex issue. For the purpose of this chapter I define New England as the modern New England states, as well as eastern and coastal New York.

#### THE MAIZE DEBATE: AN OVERVIEW

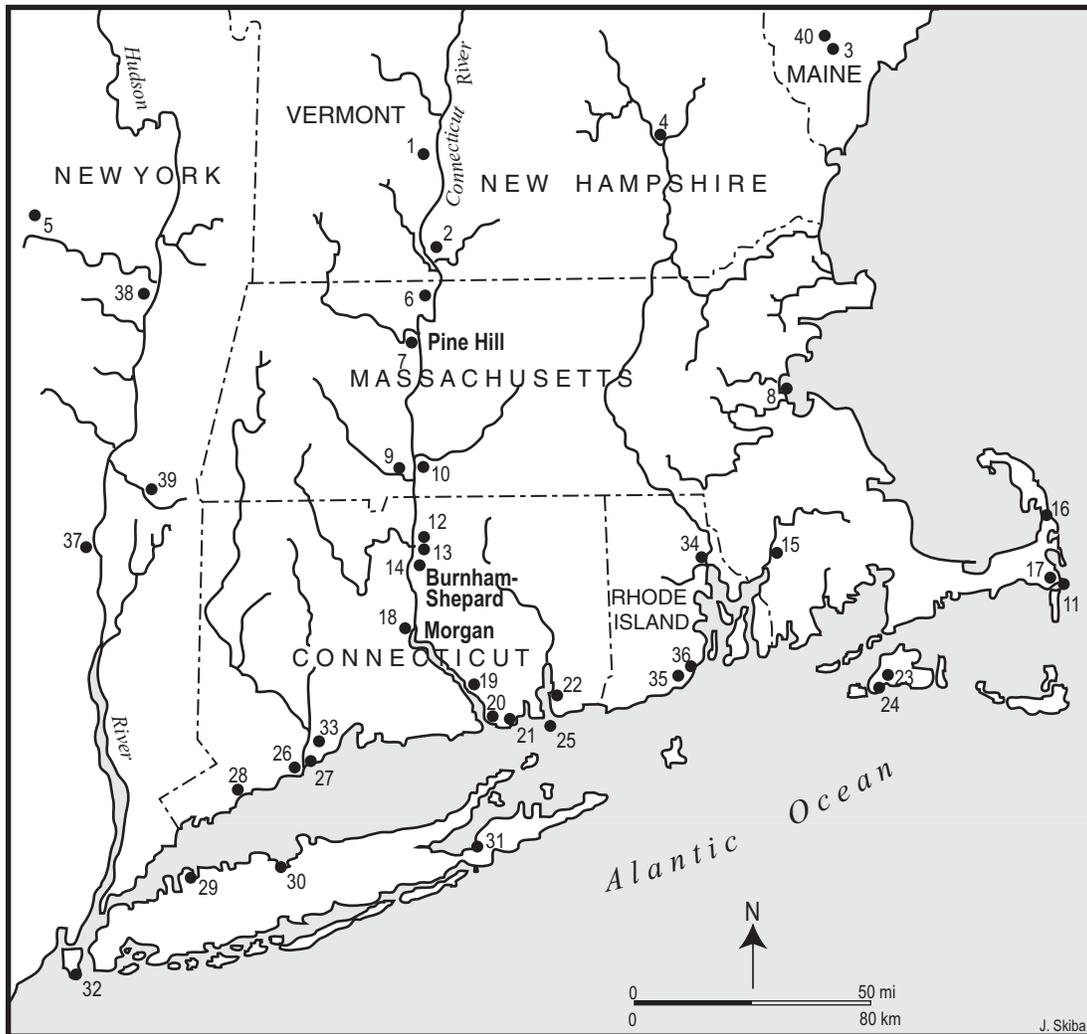
Few researchers today would agree that the adoption of maize horticulture by Native peoples in New England was a “non-event,” as stated by McBride and Dewar more than a decade ago (1987). However, many researchers do believe that while maize horticulture was practiced by New England peoples by A.D. 1000

(Cassedy and Webb 1999), it did not cause the rapid or extreme cultural changes witnessed in other parts of the world. Others, such as Hasenstab (1999) and Petersen and Cowie (this volume), propose that with better methods and more data we would discover that maize was far more important to Late Woodland peoples than we now believe.

The maize debate in New England began over twenty years ago, and centered on coastal southern New England (see Ceci 1979-1980; Silver 1980-1981). At that time Ceci convincingly argued that maize was not a dietary staple for Native peoples until after European contact. David Bernstein’s meticulous work on Long Island has provided further support for Ceci’s original hypothesis (see Bernstein 1992, 1999). Despite careful recovery techniques, including flotation and fine screening of large percentages of feature soil, maize simply does not show up on many Woodland period archaeological sites on Long Island (David Bernstein, pers. comm. 2001). Certainly, there is evidence for sedentism prior to European contact; some protected harbors in coastal New England clearly supported perennial habitation, with a subsistence base consisting of both marine and terrestrial resources (see Bernstein 1993, 1999; Bernstein et al. 1997; Gwynne 1982). From the evidence we now have available to us for the New England coast, maize horticulture seems to have been a late development and “one which probably had a negligible impact on overall lifeways . . . it was probably

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**Figure 15.1.** Map of southern New England, showing the location of archaeological sites with prehistoric cultigens and key sites referred to in the text.

not a central feature of the coastal economy” (Bernstein 1999; see also Bendremer et al. 1991; Ceci 1979-1980; McBride and Dewar 1987). That is not to say that maize is less often recovered from Late Woodland coastal sites (Figure 15.1; Table 15.1). My own recent work at the Lucy Vincent Beach site on Martha’s Vineyard indicates a diverse diet for Late Woodland peoples on the coast (Chilton and Doucette 2001): soil flotation and subsequent analysis of remains by Tonya Largy from numerous trash pits and other features indicates a diet that included a variety of maritime resources (e.g., hard- and soft-shell clam, scallop, whelk, large quantities of goosefish, scup), as well as terrestrial resources

(deer, turtle, hickory nuts, and a small quantity of maize). While there is much work to be done in sorting out the complexity of Late Woodland coastal economies, it is clear that the diet and supporting subsistence-settlement system was quite diverse (Bridges 1994; Little and Schoeninger 1995).

While there is general agreement that maize was more of a dietary supplement than a staple on the New England coast, interpretations for the interior are far more contentious. Several researchers argue for intensive horticulture during the Late Woodland period. For example, Bendremer and Dewar (1994) suggest that the presence of more than one type of cultigen at inland

**Table 15.1.** Key to Figure 15.1: Archaeological Sites with Prehistoric Cultigens in Southern New England.

Site No.	Site Name	Citation
1 <sup>1</sup>	Skitchewaug	Heckenberger et al. 1992
2	Fort Hill	Thomas 1985
3	Early Fall	Cowie and Petersen 1990
4	Campbell	Bunker p.c. in Bendremer and Dewar 1994
5	Klock	Kuhn and Funk 1994
6	19-FR-329	Garman 1991
7 <sup>1</sup>	Pine Hill	Chilton 1996
8	Calf Island, Worlds End, HL-6	Luedtke p.c. in Bendremer and Dewar 1994
9	Guida Farm	Byers and Rouse 1960
10 <sup>1</sup>	Indian Crossing	Mulholland 1988
11	Mattaquason Purchase	David Schafer p.c. 1997
12	6-HT-116	Jordan p.c. in Bendremer and Dewar 1994
13	Kasheta	Bendremer et al. 1991
14 <sup>1</sup>	Burnham-Shepard	Bendremer and Dewar 1994
15	Gardner's Neck	Bunker p.c. in Bendremer and Dewar 1994
16	19-BN-288	McManamon 1984
17	Malluzo	Dunford p.c. in Bendremer and Dewar 1994
18	Morgan	Lavin 1988
19	Selden Island	McBride 1984
20	Tubbs	Russell 1946
21	Mago Point	McBride 1984
22	72-31	McBride 1984
23	Hornblower II	Ritchie 1969
24 <sup>1</sup>	Lucy Vincent Beach	Chilton and Doucette 2001
25	Barlow Pond, Hawk's Nest	Funk and Pfeiffer 1988
26	Muskrat Hill	Coffin 1940
27	Indian River	Rogers 1943
28	Highland	Wiegand p.c. in Bendremer and Dewar 1994
29	Pleasant Hill	Ceci 1979-80
30	Matinecock Point	Smith 1950
31 <sup>1</sup>	Sebonac	Ceci 1979-80
32 <sup>1</sup>	Bowman's Brook	Ceci 1979-80
33 <sup>1</sup>	294A-25-2, 294A-AF2-1	Cassedy and Webb 1999
34	RI 2050	Handsman 1995, Leveillee 1996
35	RI 1818	Begley and Leveillee 1996
36	RI 110	Leveillee and Harrison 1996
37	Hurley	Funk 1976
38	Dennis	Funk 1976
39 <sup>1</sup>	211-1-1	Cassedy and Webb 1999
40 <sup>1</sup>	Little Ossipee North	Sidell 1999

<sup>1</sup>Sites with direct radiocarbon dates on cultigens. I recently obtained a direct date on a maize kernel from the Indian Crossing site, which had previously been dated using a wood charcoal sample from the same level (Mulholland 1988). The direct date is cal A.D. 1482-1654 ( $p=1.0$ ; See Stuiver et al. 1998; uncalibrated age =  $310\pm 40$  <sup>14</sup>C years, <sup>13</sup>C corrected, GX-27629-AMS).

sites in Connecticut, storage pits, and “substantial amounts” of horticultural remains indicates intensive horticulture in the lower Connecticut Valley (i.e., the Connecticut portion of the valley). They define “substantial amounts” as more than fifteen hundred kernels at the Burnham-Shepard site, and more than one hundred kernels at the Morgan site (see Lavin 1988). Similarly, Lavin (1988) reports “numerous maize kernels from virtually all of the features” at the Morgan site, although precise numbers are not given. On this basis she suggests that maize was a “major food source,” while acknowledging that it was likely part of a broad-spectrum hunting and foraging base.

Similarly, Heckenberger et al. (1992) conclude that maize is an “important dietary constituent” by the early Late Woodland period at the Skitchewaung site in southeastern Vermont. They base this interpretation on the presence of maize in all seven storage pit features excavated at the site (although it is worth noting that these features contained far larger quantities of charred nutshells and seeds). Similarly, Petersen and Cowie (this volume) believe that the “most profound changes to ever occur among Natives in the Northeast prior to the arrival of the Europeans were those related to the local arrival of maize-beans-squash horticulture.”

In contrast, other researchers emphasize continuity for the Late Woodland period and believe that the current data support the interpretation that maize was a dietary supplement and not a staple (Chilton 1999; Chilton et al. 2000; Dincauze 1990; Luedtke 1988; McBride and Dewar 1987; Thorbahn 1988).

What accounts for the disagreement about the role of maize in the interior? A few years ago I outlined some of the factors that have fueled the maize debate in New England (Chilton 1999). In the next section I review these factors and others that are the primary sources of miscommunication, misinterpretation, and confusion in our attempts to understand the role of maize in the lives of New England’s Native peoples.

## SOURCES OF MISINTERPRETATION

The maize debate has been both clouded and fueled by several factors: (1) the improper and inconsistent use of terms; (2) a presumed correlation between the number of maize kernels recovered at an archaeological site and the importance of maize to the prehistoric inhabitants of that site; (3) the misuse of ethnohistoric literature; (4) the misapplication of archaeological theory related to the origins of agriculture; and (5) the misinterpretation of settlement patterns.

## Improper and Inconsistent Use of Terms

One of the main sources of miscommunication and confusion in the maize debate is the improper and inconsistent use of terms to describe the relative importance of maize in the diet. For example, Bendremer et al. (1991) interpret the archaeological evidence at the Burnham-Shepard site as evidence for “*significant involvement* with maize horticulture” (emphasis added) during the Late Woodland period. Likewise, Lavin (1988) asserts that maize was an “important dietary *staple* for *inland* Indians” (original emphasis) on the basis of her work at the Morgan site. Heckenberger et al. (1992) suggest that maize and other agricultural products were an “*integral* part of the diet” (emphasis added). Petersen and Cowie (this volume) state that maize became “important” in riverine settings across New England during the Late Woodland period.

In all of these cases, the use of terms such as “integral,” “significant,” “important,” and “staple” are not defined. What do these terms mean in terms of proportion of the diet, cultural significance, or economic importance? And what is the frame of reference? Maize may have had a ceremonial importance long before it was a dietary staple. Does saying that maize is “important” mean that it constitutes more than half of the caloric intake of a population? Or does it mean, as I defined it (Chilton 1999), that it is necessary for the survival and well-being of a community? It is clear that consistency and precision in our use of terms dealing with the importance of maize in prehistoric economies will aid our attempts to understand changes over time and the differences between the usages of maize in different regions.

## Counting Kernels

There is an unquestioned assumption by many archaeologists that the number of kernels found on an archaeological site is an indication of the importance of maize to the people who lived there. For example, Bendremer and Dewar (1994) interpret the recovery of 1,500 maize kernels at the Burnham-Shepard site as indicative of intensive horticulture. Likewise, on the basis of the presence of “numerous maize kernels,” Lavin (1988) concludes that maize was a “major food source” at the Morgan site.

Certainly, there is not a one-to-one relationship between the numbers of kernels found and the importance of maize. As Dincauze (1981) points out, prehistoric farming is extremely difficult to detect in New England because of poor preservation conditions.

Maize will normally not preserve for long in the archaeological record unless it is charred, which is more of an accident than a common occurrence. Even in areas where we know that maize was an importance food resource, the recovery of maize kernels or other maize parts is rare (e.g., Mesoamerica, Iroquoia, etc.). Thus, we cannot rely on the *quantity* of cultigens in our interpretations of their relative importance. In general, we need to move away from the kernels themselves, and examine the broader archaeological and cultural context, which includes the osteological and isotopic evidence, evidence for planting fields or gardens, food storage, the full range of subsistence practices, inter- and intrasite settlement patterns, and other technical systems (e.g., ceramics). I discuss all of these below.

### The Use and Abuse of the Ethnohistoric Literature

Many archaeologists look to the Contact period to help them understand Native societies on the eve of contact. For example, Bragdon (1996) assumes that Late Woodland riverine peoples were dependent on agriculture both prior to and following European contact. She suggests there is evidence for pre-Contact “large, sedentary, agricultural villages” in the interior valleys (Bragdon 1996); here she cites McBride (1984) and Lavin (1988), who refer only to sites in the lower Connecticut Valley. She does include the Bark Wigwams site from the middle (or Massachusetts) portion of the Connecticut Valley (Johnson and Bradley 1987), but Bark Wigwams is most likely a seventeenth century site, and we know very little about this site because there have been no professional excavations beyond locational surveys (Chilton 1990). Other sites in the middle Connecticut Valley, such as the Late Woodland Pine Hill site in Deerfield, Massachusetts, provide evidence for short-term seasonal encampments of mobile farmers (Chilton et al. 2000). Therefore, Bragdon’s claim for a riverine “commitment to maize horticulture with its accompanying sedentism, nucleated settlement pattern, and dense population” is not well supported for the Late Woodland period (see further critique in Chilton 2001).

Many ethnohistoric sources mention Native farming. However, Bragdon herself suggests that “the predominance of descriptions of agricultural practice in . . . early accounts is . . . in large part a reflection” of the European preoccupation with agricultural productivity of southern New England (Bragdon 1996).

While there is certainly strong historic continuity in some aspects of Native society, the biases of the European accounts and the revolutionary effect of Europeans on Native society in the seventeenth century should not be underestimated and have not been adequately resolved (Chilton 2001). That is not to say that Native Americans were passive in such transformations. In fact, it was more likely quite the opposite. It is likely that Native peoples increased horticultural productivity as a way of entering into economic relationships with Europeans and/or in response to a shrinking land base in the face of European contact. For example, from his evaluation of the ethnohistoric literature, Bennett (1955) suggests that maize contributed as much as 65 percent to total diet during the Contact period. He also notes that “Indian cornfields were limited to Connecticut, Rhode Island, central and eastern Massachusetts,” which, of course, are the areas of most intense European settlement (Bennett 1955:370). Thomas (1985:96-97) also suggests that in the middle Connecticut River Valley, Native peoples during the Contact period relied heavily on maize horticulture. He bases this on Pynchon’s (1645-50:iii, in Day 1967) account of the names of the 13 months of the Connecticut Valley Indians (Day 1967:244). Since four of the month names refer to the growing and harvesting of maize, Thomas (1985) and Day (1967) conclude that there was a “heavy reliance” on horticulture (see also Bendremer 1999; Petersen and Cowie, this volume). However, we simply must assume that by the mid-seventeenth century, Native subsistence practices had been significantly transformed by the well-developed trade networks in the Connecticut Valley and in the broader region. The nature of that transformation is something that requires much more scholarly attention.

Even if one chooses to place more credence in the European accounts and/or assume more continuity than I have indicated here, many of the accounts emphasize flexibility and diversity in New England subsistence systems. For example, Wood (1977 [1634:86]) records the following about the peoples of the Massachusetts Bay: “In wintertime they have all manner of fowls of the water and of the land, and the beasts of the land and water, pond-fish, with catharres and other roots, Indian beans and clams. In the summer they have all manner of shellfish, with all sorts of berries.” Josselyn (1833 [1674]:93), in writing about the coast of Maine, echoes this diverse menu:

Their Diet is Fish and Fowl, Bear, Wild-cat, Ratton and Deer; dried Oysters, *Lobsters* roasted

or dried in the smoak, *Lampres* and dry'd *Moose-tongues*, which they esteem a dish for a *Sagamor*; hard egges . . . their *Indian Corn* and *Kidney beans* they boil . . . they feed likewise upon earth-nuts or ground-nuts, roots of water-Lillies, Chesnuts, and divers sorts of Berries [emphasis in original].

To this list, Roger Williams, who is referring to groups in the vicinity of Narragansett Bay, adds the hunting and trapping of numerous animals and the collecting of acorns, chestnuts, walnuts, strawberries, and cranberries (Williams 1963 [1643]).

While most of the ethnohistoric evidence for this period refers to the New England coast, there is also evidence that hunting and gathering were equally important in the New England interior. In reference to the Hudson Valley, in a letter of Isaack Rasieres from the seventeenth century (in Jameson 1909:105-107), he states that the valley peoples "support themselves with hunting and fishing, and the sowing of maize and beans."

While the ethnohistoric record may support a multitude of interpretations, ultimately, we must base our interpretations about Late Woodland subsistence and settlement on the available archaeological evidence. The ethnohistoric record provides only a source of ideas, inspiration, and—ultimately—a possible window on the amount and kind of continuity between the Late Woodland and Contact periods, but only if it is used critically and *in toto*.

## SETTLEMENT PATTERNS

The most important body of evidence that we have for interpreting degrees of sedentism and overall economy consists of settlement patterns, that is, the patterning of structures and features within an archaeological site, and the distribution of sites across the landscape in time and space.

Settlement pattern data are not plentiful for New England. This is in part due to historic disturbance, amateur digging, the scarcity of regional surveys, and geomorphological processes (Chilton 1999). Hasenstab (1999) underscores this last point, arguing that village sites are simply "hard to find" in New England because of their hypothesized location on stratified alluvial floodplains.

There is little evidence for structures, much less villages, in Late Woodland New England. While it is true that we simply may not have yet found such evidence,

we must proceed *on the basis of the data we now have on hand*. We may change our interpretations later in light of new data, and this is how any science must proceed.

So what is the current evidence? For the New England coast, Ceci (1979-1980) and Luedtke (1988) suggested that there was no evidence for settled village life prior to European contact. As I mentioned previously, there does seem to be evidence for year-round or nearly year-round habitation in some protected harbors on the coast (Bernstein 1993, 1999; Bernstein et al. 1997; Gwynne 1982), but this coastal sedentism is a process that does not seem directly associated with the adoption of maize horticulture. Instead, it is likely that the year-round availability of both marine and terrestrial resources in these areas was the impetus for increasing sedentism. This sedentism may have paved the way for the adoption of horticulture (maize, as well as indigenous plants), rather than the other way around.

For the interior, identifying post molds on Late Woodland sites is a cause to celebrate. But rarely do these post molds form a pattern that can be traced to identify structure size or shape. For the most part, post-mold patterns seem to indicate short-term wigwam-type structures; and the overlapping nature of these structures and features, as well as a general lack of well-defined middens, indicate repeated seasonal use of site locations over time (e.g., Chilton et al. 2000).

Certainly, there is evidence for fairly large—though not necessarily year-round—Late Woodland sites in the lower Connecticut Valley, but these lack published settlement pattern data (see Bendremer and Dewar 1994; Lavin 1988). Occasionally, there is evidence for large structures, or "longhouses," in New England, but these are rare occurrences (e.g., the Goldkrest site in New York and the Tracy Farm site in Maine). The Goldkrest site apparently represents a multiseasonal fishing and foraging hamlet whose inhabitants exploited floodplain resources, supplemented by some local horticulture (Lavin et al. 1996). The "longhouse" identified at Goldkrest was not occupied year-round or for multiple years. Instead, on the basis of the botanical remains, it was interpreted as having been occupied in late summer and early fall (Lavin et al. 1996). As for the Tracy Farm site, the dating of the "longhouse" structure is unclear (Cowie 2000). From the 587 post molds recorded for the site, two isolated structures were identified: a longhouse and a small circular "wigwam" (the latter is thought to date to the Middle Woodland period) (Cowie 2000). No hearths were identified, but three storage pits were excavated and were in apparent association with Contact period

artifacts. Cowie (2000) suggests that the longhouse represents either a ceremonial lodge or a multifamily residence. Thus, the archaeological record supports an interpretation of flexibility and diversity in the size and shape of the dwellings.

The ethnohistoric literature, likewise, supports such an interpretation. In 1674 Josselyn (1833 [1674]) reported on the impermanence of New England communities: "Towns they have none, being always removing from one place to another for conveniency of food . . . I have seen half a hundred of their Wigwams together in a piece of ground and within a day or two, or a week they have all been dispersed." In the second quarter of the seventeenth century, Johan de Laet (in Jameson 1909) said of the Algonquians living in the Hudson Valley that "some of them lead a wandering life in the open aire without settled habitation . . . Others have fixed places of abode."

Williams (1963:135 [1643]) also comments on the Algonquians' seasonal movements and the flexibility of their habitations:

In the middle of summer . . . they will flie and remove on a sudden from one part of their field to a fresh place . . . Sometimes they remove to a hunting house in the end of the year . . . but their great remove is from their Summer fields to warme and thicke woodie bottoms where they winter: They are quicke; in a halfe a day, yea, sometimes a few houres warning to be gone and the house up elsewhere . . .

Similarly, Gookin (1792:149) and Higgeson (1629:123) state that the New England Indians were inclined to frequently move their dwellings from place to place. Cronon (1983:38) notes that, for some groups, the size and shape of dwellings would change, depending on population density and the time of year (e.g., small wigwams in the summer, multifamily longhouses in the winter).

Another topic related to the issue of settlement patterns is the occurrence of large pit features on Late Woodland sites. Bendremer and Dewar (1994) and Petersen and Cowie (this volume) believe that the presence of what they believe are storage pit features provides evidence for the importance of maize horticulture. However, there are several problems with such an interpretation. First, pit features were not an invention of the Late Woodland period. There are many pit features in New England that date to the Middle and Late Archaic periods as well. Second, we simply do not fully understand the functional complexity of these pit features. At the Late Woodland

period Pine Hill site in Deerfield, Massachusetts, of the 21 pit features identified, only 1 contained maize (Chilton et al. 2000). Very little in the way of artifacts or other food remains was recovered from these features. On the basis of feature contents and soil micro-morphology, I have interpreted these features as short-term food storage or food processing features (Chilton et al. 2000; see also Moeller 1991). Of the five Late Woodland pit features excavated at the Lucy Vincent Beach site on Martha's Vineyard, thus far, none has been found to contain maize, although the analysis of flotation samples is currently being completed by Tonya Largy. (Maize was, however, recovered from a large fire hearth.) In general, instead of assuming that all Late Woodland pit features are storage pits, what is needed is a comprehensive study of these features (e.g., Volmar 1998), which likely had a variety of functions. They may have been used for short-term storage, long-term storage, trash pits, food composting, human or dog burials, or some combination of the above. In fact, there is great antiquity to pit features, and the continuity of pit feature use needs to be closely examined.

### Lag in Archaeological Theory

Finally, aside from issues of methodology, taphonomy, and interpretation, a more important explanation for the New England maize debate is a lag in archaeological theory. As John Hart (1999a:138) indicates, archaeologists still largely adhere to natural-state models in which "all members of a type or kind are expected to reflect the natural state." The natural-state model is particularly evident in studies of prehistoric agriculture; the assumption is that once maize is adopted, "its natural state can be defined as effective and highly productive," that is, it becomes the center of a focal economy (Hart 1999a:139).

However, as Hart (1999a) points out, maize agriculture does not have a natural state, because it is "formed on the basis of relationships between maize and human populations . . ." Thus, the degree of reliance on maize cannot be determined simply on the basis of its presence in archaeological contexts.

Many archaeologists want to elevate New England archaeology, or to "center" New England (Dincauze 1993). In doing so, they want to demonstrate that New England peoples were not backward, were not passive reactors to the Iroquois or the Europeans, and that, in fact, they were evolutionarily "complex" prior to European contact (e.g., Bragdon 1996). But as I have stated elsewhere (Chilton 2001), one does not need

hierarchy, permanent villages, and/or intensive horticulture to argue for complexity. There are anthropological models of “transegalitarian societies,” that are neither egalitarian nor politically stratified (see Clarke and Blake 1994; Hayden 1995). Models of increasing social complexity should, therefore, include the potential for *horizontal* complexity or heterarchy (see Coupland 1996; Creamer 1996; Crumley 1987). Certainly, New England is one region where rigid cultural classifications obfuscate the complexity of social relations (see also Yoffee 1993). In the end, arguing for maize horticulture as the impetus for presumed sedentism and extreme cultural transformation minimizes the importance of indigenous, premaize horticulture in the region and the associated economic, ideological, and other social transformations.

## GAINING PERSPECTIVE

It is clear that even though New England peoples had at least some experience with indigenous cultigens, the acceptance of tropical cultigens into the subsistence system undoubtedly and necessarily caused changes in subsistence, settlement, and ideological frameworks. But how drastic were these changes? My own assessment of “intensive horticulture” is framed by my early archaeological training in the Mohawk Valley. As part of my field school at SUNY Albany in 1984 (under the direction of Dean Snow), we excavated portions of two Iroquois sites, the prehistoric Otstungo site and the Contact period Rumrill-Naylor site. In comparison to these, sites like Burnham-Shepard, Morgan, Skitchewaug, and Pine Hill do not, to me, indicate intensive horticulture, that is, year-round, semipermanent villages (20-50 years). They lack substantial middens, permanent structures, evidence for year-round residence, and indications of some of the social correlates of permanent settlement (such as warfare in the form of palisaded villages, villages in defensible locations, or osteological trauma). The presence of maize kernels or even storage pits in and of themselves is not enough to elevate maize to the status of staple. Ironically, there is actually not a lot of evidence for maize storage in Iroquoia, because it was apparently most often stored above-ground in the residential longhouses. Similarly, my Mayanist colleagues tell me that they rarely find maize itself on archaeological sites, even though we know it was of central importance to the prehistoric Maya. Certainly, we don’t want to get caught up in comparing New England Algonquians to the Iroquois or to the Maya,

but sources of comparison can help us gain perspective. In this case, there are both quantitative and qualitative differences in maize use, but we cannot hope to understand these differences without looking at the broader context of subsistence, settlement, and technological systems.

## FUTURE DIRECTIONS

Finally, other than my suggestions and comments above, I would like to suggest some further directions for maize research in New England. First, we need more direct dates on New England cultigens. For example, of the sites with cultigens shown in Figure 15.1 only 10 of these sites have AMS dates directly from cultigens—most dates reported for maize in the literature are from associated wood charcoal dates (Table 15.1). But such dates are extremely important since, in theory, they leave no doubt about the association between the maize itself and the radiocarbon age obtained. For example, by redating maize, beans, and squash from the Roundtop site in New York State, Hart (1999b:65) was able to demonstrate that “beans . . . did not enter New York until at least 400 years after the introduction of maize,” thereby significantly changing our interpretations of the mechanism for the adoption of tropical cultigens in the Northeast (see also Hart and Scarry 1999).

A second important undertaking for archaeologists in the Northeast is to better understand the relationship between radiocarbon dates for wood charcoal and for maize (see Little 2002). It is clear that radiocarbon dates for maize are often much younger than their associated wood charcoal dates. For site 211-11-1, Cassidy and Webb (1999) report a wood charcoal date for a fire hearth as cal A.D. 710-990, while the associated AMS date for maize was cal A.D. 1327-1650. Similarly, at the Lucy Vincent Beach site (Chilton and Doucette 2002), we obtained three AMS dates on wood charcoal from a fire hearth that clustered around cal A.D. 1000. The associated AMS date for several maize kernels from this feature was cal A.D. 1325-1467. Likewise, Little (1994) reports for Myrick’s Pond in Brewster, Massachusetts, that “all but one of nine charcoal and shell ages associated with maize are older than the four ages directly on maize kernels in southeastern New England collected for this paper.” One possible explanation, at least when comparing wood charcoal dates to maize dates, is that we are dating heartwood and thus, older carbon. This is an issue that will take a considerable amount of time, effort, and

creativity to resolve, but is also underscores the need for direct dates.

Third, stable isotope analysis has also proven very useful for sorting out the issue of maize importance in many parts of the world. Bridges (1994), Little and Schoeninger (1995), and Bourque and Krueger (1994) have demonstrated the potential of this method for New England analyses. Stable isotope analysis is currently the most effective technique for reconstructing prehistoric diet and for reconstructing changes in diet through time. Because maize is a nonindigenous plant, and because it utilizes a different photosynthetic pathway than nearly all other Native edible plants in northeastern North America ( $^{14}\text{C}$  for maize and eelgrass, as opposed to  $^{13}\text{C}$  for all other indigenous plants), it is often possible to detect the level of maize in the diet using a combination of  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values. However, destructive analysis of human remains is often neither possible nor advisable because of NAG-PRA and other political and social concerns. Therefore, I have recently begun a project to assess whether stable isotope analysis on other animals—such as dogs or deer—would prove useful in identifying at least the initial entry of maize into the region (Chilton et al. 2001). Preliminary results suggest that dogs can, indeed, serve as proxies for human diet during the Late Woodland period. Ninian Stein at Harvard University is currently following up on this research.

Finally, standard nondestructive osteological studies can also go a long way in helping to understand the level of dependence on maize in New England (see Bellantoni 1991; Bradley 1989). For example, dental caries and various nutritional pathologies often accompany the onset of intensive maize horticulture. A large-scale comparison between the general health of Late Woodland New England Algonquians and the Late Woodland Iroquois would be extremely informative.

In the end, we will need multiple lines of site-based and osteological evidence in order to reconstruct the complex mosaic of Native American cultural practices during the Late Woodland period. There is no question that the adoption of maize horticulture was an event in New England Native history that had ideological, economic, and social consequences. It is now up to us to understand just what those consequences were.

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## CHAPTER 16

### OUT OF THE BLUE AND INTO THE BLACK: The Middle-Late Maritime Woodland Transition In the Quoddy Region, New Brunswick, Canada

David W. Black

*It has been thought that these kitchen-middens around the shores of Passamaquoddy Bay were made by a people who camped along that shore in the summer for fishing and hunting, but retreated inland to the shelter of the woods in winter. There are, however, indications that the occupation of the village sites marked by these shell heaps was more or less continuous.*  
(Matthew 1884:25)

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#### INTRODUCTION

The Quoddy Region (Figure 16.1) is a biogeographically defined marine and coastal region, situated at the confluence of the Gulf of Maine and Bay of Fundy systems, that acts as the estuary of the St. Croix and Magaguadavic Rivers. The region includes portions of northern Maine and southern New Brunswick, and consists of a complex, dynamic mosaic of fog-zone forests, freshwater marshes, salt marshes, mixed substrate intertidal zones, coves, channels, and continental shelf that exhibits great biological productivity (Black 1992; Sanger 1988:84; Thomas 1983). As shown by the quote above, archaeologists have speculated about prehistoric Native subsistence practices and settlement patterns in the Quoddy Region since the pioneering work of nineteenth-century natural historians.

In this chapter, I summarize what is known of Maritime Woodland (1250 B.C.-A.D. 1400) subsistence and settlement in the Canadian part of the Quoddy Region in the context of a brief review of archaeological research in the region. I focus specifically on the Middle-Late Maritime Woodland transition (ca. A.D. 650-750) and the Late Maritime Woodland period (A.D. 650-1400). In so doing, I demonstrate that a detailed understanding of the physical structure of the archaeological record is a crucial prerequisite to

further understanding subsistence and settlement change during the Maritime Woodland period.

The Quoddy Region is part of the traditional territory of the Pestomuhkatiyik—the Passamaquoddy people (Erickson 1978). There is no archaeological evidence that either the ancestors of the Pestomuhkatiyik or their immediate neighbours practiced horticulture prior to European contact (cf. Deal, this volume; Petersen and Cowie, this volume; Sanger 1988:95). Thus, in interpreting prehistoric subsistence and settlement in the Quoddy Region, archaeologists are reconstructing the settlement patterns and seasonal rounds of foragers adapted to the littoral zone and to adjacent terrestrial and marine habitats.

The interpretations of Quoddy Region prehistoric settlement and subsistence I present here are based on 16 components dating A.D. 650–1400. Nine of these components are located on the northern shores of Passamaquoddy Bay (the Canadian mainland of the Quoddy Region), examined by David Sanger and his students and colleagues from the 1960s through the 1980s; seven are located in the insular Quoddy Region, examined by myself and my students and colleagues, from the 1980s through the present. Site locations are shown on Figures 16.1 and 16.2. Brief summaries of relevant data for each component are presented in the Appendix.

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*Northeast Subsistence-Settlement Change: A.D. 700–1300* by John P. Hart and Christina B. Rieth. New York State Museum © 2002 by the University of the State of New York, The State Education Department, Albany, New York. All rights reserved.

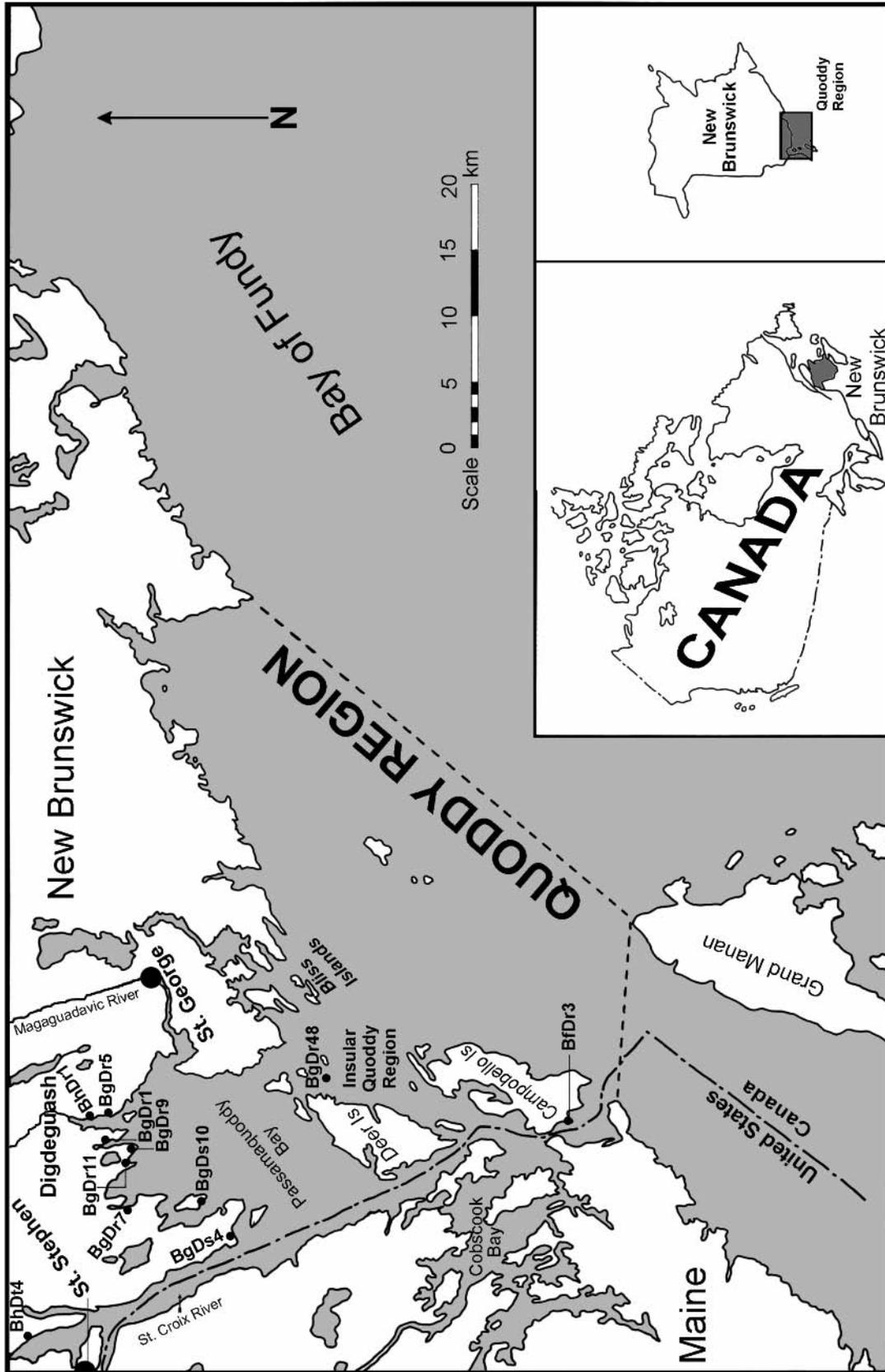
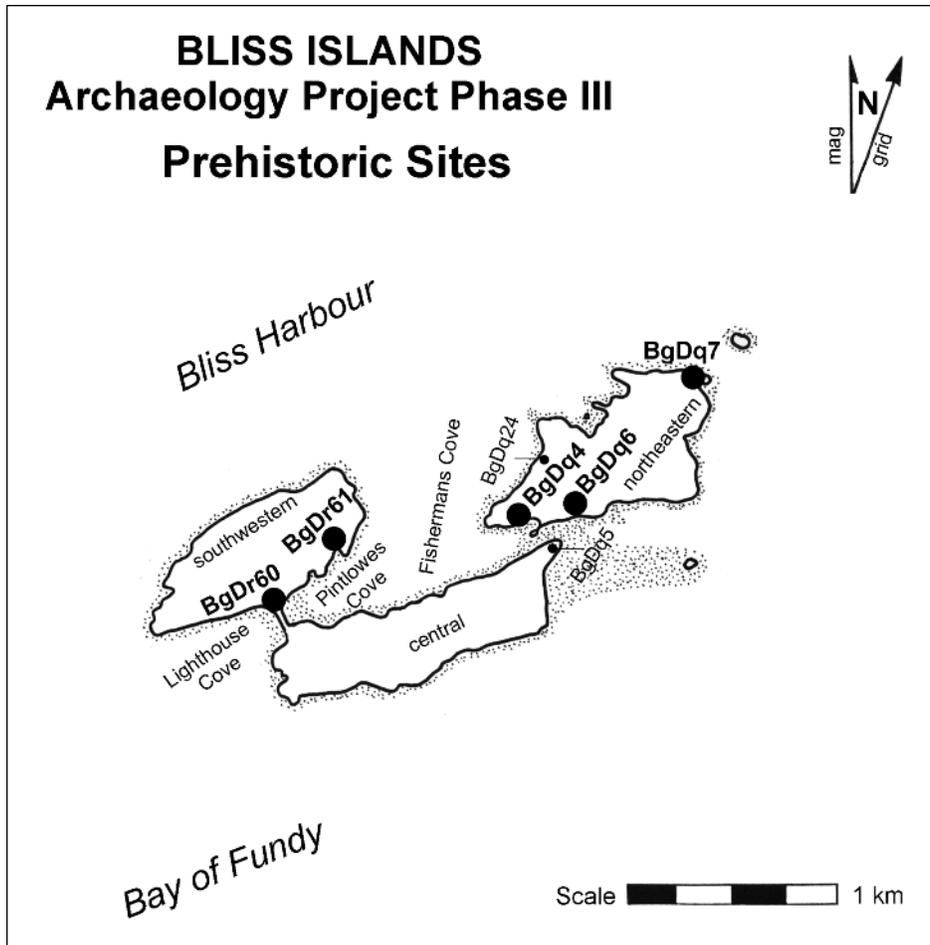


Figure 16.1. Map of the Quoddy Region, showing the locations of archaeological sites and places referred to in the text.



**Figure 16.2.** Map of the Bliss Islands, showing the locations of prehistoric archaeological sites. Sites designated by Borden numbers in large type contain Late Maritime Woodland components.

## CULTURE-HISTORICAL CONSIDERATIONS

Table 16.1 shows the system of Maritime Woodland-Historic period culture-historical nomenclature I use<sup>1</sup>. Although stylistic changes in artifact types have long been recognized (e.g., Matthew 1884; Pearson 1970; Sanger 1986; Tuck 1984), there has been a long-standing tendency for archaeologists to treat the Maritime Woodland as a single unit of analysis—and to treat sites and components dating to this period as single units of analysis—especially with respect to subsistence, seasonality, and settlement studies (cf. Turnbull and Allen 1988:256). That this tendency persists is exemplified by Sanger’s (1987:136) definition of the

Quoddy Tradition as a single, undifferentiated adaptation spanning the years from ca. 250 B.C. to ca. A.D. 1600, by Tuck’s (1984:42-85) separation of the Maritime Woodland sites in the Maritime Provinces by ethnocultural areas but not by temporal units, and by Bourque’s (1995:169-222) treatment of all Maritime Woodland remains at the Turner Farm site on the central Maine coast as a single component (“occupation” in Bourque’s terminology).

In contrast, I have adopted a stratigraphic and chronological approach to Maritime Woodland subsistence-settlement systems (Black 1988, 1992, 1993). The precision of this approach has been enhanced recently by Petersen and Sanger’s (1991) ceramic chronological sequence for the Maine/Maritimes area (Table 16.1),

**Table 16.1.** Maritime Woodland–Historic Period Chronological Model for the Quoddy Region.

Maritime Woodland Model	Date Range	Petersen and Sanger Ceramic Sequence	Date Range
Early Maritime Woodland	1250-250 B.C.	CP1 Early Ceramic	1350-200 B.C.
Middle Maritime Woodland	250 B.C.-A.D. 650	CP2 early Middle Ceramic CP3 Middle Middle Ceramic	200 B.C.-A.D. 400 A.D. 400-650
earlier Late Maritime Woodland	A.D. 650-1000	CP4 late Middle Ceramic	A.D. 650-1000
later Late Maritime Woodland	A.D. 1000-1400	CP5 early Late Ceramic	A.D. 1000-1300
Protohistoric	A.D. 1400-1600	CP6 late Late Ceramic	A.D. 1300-1450
Historic	A.D. 1600-present	CP7 Contact (Early Historic)	A.D. 1450-1650

Note: Adapted from Black (1992:92) and Petersen and Sanger (1991:126). B.P. dates were converted to B.C./A.D. using data from Stuiver and Becker (1993).

which allows Late Maritime Woodland assemblages to be assigned to three (possibly four) sequential cultural components. In my terminology<sup>2</sup>, Middle Maritime Woodland refers to the period from ca. 250 B.C. to A.D. 650 (CP2-3), characterized by the making of dentate or pseudo scallop-shell stamped, surface-treated, grit-tempered ceramics. The earlier part of the Late Maritime Woodland period, from ca. A.D. 650 to 1000 (CP4), which receives the bulk of attention here, is characterized by the making of grit-tempered ceramics decorated on the upper bodies and rims with dentate stamping or cord-wrapped stick impressions and large round punctations. This period may be separated into two parts, the earlier part (CP4a) characterized by rocker-dentate stamping and the later part (CP4b) by cord-wrapped stick impressions and occasional use of shell temper (Petersen and Sanger 1991:140). The later part of the Late Maritime Woodland, from ca. A.D. 1000 to 1400 (CP5-6), is characterized by the making of shell-tempered ceramics decorated on the upper bodies and rims with cord-wrapped stick impressions.

## SETTLEMENT AND SUBSISTENCE RESEARCH

Archaeological research began in the Quoddy Region in the late nineteenth century with the work of natural historians, especially Baird (1881) and Matthew (1884). Subsequently, there was a hiatus in

professional archaeological research spanning the first half of the twentieth century. Research recommenced in the 1950s, with surveys and excavations sponsored by the Peabody Foundation and the National Museum of Canada (e.g., Stoddard et al. 1952; Pearson 1970). This early work focused on shell-bearing sites and resulted in the identification of many of the factors Native peoples took into account in selecting locations for marine coastal habitation sites. These include: (1) locating sites on low-gradient, well-drained areas close to the high-water line, often at the heads of small coves; (2) site exposure to the south (direction of exposure to sun and summer prevailing winds), and shelter to the northwest (direction of winter prevailing winds); (3) proximity to small freshwater marshes, springs, or streams (presumably used as sources of potable water); (4) proximity to high-productivity intertidal zones, such as clam flats and intertidal ledges; and (5) proximity to places where small boats<sup>3</sup> could be landed easily and drawn up out of the reach of tides. Recent studies in the Maine/Maritimes area have confirmed the importance of these factors and consolidated them into an empirical model of coastal site location for the Maritime Woodland period (see Black 1992:58-60; Kellogg 1982; Sanger 1988:92, 1996b:344).

David Sanger conducted the first long-term archaeological research project in the Quoddy Region (see summaries in Sanger 1987:1-6, 1996a:55). His work focused on Middle and Late Maritime Woodland semisubterranean house-pit features associated with

shell-bearing sites located on the northern mainland shores of Passamaquoddy Bay (e.g., Davis 1978; Sanger 1987), and showed that these dwellings probably were occupied by nuclear families. In some cases, several dwellings may have been occupied on the same site at the same time (Sanger 1988:94).

Faunal assemblages from mainland sites are dominated by cervids—especially deer (*Odocoileus virginianus*) and moose (*Alces alces*), fur-bearing mammals—especially beaver (*Castor canadensis*), ducks and geese (Anatidae), shorebirds (Alcidae), seals—especially harbor seals (*Phoca vitulina*), and shellfish—especially soft-shelled clams (*Mya arenaria*). Patterns of beaver tooth eruption (Stewart 1974), presence of migratory bird species (Sanger 1987:69), and lack of vertebrate fish remains (Sanger 1987:69, 76) indicate that these sites represent cold season occupations (Sanger 1982:199, 1987:68-71; Stewart 1974). Sanger (1988:91) found little evidence for subsistence change during the Maritime Woodland, at least in terms of species taken, and concluded that “despite the littoral setting, the impression is one of terrestrial hunter-gatherers utilizing relatively few marine resources” (Sanger 1987:84).

In contrast, my research in the insular Quoddy Region has focused on an array of site types—large and small, stratified and unstratified, shell-bearing and non-shell-bearing (Black 1992:21)—and shown that significant changes in Maritime Woodland technology, subsistence, and settlement can be detected, especially in well-preserved sites that were reoccupied repeatedly over long periods (Black 1991, 1992:35-38, 1993). Specifically, faunal assemblages from insular sites indicate Maritime Woodland peoples depended on a variety of marine mammals and fish—harbor seals, gray seals (*Halichoerus grypus*), Atlantic cod (*Gadus morhua*), pollock (*Pollachius virens*), haddock (*Melanogrammus aeglefinus*), and herring (*Clupea harengus*)—and a range of shellfish, including horse mussels (*Modiolus modiolus*), edible mussels (*Mytilus edulis*), and sea urchins (*Stongylocentrotus droebachiensis*), in addition to soft-shelled clams (Black 1992:117-118, 1993:56-86). This impression is reinforced by stable isotope analyses of residues from ceramic shards showing that some vessels were used to cook marine foods (Black 1992:112-117). Seasonality indicators, such as presence of vertebrate fish and season-of-death analysis of soft-shelled clams, reveal more evidence for warm season occupation (Bishop and Black 1988; Black 1992:116) than was found in mainland sites<sup>4</sup>. Further, niche breadth analysis (Black 1992:108-112) suggests that Late Maritime Woodland subsistence practices were less specialized and placed more emphasis on terrestrial resources than

Middle Maritime Woodland subsistence practices.

Delineation of Maritime Woodland seasonal rounds has been a particularly contentious issue in the archaeology of the Maine/Maritimes area (cf. Deal, this volume; Petersen and Cowie, this volume). Most Maritimes archaeologists have been influenced heavily by seventeenth century ethnohistoric accounts of Native subsistence practices and settlement patterns (e.g., Christianson 1979; Davis 1991; Sanger 1987:68; Tuck 1984). The hypothetical settlement model presented by Snow (1980:44-47)—for Wolastoqiyik (Maliseet people) living in the St. John drainage—exemplifies this approach, suggesting that Native peoples occupied relatively permanent main villages at the heads of tide on river systems, moving seasonally to exploit littoral and marine resources on the coast during the warm seasons and terrestrial resources in the interior during the cold seasons. It is ironic that this model was enshrined in the literature at a time when regional specialists had begun to question both the data and the assumptions upon which it is based (cf. Bourque 1989; Sanger 1982).

Burns (1978), Stewart (1974, 1989), and Sanger (1982, 1987) established that sites on the shores of the Quoddy mainland were occupied predominantly in the cold seasons. At the same time, Bourque (1973) was establishing a similar pattern for comparable sites on the central Maine coast. It became commonplace for archaeologists working in the Maine/Maritimes area to argue that Maritime Woodland seasonal rounds were different from those observed by European explorers in the Early Historic period (Snow 1980:45, 302-303), to ascribe the differences to the effects of European contact (Bourque 1973; Burley 1981; Sanger 1982; Stewart 1989), and to question the applicability of the direct historic approach with respect to settlement patterns (Sanger 1996b:347).

Sanger (1996a:55; see also Stewart 1989:56-57) argues that most of the evidence underlying Snow's model is not directly relevant to the Quoddy Region, and that the small amount of relevant ethnohistoric evidence suggests Native peoples were wintering on the northern shores of Passamaquoddy Bay in the early seventeenth century (Sanger 1987:139). Sanger (1982, 1996a) contends that ethnohistoric accounts have conditioned archaeologists to assume that coastal foragers in the Maine/Maritimes area had settlement patterns involving coastal-interior seasonal transhumance. In his most recent contributions, Sanger (1996a:56-57, 1996c:521) has proposed a two-population model for Maine/Maritimes prehistory, suggesting that, throughout the Maritime Woodland

period, an adaptively—and perhaps ethnically—distinctive population inhabited year-round—and moved within—the coastal zone, interacting with a separate population inhabiting the interior (cf. Deal, this volume; Petersen and Cowie, this volume).

My analysis below is consistent with the two-population model, in part because of practical problems in inferring seasonal rounds involving coastal–interior transhumance from archaeological evidence in the Maine/Maritimes area. For example, the Charlotte County Archaeological Site Inventory (Blair and Black 1993), which includes the shorelines of the Canadian part of the Quoddy Region and the Grand Manan Archipelago, contains approximately 200 registered sites. At least 40 percent of these sites contain prehistoric components (most dating to the Maritime Woodland period). Ninety-five percent of the sites are located on, or immediately adjacent to, marine shorelines; less than 5 percent (<10 sites) are located in the interior of Charlotte County. Thus, even if archaeologists were convinced that the Native subsistence-settlement pattern recorded by early European explorers is applicable to Quoddy Region late prehistory, the archaeological evidence with which to evaluate such a conviction from an interior perspective is unavailable. Moreover, because interior habitation sites in the Maine/Maritimes area are notorious for their poor organic preservation (cf. Nash et al. 1991:217-218; Sanger 1996a:56; Stewart 1989:73), even if a substantial number of interior sites were located and excavated, archaeologists would not have the faunal information necessary to establish subsistence orientation and seasons of occupation for interior sites<sup>5</sup>.

Sanger (1996b:335) characterizes Maritime Woodland peoples living in the littoral zone of the Maine/Maritimes area as having small-scale, band-level social organization and as residentially mobile “in response to seasonal availability of key resources” (Sanger 1996c:523). He believes (Sanger 1996c:523) that Native peoples did not practice significant food preservation and storage. Thus, in Sanger’s (1996c:515) view, Maritime Woodland peoples would fit with Binford’s (1980:16) model of cold climate foragers who did not store appreciable amounts of food. Binford (1980:5-10) defines “foragers” as groups who make residential moves among a series of resource patches, and who, rather than storing food, typically gather food daily<sup>6</sup>. He (Binford 1980:10-12) contrasts foragers with “collectors”, who are logistically mobile, supply themselves through specially organized task groups, and typically practice food preservation and storage. Below, I present evidence indicating that Late Maritime Woodland

peoples in the Quoddy Region may have been shifting from a subsistence-settlement pattern emphasizing residential mobility to a pattern in which logistical mobility played a greater role.

Nash and Miller (1987) argued for a mosaic of Native subsistence and economic adaptations in the Maine/Maritimes area during the Maritime Woodland and Early Historic periods. Below, I substantiate the point that the subsistence-settlement systems of pieces in this mosaic—of which the Quoddy Region is one—must themselves be seen as mosaic in the temporal dimension. Settlement-subsistence change should not be conceived as Native groups selecting alternate patterns from an abstract array of ideal settlement-subsistence types. Rather, the temporal mosaic of settlement-subsistence systems is an archaeological construct, created by an averaging of the subsistence and settlement choices made by Native peoples living in specific environments, during periods that we, as archaeologists, designate for our purposes according to criteria that we select.

## EXAMPLE COMPONENTS

Sanger (1987) presents summary descriptions of Late Maritime Woodland components on the northern mainland shores of the Quoddy Region. Relevant details from his descriptions are summarized in the Appendix. In this section, I present brief descriptions of three earlier Late Maritime Woodland components on the shores of the insular Quoddy Region. These and other insular components also are summarized in the Appendix.

### The Partridge Island Site

Native occupations at the Partridge Island site (Bishop 1994; Bishop and Black 1988; Black 1991, 1993) span the periods from the later part of the Early Maritime Woodland (ca. 400 B.C.) to the earlier part of the Late Maritime Woodland (ca. A.D. 700) (Figure 16.3). The Early Maritime Woodland occupations, which took place during the warm seasons, are represented by cultural material in a basal black soil deposit (sc1). This material is covered by a series of Middle Maritime Woodland deposits (sc2a, 2b, and 2c) consisting of shell middens in the central and shoreward parts of the site that accumulated during the occupation of substantial living floors (similar to those described by Sanger [e.g., 1987:26-27] as semi-subterranean house pits) at the landward edge of the

site. Middle Maritime Woodland occupations took place in all seasons, but evidence for cold season occupations predominate. The Partridge Island site also contains a twentieth century occupation, probably representing weir-tending activities, restricted to the active soil layer at the surface (scA).

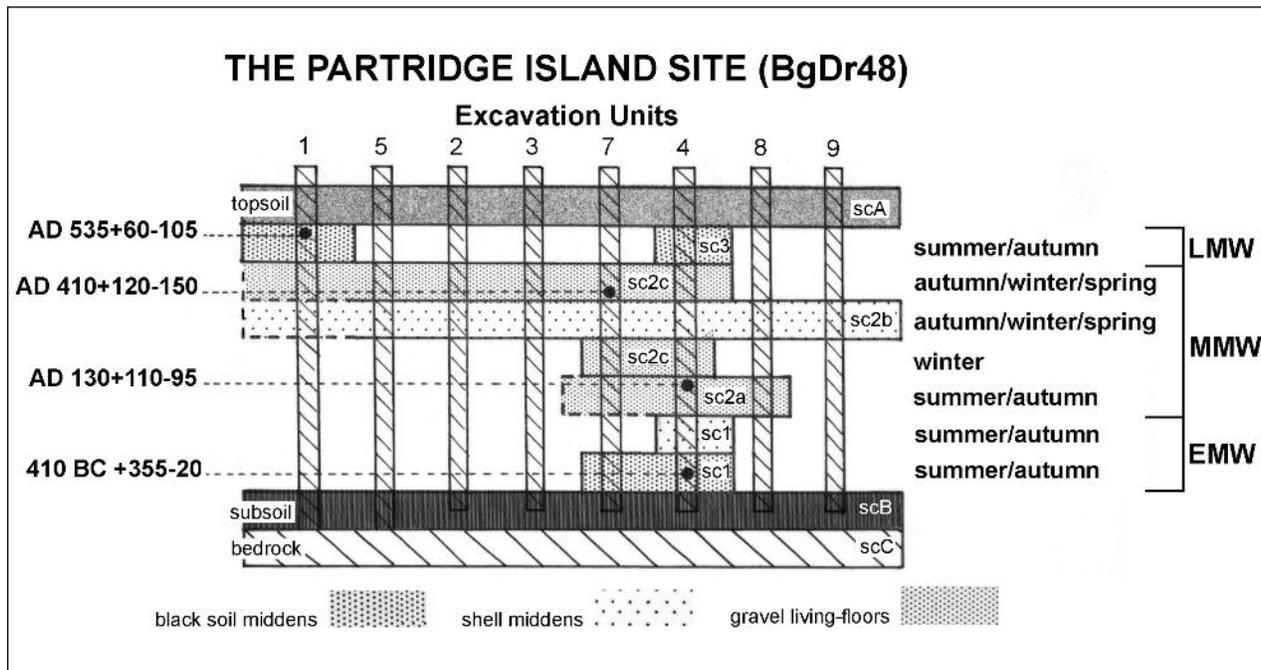
The Late Maritime Woodland occupation at Partridge Island (sc3) was not recognized as a separate cultural component during the excavation and initial analyses of the site (e.g., Bishop and Black 1988). It was subsequently recognized because of similarities to the Late Maritime Woodland component at the Weir site (MacDonald 1994). The component consists of a substantial living floor and associated pit features in the central part of the site (Unit 4), and a gravel and black soil living floor beneath a peat deposit in Unit 1 at the shoreward edge of the site. The assemblage includes a few shards of shell-tempered, cord-wrapped stick-impressed ceramics (Bishop 1994:21-22) and a few flakes of probably exotic chert (MacDonald 1994:97-100). Faunal preservation is poor in Unit 1 due to the acidity of the peat soil and the near absence of shellfish remains (Black 1993:45); however, codfish

(Gadidae) and herring (Clupeidae) bones associated with this component in Unit 4 suggest the Late Maritime Woodland occupations took place during the warm seasons (Black 1993:85) (Table 16.2).

While season-of-death analysis of soft-shelled clam valves indicates that shellfishing was mainly a winter/spring activity at Partridge Island, there is some indication of warm season shellfishing in sc3 (Black 1992:89, 1993:142). Late Maritime Woodland pit features were excavated into the Middle Maritime Woodland shell middens (see Bishop and Black 1988:27; Black 1991:210), a practice that may have incorporated earlier faunal remains into the later component, complicating seasonality interpretations.

### The Weir Site

The Weir site (Black 1985:41-48, 1987:7, 1988:13-17, 1992:35-38, 65-78) is similar to the Partridge Island site in terms of structure and chronology; however, the near-surface layers of the Weir site are better preserved because the site is sealed beneath a 10-30 cm deep peat deposit, most of which has not been disturbed by



**Figure 16.3.** Partridge Island site: stratigraphy/chronology/seasonality schematic (adapted from Bishop and Black 1988). Vertical columns show how noncontiguous excavation units intersect stratigraphic units (stippled horizontal bars). (LMW = Late Maritime Woodland; MMW = Middle Maritime Woodland; EMW = Early Maritime Woodland; sc = stratigraphic component.)

**Table 16.2.** Faunal Remains Associated with the Partridge Island Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
<b>MAMMALIA</b>			
<i>Castor canadensis</i>	beaver	calcined fragments <sup>1</sup> post-cranial elements <sup>2</sup>	MNI=1 <sup>3</sup>
<i>Canis sp.</i>	(domestic?) dog		MNI=1
<i>Phoca vitulina</i>	harbor seal		MNI=1
<i>Odocoileus virginianus</i>	white-tailed deer		MNI=1
<b>AVES</b>			
<i>Gavia immer</i>	common loon		MNI=1
<i>Somateria mollissima</i>	eider duck		MNI=1
<b>OSTEICHTHYES</b>			
<i>Pollachius virens</i>	harbor pollock		MNI=1
<i>Melanogrammus aeglefinus</i>	haddock		MNI=1
<i>Clupea harengus</i>	Atlantic herring		MNI=4 <sup>4</sup>
<b>SHELLFISH<sup>5</sup></b>			
<i>Mya arenaria</i>	soft-shelled clam		41% <sup>6</sup>
<i>Modiolus modiolus</i>	horse mussel		34%
<i>Mytilus edulis</i>	edible mussel		9%
<i>Nucella lapillus</i>	dogwhelk		6%
<i>Strongylocentrotus droebachiensis</i>	green sea urchin		9%

Note: Data from Bishop and Black (1988:23) and Black (1993:59, 83-85).

<sup>1</sup>Not further identifiable; only calcined fragments found in Unit 1.

<sup>2</sup>Beaver cranial/ dental elements are excluded from this analysis; most represent artifacts rather than food remains.

<sup>3</sup>MNI = minimum number of individuals.

<sup>4</sup>Most small fish remains were recovered from column samples; quantity is probably under-estimated as compared to other vertebrates.

<sup>5</sup>Only the five most common shellfish species are listed; all other species together make up < 1% of the total shellfish assemblage.

<sup>6</sup>% = estimated proportion of the total shellfish assemblage by shell weight.

Historic period activity. The site is composed of four mounds of cultural material on four distinct bedrock outcrops. Figure 16.4 is a schematic representation of the stratification of the central mound, which contains Early, Middle, and Late Maritime Woodland material (dating ca. 400 B.C.–A.D. 1000). The Early Maritime Woodland occupations, which took place during the warm seasons, are represented by cultural material in the basal soil deposit (sc1) immediately above the bedrock outcrop. Above this deposit are a series of Middle Maritime Woodland occupations (sc2 and sc3) consisting of substantial shell middens and gravel-based living floors (Figure 16.5). Middle Maritime Woodland occupations took place in all seasons, but evidence for cold season occupations predominates.

The Late Maritime Woodland occupation (sc4), dating ca. A.D. 700–1000, is more extensive, covering the earlier components on the central mound (Figure 16.5), and forming the bulk of the cultural material in the eastern and western mounds (MacDonald 1994). These deposits consist of a 5-25 cm deep black soil

midden containing gravel-based living floors and rock-delimited features (Figure 16.6). The northern mound consists mainly of shell midden deposits, the bulk of which may have accumulated during the occupation of the Late Maritime Woodland living floors on the other mounds (Black 1985:97-98, 1992:143-144).

Some poorly preserved shell-tempered ceramics are present in the Late Maritime Woodland component. The lithic assemblage includes exotic materials from Nova Scotia and Maine (Black et al. 1998; MacDonald 1994). Harbor seal, fish, and migratory bird remains suggest the Late Maritime Woodland occupations took place during the warm seasons (Table 16.3). Although season-of-death analysis of soft-shelled clams indicates that shellfishing was mainly a winter/spring activity at the Weir site, one sample of clams associated with sc4 suggests warm season shellfishing (Black 1992:142). Poor organic preservation on the western mound and pit features excavated into earlier deposits on the central mound

(e.g., Black 1992:190) limit and complicate seasonality interpretations.

### The Northeast Point Site

The Northeast Point site (Black 1985:26-27, 1987:8, 1992:40, 89-90) is structurally similar to the Late Maritime Woodland component at the Weir site; it consists of a black soil midden, containing gravel-based, rock-delimited living floors and hearth features, sealed beneath a peat soil deposit not disturbed by Historic period activity (Figure 16.7). The main difference is that Northeast Point is a single-component site—probably representing a single occupation dating ca. A.D. 700—lacking shell midden deposits.

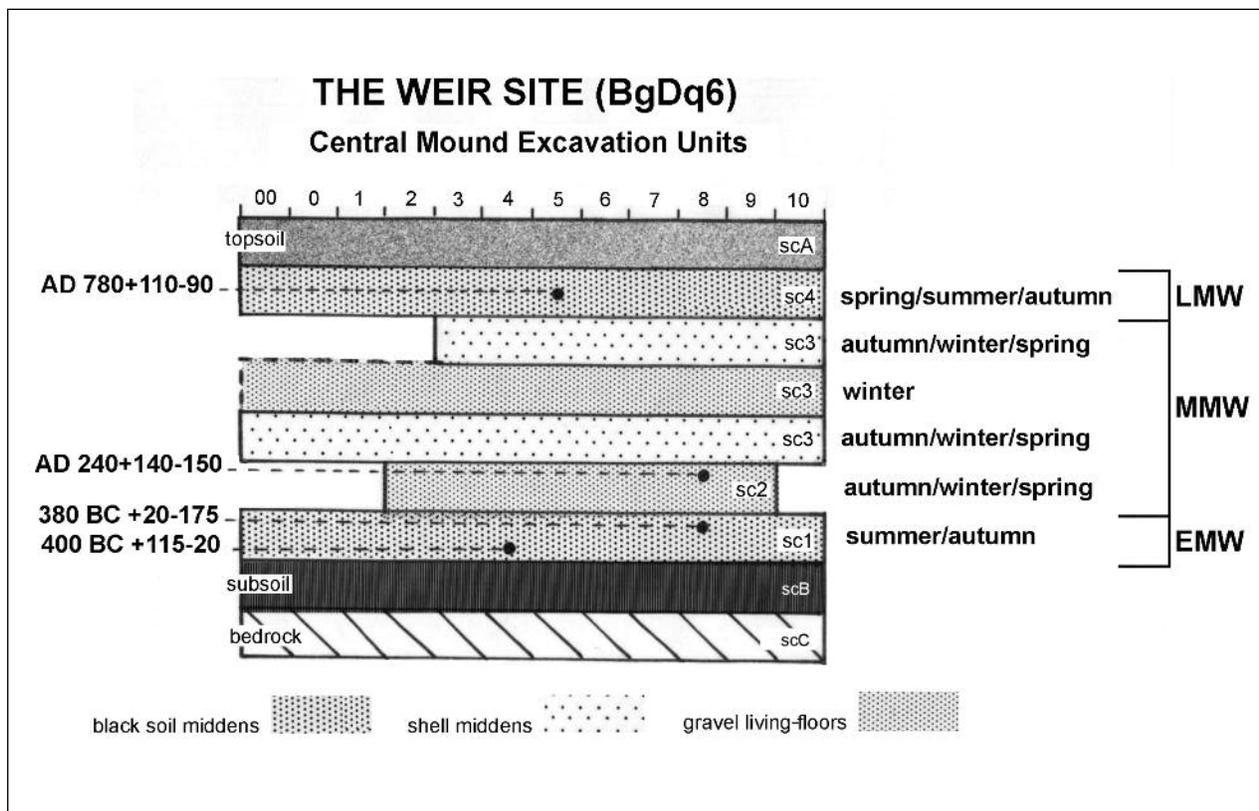
No ceramics are associated with this occupation. The lithic assemblage includes a significant proportion of artifacts and debitage made of exotic chert

from sources in the Minas Basin/North Mountain area of Nova Scotia. The few identifiable faunal elements preserved represent artifacts rather than food remains (Table 16.4); thus, there is no faunal basis for seasonality inferences. Site exposure to the northwest suggests a warm season occupation<sup>7</sup>.

## THE MIDDLE-LATE MARITIME WOODLAND TRANSITION

### Middle Maritime Woodland Period

Middle Maritime Woodland components are found in both insular (e.g., Weir, Camp, Partridge Island) and mainland (e.g., Ministers Island, Teachers Cove, Holts Point, Phils Beach, Simpsons Farm) locations. They are usually stratified above Early Maritime Woodland



**Figure 16.4.** Weir site: stratigraphy/chronology/seasonality schematic (adapted from Black 1992). Numbers at top of block diagram show how contiguous excavation units in the central mound intersect stratigraphic units (stippled horizontal bars). (LMW = Late Maritime Woodland; MMW = Middle Maritime Woodland; EMW = Early Maritime Woodland; sc = stratigraphic component.)



**Figure 16.5.** Weir site, central mound: north profile of units M1, M2, and N3. The bulk of this mound consists of Middle Maritime Woodland shell middens and living floors (sc2 and sc3). The earlier Late Maritime Woodland component (sc4) is located between the Middle Maritime Woodland layers and the peat soil (scA) capping the site (scale = 1 m).



**Figure 16.6.** Weir site: Unit W0W, layers 2 and 3. The peat soil and part of the black soil midden have been removed to show a linear arrangement of rocks representing the margin of a living floor dating to the Late Maritime Woodland period (scale: unit is 1 sq. m in area).

**Table 16.3.** Faunal Remains Associated with the Weir Site Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
<b>MAMMALIA</b>			
<i>Mustela macrondon</i>	sea mink		MNI=1 <sup>1</sup>
<i>Castor canadensis</i>	beaver	post-cranial elements <sup>2</sup>	MNI=1
<i>Canis familiaris</i>	domestic dog		MNI=1
<i>Canis sp.</i>	(domestic?) dog	juvenile	MNI=1
<i>Phoca vitulina</i>	harbor seal		MNI=1
<i>Alces alces</i>	moose		MNI=1
<b>AVES</b>			
<i>Gavia immer</i>	common loon		MNI=1
<i>Pinguinus impennis</i>	great auk		MNI=1
Anatidae	ducks		MNI=2
<i>Anas acuta</i>	pintail duck		MNI=1
<i>Somateria mollissima</i>	eider duck		MNI=1
<i>Uria aalge</i>	thick-billed murre		MNI=1
Laridae	gulls		MNI=1
<i>Corvus brachyrhynchos</i>	common crow		MNI=1
<i>Ectopistes migratorius</i>	passenger pigeon		MNI=1
<i>Bubo virginianus</i>	great horned owl		MNI=1
<b>OSTEICHTHYES</b>			
Gadidae (small)	small codfish		MNI=1
Gadidae (large)	large codfish		MNI=1
<i>Gadus morhua</i>	Atlantic cod		MNI=1
<b>SHELLFISH<sup>3</sup></b>			
<i>Mya arenaria</i>	soft-shelled clam		51% <sup>4</sup>
<i>Modiolus modiolus</i>	horse mussel		14%
<i>Mytilus edulis</i>	edible mussel		<1%
<i>Buccinum undatum</i>	northern whelk		5%
<i>Strongylocentrotus droebachiensis</i>	green sea urchin		29%

Note: Data from Black (1992:100, 239-241, 243), Black et al. (1998), and Reading (1994).

<sup>1</sup>MNI = minimum number of individuals.

<sup>2</sup>Beaver cranial/dental elements are excluded from this analysis; most represent artifacts rather than food remains.

<sup>3</sup>Only the five most common shellfish species are listed; all other species together make up < 1% of the total shellfish assemblage.

<sup>4</sup>% = estimated proportion of the total shellfish assemblage by shell weight.

components, or above subsoil deposits containing scattered Late/Terminal Archaic artifacts. Often they have Late Maritime Woodland components stratified above them.

Middle Maritime Woodland components consist of substantial gravel-based living floors, and ephemeral living floors and hearth features interdigitated among substantial shell midden deposits. These components tend to be deep, and distinctly and complexly internally stratified. They exhibit good stratigraphic separation from other components, and excellent faunal preservation. Faunal assemblages suggest relatively specialized exploitation focused on marine resources. While indicators suggesting cold season occupations tend to predominate, warm season indicators occur in

both insular and mainland components, and warm and cold season occupations are separable in well-preserved sites. These observations are consistent with a pattern of residential mobility in which small groups of people moved seasonally within the Quoddy Region, spending warm and cold seasons in either mainland or insular locations conditioned by the availability of resources and the locations of other groups of people.

#### Earlier Late Maritime Woodland Period

Components dating to the earlier part of the Late Maritime Woodland period occur in both insular (e.g., Weir, Camp, Northeast Point, Partridge Island) and mainland (e.g., Ministers Island, Carson, Holts Point,



**Figure 16.7.** Northeast Point site: units 13, 14, and 23. This single-component earlier Late Maritime Woodland site consists of rock and gravel features surrounded and covered by black soil midden situated between bedrock and an overlying peat deposit. The peat and black soil have been removed to expose a feature (horizontal scale = 1 m; vertical scale = 50 cm).

**Table 16.4.** Faunal Remains Associated with the Northeast Point Late Maritime Woodland Component.

Taxonomic Designations	Common Names	Description	Quantity
<b>MAMMALIA</b>		calcined fragments <sup>1</sup>	
<i>Castor canadensis</i>	beaver	incisor midsection <sup>2</sup>	MNI=1 <sup>3</sup>
<b>SHELLFISH</b>			
<i>Mytilus edulis</i>	edible mussel	5 complete valves <sup>4</sup>	MNI=3

Note: Data from Black (1987:8, 1992:105, 238-239).

<sup>1</sup>Not further identifiable.

<sup>2</sup>Probably represents an artifact rather than food remains.

<sup>3</sup>MNI = minimum number of individuals.

<sup>4</sup>One valve has been drilled for suspension; all probably represent artifacts rather than food remains.

Eidlitz, Orrs Point) locations. These components are sometimes stratified above Middle Maritime Woodland and/or earlier components, are sometimes mixed with earlier material, or may be located as separate sites. Often, they are larger in areal extent than Middle Woodland components. Sometimes they are mixed with later Native components, and usually are mixed with Historic material.

Earlier Late Maritime Woodland components consist of substantial cultural gravel- or black soil-based living floors with associated pits and rock-delineated features embedded in substantial black soil middens. Shell middens, if associated, are located on the peripheries of the black soil middens. These components exhibit poor stratigraphic separation from earlier and later components. They also exhibit variable

and often poor vertebrate faunal preservation, even in undisturbed areas, due to the acidity of black soil middens and overlying peat deposits. Seasonality indicators in mainland components suggest cold season occupations; warm season indicators predominate in insular components.

These observations are consistent with a pattern of residential mobility in which groups of people (perhaps somewhat larger than Middle Maritime Woodland groups) moved seasonally within the Quoddy Region, preferentially spending the warm seasons at insular locations and cold seasons at mainland locations. Such a pattern may represent a polarization of the Middle Maritime Woodland settlement pattern. Components from this period, especially those in the insular Quoddy Region, contain evidence of long-distance exchange of lithic materials. The inferred change in settlement pattern could have been concomitant with the development of Late Maritime Woodland regional exchange systems (Bourque 1994:34-35), if most exchange took place at outer coastal locations during the warm seasons, when long-distance canoe travel was easiest and safest. Such components represent plausible precursors to large, warm season-occupied, coastal aggregation/exchange sites, such as Goddard (Bourque and Cox 1981; Petersen and Cowie, this volume; Sanger 1996c:523) dating to the later part of the Late Maritime Woodland on the central Maine coast.

### Later Late Maritime Woodland Period

Components dating to the later Late Maritime Woodland period are located in both insular (e.g., Gooseberry Point, Pintlowes Cove, Lighthouse Cove) and mainland (e.g., Ministers Island, McAleenan, Simpsons Farm, Phils Beach) locations. While some of these components are stratified over, or mixed with Middle Maritime Woodland components, insular components are separate site locations. Both mainland and insular components often are black soil middens with shell admixtures; living floors and other features are absent or indistinct. These components tend to be small, located in surface deposits, and poorly separated from other components; most are mixed with Historic material.

Faunal preservation is variable, and, in general, vertebrate faunal remains are present in low densities. Seasonality indicators in insular components suggest warm season occupations. The seasonality of mainland components is problematic because faunal remains from later Late Maritime Woodland components may

not have been distinguished from earlier faunal remains. Sanger (1987:100, 110) has argued that the later prehistoric components at Simpsons Farm and Phils Beach represent cold season occupations.

Ironically, in the Quoddy Region there is greater uncertainty about the subsistence and settlement patterns of the later part of the Late Maritime Woodland than for the earlier periods described above. I doubt that the Charlotte County Archaeological Site Inventory contains a representative sample of components dating to this period. Petersen and Cowie (this volume) raise similar concerns about site inventories in Maine and Vermont. Most later Late Maritime Woodland components examined to date in the Quoddy Region may represent short-term logistic forays for the purpose of procuring specific resources. This interpretation would account for their small size, low density of artifacts, debitage and food remains, and frequent separation from earlier residential site locations. Such components are consistent with a settlement pattern in which Native peoples had aggregated into a small number of larger settlement units, and practiced less residential mobility, but more logistical mobility, than in the earlier periods.

## DISCUSSION AND CONCLUSIONS

In the Quoddy Region, the Middle-Late Maritime Woodland transition is marked by an apparently abrupt structural shift from the mussel-tinged blue-gray of the Middle Maritime Woodland shell middens to the humic-stained black of the Late Maritime Woodland soil middens. This shift coincides with changes in lithic artifact assemblages and lithic reduction strategies, a shift from surface-treated to decorated ceramics, the appearance of evidence for long-distance lithic material exchange, and a broadening of the subsistence base. The settlement system shifted from a pattern of residential mobility among warm and cold season-occupied—and perhaps year-round occupied—sites at both insular and mainland locations to one of residential mobility between warm season-occupied insular sites and cold season-occupied mainland sites. More field research is required to thoroughly document these changes. However, taken together they signal a significant reconfiguration of Maritime Woodland culture occurring about A.D. 650–750.

Perhaps the most salient conclusion that can be drawn from this study is that significant subsistence-settlement change took place among Native peoples

in the coastal Northeast outside the context of their developing or adopting horticulture. The structural shift in the archaeological record, documented here, is not restricted to the Quoddy Region. Coastal black soil middens containing evidence of pit features and warm season occupation appear at about the same time, in the archaeological records of other parts of the Maine/Maritimes area: Nova Scotia (Nash et al. 1991:216, 224; Sheldon 1991:233), Grand Manan (Blair 2000), the central Maine coast (Bourque and Cox 1981; Cox 1987), and the Casco Bay area (Hamilton and Mosher 2000). Such components may occur even farther afield, on the islands in Boston Harbor, for example (see Ludetke 1998:16-17). Presumably, the structural shift in coastal sites, from shell midden- to black soil midden-dominated components, must somehow reflect concomitant changes in Native subsistence-settlement systems.

How can the Middle-Late Maritime Woodland transition be accounted for? Archaeologists working in the Northeast often directly relate the appearance of substantial pit features in the archaeological record to Native peoples developing or adopting horticulture (cf. Petersen and Cowie, this volume). I suggest that the appearance of pit features, in the Quoddy Region archaeological record specifically, and in Maine/Maritimes coastal sites generally, is associated with the development of a more sedentary settlement pattern and with greater reliance on stored wild foods, rather than with the adoption of a horticultural economy. However, this assertion by itself sheds no light on the reasons for settlement and subsistence changes in the context of a littoral foraging lifestyle.

Population replacement at the Middle-Late Maritime Woodland transition has been raised (Bourque 1995:256-257) as a possible explanation, but continuities in ceramic technology and decorative motifs make this an unlikely scenario (cf. Deal, this volume). Population expansion may be indicated by the greater areal extent of some earlier Late Maritime Woodland components, as compared to Middle Maritime Woodland components. However, evaluating this variable is hampered by the complexity of determining how often and how long the (essentially internally unstratified) black soil middens were occupied (Black 1992:93; Sanger 1987:83-84; Sheldon 1991:232-233), even when, as at Weir and Northeast Point, they are relatively undisturbed and well separated from other components: Do they represent single occupations? A few seasons or years of intensive occupation? Or several decades—or even centuries—of low

intensity intermittent occupations? Are all of these sites similar in these respects, or do they represent points on a continuum between the extremes of short-term-long-term, intensive-intermittent occupation?

Climatic and environmental change during the Maritime Woodland period, as it is generally characterized in the archaeological literature (e.g., Rutherford 1991:111-112; Sanger 1988:83-84), seems too gradual to precipitate an abrupt cultural reconfiguration. However, the Middle-Late Maritime Woodland transition coincides with the beginning of the Subatlantic period, several centuries of cooler climate (Anderson 2001:146, 164-165), and the later Late Maritime Woodland period coincides with the Medieval Warm period, several centuries of warmer climate (Anderson 2001:146, 166-167). In the future, it may be possible to link climatic change to the cultural and archaeological changes documented in the Quoddy Region.

The development of long-distance exchange systems involving Native peoples from Labrador and Newfoundland to northern New England (Black et al. 1998; Bourque 1994:34-35; Sanger 1988:94), indicates that sociological factors may have been involved in the Middle-Late Maritime Woodland transition. Loring (1988:50-53) suggests that exchange systems may have developed to compensate for the restriction of social networks created by subsistence practices focused on littoral and marine resources, and settlement patterns based around littoral locations. The issues of how and why the exchange systems developed, and how they interrelated with other aspects of Maritime Woodland culture, remain to be fully explored.

The evidence presented in this chapter also suggests a shift in the Native subsistence-settlement system marking the transition from the earlier to the later parts of the Late Maritime Woodland period at ca. A.D. 1000. There are indications that Native peoples in the Quoddy Region may have been shifting from a pattern emphasizing residential mobility to one emphasizing more permanent base camps and more logistical mobility. Ironically, while Snow's (1980:320) model of head-of-tide villages with satellite shell midden sites makes little sense for ancestral Wolastoqiyik living in the St. John drainage, it may be useful in accounting for the later Late Maritime Woodland settlement pattern of ancestral Pestomukatiyik living in the Quoddy Region. Sanger (1987:139-140) has argued that ethnohistoric evidence does not support the existence of permanent villages in the Quoddy Region. However, archaeologists working in adjacent parts of

the Maine/Maritimes area have argued for the development of “central places,” such as the Melanson site in Nova Scotia (Nash et al. 1991) and the Turner Farm site on the central Maine coast (Spiess et al. 1983), and centralized “base camp areas,” as at the mouth of the Miramichi River in northeastern New Brunswick (Allen 1984:23), during the centuries immediately before European contact.

If such settlements existed in the Quoddy Region, they may have been located at the sites of modern towns, such as St. George (head-of-tide on the Magaguadavic River) and St. Stephen (head-of-tide on the St. Croix River), and at the heads-of-tide on smaller streams, such as the Digdeguash (Figure 16.1). Evidence of these sites may have been destroyed by recent marine incursions or by Historic period constructions, such as mills, dams and highways, or may lay beneath the modern towns. Snow (1980:320) has noted the difficulty of finding late prehistoric village sites in other parts of the coastal Northeast.

If horticulture was practiced by Native peoples in the Quoddy Region—immediately before, at, or immediately after European contact—locations on the lower reaches of the river systems are those where it would most likely have been practiced. It is unlikely that Native peoples would have practiced horticulture at the coastal campsites that have received the bulk of archaeological attention because, even today, coastal and insular locations in the Quoddy Region are marginal for horticulture. At any rate, at this point no evidence for horticulture and little evidence for wild plant use exists, in part because of the difficulty and expense involved in acquiring assemblages of macrobotanic remains (cf. Petersen and Cowie, this volume).

Presently, there is no compelling evidence for exotic lithic materials associated with later Late Maritime Woodland components in the Quoddy Region. This raises the possibility that people inhabiting the region ceased participating in regional exchange systems after ca. A.D. 1000. However, an equally plausible scenario is that evidence for exchange dating to this period lies in a few undiscovered or uninvestigated residential sites at head-of-tide locations on the river systems.

In conclusion, in the Quoddy Region, the Middle-Late Maritime Woodland transition has been documented in coastal sites. Explanations for the reconfiguration of Maritime Woodland culture that corresponds to this transition are complicated by anthropogenic disturbance of transitional components during subsequent Native and Euro-Canadian occupations, by uneven faunal preservation, and by

lack of recovery of carbonized plant remains. Thus, I have offered only tentative suggestions to account for this transition.

The earlier-later Late Maritime Woodland transition has not been adequately documented even in coastal sites, since the existing site inventory for the later Late Maritime Woodland period lacks substantial residential components and almost certainly is not representative of the Native subsistence and settlement system immediately before European contact. Components from this period investigated to date are small and impoverished in terms of artifact and vertebrate faunal assemblages. At this point, any attempt to account for this transition is premature.

The Quoddy Region is an important piece in the mosaic of Maine/Maritimes Native prehistory and history. In this chapter I have shown, using the Quoddy Region as an example, that Native subsistence-settlement systems in this area are not only spatially mosaic, but should be *expected* to be mosaic in the temporal dimension as well. I have raised more questions here than I have answered—however, the *expectation* of settlement-subsistence variation within the Maritime Woodland period is a crucial step in designing the studies that will address the unanswered questions.

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## APPENDIX

Canadian Quoddy Region Sites and Components  
Dating A.D. 650-1300

### Passamaquoddy Bay Mainland

*Simpsons Farm* (BhDt4). Radiocarbon Dates (RD): A.D. 1545+100-50 [740±60 B.P.] (B-11067)<sup>s</sup>; Ceramic Association (CA): CP5 (inferred from Hale 1985:19); Other Components (OC): earlier: Middle Maritime Woodland (inferred from Baird 1881); later: Historic; Location (LO): small point, exposed southwest; Structure (ST): large black soil midden, living floors, (peripheral shell middens?); Seasonality (SE): cold season (inferred from Hale 1985:14-18; Sanger 1987:iv, 110).

*McAleenan* (BhDr1). RD: A.D. 1295+120-80 [680±160 B.P.] (GSC-1313); CA: CP5 (Petersen and Sanger 1991:145); OC: none reported; LO: small cove, exposed south; ST: small, shallow, black soil, highly fragmented shell midden; SE: winter (Stewart 1974, 1989:69); autumn/winter/spring (Sanger 1987:89).

*Ministers Island* (BgDs10)<sup>8</sup>. RD: A.D. 1160+125-180 [900±180 B.P.] (GSC-1581), A.D. 990+165-210 [1060±140 B.P.] (GSC-1674); CA: CP4 (Petersen and Sanger 1991:171); OC: earlier: Late Archaic, Early and Middle Ceramic (Sanger 1987:106); later: CP6-7 (Petersen and Sanger 1991:176), Historic; LO: small cove, exposed south; ST: large, deep black soil midden, living floors, peripheral shell middens; SE: possibly year-round (Stewart 1974); winter/spring (Stewart 1989:69)

*Carson* (BgDr5). RD: A.D. 1120+95-100 [925±80 B.P.] (S-510), A.D. 920+75-135 [1120±65 B.P.] (SI-2187); CA: CP4 (Sanger 1987:86); CP5 (Petersen and Sanger 1991:145); OC: earlier: Late Archaic (Sanger 1987:32); later: Historic; LO: small cove, exposed southwest; ST: large, shallow black soil midden with shell admixture, living floors, peripheral shell middens; SE: late fall/winter/spring (Stewart 1989:69); November-April (Sanger 1987:69).

*Teachers Cove* (BgDr11). RD: A.D. 885+95-190 [1170±100 B.P.] (S-608), A.D. 745+65-55 [1635±60 B.P.] (S-609)<sup>s</sup>; CA: CP4 (Petersen and Sanger 1991:170); OC: earlier: CP3 (Petersen and Sanger 1991:138); LO: large cove, exposed southwest; ST: large, shallow black soil midden with shell admixture, living floors, peripher-

al shell middens; SE: autumn/winter/spring (Stewart 1989:69).

*Eidlitz* (BgDs4). RD: A.D. 710+95-50 [1290±80 B.P.] (GAK-1888); CA: CP4 (Petersen and Sanger 1991:141); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:109); later: Historic; LO: small cove, exposed south; ST: small, shallow black soil and shell mixture; SE: cold season (inferred from Sanger 1987:iv, 110).

*Phils Beach* (BgDr1)<sup>9</sup>. RD: none; CA: CP5-6 (inferred from Sanger 1987:99; see also Bishop 1984); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:100; see also Bishop 1984); LO: small cove, exposed southwest; ST: large black soil midden, living floors, (peripheral shell middens?); SE: warm and cold seasons, perhaps year-round (Sanger 1987:100).

*Holts Point* (BgDr9). RD: none; CA: CP4b, CP5 (inferred from Sanger 1987:101; see also Hammon 1984); OC: earlier: Late Archaic, Middle Ceramic (Sanger 1987:101); later: Historic; LO: small cove, exposed south; ST: large black soil midden, (living floors?), (peripheral shell middens?); SE: cold season (Sanger 1987:102); winter/spring (Hammon 1984:93).

*Orrs Point* (BgDr7). RD: none; CA: CP4-5 (inferred from Sanger 1987:98); OC: earlier: none reported; later: Historic; LO: point, exposed southwest; ST: large black soil midden, living floors, peripheral shell middens; SE: no faunal analysis conducted (Sanger 1987:102).

### Insular Quoddy Region

*Pintlowes Cove* (BgDr61). RD: A.D. 1645+25-85 [680±50 B.P.] (B-57996)<sup>s,10</sup>. CA: no ceramics recovered; OC: later: Historic; LO: small cove, exposed southeast; ST: small, shallow black soil and shell mixture; SE: summer/autumn (Black 1992:147).

*Lighthouse Cove* (BgDr60). RD: A.D. 1560+100-65 [730±75 B.P.] (B-34191)<sup>s</sup>; CA: CP 5-6 (Petersen 1996); OC: later: Historic; LO: small cove, exposed southeast; ST: small, shallow black soil and shell mixture; SE: summer/autumn (Black 1992:147).

*Gooseberry Point* (BfDr3). RD: A.D. 1375+15-90 [660±50 B.P.] (B-4190), A.D. 1480+45-35 [830±60 B.P.] (B-34190)<sup>s</sup>; CA: CP5 (inferred from Black and Johnson 1986); OC: later: Historic; LO: small point, exposed south; ST: small, shallow black soil and shell mixture;

SE: warm season (Rojo 1987:221); spring / summer / autumn (Black 1990).

**Weir Site** (BgDq6). RD: A.D. 890+90-115 [1150±80 B.P.] (B-70008), A.D. 780+110-90 [1230±70 B.P.] (B-21140), A.D. 715+65-50 [1280±60 B.P.] (B-8198), A.D. 685+90-30 [1310±60 B.P.] (B-70010); CA: CP4, CP5 (Petersen and Sanger 1991:170; Petersen 1996); OC: earlier: CP2-3 (Petersen 1996); LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden with shell admixture, living floors, peripheral shell middens; stratified between deep earlier components and culturally sterile peat soil; SE: Figure 16.4 (see also Black 1992:146-49).

**Northeast Point** (BgDq7). RD: A.D. 715+145-55 [1280±80 B.P.] (B-40899), A.D. 590+50-150 [1500±70 B.P.] (B-23160); CA: no ceramics recovered; OC: none; LO: small cove, exposed northwest and southeast; ST: large, black soil midden, living floors; stratified between bedrock and culturally sterile peat soil; SE: no direct seasonality information (Black 1992:147); warm season? (see end note 7).

**Partridge Island** (BgDr48). RD: A.D. 535+60-105 [1550±50 B.P.] (B-3968); A.D. 410+120-150 [1650±80 B.P.] (I-12381); CA: CP4-5 (inferred from Bishop 1994:84); OC: earlier: CP2 (Petersen and Sanger 1991:136); later: Historic; LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden, black soil and shell mixture, living floors, (peripheral shell middens?); SE: Figure 16.3 (see also Bishop and Black 1988:31; Black 1993; Bishop 1994).

**Camp Site** (BgDq4). RD: A.D. 1635+15-140 [300±50 B.P.] (B-8196); A.D. 410+115-150 [1650±70 B.P.] (B-21138); CA: CP4a (Petersen 1996); OC: earlier: CP2; later: CP5-6 (Petersen 1996), Historic; LO: thoroughfare, exposed southeast; ST: large, shallow black soil midden with some shell admixture, peripheral shell middens; SE: spring/summer/autumn (Black 1992:147).

## END NOTES

1. Recent controversies concerning the appropriateness of various systems of culture-historical nomenclature (e.g., Black 1992:9; Bourque 1995:169; Leonard 1995) underline the preliminary character of Late Prehistoric reconstructions in the Maine/Maritimes area.

2. I use this scheme throughout the chapter in place of the various systems of culture-historical nomenclature used by the researchers whose work I cite. Note that my terminology is somewhat different from that used by Deal (this volume) and Petersen and Cowie (this volume) for adjacent areas.
3. Presumably, these were predominantly birch-bark canoes during the Late Maritime Woodland period (Black 1992:152; Sanger 1988:91).
4. Burns (1978:38), probably influenced by ethno-historic accounts, interpreted shellfish remains at the Teachers Cove site as evidence of warm season occupation. Stewart (1989:65) countered this argument by suggesting that paralytic shellfish poisoning (PSP) was a significant threat in warm seasons that would make cold season exploitation of shellfish more likely. I, in turn, argued that because of seasonal inconsistency in PSP outbreaks from year to year, because coastal residents develop resistance to PSP toxin, and because PSP has been exacerbated by recent environmental change, shellfishing would not have been limited to the cold seasons (Black 1993:87). Season-of-death analyses of soft-shelled clams from insular Quoddy Region sites indicate that most prehistoric shellfishing took place in the winter and spring; however, there also is evidence for warm season shellfishing (Black 1990; 1992:140-42).
5. This problem may be alleviated, to some degree, by the recovery and analysis of prehistoric plant remains, especially from interior sites; such studies are in their infancy in New Brunswick (cf. Leonard 1995:22), but see Black (1993:52-55), Deal (this volume), Deal et al. (1991:175), and Leonard (1996).
6. The residential mobility of foragers is “characterized by regular residential moves and the exploitation of areas immediately surrounding residential locations” . . . “normally moves are conducted by the entire group, which vacates one area for another” (Shott 1986:27). Collectors “employ mobility strategies that involve frequent and long-distance logistic forays mounted from residential locations”; “logistic forays are specialized moves executed by comparatively specialized task groups” (Shott 1986:27).

7. However, the exposure of this site to the north-west may result from erosion caused by sea level rise; it may have been sheltered to the north and exposed to the east at the time of occupation, a locational configuration consistent with many shell-bearing sites in the insular Quoddy Region.
8. This site is located on a large island that probably was attached to the mainland before and during the earlier part of the Late Maritime Woodland period.
9. This site is designated BgDr25 in some previous publications.
10. All radiocarbon dates were calibrated and converted from B.P. to B.C./A.D. using CALIB 4.2. In the Appendix, uncalibrated (B.P.) dates are shown in brackets following their calibrated (B.C./A.D.) equivalents; corresponding laboratory numbers are shown in parentheses. All dates are presented with one standard deviation ( $\pm 1\sigma$ ) ranges; calibrated dates are rounded to the nearest half-decade. Dates measured on marine shell samples are designated by <sup>s</sup> following the date information; all other dates were measured on wood charcoal. Marine shell dates were calibrated using the MARINE98.14C dataset. Carbon in marine shells was assumed to be 100 percent marine in origin; no correction for local marine reservoir effects was included in the calculations. Dates on wood charcoal were calibrated using the INTCAL98.14C dataset.

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# CHAPTER 17

## ABORIGINAL LAND AND RESOURCE USE IN NEW BRUNSWICK DURING THE LATE PREHISTORIC AND EARLY CONTACT PERIODS

Michael Deal

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### INTRODUCTION

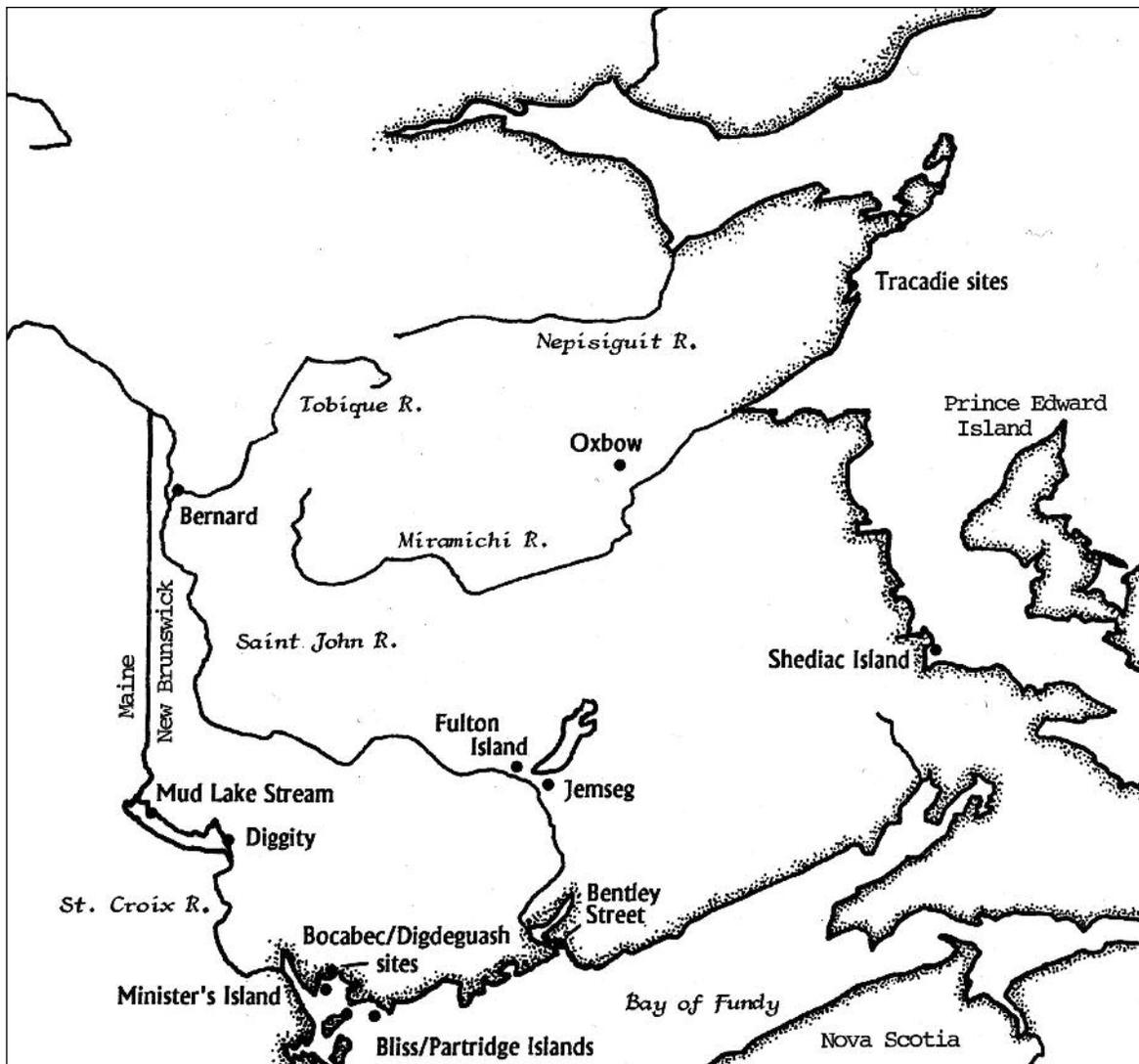
This chapter developed from a legal background paper relating to aboriginal land claims in the province of New Brunswick (Deal 1998), which along with Nova Scotia and Prince Edward Island, make up the Canadian Maritime Provinces. While the information was originally used to illustrate traditional ties to the landscape and resources for establishing aboriginal land and resource rights (e.g., Aronson 1997), it is also valuable to archaeologists who wish to understand the ecological context of local prehistoric societies and related mobility strategies. Land use patterns are equated here with patterns of archaeological settlement (site) distribution and seasonality, while resource use relates to the natural resources that formed the basis of prehistoric technologies and subsistence practices. The Late Prehistoric and Protohistoric aboriginal inhabitants of New Brunswick were foraging peoples (hunter-gatherers) who followed complex mobility patterns according to changing socioeconomic conditions. According to Kelly (1992:43-44), forager mobility, or the periodic movements of people across the landscape, is influenced by a number of factors, including subsistence, level of food storage, trade, territoriality, social and gender inequalities, work patterns, demography, and cultural perceptions. Nash (1997) even associates the long-term settlement and subsistence patterns of the indigenous peoples of the region with the three archetypal landscapes of glacial wasteland, primordial sea, and forest labyrinth, with the latter being primarily associated with the Woodland period. Following Binford (1980), a distinction is made here between residential mobility and logistical mobility. The former relates to the movement of all members of a campsite or village from one location to another, while the latter involves the movement of small

groups or individuals to and from residential sites (Kelly 1983:278). In logistical terms, mobility can involve short trips for general foraging, specific tasks, or resource monitoring. The discussion below begins with a review of archaeological evidence of aboriginal resource use in the province, followed by an assessment of current models of aboriginal settlement and resource use. The major archaeological sites discussed below are found on the map in Figure 17.1.

Archaeologists working in the Maritime Provinces generally agree that there was a largely unbroken cultural sequence for the 1,500 year span before European contact (ca. 2000-500 B.P.). In terms of the regional chronology, this includes the Middle and Late Woodland and Protohistoric periods (see Table 17.1). While Middle and Late occupations can sometimes be distinguished in coastal shell midden sites (Black, this volume), this is not always possible at interior sites, which tend to have compressed stratigraphy and occupation sequences from Late Archaic to historic times. In the archaeological literature, the Middle and Late Woodland peoples are generally treated as a cultural continuum, distinguished by minor changes in technology, and historic ethnic divisions are often projected back to the Middle Woodland period (e.g., the ancestral Mik'maq, Maliseet, and Passamaquoddy). Middle and Late manifestations of Woodland culture are often distinguished on stylistic fads in ceramic designs, and assigned to specific Ceramic periods (CP1-7; after Petersen and Sanger 1991). Based on our current understanding of local prehistory, the "early Late Prehistoric (A.D. 700-1300)" designation used elsewhere in this volume is not easily identified as a distinctive developmental period. However, ongoing research does suggest a trend from Middle to Late Woodland times toward the exploitation of a wider

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*Northeast Subsistence-Settlement Change: A.D. 700-1300* by John P. Hart and Christina B. Rieth. New York State Museum © 2002 by the University of the State of New York, The State Education Department, Albany, New York. All rights reserved.



**Figure 17.1.** Map of New Brunswick indicating major river systems and archaeological sites mentioned in text. (Revised by Miki Lee in August 2000.)

range of local resources, interregional trade, and possibly the adoption of limited horticultural practices (see below). Our understanding of Early Woodland occupation is also clouded by archaeological evidence of contact with neighbouring aboriginal groups (McEachen 1996). Allen (1993:32) suggests that the Passamaquoddy and Maliseet of southwestern New Brunswick are descended directly from one of the Late Archaic populations that inhabited the area (also see Rutherford 1989). The ancestral Mi'kmaq may have also developed out of a local Archaic population, although some researchers believe that they migrated

into the area along the St. Lawrence drainage during the Early Woodland period (Fiedel 1990), and replaced or merged with the existing population.

## RESOURCE USE

New Brunswick has a diverse landscape of highland ranges, lowland plains, large interior lakes, expansive and small river systems, and numerous coastal bays and inlets. The largest rivers are the Miramichi, Saint John, and St. Croix, which were the

**Table 17.1.** Chronological and Ceramic Periods Referred to in Text.

Ceramic Periods for the Maritimes & Maine <sup>1</sup>	General Cultural Periods for New Brunswick
CP 7 (Contact) ca. 400-200 B.P.	Protohistoric ca. 500-400 B.P.
CP 6 (late Late Woodland) ca. 650-400 B.P.	-
CP 5 (early Late Woodland) ca. 950-650 B.P.	Late Woodland ca. 1000-500 B.P.
CP 4 (late Middle Woodland) ca. 1350-950 B.P.	-
CP 3 (middle Middle Woodland) ca. 1650-1350 B.P.	-
CP 2 (early Middle Woodland) ca. 2150-1650 B.P.	Middle Woodland ca. 2000-1000 B.P.
CP 1 (Early Woodland) ca. 3050-2150 B.P.	Early Woodland ca. 3000-2000 B.P.
Pre-ceramic	Late Archaic ca. 5000-3000 B.P.

<sup>1</sup>Ceramic periods follow Petersen and Sanger (1991). Note that the Saint John River sequence has recently been revised by Bourgeois (1999).

major waterways for the early historic Mik'maq, Maliseet, and Passamaquoddy, respectively (see Figure 17.1). Palynological studies indicate that there was a change in the forests of New Brunswick around 2000 B. P., which was characterized by a deterioration of the former closed, mesic, temperate hardwood-hemlock forests (Rutherford 1991:104). The change included increased numbers of spruce (*Picea* spp.), alder (*Alnus* spp.), and hazel (*Corylus cornuta*); and a decrease in eastern hemlock (*Tsuga canadensis*), beech (*Fagus grandifolia*), and birch (*Betula* spp.). Today, most of New Brunswick falls within the Acadian Forest Region, in which red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), yellow birch (*Betula alleghaniensis*), and sugar maple (*Acer saccharum*) are dominant species, with lesser amounts of red pine (*Pinus resinosa*) and white pine (*Pinus strobus*; Rowe 1959). Northern New Brunswick forests are more of a mixed nature, showing a transition between a boreal forest, dominated by conifers, and the more deciduous forest to the south. Dominant species include white and red pine, eastern hemlock, and yellow birch.

In a now classic study of prehistoric settlement patterning in New Brunswick, W. F. Ganong (1904) recognized that resource availability and diversity were closely integrated with aboriginal settlement location and size. At that time there was very little archaeological information on resource use to compare with the ethnohistoric record. Some evidence was obtained through the study of traditional place-names. For example, Ganong (1915:416) identified "Passamaquoddy" as a corrupted version of a Native name for an outer portion of the modern Passamaquoddy Bay, between Campebello and Deer Islands, that refers to the abundance of pollock in that

area. Ganong recognized that sites were located along navigable waterways, such as main branches of large rivers and at the mouths of these rivers at the coast. Travel was by canoe and the main river and lake systems were connected by short portages, which continued to be used into the Historic period (Ganong 1901, 1913a, 1913b, 1914; also Finley 1996). He suggested that prehistoric peoples established habitation and campsites according to the most important resources along these waterways, then looked for certain requisite conditions for habitation (Ganong 1899, 1904). These criteria included a well-drained and dry site location, with an adequate canoe landing area, preferably in an exposed location for viewing approaching parties and to allow a breeze to remove insects (Ganong 1904:24-26). Also important was access to fresh spring water for drinking, firewood, and a grove of white birch for construction purposes. Ganong's (1904:23-24) principal resources were listed as "environmental factors affecting settlement." His general categories are still relevant today, although he gave priority to faunal resources over floral and inorganic resources. Today we recognise that settlement location and mobility can also be socially or politically motivated, yet sociopolitical conditions are not easily determined from the archaeological record (see Kelly 1992).

### Floral Resources

Archaeologists in the Maritimes have only been actively collecting prehistoric plant remains since the 1980s. Archaeological specimens consist primarily of macrobotanical materials, such as charred seeds, nutshells, and plant fibers. A classic paper by Gorham (1943) deals with the interpretation of charred plum

pits (*Prunus nigra*) from the Meductic site. During the 1980s, Hinds (1975, 1985; Deal et al. 1991:175) identified charred seeds recovered from the Fulton Island, Diggity, and Mud Lake Stream sites, and Warman (1986) identified macroplant remains from five sites on the Bliss Islands, Passamaquoddy Bay. Since 1990, paleoethnobotanical work has been undertaken by archaeology students at Memorial University of Newfoundland. Unpublished reports concerning nine New Brunswick sites and six Nova Scotia sites are summarized by Lackowicz (1991). Other recent analyses have included additional macrobotanical remains from the Bliss Islands (Black 1993:52-55), the Skull Island burial, Shediac Bay (Leonard 1996; also Crawford 1999:230-231), and the Jemseg and Meadows sites, along the Saint John drainage (Monckton 1997, 2000).

Considering the extensive use of plant materials for food, medicine, and tools by the historic Native populations, it is obvious that we have much more to learn about plant use in the prehistoric period. Less than fifty plant species have been identified from archaeological samples from the Maritime Provinces. The most commonly occurring macroplant remains from Late Prehistoric sites in the Maritimes consists of cherry and plum pits (*Prunus* spp.), and blackberry, or raspberry (*Rubus* spp.), and knotweed (*Polygonum* sp.) seeds (Lackowicz 1991:68). While knotweed may have been present as a common weed at many prehistoric sites, *Prunus* and *Rubus* species produce edible fruits and certain plant parts have medicinal properties. Other species with edible fruits recovered from New Brunswick sites include partridgeberry (*Mitchella repens*), strawberry (*Fragaria* spp.), blueberry (*Vaccinium* spp.), bunchberry (*Cornus canadensis*), gooseberry (*Ribes* spp.), and elderberry (*Sambucus* spp.).

Nut kernels have been an important food source in eastern North America since Archaic times. Late Prehistoric sites in New Brunswick have yielded specimens of butternut (*Juglans cinerea*), hazelnut (*Corylus cornuta*), beechnut (*Fagus grandifolia*), and acorns (*Quercus* spp.). Butternuts have been recovered from the Fulton Island and Meadows sites, on the St. John River (Foulkes 1981; Varley 1999:43), and at a Middle Woodland (Iroquoian?) site on l'Isle Verte (Trembley 1997). These sites are in historic Maliseet territory, while Leonard (1996) has identified hazelnut and beechnut at the Skull Island site, Shediac Bay, in historic Mik'maq territory. The wood of hardwoods in general could also be used as firewood, construction materials, and tool hafts. The selection of wood for tool hafts may have been more important to the user

than the stone elements of the tools, since they often take longer to make and are used for longer periods (Keeley 1982). Birch was a particularly important species, since its bark was used for making wigwams, canoes, containers, and burial shrouds. Birch bark has been recovered from burial sites dating from the Early Woodland to the Historic period. Monckton's (1997, 2000) analyses of charred wood from the Jemseg and Meadows sites indicates that a wide variety of fuel woods were used in the Lakes Region of central New Brunswick, including maple, beech, ash, oak, birch, ironwood, pine, and spruce, which he believes were collected randomly from the forest floor. At coastal and island sites, occupants would have been forced to rely more heavily on conifers, such as pine, balsam fir, hemlock, and spruce, for their firewood. Other economically useful plant species identified from charred seeds at New Brunswick sites include sarsaparilla (*Aralia* sp.), bullrush (*Scirpus* sp.), and violet (*Viola* spp.). The Native peoples of the province must have used a variety of plant species primarily for their medicinal properties, yet we receive little clarification of this from either the ethnohistoric literature or archaeology.

Hadlock (1947), Harper (1956), and Whitehead (1987) present the only published accounts of archaeological plant fibers in the Maritime Provinces. Two small fragments of woven matting were recovered from a Protohistoric burial site at Redbank, which were probably manufactured from strips of arborvitae (*Juniperus virginiana*) bark (Hadlock 1947). Harper (1956:40-51) discusses fiber-woven artifacts recovered from Portland Point, Saint John, Redbank, and the Hopps site, Pictou, Nova Scotia. Whitehead (1987:4) believes that the charred fragment from Portland Point is made from Indian hemp (*Apocynum cannabinum*). The woven artifacts from the Hopps site include fragments of mats, bags, blankets, and cordage. According to Whitehead (1987:26) they are made from a variety of materials, including reeds (*Scirpus lacustris* and *Juncus effusus*), cattail leaf (*Typha latifolia*), the bark of white cedar (*Thuja occidentalis*), and basswood (*Tilia americana*), and a species of grass, believed to be American beach grass (*Ammophila breviligulata*). Some fragments are also made from the inner bark of a conifer species, as yet unidentified. Indirect evidence of plant fiber industries is also available in the form of fabric impressions on ceramics. Positive casts of these impressions sometimes permit the identification of original structures, such as cordage twists, but the raw materials are rarely identified (Petersen 1996:5).

Among the food plants listed above, Canada plum (*Prunus nigra*) may be of particular importance. It grows wild throughout the province, but is most densely clustered along the upper Saint John and Restigouche Rivers, the mouth of the St. Croix River, and along the lower portion of the Miramichi River (Gorham 1943:44). The common occurrence of plum trees at Native sites and the recovery of charred plum pits at Meductic led Gorham (1943) to suggest that the prehistoric Native peoples of New Brunswick were intentionally planting this species around their campsites. Leonard (1996) recently recovered plum pits from a Late Prehistoric burial at Skull Island site, Shediac Bay, and has revived Gorham's theory concerning Native arboriculture. Additional evidence for possible plum arboriculture comes from the discovery of nine plum pits in a leather pouch that accompanied a Protohistoric female burial from Northport, Nova Scotia (Whitehead 1993:45). The Skull Island site also produced 75 gm of charred groundnut (*Apios americana*) tubers (Leonard 1996:144-152). This species was an important food resource in the Early Historic period and very likely represents a form of pre-Contact plant use. Leonard (1996:150-152) presents evidence that indicates that the groundnut may actually have been introduced into the Maritimes during prehistoric times.

Leonard (1995, 1996:168-186) also reviews the evidence for possible Mi'kmaq horticulture during the Protohistoric period. He cites Lescarbot's assertion that the Mi'kmaq once cultivated corn, beans, and squashes, only to abandon the practice when they began to acquire foodstuffs through trade with the French (Leonard 1996:176). Leonard also cites Pierre Arsenault's 1714 account of Mi'kmaq gardens of corn at Shediac and Richibucto, and John Giles late seventeenth century account of Maliseet gardens of corn and storage practices at Meductic (1996:177-180). As Leonard points out (1996:176), both of these areas had suitable climatic conditions for corn horticulture, along with portions of southwestern New Brunswick. Historic accounts also indicate that the Mi'kmaq were growing tobacco (probably *Nicotiana rustica*) during the early seventeenth century (Leonard 1996:168-174). Monckton (1997) recently identified corn kernel and cupule (*Zea mays*) fragments, and a single possible tobacco seed from the Jemseg site. Unfortunately, the cultural context for these specimens is presently unclear (Susan Blair 2000, pers. comm.), and other specimens of uncharred squash seeds (*Cucurbita pepo*) and a single charred barley seed (*Hordeum* sp.) are believed to date to the period of European settlement.

Leonard's (1996) study provides a provocative model of Late Prehistoric-Protohistoric plant use. It begins with a Late Prehistoric hunting and fishing subsistence strategy, supplemented by the collection of edible berries, nuts, and roots. This much is consistent with existing paleoethnobotanical evidence. Some time during the Late Prehistoric period, plum arboriculture and tuber management were introduced from outside the region. This rudimentary form of horticulture prepared them for the adoption of tobacco, and later, corn (maize) cultivation. The latter most likely took place between A.D. 1350 and 1550, in areas suitable for corn cultivation (Leonard 1996:185). As the volume of European foodstuffs including peas, beans, biscuits, and prunes increased, attempts at corn horticulture, along with plum arboriculture, were abandoned. This model is very compelling, but much more archaeological evidence is needed, especially in areas of possible corn cultivation.

### Faunal Resources

Faunal resources utilized by the Late Prehistoric peoples of New Brunswick include a variety of land and marine mammals, birds, freshwater and marine fish, and shellfish. Today, the diversity and richness of faunal resources varies considerably by ecological zone within the province. Although the archaeological record for faunal resources in this province is far from complete, it demonstrates that this situation also existed in the Late Prehistoric period when it affected local patterns of resource exploitation (e.g., Burley 1981:206). There have been over one hundred zooarchaeological reports written for the Maritime Provinces (Murphy and Black 1996). These reports tend to be short research papers, often unpublished, concerning faunal assemblages from single sites, but together they give us a glimpse of prehistoric animal use. Stewart (1989) provides one of the few published overview papers for this region.

It should be noted that the preservation of archaeological specimens varies considerably between coastal and interior locations. Large quantities of shell in coastal midden sites counteract the acidity of midden sediments and allow the preservation of a wider range of organic materials, including mammal, bird, and fish bones. Bones do not survive well at interior sites unless they have been exposed to fire. Even then, some denser bone, such as beaver, survive charring better than bones of other species (Knight 1985; Spiess 1992), thus influencing the interpretation of faunal assemblages at interior sites. Evidence of interior

freshwater fish species is particularly lacking. For example, only 4 elements have been identified from the Mud Lake Stream site, even though fish bone represented 26 percent of the charred bone recovered (i.e., nearly 2,756 specimens). Three of these represent landlocked Atlantic salmon (*Salmo salar*) and the other is from the Catostomidae (sucker) family (Deal et al. 1991:175).

Fur-bearing animals were important to prehistoric peoples as a source of food and clothing and most species are widely distributed over the province. The species most commonly recovered from archaeological sites in New Brunswick are the beaver (*Castor canadensis*), river otter (*Lutra canadensis*), muskrat (*Ondatra zibethicus*), hare (*Lepus americanus*), marten (*Martes americana*), fisher (*Martes pennanti*), black bear (*Ursus americanus*), white-tailed deer (*Odocoileus virginianus*), caribou (*Rangifer tarandus*), and moose (*Alces alces*). The now-extinct sea mink (*Mustela macrodon*) has been reported from at least one site in Passamaquoddy Bay and another on Spednic Lake (Black et al. 1998; Deal 1986:89). The non-fur-bearing land mammal species include the porcupine (*Erethizon dorsatum*) and dog (*Canis familiaris*). In the Early Historic period dogs were used for hunting beaver, caribou, lynx, and moose, and only occasionally eaten (Christianson 1979:105).

Bone and antler tools are common at coastal shell midden sites, including projectile points, awls, needles, combs, and leister prongs (e.g., Sanger 1987:51-55). The teeth of beaver and various carnivores, such as the fisher, sea mink, and river otter, were also made into tools and pendants (Tyzzer 1943). Marine mammals are represented by harbor seal (*Phoca vitulina*), hooded seal (*Cystophora cristata*), gray seal (*Halichoerus grypus*), sperm whale (*Physeter catodon*), and harbor porpoise (*Phocoena phocoena*). Seals were hunted for their oil and skins by the Mi'kmaq of the northeast coast of New Brunswick and Prince Edward Island, and in Early Historic times these commodities became important in their trade with the Europeans (Prins 1996:99-100). Atlantic walrus (*Odobenus rosmarus*) was also available to native groups on the northeast coast and nearby Prince Edward Island (Keenlyside 1984:11).

Avian remains are also common in coastal shell middens, and more than thirty species have been identified at sites in the Maritime provinces (e.g., Black 1992:235-236; Erskine 1966; Sanger 1987:70). Migratory bird species are particularly useful for interpreting the season of occupation of prehistoric sites, and therefore, mobility patterns. For example, the pied-billed grebe

(*Podilymbus podiceps*), blue-winged teal (*Anas discors*), and wood duck (*Aix sponsa*) are summer residents on the coast of southwestern New Brunswick, while the red-throated loon (*Gavia stellata*), bufflehead (*Bucephala albeola*), barrow's goldeneye (*Bucephalia islandica*), king eider (*Somateria spectabilis*), oldsquaw (*Clangula hyemalis*), white-winged scotter (*Melanitta deglandi*), surf scotter (*Melanitta perspicillata*), black scotter (*Melanitta nigra*), common murre (*Uria aalge*), thick-billed murre (*Uria lomvia*), and great auk (*Pinguinus impennis*) were winter residents (Stewart 1989:62-64, 67). Other species, such as the common loon (*Gavia immer*), great cormorant (*Phalacrocorax carbo*), common goldeneye (*Bucephala clangula*), common eider (*Somateria mollissima*), common merganser (*Mergus merganser*), red-breasted merganser (*Mergus serrator*), razorbill (*Aalca torda*), great horned owl (*Bubo virginianus*), black duck (*Anas rubripes*), and herring gull (*Larus argentatus*) were year-round residents. Waterfowl could also be hunted on north shore marshes and lagoons, on the marshes and bogs of southeastern New Brunswick, and on numerous marshy lakes, such as French and Maquapit Lakes in central New Brunswick (Ganong 1904:23).

The Bay of Fundy and the eastern coast of New Brunswick have different source waters, with varying currents, tidal amplitudes, and water temperatures (Scott and Scott 1988). These factors affect the diversity and productivity of fish and shellfish species in the two areas. Marine fish species recovered from Late Prehistoric sites include herring (Clupeidae family), Atlantic cod (*Gadus morhua*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), Atlantic sturgeon (*Acipenser oxyrinchus*), monkfish (*Lophius americanus*), harbor pollock (*Pollachius virens*), haddock (*Melanogrammus aeglefinus*), flounder (*Pseudopleuronectes* spp.), and hake (*Urophycis* spp.). Of particular importance were anadromous species, such as Atlantic salmon (*Salmo salar*), gaspereau or alewife (*Alosa pseudoharengus*), and American shad (*Alosa sapidissima*), which were available in great numbers during spawning season. They returned yearly to certain rivers, where they could be easily captured at waterfalls, tide-heads, and along narrow thoroughfares between lakes. Ganong (1904:23) lists several ideal locations, including the falls near Milltown on the St. Croix, Aroostok Falls on the Saint John, and most of the mouths of branches of the upper Saint John and Miramichi Rivers. Freshwater (landlocked) Atlantic salmon are found in many of the interior lakes, such as Spednic Lake, which drains into the St. Croix River.

Ganong (1904:24) suggests that the catadromous

species, the American eel (*Anguilla rostrata*) might have been the most important fixed resource for determining campsite and village locations. He notes prehistoric site locations at Nadouan (Eel Ground), on the Miramichi, and Eel River in Restigouche. Weirs were used in some areas to catch eels and other fish, such as salmon and sea trout, on their downstream movement (Christianson 1979:111; Keenlyside 1984; Lutins 1992).

Another important fixed resource is the great variety of shellfish along the shorelines of New Brunswick. The most important species utilized along the Bay of Fundy coast was the soft-shell clam (*Mya arenaria*). Shells of this species form the bulk of most coastal midden deposits in Passamaquoddy Bay. However, several other species have been recovered, including the common mussel (*Mytilus edulis*), horse mussel (*Modiolus modiolus*), bean mussel (*Crenella glandula*), sea scallop (*Phlacopecten magellanicus*), Arctic saxicave (*Hiatella arctica*), tortoiseshell limpet (*Acmaea testudinalis*), Atlantic dogwhelk (*Nucella lapillus*), northern whelk (*Buccinum undatum*), ten-ridged whelk (*Neptunea decemcostata*), Stimpson's whelk (*Colus stimpsoni*), rough periwinkle (*Littorina saxatilis*), round periwinkle (*Littorina obtustrata*), and common periwinkle (*Littorina littorea*) (Black 1992:237). Sea urchin (*Strongylocentrotus droebachiensis*) is also common in some insular shell middens. Clams are often considered a starvation food source, but Sanger (1987:72) suggests that they may have had a pivotal role in an adaptation to a marine environment. They can be easily gathered by all family members and they are edible throughout the winter. Black and Whitehead (1988) believe that shellfish preservation and storage practices may have been developed in the Prehistoric period. This might have affected aboriginal mobility patterns along the southwestern coast. Along the northeast coast of New Brunswick, the Atlantic oyster (*Crassostrea virginica*) is the most important species, along with the hard-shell clam or quahog (*Mercenaria mercenaria*), surf clam (*Spisula solidissima*), soft-shell clam, and the common mussel.

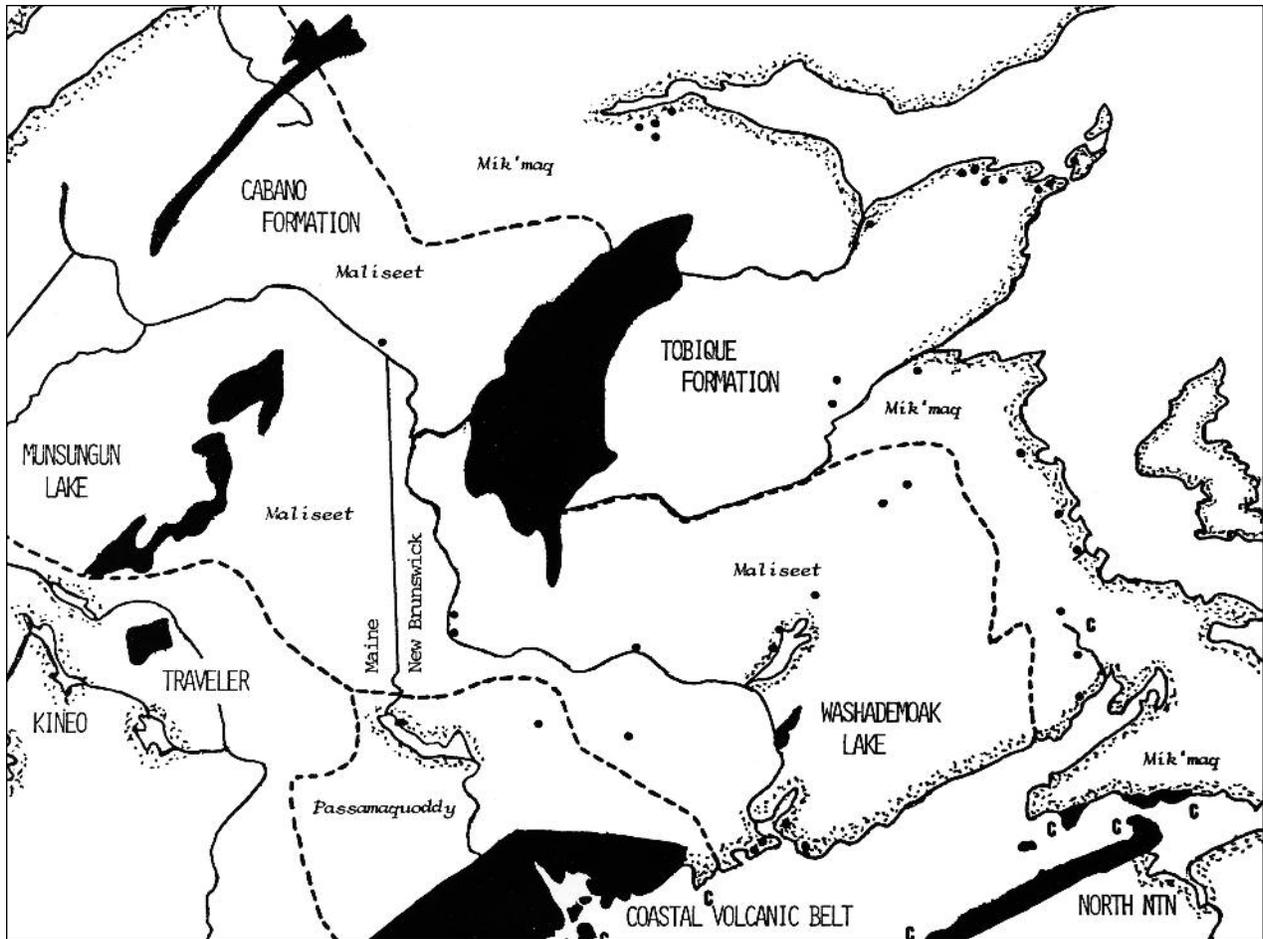
### Rock and Mineral Resources (Figure 17.2)

Rock (or lithic) materials constitute the most significant class of inorganic resources collected by the prehistoric peoples of New Brunswick. This includes a variety of knappable rocks for making chipped stone artifacts, such as knives, arrowheads, and engraving and scraping tools. Less brittle varieties of rock were utilized for hammerstones, anvils, and pecked and

ground stone tools, such as gouges, adzes, and axes. Certain clays and minerals were also collected. Clay was used for the manufacture of pottery. Native copper was hammered and shaped into awls and knives, and hematite (red ochre) and graphite were ground and used as pigments. Hematite and graphite usually receive only a brief mention in the archaeological literature. Both minerals can be found in the Bathurst area of northeastern New Brunswick, while hematite is also found at Markhamville, northeast of Saint John (Sabina 1972:15, 29). Snow (1980:298) suggests that the Champlain drainage area of Vermont may have been a regional source area for black graphite, beginning in the Early Woodland period.

Knappable lithics include a wide variety of silicates (crystalline, cryptocrystalline and noncrystalline), silicified sediments, and igneous and metamorphosed rocks (Crabtree 1967). The knapper looks for materials of suitable texture, elasticity, and flexibility to facilitate the production of flakes with sharp cutting edges. While many materials can be used to make chipped stone artifacts, there is a tremendous variation in the quality of rocks from and within different source areas. As Crabtree (1967:8) notes, a knapper must have a working knowledge of many different materials, since variations in quality call for different methods in flaking. Certain lithic source areas became well known in prehistoric times and lithics from those areas were widely distributed within the province. Workable fragments could be quarried from outcrops or collected as loose fragments and taken to workshop locations for processing into tool blanks. MacDonald (1994:3) makes a useful distinction between primary, local bedrock sources and secondary sources. The latter can be present at a site due to cultural introduction ("culturally exotic" lithics), or they may be present in the area due to geological transportation ("geologically exotic" lithics).

Lithological analyses have been conducted on artifact assemblages from several Late Prehistoric sites in New Brunswick (Black and Wilson 1999; Crofts 1984; Gaunce 1984; MacDonald 1994; Matthew 1884:19-20; Wilson 1983). These studies have relied heavily on visual identification with the aid of low power binocular microscopes. More recent analyses have incorporated geochemical and petrographic techniques that will allow for more accurate identification of specimens to source areas (Burke 2000; Rutherford and Stevens 1991). Primary sources in New Brunswick are found along the Tobique River (Burke 2000), at Washademoak Lake, central New Brunswick, and along the Bay of Fundy coast (Black and Wilson 1999;



**Figure 17.2.** Map of New Brunswick and adjacent areas of Maine, Quebec, Prince Edward Island, and Nova Scotia. Major prehistoric lithic source areas (adapted from Burke 2000:figure 6-5; and Jeandron 1997) are shaded in black. The small dots are clay sources tested by Allain (1984); except for three locations around Passamaquoddy Bay, within the Coastal Volcanic Belt area. The letter “c” represents a native copper source area.

Jeandron 1997; Matthew 1900; Sabina 1972). A number of minor primary source areas have been identified along the coast of Passamaquoddy Bay (Crotts 1984:38-46; MacDonald 1994; Matthew 1884:20-21). Lithics from elsewhere in the Maritime Peninsula also made their way to New Brunswick, presumably over an exchange network that followed the east coast south from Labrador to New England (e.g., Loring 1988:50-51). Examination of lithic artifacts and debitage from sites in Passamaquoddy Bay indicate that these “culturally exotic” lithics became more common during the Late Woodland period in that area (Black 1992:50-56; MacDonald 1994:108-109).

Washademoak Lake is situated in the Lakes Region of the Saint John River Valley, which consists of French,

Maquapit, Grand, and Washademoak Lakes and the thoroughfares that connect them (Matthew 1900:61). The Washademoak lithics consist of a variety of cherts, including chalcedony, carnelian, agate, and jasper, which can be collected as fragments along the shore between Belyea and Crafts Coves (see Black and Wilson 1999:82, 86, 107, note 11). They have been described as glassy, translucent cherts with red or gray coloring, with an opaque or translucent mustard-yellow variant (Jeandron 1997:55). Matthew suggested that the principal workshop site was located at MacDonald’s Point (1900:65), but Jeandron has identified a more likely source area farther to the northeast. A more recent study by Black and Wilson (1999) suggests that this source only came into use during

the Early Woodland period. Tools made from Washademoak chert are found primarily at sites along the Saint John River drainage, but the material has also turned up in the Quoddy Region.

Knappable quality rhyolites (or felsites) are known from the Tobique River area. Clarke (1968) notes this source several times in his volume on the Native peoples of New Brunswick. Burke (2000:203-204) describes the archaeological specimens as maroon to dark brown rocks that weather to a buff or light pink color. No quarry locations have been identified, suggesting that this material may only be available as a secondary source. Sabina (1965:16) also reports that agates, chalcedonies, jasper, and carnelian occur in gravels of the Tobique River.

Sabina (1965:27) lists chert deposits along the Bay of Fundy coast between Saint John and Passamaquoddy Bay. This includes jaspers and agates in the lava flows on the west side of Little Dipper Harbour, west of Chance Harbour, and Darling Lake. She also reports jasper occurring along the north shore of Belisle Bay. Materials from this area have been tentatively identified in lithic assemblages from Passamaquoddy Bay and the Lakes Region (Black and Wilson 1999; MacDonald 1994; Matthew 1900). Crotts (1984:38-46) identifies several minor sources on the coast of Passamaquoddy Bay, which turn up in small amounts in lithic assemblages of sites in that area. These include gray quartzite from near St. Andrews, a porphyritic tuff rhyolite from the northeast shore, and black siltstone and a black volcanic from the Digdeguash Basin (also see Matthew 1884:20-21).

Chalifoux and Burke (1995) identify two quarry and several workshop sites at Grand Touladi Lake, in the Témiscouta region of Quebec. This region consists of a series of lakes and rivers that connect the upper Saint John and St. Lawrence Rivers. It formed part of the Early Historic Maliseet tribal territory (Erickson 1978:124). Touladi lithics, which form part of the Cabano Formation, are described as fine-grained homogeneous cherts, varying in color from black to gray to bluish-green in fresh fracture (Burke 2000:178-179). This material is rarely found in secondary deposits. Touladi cherts represent the dominant material for archaeological sites in the Témiscouta area (Chalifoux and Burke 1995). Access to the Saint John River drainage suggests that this material is also likely to be present, but as yet unidentified, in lithic assemblages of sites along the central and southern portions of the river.

Another major lithic source, formerly in Maliseet territory, in the modern state of Maine, is the Munsungun

Lake area. Doyle (1995:306) describes these lithic materials as generally deep red-wine, dark green, dark gray or black cherts, moderately fine-grained, massive textured, weakly translucent at the edges, and having excellent conchoidal fracture. Doyle (1995:300) identifies Munsungun chert as a primary source, due to archaeological evidence for extensive quarry and workshop activity (Bonnischen 1981; Pollock et al. 1999). Burke (2000:189-192) suggests that most of the Munsungun chert used during Paleoindian times was collected at the source, but that Late Prehistoric peoples may have also collected loose fragments from secondary deposits in streams and around the lakes in the area. A second lithic source area in Maine is the Kineo-Traveller Mountain region. Fragments of Kineo rhyolite (or felsite) were spread widely over central and eastern Maine as glacial till and it occurs commonly in archaeological assemblages of the region (Burke 2000:223; Doyle 1995). Doyle (1995:304) describes this lithic material as a green-gray glassy porphyritic rhyolite, containing phenocrysts of feldspar, tiny glass beads of quartz, and several accessory minerals. MacDonald (1994:36) considers this material to be culturally exotic when it occurs in archaeological assemblages in Passamaquoddy Bay.

Perhaps the most commonly occurring exotic materials in southern New Brunswick sites are the North Mountain lithics from Nova Scotia (Crotts 1984; Doyle 1995; MacDonald 1994). Chalcedonies and jaspers occur as fill in amygdules in the basalt block that forms the North Mountain (Dostal and Dupuy 1984:247; Sabina 1965:41-46; Thompson 1974). Knappable lithics can be quarried or collected at several locations extending from Blomidon point, around Cape Split and southwest to Digby Neck. The most extensive deposits are associated with the Scots Bay Formation, and a Late Prehistoric workshop site has been identified at Davidson Cove (Deal 1989). Many of the deposits are very difficult to access due to steep cliffs and high tides, but important deposits can be easily reached at Davidson Cove, nearby Ross Creek and at Trout Brook, Digby Neck. Other deposits of North Mountain lithics can be found on Ile Haute and Cape d'Or, and similar materials are known from Grand Manan (Doyle 1995:308). The latter includes chalcedony, agates, and jasper found in the basaltic rocks between Northern Head and Dark Harbour (Sabina 1965:29). These materials may have been considered too poor in quality for stone tools. One other possible Nova Scotian source is the quarry site on Ingonish Island, off northern Cape Breton Island (Nash 1978). It has been classified as a medium-grained gray

chert, with pronounced foliation (Nash 1986:170). This material has been visually identified at sites along the eastern coast of New Brunswick and Nova Scotia, on Prince Edward Island, and the Magdalen Islands (Keenlyside 1990:14; Martijn 1989:212; McCaffrey 1986:153).

Small amounts of lithics from the Mistassini region of central Quebec and Ramah Bay in Labrador have also been identified in archaeological sites in New Brunswick (e.g., Gaunce 1984:57; Keenlyside 1990:14; Rutherford and Stevens 1991). According to Rutherford and Stevens (1991), these two lithics are very difficult to distinguish visually, but they have identified both Ramah chert and Mistassini quartzite among specimens from the Tobique area using geochemical techniques.

### Ground Stone Resources

A variety of less brittle materials are used for making ground stone tools. Hard materials, such as quartz, make suitable hammerstones and anvils for processing other rocks. As with chipped stone raw materials, fragments for manufacture can be quarried from bedrock outcrops or surface collected. The latter may even include artifacts abandoned by earlier peoples and reused. These fragments are generally flaked by hammerstones to produce a general shape, then pecked with a harder stone to further shape the tool and finally ground with an abrasive material. Sandstones are preferred for abrading tools, especially for sharpening cutting edges. Experimental studies have shown that ground stone cutting edges are more efficient than chipped stone cutting edges, since they dull less quickly and therefore require less resharpening (Boydston 1989:74).

Poole and Turay (1973) conducted a lithological analysis of 310 ground stone specimens from the Late Archaic site of Cow Point, near Grand Lake. Although they were studying Archaic artifacts, their assessment of source materials also applies to later periods. Using a hand lens and biological dissection microscope, they identified virtually all of the specimens to sedimentary and metasedimentary rocks, mainly siltstone and argillite (n=171) or igneous and meta-igneous rocks (n=137). The source of the rocks could not be pinpointed beyond the Appalachian region, while the Canadian Shield was ruled out as a source region. The igneous, siltstones, and argillites probably came from Siluro-Devonian rocks common to central, eastern, and southeastern Maine and the Maritimes, while pre-Carboniferous rocks of the northern Appalachians

northeast of New York have a similar source (Poole and Turay 1973:155). They identify the red sandstones and conglomerates as Carboniferous or Upper Devonian rocks from the Maritimes. They suggest that distinctive specimens might someday be identified to source locations through comparative analysis. One specimen was identified as Nova Scotian North Mountain basalt, but all of the rest could have originated in deposits within the province (Poole and Turay 1973:171-174). Their results are consistent with our general understanding of ground stone tool manufacturing. The Cow Point celts, which are believed to have functioned as axes and adzes, were made from tuffs altered to greenstone or massive basic igneous rocks (Sanger 1973a:23). In the ethnographic and archaeological literature, igneous rocks are preferred for use as ground stone axes, and include greenstone, diabase, dolerite, diorite, apatite, and nephrite (Dickson 1972:206, Mackie 1995:48).

### Clay Resources

During the Late Prehistoric period, the Native peoples of New Brunswick were making pottery containers to serve a variety of cooking and storage functions (Deal et al. 1991; also see Matthew and Kain 1905). The specific locations of clay deposits utilized during this period are unknown, yet Allain (1984) has identified 44 deposits suitable for making aboriginal pottery. Clay deposits are located in the major areas of aboriginal occupation (Allain 1984:2), with the majority being either lacustrine or estuarine clays from near the mouths of major rivers. The sources include three deposits on the Chiputneticook-St. Croix drainage and Passamaquoddy Bay, three on or near Grand Lake (Lakes Region), one on the upper Saint John at Saint Léonard, four at or near the mouth of the Saint John River, three on or near the mouth of the Petitcodiac River, four at the mouth of the Restigouche River, three near Richibucto, seven in the Caraquet-Shippagan area, and three on the Miramichi (including one near Red Bank). Allain has made several replicas of prehistoric pottery vessels using these clays. Samples from two deposits on the Chiputneticook-St. Croix drainage and one from Pirate's Cove, on Spednic Lake, were used successfully to make replica bricks for residue analyses (Deal and Silk 1988). Further, a study of commercial clays by Ries and Keele (1911:96-98) identified clay deposits north of Fredericton, at Saint John, and at Lewisville, outside Moncton, that they considered to be smooth and plastic enough for production of earthenwares.

## Copper Resources

Throughout the Late Prehistoric period native groups in New Brunswick and elsewhere in the Maritimes were acquiring small amounts of native copper. Copper use can be seen in three stages. During the Early Woodland period, finished copper items, such as rolled copper beads, were traded into the area as part of a pan-Northeastern religious cult and trading network (McEachen 1996; Morin 1978; Rutherford 1990; Turnbull 1976, 1986). During the Middle and Late Woodland periods, small amounts of local copper were collected and made into tool forms, such as awls and blades (Leonard 1996:80-102; Monahan 1990). Finally, during the Protohistoric period, copper and brass kettles were obtained through trade with Europeans and pieces of worn-out kettles were reworked into ornamental objects, such as the tinkling cones worn by Mi'kmaq women (Whitehead 1991).

The local copper-working industry of the Late Prehistoric period featured the cold hammering (and possibly annealing) of small copper nuggets into sheets and bars that were made into a variety of artifacts. Leonard (1996:figure 40) lists 49 archaeological sites in the greater Northeast where native copper artifacts have been found. Of the Late Prehistoric sites with copper assemblages, the only New Brunswick sites are located in the southeast, in the Shediac area, while several sites are found in Nova Scotia. The extensive trade network of the Early Woodland period that brought in copper to New Brunswick from the Great Lakes area seems to have been dismantled by the Middle Woodland period (Rutherford 1990). It is very likely that local sources became more important, although only small quantities of copper could be obtained. Leonard (1996:figure 41) lists 11 potential native copper sources in the Atlantic region, including three sites in New Brunswick, one near Bathurst, one at Clark Point, Passamaquoddy Bay, and another near Southwest Head, Grand Manan Island. The first source is a mine yielding copper, zinc, and lead, which was opened in 1957 (Sabina 1965:15), and may not have been known to aboriginal peoples. Clark Point and Grand Manan appear to be primary copper sources, existing as copper nuggets (nodules), narrow veins, or patches in trap rocks (Sabina 1965:24, 29).

The eight exotic source areas include one in Quebec, one in southern Newfoundland, and six in Nova Scotia, especially the well-known source at Cape d'Or. Leonard (1996:91) reports on an important assemblage of copper artifacts from the Skull Island site, Shediac, which includes two nuggets, two

flattened nuggets, a blank, two large rod-shaped artifacts, two small rod-shaped artifacts, and two conjoining fragments of a copper sheet. These artifacts, as well as many others from sites in Nova Scotia, are probably made from local copper; however, very little chemical sourcing of the copper has been attempted (for an exception see Rapp et al. 1990).

During the Protohistoric period, native groups in New Brunswick were able to acquire large amounts of copper in the form of copper kettles, first from the Basque, and then from the French (Fitzgerald et al. 1993:48). At first the kettles may have been more important as a source of copper for making traditional items, and only later as a replacement for pottery (Miller and Hamell 1986:34). Eventually they became the centerpiece of a Protohistoric burial tradition, in which high-status individuals were covered with a kettle, accompanied by other exotic trade items, such as iron swords and daggers, and glass beads (Whitehead 1991). Several "copper kettle" burial sites have been reported in the Maritime Provinces, including Portland Point, Restigouche, Red Bank, Tabusintac, and Tracadie (e.g., Gorham 1928; Harper 1956; Smith 1886; Turnbull 1984). According to Turgeon (1997:2), the copper kettle, more than any other European trade item, became associated with Mi'kmaq religious and political beliefs during the Early Contact period.

## SETTLEMENT MODELS

When Ganong (1899) compiled the first comprehensive list of possible prehistoric sites in New Brunswick, he had to rely primarily on the Early Historic literature, modern Native informants, and place-name nomenclature. In fact, he was only able to cite four archaeological sources (i.e., Bailey 1887; Baird 1882; Goodwin 1893; Matthew 1884). Since that time, hundreds of prehistoric sites have been located around the province and many have been excavated. Ganong (1899) reported sites within seven districts. His first two districts roughly coincide with the archaeological areas used here for the discussion of prehistoric settlement patterning. The latter includes the Chiputneticook-St. Croix drainage and Passamaquoddy Bay (Ganong's Passamaquoddy district), the Saint John River drainage area (Ganong's Saint John district), and the eastern coast (Ganong's Petitcodiac-Missequash, Richibucto, Miramichi, Nepisiquit, and Restigouche districts). The latter districts are still too poorly known archaeologically to be given separate consideration

here. The three archaeological areas also coincide with the Early Historic aboriginal territories of the province, which survived into the twentieth century as family hunting territories (Speck and Hadlock 1946).

### **Area 1: Chiputneticook-St. Croix Drainage and Passamaquoddy Bay (see Figure 17.2)**

This archaeological area includes the New Brunswick portion of the territory associated with the Passamaquoddy as late as 1890 (Erickson 1978:124). It includes the Chiputneticook Lake and West Grand Lake systems, which are drained by the St. Croix River into Passamaquoddy Bay; and the Magaguadavic Lake system, which is drained by the Magaguadavic River into Passamaquoddy Bay. Most of the archaeological research conducted on the interior lakes and rivers of this area was done during the early 1980s, after the Canadian Government designated the St. Croix Drainage a Waterway Recreational Area, and before it became a Canadian Heritage River System (Archaeology Branch 1989). This included archaeological surveys on both sides of Spednic Lake and the St. Croix (Allen 1983; Carlson 1981; Hale 1984, 1986; Kopec 1984; Sanger 1973b), analyses of private collections (Armstrong 1982; Deal 1984a; Kopec 1985), and excavations at the Diggity and Mud Lake Stream sites (Deal 1984b, 1985, 1986). An avocational archaeologist had previously surveyed and excavated sites on Magaguadavic Lake (Maclure 1980).

By contrast, Passamaquoddy Bay has been the focus of intense archaeological activity since the late nineteenth century. Research in the coastal Quoddy Region began with surveys and excavation in the 1880s (Baird 1882; Matthew 1884). After a long hiatus, survey work began again in the 1950s and continued into the 1980s (Bell and Schley 1970; Davis 1980; Davis and Christianson 1981; Pearson 1970; Stoddard 1950). Several coastal sites were excavated at Digdeguash Harbour and St. Andrews (Sanger 1987), Teacher's Cove (Davis 1978), Ministers Island (Ferguson and Turnbull 1980), and Sand Point (Lavoie 1971). Earlier collections were also reexamined, including materials from Phils Beach (Bocabec) and Holts Point on the Bocabec River (Bishop 1983; Fowler 1966; Hammon-Demma 1984). Archaeological fieldwork in the Insular Quoddy Region began much later and is still underway, and includes surveys of Grand Manan, Partridge, Deer, and Bliss Islands (Black 1984a, 1985, 1988; Blair 2000; Davis and Ferguson 1980). Several excavations have been conducted in association with these surveys (Bishop 1985; Bishop and Black 1988;

Black 1983, 1984b, 1991, 1993, 1994; Turnbull 1981).

Champlain's narrative on the Native groups of the Bay of Fundy coast and areas to the south suggests a simple cyclical settlement and subsistence pattern, involving summer coastal habitation and a winter inland hunting season (Hoffman 1955). Sanger (1971c) was the first to point out that this model was inconsistent with archaeological information from northern Maine. Faunal evidence from Maine sites suggested a winter coastal occupation for the Late Prehistoric period. Subsequent fieldwork in the coastal Quoddy Region suggested a similar pattern for southwestern New Brunswick (Sanger 1982, 1987; Stewart 1989). Sanger (1987) suggests that this apparent reversal in settlement use was a result of the intensification of the fur trade during the late sixteenth century. According to this scenario, Native groups hunted fur-bearers in the winter and moved to the coast in the summer to trade with visiting Europeans.

Snow (1980:42 ff.) has suggested a general dualistic settlement pattern for the Early and Middle Woodland cultures along the northeast coast up to the Saint John River, featuring interior summer camps and winter coastal occupation. His model for the Late Woodland has been referred to by Sanger (1987:139) as a "centralistic" resource exploitation pattern, involving larger settlements on the major rivers, from which collecting trips were made to inland and coastal resource sites. According to Sanger (1987:140), Snow's Early-Middle Woodland model appears to be refuted by evidence of possible year-round occupation for some coastal sites, while a lack of evidence for large village sites brings his Late Woodland model into question. As an alternative to Snow's model, Sanger (1987:14) suggests that nucleation into larger villages in river valleys like the Saint John began after European settlement, when Native populations were devastated by diseases and Native groups felt a need to assert their control over riverine trade routes (i.e., the ethnohistoric pattern).

Sanger (1987:113) characterized coastal Quoddy sites as cold weather base (i.e., residential) camps, from which small groups sortied to exploit local resources (i.e., to logistical camps). Campsites were intentionally located with south-to-southeast orientations, preferably with a height of land behind, to break the prevailing wind and take advantage of exposure to sunlight. Another adaptation to cold weather was the use of semisubterranean dwellings during the Late Prehistoric period (Sanger 1976, 1987). There is a tendency for dwellings to be located toward the interior of these coastal sites, while deeper shell

midden deposits were located along the beach. Sanger (1987:117-120) suggests a generalized hunting-gathering subsistence pattern for this region. Shellfish were obviously an important factor in site location, while various nearby marine and terrestrial habitats were extensively exploited (Sanger's "effective working territory"). Boating technology allowed for a larger marine versus terrestrial catchment area. However, tidal ranges in the region would have greatly affected the scheduling of activities, in that canoeists would try to avoid the wider intertidal zone in favor of sheltered coves (Sanger 1987:119).

The Chiputneticook-St. Croix drainage area is believed to be the principal interior resource area for the ancestral Passamaquoddy. The St. Croix River is not easily navigable and there is very little evidence of campsites along the river, especially between the West Grand and Chiputneticook Lake systems. Snow (1980:51) suggested that, since the ancestral Passamaquoddy did not have the same ready access to inland resources as their neighbors, the ancestral Maliseet and Penobscot, they may have been led to a mutually advantageous exchange in foodstuffs during the Late Prehistoric period. However, Sanger (1987:125) suggests that the Passamaquoddy tribal territory known from ethnohistoric sources may not reflect the prehistoric situation. He suggests that the St. Croix may not have served as a major interior waterway at all, and that the interior and coastal inhabitants were two different populations (Sanger 1986:154; 1987:132).

Spednic Lake is the largest interior waterway on this system. Archaeological evidence from this lake suggests that there were two settlement areas at opposite ends of the lake that were used as bases for fishing, hunting, and birding expeditions from late spring to fall (Deal et al. 1991:172). A winter occupation cannot be demonstrated or ruled out. The remaining Late Prehistoric sites are widely dispersed along the lake, including sites on islands and the tips of long narrow peninsulas. These were probably logistical campsites between the two larger residential areas. No semisubterranean dwellings have been identified at these interior sites. Instead, more generalized activity areas and pit features are present. The supporting posts for interior houses probably sat on the surface of the site, like historic wigwams, and therefore did not leave postholes.

Snow (1980) suggests a somewhat greater reliance on sea mammal hunting in the Passamaquoddy Bay area due to the relative richness of marine resources in

that area. Not surprisingly, there is ample evidence for marine exploitation from the insular sites in the area, which is now referred to as the Insular Quoddy Region (Black and Turnbull 1986). Coastal Quoddy shell middens contain primarily soft-shelled clams, while insular sites feature more horse mussel and sea urchin shell and less clamshell (Black 1993:101). Black and Turnbull (1986) note that sea urchin exploitation appears to increase during the Late Prehistoric period. Outer insular sites appear to be more seasonally specific and resource-specialized. Black and Turnbull (1986:401) suggest a pattern of seasonal movements from residential sites on the mainland and larger islands to marine (logistical) resource sites on the smaller islands during warmer weather.

Black (1992, and this volume) presents a detailed and fine-grained ecological-based analysis of Late Prehistoric occupation of the Bliss Islands. During the Middle Woodland period, the Bliss Islands may have been utilized periodically during both the warm and cold seasons, and possibly year-round. Both summer and winter sites and dwelling remnants are identified. Black (1992:151) presents a pattern of fauna exploitation involving shellfish collecting in the winter and spring, deer hunting in spring and summer, birding in the summer, vertebrate fish harvesting from traps and weirs in summer and fall, and gray seal hunting in winter. By contrast, Late Woodland camps are warm season occupations, and faunal assemblages indicate a greater emphasis on hunting and less emphasis on littoral resources. Black's (1992:152) reconstruction suggests the hunting of harbor seals in spring and early summer; harvesting of herring and cod, and birding in summer; and deer and moose hunting in fall. He suggests a maximum population density for the Quoddy Region during the Middle and early Late Woodland periods, which coincided with a period of high productivity in shellfish species due to a stabilization of the local shorelines (see Sanger 1987). Black (1992:155) further speculates that after 1,500 years ago, sea levels gradually began to rise, causing a reduction in shellfish productivity, and a Native response of exploiting more diverse resources and a higher level of mobility. He echoes Snow's (1980) observation, that Late Woodland populations began to concentrate in a few larger (residential) villages on the mainland, such as the heads of tide of major rivers, with smaller resource sites on the islands (Black 1992:153). He also accepts Loring's (1988) notion of a Late Prehistoric regional exchange system based on lithics and possibly birch bark.

## Area 2: Saint John Drainage (see Figure 17.2)

In historic times, the Saint John drainage, along with the Tobique and Témiscouata areas up to the St. Lawrence River, were major portions of the Maliseet territory (Erickson 1978:124). Archaeological research in the New Brunswick portion of this area has focussed on the confluence of the Tobique and Saint John Rivers, the Lakes Region, and the mouth of the Saint John River. Moorehead (1922:233-236) spent two weeks on the upper reaches of the Saint John River during his 1914 expedition in search of "Red Paint" sites. He tested several sites between Edmonston and Eel River, and sank several hundred test pits for a 4 km radius about the mouth of the Tobique River. After Moorehead, the upper Saint John River area was left primarily to local avocational archaeologists (e.g., Adney 1933; Bradstreet 1996; Clarke 1968) with limited professional survey and excavation work (Allen 1975, 1976; Buchanan 1989; Ferguson 1982; Sanger 1967, 1971a; Stoddard 1950:74-79; Turnbull 1990). In 1990 there were only 22 sites known from the Tobique region, yet they indicated a long prehistoric sequence (Turnbull 1990:25). In 1993 the Tobique First Nations community sponsored fieldwork at the Bernard site with the help of David Keenlyside, Curator for Atlantic Archaeology, Archaeological Survey of Canada.

In the Lakes Region, along the central portion of the Saint John River, a limited amount of survey and excavation work was conducted during the late nineteenth century (Bailey 1887; Kain 1902; Matthew 1896, 1900). Recent archaeological interest began in the 1960s with Pearson's (1968a) survey, Davis's (1971) analysis of ceramics from the Key Hole site, and Sanger's (1971b, 1972) excavation of a Late Archaic cemetery at Cow Point. Subsequent survey work at Grand Lake (Turnbull 1975) led to excavations at the Fulton Island site (Foulkes 1981). The recent Jemseg Crossing Archaeological Project was a salvage operation at the area of impact for the proposed crossing of the Trans Canada Highway at Jemseg (Blair 1997a, 1997b, 1998). The nearby Meadows site was also recently excavated (Varley 1999:43).

A series of surveys in the lower Saint John River area (Burley 1975; Fisher 1964, 1965; Turnbull 1974a) followed Harper's (1956) excavation of a site at Portland Point (also see Harper 1954), but no other major excavations have been undertaken (Jeandron 1996). Unfortunately, there appears to be little surviving evidence of prehistoric occupation at the mouth of the Saint John River (Burley 1975). This area

has been heavily impacted by modern construction activities. However, remnants of sites at Portland Point, Marble Cove, and Bentley Street may yet provide a glimpse of Late Prehistoric settlement patterns. The Marble Cove site sits at the end of an important portage route and Late Archaic remains link this site with the sites at Portland Point and Cow Point (Burley 1975:37-38). Recent testing at the Bentley Street site has revealed a prehistoric occupation dating back at least 3,000 years (Allen 1998).

Snow (1980) was the first author to give detailed consideration of prehistoric settlement and subsistence patterning on the Saint John River. He suggests that ancestral Maliseet lived in semipermanent villages located on saltwater. These villages could range as far north as the Lakes Region, which sits at the head of tide for the Saint John River. Snow's (1980:45) model involves logistical movements of small bands from these villages into upstream forests in the winter and coastal (residential) encampments in the late spring and summer as important resources became available. According to Snow (1980:47), winter campsites were scattered along the shores of the river and its ponds, lakes, and most tributaries, and summer campsites were found on the coast. Snow feels that the European fur trade had little effect on the Maliseet, since they followed a relatively mobile and diffuse settlement-subsistence pattern. He also suggests that whatever incentive there was to adopt horticulture disappeared with the intensification of the fur trade (Snow 1980:46). Thus, semipermanent villages, regular seasonal scheduling, and a dense population led to development of a tribal sociopolitical system for the Maliseet (Snow 1980:48). According to David Sanger (1998, pers. comm.), Snow's model appears to be based primarily on Speck's (1940) characterization of the Penobscot in Maine, which he applies wholesale to the Saint John River region without adequate confirmation from archaeological evidence (also see Sanger 1986).

In a recent detailed study of the major lithic source areas at Témiscouata, Tobique, and Munsungun, Burke (2000) reviewed the archaeological evidence for settlement and subsistence patterning for the interior of the Saint John River waterway. He considered three possible scenarios, namely, that the population of the waterway consisted of (1) two distinct groups with little interaction; (2) two distinct groups with considerable interaction and fluid group membership; or (3) a coastal group occupying the interior on a seasonal basis (Burke 2000:164). He eventually settled on

a model with two distinct populations. The interior population was characterized as small, mobile, family-based groups that used the major lithic resources as part of their annual round (Burke 2000:337-339). The coastal group was considered more sedentary, with a specialized coastal economy. Lithics are seen as an important element in the social and economic interactions between the two groups. Burke's model appears to complement Sanger's "two population" model for the St. Croix-Passamaquoddy Bay region (see Sanger 1986:153-154).

### **Area III: Eastern New Brunswick (see Figure 17.2)**

The eastern shoreline of New Brunswick formed part of the Early Historic Mi'kmaq territory (Erickson 1978:124), which extended eastward into modern Prince Edward Island and southward into Nova Scotia. Archaeological activity in the area has been sporadic. Late in the last century, a Protohistoric copper kettle burial was reported in the Tabusintac area (McMillan 1886). This area was recently revisited by Ferguson (1988). Goodwin (1893) presented a brief report on sites in the Cape Tormentine area, including a possible lithic quarry site on Jourmain Island. In 1913, W. J. Wintemberg and H. I. Smith surveyed the east coast and collected specimens for the National Museum (Wintemberg 1914). They reported the presence of shell middens at Dalhousie and Shediac Island, and several small sites in the Bathurst area. Gorham (1928) reported a Protohistoric burial at Red Bank, on the Miramichi River, and two years later Wintemberg (1937) tested an Early Woodland burial site in the same area. Theodore Stoddard briefly visited southeastern New Brunswick during his 1950 survey and later conducted an excavation at the Graham site, an Early Historic Mi'kmaq dwelling in the Richibucto area (Stoddard and Dyson 1956). In the late 1960s, surveys were conducted by Pearson (1968b) and Martijn (1968), but the first sustained period of research occurred in the 1970s. On the Miramichi, excavations were conducted at Bartibog (Burley 1974, 1976) and at the Oxbow site and Augustine mound in Red Bank (Allen 1981; Emin 1978; Turnbull 1976). Over one hundred sites have been recorded in the Red Bank area and limited fieldwork was conducted into the 1980s, including the testing of several large storage pits on the upper terrace above the Oxbow site (Allen 1984, 1988, 1991). Another Protohistoric copper kettle burial was report-

ed in the Richibucto area (Turnbull 1984). Excavations were also conducted at Old Mission Point (Turnbull 1974b; Turnbull and Turnbull 1974), at the mouth of the Restigouche River. Survey work has been undertaken in the Tracadie Estuary area (Keenlyside 1970; Keenlyside and Keenlyside 1976) and Kouchibouquac (Foulkes 1982; Lavoie 1972). A recent shoreline survey from Shediac to Shemogue Harbour (Leonard 1988) was followed by excavations at Shediac Island and Skull Island in Shediac Bay (Leonard 1996).

Narratives by Le Clerq (1910) and Denys (1908) provide a model for the Early Historic period on the east coast, involving year-round moose and caribou hunting; winter and summer beaver and bear hunting; warm weather birding; fall fishing of cod, salmon, and eels; and ice-fishing in the winter (see Hoffman 1955). Burley (1981:207) characterizes the Protohistoric Mi'kmaq of the Northeast as generalized hunter-gatherers using a central location (i.e., residential site) from which to exploit resources in two or more areas. His model for the entire ancestral Mi'kmaq region in the Late Prehistoric period emphasizes the importance of fishing and food preservation, the gathering of shellfish and sea mammal hunting in spring and mid-winter, and the year-round hunting of ungulates (Burley 1983).

For the Late Prehistoric Miramichi area, Allen (1991:23) pictures large summer villages along the riverside, which focussed on the fishing of Atlantic salmon and Atlantic sturgeon, and to a lesser extent on smelt, gaspereau, shad, striped bass, and tom cod. Fish were dried and smoked for winter and the surplus could be traded. There were also spring and summer visits to the seashore for birds' eggs and beach peas. In the fall, migratory birds were hunted on coastal marshes. During the fall, residents of the Miramichi began to move to winter camps on upper terraces, where large storage pits were filled with pots and baskets of dried and smoked fish, smoked fowl, fruits, nuts, and edible grains (Allen 1991:33). With some local resource variation, this adaptation might be extended to the coastal lagoon-estuary localities at Tracadie and Kouchibouquac (Nash and Miller 1987:48). Keenlyside (1990:32) also notes that prime fishing locations on the Tracadie River drainage, such as prominent points of land or shoreline locations where the channel changes direction, were clearly an important consideration in the choice of habitation sites. The occurrence of exotic lithics from Cape Breton Island, the Bay of Fundy, and Ramah Bay at Tracadie sites (Keenlyside 1990) seem to lend support

to Loring's (1988) regional exchange hypothesis for the Late Prehistoric period.

Archaeological evidence for the sixteenth century indicates that traditional summer fishing villages were abandoned after European contact, and that people began to move to the coast to trade (Allen 1991:37). The faunal information from archaeological sites indicates more variety in site seasonality on the east coast compared to the Fundy coast (Stewart 1989:56). Stewart (1989:74) indicates that the discrepancy between the faunal evidence from the Fundy and northeastern coast sites may be indicative of an ethnic split, with the ancestral Mi'kmaq using coastal sources mostly in the summer and the ancestral Maliseet-Passamaquoddy using coastal resources mostly in the winter.

## SUMMARY AND DISCUSSION

Although the archaeological evidence is far from complete, it is obvious that the Late Prehistoric and Protohistoric populations of New Brunswick exploited a broad and diverse range of natural resources. Faunal resources recovered from archaeological sites represent a wide range of the available modern species, as well as extinct sea mink and great auk. Fur-bearing mammals were widely distributed throughout the province. Anadromous and catadromous fish species were a particularly valuable riverine resource, especially Atlantic salmon. Shellfish were important in certain areas, especially during the Middle and early Late Woodland period in Passamaquoddy Bay.

Archaeological evidence of plant use is beginning to accumulate, but at a slow pace due to considerable preservation problems. The present archaeological evidence is obviously only a small fraction of the species once collected in prehistoric times. Nutshells and seeds from various wild fruits are represented in charred form, but the green parts of plants and flowers used for herbal medicines and beverages do not survive in the acidic soils of the province. Wood, bark, and plant fibers have survived only under exceptional preservation conditions. Local variability in foodstuffs may have been important to social and economic interactions within the region. The exchange of botanical products is well documented for western Canada, including seaweeds, berries, roots, bulbs, nuts, woods, baskets, mats, twines, and fibers (Turner and Loewen 1998). While documentation is inadequate for the east coast, a similar range of products

was available for exchange. Leonard's incipient horticulture model for portions of the province also deserves further consideration, but at present it should be considered speculative.

Certain rock and mineral resources were also important to aboriginal populations in New Brunswick. In the Late Prehistoric period, knappable lithics were the raw materials for hunting and processing tools. Native populations in the Northeast sought out the best quality lithic materials in each region, and certain higher quality lithics were distributed over long distances. Cherts from coastal Labrador and the Quebec interior made their way to the Maritimes and Maine, and especially toward the end of the Prehistoric period. Cherts, chalcedonies, and rhyolites from certain Nova Scotian quarries were also prized. Ground stone raw materials and clay for pottery making were widely available within the province. Copper was an important material for making both ritual and domestic items throughout the Woodland period. Only small amounts of local copper were available, so raw copper was most likely acquired through trade, at first from long-distance Native sources, then regional Native sources, and finally through European trade during the Protohistoric period.

As archaeological evidence accumulates for the Late Prehistoric/Protohistoric period, more fine-grained studies of settlement form and mobility patterns in different parts of the province may be possible, like Black's (1992) study of the Bliss Islands. For most of the region we are forced to look at large-scale similarities and differences in landscape and resource availability. Some of the major characteristics of the archaeological areas are listed in Table 17.2. There is a possibility that the Chiputneticook-St. Croix drainage and Passamaquoddy Bay area had two distinct populations during the Woodland period. The St. Croix River is difficult to navigate. In fact, from the Chiputneticook Lakes, it is easier to travel via portages to the Saint John River than to use the St. Croix. An interior population would have had greater access to lithic resources, nut trees, terrestrial fauna, and freshwater fish. The Quoddy Region is a rich marine environment with sheltered coastal campsites and a number of large islands. Terrestrial fauna could be hunted near the coast and on some of the larger islands. Harbor seals are attracted to freshwater estuaries, rivers, and lakes (Beck 1983) in the early spring and summer, and the harbor porpoise is a year-round resident (Gaskin 1983). Cod were resident and abundant

**Table 17.2.** Summary of Landscape and Resource Characteristics for the Three Major Archaeological Areas of New Brunswick.

Archaeological Area:	Chiputneticook-St. Croix	Saint John River	Eastern New Brunswick
Landscape	Large Segmented River System/Lakes Large Bay/Islands Acadian Forest	Large Navigable River Large Interior Lakes Acadian Forest (South) Mixed Forest (North)	Medium Sized Parallel River Systems Estuaries and Lagoons Acadian Forest (South) Mixed Forest (North)
Floral Resources	Edible Fruits/Nuts Medicinal Plants Fuel/Construction Wood Plant Fibers Late Corn Agriculture?	Edible Fruits/Nuts Butternut Available Medicinal Plants Fuel/Construction Wood Plant Fibers Storage? Late Corn Agriculture?	Edible Fruits/Nuts Groundnut Management Medicinal Plants Fuel/Construction Wood Plant Fibers Late Corn Agriculture? Storage on Miramichi
Faunal Resources	Deer/Moose/Caribou Beaver Salmon/Cod Eels Harbor Seal/Gray Seal/ Harbor Porpoise Available Sea Mink (Traded?) Soft-Shell Clams/ Mussels/Sea Urchins Shellfish Preservation? Waterfowl	Deer/Moose/Caribou Beaver Freshwater Fish Eels Salmon/Gaspereau Harbor Seal Waterfowl (Marshy Lakes)	Deer/Moose/Caribou Beaver Salmon/Gaspereau/Sturgeon Eels Harbor Seal/Harp Seal/ Walrus Available Oysters/Quahog/Mussels Waterfowl (Wetlands)
Lithic and Mineral Resources	Abundant Clay/Igneous Groundstone Materials Coastal Lithics Kineo-Traveller Exotics North Mtn Exotics	Abundant Clay/Igneous Groundstone Materials Munsungun Tobique/Cabano Washademoak Kineo-Traveller Mtn.? North Mtn. Exotics	Abundant Clay/Igneous Groundstone Materials Tobique/Cabano North Mtn/Ingonish Exotics Local and North Mtn. Copper

in the insular area (Rojo 1987), and salmon and gaspereau could be harvested in the spring at the Milltown Falls above the St. Croix estuary. Waterfowl were also available along the coast and eggs could be collected from rocky islands. North Mountain cherts and Kineo-Traveller Mountain porphyry appear as exotics in local lithic assemblages and may have been part of a Late Prehistoric coastal exchange system, which might also have included birch bark (Loring 1988) and sea mink (Black et al. 1998).

The landscape of the Saint John River area is dominated by a large navigable river system and a large central lake system. Portages facilitate movement between this and surrounding areas. The Tobique is a

medium-sized river system that links the Saint John and St. Lawrence Rivers. It is difficult to imagine a single cohesive mobile population exploiting this extensive system in prehistoric times. Two or more distinct residential groups could have easily shared this area (e.g., Burke 2000). Archaeological evidence indicates at least three population centers (i.e., clusters of sites) associated with the estuary, Lakes Region, and the confluence of the Tobique and Saint John Rivers. Of the three archaeological areas, this one would have had the most variety in faunal and floral resources. For example, nut trees and shrubs were more numerous, although nut yields are quite variable, with beechnut, hazelnut, and butternut having large crops about

every second or third year (Asch Sidell 1999:205). A major difference was in access to good quality lithic resources, with Munsungun Lake, Tobique, and Washademoak sources being located in this area. Not surprisingly, lesser amounts of exotic lithics are associated with this area.

The eastern coastal area is characterized by numerous medium-sized river systems running parallel to one another and draining into the Gulf of St. Lawrence and Northumberland Strait. In the north, broad estuaries and lagoons are common. The archaeological evidence suggests at least two major residential populations on the east coast: one centered on the Miramichi River in the north and another in the southeast. Anadromous fish were particularly important in the north, including Atlantic salmon, gaspereau, and sturgeon. While walrus and harp seals were probably not available in the Bay of Fundy and the Gulf of Maine during the Late Prehistoric period, they occurred in large numbers along the east coast (Kingsley 1998). Oysters, quahogs, and common mussels were more important on the east coast, compared to soft-shell clams in Passamaquoddy Bay. The waters of the Bay of Fundy are too cold for oysters, although they were available in the Minas Basin area during Archaic times (Deal and Rutherford 2001). This area had the least access to good quality lithic materials. More exotic lithics, as well as copper, were acquired from what is now Nova Scotia, including the Ingonish quarry off Cape Breton Island. The acquisition of these exotics was probably facilitated through ties with other ancestral Mi'kmaq groups to the south.

Areas like Passamaquoddy Bay, the Lakes Region, and the Miramichi River were resource-rich during the Late Prehistoric and Protohistoric periods. It would be foolhardy to suggest a simple settlement and subsistence model for the entire province, or for the entire time period. Sanger (1987:137-138) even notes the ambiguous nature of the terms "coastal" and "interior" when considering aboriginal land use patterns. Sites on estuaries, on rivers above the head-of-tide, or on lakes close to the coast are difficult to categorize. Based on the current reassessment of resource use, this author prefers a very flexible settlement and subsistence model, like the general "mosaic" model suggested by Nash and Miller (1987), which takes into account local resource variability over time. Black's (1992, and this volume) Bliss Island study indicates that resource and land use can change quickly from an archaeological perspective. Native populations were sensitive to changing resource availability and adapted their movements and settlement systems accordingly.

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## CHAPTER 18

# MAIZE AND VILLAGES: A Summary and Critical Assessment of Current Northeast Early Late Prehistoric Evidence

John P. Hart and Bernard K. Means

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### INTRODUCTION

Throughout much of the Northeast, the early Late Prehistoric period (A.D. 700-1300) is the time when evidence for subsistence and settlement traits of Native societies described by early European explorers first appears in the archaeological record. Except in the far north, these traits include maize-based agriculture and comparatively large nucleated villages. Our knowledge of these traits grew considerably during the last few decades of the twentieth century, the result of the increased use of flotation recovery for macrobotanical remains, the development of paleoethnobotany, accelerator mass spectrometry (AMS) dating on crop remains, stable carbon isotope analysis (SCIA) of human bone, large-scale cultural resource management excavations, a renewed interest in museum collections, and developments in method and theory. All of these are reflected in the chapters of the present volume.

### VILLAGES AND MAIZE AGRICULTURE

Throughout the last half of the twentieth century, settlement pattern studies grew increasingly sophisticated and diversified with approaches that examined patterning: on the regional level, with, for example, analyses of the distribution of archaeological sites and other remnants of human behavior with respect to each other and the natural landscape; and on the intrasite level, with analyses of the archaeology of the household, mortuary behavior, and natural and cultural formation processes. Such studies have shown that the constituent components of an individual site can be

examined to better understand the site as a whole.

However, it has been recently argued that the study of the community as an entity in and of itself has been largely ignored in many settlement pattern and household archaeology studies (Yaeger and Canuto 2000). That is, many studies on the regional level are viewed as having become too reductionist, with sites becoming mere functional nodes in a larger settlement system. Studies on the intrasite level are said to emphasize the analysis of individual site attributes to the detriment of integrating them into a larger community system.

That these criticisms are broadly applicable could be disputed by archaeologists working in Mesoamerica, southwestern North America, and, increasingly, southeastern North America. Unfortunately, these criticisms still hold considerable validity in characterizing archaeological research throughout the Northeast (but see, e.g., Knapp, this volume; Means, this volume; Miroff, this volume; Timmons 1997). While reviewing the current state of the archaeology of the Iroquoian groups in New York State, for example, Prezzano (1996:8) attributed the limited number of studies at the community level to a focus on site-locational models and nonspatial ceramic attribute studies, with the latter emphasizing construction of local chronological sequences. Coupled with a lack of well-excavated and broadly exposed sites, she suggested that archaeologists studying northern Iroquoian cultural developments do not see "that changes within community organization not only reflect sociopolitical transformation within a region but are the roots of such changes" (Prezzano 1996:8).

Maize becomes increasingly frequent on archaeological sites across the East, dating to the period A.D. 900-1500 (Smith 1992:292), reflecting the establishment,

perpetuation, and intensification of coevolutionary relationships between human and maize populations over varying lengths of time (Hart 1999a). The intensification of maize production as a result of coevolutionary processes may have contributed to the aggregation of dispersed hamlets into nucleated settlements in various areas of the Northeast (Hart and Nass 2002), although some nucleated settlements were present in parts of the central and upper Ohio River basins between A.D. 500 and 900 prior to evidence for maize being an important dietary component (Church and Nass, this volume; Dancey 1988; Maslowski 1985; Shott et al. 1993; Wymer 1993:138-140).

Studies of modern slash-and-burn agriculturists in Mesoamerica indicate that individuals may rely on other members of their community—who are not always kin—to tend their fields while they construct or repair their own dwellings, or for help with other tasks, including clearing the area for their dwellings. Individuals who draw on the labor of other community members may in turn provide their own labor to others when assistance is needed (Sandstrom 2000:59-61); group cooperation would be necessary to clear an area for a village settlement (Lowie 1949:336; Myers 1973:244). Concentrating a social group into a single village settlement—at least seasonally—was one potential strategy to ensure that enough people to perform tasks related to agriculture were in the right place at the right time (Leonard and Reed 1993; Moeller 2001:2). It is for these reasons, among others, that the intensification of maize agriculture in the Northeast was apparently often associated with the appearance of nucleated settlements. However, the mechanisms and developmental sequences that led to the nucleation of dispersed hamlets into villages remain unclear for many parts of the Northeast (but see, e.g., Fuller 1981a; Hart 2001).

## DEFINING VILLAGES AND HAMLETS

It is appropriate at this juncture to pause before we review the history of maize agriculture and nucleated villages in the Northeast, and briefly consider and define what exactly is meant by the village, and evaluate the corollary concept of the hamlet. This issue is addressed in some detail by Means (this volume), as he explores several significant distinctions between the concepts of the village and the community. Both the village and the hamlet represent residential settlements with architectural and other elements, including but not limited to dwellings, that are occupied

minimally on a seasonal basis. Villages and hamlets may contain the same or similar constituent elements (Fuller 1981a, 1981b; Raber et al. 1989), so matters of scale form a principal difference in the application of these two terms.

Hamlets are frequently defined as having no more than two households, while villages consist of more than two households (Chang 1958:303-305; Fuller 1981a, 1981b). Since a household may consist of more than one dwelling, the boundary between a large hamlet and a small village is somewhat arbitrary and may be imperceptible to the archaeologist. For a residential settlement to be designated a village, one would also expect the presence of social ties above the household level that are enacted and reinforced on a regular basis (Keesing 1975:10). A communal locality or structure, such as a plaza or men's house, is frequently present in village settlements and is the location of ceremonies and rituals that help maintain social ties above the household level (Chang 1958:303). The presence of a communal locality may be useful in distinguishing a small village from a large hamlet (Butt 1977:6). Hamlets also need to be linked by social ties that may be activated more infrequently, if only to ensure that suitable marriage partners are available when necessary, to participate in ceremonies and rituals to maintain these social ties, and to disseminate information about variations in local environments and resource availability (for archaeological cases see, for example, Dancey 1991:66; Fuller 1980, 1981a, 1981b; Hart 1993:102-111; Means 1996; Stewart 1990:81).

Both hamlets and villages may be contemporaneous elements in a settlement system, perhaps part of divided-risk strategies (Hart 1993:83-85). Members of a community may simultaneously maintain households in hamlets and villages, varying their residence throughout the year depending on a number of factors. Households from hamlets that are linked socially and economically to a village may jointly participate in ceremonies and rituals in the village's communal locality or facility (Butt 1977:6; Harp 1994).

What of the distinction made by some archaeologists between small villages and large villages? If such a distinction is to prove at all useful, it must be applied critically and sparingly. What researchers define as a small village in one time period or region may represent a large village in another time or place. Further, if village sites from one time period or in one region form a rough continuum in size from smallest to largest, an arbitrary distinction between small and large villages can imply the presence of a hierarchically ranked settlement system that did not in fact exist. Finally, the

use of the term “small village” and the term “large village” can blur and obscure important differences between village sites. For example, Means (this volume) examines two overlapping village components, where the later and much larger component has a simpler community plan than the smaller and earlier component. In this case, the density of dwellings relative to overall settlement size and the complexity of their arrangement with respect to each other are much greater in the smaller component than in the larger. Perhaps, to avoid terminological confusion, it would be best to simply distinguish between smaller and larger villages on an as-needed basis and within an explicit comparative framework.

In some cases, a village may consist of a number of households dispersed throughout a locality, and it may be difficult to distinguish such a village from a settlement system dominated by hamlets. Nucleated or aggregated villages, on the other hand, consist of more than two households in close proximity to one another and, more so than with hamlets, their inhabitants need to consider issues such as activity overlap and privacy. Nucleated villages often have planned layouts that indicate attempts to minimize these issues (Aiello and Thompson 1980:167; Lawrence and Low 1990:447). For some nucleated villages, a plaza that functions not only as an integrative facility, but acts as a buffer between households as well (Means, this volume) will be present. A settlement’s layout may be redesigned when it begins to interfere with rather than facilitate social interactions (Fenton 1951:42; James 1949:56). Custer et al. (1995:93) argue that villages became increasingly planned through the Late Prehistoric period in the Northeast and Middle Atlantic regions, indicating that their inhabitants were cognizant on at least some level of the active role that architectural elements and their arrangement played in maintaining, perpetuating, and even generating social institutions (Fletcher and LaFlesche 1911:138; Gross 1979:329, 337; James 1949:48; Lowie 1946; Means 1999:35, 2000:44, 2001; Pearson and Richards 1994:12). Changes in the layouts of villages likely reflected the development of new, or the modification of existing social institutions to better manage increasingly larger groups of people working and living alongside one another (Carneiro 1967:239; Eggan 1955:495; Gummerman 1994:9).

## REGIONAL SUMMARIES

In the following pages we provide brief summaries of the history of maize agriculture and nucleated

villages in the Northeast, based primarily on the chapters of this volume. We then provide a critical assessment of our current state of knowledge about maize agriculture and settlement in the Northeast for the early Late Prehistoric period.

### Western Lake Erie

Stothers and Abel (this volume) provide a summary for the earliest evidence of maize in the western Lake Erie basin. They determine that the earliest evidence for maize is no earlier than A.D. 750, but suggest that evidence will be found for maize as early as A.D. 400. Maize becomes frequent in the archaeological record of this region from A.D. 750 to 1000. SCIA suggests that maize was an important dietary component for some individuals by at least A.D. 900 (Stothers and Abel, this volume, Tables 4.2 and 4.3). As in the central Ohio River basin (see below), there remain individuals for whom maize was not important at least through the calibrated fifteenth century A.D.

There is apparently no evidence for nucleated villages in this region as late as A.D. 1300 (Stothers and Bechtel 2000:24), after which fortified hamlets and villages occurred (Stothers and Abel, this volume). Prior to this time, settlements consisted of warm weather hamlets and small winter camps.

### Southern Ontario

The earliest direct AMS date on maize in Southern Ontario is 1570±90 (cal 2  $\sigma$  A.D. 258 [442, 448, 468, 482, 530] 657) from the Grand Banks site (Smith and Crawford, this volume). Maize is common on sites in this region beginning by around A.D. 900-1000 (Ounjian 1998). A number of SCIA studies have been published covering the period A.D. 400-1500 for southern Ontario that provide insights into when maize became an important component of some diets (Katzenberg et al. 1995; Schwarcz et al. 1985). According to Katzenberg et al. (1995:346), the results show that there was a gradual increase in maize consumption from A.D. 700-1300, when  $\delta^{13}\text{C}$  values consistently show high levels of consumption. Because of the small sample sizes, the late values indicate that high rates of maize consumption were probably common; the early values indicate that high rates of consumption were less common (Hart 2001:173).

The earliest seasonally occupied nucleated villages occur in southern Ontario by the late eighth century A.D. (Kapches 1990; Warrick 1996). Palisaded, nucleated villages with longhouses are present after ca. A.D.

900 (Timmons 1997). Larger villages with large long-houses begin to occur in the thirteenth century A.D. (Dodd et al. 1990). The range of village sizes also increases through time (Dodd 1984). Storage pits occur in the earliest villages, but numbers of pits increase substantially after ca. A.D. 1000 (Chapdelaine 1993).

### Central Ohio River Basin

The central Ohio River basin has the longest well-documented history of maize in the Northeast. Maize has been directly AMS dated to 1730±85 B.P. (cal 2σ A.D. 84 [261, 278, 324, 331, 335] 535) and 1720±105 B.P. (cal 2σ A.D. 74 [263, 275, 338] 560) at the Edward Harness Mound site in Ohio (Ford 1987). Maize has also been found at a few other early sites in the drainage basin that date to before 1000 B.P., such as the Childers site in West Virginia (Wymer 1992), which dates to approximately A.D. 585 (Shott 1992:219), although the maize from this site has not been direct AMS dated. Maize finds become more frequent at sites dating between ca. A.D. 900 and 1000 (Fritz 1990; Wagner 1987). At this time maize appears to have largely replaced the indigenous seed crop complex that had been in use for the previous millennium (Wagner 1987). In an SCIA study of 102 individuals recovered from 19 contexts across the central Ohio Basin, Greenlee (2001) determined that maize became an important component of some individuals' diets beginning around A.D. 850-900. Her results also show that maize was not an important dietary component for other individuals through at least A.D. 1150-1200.

Church and Nass (this volume) provide an overview of the settlement history of the central Ohio River basin that complements other recent publications (e.g., Carskadden and Morton 2000; Drooker 2000). Church and Nass indicate that during the period ca. A.D. 700-1000, settlements appear to have been largely dispersed hamlets; large storage pits are uncommon. Between A.D. 1000 and 1200, sites remained small, but appear to have been more structured, with some sites having linear arrangements of houses; large storage pits are present on some sites (also see Nass and Yerkes 1995; Pollack and Henderson 2000). As related by Church and Nass, after ca. A.D. 1250, large nucleated, planned villages became common (also see Pollack and Henderson 2000). These sites often have central plazas surrounded by domestic activity areas (e.g., houses, work areas, burials) in which large storage pits are common (also see Carskadden and Morton 2000).

### Lower Upper Ohio River Basin

*Unglaciated Allegheny Plateau.* The lower Upper Ohio River basin has a less well-documented history of maize than does the central Ohio River basin. Adovasio and Johnson (1981) report early maize from Stratum IV at the Meadowcroft Rockshelter bracketed by radiocarbon dates of 2325±75 B.P. (cal 2σ 758 [396] 201 B.C.) and 2290±90 B.P. (cal 2σ 757 [387] 119 B.C.), and from Stratum V, bracketed by radiocarbon dates of 2155±65 B.P. (cal 2σ 386 [198, 188, 180] 2 B.C.) and 2075±125 B.P. (cal 2σ 396 B.C. [89, 78, 57 B.C.] A.D. 221). While these dates, especially the youngest, are not out of the realm of possibility given other early direct dates in the East (e.g., Riley et al. 1994), they must be substantiated through direct AMS dating before being widely accepted (King 1999). Outside of Meadowcroft, there is a paucity of archaeobotanical data available for the lower Upper Ohio River Valley for sites dating before approximately A.D. 1000. After A.D. 1000, maize is frequently reported from archaeological sites. Although samples are small, SCIA shows maize to have been an important dietary component for some individuals by around A.D. 1000 in this region, although there is a fairly wide range in δ<sup>13</sup>C values (Farrow 1986; Greenlee 1990; Sculli 1995).

Through time there is an increase in the range of village sizes (Hart 1993). Nucleated villages are first evident in the region during the period A.D. 1000-1200 (Hart 1993; Nass and Hart 2000); circular and linear villages occur, as do hamlets, consisting of one or a few dwellings. Most circular villages are palisaded. After A.D. 1200, the size range of villages increases and hamlets persist (Hart 1993, 1994; Nass and Hart 2000). This trend continues after A.D. 1400, with the largest villages reported after this date (Hart 1993). Storage facilities before approximately A.D. 1250 consist of large subterranean pits and semisubterranean storage structures. After A.D. 1250, storage facilities include attached semisubterranean appendages to domestic structures and detached semisubterranean facilities. Houses with multiple storage appendages occur after A.D. 1300, and large structures with many appendages occur after A.D. 1500 (Hart 1995).

*Allegheny Mountains.* Little macrobotanical evidence is available for periods predating the early Late Prehistoric period (Means, this volume). The earliest evidence for maize is an associated wood-charcoal radiocarbon date of 1150±50 B.P. (cal 2σ A.D. 780 [890] 1000) from the Railroad site (Boyd et al. 1998a). This site also produced the latest date associated with maize remains in the region at 510±50 B.P. (cal 2σ A.D.

1325 [1425] 1460) (Boyd et al. 1998a). The earliest date associated with maize from a village site is 1080±70 B.P. (cal 2σ A.D. 800 [985] 1115) at the Petenbrink site (Boyd et al. 1998b), which is also the earliest definite date for a village site in the region. A storage feature dated to 770±60 B.P. (cal 2σ 1175 [1270] 1305) from Pony Farm Triangle East, a possible village site (Means and Fischler 1998), contained the largest quantity of maize from a single context in the area (Raymer and Bonhange-Freund 1999:8). In total, maize has been recovered from sites dated to the tenth through fifteenth centuries A.D.

Nucleated villages are evident in the region by the end of the tenth century A.D., if not earlier. Hamlets and seasonally occupied specialized procurement camps continued to be used after the appearance of the first villages, which had 10 or fewer dwellings. Considerably larger villages with over 30 dwellings occurred during and after the thirteenth century A.D. Some of these villages, such as Peck No. 1, appear to have increased in size from the absorption of single-household hamlets (Means 1998a). Comparatively small villages are seen throughout the early Late Prehistoric period, perhaps representing daughter settlements from larger communities. This latter pattern, along with an apparent increase in the use of attached and detached semisubterranean storage facilities, had already been noted by Hart (1993, 1995). Despite claims that the region was abandoned after A.D. 1250 (Johnson 2001; Johnson et al. 1989), clear evidence of settlement and the cultivation of maize is found in the region through the fifteenth century, although it is possible that aboriginal inhabitants of the region were no longer living in nucleated villages by this time.

### Susquehanna River Basin

**West Branch.** There have been no reports of early maize in the West Branch of the Susquehanna River basin comparable to those in the Ohio River basin and around Lake Erie. The earliest radiocarbon date associated with maize is at the Fisher Farm site 1245±70 B.P. (cal 2σ A.D. 656 [776] 976) (Hatch 1980). Maize is commonly found on sites beginning in the ninth century A.D. (Hart and Asch Sidell 1996). No SCIA studies have been published for this region, although Stewart (2000) citing unpublished  $\delta^{13}\text{C}$  values on bone from ca. A.D. 1250 to 1300 indicated it was an important component of at least some individuals' diets.

From ca. A.D. 750 to 1250 settlements consisted of

hamlets, some of which were apparently fortified (Custer et al. 1996; Hart and Asch Sidell 1996; Stewart 1990). Storage pits are common on sites during this period of time (Hart and Asch Sidell 1996; Stewart 1990). Hamlets persisted after the appearance of nucleated fortified villages around A.D. 1250. Larger, nucleated, fortified villages occur after ca. A.D. 1300 to 1350 (Stewart 1990).

**Upper Susquehanna.** The Upper Susquehanna River basin in New York has a much shorter known history of maize. The earliest date associated with maize is 1000±70 B.P. (cal 2σ A.D. 890 [1008] 1207) from the Binghamton Mall site (Wurst and Versaggi 1993). Maize is frequently reported from sites beginning in the twelfth century A.D. (Cassedy and Webb 1999). SCIA has been reported for only two individuals from this area (Vogel and ver der Merwe 1977), which does not permit an assessment of when maize became an important dietary component for some individuals.

Prior to A.D. 1000, settlements apparently consisted of seasonally occupied camps or hamlets (Funk 1993; Prezzano and Rieth 2001). Nucleated villages occur as early as the eleventh century A.D. (Prezzano and Rieth 2001), although a recent dating project at what was once thought to be the best example of an early village with large longhouses, the Roundtop site, raises serious questions about this traditional view (Hart 1999b, 2000). By the thirteenth century A.D. there is clear evidence in this region for nucleated, palisaded villages with large longhouses or circular houses (Hart 2000; Prezzano 1992; Prezzano and Rieth 2001). Large storage pits are common during the early Late Prehistoric period (Ritchie and Funk 1973). As shown by Ritchie and Funk (1973), Funk (1993), Knapp (this volume), Miroff (this volume), and Rieth (this volume), hamlets and camps continue to be occupied after the appearance of nucleated villages.

### New England

**Southern New England.** The oldest date associated with maize in southern New England is 1100 B.P. ± 70 B.P. (cal 2σ AD 776 [904, 910, 976] 1145) from site 211-1-1 in the lower Hudson River drainage of far eastern New York. This site also produced the oldest direct AMS date in southern New England, 1050±50 B.P. (cal 2σ A.D. 891 [997] 1149) (Cassedy and Webb 1999). In the lower Connecticut River basin, the oldest date associated with maize is 1060±70 B.P. (cal 2σ AD 782 [991] 1157), from the Sheldon Island site. The oldest

date associated with maize in coastal southern New England is  $835 \pm 120$  B.P. (cal  $2\sigma$  AD 982 [1217] 1394), from the Highland Site in Connecticut (Cassedy and Webb 1999). Maize becomes frequently reported in the region in the thirteenth century A.D., and relatively large amounts of maize have been reported from some sites dating to the fifteenth and sixteenth centuries A.D. (Bendremer et al. 1991; Chilton et al. 2000). As reviewed by Petersen and Cowie (this volume), the one reported SCIA study for this area on six individuals from Nantucket Island ranging in age from A.D. 1193 to 1690, produced ambiguous results for determining if maize was a major component of the diet of the individuals analyzed, because of the influence of the consumption of eel grass feeders on human  $\delta^{13}\text{C}$  values (Little and Schoeninger 1995).

To date, no nucleated villages have been reported from the region until very late in prehistory or at European contact (Bendremer 1999; Bernstein 1999; Chilton 1999, this volume; Chilton et al. 2000; Hasenstab 1999). This also appears to be true for the upper Hudson Valley, as reported by Brumbach and Bender (this volume). Hamlets with storage pits are known in the region by at least the fourteenth century A.D. (Bendremer 1999).

**Northern New England.** Petersen and Cowie (this volume) and Asch Sidell (1999) review the history of maize in northern New England (New Hampshire, Vermont, Maine). The oldest date associated with maize in the upper Connecticut River basin is  $850 \pm 50$  B.P. (cal  $2\sigma$  A.D. 1036 [1212] 1279) from the Skitchewaug site (Cassedy and Webb 1999; Heckenberger et al. 1991). In Maine, the earliest dates are a direct AMS date of  $570 \pm 40$  B.P. (cal  $2\sigma$  A.D. 1300 [1334, 1336, 1400] 1433) from the Little Osprey site and an associated radiocarbon date of  $570 \pm 70$  B.P. (cal  $2\sigma$  AD 1286 [1334, 1336, 1400] 1445) from the Little Falls site, both in the Saco River basin (Asch Sidell 1999). Most dates associated with maize in this region fall in or after the fourteenth century A.D. (Petersen and Cowie, this volume). The one published SCIA study (Bourque and Krueger 1994) produced similar results to the Little and Schoeninger (1995) study, with no unambiguous evidence for maize being important in the diets of the individuals analyzed.

As in southern New England, no nucleated villages have been reported for northern New England until just before or at European contact (Peterson and Cowie, this volume). Petersen and Cowie (this volume) suggest that after ca. A.D. 1200-1300 some settlements were occupied by hundreds of people,

although evidence for this is ambiguous. Clearly, hamlets—some fortified—are present in the region by the thirteenth to fourteenth centuries A.D. Longhouses have been reported from some sites late in prehistory. Storage pits are present by at least the thirteenth century A.D. (Petersen and Cowie, this volume; Heckenberger et al. 1991).

## New Brunswick

Deal (this volume) reviews Leonard's (1996) suggestion that maize may have been adopted in some areas of New Brunswick by A.D. 1350-1550, but that it was abandoned after the adoption of European crops. Deal suggests there is need for additional archaeological evidence before this suggestion can be properly evaluated. Evidence for prehistoric nucleated villages in New Brunswick is also lacking, although as Black (this volume) and Deal (this volume) review, suggestions have been made for nucleated villages during Protohistoric and Early Historic times based on indirect evidence.

## Summary

The information summarized above appears to show several trends in the timing of maize, and its importance in diets and the timing of nucleated villages. Most conspicuous is an apparent west-to-east and south-to-north trend in the timing of the earliest maize (also see Petersen and Cowie, this volume). The earliest confirmed maize in the region covered by this book comes from Ohio (cal A.D. 275) and southern Ontario (cal A.D. 460); the potentially earlier dates from Meadowcroft Rockshelter in the lower Upper Ohio River basin (ca. cal 387 B.C. to 57 B.C.) would change this pattern if confirmed with direct AMS dating. In the West Branch of the Susquehanna, the earliest associated date is cal A.D. 775, followed by cal A.D. 890 in the lower Upper Ohio River basin, cal A.D. 1000 in the Upper Susquehanna and cal A.D. 900 in southern New England, cal A.D. 1200 in the northern Connecticut River Valley and cal A.D. 1350 in Maine. It is unclear if maize occurred prehistorically in New Brunswick (Black, this volume; Deal, this volume).

Few of the areas covered in this book have SCIA data that allow an assessment of when maize became an important source of protein in some individuals' diets. In western Lake Erie (ca. A.D. 900), southern Ontario (ca. A.D. 750), and the central Ohio River basin (ca. A.D. 850), SCIA data suggest that maize became an important source of protein in some diets

several centuries after its first appearance in the archaeological record. In those regions with relatively well-established histories of maize, its remains do not become frequent on archaeological sites until several centuries after its first confirmed archaeological visibility (central Ohio River basin, southern Ontario). Assuming that maize continued to be grown in these areas after its initial archaeological visibility, this evidence suggests that there was not a sudden shift of subsistence patterns or diets immediately following maize's introduction into these regions, consistent with expectations in Hart (1999a). The SCIA data from the lower Upper Ohio River basin suggest that maize was an important source of protein in some individuals' diets soon after its initial appearance in the archaeological record, but archaeobotanical data are lacking from most pre-A.D. 1000 contexts in this region; direct AMS dates on purportedly early Meadowcroft maize may change this assessment. SCIA data for the Susquehanna River basin and New England that would help to determine when maize became an important source of protein in these regions are not available.

Nucleated villages do not occur in most of the regions covered in this book until well after (1) the initial archaeological visibility of maize, (2) current evidence suggests maize became an important source of protein in some individuals' diets, and (3) maize becomes frequent in the archaeological record. In southern Ontario, for example, nucleated villages are first evident around A.D. 800; larger nucleated villages with many large longhouses are not apparent until around A.D. 1200. In the West Branch of the Susquehanna, nucleated villages are not evident until approximately A.D. 1250; larger nucleated villages occur after approximately A.D. 1350. In New England and New Brunswick, there is no evidence for nucleated villages until at or just before European contact. In other areas, such as the lower Upper Ohio and the Upper Susquehanna River basins, nucleated villages are apparent at or soon after the first evidence of maize. However, in both of these areas, there is a paucity of archaeobotanical data prior to approximately A.D. 1000, and as reviewed above, evidence for nucleated villages before the twelfth century A.D. in the Upper Susquehanna River basin is suspect. Current evidence for the lower Upper Ohio River basin suggests that maize may be present at hamlet sites approximately a century before the appearance of nucleated villages, though this is a tenuous conclusion, based on dates at two sites. The majority of village sites in the Allegheny Mountains of this region

currently have no radiocarbon dates, and until these are obtained from organic remains or residue on ceramics in museum collections, the association between maize and nucleated villages in the lower Upper Ohio River basin will remain unclear.

## DISCUSSION

### Early Maize

Taken at face value, the above summary suggests a gradual west-to-east spread of maize. This apparent trend, while attractive from a commonsense point of view, may in fact be quite misleading. The earliest maize recovered in a region does not necessarily represent the introductions of that crop (Hart 1999a:160-161). When first adopted, maize use was probably below the level of archaeological visibility. Without intensive sampling and identification efforts at older sites, it is not possible to rule out the presence of earlier maize in a region. The presence of maize at an open-air archaeological site is a function of the length and intensity of maize use at the site and the length of site occupation, charring of accidentally lost maize, and deposition in contexts favorable for preservation over many hundreds of years (Hart 1999a:160). Recovery of early maize from a site is dependent on the use of flotation recovery, the intensity of sampling relative to the density and distribution of maize on the site, and sampling intensity and identification efforts in the laboratory (Hart 1999a:160). For example, the earliest direct dated maize east of the Mississippi River, 2077±70 B.P. (cal 2σ 354 B.C. [90, 76, 59 B.C.] A.D. 72), is from the Holding site in Illinois (Riley et al. 1994). Over 5,300 liters of soil from midden and feature contexts were subjected to flotation from this site, producing only 19 pieces of maize following an intensive identification effort. This level of sampling has not been done across most of the Northeast, which suggests that our knowledge of maize history is far from complete. An emphasis in some areas on the excavation of more archaeologically visible nucleated villages (due to the number and density of remains) as opposed to other site types may also bias the recovery of early maize.

Also of note is that the purportedly earliest maize samples in many of the regions reviewed above have not been subjected to direct AMS dating. Direct AMS dating of seemingly early domesticates has consistently shown that the formation of archaeological deposits is more complex than often thought. There is

no necessary connection between a fragment of maize and nearby wood charcoal, even if contained within the same pit feature or recovered from the same flotation sample. Similarly, there is no necessary temporal connection between a maize fragment and a spatially associated artifact belonging to an ostensibly temporally sensitive type. Direct AMS dating is the only technique available to firmly establish the age of potentially early maize (e.g., Asch Sidell 1999; Conard et al. 1983; Crawford et al. 1997; Hart 1999a, 1999b; Little 2002). It is also critical that the identification of potentially early maize be made by a qualified paleoethnobotanist (Petersen and Cowie, this volume). As demonstrated by Asch Sidell (this volume) intensive paleoethnobotanical analysis can provide important insights not only on the history of crops, but also on the impacts of human settlement on vegetation, with potential implications for early evidence of agricultural activities.

A good example of the importance of direct AMS dating and identification by qualified paleoethnobotanists of purportedly early crop remains are the results of a recent series of bean dating projects (Hart 1999b; Hart et al. 2002; Hart and Scarry 1999). Based on wood charcoal radiocarbon dates and diagnostic artifacts, it was thought that beans were present throughout the Northeast by at least A.D. 1000. Samples of purportedly early beans from 26 archaeological sites from the Illinois River east to the Connecticut River were obtained during these projects. Examination of these samples determined that material identified as beans from one site thought to date as early as ca. A.D. 850 contained no beans (Hart and Scarry 1999). A total of 51 direct AMS dates on beans and associated maize determined that beans are not archaeologically visible across the Northeast before the late thirteenth century A.D., only 250 years before maize-beans-squash intercropping systems were first described by early European explorers (Hart et al. 2002). The use of AMS dating, then, has completely changed the history of beans and of maize-beans-squash intercropping in the Northeast. The possibility of determining the presence of beans from residue on ceramics in museum collections, if performed in conjunction with the AMS dating of that residue, can further clarify this history.

### SCIA of Human Bone

SCIA of human bone collagen is another area that requires critical assessment. This analytical technique cannot be used to determine when maize first entered

the diets of individuals within a region (Hart 1999a:163-169). Rather, it can only be used to monitor when maize became an important source of dietary protein for some individuals. SCIA of bone apatite can potentially provide a better assessment of maize consumed at low levels (see references in Hart 1999a), but to date this technique has not been used extensively. Bourque and Krueger's (1994) SCIA study suggests the potential benefits of analyzing both collagen and apatite.

Most regional SCIA study samples have been very small, often relying on one or a few individuals to characterize the diet of specific sites, phases, and time periods. This has been done under the questionable assumption that diets are monotonous within communities and regions (compare Hart 1999a:165-168 and Katzenberg et al. 1993:268). Contrary to this assumption, diets were probably quite variable, and based on sampling theory, large samples are needed to establish variation and change in the contribution of maize to diets (Hart 1999a:167-168).

Greenlee's (2001) recent SCIA study of the central Ohio River basin, which sampled 350 individuals from 75 deposits (of which she reports the results on 103 individuals from 19 deposits) is a good example of the importance of large samples. Her results show high levels of maize consumption by some individuals beginning around A.D. 850-900, while maize consumption is not detectable in other individuals at least through A.D. 1250, suggesting a more complex history of maize consumption than is generally assumed (Greenlee 2001:234-235), consistent with arguments in Hart (1999b). As recognized by Greenlee (2001:236), just as with macrobotanical remains of crops, it is necessary to obtain direct dates on bone used for SCIA to determine the exact age of samples; there is no necessary temporal association between bone and spatially associated charcoal. Diagnostic artifact type associations are of limited value given the sometimes questionable associations and the long time ranges of many of those types (e.g., Schulenberg, this volume). SCIA studies that rely on associated wood charcoal dates and/or diagnostic artifacts for chronological control run the very real risk of misassigning bone to incorrect periods of time.

### Site and Regional Histories

Early Late Prehistoric sites have often been interpreted as single component based on one or a few radiocarbon dates or on incomplete analyses of diagnostic artifact patterning. Reanalyses of museum collections

from excavations at village sites have shown that what were previously interpreted to be single component sites were, in fact, multicomponent (e.g., Drooker 2000; Hart 1999b, 2000). For example, the well-known Roundtop site in the Upper Susquehanna River Valley was originally interpreted as a primarily single component site dating to the eleventh century A.D. on the basis of a single radiocarbon date and interpretation of the pottery assemblage (Ritchie 1973). A recent series of 10 radiocarbon dates coupled with a reexamination of pottery assemblages from pit features, site plans, and other excavation and original laboratory records resulted in a determination that the site had at least three components dating to the early thirteenth, mid-fourteenth, and sixteenth centuries A.D. (Hart 1999b, 2000). Longhouses at this site, traditionally thought to be the best early examples in New York, were shown to belong to the later two components rather than the earliest. New radiocarbon dates and examination of pottery from other purportedly single component early Late Prehistoric sites in New York also resulted in the identification of multiple components, changing some traditionally held assumptions about the early Late Prehistoric settlement history of New York (Hart 2000).

New excavations and radiocarbon dating can also result in a revision of the history of occupations in an entire region. For example, based on the presence of limestone-tempered pottery and a small number of radiocarbon dates from village sites on the Somerset Plateau in the Allegheny Mountains of southwestern Pennsylvania, some suggested that this area was abandoned after A.D. 1250 as a result of climatic change detrimental to maize agriculture (e.g., Johnson 2001; Johnson et al. 1989). As a result of CRM excavations in this area during the 1990s (Means 1998b) and direct AMS dating of beans from a previously excavated site (Hart and Scarry 1999), it is now apparent that nucleated villages and hamlets persisted in this area through at least the fifteenth century A.D. whether or not climatic change was unfavorable for maize production.

### Culture Historic Taxa

Following trends in the current literature (e.g., Lyman et al. 1997) a number of chapter authors (Knapp, Means, Rieth, Schulenberg) question the value of culture-historic taxa in current analytical efforts. There is nothing inherently wrong with culture-historic taxa—they formed the basis of archaeological systematics through much of the twentieth

century. Problems potentially arise, however, when those taxa are used for purposes for which they were not originally intended. The units used in analysis must be consistent with the theory used to explain the past (Dunnell 1971, 1982).

The primary goal of culture history was to define spatially and temporally bounded units to control variation in regional archeological assemblages and thus an emphasis on *between* as opposed to *within* taxa variation. As a result, using these units to study change fosters interpretations that emphasize sudden change (saltation) at taxa boundaries as a result of prime movers such as climatic change (Hart and Nass 2002; Leonard and Reed 1993). Use of culture-historic taxa also influences the kinds of questions asked of the past, often focusing research on the establishment and explanation of spatial as well as temporal boundaries of taxa (Hart 1999c). On the assumption that culture-historic taxa reflect bounded ethnic groups, they may be treated as closed systems, perpetuating the myth of the primitive isolate (Terrell et al. 1997). Rather than taking for granted that the culture-historic units are meaningful in a particular theoretical context, there must be a critical assessment. If those units are not compatible with current theory, new units must be defined that are; the number of taxonomic systems in use within a region will depend on the theories and goals of researchers.

### Theory and Model Building

A key component of developing explanations about the past is model building (Terrell 1986). The building of models forces us to put all of our cards on the table, by making us be explicit about our theoretical assumptions, key variables, and the kinds of data that need to be created to test hypotheses derived from the model. The kinds of models built will depend on the theory being used and the objectives of research, and will change through time as new theories are developed and old ones abandoned. Since the theories used in much of archaeology today are very different from those used in the mid-twentieth century, when the methods for defining culture-historic taxa were developed, we need to seriously consider whether those taxa are valid for our current investigations.

Our concern in this chapter is on our knowledge about the history of maize agriculture and nucleated villages in the Northeast. Of critical importance is an understanding of how maize agriculture evolved within the various subregions of the Northeast; and as some of the authors in this volume (e.g., Chilton;

Petersen and Cowie; Stothers and Abel) demonstrate, there is no wide agreement on this topic. In order to better understand maize agriculture evolution, it is important to understand how maize as a sessile plant would respond to differing agricultural settings. Explicitly incorporating biological knowledge, including modern organic evolutionary theory, into our models can lead to significant new insights, not only about maize agriculture evolution (Hart 1999a), but also about the evolution of settlement patterns (Hart 2001). The current debate about the importance of maize agriculture in New England could very well benefit from such an approach, resulting in better understandings about the potential of regional variation in maize's importance. Models such as Stothers and Abel's (this volume) might be more convincing by being explicit about how maize agriculture could have been managed successfully under the conditions of their model, rather than just assuming its successful perpetuation and availability.

## CONCLUSIONS

Current data on the timing of maize and nucleated villages do not show a sudden appearance of nucleated villages after the adoption of maize. The frequency of maize in the archaeological record may be a function of the length of site occupation, and thus its ubiquity at many nucleated village sites. Rather than being a direct cause of nucleated settlements, settlement nucleation and maize agriculture intensification may be connected as a result of the coevolution of human and maize populations (Hart 2001). Since evolution is opportunistic, the adoption and evolution of maize agriculture need not necessarily result in nucleated villages. People can form social networks that manifest at critical points throughout the year to manage some of the tasks requiring group cooperations that are associated with maize agriculture, without also maintaining coresidence within a nucleated village. Following this line of reasoning, the apparent absence of villages in New England for hundreds of years after maize becomes archaeologically visible need not be such a puzzle or point of contention. The apparent coevolution between maize agriculture and nucleated villages in many areas may simply indicate that some inhabitants of those regions chose to reinforce their social and economic networks through coresidence. Building explicit models of subsistence and settlement change will help us identify those areas where we are lacking appropriate data to

address these issues (Hart 1999a, 2001). Attention needs to be placed not only on the size of villages and their constituent elements, but how these elements were arranged within villages at any point in time.

As we enter the twenty-first century, our knowledge of early Late Prehistoric subsistence and settlement change in the Northeast is greater than at any time in the past. However, our knowledge is far from complete and in many instances stands in need of revision. The descriptions of sites in the literature are based on the methods, techniques, and theories available at the time of analysis and also reflect the biases of the writer. Critically evaluating our data and the implications of the sources of those data thus becomes increasingly important as new methods and techniques are developed and as the time since the original analyses and interpretations lengthens. Increased use of flotation recovery of macrobotanical remains, AMS dating of crop remains, SCIA of human bone collagen and apatite (if possible, under NAGPRA), large-scale excavations, reanalysis of museum collections, and new developments in method and theory will change our understandings of early Late Prehistoric subsistence and settlement in the Northeast as we progress through the first few decades of the twenty-first century.

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