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Editor

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Cover: Some blades from the Glazier Cache (taken from Feder, Figure 2).

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EDITOR'S CORNER

This year's volume of the Bulletin is dedicated completely to Native American archaeology. Peter Pagoulatos' article *An Interregional Comparison of Middle Woodland Settlement Patterns: A View from the State of New Jersey* provides an overview of Middle Woodland cultures in the Middle Atlantic state of New Jersey, and compares his findings to those of researchers in southern New England. Although his emphasis is on settlement patterns, Pete discusses material culture as well. He provides data and suggests theories that Connecticut archaeologists working on Middle Woodland sites should find intriguing.

Edward Kaeser's article *The Bartow Lagoon Site, Pelham Bay Park, Bronx County, New York* is a good, old-fashioned site report from an icon on New York City archaeology. His discussion of this Late Woodland shell midden containing a dog burial shows that even badly disturbed sites may yield significant cultural information. A long-time amateur archaeologist, Ed sets a good example for amateurs and professionals alike on the value of publishing detailed site reports with regional comparisons that maximize our interpretation of prehistoric peoples.

Katherine Howlett's paper *Gendered Practices: Ethnohistoric and Archaeological Evidence of Native American Social Divisions of Labor* is an extremely interesting and innovative article on the discovery and understanding of gender and social relations of labor at an archaeology site. The Sandy Point site is well-known among New England archaeologists for its contribution to our knowledge of late prehistoric horticulture in coastal Massachusetts. Kat focuses on the lithic materials from the site, however, to provide important insights into the social organization of its occupants. Kat addresses both male and female divisions of labor, a fact that drives home the point that we as archaeologists should be searching equally for information on all members of a social unit – members of all age grades, genders, classes and ethnic groups.

Katherine Lee Priddy's article *The Manhansets of Manhansack-Ahaquatuwamock: An Analysis* also discusses Native American social relations, albeit during a later time period than Kat Howlett and in a wider geographical perspective. Lee provides insight into Native American social relationships and survival strategies on eastern Long Island during the 17th and early 18th centuries. Using primary documents and material culture (specifically pottery), Lee documents the cultural adaptations of the Manhanset and Montauk peoples as they attempted to retain community in the midst of intensifying Euro-American colonization and aggression. She suggests that one of these adaptations may have been the creolization of indigenous pottery.

Ken Feder's article on *The Glazier Blade Cache: 30 Remarkable Blades Found in Granby, Connecticut* focuses on the discovery, excavation, and analysis of a specific early Middle Woodland blade cache discovered in Granby, Connecticut in the Farmington River Valley. It is the only cache that has been associated with organic matter, and the only one that has been radiocarbon-dated.

This volume includes the *Museum Showcase*, which I hope will become an annual feature of the *Bulletin*, highlighting one or more archaeological accessions from a local museum. This volume features three objects from the Institute for American Indian Studies' collections – two reconstructed Native American pots and a harpoon excavated from the Smith's Cove site in Niantic, Connecticut.

LITHIC ARTIFACT AND BIO-ARCHAEOLOGICAL ANALYSES OF A POSSIBLE ADENA BURIAL SITE (CT84-51) IN MILFORD, CONNECTICUT

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ABSTRACT

On April 27, 1990, the State Archaeologist responded to a call by the Milford Police Department concerning a Native American burial discovered during the excavation of a lateral sewer line in the Laurel Beach section of town. Recovered in the backdirt pile was an Orient fishtail-like projectile point and numerous chert implements including a large biface, unifacial flakes, and end-scrapers. In situ along the trench wall were cranio-facial and pectoral elements of a young adult male stained green from exposure to copper salts. This paper presents the on-site bio-archaeological data and the laboratory analysis of the lithic artifacts. A case is made for the burial representing an Adena influence into Long Island Sound.

INTRODUCTION

Connecticut General Statutes Section 10-388 *et seq.* provides for the inclusion of the State Archaeologist when unmarked burials are recovered during construction and other land use activities. Procedures include the notification of the Native American Advisory Council and local tribes when human remains are determined to be of Indian origin. As a result, when the State Archaeologist was notified by the Chief State Medical Examiner's Office and the Milford Police Department that human remains had been discovered during a lateral sewer line excavation in the Laurel Beach section of Milford, Connecticut in New Haven County, on April 27, 1990, immediate field inspection commenced. Upon arrival at the discovery site, the State Archaeologist was confronted not only with town officials and construction site personnel, but members of television and newspaper media who had learned of the discovery over police radio transmission (Stableford 1990).

Excavation of a narrow (3 foot wide) trench by the backhoe operator to lay a lateral sewer line from the house to the street resulted in the discovery of many stone artifacts spoiled into the backdirt pile. However, upon the discovery of human skeletal remains exposed along the wall of the trench, Chief Inspector William J. Maloney halted operations and contacted the Milford Police Department. This set into motion the procedures eventually involving the State Archaeologist's investigation.

Exposed in the north wall of the trench excavation were human skeletal remains, including cranio-facial, mandible, and frontal vault elements. Post-cranial elements included cervical vertebrae, anterior portion of the left scapula, and left clavicle fragments. The skull was exposed face-out with full dentition present. The individual was lying on its right side, facing south and with the head oriented to the west/

southwest. No skeletal elements posterior to the clavicle were present. Forensic analysis of the few surviving skeletal elements suggests that the burial is that of a young adult male (20 - 30 years of age) of Native American ancestry.

All human skeletal remains were stained green and preserved through the leaching of copper salts into the organic remains. Although no copper artifacts were located, preservation included only those skeletal elements that may have been associated with copper associated within the neck/face anatomical areas. Material culture recovered from backdirt piles of the trench excavation, included one projectile point, one large chert biface, two chert flakes, and two end-scrapers. However, three chert flakes were located *in situ* under cranio-facial elements eroding out of the trench wall. No human remains were removed from their context. Backfilling occurred after the transverse pipe was laid and the burial remains in place as originally discovered. However, due to extensive public media coverage and the crowd of local spectators that were on site, the State Archaeologist made the decision not to rebury the disturbed artifacts associated with the burial due to concerns of future vandalism.

Preliminary examination suggested that the remains consisted of a single primary, flexed burial. Possible cultural affiliations were with either the pre-Contact 1st century Ohio Valley Early Woodland Adena culture or a Contact period burial from the 17th century. Upon determination of the burial's Native American origin, the State Archaeologist contacted the state Native American Heritage Advisory Council. Location of the burial was situated within the boundaries of the local Paugussett Tribe, and tribal representatives were also notified.

FIELD AND LABORATORY METHODS

This paper is the result of research completed a decade after the initial excavation and study; it will describe the burial, forensic analysis of the human skeletal remains, and the results of the analysis of associated lithic artifacts, which have not been previously published. Present research includes typing of the two bifacially worked artifacts based on their general morphology and material. The diagnostic features of these artifacts assisted in the determination of the temporal provenience of the assemblage. Also, use-wear analysis was used to determine if and how the tools and flake debitage were used. One objective was to explore mortuary practices to determine whether the tools were solely ceremonial items, or whether they were items of more utilitarian function. Finally, as the raw lithic material was determined to be more exotic than found locally in Connecticut, we attempted to determine its source.

Fieldnotes, maps and photographs of the excavation are on file at the Connecticut Archaeology Center, University of Connecticut. The burial feature was located approximately 500 feet inland from Long Island Sound in the Laurel Beach section of Milford, CT (Figure 1). Presently, the burial lies at the contour of 10 feet above sea level, on a 0 - 3% slope. Though estimates of sea level stabilize around 3000 years ago in this area (Gordon 1983), if the burial is of Early Woodland origin the burial area may have been the tip of an island facing Long Island Sound on substrate (till/bedrock). The site is within a modern residential area, and, the soils consist of fine-to-coarse sandy deposits along a salt marsh ecosystem at the western mouth of the Housatonic River.

Burial Analysis

The burial feature is comprised of a mat of very dark brown soil (10 YR 2/2) under the skeletal remains and a dark reddish soil (5 YR ¾) at the western boundary anterior to the preserved cranio-facial region (Figure 2). The feature becomes visible under 33 inches of fill, and, appears to a depth of approximately five feet where the burial was placed on top of a heavy gravel deposit. University of Connecticut geologist

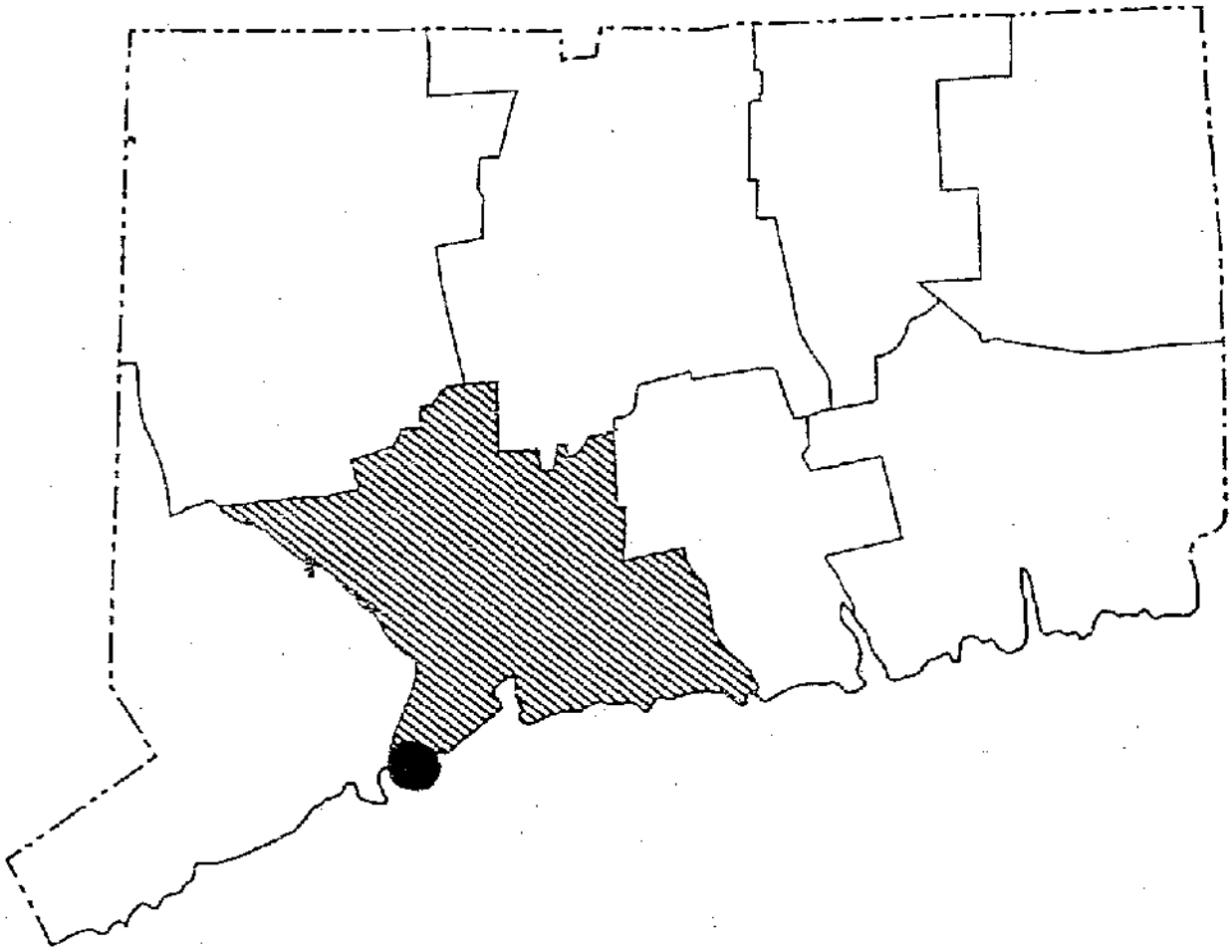

Figure 1. State of Connecticut with New Haven County highlighted and the Milford Burial Site marked.

Robert Thorson suggests that stratigraphic profiles exhibit a sharpness and angle of clear sand beds in the burial feature matrix, which may represent a wash process into the burial pit prior to being filled (Thorson, personal communication 2004). That is, the burial feature may have been filled from the foot to the head before being filled from the head to the foot, then from the sides (Figure 2).

Due to the fact that the remains were never removed from the trench wall, all forensic aspects of the skeleton were taken as on-site observations. The burial contained the remains of a single individual where all skeletal elements were stained green, presumably from copper salts or vivianite in the soil. The head was lying on its right side and oriented to the west, facing Long Island Sound to the south. No skeletal elements inferior to the pectoral girdle (i.e., shoulder complex) were preserved. The left clavicle was complete with an unfused medial epiphysis. The anterior portion of the left scapula was preserved including the glenoid cavity, acrominal process, and three inches of the scapular spine. The mandible was complete and in an excellent state of organic preservation with all adult molars erupted and heavily stained green. The medial left mandibular incisor and left first molar were missing. All of the teeth demonstrated extensive wear, which was especially obvious on the lingual and buccal surfaces of the molars exhibiting an oblique angle. No signs of caries were present, but alveolar resorption is evident on the missing dentition. While resorption of bone into the sockets of missing teeth usually indicate periodontal disease, it is possible this individual lost two teeth as a result of trauma earlier in life, and, not from poor dental

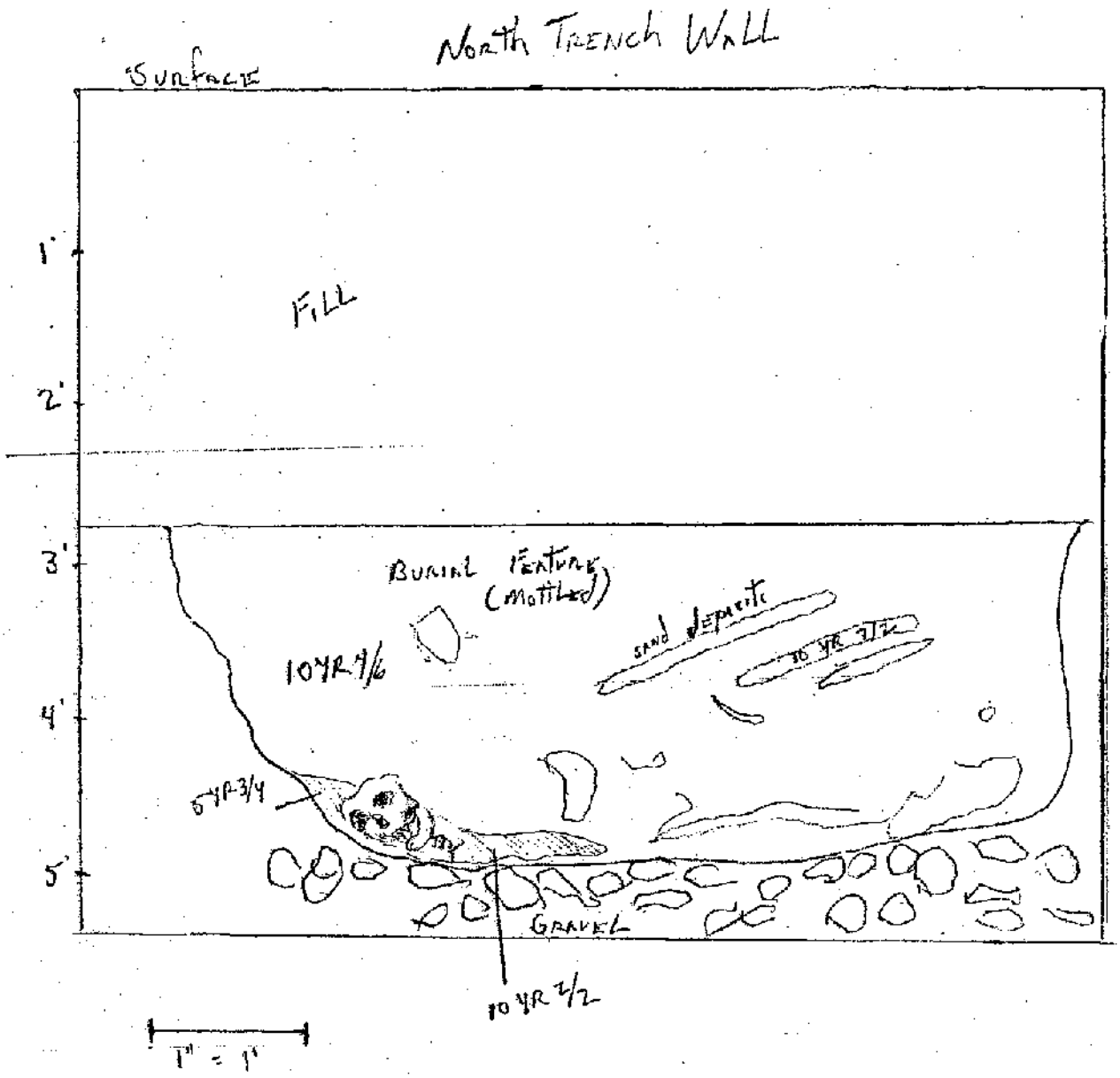

Figure 2. Burial feature profile.

health. In addition, there were no visible signs of structural changes to the maxilla or mandible due to long-term tooth loss. However, there were no visible signs of trauma on the mandible or other skeletal elements. The cranio-facial complex was also complete, though there was no preservation of the frontal bone above the moderately developed superciliary arches (i.e., brow ridges). More detailed analyses could have been conducted in a laboratory setting, however, in respect to Native American sensitivities and the request of the Native American Heritage Advisory Council, all human remains were conserved in their original position and covered over after the sewer line construction activity without undue disturbance. Hence, they were unavailable for laboratory study.

Based on the full, occlusion eruption of the third molar, and the unfused medial epiphysis of the left clavicle, which usually fuses in the mid-twenties, the individual can be comfortably aged as between 21 - 30 years of age (White 2000). Moderate prominence of the brow ridges, the angle of the ascending ramus (ca. 120 degrees), and the overall robusticity of the cranio-facial features, the individual is sexually estimated to be male. Shovel-shaped maxillary incisors suggest Native American ancestry. Though no surviving copper was evident, preserved green-stained skeletal elements suggest the individual was adorned with beads around the neck or associated with the neck/face region.

Lithic Analysis

Measurements were taken from all stone implements recovered from the burial and backdirt spoils (Table 1). The projectile point is 70mm in length, 23mm in width, and 9mm in breadth. The lateral edges are slightly convex forming a narrowly lanceolate shape. The extremely weak shoulders merge into side notches. The base is slightly flared and flat on the bottom. Both the ventral and dorsal surfaces are convex. The point is made of an unknown gray-to-black material with a semi-translucent quality (Figure 3).

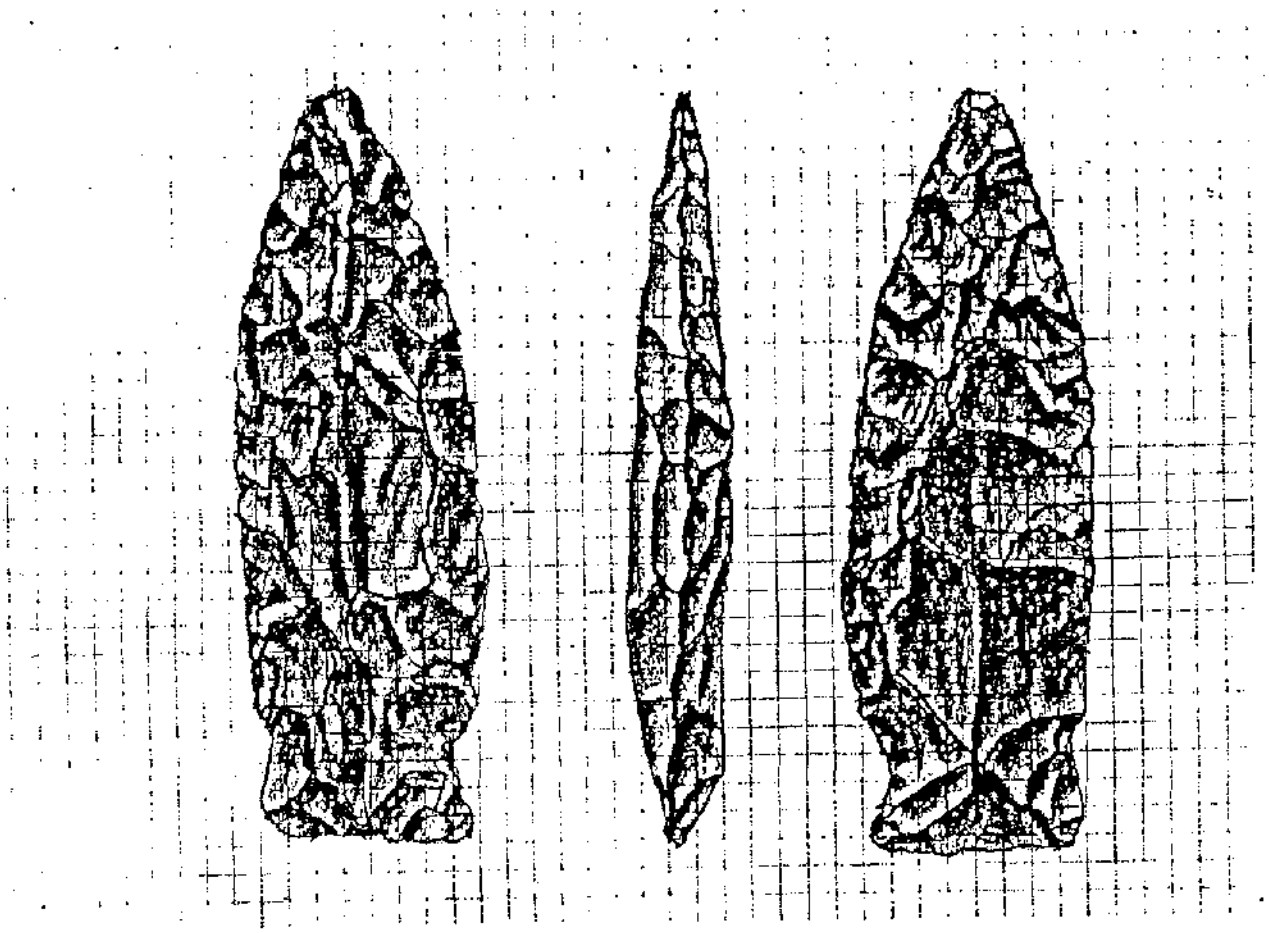

Figure 3. Projectile point from Milford Burial Site. See Table 1 for measurements.

The point best conforms to Ritchie's Orient Fishtail, though it is not a "classic" example because of the relatively small stem. The narrow blade merges into a flaring "fishtail" stem that characterizes the point. Typically, Orient points are small-to-medium sized ranging from 25mm to 102mm in length with most examples being between 50mm and 64mm in length (Ritchie 1961). The point is lanceolate in outline

TABLE 1: LITHIC ARTIFACT INVENTORY, MILFORD BURIAL SITE (CT84-51)

Artifact Inventory No.	Artifact Type	Measurements*	Provenience
01	Chert Biface	L = 192mm W = 111mm B = 24 mm	Backdirt pile
02	Chert Unifacial Flake	L = 181mm W = 80mm B = 23mm	Backdirt pile
03	Chert Flake	L = 81mm W = 45mm B = 16mm	Backdirt pile
04	Chert Flake	L = 79mm W = 44mm B = 13mm	Under Cranium
05	Chert Flake	L = 52mm W = 41mm B = 10mm	Under Cranium
06	Chert Flake	L = 65mm W = 43mm B = 12mm	Under Cranium
07	Chert End-Scraper	L = 38mm W = 23mm B = 9mm	Backdirt Pile
08	Chert End-Scraper	L = 24mm W = 21mm B = 7mm	Backdirt Pile
09	Projectile Pt.	L = 70mm W = 23mm B = 9mm	Backdirt pile

* L = Length; W = Width; B = Breadth

and bi-convex to nearly flat in cross-section. The primary focus for the Orient point type is Long Island, coastal Connecticut and southeastern New York from the Late Archaic to Early Woodland periods.

Use-wear analysis attempted to determine the functions of the stone tool by examining direct evidence on the tool surface (Andrefsky 1998). Using methods developed by Keeley (1980), we examined four aspects of the chert artifacts under both 25X and 50X microscopic lenses. We first looked at "brightness", which is a relative measurement determined by the reflectivity of the surface, or the light intensity of the polish. Evidence from previous studies (Hayden and Kamminga 1979) suggests that mineral and organic residues adhere to the surface of the tools and produce distinctive patterns indicative of different contact materials. Using a scale of 1 to 5 with 5 being the brightest. Secondly, we observed surface markings, which included pitting, undulations, and striations. Presence/absence was recorded for pitting and undulations. Striation was recorded by presence/absences and type. There are a number of distinctive types of striations that are created under different working conditions. Keeley (1980:23) describes four of these: narrow deep, narrow shallow, broad deep, and broad and shallow.

Finally, function of the artifacts was determined by comparing the results to Keeley's (1980) descriptions of six different classifications of wear patterns to determine if and how the artifacts were used. For example, wood-working polish typically exhibits bright and gently curving undulations in the general direction of the work. Striations occur with intensive use and are broad and shallow when present. Bone-working also produces a bright polish, but develops pits at points along the working edge. Striations are deep, narrow parallel tracks. Bright wet hide-working polish has more of a greasy luster. When a dry hide is worked, the polish is dull and matted, producing pits. Likewise, meat cutting causes a greasy luster as well as minute striations on the working edge only. When antlers are the contact material, the polish is again bright and the surface either pockmarked or has parallel striations. Some plants produce a very bright sheen with a fluid appearance and "comet-shaped pits" (Keeley 1980:60).

RESULTS

Results of the lithic analyses are presented in Table 2. The chert biface is 192mm in length, 111mm wide, and, 24mm in breadth. The ventral and dorsal surfaces are almost flat while the overall shape in the form of a "tear drop" (Figure 4). This large biface exhibited a relatively bright polish with clear undulations present along one side of the length of the biface. Striations were all broad while some were quite deep and others shallower. These markings indicate that the tool was used and the signatures suggest wood-working activities. Archaeologist Douglas Charles of Wesleyan University interpreted the biface as a possible adze (Charles, personal communication 2004).

The large unifacial chert flake (180mm in length) appears to exhibit some retouching on the edges; however, there is no conclusive evidence for use wear (Figure 5). The surface is not bright, and though there were some striations they were infrequent and had no definite directional patterns. Lack of patterning could be the results of marks occurring naturally in the sediment after deposition.

A retouched chert flake was relatively dull in brightness except for the ventral tip, which had a greasy luster (Figure 6). Observed striations located in the same area were small, narrow, and deep, suggesting either wet-hide or meat polish (Keeley 1980:49).

Three artifacts labeled 4 through 6 in Table 2 showed polish and very small striations. While these artifacts exhibited some signs of wear, they were not pervasive enough to truly indicate any particular pattern. Interestingly, these artifacts represent the only material culture with known provenience within the burial; that is, they were lying immediately under the facial elements. In contrast, Artifacts 7 and 8, having no specific provenience data, presented clear evidence for being end-scrapers: glossy polish, some striation, but, most importantly, circular pitting on the working surface.

TABLE 2: OBSERVED WEAR

Artifact	Brightness	Pitting	Undulations	Striations	Notes
01	4	N/A	Present	Broad and Deep Broad and Shallow	Most ridges show abrasion Striations parallel and at ~45 degree angle Polish only on one side
02	3	N/A	N/A	Narrow and Deep Broad and Shallow	High ridges show abrasion Striations few with no definite direction
03	1 3-4 on point	N/A	N/A	Narrow and Deep	Polish only on ventral tip Polish bright but glossy
04	3	N/A	N/A	Broad and Shallow	Glossy polish along edge
05	3-4 in some spots on edge	N/A	N/A	Narrow and Deep Broad and Shallow	Polish along retouched edge Polish mostly on the dorsal surface but there is some on the ventral surface Striations extend from edge fractures at a 90 degree angle
06	2	N/A	N/A	N/A	Many step fractures
07	3 on edge	N/A	N/A	N/A	Glossy polish along edge
08	2	Present	N/A	Broad and Shallow	Circular Pits

CONCLUSIONS

This study was limited to field observations of the mortuary pattern, primarily vertical description of the feature, and disposition of preserved skeletal elements. In sensitivity to Native American concerns,

the burial feature was not excavated. Likewise, human remains were not removed from the trench wall. All efforts were made not to be intrusive and description consisted of observed characteristics. In addition,

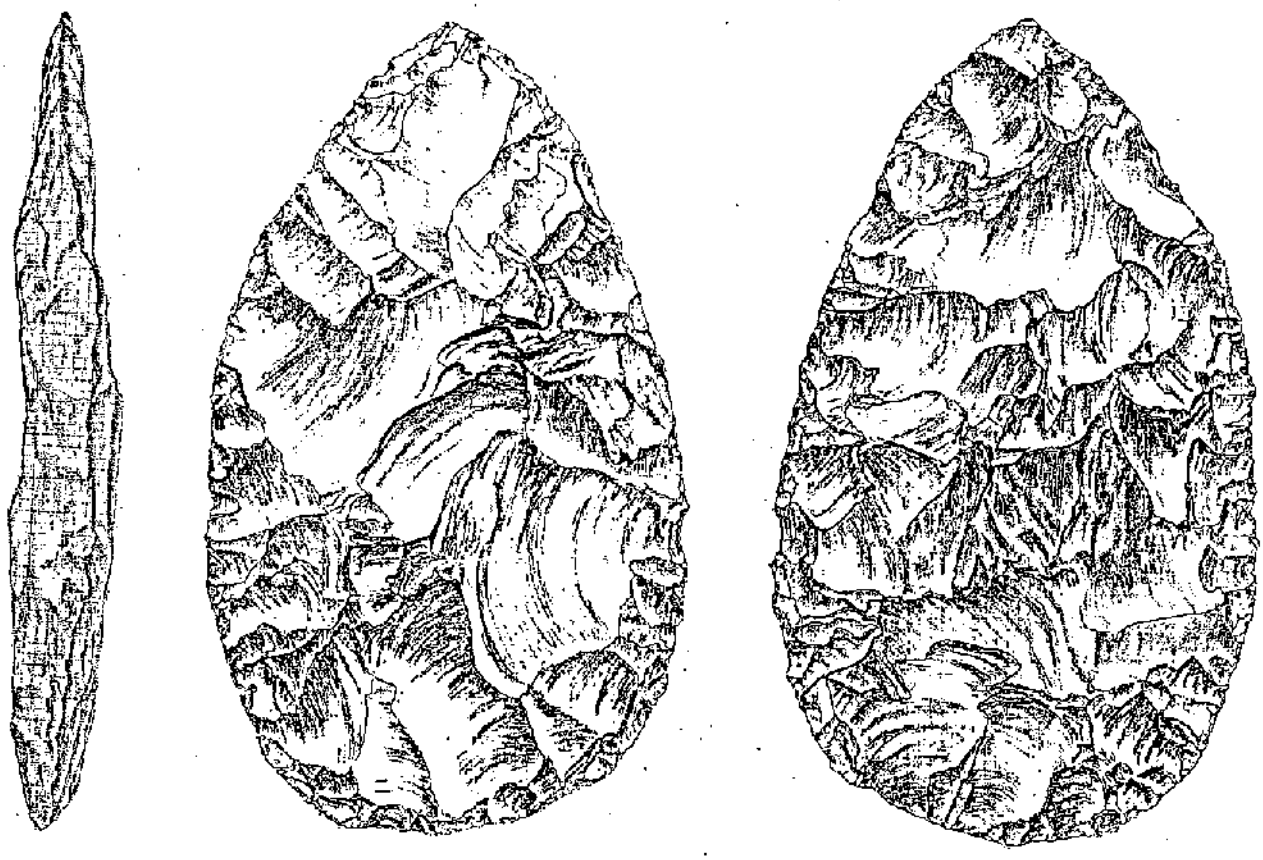

Figure 4. Chert biface from Milford Burial Site. See Table 1 for measurements.

except from the chert flakes protruding from under the cranio-facial area, all stone tools were recovered from backdirt piles and only assumed to be associated with the burial. Connecticut Archaeological Site files and Maps show many pre-Contact sites in the general area, and, the burial could have been placed within a settlement context with the recovered artifacts not being funerary objects. However, two arguments can be made for the stone tools as funerary objects: 1) raw material is consistently cherts exotic to, and rarely located, in Connecticut; 2) field inspection of the entire trench excavation yielded no artifacts or features other than the burial. While the trench wall was trowel-scraped, there was no opportunity in the timeframe available to screen the backdirt pile for additional aspects of material culture or skeletal remains. Nonetheless, we suggest that all the artifacts recovered from the sewer line excavation are associated with the burial.

While specific distribution of funerary objects within the grave was unattainable, a case can be made that if the stone tools recovered were associated with the burial, their position would have laid toward the south of the body and with the individual "facing" the artifacts. Due to concerns of vandalism, artifacts recovered from the backdirt pile were brought to the University of Connecticut and the burial was backfilled prior to the state archaeologist leaving the site.

The Milford burial presents some unique characteristics for the region, which made both temporal parameters and cultural affiliation difficult to determine. Assumed presence of copper implements within the burial, which was made due to the green coloration of surviving skeletal elements, narrowed the temporal indicators to the Early/Middle Woodland and Contact periods. However, though material culture was limited, no European manufactured artifacts were recovered, suggesting that the later time period be ruled out. In addition, personal communication with Christina Reith, at the New York State Museum, Albany, supports the connection of the stone artifacts as dating to the Early/Middle Woodland:

> The overall shape of the biface looks very much like Adena/Meadowood bifaces found in New York. Although (this) culture is generally associated with western and central New York, substantial occupations have been found in the Hudson, Scholarie, and Eastern Mohawk valleys of New York. We are currently involved with a large field project in the Schoharie Valley which has produced "teardrop bifaces". In New York, sites dating to the Adena/ Meadowood culture have produced Orient fishtail points (Rieth, personal communication, April 5, 2004).

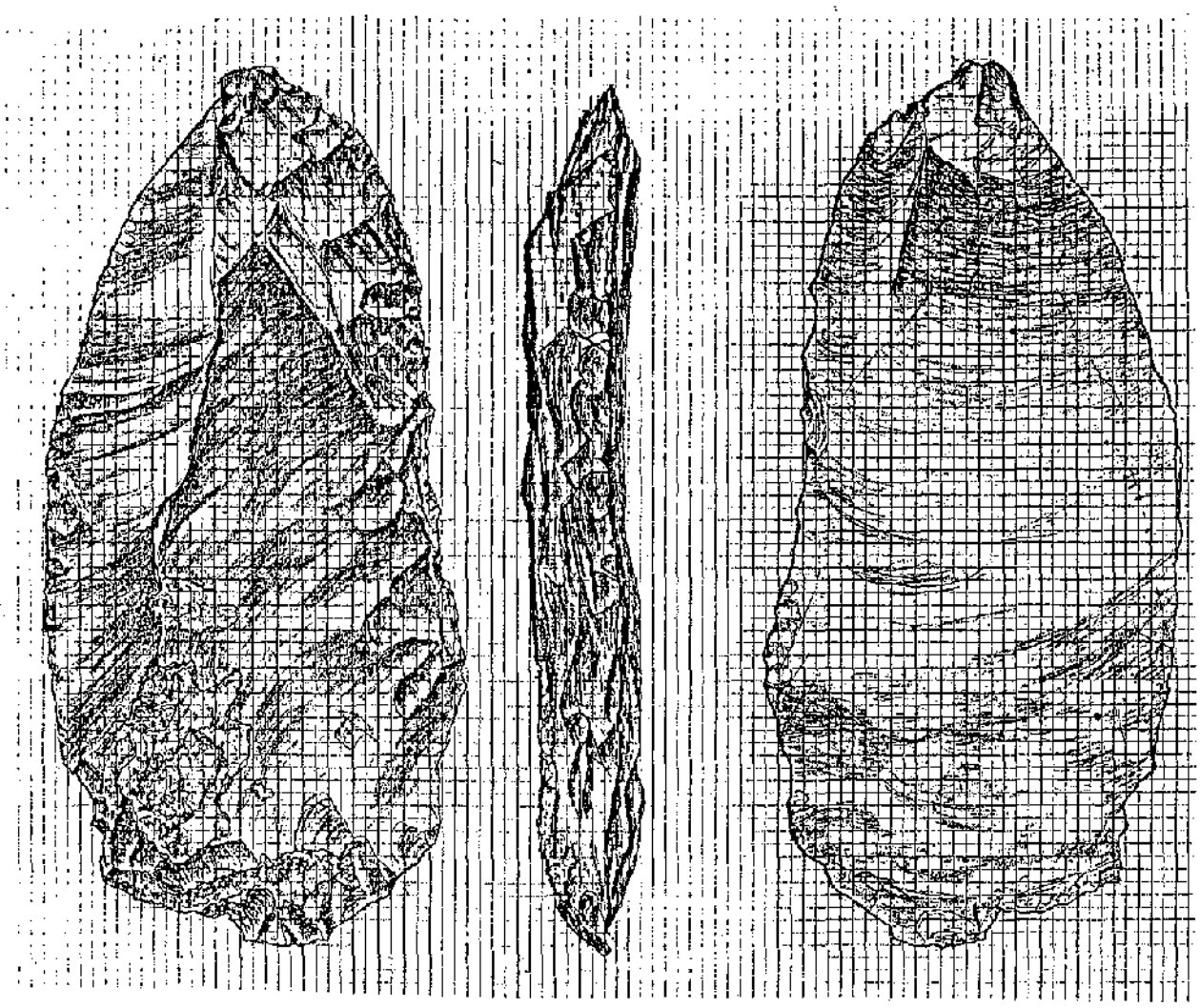

Figure 5. Chert unifacial flake from Milford Burial Site. See Table 1 for measurements.

The principal focus of the Adena culture was the central and southern regions of Ohio. However, their location on the Ohio River provided them accessible passageways into diverse regions, including southern New England and New York. "Adena" influences in mortuary ceremonialism and the influx of exotic artifacts are associated with extended trade networks (Ritchie 1969). For example, Adena burials have been reported from the Connecticut River Valley (Cooke and Jordan 1972), while Orient burials have been located on Stony Brook, Long Island (Ritchie 1969). The town of Milford lies across Long Island Sound from the Stony Brook site, at the confluence of the Housatonic River.

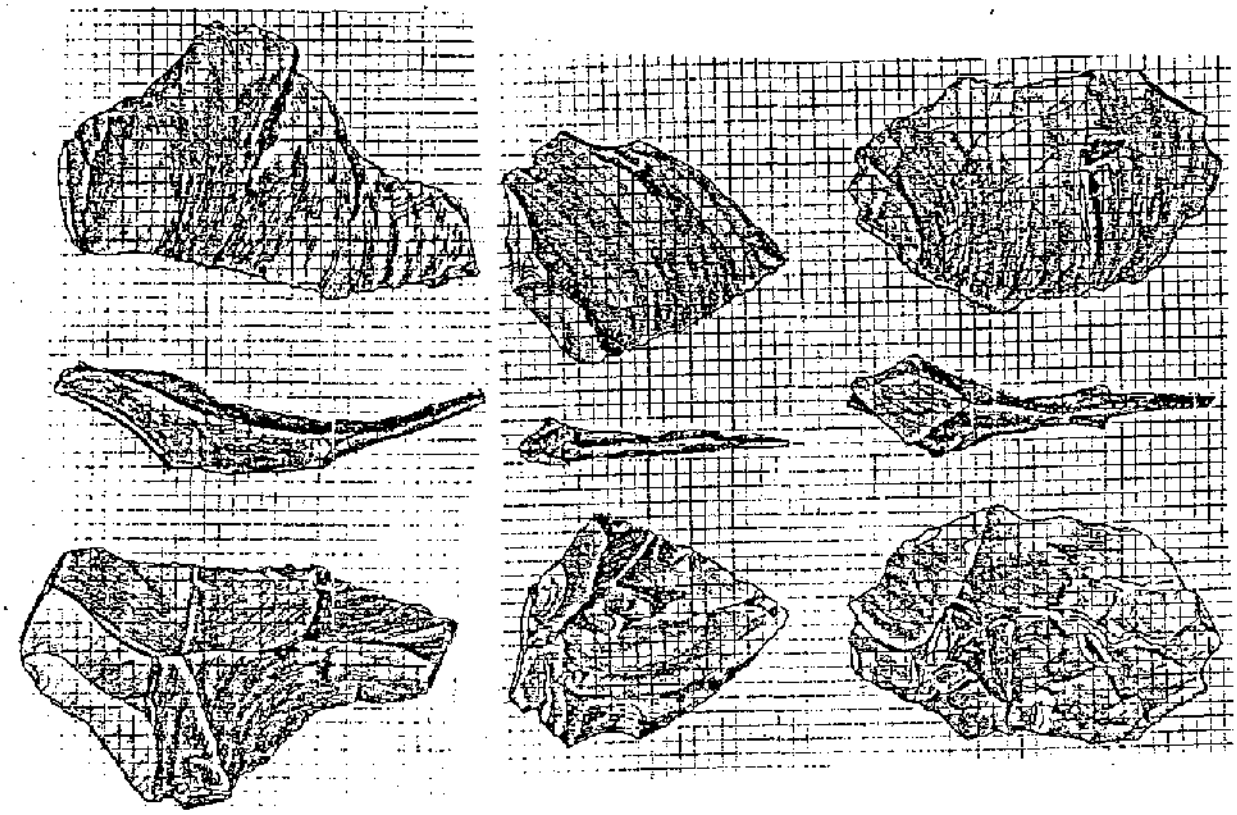

Figure 6. Chert flakes (artifacts #04, 05, and 06 left to right) recovered from under cranium at the Milford Burial Site. See Table 1 for measurements.

Comparisons with the Adena burial reported by Cooke and Jordan (1972) from the East Windsor Hill area of South Windsor, CT, show both similarities and dissimilarities. For example, all human remains were stained green from exposure to copper salts, and primarily confined to cranio-facial, clavicle, hyoid, cervical vertebrae, innominate, and right arm and hand elements. Also, a flint blade was recovered, though of a raw material and morphology distinct from the Milford Burial. However, the East Windsor Hill excavation yielded copper columella beads and a block-ended tube fragment. Cooke and Jordan (1972) suggest that the individual may have been placed in a supine, extended position similar to those recorded for Adena in the Ohio Valley. The Milford burial suggests that the individual was flexed and laying on his right side.

The results of the lithic analysis support the functional use of all the stone tools recovered from the mechanically produced refuse pile. The exceptions are the three chert flakes recovered from the trench

wall positioned under the face of the individual. These latter materials did not exhibit wear patterns, and we do not believe they had a utilitarian function. Nonetheless, this research suggests that these artifacts were not simply ceremonial items, but, were previously utilized for a variety of purposes, including woodworking, meat cutting and/or hide preparation.

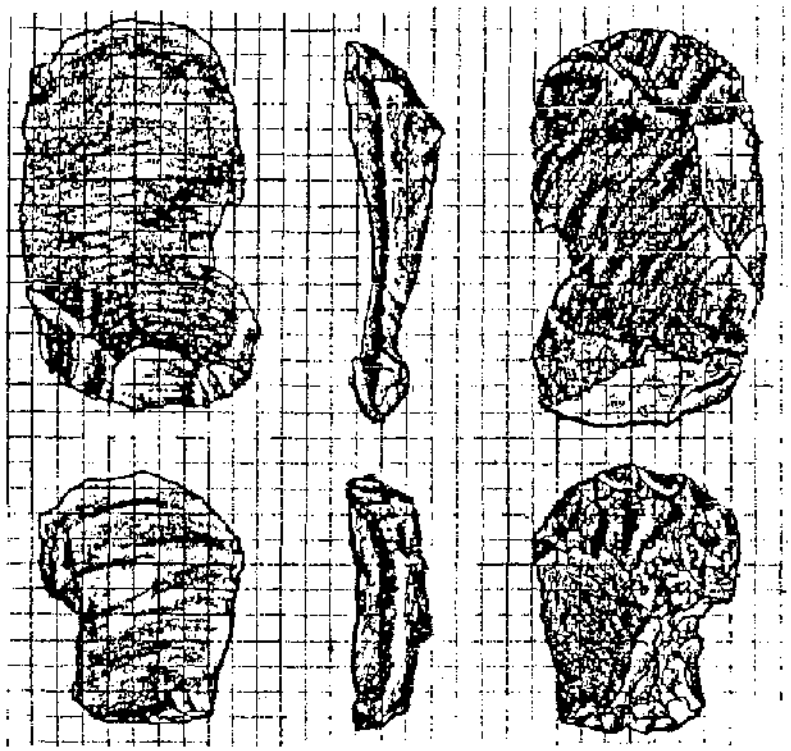

Figure 7. Chert end-scrapers (artifacts #07 - top; #08 - bottom) from the Milford Burial Site. See Table 1 for measurements.

The material lithic type suggests that the artifacts were not procured from local sources. Future analysis should include non-destructive techniques such as neutron activation and x-ray diffraction that may assist in determining the source of the chert artifacts.

The incorporation of these stone artifacts into the burial feature also suggests evidence of their importance as exotic materials, as valued resources sought after through trade and subsequently more utilized (Georgiady and Brockmaann 2002). Artifacts like #8, an end-scraper, exhibited many inclusions, were heavily worked and used (Figure 7). Lithic materials valued because of their technological or ideological significance are usually curated and used under conditions in which other materials would have been discarded (Gould 1980). Though the source remains unknown, it is probably that they were trade items, carried in by Adena traders into Long Island Sound, one of which may have died along the journey.

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AN INTERREGIONAL COMPARISON OF MIDDLE WOODLAND SETTLEMENT PATTERNS: A VIEW FROM THE STATE OF NEW JERSEY

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ABSTRACT

Middle Woodland settlement patterns are poorly understood in the State of New Jersey, as this study evaluates current settlement pattern data using logistical models of land use, against available archaeological data. Finally, an interregional comparison is made between the states of New Jersey and Connecticut. Current data from New Jersey indicate that Middle Woodland populations exhibited a complex series of movements, based upon seasonal availability of resources across two primary zones: interior riverine and coastal. Large population aggregates coalesced in riverine zones along the Delaware River in the spring to exploit anadromous fish spawning runs; settlement systems at this time most resemble a collecting I strategy. With the passing of the annual spawning runs, groups dispersed into smaller and more mobile family groups to coastal zones to harvest shellfish and other aquatic-related resources in the warmer months, most typical of a foraging I pattern. During the fall and winter months, highly mobile groups returned to feeder streams and tributaries of the interior zones in the Delaware Valley to gather wild plant/nut foods and hunt mammal resources; this pattern of settlement was also typical of a foraging I strategy.

INTRODUCTION

Middle Woodland period (A.D.1 - A.D.800) land use of New Jersey is poorly understood in comparison with other parts of the Northeast (Ritchie 1969a; Snow 1980; Custer 1984; Dent 1995; Juli 1999). Although the well-documented Abbott Farm National Landmark near Trenton has provided valuable information regarding Middle Woodland land use, settlement patterns beyond this area have yet to be adequately evaluated (Cross 1956; Williams and Thomas 1982; Wall *et al.* 1996; Pagoulatos 1998). Middle Woodland populations used chipped and ground stone tools and clay pottery. Lithic assemblages consisted of Fox Creek stemmed and lanceolate as well as Jack's Reef pentagonal and corner-notched biface forms, large, broad Petalas blades and knives, notched netsinkers, bola stones, celts, ungrooved axes, and pestles; clay pottery typically included plain, cord-marked, net-impressed, incised, dentate-stamped, rocker-stamped, and Abbott-zoned decorated varieties (Williams and Thomas 1982; Stewart 1998).

The data which is presented in this study came from a variety of sources, such as review of state-sponsored surveys (Cross 1941, 1956), site records housed at the New Jersey State Museum, cultural resource management reports housed at the Department of Transportation, the Department of Environmental Protection, the index of the Archaeological Society of New Jersey's Bulletin (Bello 1986, 1990, 1995), published literature (Kinsey 1972, Stewart 1989, 1990; Ceci 1990; Pagoulatos 1992a), and various other sources (Williams and Thomas 1982; Wall et. al. 1996; Pagoulatos 1998). In this study, two main types of data were assessed: environmental data and cultural data. Each type of data is discussed below.

ENVIRONMENTAL DATA

Reconstruction of Middle Woodland paleo-environments of New Jersey is based on locally and regionally based pollen data from the Mid-Atlantic and New England regions. Although climate and physiography closely approximated modern conditions across the region during this time, pollen sequences suggest a succession from oak-hickory (warm and dry) to oak-hemlock-chestnut biomes (cool and moist) by the Middle Woodland period (Sirkin *et al.* 1970; Carbone 1976; Sirkin 1977; Williams and Thomas 1982; Hartzog 1983; Funk 1991). Also, coastlines and tidal estuaries stabilized in the Middle Atlantic region during this time, as the rate of sea level rise was drastically reduced from previous periods. In the Delaware Bay, sea level rise averaged about one centimeter per decade, as the upriver extent of tidal estuary influences approximated modern conditions by A.D. 300 (Custer 1984:93; Kraft and John 1978; Berger 1994).

New Jersey presently exhibits a diversity of environmental settings (Figure 1). In this study, four major physiographic provinces (or regions) are recognized, based on geological formations, soils, and land forms: Ridge and Valley, Highlands, Piedmont Lowlands and the Coastal Plain (Wolfe 1977). The Ridge and Valley (RV) region extends from the Delaware Water Gap to the New York State border and contains a series of parallel ridges and valleys, referred to as the Kittatinny Mountains. The Highlands (HIGH) and Piedmont Lowlands (PL) extend from present-day Trenton to the Delaware Water Gap. The former is characterized by a broad highland belt broken with intermontane valleys; the latter, a lowland region which slopes southward. The Coastal Plain extends from southern New Jersey to Trenton and is characterized by a broad, low-lying belted coastal plain gently sloping to the Atlantic Ocean. The Coastal Plain is subdivided into the Inner and Outer Coastal Plain. The Outer Coastal Plain (OCP) consists of coastal marshes and estuaries; the Inner Coastal Plain (ICP) is characterized by tidal and freshwater lowlands, extending from the Delaware River to Raritan Bay.

CULTURAL DATA

Different types of cultural data were used to interpret human behavior, as reflected in the archaeological record. Cultural data used in this study included:

1. the classification of specific artifact classes in conjunction with statistical methods to discern the range of human (cultural) activities at a site,
2. the establishment of occupation types, and
3. an assessment of land use models.

Each form of cultural data is discussed below.

CULTURAL ACTIVITIES

Coefficient of Variation

The Coefficient of Variation (CV) statistic provides data on inferred activity variability (Pagoulatos 1992a, 1998). This information is important with respect to the identification of occupation types across different environmental locales and should also provide testable data concerning procurement strategies and settlement patterns. Four different indices are established for artifact categories. An index is constructed in order to compare the range of variability within and between occupations. The categories are the following:

1. Ground stone tools: items created by grinding an edge (axe, adze) or surface (pestle, mortar) as part of the manufacturing process.
2. Projectile points: items with blades and hafting elements.
3. Chipped stone tools: items created by percussion or the removal of flakes (i.e., scrapers, drills, knives, utilized flakes), excluding projectile points.
4. Tool production: cores, modified cobbles and hammerstones.

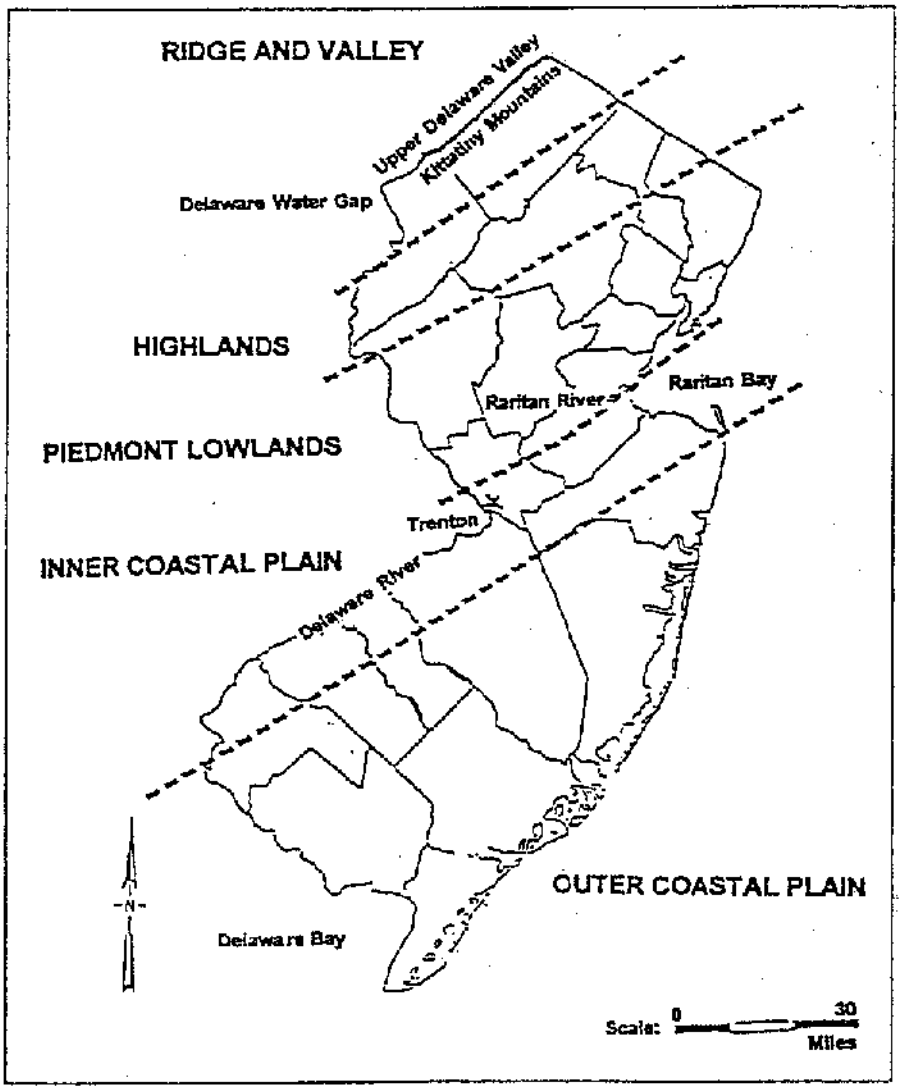

Figure 1. Physiographic provinces of New Jersey.

Each index is calculated by dividing the number of items in each particular artifact category by the sum total number of items in the represented artifact categories. This calculation yields the proportion of each category. These values (proportions) are then used in determining the CV for an assemblage. Because we are interested in comparing the relative rather than absolute dispersion of two or more groups of data, the CV is considered an appropriate measure of standard deviation. The CV expresses the sample variability in terms independent of mean size, which can vary. The measure is designed to express group variability, as expressed by the standard deviation (S) in terms relative to the central tendency of that group (X). The CV formula is as follows:

$$CV = \frac{S \times 100}{X}$$

The CV ranges from 0 to 200. Sites which yield a CV of 0 would have an equal proportion of each individual artifact category; in cases where only one of the above-mentioned artifact categories is present (including pottery), a CV of 200 will be assigned. Below is an example of the calculation of a CV for a sample prehistoric site.

Sample Site	Ground stone Tools	Projectile Points	Chipped Stone Tools	Tool Production
Quantity(#)	0	17	0	6
Percentage(%)	0	74	0	26

$$CV = \frac{34.89 \times 100}{25} = 139.6$$

A CV of 139.6 reflects a fairly high degree of interval variability; that is, there is a lot of variation between the categories. In this example, a high proportion of projectile points suggests that the hunting (and possibly processing) of mammals was an important activity at this location. Therefore, this CV reflects a rather specialized location where a limited range of activities took place. By contrast, a CV of 75 would reflect a much more variable assemblage, indicating that all categories represent roughly similar proportions of the overall assemblage, and that a more even distribution of activities took place.

Occupation Types

This measure of activity variability as expressed by the CV is used in part for the definition of occupation types (an occupation, or site, is defined as any location which yields evidence of past human behavior). This measure can be used in combination with other characteristics such as occupation size, location, feature types, and preserved subsistence remains, to define occupation types. The frequency and distribution of occupation types are then used to assess Early Woodland land use systems. Using the criteria outlined above, the following occupation types are established (Pagoulatos 1992a, 1998):

> Base I (B1) locations are usually characterized by a wide range of artifact types, indicative of manufacturing, maintenance, and procurement activities. Artifact density is high and cultural depositions are often deeply stratified, reflecting recurrent and long-term use. Numerous types of features are also found at B1 locations, including hearths, trash pits, activity areas of various kinds (toolmaking, food processing), house structures, burials, caches, and other storage facilities. This occupation type is often situated on major drainages and at contrasting ecological boundaries, thus minimizing the necessity for travel to any specific resource zone. The social unit usually consists of the largest aggregate population that occurs at any time of the year, including numerous related extended families, or the macroband.
>
> Base 2 (B2) locations are often characterized by a relatively wide range of cultural activities similar to those found at larger B1 locations. However, artifact densities are moderate and archaeological deposits less complex, suggesting limited seasonal re-use. Feature types most often consist of cooking, activity areas, trash, and sometimes household areas; burials and

storage facilities are rare. The social unit represents a few related families (or the microband), operating out of B1 locations.

Target 1 (T1) locations are characterized by fewer, more specialized activities (e.g., hunting, nut processing). Artifact densities are low, reflecting short-term episodes of use. Feature types are limited, usually represented by resource processing, cooking, and related work areas. T1 locations are usually found close to a specific resource zone; resources are processed at the site, prior to their transport back to B1 and B2 locations. The social unit represents organized task groups, or families, operating out of base locations.

Target 2 (T2) locations are often characterized by few artifact types, very low artifact density, and limited cultural deposition, reflecting brief occupation of a specialized nature. T2 locations are usually found near a specific resource zone. Features are rare and resource procurement is usually a single commodity (mammal, nut, fish, raw material) on a periodic, or as-needed basis. The social unit generally represents a family, specialized task group, or individual, operating out of larger B1, B2, or T1 locations.

As part of the site type interpretation, sites were also evaluated for site use intensity and function, using a Feature Diversity Index (FDI) (Pagoulatos 1998). Feature types were counted for each site using the following classification scheme (Table 1): pits, hearths, storage, burials, residence, caches, middens, and fire-cracked rock dumps. Then each site received a count based on the number of different feature types present. For example, if a site had pits and hearths, it would receive a FDI rating of two (2). Finally, all sites were computed and the total number of feature types was divided by the total number of sites. The FDI is designed to produce the average number of feature types per site. Thus sites with a high FDI may represent multiple activity sites or sites that were intensely re-used; sites with a low FDI are more likely to represent sites with a limited range of activity.

Land Use Models

A set of principles for organizing settlement systems have been proposed by Binford (1980) and Pagoulatos (1998) and implemented in this study. Using these logistical models, it is suggested that the mobility and organizational complexity of hunter-gatherer groups is related in part to spatial and seasonal variability of resources. Each general logistical model is discussed below.

Binford (1980) presents a model of human land use along a forager-collector continuum. *Foragers* are characterized by high residential mobility, exploiting seasonally available resources across a variety of resource zones. A foraging strategy necessitates the frequent movement of people to resources, in environments where resources are uniformly distributed, with little variation from season to season. Foraging groups tend to be small, scheduling their movements across the landscape so as to exploit seasonally available resources. Foragers operate out of base locations, leaving to procure food and returning on a daily basis. Target locations are usually established nearby, where specialized tasks are performed (e.g., mammal butchering, plant processing). When resources are depleted, the entire group abandons the area and moves elsewhere. *Collectors* show evidence of less residential mobility, greater sedentism, and the increased use of storage facilities. A collecting strategy is characterized by the movement of resources to people (to base locations), rather than moving people to the resource. This strategy is more efficient when resources are not evenly distributed, and resource variation in the availability of resources is high. According to this system, organized task groups establish target locations a distance from the larger resident population, where they acquire and initially process materials from specific resource zones. Subsequently, these resources are transported back to base locations, for final processing and storage or consumption.

TABLE 1: MIDDLE WOODLAND SITE LOCATION DATA

SITE NUMBER	PROV	DRAINAGE	CV	FDI	TYPE
AT051	OCP	GREAT EGG HARBOR	200		T2
AT052	OCP	GREAT EGG HARBOR	92		B2
AT058	OCP	GREAT EGG HARBOR	200		T2
AT062	OCP	GREAT EGG HARBOR	200		T2
AT063	OCP	GREAT EGG HARBOR	200		T2
AT071	OCP	GREAT EGG HARBOR	200		T2
AT074	OCP	GREAT EGG HARBOR	200		T2
AT102	OCP	GREAT EGG HARBOR	200	1	T2
BU135	ICP	RANCOCAS	70	2	B2
BU136	ICP	RANCOCAS	200		T2
BU231	ICP	RANCOCAS	85	2	B2
BU273	ICP	PENNSAUKEN	70	3	B2
BU274	ICP	PENNSAUKEN	69	1	B2
BU343	ICP	RANCOCAS	105		T1
BU348	ICP	RANCOCAS	77	1	T1
BU420	OCP	MULLICA	95		T2
BU433	ICP	RANCOCAS	200		T2
BU446	ICP	RANCOCAS	200		T2
CLOVE ROCKSHELTER	HIGH	PASSAIC	68	1	B2
CM25	OCP	GREAT SOUND	116	2	T2
CM28	OCP	GREAT SOUND	122	2	T2
CM32	OCP	GREAT EGG HARBOR	134	3	T2
EDMUNDS ROCKSHELTER	RV	MUSCONETCONG	95		T2
GL111	ICP	WOODBURY	104		T1
GL118	ICP	DELAWARE	93	1	T2
GL139	ICP	TIMBER	98	2	B2
GL161	ICP	MANTUA	109		T2
GL170	OCP	MAURICE	87	2	T1
GL171	OCP	MAURICE	69	2	B2
GL213	ICP	TIMBER	200		T2
GL238	ICP	RACCOON	65	2	T1
GL206	ICP	MANTUA	116		T2
HARRYS FARM	RV	DELAWARE		3	B2
HU474	PL	RARITAN	146		T2
HU502	PL	RARITAN	84	1	B2
HU529	PL	RARITAN	151		T2
JOANNA	HIGH	RARITAN	153	1	T2
LERRO FARM	ICP	OLDMANS	126	4	B2
LOCUS 4	ICP	RANCOCAS	200		T2
ME01	ICP	WATSONS	76	5	B1
ME01-A	ICP	DELAWARE		1	T2
ME01-B	ICP	WATSONS		2	T1
ME01-C	ICP	WATSONS	200		T2
ME01-D	ICP	WATSONS		2	T2
ME01-E	ICP	WATSONS	200		T2
ME01-G	ICP	WATSONS	200	1	T2
ME01-I	ICP	DELAWARE		2	T1
ME20	ICP	DELAWARE		2	T2
ME037	ICP	CROSSWICKS		2	T1
ME99	ICP	DELAWARE		1	T2
ME100G	ICP	CROSSWICKS		3	T1
ME106	ICP	CROSSWICKS		2	T2
ME114	ICP	WATSONS		1	T2
ME115	ICP	WATSONS	141		T2
ME116	ICP	WATSONS	200		T2
ME117	ICP	WATSONS	200		T2
ME118	ICP	WATSONS	128		T2
ME119	ICP	CROSSWICKS		1	T2
ME125	ICP	ASSUNPINK		1	T2
ME245	ICP	DELAWARE	114	1	T1
MI114	ICP	MILLSTONE	134		T2
MI189	ICP	RARITAN	116		T2

TABLE 1: MIDDLE WOODLAND SITE LOCATION DATA (continued)

SITE NUMBER	PROV	DRAINAGE	CV	FDI	TYPE
MI190	ICP	RARITAN	93		T1
MILLER FIELD	RV	DELAWARE			T2
MR233	HIGH	RARITAN	150	2	T2
MR241	HIGH	MUSCONETCONG	130	2	T2
OC04	OCP	LITTLE EGG HARBOR		1	T2
OC60	OCP	GREAT SOUND		4	B2
OC071	OCP	TOMS	200		T2
OC080	OCP	LITTLE EGG HARBOR	75	5	B2
RACCOON POINT	ICP	RACCOON	60	4	B2
SA079	ICP	SALEM	167		T2
SA109	ICP	SALEM	200		T2
SALISBURY	ICP	DELAWARE		2	B2
SHADOW LAKE	OCP	MULLICA	66		B2
WA522	RV	POHATCONG	67		T1
WA613	RV	DELAWARE	77		B2

Source: Table 1, Pagoulatos 1998; BU135, Pagoulatos 2000; CM25 & CM28, Mounier 1997; OC4 & OC60, Stanzeski 1996.

**Editors Note: Corresponding CV was not computed for certain sites due to stratigraphic mixing of artifact assemblages associated with specific Middle Woodland components.*

A modified scheme of land use has been developed, further subdividing foraging and collecting settlement systems into Foraging I/II and Collector I/II settlement systems (Pagoulatos 1998). This four-level logistical model bridges the gap between highly mobile foragers and sedentary collectors, along a Forager-Collector continuum. Foraging settlement systems are composed of Foraging I and II strategies. *Foraging II* settlement systems represent frequent residential shifts by individual family units to specific resource zones; this type of mobility pattern would only generate T2 loci. *Foraging I* systems are better characterized by residential shifts by microbands (extended family) across different resource zones, producing both B2 and T2 sites. Collectors are also subdivided into Collecting I and II strategies. *Collecting II* settlement systems represent microband groups characterized by greater residential stability, with the movement of specific task-groups, or domestic units away from B2 camps and establishing T1 encampments on a seasonal basis. *Collector I* land use represents highly stable groups, with fewer residential shifts, yielding mostly B1 and T1 site types, although T2 sites would still be present. In this settlement system, macrobands (multiple families) establish semi-permanent bases, from which family or task groups venture to seasonally used temporary encampments (T1) sites. Although Collecting settlement systems produce new site types such as B1 and T1 loci, B2 and T2 loci would still be present.

ANALYSIS AND INTERPRETATION

Middle Woodland sites were analyzed in terms of environmental location and cultural diversity, using simple quantitative measures such as frequencies and percentages to compare these data. The total sample size was 77 site locations (Table 1). The presentation in this section begins with a definition and description of specific occupation types. Occupation types were then assessed in relation to each physiographic province, specific drainage systems, and particular microenvironments, when possible. Subsequently, a comparison of occupation types and land use models is made, on a regional basis. Finally, the transition from the Middle to Late Woodland periods is discussed, concerning presumed shifts in settlement patterns and corresponding subsistence practices.

Settlements and Occupation Types

Activity variability as expressed by the CV was used in part for the definition of occupation types. This measure was used in conjunction with other characteristics such as occupation size, location, feature types, and preserved subsistence remains, to define occupation types. Four major occupation types were defined: Base 1, Base 2, Target 1 and Target 2 (Table 2). Each site category is described in greater detail below.

TABLE 2: SITE TYPES AND PHYSIOGRAPHIC PROVINCES

Site Type	RV	HIGH	PL	ICP	OCP
B1	0	0	0	1	0
B2	2	1	1	8	5
T1	1	0	0	10	1
T2	2	3	2	27	13

As a whole, the CV ranges from 60 to 200, with a general mean of 131 (Table 1; Figure 2); the FDI ranges from 0 to 5, with a mean of 0.88 (Figure 3). The vast majority of Middle Woodland sites (N=59, 77%) produce low density artifact assemblages, exhibit a limited range of artifact classes, typically contain few cultural features, and broadly correspond to T2 and T1 site locations. These limited activity loci usually have a CV which ranges from 80 to 200, and infrequently contain cultural features (Figure 3). By

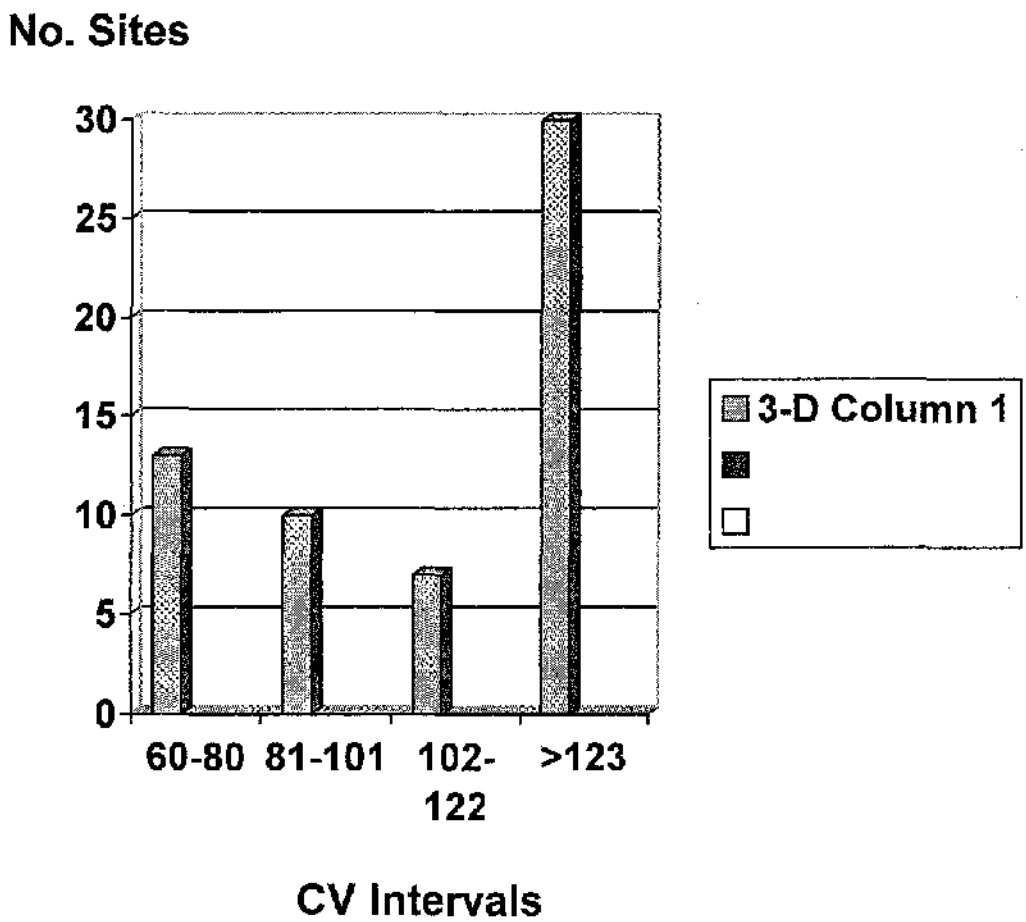

Figure 2. Middle Woodland sites and CV.

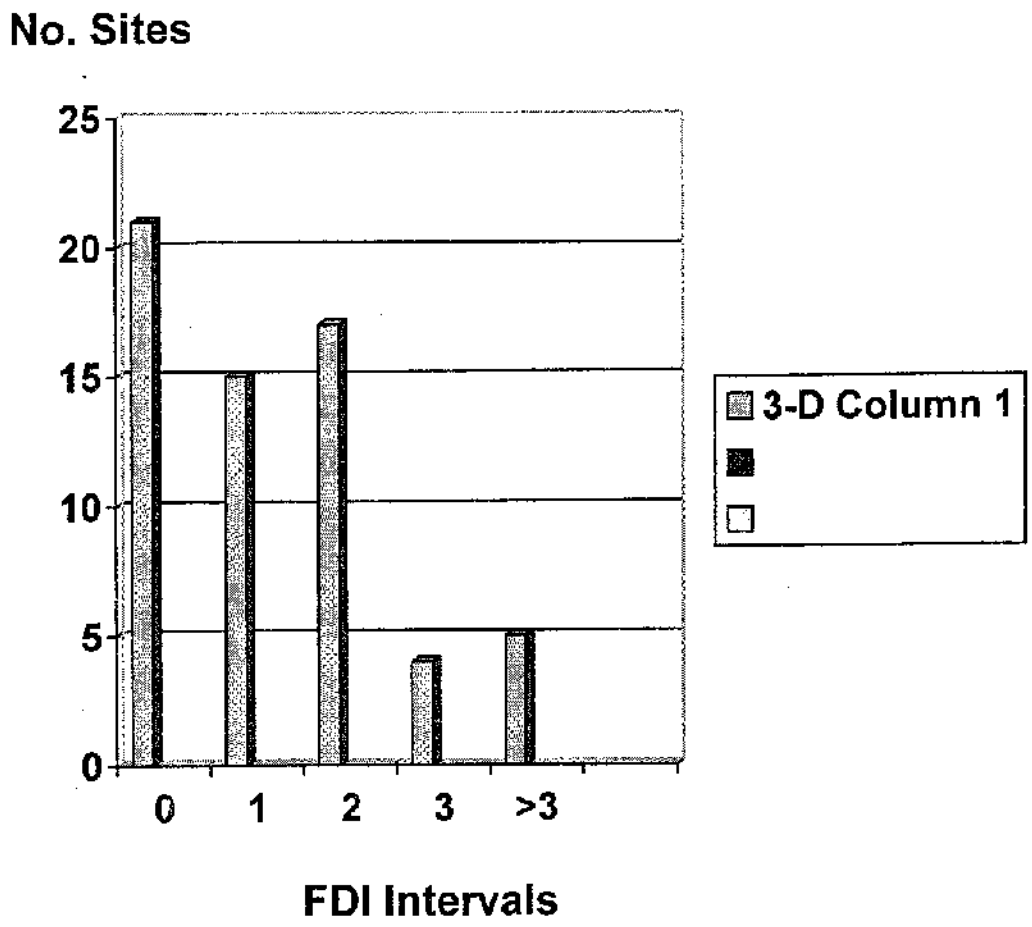

Figure 3. Middle Woodland sites and FDI.

contrast, B1 and B2 site locations have a higher density and wider diversity of artifacts and features, with a CV generally ranging from 60 to 80 (Figure 2), and usually contain two or more different features types (Figure 3). These occupation types are described in greater detail below.

Base Locations

The single B1 (N=1) site location (ME1) has a CV of 76 and a FDI of 5.00 (Tables 1-2, Figures 4-5). Site ME1 (Abbott Farm) is located within the Abbott Farm National Landmark, in close proximity to Watson's Creek and the Delaware River of the Inner Coastal Plain region; no other B1 site locations have been identified elsewhere across the state. For the purposes of this study, ME1 incorporates terrace and lowland excavations completed by Volk (1911) and Cross (1956). Site ME01 is found in a rich environmental setting close to riverine and upland resource zones, yielding a thick depositional record, containing hearths, storage pits, caches, numerous human burials, and presumed post molds; recovered subsistence remains include anadromous fish, freshwater shellfish, migratory waterfowl, terrestrial mammals and mast forest nut resources, which may imply different seasonal reuses or that at least a portion of the population resided year-round in the Abbott Farm area (Volk 1911; Cross 1956; Parris 1980; Williams *et al.* 1981; Wall *et al.* 1996).

B2 (N=17, 22%) locations yield a mean CV of 74 and a FDI of 2.29 (Tables 1-2, Figures 4-5). B2 sites are widely distributed across the Delaware and its major tributaries, streams that flow into the Atlantic Ocean and the Delaware Bay. B2 loci such as BU135, 231, 273, 274, GL171, Harry's Farm,

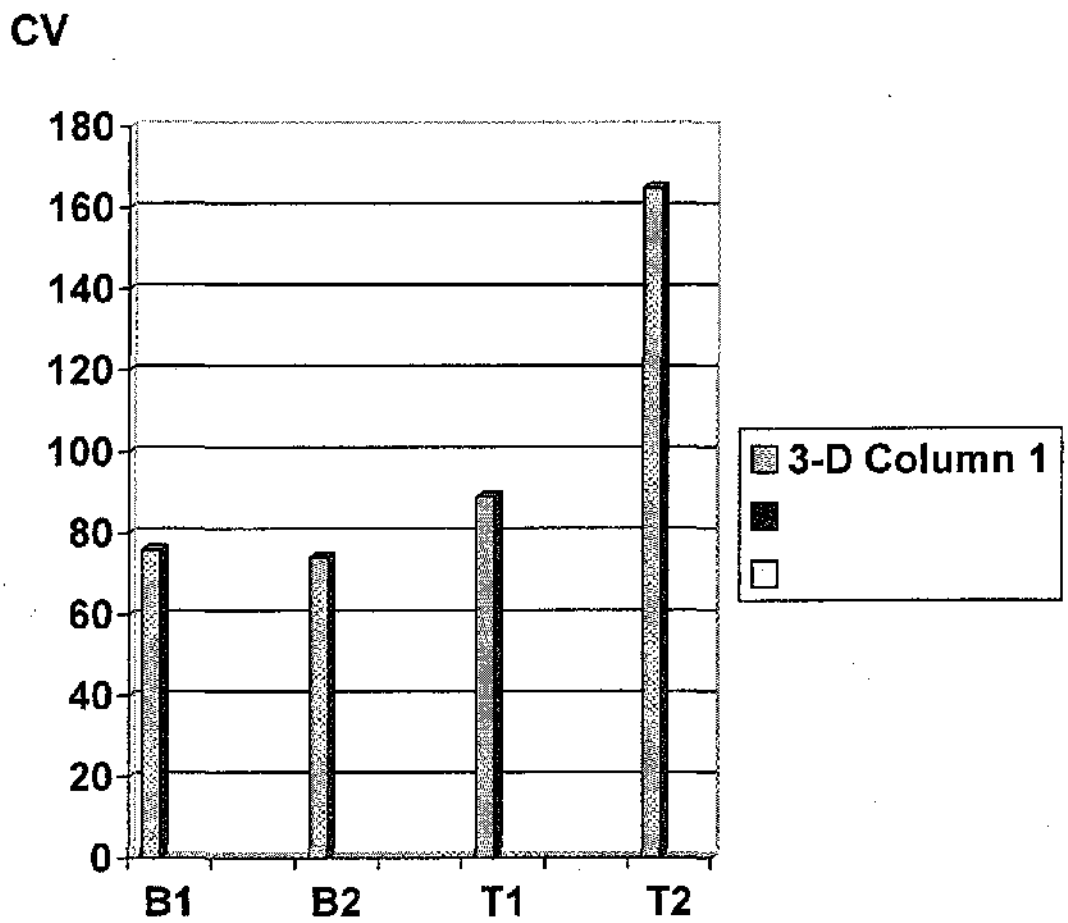

Figure 4. Middle Woodland occupation types and CV.

Lerro Farm, OC, 060, 080, Raccoon Point, and Salisbury yield lithic workshops, pits, hearths, as well as occasional storage pits and human burials, reflecting repeated seasonal re-uses.

Target Locations

Target loci as a whole, are situated in a very wide range of microenvironments, with special emphasis on interior riverine drainages and upland zones away from the Delaware River. T1 location (N=12, 16%) have a CV of 89 and a FDI of 1.25 (Tables 1-2, Figures 4-5). T1 sites such BU343, 348, GL111,238, ME1-B, I, 37, and 100G are found is a variety of floodplain and terrace bluff settings, near tidal marshes close to the Delaware River, as well as interior drainage systems away from the Delaware River; these sites tend to produce rather varied lithic and clay pottery assemblages, associated with pits and hearths. T2 (N=47, 61%) locations have a mean CV of 165 and a FDI of 0.55 (Tables 1-2, Figures 4-5). T2 sites typically yield a very narrow range of tool types and features are rare, indicative of very specialized mammal, fish, wild plant procurement and shellfish harvesting loci; T2 sites typically represent occupations of short duration and limited re-use.

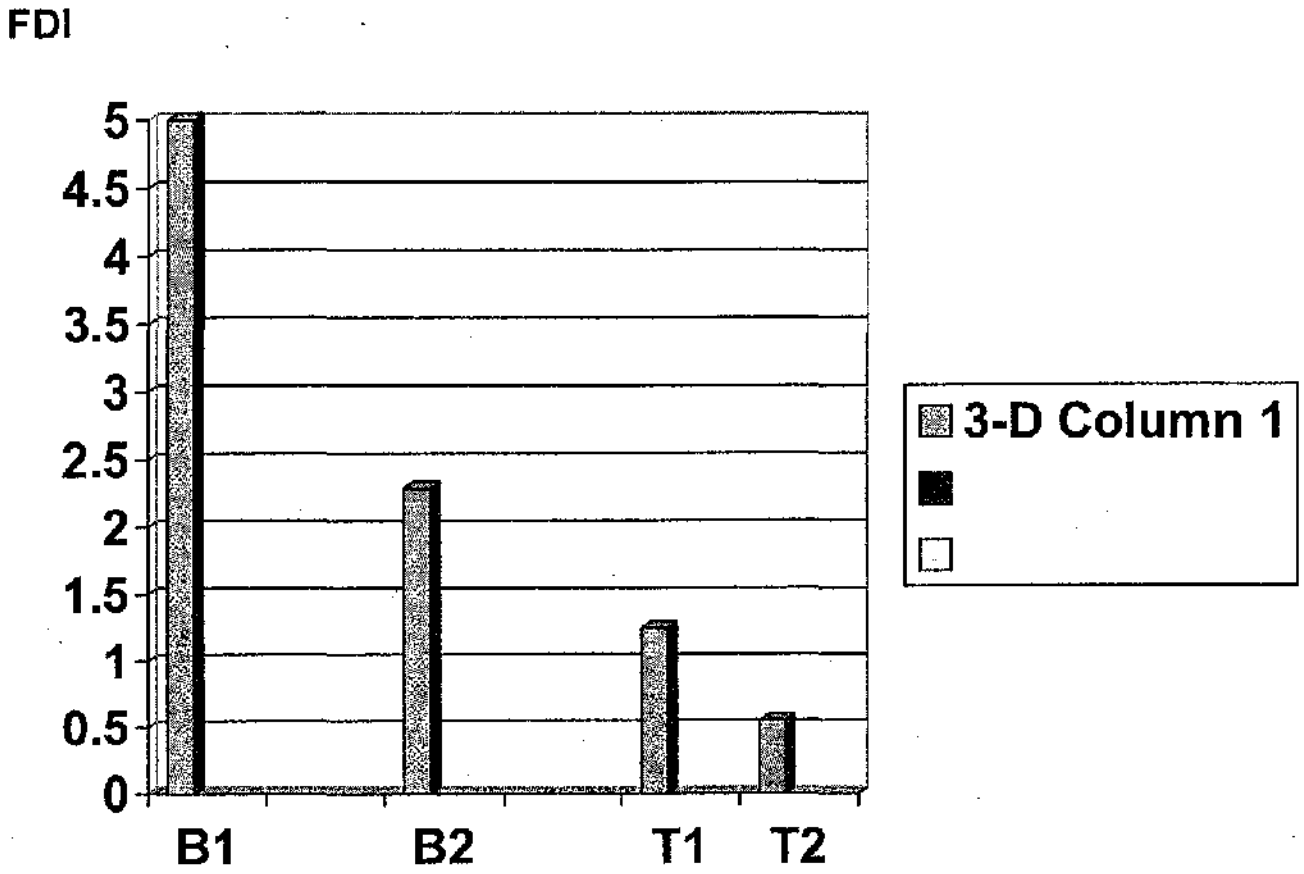

Figure 5. Middle Woodland occupation types and FDI.

Occupation Types and Physiographic Provinces

Ridge and Valley

Although regional important multicomponent sites such as Miller Field, Harry's Farm and Pahaquarra have been found in this region, they primarily represent late prehistoric occupations, attributed to the Late Woodland period (Kraft 1986). These specific sites were not subjected to the CV (to determine Middle Woodland site definitions) because subsequent Late Woodland occupancy had severely compromised Middle Woodland stratigraphy. However, on the basis of recovered artifacts and features, the Middle Woodland component from at least Harry's Farm most likely represents a microband, or B2 site location (Pagoulatos 1998). Harry's Farm is situated adjacent to the Delaware River, yielding a rather wide diversity of artifact classes such as bifaces, netsinkers, scrapers, and flake tools, as well as Abbott Horizontal Dentate, net-impressed, and cord-marked pottery; also numerous pits and hearths have been identified, one of which is a large platform hearth containing FCR, which has been radiocarbon dated to A.D. 290 (Kraft 1975). By contrast, several Middle Woodland sites have been reported by Staats (1989) from the Musconetcong and Pequest drainage systems in this region; these loci appear to reflect T2 hunting encampments, producing Fox Creek points, knives and FCR.

Only three Middle Woodland sites have been subjected to statistical analyses within the upper Delaware Valley (Table 1). Sites are classified as Base (40%) and Target (60%) locations (Table 2). Site WA613 is located on the Delaware River and has yielded a CV of 77, but no features are noted. Site

WA613 has been classified as a B2 location, where multiple family units performed a variety of extractive and maintenance tasks (Pagoulatos 1998). Site WA522 represents a T1 location (CV=67); however, features have not been reported from this site. Site WA522 is situated on Pohatcong Creek, a feeder tributary of the Delaware, and has produced a variety of chipped stone tools and pottery, reflecting a rather wide range of tasks (Pagoulatos 1998). Miller Field and Edmunds Rockshelter (CV=95) both appear to represent T2 loci. The former is located on the Delaware River and contains a minor Middle Woodland component characterized by Fox Creek bifaces and net-impressed pottery, which is overlain by complex Late Woodland deposition (Kraft 1972); the latter is a rockshelter overlooking the Musconetcong River, yielding an argillite-bearing assemblage of Fox Creek bifaces, knives, drills, scrapers, knives, bola stones, cord-marked clay pottery, and preserved white-tailed deer bone (Hotchkin and Staats 1983).

Settlement pattern data in this region appears to be generally characterized by B2 and T2 loci. B2 sites are situated on the Delaware; more specialized target locations are primarily situated across a variety of tributary systems away from the Delaware. Seasonal land use could be indicated by the presence of bases on the Delaware River, with groups traveling to interior tributary systems, where they established T2 encampments; this pattern reflects a relatively high degree of residential mobility most typical of *foragers I.*

Highlands

Only four Middle Woodland sites are contained within the Highlands region (Table 1). Sites are classified as Base (25%) and Target (75%) locations (Table 2). Clove Rockshelter overlooks the Passaic, has a CV of 68, and contains a variety of tool forms, pottery and hearth features; this site most likely represents a B2 site (Pagoulatos 1998). By contrast, Joanna, MR233, and MR241 most resemble T2 loci, with a mean CV of 144 and a 1.67 FDI. MR233 is situated along Drake's Brook, a small feeder tributary of the Raritan; this site has a chert Jack's Reef-like point, argillite knives and clay pottery, preserved nut hull fragments, as well as pit and hearth features (Pagoulatos 1990). Joanna is located on a small stream which feeds into the Raritan; this site has yielded five discrete argillite-bearing loci, representing workshops and activity areas, consisting of Fox Creek lanceolate-shaped bifaces, waste flakes, hammerstones, and hearths (Petrosky 1988). Site MR241 is located on Budd Lake in the Musconetcong drainage; this site has yielded an argillite assemblage consisting of numerous Fox Creek stemmed and lanceolate biface forms, as well as pit and hearth features (Pagoulatos 1996). Limited Middle Woodland settlement pattern data from the Highlands region has produced B2 and T2 loci, reflecting rather high residential mobility, most typical of *foraging I.*

Piedmont Lowlands

A total of three Middle Woodland sites are present within the Piedmont Lowlands (Table 1). Sites are classified as Base (33%) and Target (67%) locations (Table 2). All three sites are found in the Raritan drainage system. Site HU502 has a CV of 84 and has yielded points, chipped and ground stone tools, as well as pottery, and hearths; this site most likely represents a B2 site. Sites HU474 and HU529 have a mean CV of 149; no features have been reported from these more limited activity loci. Settlement pattern data in this region is characterized by B2 and T2 loci, reflecting a relatively high degree of residential mobility most typical of *foragers I.*

Outer Coastal Plain

A total of 19 Middle Woodland sites are present within the Outer Coastal Plain region (Table 1). Sites are classified as Base (26%) and Target (74%) locations (Table 2). The former consist of only B2 locations; the latter, consist of T1and T2 locations. B2 locations (N=5) locations have a mean CV of 76 and 2.60 FDI. The single T1 locus (GL170) yields a CV of 87 and a 2.0 FDI; T2 (N=13) loci have a mean CV of 172 and a 0.69 FDI.

B2 loci are found across a variety of coastal riverine settings. For example, Site GL171 is situated on a bluff terrace overlooking Little Ease Run, a feeder tributary of the Maurice River; this base has produced lithic workshops, refuse pits and hearths in association with Fox Creek and Jack's Reef points and clay pottery (Mounier 1992). Site OC060 is located in the Great Sound region, containing a Fox Creek component consisting of a wide diversity of chipped and ground stone tools, clay pottery, numerous pits, hearths, caches, and human burials. Preserved subsistence remains from OC060 consist of oyster, clam, and whelk, fish, turtle, snake, duck, geese, beaver, muskrat, black bear, and white-tailed deer; collected organic samples of clamshell and charcoal have been radiocarbon dated to A.D. 140 and A.D. 420, respectively (Stanzeski 1996). Site OC080 is found along Little Egg Harbor, and has yielded a rather wide lithic and pottery assemblage associated with pits, hearths and caches (Stanzeski, personal communication 1996).

By contrast, targets are found in a variety of settings such as bays, coves, and tributaries, in salt, brackish and freshwater resource zones. Target sites contain a more limited range of artifact assemblages, with occasional features, indicative of more specialized extractive tasks. However, T2 loci show evidence for specialized uses. For example, sites such as CM25, CM28, CM32, and OC04 represent shell midden stations. Sites CM25 and CM28 border tidal marshes within the Deep Creek peninsula of Great Sound. Site CM25 contains Fox Creek bifaces, cord-marked pottery, scattered FCR, pit features, oyster shell deposits, and preserved nut hull fragments; this site has been radiocarbon dated to A.D. 240. Site CM28 is a sheet midden of oyster shell, associated with chipped stone tools, clay pottery, and pit features, radiocarbon dated to A.D. 350 (Mounier 1997). Sites CM32 is situated along Little Egg Harbor, yielding Fox Creek and Jack's Reef-like biface forms, sheet midden of clam and oyster, hearths, pits, and several distinct cultural loci where task groups processed shell fish, mammal and other aquatic-related resources; this site has been radiocarbon dated to A.D. 550 (Pagoulatos 1992b). Site OC04 (Tuckerton Mound) borders a tidal estuary near Little Egg Harbor; this shell midden measures 80 feet by 50 feet, and is nine feet high. Site OC04 contains large quantities of clam, with lesser amounts of oyster, whelk, and scallop, as well as turtle, bird, white-tailed deer, and other small mammals; this shell midden has been radiocarbon dated to A.D. 420 (Cross 1941; Stanzeski 1996). Although few stone tools have been identified from OC04, several probable shell tools have been reported (Stanzeski 1981). Sites such as AT 051, 052, 062, 063, 071 and 074 represent even more specialized loci, producing low diffuse scatters of tools and pottery, perhaps representing specialized plant processing loci (Pagoulatos 1998). For the most part, Middle Woodland settlement pattern data from the Outer Coastal Plain region has produced B2 and T2 loci, reflecting high residential mobility, most typical of *foraging I*.

Inner Coastal Plain

A total of 46 Middle Woodland sites are present within the Inner Coastal Plain (Table 1). Sites are classified as Base (20%) and Target (80%) locations (Table 2). The former consist of B1 and B2 locations. Only one B1 site location has been identified in this study, designated as ME1, with a CV of 75 and a FDI of 5.00. Site ME1 borders extensive tidal marshes, situated at the confluence of the Delaware and Watson's Creek, juxtaposed at contrasting boundaries of lowland and upland resource zones. The well-documented Abbott Farm Site (ME01) is a large multicomponent occupation with thick argillite-bearing Fox Creek depositions, associated with Abbott-zoned decorated pottery, hearths, storage, cache and refuse pits, as well as numerous human burials, with the most intensive re-uses taking place during the Middle Woodland period, between A.D. 300 and A.D. 800 (Cross 1956; Williams and Thomas 1982; Wall *et al* 1996). In particular, the lowland portion of the site, designated as Excavation 14, has yielded a high number of notched netsinkers, argillite Fox Creek knives and Petalas blades, many of which were found in caches, occasional harpoons, as well as preserved sturgeon dorsal and lateral scutes (bony plates) from refuse pits (Cross 1956:120,193). Fox Creek knives and Petalas blades may have served as fish-scaling and butchering tools, as these implements have been found in direct association with sturgeon remains on certain nearby Hudson River Valley sites (Funk 1976:295). Perhaps these data from the Abbott Farm

indicate that the procurement and processing of anadromous fish was an important seasonal activity here (Cross 1956; Cavallo 1984; Stewart 1999).

B2 (N=8) locations have a mean CV of 96 and 2.63 FDI (Table 1). B2 sites tend to be found on the major tributary systems of the Delaware such as the Rancocas, Raccoon, Pennsauken, Oldman's, Watson's and Timber Creeks. These sites yield a rather wide range of artifacts reflecting tool making, plant processing, woodworking, and a heavy emphasis on mammal processing tasks; recovered cultural features consist of activity areas, refuse pits, fire-cracked rock hearths, caches, as well as occasional storage pits and human burials. The diversity of artifact classes and features reflects repeated seasonal re-uses. For example, Lerro Farm is situated on Oldman's Creek, a feeder tributary of the Delaware; this site yields a wide variety of chipped and ground stone tools, clay pottery, as well as pits, hearths, caches and a small number of human burials, radiocarbon dated to A.D. 485 (Blenk 1977). The well-documented Raccoon Point site is found on a promontory overlooking a tidal estuary of Raccoon Creek; this site has produced storage and fire pits, as well as a wide variety of mostly argillite hunting, plant processing and fishing-related implements (Kier and Calverly 1957). The Salisbury site is situated on the Delaware River, containing Jack's Reef corner-notched and pentagonal point forms, cord-wrapped stick and net-impressed pottery, as well as pits and hearths, directly associated with white-tailed deer and small mammal bones (Cross 1941). Site BU135 is located on a feeder stream of the Rancocas; this site has yielded an argillite assemblage consisting of several Fox Creek points, a rather wide variety of form tools, clay pottery, as well as pits and hearths, directly associated with charred nut hulls, seeds, small and medium-sized mammal bones (Pagoulatos 2000).

Target site locations are classified as T1 and T2 loci. T1 loci (N=10) have a mean CV of 93 and a FDI of 1.30; T2 loci (N=27) produced a mean CV of 169 and a FDI of 0.48 (Table 1). Target locations are distributed across a variety of tributary systems such as the Crosswicks Creek and Watson's Creek, near the Delaware River, in the vicinity of the Abbott Farm National Landmark (Wall *et al.* 1996), as well as within interior riverine settings, on the Rancocas, Woodbury, Mantua, Timber, Assunpink and Raritan, away from the Delaware River. T1 sites such as ME1-B, ME1-I, ME37, and ME100G tend to yield a rather wide variety of tool forms, pottery, as well as pit features and hearths; T2 loci such as ME1-A, ME1-D, ME20, ME99, ME106, ME114 and ME119 tend to contain a more limited range of tool types and features, indicative of more specialized procurement activities. These sites are described in greater detail below.

Sites such as ME37, ME100G, ME106, ME119 are all positioned on the high terrace bluffs, overlooking tidal marshes associated with Crosswicks Creek. Site ME37 yields Fox Creek and Jack's Reef bifaces, as well as pits and hearths, associated with calcined mammal bone, and charred goosefoot, blackberry, and wild grape seeds (Dumont and McLearson 1986). Also, a variety of clay pottery types have been identified from ME37, including cord-wrapped stick, with linear incising and oval punctations, as well as interior/exterior cord-marked sherds, which are assigned to Ware types III and IA, respectively; these pottery styles typically date between A.D. 200 and A.D. 800 (Stewart 1998). Site ME100G contains Jack's Reef points, pits, soil stains and hearths, directly associated with nut hulls and calcined mammal bone, with radiocarbon dates of A.D. 470, A.D. 830 and A.D. 900 (Stewart 1987). Recovered pottery from ME100G includes I and III Ware types, as well as interior/exterior smoothed pottery, with cord-wrapped stick, which most resembles Ware XII types, which have been radiocarbon dated between A.D. 590 and A.D. 730 (Stewart 1998). Site ME106 yields Fox Creek and Jack's Reef biface forms, as well as pits and hearths, one of which, produced a radiocarbon date of A.D. 480; preserved organic remains consist of nut hulls, calcined mammal bone, and charred goosefoot, pokeweed, blackberry, and smartweed (Foss 1986). Ceramic wares from ME106 include types I and XIIIc (Abbott-zoned dentate), which generally date between the Middle and Late Woodland periods (Stewart 1998). Site ME119 contains Fox Creek bifaces, calcined mammal bone and charred seeds, associated with large FCR hearths, which may represent

roasting platforms, or food-smoking facilities (McLearson and Fokken 1986). Recovered pottery from ME106 consists of Wares I and XII (Stewart 1998).

Sites ME1-A and ME1-I are also located on terraces adjacent to tidal marshes, but the former is situated near the Delaware River, while the latter is found at the confluence of Crosswicks Creek and Watson's Creek. Site ME1-I contains Fox Creek stemmed and Jack's Reef pentagonal-like biface forms, pits, hearths, preserved nut hulls, calcined mammal bone, as well as charred bayberry and blackberry seeds; a radiocarbon date of A.D. 730 has been produced, directly associated with a Fox Creek biface (Perazio 1986). Recovered pottery from ME1-I includes XIII (exterior/interior smoothed, rectilinear and punctated designs) Wares, which typically date to the late Middle Woodland and Late Woodland periods (Stewart 1998). Site ME1-A yields Fox Creek stemmed and Jack's Reef corner-notched biface forms, hearths, as well as nut hulls and calcined bone of small to medium-sized mammals (Stewart 1986a). Identified ceramics from ME1-A consist of 1B (cord-wrapped paddle), XII and XIII; 1B dates between A.D. 200 to A.D. 800 (Stewart 1998).

Sites ME1-B and ME1-D are situated within floodplain settings, adjacent to tidal wetlands associated with Watson's Creek; Site ME114 is located on a low rise, overlooking floodplains associated with the Delaware River. Site ME1-B yields Fox Creek and Jack's Reef-like pentagonal bifaces, FCR hearth (ovens) and soil stains, which have produced radiocarbon dates of A.D. 90 and A.D. 960 (Cavallo 1987); recovered ceramics consist of IA and XII Ware types (Stewart 1998). Site ME1-D contains Fox Creek points, charred nuts, pits, and hearths, which have produced radiocarbon dates ranging from A.D. 20 to A.D. 730 (Wall, Stewart, Cavallo & Busby 1996). Ceramic types from ME1-D primarily consist of 1B, 1C (net-impressed), 1D (incised, with interior/exterior smoothed), XIII, and XIX (exterior/interior cord-wrapped paddle) Wares; 1C and 1D generally date from A.D. 300 to A.D. 800, while XIX dates from A.D. 200 to A.D. 800 (Stewart 1998). Site ME114 has clusters of tool loci, Ware I ceramics, and cultural features, which have produced radiocarbon dates of A.D. 430, A.D. 540, and A.D. 680 (Wall and Stewart 1996).

By contrast, Sites ME20 and ME99 have produced less varied artifact assemblages, when compared to the above-mentioned Abbott Farm National Landmark sites; both sites are located in low relief settings, along a branch of Shady Brook, which feeds into the Delaware River. Site ME20 has yielded Jack's Reef pentagonal and corner-notched points, hearths, pits, and preserved hickory, walnut, and mammal bone, as well as ceramic Ware types 1A, XII and XIII; this site has yielded radiocarbon dates of A.D. 160 and A.D. 350 (Stewart 1986b). Site ME99 has produced a Jack's Reef-like pentagonal point, charred seeds, and a hearth (Stewart 1986b).

Current data may indicate that at least on a seasonal basis, the Delaware River may have been a primary focus of settlement. Abbot Farm (ME1) most resembles a B1 site location, which appears to have attracted larger population aggregates to exploit anadromous fish during spawning runs in the spring and perhaps fall; this short-term, but intense seasonal activity would have most likely required group-oriented activity (beyond the extended family unit) to set up and maintain nets, fish weirs, as well as to harvest and process fish prior to spoiling (Cavallo 1984; Stewart 1999). After these intensified labor and coordinating efforts, fish resources were probably stored and/or redistributed among extended families and individual domestic units. The B2 loci along various feeder streams of the Delaware most likely represent the dispersal of extended family units to the interior to hunt and gather wild plant foods after the spawning runs; T1 and T2 encampments probably served as short-term forays away from bases. This site typology reflects a relatively stable population, most typical of a *collector I* settlement strategy.

Settlement and Subsistence Patterns

The spatial distribution of identified Middle Woodland occupation types implies a complex series of seasonal movements. For example, a variety of B1, B2, T1 and T2 occupation types have been detected in the Inner Coastal Plain; this site distribution most resembles a *Collecting I* pattern. At least on a seasonal basis, Middle Woodland populations in the lower/middle Delaware River Valley exhibited a rather high degree of residential stability, during which they performed a variety of extractive and maintenance activities in lowland and adjacent terrace bluff zones; in particular, during the spring and possibly early fall seasons, large groups may have aggregated to exploit anadromous fish spawning runs from the Delaware River and its nearby tidal estuaries. Additionally, multiple family groups and smaller task groups may have ventured away from B1 sites (such as Abbott Farm) and establish B2 and T1 encampments along interior riverine feeder streams; from these encampments, specialized task groups, or individual domestic units, may have made forays to even more specialized T2 loci to extract specific resources. By contrast, the Ridge and Valley, Piedmont Lowlands, Highland and Outer Coastal Plain physiographic provinces predominately contain B2 and T2 occupation types, broadly corresponding to a *Foraging I* pattern.

These data may indicate that mobility patterns and group movements may have been dependent upon seasonally available wild plant, nut, mammal and aquatic-related resources. While a variety of preserved subsistence remains have been discovered in association with Middle Woodland sites, these organic remains must be integrated with other types of data such as resource zone location, occupation type, feature recovery, and associated artifact classes, to discern site seasonality and settlement patterns.

On the basis of excavations by Volk (1911) and Cross (1956) and more recent archaeological interpretations by Cavallo (1984), it is believed that Middle Woodland populations within the lower/middle Delaware Valley concentrated their efforts upon the exploitation of anadromous fish (Cross 1956; Parris 1980). Historically, anadromous fish such as alewives, shad and sturgeon are known to have traveled by the millions from the Atlantic Ocean and into freshwater drainage systems such as the Delaware River to spawn, from mid-March to late May; for example, as recently as the late nineteenth century, any many as 20 million shad (Miller and Friedersdorff 1975) and 2150 metric tons of sturgeon (Rostlund 1952) were caught by fisherman each year from the Delaware River, before industrial activity and sewage heavily polluted these waters (Kraft 2001:213).

For example, Atlantic sturgeon, the largest anadromous fish, is known to prefer to spawn in shallow, clay-bottomed freshwater areas such as those present in the freshwater tidal estuaries of the lower/middle Delaware River Valley; during the seventeenth century, sturgeon were taken by spears, harpoons, bows and arrows, and nets (Kraft 2001:213). Also, as a result of a geological fault at the fall line of the Delaware River in the Abbott Farm region, the river changes abruptly from a deep, tidal stream to one that is relatively shallow, north of present-day Trenton. This natural phenomenon would have forced spawning anadromous fish (such as sturgeon and shad) to slow down and congregate, awaiting the opportunity to advance further upstream, allowing prehistoric populations to easily gather large surpluses of spawning fish during their seasonal run upstream (Kraft 2001). The presence of large quantities of Fox Creek knives and Petalas blades, netsinkers, and large platform hearths, filled with FCR, as well as reported Sturgeon remains from Site ME1 may attest to this economic activity during Middle Woodland times (Cross 1956; Parris 1980; Williams *et al.* 1981; Cavallo 1984). For example, Fox Creek knives and Petalas blades are believed to have been employed for deboning anadromous fish such as Atlantic sturgeon and American shad; the presence of numerously reported platform hearths from ME1 and surrounding sites may have served for cooking and smoking anadromous fish resources (Cavallo 1984).

In addition to the recovery of anadromous fish such as sturgeon, freshwater shellfish (clam, oyster), and charred nut hulls (butternut), a wide variety of fauna were also identified from Site ME1, indicating the exploitation of both riparian and flood basin ecosystems (Cross 1956; Williams *et al.* 1981). However,

the primary recovered fauna consisted of white-tailed deer, and lesser amounts of elk, bear, turkey, raccoon, swan, and goose (Williams *et al.* 1981). While sturgeon would have been seasonally available between spring and early fall, migratory waterfowl such as swan and goose would generally have been present in fall and winter. Recovered antler from male deer could suggest killings during various seasons. These data may imply that Site ME1 was seasonally reused, or that it represents longer duration residential stability (Williams *et al.* 1981:150-154).

Beyond the lowland estuaries of the Abbott Farm site (ME1), numerous T1 and T2 loci are present in floodplain and adjacent terrace bluffs, along Crosswicks and Watson's Creeks, near the Delaware River; these zones appear to have been seasonally exploited by task groups away from lowland bases. Target locations such as ME1-A, ME1-B, ME1-I, ME20, ME37, ME99, ME100G, ME106, ME119 tend to yield plant processing and hunting equipment, generally associated with charred seeds (blackberry, goosefoot, bayberry, pokeweed, wild grape), nuts (hickory, acorn, walnut), and mammal bone (small to medium-sized mammal), reflecting late summer and fall occupancy. Additionally, sites such as ME1-B and ME119 produced large FCR ovens, perhaps implying the processing of fish resources; aquatic-related (fish) exploitation most likely took place in the fall and/or spring (Wall *et al.* 1996).

B2 site locations such as BU135, 231 (Rancocas), BU273, 274 (Pennsauken), Lerro Farm (Oldmans), and GL139 (Timber), and Raccoon Point (Raccoon) are all situated along interior riverine tributaries within the Inner Coastal Plain. These sites yield caches of blades, drills, scrapers, netsinkers, as well as numerous mortars and pestles, indicative of mammal, nut and aquatic-related resource procurement; recovered calcined bone mammal bone and nut hulls from BU135 imply at least fall season occupancy (Pagoulatos 2000).

In the upper portions of the Delaware Valley, B2 site locations such as Harry's Farm is situated in close proximity to the Delaware River; this site contains hunting implements, mortars, pestles, blades, and netsinkers, and large platform hearths, indicating mammal, mast forest and possibly fishing activities (Kraft 1975). By contrast, interior upper Delaware Valley (upland) zones in the Ridge and Valley and Highland regions typically contain T2 site locations such as Edmunds Rockshelter, Joanna, MR233 and MR241. For example, Edmunds Rockshelter yields points, drills, scrapers, bola stones, and calcined white-tailed deer bone, implying the exploitation of large mammals and birds (Hotchkin and Staats 1983); MR233 produces points, scrapers and preserved nut hull fragments, reflecting the procurement of mammal and mast forest resources (Pagoulatos 1990). Sites such as Joanna (Petrosky 1988) and MR241 (Pagoulatos 1996) have produced predominately Fox Creek bifaces, knives, and scrapers, indicating the hunting-related tasks, taking place at these sites. Perhaps these upland zone encampments represent cold (late fall/winter) season hunting loci.

As a whole, Middle Woodland loci in the Outer Coastal Plain represent T2 and B2 site locations. Although the majority of these sites represent shellfish (midden) collecting stations, mammal and aquatic-related resources were also exploited. For example, B2 site locations such as OC60 yield a wide variety of Fox Creek artifacts and features, in association with shellfish such as oyster, clam, whelk, fish, turtle, snake, migratory waterfowl such as duck and geese, as well as mammals, including white-tailed deer, beaver, muskrat, and black bear (Stanzeski 1996). By contrast, more specialized shellfish stations such as CM25, 28 (Mounier 1997), CM32 (Pagoulatos 1992b), and OC04 (Cross 1941, Stanzeski 1996) primarily contain oyster and clam, with lesser amounts of fish and mammal bone. In all likelihood, Middle Woodland uses of the Outer Coastal Plain would have been in the warmer (summer) months (Pagoulatos 1998).

Land Use Models

Available subsistence and settlement data indicate that Middle Woodland populations exhibited a complex series of seasonal movements in two primary resource zones: riverine and coastal. These seasonal movements are described in greater detail below.

The interior riverine zone of the Inner Coastal Plain was most likely the focal point of spring season anadromous fish procurement. With the end of the last winter frosts in the early spring, large population aggregates coalesced along the Delaware River and its associated freshwater tidal estuaries, such as those of the Abbott Farm area, to exploit the annual anadromous fish spawning runs. Multiple extended family group aggregated into B1 loci (such as the Abbott Farm site) along the fall lines (near the Trenton area) to concentrate on anadromous fish runs; B2, T1 and T2 camps were probably established away from the Delaware River, where task groups collected wild plant foods and hunted mammal resources, on a seasonal basis. While certain groups may have remained in this zone for extended periods of time, and perhaps exhibited a degree of residential stability, resembling a *collecting I* strategy, other groups may have seasonally dispersed into other resource zones.

With the passing of the annual (spring) spawning runs, smaller social groupings may have dispersed from the interior riverine zone and traveled to the coastal zone (Outer Coastal Plain) to exploit a variety of terrestrial, fauna, migratory waterfowl, and especially aquatic-related resources such as shellfish, fish and marine mammals during the warmer (summer) months, from extensive tidal marshes, associated with bays, coves, and tributaries. Groups would establish bases (B2) and specialized processing site loci (T2) to harvest shellfish and maritime-related resources, near the coast. This pattern of settlement would be typified of high residential mobility reflecting a *foraging I* strategy.

During the autumn and winter months, family groups left the coast and penetrated interior feeder streams of the Delaware Valley (Inner Coastal Plain, Piedmont Lowlands, Ridge and Valley) and associated uplands (Highlands) to collect wild plant foods, mast forest nut resources and hunt. Family groups would establish bases (B2) along streams, but would disperse into smaller task groups (T2 loci) and travel to specific resource patches, from which they would harvest plant and nut foods in the fall, as well as stalk white-tailed deer and other mammal resources, especially during the colder (winter) months. This settlement pattern would be most typical of a *foraging I* strategy.

Middle/Late Woodland Transition

Between A.D. 700 and A.D. 900, there were apparent changes in settlement patterns, diagnostic artifacts, and possibly subsistence practices in the Delaware River Valley. Chronologically diagnostic artifacts such as Levanna triangle points appear for the first time, implying the introduction of the bow and arrow by at least the Late Woodland period (Kraft 2001). Although the introduction of maize has been identified in the upper Delaware Valley by A.D. 1000 at sites such as Miller Field (Kraft 1972) and Harry's Farm (Kraft 1975), it does not appear to have been a major food source until about A.D. 1300 (Kraft 1986, 2001). Stewart (1990) suggests that the transition to settled village life and maize domestication was a gradual process, which may have required two or three centuries until late prehistoric populations were cultivating maize and residing in hamlets or small villages by A.D. 1200/1300 (Stewart, Hummer and Custer 1986). Stewart (1990:231) has detected a settlement shift between the late Middle Woodland and early Late Woodland periods (A.D. 700/900) from freshwater tidal marshes to broad floodplain settings; perhaps this reflects a subsistence shift from an emphasis on anadromous fish procurement to floodplain horticulture. Stewart (1990) has noted that this pattern of subsistence focus is apparent at sites within the Abbott Farm complex, as Middle Woodland sites in the lowlands appear to have been intensively occupied to presumably exploit anadromous fish runs, but were less intensively occupied during the Late Woodland period. Historically, aboriginal fishing was a seasonal procurement system, which was apparently secondary to floodplain horticulture by the seventeenth century (Kraft 2001).

INTERREGIONAL COMPARISONS

Paleoenvironments

A proper assessment of Middle Woodland settlement patterns in Connecticut requires an understanding of the paleo-environment of southern New England, and more specifically that of the State of Connecticut (Lavin 1988a; McWeeney 1999). Numerous pollen sequences have been reported from this region over the years (Davis 1958, 1969, 1980, 1983; Davis and Deevey 1964; Fagan 1978; Pierce and Tiffney 1986). Four major vegetational (pollen) sequences have been noted, designated as T, A, B and C (Davis 1967). For the purposes of this study, only the latter portion of the C zone will be discussed, because it corresponds to the Middle Woodland period in southern New England.

The C pollen zone dates from about 5000 B.C. to the present in southern New England (Davis 1967). This pollen zone is further subdivided as follows: C-1, C-2 and C-3. In particular, the C-2 zone dates from 2000 B.C. to A.D. 1 and the C-3 zones dates from A.D. 1 to the present; the latter portion of the C-2 zone and the early portion of the C-3 zone roughly correspond to the Middle Woodland period. While the prior C-2 zone reflects a transition from an oak-hickory to oak-chestnut biome in the region, the early portion of the C-3 zone is dominated by hemlock, elm, sugar maple, birch, chestnut, and ash, suggesting a trend toward cooler and moister climates (Davis 1958, 1967, 1969, 1983).

On the basis of ice core and dendrochronology studies, certain researchers have also noted climatic intervals of cooling in the northern hemisphere in the past, and have referred to these cooling episodes as Little Ice Ages (Deevey and Flint 1957; Wendland and Bryson 1974; Grove 1988; Dahl-Jensen *et al* 1998; McWeeney 1999; Fiedel 2001). Several global cooling episodes have been reported which correlate to the C-2 and C-3 zones, including radiocarbon dated organic materials using tree-ring data from northern Europe (1000 B.C.) and North America (A.D. 690), as well as ice core samples from Greenland (600 B.C., A.D. 1, A.D. 400). In Connecticut, cooling episodes have been detected by the Early Woodland period, as preserved fir needles have been radiocarbon dated to 730 B.C. from the Quinnipiac River, north of New Haven. Preserved fir needles may indicate cooler and moister climatic conditions in the state, at this time (Pierce and Tiffney 1986; McWeeney 1999:11).

Also, sea level appears to have stabilized in Southern England during this time, resulting in the development of open, shallow tidal estuaries; these newly emerging ecosystems may have played an important role in human adaptation, as they effectively increased food resource variety and density (Bloom and Stuiver 1963; Dincauze 1973; McBride 1984). Tidal marsh developments along the Connecticut River appear to coincide with rising sea levels, and, in particular, the stabilization of the rate of inundation sometime around 500 B.C. (Gordon 1983). Radiocarbon dated core samples from Lord Cove, Selden Creek, and Whalebone Cove have contributed toward a better understanding of tidal marsh development in the lower Connecticut River Valley. Analysis of core samples indicate the development of salt-water tidal marshes as early as 500 B.C., at the mouth of the river, the development of fresh/brackish water tidal marshes upriver, between A.D. 1- 500, and freshwater tidal systems by A.D. 1450, in the northern reaches of tidal marsh influence, some 15 to 20 miles upriver (McBride 1984:26-33).

The Middle Woodland Period of Southern New England

Various Middle Woodland regional complexes have been recognized in southern New England. Some of the better documented include the Fox Creek and Four Mile phases of New York State (Ritchie 1969a; Funk 1976). These regional expressions of the Middle Woodland period are generally characterized by Fox Creek, Greene and Jack's Reef points, Petalas blades, net-impressed, cord-marked, incised and rocker-stamped decorated ceramics, and a settlement pattern oriented toward riverine and coastal zones; Levanna points appear by the latter portion of the Four Mile Phase, by A.D. 700 (Snow 1980).

Despite several decades of archaeological research, the Middle Woodland period in Connecticut is still rather poorly understood (Rouse 1945, 1947; McBride 1984; Lavin 1984, 1988a; Cassedy 1992, 1998; Lavin and Mozzi 1996; Juli 1999). The Middle Woodland period across the State of Connecticut has traditionally been characterized by similar Fox Creek and Jack's Reef biface forms, as well as brushed, fabric-marked, and stamped motifs assigned to the Windsor Tradition (Lavin 1984; 1998). In the lower Connecticut River Valley, the Middle Woodland period broadly corresponds to the Roaring Brook Phase, which dates between A.D. 1 and A.D. 700. The Roaring Brook Phase is primarily characterized by a quartz cobble lithic industry, stemmed projectile point forms, rocker and dentate-stamped ceramics, and settlement patterns predominantly oriented toward coastal/riverine settings, with only limited, or seasonal use of upland zones (McBride 1984).

Roaring Brook Phase settlement patterns in the lower Connecticut River Valley most resemble a *collecting* strategy (Binford 1980; McBride 1984). Occupation types primarily consist of seasonal (base) camps and temporary encampments; the former are concentrated in riverine and tidal marsh zones, while the latter are mostly located in upland zones, along upland streams (McBride 1984:310). This pattern of settlement strongly contrasts from the preceding Broeder Point Phase, which is characterized by seasonal camps and task-specific sites distributed across a wider variety of ecozones; this settlement pattern is more indicative of highly mobile populations, reflecting a *foraging* pattern (McBride 1984; Pagoulatos 2002).

For example, Roaring Brook Phase seasonal camps such as 75-4, 75-16, 75-20 and 105-24 are concentrated in riverine/tidal zones, generally range from 750 to 1500 square meters, and yield a wide range of cooking, roasting, and storage features; preserved food remains such as mammals, wild plants, anadromous fish, and other aquatic-related resources imply spring, summer and fall occupancy. By contrast, temporary camps are mostly found along upstream stream locales, typically range from 50 to 100 square meters in size, and contain only cooking features; preserved food remains from these more specialized sites primarily consist of nut and mammal resources, reflecting fall seasonal uses. These data most likely indicate that population aggregates performed a variety of extractive and maintenance tasks at seasonal (base) camps in riverine zones for much of the year, while specialized task groups may have ventured out to upland zones to procure specific resources on a seasonal basis (McBride 1984:317-321).

During the Roaring Brook Phase, aboriginal populations increasingly focused upon the developing tidal marshes in riverine zones. Although there is no evidence for year-round occupation at this time, residential moves were primarily concentrated around tidal marshes, suggesting a trend toward increasing sedentism (McBride 1984:312); this pattern has also been noted in the Charles River estuary (Dincauze 1973). Apparently, there may be a correlation between the development of tidal marshes in the lower Connecticut River Valley and increased sedentism, since these enriched ecotones could have supported larger, more stable human populations for extended periods of time (McBride 1984:314; Juli 1999:144).

By A.D. 700, McBride (1984) notes changes in settlement patterns, the introduction of new chronologically diagnostic artifacts, and possibly new subsistence practices in the lower Connecticut Valley, which has been designated as the Selden Creek Phase. The Selden Creek Phase generally dates from A.D. 700 to A.D. 1500, and resembles other regional phases corresponding to the Late Woodland period in Southern New England. The Selden Creek Phase is characterized by Levanna and Madison points, as well as plain, cord-marked, fabric-impressed, brushed, stamped and incised pottery of the Windsor Tradition (McBride 1984; Lavin 1998). Also, there is the appearance of fewer but larger, more nucleated semi-sedentary villages, and a settlement shift to floodplains or terraces, immediately adjacent to major drainages; highly seasonal encampments have been detected in upland zones (McBride 1984:322-326).

Researchers have noted similar settlement shifts across the Northeastern United States by at least A.D. 1000, and attribute this change in settlement pattern to the introduction of maize domestication

(Ritchie 1969a; Dincauze 1974; Snow 1980; Lavin 1988b; Hart and Sidell 1996). In Connecticut, the domestication of maize has been reported by Juli (1994) from the Thames River drainage sometime after A.D. 1000, as well as from the Connecticut Valley from Selden Island (Feder 1999), Burnham-Shepard (Bendremer *et al.* 1991), Morgan (Lavin 1988b), and Mago Point (McBride 1984; Bellantoni and Dorr 1985) between A.D. 1100 and A.D. 1300 (See Feder 1999).

Interregional Comparison

Paleoenvironments and Changing Prehistoric Land uses

Paleo-environmental data from both the Middle Atlantic and Southern New England indicate that climate and physiography closely approximated modern conditions during the Middle Woodland period. Pollen sequences from both regions generally imply a succession from oak-hickory (warm and dry) to oak-hemlock-chestnut (cool and moist) by the early portion of the Middle Woodland period (Carbone 1976; Davis 1983; Hartzog 1983; McWeeney 1999).

Regional temperature cooling, increased moisture, coastline stabilization, and the corresponding development of tidal marshes in both the Mid-Atlantic and Southern New England regions during the Middle Woodland period would have likely led to similar changes in human land use (Snow 1980; Custer 1984; McBride 1984; Lavin 1988a; Dent 1995; Juli 1999; Kraft 2001). Current data suggest that sea levels along the Atlantic seaboard were beginning to stabilize by about 500 B.C., as the rate of sea level rise drastically declined and tidal estuaries approximated modern conditions by at least A.D. 500 (Bloom and Stuiver 1963; Gordon 1983; Kraft and John 1978; Custer 1984; McBride 1984; Berger 1994).

As mentioned previously, these newly developing tidal estuarine ecosystems likely played an important role in human adaptation, as they effectively increased food resource variety and density across the Atlantic seaboard of the Northeastern United States (Dincauze 1973; Snow 1980; McBride 1984). Settlement pattern data from the Mid-Atlantic and Southern New England regions appear to indicate a concentration and orientation around these newly emerging tidal marsh ecozones, where aboriginal populations performed a wide variety of tasks, including the predominate exploitation of migratory waterfowl, fish and shellfish by the Middle Woodland period (Dincauze 1973; Funk 1976; Snow 1980; Custer 1984; Dent 1995).

During the preceding Early Woodland in Connecticut and New Jersey, aboriginal populations appear to have been more dispersed, as they exploited a wider range of microenvironments such as riverine zones, smaller feeder streams, and interior wetlands, most resembling a *foraging pattern* (McBride 1984; Pagoulatos 1998, 2001a, 2002). However, as sea levels stabilized and tidal estuary ecosystems fully emerged, Middle Woodland groups may have begun to increasingly concentrate on these rich ecosystems, resulting in larger population aggregates around tidal marsh zones, with the placement of fewer and larger base camps, where they performed a wide range of tasks most typical of a *collecting pattern* (Binford 1980).

Material Culture

A comparison of Middle Woodland period material culture between the Mid-Atlantic and Southern New England indicate a rather high degree of continuity, in terms of artifact classes such as hunting and fishing equipment, as well as clay pottery styles. For example, Fox Creek, Jack's Reef, and Petalas biface forms, as well as notched netsinkers have been identified from Middle Woodland contexts across much of the Northeastern United States (Ritchie 1969a; Funk 1976; Snow 1980; Custer 1984; Dent 1995; Juli 1999). Fox Creek knives and Petalas blades may have served as fish-scaling and butchering tools (Cavallo 1984), as these implements have been found in direct association with sturgeon remains (Funk 1976:295), Jack's Reef biface forms may have functioned as hunting implements, used as spear points or perhaps

arrows (Williams and Thomas 1982; Strauss 1992). Notched netsinkers have also been recovered from numerous coastal and riverine sites throughout the Northeast (Cross 1956; Ritchie 1969a, 1969b; Snow 1980). Pottery assemblages throughout the region also appear to produce parallels, when examining decorations styles and temper. For example, pottery styles from the Mid-Atlantic (Custer 1984; Dent 1995; Kraft 2001) and Southern New England (Snow 1980; Lavin 1998) regions primarily consist of a wide variety of shell- and grit-tempered net-impressed, cord-marked, incised, rocker-stamped, dentate-stamped varieties.

Although a comparison of artifactual data from the states of Connecticut and New Jersey indicate a high degree of similarity, it is interesting to note that the well-documented studies from the lower Connecticut River Valley do not fully conform to the traditional view of the Middle Woodland period throughout the region. For example, although ceramic assemblages assigned to the Windsor Tradition share typological characteristics with other assemblages from the Mid-Atlantic and Southern New England regions (McBride 1984; Lavin 1998), McBride (1984) notes the absence of Fox Creek, Jack's Reef, and Petalas biface forms from Roaring Brook Phase sites. It is currently unclear whether the absence of these artifact classes simply represent interregional variability or different (unlike) forms of economic behavior. Lavin (1998) has suggested that the Windsor Tradition ceramics may have been carried into the Connecticut region via population movements from the Mid-Atlantic region during the Middle Woodland period, as aboriginal populations may have migrated with a maritime-estuarine economy, possessing a distinctive technology for tidal marsh (aquatic) exploitation; this region may have been already occupied by foraging societies with artifacts strongly resembling those of the Point Peninsula Tradition.

Settlement Patterns

A comparison of archaeological data attributed to the Middle Woodland period between the states of New Jersey and Connecticut generally produced a similar pattern of settlement, which most resembles a *collecting strategy* (McBride 1984; Pagoulatos 2001a). However, even though Middle Woodland data from both regions indicate a degree of residential stability within riverine/tidal zones and only seasonal uses of upland zones, there are some differences when comparing occupation types and settlement distribution. For example, McBride (1984) notes two primary occupation types which are attributed to the Roaring Brook Phase, described as seasonal and temporary camps; these occupation types are most similar to Base 2 and Target 1 locations, respectively, from the New Jersey data set (Pagoulatos 1992, 1998, 2001a). By contrast, data from New Jersey consist of four occupation types, defined as B1, B2, T1 and T2 site locations. These differences may imply that although both regions exhibited a degree of residential stability, the use of ecozones and corresponding settlement systems were not the same. Each region is described in greater detail below.

In New Jersey, settlement pattern data appear to indicate a complex series of residential moves across interior riverine and coastal zones. For example, large population aggregates appear to have coalesced in riverine/tidal zones at B1 'village' site locations such as the Abbott Farm (ME1) in the spring to exploit anadromous fish spawning runs. Lowland based occupations such as ME1 have yielded a wide variety of features, thick depositions, and fishing equipment, associated with the procurement of sturgeon; also, numerous short-term camps (T1, T2 site locations) have been detected along adjacent and surrounding terrace bluffs, where mammal and wild plant resources were exploited (Cross 1956; Wall *et al.* 1996). This pattern of settlement appears to represent a semi-sedentary, but highly seasonal settlement system, which most resembles a *collecting I* strategy (Pagoulatos 2001a). Following the annual spawning runs, groups dispersed into smaller, more mobile social groupings during the remainder of the year to exploit a wide variety of wild plant, mammal and aquatic-related resources; this pattern of settlement has produced mostly B2 and T2 occupation types, more typical of a *foraging I pattern*.

In Connecticut, although settlement pattern data from at least the lower Connecticut River Valley do reflect a degree of residential stability in riverine/tidal zones by the Middle Woodland period, the nature of sedentism and settlement structure appear to have been different, when compared to the New Jersey data. For example, McBride (1984) notes a concentration of base camps (B2) within riverine/tidal resource zones, and highly seasonal temporary encampments (T1) along upland streams. Even though riverine zones were likely occupied by Middle Woodland populations during much of the year, B2 sites do not appear to have been year-round occupations; instead, they seem to have been highly seasonal, with frequent residential moves throughout the riverine zone, more typical of a *collecting II pattern*. It was not until the Selden Creek Phase (Late Woodland period) that groups established sedentary villages in the lower Connecticut Valley, most resembling a *collecting I* strategy (McBride 1984; Pagoulatos 2001a). Perhaps this settlement pattern change resulted from the introduction of maize domestication (McBride 1984; Feder 1999; Juli 1999).

Why then, was there a difference in how riverine zones were being utilized between these two regions? Although fishing has been noted throughout Southern New England since the Archaic period (Johnson 1942; Ritchie 1969b; Dincauze 1976; Funk 1976; Barber 1980; Thomas 1980; Lutins 1992; Peterson *et al.* 1994) and into the early historic period (Wood 1865; Williams 1936; Brasser 1978; Day 1978; Salwen 1978; Thomas 1978; Brumbach 1986; Banks 1990), few Roaring Brook Phase sites in at least the lower Connecticut River Valley show evidence toward the exploitation of anadromous fish (McBride 1984). By contrast, the well-documented Abbott Farm site (ME1) has yielded a high quantity of Fox Creek knives, Petalas blades, netsinkers, and preserved sturgeon remains from refuse pits, indicating the intensive (seasonal) exploitation of anadromous fish; historically during the seventeenth century, sturgeon are known to have been taken by native groups such as the Delaware, using spears, harpoons, bows and arrows, and nets from the Delaware River Valley and its associated drainage systems (van der Donck 1841; de Vries 1912; Lindestrom 1925; Goddard 1978).

Perhaps, the unique position of the Abbott Farm site near the geologic fault line of the Delaware River presented a unique opportunity for aboriginal groups in the Delaware Valley region, resulting in large food surpluses and a corresponding higher degree of residential stability, at least on a seasonal basis. Also, the apparent absence of presumed fishing equipment such as Fox Creek knives, Petalas blades, and the recovery of small quantities of notched netsinkers from Roaring Brook Phase occupations may indicate that anadromous fish exploitation may not have been as important an activity in this portion of the lower Connecticut River Valley. It is interesting to note that Thomas (1978) reports the mid-seventeenth century procurement of anadromous fish such as shad, alewives, and salmon by aboriginal groups between the months of March and May, from large falls in the interior portions of the central Connecticut River Valley in Massachusetts; perhaps there were economic differences between lower and upper portions of the Connecticut River Valley which should be more closely evaluated, in regard to settlement systems.

Middle/Late Woodland Transition

By A.D. 700/900, there were major changes in settlement patterns, diagnostic artifacts, and possibly subsistence practices in both New Jersey and Connecticut. Chronologically diagnostic artifacts such as Levanna and Madison triangle points appear for the first time, implying the introduction of the bow and arrow by at least the Late Woodland period. Settlement pattern studies by Stewart (1990) and by McBride (1984) indicate a similar settlement shift between the late Middle Woodland and early Late Woodland periods from tidal estuaries to broad floodplain settings in both the Delaware Valley and lower Connecticut Valley, respectively, perhaps reflecting a corresponding subsistence reorientation from aquatic-related estuarine resources to maize domestication.

Although maize was most likely introduced into the Northeast by A.D. 1000, it does not appear to have been a major food source until about A.D. 1300 (Snow 1980; Kraft 1986; Hart and Sidell 1996;

Feder 1999). More likely, the transition to maize cultivation and settled village life was a gradual process in both regions, which may have required two or three centuries until late prehistoric populations were fully cultivating maize and residing in semipermanent villages by A.D. 1200/1300 (Snow 1980; Stewart 1990; Feder 1999). By A.D. 1200/1300, aboriginal populations in both regions were residing in semi-sedentary villages, practicing a mixed economy of hunting, gathering, fishing and horticulture, broadly corresponding to a land use pattern most resembling a *collecting I strategy* (McBride 1984; Stewart 1990; Feder 1999; Pagoulatos 2001b)

CONCLUSIONS

This study has presented a proposed Middle Woodland land use model for the State of New Jersey, which makes use of spatial site distributions and environmental variables. These data were then compared to Middle Woodland period site distributions from the State of Connecticut. On the basis of comparative paleo-environmental and settlement pattern data, both states (regions) exhibited a general degree of similarity, or fit. Although both regions reflect similar cultural historical trajectories and settlement systems most resembling *collectors,* there appear to be differences in residential stability, uses of specific ecozones, and apparent economic orientation, or focus. Additional research in both regions should be focused upon four primary avenues of scientific inquiry, described below.

First, a closer examination of occupation types, settlement patterns, subsistence orientation, and corresponding environmental parameters should be made between lower and upper portions of the Connecticut River Valley. The apparent lack of data supporting a maritime economy, focused upon anadromous fish procurement in the lower valley may be a real pattern which should be carefully evaluated against data from the upper valley, in Massachusetts. Perhaps interior adaptations were increasingly oriented toward anadromous fish as aboriginal groups seasonally positioned themselves proximate to large falls in the upper portions of the Connecticut Valley. If this were the case, then large complex sites such as Abbott Farm would more likely be present in the upper reaches of the Connecticut Valley (See Thomas 1978).

Second, even though aboriginal groups exhibited a greater degree of residential stability in both regions, when compared to the preceding Early Woodland period (McBride 1984; Pagoulatos 2002), why did aboriginal groups reflect a more complex *collecting I* pattern in the Delaware Valley, while those of the lower Connecticut Valley had a less complex *collector II* pattern? Perhaps emerging anadromous fish adaptations in the Delaware Valley region played a more crucial role toward altering settlement systems, when compared to the lower Connecticut Valley during the Middle Woodland. Even so, while groups may have had a higher degree of residential stability in the Delaware Valley during the annual anadromous spawning runs in the spring, during the remainder of the year, these groups exhibited high mobility, frequently moving across a wider range of ecozones, more typical of *foragers*. By contrast, while groups in the lower Connecticut Valley moved their seasonal camps more frequently, they resided in riverine zones throughout much of the year.

Third, Lavin (1998) presents an intriguing hypothesis explaining the spread of the Windsor Tradition into Southern New England from the Mid-Atlantic region. If maritime-based aboriginal populations using pottery assigned to the Windsor Tradition migrated into Connecticut, then radiocarbon dates should imply earlier maritime adaptations in the western portion of the state, and subsequently later occupation in the eastern part of Connecticut; this hypothesis should also receive much closer attention.

And finally, what was the role of bases such as the Abbott Farm site (ME01), in terms of their potential function as exchange centers for trade, more complex labor organization (at least during

anadromous fish runs), and social alliance formation with other Middle Woodland period communities in the Northeastern United States? These questions will require an interregional analysis of storage features, subsistence remains, and trace element analysis of raw materials such as stone tools and clay pottery contained within Middle Woodland sites across the Northeast (Stewart 1989).

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THE BARTOW LAGOON SITE, PELHAM BAY PARK, BRONX COUNTY, NEW YORK

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ABSTRACT

Learning of the impending construction of a mile-long rowing course planned for the 1964 Olympic trials within a lagoon in a Bronx County public park and the resultant destruction of at least one of several known aboriginal shellfish collecting sites situated on the lagoon shore, a salvage effort was thought imperative even as the site was in the process of being destroyed.

INTRODUCTION

Since New York's Bronx County Department of Parks acquired the 2,764 acres of land which became Pelham Bay Park in 1888, it has been recognized not only as a place of recreation and retreat for city dwellers, it has also drawn attention as a source of Amerind artifacts to help fill display cases by museum-sponsored personnel and the hunting ground of curio collectors. In 1937, the partial filling of the inshore waters and contiguous tidal marsh of Pelham Bay between Hunter Island and Rodman Neck created Orchard Beach and the lagoon on which the Bartow Lagoon site is situated (Figure 1:1).

News of the proposed destruction of near-pristine land focused on a one-time sporting event built primarily to prepare Olympic rowing crews raised the ire of several concerned individuals who, despite their objection, could not halt the project. No longer could county parkland be considered protected from such irreversible alteration. The raceway course development necessitated extensive dredging and the removal of several rock islets by blasting. The U.S. Fish and Wildlife Service has found that dredges kill fish and can seriously alter the delicate ecosystem sustaining the marine and terrestrial life that depend on the food and shelter produced at the water's edge.

Several years later, again over objections and without an archaeological impact evaluation, a sanitary landfill was created at the south end of the park's Pelham bridge which spans the entrance of the Hutchinson River and Givan Creek. This project created a small mountain which not only covered undeveloped beach front but also archaeology sites. Prior to construction of the land fill, late Woodland period artifacts had been recovered from the surfaces of eroded midden spread.

Besides introducing hazardous waste into the water, a squatter community of trash pickers developed, whose shelters lined the opposite northern shore. The backs of some of the shelters destroyed the beach embankment and shoreline known to contain an extensive shell midden that produced cultural material diagnostic of Archaic to mid-Woodland period components (Figure 1:2). This site had undergone test excavation by the author prior to a limited research study by graduate students from the New York University Department of Anthropology (Rothschild and Lavin 1977:1-27).

Figure 1. Map of Pelham Bay Park locating Bartow Lagoon site and sites noted in the text. USGS 7.5 minute series, Bronx County, New York quadrangle.

Although possibly exhausted of cultural material (of which we have no knowledge) by previous excavators of the Bartow Lagoon site in the early 1950s, a continued investigation of the site before its compete destruction might help reconstruct some of the site's features, reinterpret the original field situation and establish a cultural and temporal affiliation with an indigenous Woodland period occupation.

The Bartow Lagoon site is one of a number of undocumented shell midden deposits located within the confines of the park. Information relating to these site locations, their contents and context was never recorded owing to unrestrained clandestine pot hunting and the dispersal of the recovered artifacts and relevant data. Over the span of three decades, several of these small disturbed sites have been reexamined by the author and the recovered data added to the region's data base (Kaeser:1968:15, Table 1).

An attempt to contact the original excavators to gain an examination of artifact recoveries or site records was unsuccessful. In conversation with one of the excavators at a later date, it was learned that

TABLE 1: ARCHAEOLOGICAL AND ETHNOHISTORICAL EVIDENCE INFERRING THE USE OF DOGS BY AMERINDS OF THE ATLANTIC COASTAL AREA

Cultural group	Type of use	Comments	References
Micmac	Hunting Companion		Baird 1891:190 Russell 1980 Flannery 1939
Virginia Algonquians			Barbour 1969:1
Iroquois	Food	Mid-winter celebration	Wallace 1972 Flannery 1939
Huron		Major source of meat	Brebeuf 1896, 1901 J.R. 7:223 Wrong 1939:226
		Visitor Delicacy	Denys 1908
Huron	Affection or value		Flannery 1939 Butler, Hadlock 1949
Shinnecock Long Island Suffolk Co., N.Y.			Fernow 1883
Micmac		Women suckled abandoned pups	Flannery 1939 Fernow 1883
S. Eastern Ojibwa	Ritualism	Sacrificed to spirits for aid in hunting - Protect family from dangers of winter	Henry 1964
Huron		Dog eaten at feasts & ceremonies	Bigger 1922, 1936; 3:128, 129. Wrong 1939: 220, 226. Brebeuf, 1896-1901, 9:111, 21L161, 23:173.
Frontenac Island Cayuga Co., N.Y.	Ritualism	(5)Human male adults (1) infant accompanied by (9) terrier size dogs, (3) big as collie	Ritchie 1965: 111
"		Infant burial No. 23, buried with pup	Ritchie 1965: 123
Oberlander No. 2 and Wray Site Onondaga Co., N.Y.		Burned bone of deer and dog in human cremation	Ritchie 1965: 197

TABLE 1: ARCHAEOLOGICAL AND ETHNOHISTORICAL EVIDENCE INFERRING THE USE OF DOGS BY AMERINDS OF THE ATLANTIC COASTAL AREA (continued)

Cultural group	Type of use	Comments	References
Garoga Site Fulton Co., N.Y.		Weapons, domestic and ceremonial items and dogs lavished on dead	Ritchie 1965: 323
Iroquois		Dogs sacrificed for war god Agreskoue or Agriskoue to guide them to victory	Lafitau 1724: 1:126, 132, 205, 206:2; 189-190. J.R. 33:225, 39, 207-209; 53:224; 57:96.
		Most distinguished warriors received heads of dogs boiled in kettle.	Fenton 1953.
Port Washington Nassau Co., N.Y.		Dog remains in (3) human graves (2) infants, (1) adult (1) infant with (3) dogs	Booth 1982:54-60
Pelham Bay Bronx Co., N.Y.		Articulated dog skeleton in pit, base of ossuary dog bundle burials in human ossuary	Kaeser 1970; 9-44.
Lake Montauk Suffolk Co., N.Y.		Human remains in casket with trade goods and (1) dog	Latham 1927.
College Point Queens Co., N.Y.		Dog remains in pit sans head Human and dog remains in pit	Lopez, Wisniewski 1958.
Beach Haven Nassau Co., N.Y.		(5) pits containing human remains (2) included dog remains	J.P. Orchard 1927, 1977; 66-69.
Orient Suffolk Co., N.Y.		Mixed dog and human remains. Cremations -mixed human and dog remains	Ritchie 1959: 56.
Port Washington Nassau Co., N.Y.	No evidence of ritualism	(8) dogs in pits	Harrington 1982: 83.
Shoram Wading River Nassau Co., N.Y.		Dog in refuse pit	Wyatt 1982.
Mount Sinai Harbor Nassau Co., N.Y.		(6) dog burials	Gramly, 1977.

TABLE 1: ARCHAEOLOGICAL AND ETHNOHISTORICAL EVIDENCE INFERRING THE USE OF DOGS BY AMERINDS OF THE ATLANTIC COASTAL AREA (continued)

Cultural group	Type of use	Comments	References
Hopkins Point Nassau Co., N.Y.		(3) dogs in refuse	Gramly, Gwynne 1979.
Frontenac Cayuga Co., N.Y.	No evidence of ritualism	(7) flexed dogs in refuse pit	Ritchie 1965:52.
Rector Mound Wayne Co., N.Y.		Dog buried in pit	Ritchie 1965: 243.
Kipp Island Site Seneca Co., N.Y.			
Owasco Site Cayuga Co., N.Y.		Small breed dog buried	Ritchie: 276.

a sub-adult human burial and a portion of a ceramic vessel were discovered at the base of a tree stump located in close proximity to the 1950s excavation. For unknown reasons, the recovery of the burial was postponed. Bystanders who had witnessed the find returned to the site and disinterred the remains. Regrettably, no photograph of the gravesite, description of the osseous remains, record of artifactual inclusions in the grave matrix or superior midden stratum was available to me. It is assumed that the grave held an articulated, possibly flexed skeleton. The final destination of the remains is still unknown.

The northwest quadrant of the site held a partially buried glacial boulder of approximate five feet surface diameter. The erratic's western periphery had been dug out to an eighteen inch depth, probably in the search for cultural materials known to cluster in close proximity to such features within the park area. Scattered mollusk shells at this locus hinted at the probability of it being a place of food preparation.

Newly flattened *Phragmites communis* reeds and water- born debris covered the sites surface just above the lagoon's normal high water mark. Despite pronounced changes observed in the surface contours caused by survey and construction vehicles, it was not difficult to relocate the decade-old excavation. Surface examination and a metal probe search defined the perimeters of the surface-slumped, north to south oriented alignment of nine, four by four ft squares which I numbered A-1 to A-9, forming a grid of approximately one hundred forty-four square feet (Figure 2). If time permitted, it was planned to cut a linear trench of five ft squares through the remainder of the midden in an attempt to define the northern extent of the deposit and expose its internal stratification. Unfortunately, time constraints allowed only two units to be examined (A-1 and A-2).

EXCAVATION METHOD

After locating the perimeters of the 1950s excavation, its northeastern grid corner was extended by three five by five feet squares numbered B-1, B-2, B-3, the starting point of Excavation Unit 2 (Figure 2). Portions of square B-2 and B-3 surfaces bisected a hard-packed footpath used primarily by a group of New York City dwellers who, over the course of many years, cultivated a garden which nearly covered the rock islet fronting the site. This islet was one of several obliterated from the lagoon by blasting. The path led westward into the adjacent woodland where a weed-choked fresh water spring surfaced. The water used for garden irrigation on the islet was transported across the site area and salt marsh during low tide by bucket brigade. In addition to essential irrigation water, topsoil was also carried to the garden to replace

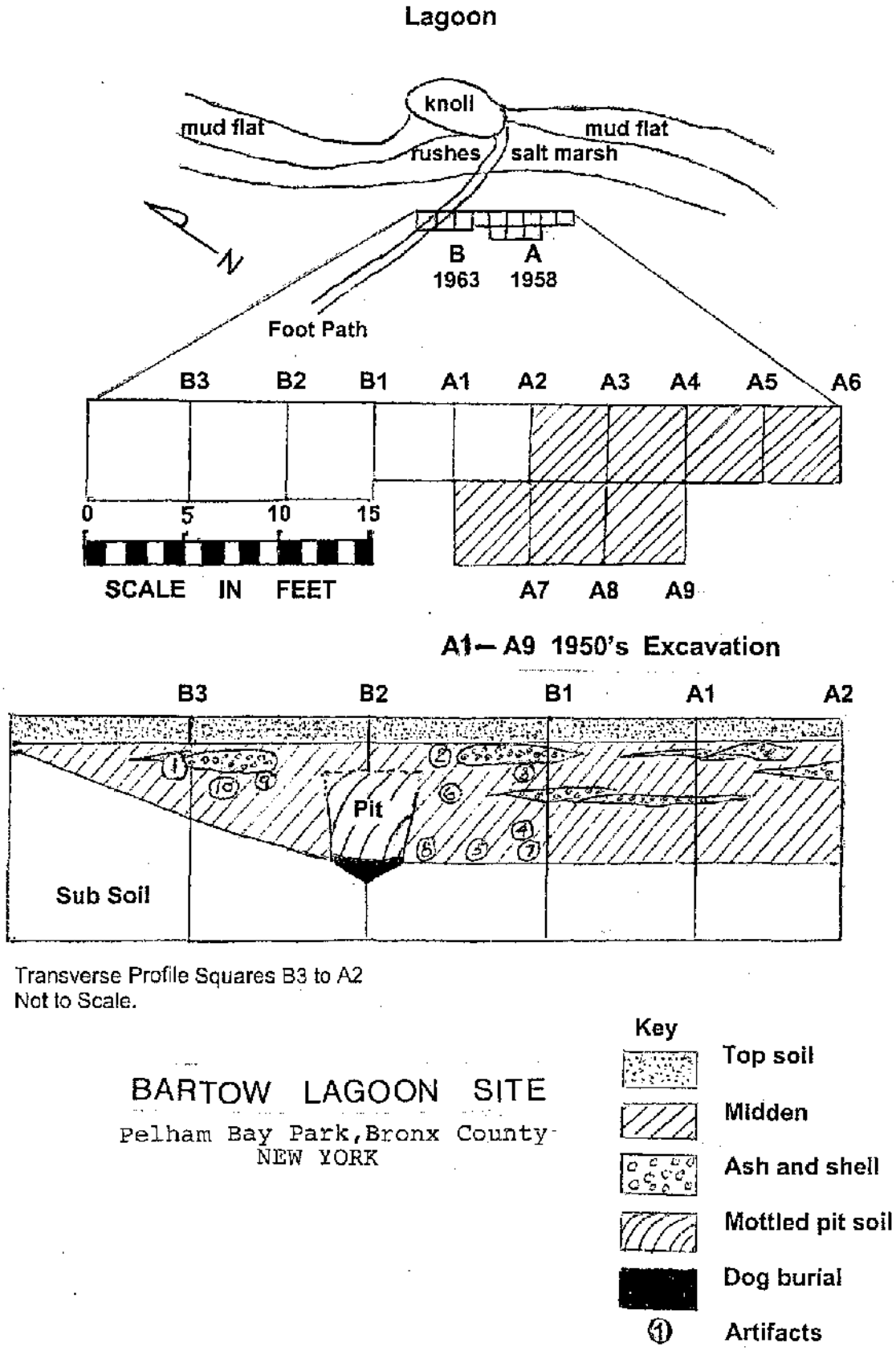

Figure 2. Bartow Lagoon site. Plan and transverse profile 1963 Excavation Unit 2(B) and tested portion of 1958 Excavation Unit 1(A). Dog burial pit located at intersection of Excavation Unit 2, squares B-1 and B-2.

earth washed out of the rock hollows utilized as planting beds. It is likely that the site's aboriginal occupants also used the freshwater source and the pathway route to the islet to gather the rock and beach dwelling shellfish, which made up the deposits found in the midden stratum.

Backfill earth was removed by shovel downward to undisturbed sub-soil from the 1950s north-south aligned A-1 and A-2 squares. The cleared wall profile exposed in the four ft squares and the contiguous Excavation Number 2 excavation revealed the approximate northern latent extent of the midden and exposed in transverse profile the internal midden and subsoil stratification. No recognizable features such as hearths or lithic reduction work place marked by parent cores and flakes were observed in the cleared wall profile or midden matrix.

Below a three-inch surface layer of sandy, tan colored soil, a black midden stratum eight inches at greatest thickness was noted in the 1950s wall profile. The midden stratum of Excavation Unit 2 thinned to six inches within squares B-1 and B-2 then feathered to just a trace below the topsoil of square B-3. Subsoil in all squares was composed of sterile orange, sandy soil (Figure 2).

The midden stratum at its thickest in squares A-1 and A-2 generally paralleled the topsoil surface. The black midden soil appeared interspersed with two to four feet long by two to three inches thick lenticular deposits, some overlapping, of gray ash containing whole and broken clam and oyster valves. Where wet, the midden matrix appeared greasy-black. A few fist-sized, unmodified, quartzite cobbles were scattered in the midden stratum.

It was thought possible that the midden might extend eastward down-slope under the salt marsh; however, limited time and the encroachment of survey and dredge workers' activities prevented this search. Shovel tests were scattered over the inland, brush-covered periphery of the site in the hope of finding an undisturbed segment of the midden that might be investigated at a more opportune time. Results were negative.

ARTIFACT RECOVERIES, EXCAVATION UNIT 2

Ceramics

A total of 23 body and near-rim clay sherds, parts of a single vessel, were recovered in a three-foot lateral scatter within Square B-1 at a four-inch depth in the eight-inch thick midden stratum. Exterior sherd surfaces display broad, incised parallel horizontal and oblique lines set approximately one-fourth inch apart over a cord-wrapped paddle-malleated surface (Figure 3). Coil constructed, the paste is hard, containing scattered small shell fragments possibly used as an aplastic. The inner surfaces of the one-fourth inch thick sherds are honeycombed by the leaching out or burning of soft temper constituents, either shell or vegetable fiber. Exterior and interior sherd surfaces are tan, the cores are black inferring poor draft or low firing temperature. Interior sherd surfaces are scraped smooth with a shell edge or stone flake.

The incompleteness of comparative morphological data makes this pottery sample identification tentative. The crude horizontal and oblique incising over cord malleation on the sherd exteriors is used as the criterion for typological classification as Bowman's Brook Incised. The type is linked with the Clasons Point Phase, East River Complex, Late Woodland period.

Lithics

Four Levanna style projectile points in the shape of equilateral triangles with straight bases were found three to eight inches into the midden stratum (Figure 4:1-5). A polished celt was recovered five inches into the midden stratum (Figure 4:6). A quartz lanceolate biface blank was also located five inches

Figure 3. Bartow Lagoon site. Bowmans Brook Incised, near rim.

into the midden stratum (Figure 4:9). A cup-shaped limonite paint stone was found six inches into the midden stratum (Figure 4:10). A second celt in process, percussion flaked, was located 8 inches into the midden stratum (Figure 4:7). A combination double-pitted hammer and anvil stone was recovered from the same level within the midden stratum (Figure 4:8).

FEATURE

A dog bone bundle burial found at intersection of squares B-1 and B-2, Excavation Unit 2 (Figure 2). Approximately four inches below the topsoil overburden, a fifteen-inch circular soil stain appeared. The mottled mix of orange subsoil-like earth and black midden earth was viewed as a possible pit orifice. Traced downward four inches to the sub-soil surface, the vertical column of disturbance diminished in diameter to twelve inches and descended another four inches below the subsoil surface where the pit's rounded base terminated. Filling the basal two inches of the pit bottom, the compact, disarticulated bones of a dog lay in a matrix of dark brown, organically stained earth (Figure 5).

No evidence of butchering for food preparation or hide removal was observed, such as dismembering cut marks or hammerstone percussion marks on long bones indicative of marrow removal. Neither was there evidence of gnawing by scavenging animals to indicate the dog's deposition above ground for an extended time period.

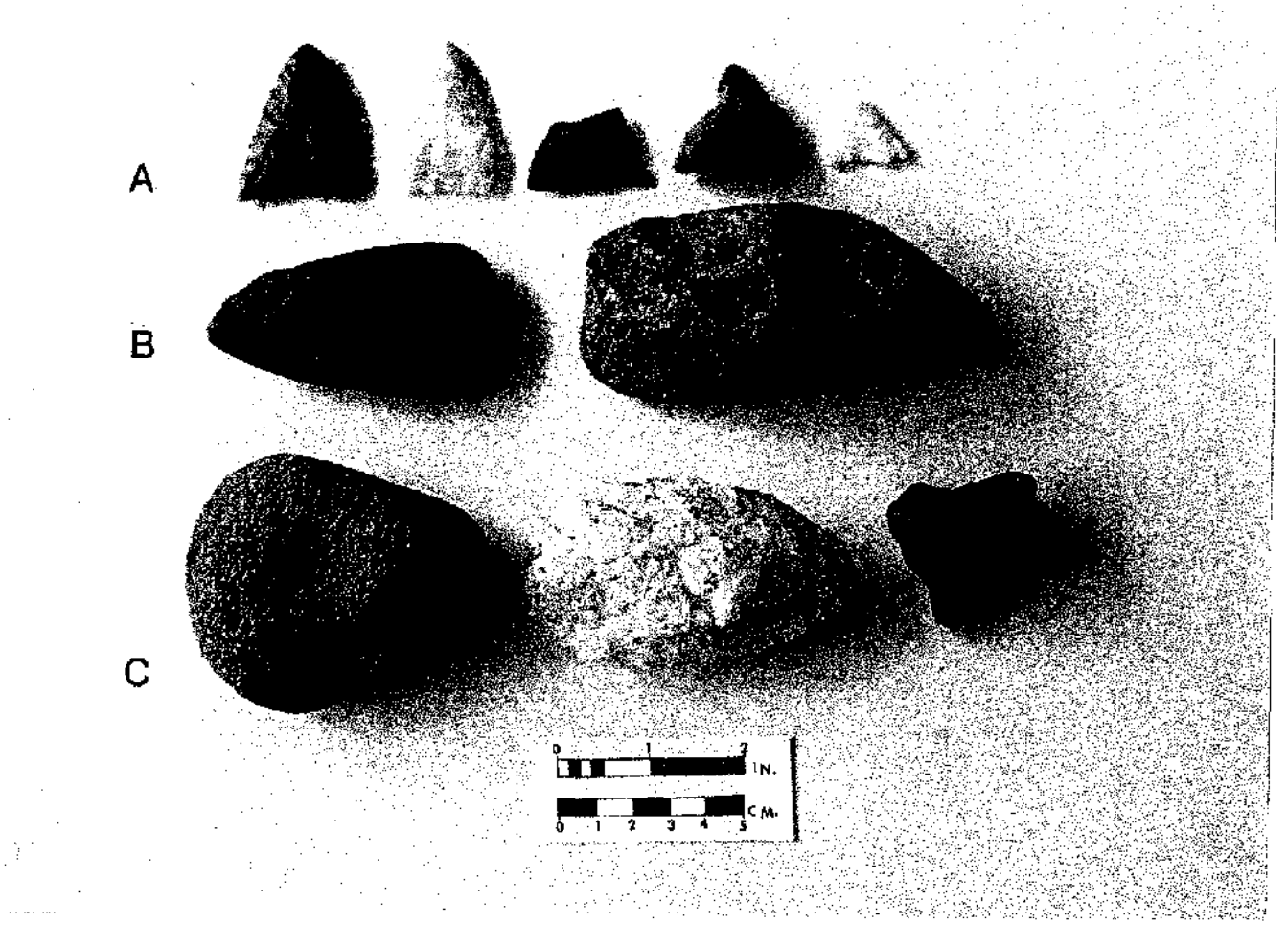

Figure 4. Bartow Lagoon site: Line A, left to right, 1-5, Levanna points. B,6; polished celt. 7: celt in process. C,8; double pitted hammer and anvil. 9: lanceolate biface blank. 10: limonite paint stone cup.

The absence of visual damage to the bone surfaces might infer the aboriginal practice of housing the animal's carcass or the common practice of above ground scaffold placement out of reach of scavengers. The disarticulated bones might have then been gathered and packaged for a final, deliberate and possible ceremonial interment. While not the only possible scenario, the above is plausible and reminiscent of burial customs recorded for the Late Woodland, East River Culture (Kaeser 1970:9-34).

Establishing ethnographic and archaeological parallels is a difficult form of inquiry, yet the data obtained can help augment local culture attributes and relationships with complexes north and south of the coastal New York region. A limited survey of the recorded use of the dog in prehistory, by nature a sampling technique, has a dual promise. First is the possible definition of cultural relationships between ethnic groups occupying the coastal region; the second is the establishment of temporal parameters for these relationships (Table 1).

Here only identified by taxa (*Canis familiaris*), the dog can be considered not just our proverbial best friend in the animal world, but probably our oldest and in prehistory, an essential companion in the afterlife. Derived from archaeological observations and ethnographic data, the dog was an important member of Amerind life. The dog provided protection, companionship, hunting assistance, kept humans warm, cleaned up camp, served as emergency food and as on the North American Plains, possibly used as a beast

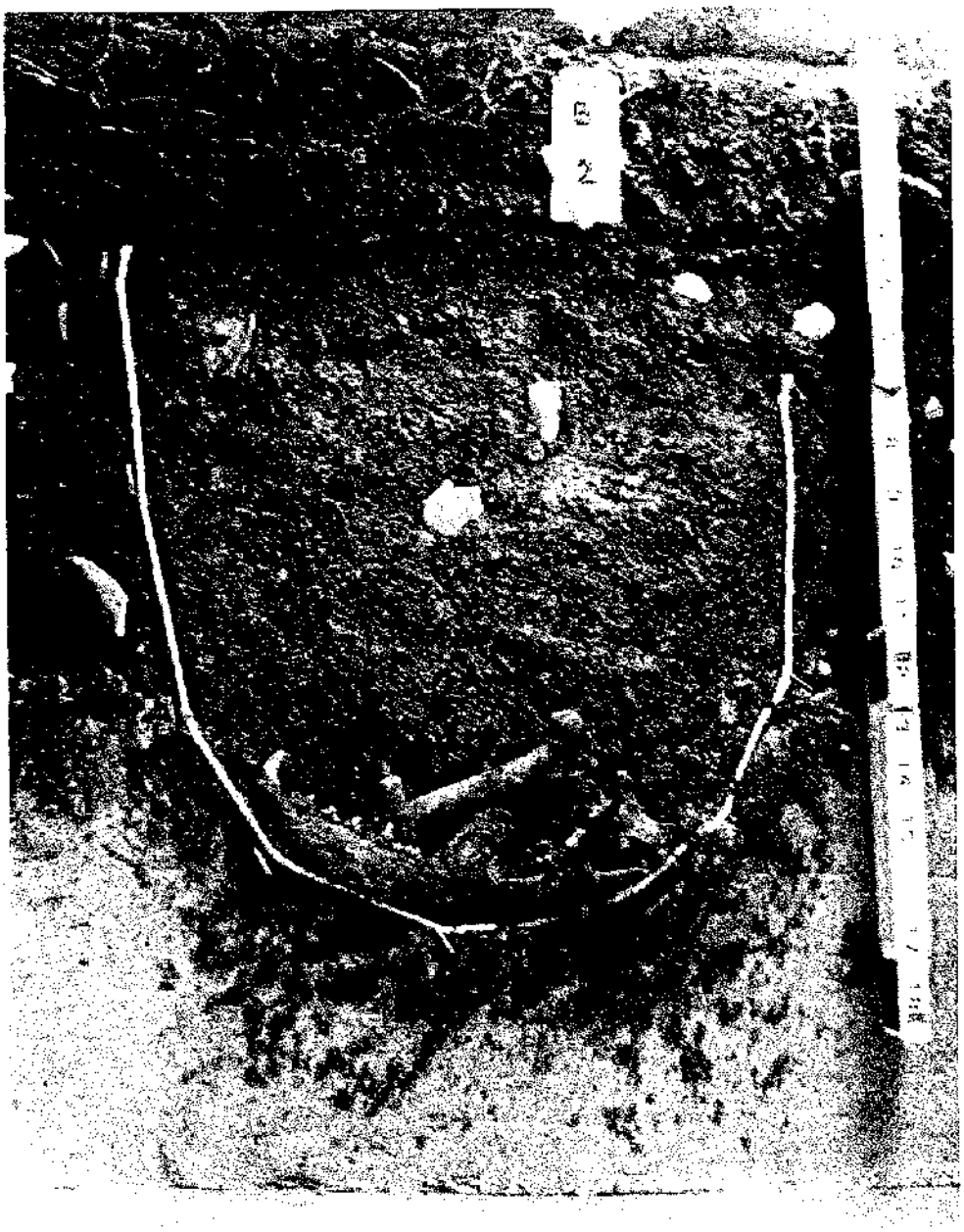

Figure 5. Bartow Lagoon site. Photo profile of near center section of dog burial pit. String denotes out edges of pit.

of burden prior to the adoption of the horse. In ritual contexts, the animal appears centrally in meals used as sacrifices, interred as grave goods, and demonstrating that dogs enjoyed the affection of their owners, buried as humans in bundle or articulated fashion.

As in human burial, the basic themes of ceremonial dog burial appears remarkably similar among Amerind groups scattered along the Atlantic coast from the Canadian Maritime provinces to Virginia. Only the expression of the burial complex in terms of artifactual inclusions or interment variations and degree of elaboration of burial traits seem to differ. A singular applicable quotation dealt with the use of the dog by the Delaware as a possible food source within the central Atlantic states:

> The Delaware are very particular in their choice of meats, and nothing short of the most pressing hunger can induce them to eat of certain animals, such as the dog (Heckewelder 1876:196).

DISCUSSION AND SUMMARY

Although most recorded western coastal New York sites were shellfish collecting stations and the artifacts in the main suggest a life close to subsistence level, the decorative elaborations seen on some ceramic vessels testify that the resident people were not totally impoverished aesthetically. At present, cultural traditions reflecting parts of social structure such as religion, social mores, superstitions or taboos cannot be extracted archaeologically. In the absence of such evidence, researchers are far from understanding the intricacies of coastal New York's prehistoric occupants. Only among the human and dog burial discoveries can some knowledge of a religion-oriented custom be envisioned and added to the regional data base.

Not needed to be hunted and readily at hand, the dog fitted the bill for a variety of needs from companionship to ritual ceremonialism. One can only guess when and where it started. The early Amerinds who participated in the domestication of and relationships with dogs are long gone. It can be safely stated that the dog was and is still the most useful animal ever adopted by humans. It is of particular note that evidence of a cultural continuity of dog-human association from at least the early Woodland period (Table 1) to the present still exists today. Attesting to the longevity of such relations with the dog are the approximately fifty million dogs owned in the United States today, the multi-billion dollar dog food, medication products, grooming and training industry and cemeteries devoted to their burial.

Small and disturbed sites such as the Bartow Lagoon site can be viewed as potentially significant archaeological locations even as they are being destroyed. Within their limited context, they are capable of yielding a considerable array of cultural information. The remnant of the midden examined in Excavation Unit 2 and exposure of the east wall profile of the two 1950s excavated squares raised more questions than answers. The salient question focused on whether the artifacts were contemporaneous with the scatter of lenticular shell-ash deposits or some part of the homogeneous-appearing midden matrix in which they were found.

No evidence of stratigraphic sequential episodes of dumped shell deposits or the downward movement of cultural material and differential settling of deposits due to shell or organic matter decomposition was apparent. Nor could the estimated origin of the dog burial pit orifice be accurately linked to a specific cultural horizon within the midden stratum. The only evidence hinting at common temporal deposition was the four in-depth measurement recorded for the estimated dog burial pit orifice and its proximity to the Bowmans Brook Incised vessel sherds.

Taking into account the limited portion of the site investigated, it must have been a desirable location lying in close proximity to potable water and a shellfish source. The shallow and unstratified nature of the artifacts suggest that occupation of the site by any group was neither prolonged nor continuous. Their length of stay was dependent on the resources to be procured and quantity desired. While no evidence was recovered to confirm seasonality of occupation, the general area has been known to be partially inundated during the fall hurricane season. The devastating Atlantic coast hurricane of 1938, witnessed by the author, flooded this area and adjoining low-lying land with many feet of water and scattered water-craft inland over one half mile. How many times this may have occurred in prehistory is speculative.

The cultural material salvaged from the Bartow Lagoon site Excavation Unit 2, allows an assessment of the site's occupation in respect to cultural identity, function and chronology. Exemplified by the recovered cultural material, the site's Late Woodland period of occupation coincides with several other shellfish collecting stations recorded within the confines of Pelham Bay Park (Figure 1): The Cherry Orchard Rock site, Figure 1:4, (Kaeser 1965; 10-19); the Archery Range Ossuary site, Figure 1:5 (Kaeser 1970; 9-34); and the Milo Rock site, Figure 1:3 (Lopez 1958). The above three sites produced sherds of Bowmans Brook Incised and East River Cord Marked vessels, celts and Levanna projectile points recognized as diagnostic traits of the Late Woodland period Bowmans Brook and Clasons Point phases of the East River Complex.

Some might debate the merits of salvage archaeology data gathered through the decades. In the preceding paragraphs, the author has endeavored to look into the lives and minds of a people who lived on transiently occupied sites, such as the Bartow Lagoon site, centuries and millennia ago. The dissemination of even modest data gained by salvage methods can provide corroboration of present knowledge and aid professional and avocational investigators in their efforts to extend the geographic parameters in which the cultural traits occur.

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GENDERED PRACTICES: ETHNOHISTORIC AND ARCHAEOLOGICAL EVIDENCE OF NATIVE AMERICAN SOCIAL DIVISIONS OF LABOR

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ABSTRACT

Archaeologists have recognized the value and importance of the investigation of gender as an aspect of social identity, but are still exploring ways of translating theory to method. In this article, an agent-centered approach is presented for the consideration of Native American gender identity, using the archaeological and ethnohistorical evidence of daily practices. Using a case study from southern coastal Massachusetts, this framework will be utilized in the examination of social landscapes and labor practices, with an analytical focus on lithic remains. These multiple lines of evidence suggest that Native American men and women at the site were actively, relationally constructing their social world.

INTRODUCTION

In his 1635 work *New England's Prospect*, William Wood wrote of the Native American women he had observed, "Their employments are many," including but not limited to agriculture, shellfish procurement and processing, house construction, weaving of mats and baskets, and food preparation and storage (Wood 1977:112-114). Indeed, it was Wood's (1977:112) opinion that these women's

> qualities and industrious deservings may justly claim the preeminence and command better usage and more conjugal esteem, their persons and features being every way correspondent, their qualifications more excellent, being more loving, pitiful, and modest, mild, provident, and laborious than their lazy husbands.

Lazy though they may have been in Wood's estimation, the men of these groups had their occupations as well; he did also describe the work of the men in larger game hunting, fishing, and canoe-building. In effect, what he described was a division of labor by gender. Regardless of his *opinion* of the value of their production, it is apparent from his description that both the women and the men he encountered in the region of the Massachusetts Bay Colony played very active and productive roles in their social groups. Yet this aspect of social structure is often not directly questioned in the archaeological or historical literature.

When investigating social organization and culture of Native American groups in late prehistory or the Contact period, the ethnohistoric documentation of European observers is both invaluably rich and objectively problematic. This ambiguity is particularly evident in gendered studies, where the researcher is faced with a dual layer of obscurity. The active voices of Native Americans are rarely heard in the historic record, and largely only through the lens of observation by cultural outsiders with the occasional report of words. This representation is itself heavily biased towards the activity of men, leaving women's voices even fainter in the record, for European observers tended to seek communication and company from men who were assumed to hold power in those societies (Bragdon 1996:181, Rubertone 2001:107). But the value of the ethnohistoric record is not irretrievably skewed, and can be most critically employed when using multiple lines of evidence. Cultural landscapes and material remains, recovered by

archaeologists, can provide correction or confirmation of the textual record of gender relations and the performance of a division of labor.

In this paper I will compare these lines of evidence in a case study which focuses on Sandy's Point, a Late Woodland/Contact period site in southern coastal Massachusetts. Excavated in the early 1990s, the Sandy's Point site revealed the remains of a seasonally occupied Native American farming encampment. Features including a shallow midden, corn hills, and post holes suggest the site was primarily used as a short-term summer occupied camp for growing corn and collecting marine foods. Lithic material was recovered from most areas of the site (Mrozowski 1994). Since a significant portion of the excavated area was found in association with Late Woodland/Contact period materials, it is appropriate to make use of ethnohistorical information in its interpretation. The presence of corn hills and a variety of shell from the midden dovetail with historical descriptions of subsistence production divided along gender lines, wherein women were primarily responsible for agriculture and shellfish collection and processing, while men were responsible for woodland game and off-coast fishing (Wood 1977; Williams 1973; Gookin 1972). These sources indicate that the seasonal agricultural and food processing (i.e. drying/smoking of fish and shellfish) activities of these societies were conducted in close proximity to their dwellings, and that both were controlled largely by women.

The focus of the site analysis to date has largely been on environmental and archaeo-biological investigations. This is understandable given that the site encompassed the only archaeological evidence of Native American agricultural practices in this region that have been recovered to date. Through botanical, faunal, and soil micro-morphological studies, archaeologists can better understand this component of subsistence production which may have been a critical component of culture change in the Woodland period. Such a focus, however, may necessarily neglect the people in favor of the products. My aim here is to highlight the practices of people in relation to those materials, and in relation with one another, to broaden our understanding of how daily practices were actively, socially structured. Using the concept of division of labor as a form of social structuration, I will focus particularly on the lithic sub-assemblage as partially representative of labor practices at this site. Though lithics have ordinarily been addressed in gender-neutral or androcentric terms, I hope to demonstrate instead that the procurement, manufacture, use and discard of lithic material were practices which mediated gendered *relations* of labor.

In the following sections, I will first consider the broader literature on the "location" of gender in the archaeological context. Next I will discuss the ethnohistoric descriptions of regional Native American gender relations in the Contact period, and consider the embedded biases of these observations. I will then review the material and spatial evidence from Sandy's Point, and suggest how these data may be linked to gendered social practices. In the final section I will offer an interpretation of the social relations of labor practiced at this site, and possibly in the region, based on these lines of evidence.

THE ARCHAEOLOGY OF GENDER AND SOCIAL RELATIONS

It has been twenty years since archaeologists first began to seriously consider gender as a legitimate research focus (Conkey and Spector 1984, see also Wylie 1991). For clarity, I define gender as socially constructed identity related to (not synonymous with) sexual difference. Initially considered as a part of the broader feminist movement in the social sciences, the aim was to critique and correct the glaring androcentric biases inherent in most archaeological interpretation. To this end, early archaeologies of gender focused on making women "visible". Quite often this meant a critical re-examination of old concepts such as the universal separation of gender spheres and/or the invisibility of women in the archaeological record. For example, Joan Gero (1993:35) has noted that the focus on easily recognizable stylistic

and morphological differences in refined lithic hunting tools, used as diagnostic cultural markers, has led to a faulty conclusion that Paleo-Indian life revolved around big-game hunting:

> In its historic context, the equation of Early Man with hunting big game was integral, essential and convergent on proving 'man' early. Associated from the start with hunting big-game, Early MAN could only be a big-game hunter, with all the ideological loading that entailed... and all that it left out: women!

This focus had the effect of relegating all other material recovered from these contexts to the background, unexamined and dismissed as unimportant. The causes and maintenance of this bias were multivariate, including a severe gender bias within the research community itself and preservation issues which favored lithic material; "(w)hat can be made visible is, by virtue of its visibility, central to the past" (Gero 1990: 114). The lasting effect of this practice was a form of scientific knowledge construction, wherein the early research focus and implied gender attributions became institutionalized, and research outside of this narrow realm was neither encouraged nor supported.

Elizabeth Chilton has also noted the selective examination of refined hunting tools in Paleo-Indian studies, leaving the vast majority of most lithic assemblages unanalyzed (Chilton 1994). To combat this narrow representation, she proposed an economic heuristic model to the study of gender in prehistoric contexts, wherein tasks and materials would be classified by gender using associations with domestic and non-domestic spatial spheres. Though the gender attribution/categorization system of this model has not come to be viewed as a particularly effective approach, the analysis of intrasite variability in lithic distribution offers a vast improvement over reviewed Paleo-Indian studies which determined site function as a whole through a few diagnostic artifacts or by an aggregate index of artifact diversity (Andrefsky 1998:201). If we believe that gender roles and relations are a complex and continually renegotiated part of social identity, then by extension we can also believe that the use of space will reflect that complexity (see for example Lefebvre 1991, Moore 1996). An analysis of spatial variability at a habitation site, for example, may break down the value and utility of the broader categories of domestic and non-domestic space, and the simple association of gender with these categories.

These early models of task differentiation and separation of gendered spheres, employed with processualist methodologies, attempted to "locate" women in the past by assuming that the material and spatial markers of their existence had simply been ignored. But the limitations of these models became apparent as scholars came to realize that gender is not defined so simply or universally. In seeking a more flexible theoretical framework many archaeologists have turned to variants of agency and practice theories to aid in the archaeological interpretation of gendered pasts. These theories relate to the active, conscious participation of individuals in reproducing or resisting the constraints of the broader social structures that they are born into. In demonstration of the effectiveness of these frameworks, several archaeologists have offered reinterpretations of existing sites and assemblages with explicit reference to social, particularly gendered, sources of cultural change. For example, Claassen (1991) examined patterns of shellfish collecting as a subsistence activity practiced largely by women in Native American contexts. She determined that ecological models of subsistence, such as optimal foraging theory, were not adequate predictors of shellfish gathering. She found in ethno-archaeological studies, for example, that women gathering shellfish often bypassed the predictable choices (maximal resources for minimal work), instead *choosing* less-than-optimal beds or *selecting* a single species where many were available. These examples reveal the influence of individual or socially derived agency over a biologically or environmentally driven behavior. Similarly, Watson and Kennedy (1991) reexamined extant evidence to suggest that human agency, and very likely that of women, was the cause of plant domestication rather than a combination of ecological happenstance and rote reactive behavior.

This focus on individual or group agency and social practice has also been applied to the consideration of lithic assemblages. For example, Luedtke (1997) critically explored both the faulty association of lithic material with men's work, and the lines of evidence which may be utilized in creating a more balanced view of stone tool production and use. She not only rejected the idea that women were not producers and users of stone tools, she also challenged the assumption that all *men* were skilled producers.

> Shouldn't we assume that stone tool makers varied in their goals and skills, even within the same culture? In fact, recent refitting studies and careful technological analyses support this assumption, and even indicate that in some cases the very highest levels of workmanship may only have been attained by a few especially skilled and talented individuals... In summary, perhaps our assumption should be that virtually everyone in the pre-metallurgical world made and used stone tools, but that there were great variations in goals, in skill, and probably in the amount of time and energy invested in this activity (Luedtke 1997:11).

In order to investigate those goals, skills, and investments which were driven by gendered division of labor, Luedtke reviewed the lithic material from several Boston Harbor island sites which she felt represented a range of gendered production practices. Luedtke considered these results demonstrative of significant differences in activities relating to lithic procurement, manufacture, use and discard. She concluded that the lithic assemblages associated with women's working areas were characterized by expedient tool use and repair, using local materials, suggesting that the low investment by women in these tools shows that "it is unlikely that chipped stone tools played a big role in creating or demonstrating social identity for women" (Luedtke 1997:18). Again, the interpretations of differential material use are related to social and subjective factors, rather than a naturalized difference which would conflate gender roles with biological sex.

Though it has proved vitally important to address the agency of individuals or social groups in archaeological interpretation, these types of studies have been criticized on a few points. First is the inconsistent relation of these individual actions to a broader context. While it is necessary to recognize the action of social being from the smallest level, and to credit past actors with the conscious abilities we ourselves claim (Moore 2000), how does this help us to understand wider social organization and cultural change over time? Second, agency frameworks often implicitly suggest that we can or have derived the source of personal intentions within the identification of personal actions (Pauketat 2001). And third, the emphasis on individual action may often privilege those social actors whose lives are most visible in the material and historical record (most often European males in the case of Contact period North America). Though agency is not generally defined in those hyperactive terms, it has often been the case that the most obvious examples of social agency are to be found in those types of actors. Once again, the issue of visibility becomes problematic, both for Native Americans and for women (Gero 2000, Lazzari 2003).

An appeal to a wider practice theory framework may help to avoid these difficulties. Broadly defined, practice theory attributes social structure to the daily, repeated practices of individuals; social practice is recursively implicated in the creation or reproduction of social structure, and is simultaneously shaped and constrained by that social structure (Bourdieu 1977, Dornan 2002). This framework, then, easily accommodates the multiscalar consideration of social life in terms of temporal change and populations. It is applicable specifically to the interpretive focus on gender in that gender can be considered one type of social structuration: it is *made*, both by us and for us (Ortner 1996). Further, because *all* practices are a part of relational social structuration, we are not restricted to the most apparent or hyper-representative evidence (Lightfoot *et al* 1998). For example, when critically examining lithic assemblages, the end-products and apparent uses of them are only a small part of the whole suite of actions and domains that are related to the practice of lithic technology. Some of these practices include raw material procurement, acquisition of technical skills (i.e. learning or apprenticeship), use and re-use of materials, social

interactions involving these materials (i.e. sharing), and spatial location of manufacture, use, or waste disposal. These are the ways that social structure is daily materialized. Considered in the long term, changes to any of these thought or unthought practices may lead to broader structural shifts. Where a person sits while knapping stone, in relation to the rest of his or her group, may be implicated in the specialization of craft knowledge. As gender identity is clearly related to these small operations, gender is also deeply implicated in long-term persistence or change in social organization.

Because practice theory emphasizes the way in which all levels of action relate to the construction of society, case studies have focused on evidence of the materiality of social structure and the role of social space. Dobres (1995 and 2000) has brought greater attention to the analysis of *chaîne opératoire*, which is based on the idea "that any technological act is the sum of technical facts, physical facts, and cognitive and perceptual motor facts" (Dobres and Hoffman 1994:237). The use of this concept in social contexts illustrates the fact that technology cannot be appropriately understood in isolation from social interaction. Sassaman has suggested that viewing lithic tool use, agriculture, and ceramic manufacture as socially practiced technologies (often organized through gendered labor) leads to a very different understanding of the broad temporal shift from hunter-gatherer to semi-sedentary or sedentary subsistence/settlement patterns. Rather than assuming mutually exclusive spheres of production practice, interdependence of gendered production and an accumulation of small changes may actually be a better explanation for this shift than a sudden and unlikely "appearance" of new technologies (Sassaman 1992). As a last example, more attention has been given of late to discerning evidence of apprentice or novice stone knappers, accounting for lithic debitage exhibiting poor technique or experimentation on low-quality materials (Finlay 1997). Technological skill is not a given, and it is probably no surprise to think that children must spend time learning to knap stone. To recognize this in the past, however, requires attention to the evidence of mundane, daily actions. It is at this level that I wish to consider the ethnohistoric, spatial, and lithic evidence of gendered production.

ETHNOHISTORY OF THE CONTACT PERIOD, COASTAL SOUTHERN NEW ENGLAND

While no direct historical documentation is extant for the Sandy's Point site, a wealth of ethnohistoric detail was included in records from earliest European exploration and settlement of coastal southern New England, and these records allow for a richer interpretation of production practices on the site than otherwise would be possible. Of course the observations of these Europeans were biased. Explorers and settlers arrived with a particular mindset and *habitus* (Bourdieu 1977) coloring their perceptions and social interactions, which included specific expectations for gender roles and ideologies. At the time of the first settlements in New England, English society was in the midst of a major paradigm shift in gender, due in part to a changing economic base from agriculture organized under a feudal system into capitalistic, wage-labor production. Women were largely shut out of the new labor market, the products of their traditional roles devalued (Clark 1919:124; Fletcher 1995). The new European market economy was also fundamentally at odds with the Native Americans' conservative use of their natural resources for subsistence (Cronon 1983:53). These elements of the explorers' or settlers' mindset informed his observations of gender, the division of labor, and land-use, and are apparent in the numerous ambiguities in the descriptions. Ironically, however, it is in part the European colonial agenda which yields such detailed information in their writing with regards to materials which they would regard as commodities, and to production in general. It is for this information that I will consider a few of the available text sources.

Early explorers offer the perspective on Native American social groups prior to their large scale disenfranchisement from the landscape, though certainly cultural contact was recognized from as early as Verrazzano's 1524 voyage through Narragansett Bay (Verrazano, in Karr 1999). On his exploratory voyages in 1604-1607, Samuel de Champlain made a closer examination of areas presently known as Cape

Cod Bay, Nantucket Sound and Buzzards Bay. Following encounters with the local populations, Champlain described their manner of subsistence, noting "All the inhabitants of this place are very fond of agriculture, and provide themselves with Indian corn for the winter." He also noted physical household structure in active use:

> Their dwellings are separate from each other, according to the land which each one occupies. They are large, of a circular shape, and covered with thatch made of grasses or the husks of Indian corn. They are furnished only with a bed or two, raised a foot from the ground, made of a number of little pieces of wood pressed against each other, on which they arrange a reed mat, after the Spanish style, which is a kind of matting two or three fingers thick: on these they sleep (Champlain 1946:95-6).

Much of the material noted here, including the structure and the reed mats, can be placed into the context of gendered task division by later European observation. Champlain's opinion of the subsistence production of the Cape area residents is that "They are not so much great hunters as good fishermen and tillers of the land (Champlain 1946:96)."

Champlain's maps and illustrations are also useful European representations of the Native American use of space. In Figure 1, planting fields are scattered along the shoreline and somewhat inland on the Cape, each field with an immediately adjacent structure. A few fields are also associated with a series of linear rows; these are not specifically identified but may represent fallow fields (the European agricultural tradition being furrowed rows, not hills), drying planks for corn, or storage trenches which he himself describes:

> They make trenches in the sand on the slope of the hills, some five to six feet deep, more or less. Putting their corn and other grains into large grass sacks, they throw them into these trenches, and cover them with sand three or four feet above the surface of the earth (Champlain 1946:95).

This perhaps describes the storage of seed corn for the following year.

As more English settlers arrived, the ethnohistoric record was expanded by individuals who took a particular interest in the lives of the local native inhabitants. In 1634 William Wood presented *New England's Prospect*, the first detailed description of not only the natural resources of the colonized region but also the people. His book promised:

> A true, lively and experimental description of that part of America, commonly called New England: discovering the state of that country, both as it stands to our new-come English planters; and to the old native inhabitants... (Wood 1977:2).

Part of his aim, of course, was to encourage colonization, yet he also showed a genuine admiration for the people he described. The end result of this conflict of interests was that the portrayals were ambiguous in tone, particularly with regards to gender. The Englishman's admiration for hard work and industry was expressed in the glowing terms with which he described women and the scope of their duties, while his distaste for idleness fell hard upon the heads of the men who did not appear, in his eye, to do much beyond eat and play games. At the same time, women's lives are seen as slavish and altogether subordinate, devoted to the care of men:

> Much good might they receive from the English, and much might they benefit themselves, if they were not strong fettered in the chains of idleness; so as that they had rather starve than

> work, following no employments saving such as are sweetened with more pleasures and profit than pains or care, and this is indeed one of the greatest accusations that can be laid against them which lies but on the men (the women being very industrious) (Wood 1977:91).

This was his means of ultimate reconciliation with the goal of colonization, showing that though there were, in fact, industrious people in New England making good use of the land, they were only women, and the nature of the men was justification for relieving them of their lands. However ambiguous, Wood

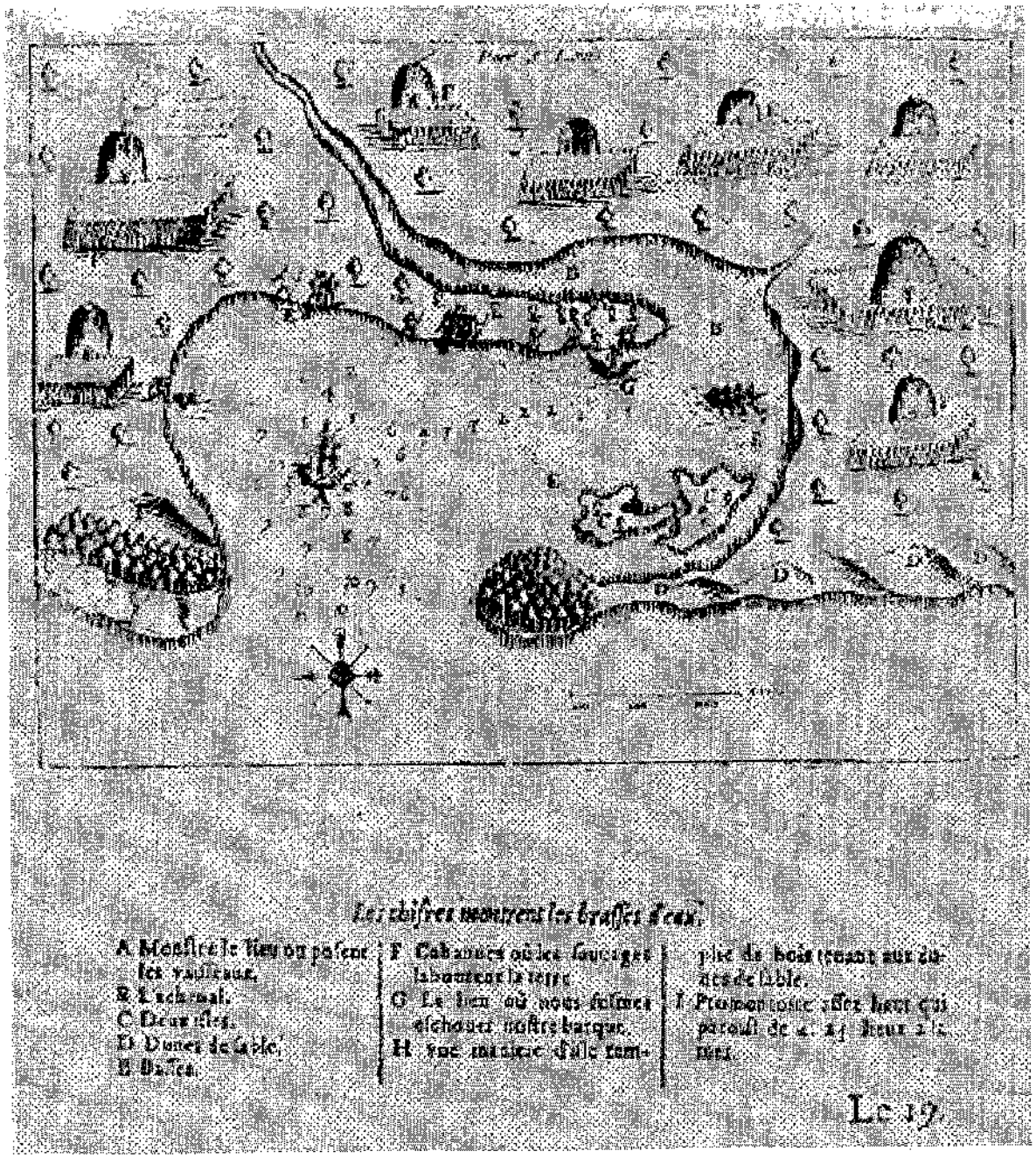

Figure 1. 1613 Woodcut of Plymouth Harbor produced by Samuel de Champlain. Courtesy of the John Carter Brown Library at Brown University.

included in his publication an entire chapter devoted to "Women, Their Dispositions, Employments, Usage by Their Husbands, Their Apparel, and Modesty." The productive capacities and employments of women were described in rather exemplary terms, so much so that one may suspect an exaggeration of the proportionate production in relation to men. These efforts included house-building, especially the weaving of mats for covering the round branch frames, "which deny entrance of any drop of rain...neither can the piercing north wind find a cranny through which he can convey his cooling breath (Wood 1977:112)." At the change of locale within the seasonal rounds, women transported the physical components of the household, "troubled like snails to carry their houses on their backs."

Procurement and processing of food resources was also the care of women. Corn agriculture was practiced, "wherein they exceed our English husbandmen, keeping it so clear with their clamshell hoes as if it were a garden rather than a corn field (Wood 1977:113)," and this responsibility carried over to the processing and storage of the harvest. Wood offered the opinion that the storage pits were employed in order to hide the corn from gluttonous men, who would have eaten it all if they only knew where it was buried (not a particularly flattering notion, hinting that the men were too stupid to locate the storage pits which the Pilgrims so readily found). He noted that women brought in shellfish as well as lobster for both food and fish bait, and that this was no mean feat, for "(t)hey must dive sometimes over head and ears for a lobster (Wood 1977:114)." Fish were caught and brought in to shore by men in canoes, at which point women carried them to camp, cleaned and processed them with the lobster. Processing involved using some of the catch for the daily diet, often cooked in a pottage with corn and other harvested plants, as well as those wild foods gathered as the season allowed. The surplus was prepared for use in seasons of less plenty:

> In the summer these Indian women, when lobsters be in their plenty and prime, they dry them to keep for winter, erecting scaffolds in the hot sunshine, making fires likewise underneath them (by whose smoke the flies are expelled) till the substance remain hard and dry. In this manner they dry bass and other fishes without salt, cutting them very thin to dry suddenly before the flies spoil them or the rain moist them, having a special care to hang them in their smoky houses in the night and dankish weather (Wood 1977:114).

In the process of this specific type of food preparation there was evidently need for tools, in the slicing of fish and lobster for smoking, and in all likelihood the full range of food preparation activities would have required some kind of cutting implement. The particular type of implement was not noted, and may have been bone, but certainly stone would provide a sharper edge. Additional tasks noted in this chapter included the gathering of plant materials to use in mat and basket weaving and dyeing, sewing shoes and crafting feather cloaks, and "all their household drudgery which daily lies upon them (Wood 1977:114)." The collection of edible wild plants was not mentioned as a task, perhaps because Wood was not present at the correct time of year to witness it, or perhaps because men were neither invited nor encouraged to participate.

Wood also provided the earliest detailed descriptions of men's production activities. Although he denigrated their contributions by calling them lazy, the native local men contributed significantly to their families and larger political allegiances. From his descriptions it is apparent that women were in control of and did most of the work associated with the household/field area, whereas the work of men was performed in a nonspecific arena away from this area (perhaps contributing to his poor opinion of men). The tasks performed in the non-focal areas were never specifically gender attributed, but from context it is clear he was referring to men. For example, he noted women collecting "lobsters for their husbands, wherewith they bait their hooks when they go afishing for bass or codfish" (Wood 1977:113). As his means of discussing women's work was a separate chapter, the remaining sections of subsistence production are assumed to refer to men as the agents.

Materially these tasks involved some specialized tools, the largest of these being canoes. On the manufacture of pine log canoes, Wood noted "before they were acquainted with English tools they burned hollow, scraping them smooth with clam shells and oyster shells, cutting their outsides with stone hatchets (Wood 1977:109)." We should observe from this description that men were not only using stone tools but also shell tools, just as women used shells as hoe blades. This suggests that the utilized base material was not gender-specific, though the manufactured form or task application may have been.

Fishing, game hunting and trapping required more specialized tools. Bows, arrow, fishing nets, lines, and hooks and other projectile cutting implements were part of this toolkit, and arguably the nature of their use demanded that these be highly refined items. Some basic conditions of the manufacture of these items were described by him; he noted "hemp more curiously wrought of stronger material than ours, hooked with bone hooks... they likewise make very strong sturgeon nets (Wood 1977:107)." Particularly for sturgeon they made use of "a forty-fathom line," or 240 feet of cord. The cord was also produced to be used in traps, such as for deer, "which are springs made of young trees and smooth-wrought cords, so strong as it will toss a horse if he be caught in it (Wood 1977:106)." The same traps were used for any other game which could not chew through the cords, such as otter and beaver. Specialized traps for these animals were mentioned, but not described by Wood, who only said "(t)hese beasts are too cunning for the English, who seldom or never catch any of them..." Another type of trap involved the manipulation of the landscape; by forming hedgerows which narrowed to a wedge, they were able to easily take deer that found themselves confined by the hedge.

One of the most recognizable of the refined tools in the archaeological record, stone projectile points or arrowheads, was conspicuously absent in Wood's observations. Instead, he described the use of arrows "headed with brass in the shape of a heart or triangle (Wood 1977:108)," meaning either they were manufactured from European trade materials or local copper. In either case, this may suggest that lithic material may have been a functional choice in part, rather than wholly stylistic, aesthetic, or ritualistic, at least in the early historic period. In other words, lithic material was not so heavily invested with meaning that it could not be abandoned in favor of a better material, or one which required less manufacture effort.

Another source of detailed observation is Roger Williams's *A Key into the Language of America*, published in England in 1643 (Williams 1973; for a more in-depth analysis of Williams's work, see Rubertone 2001). In it, he addressed some of the elements considered by earlier writers, such as household organization and subsistence production, while also including some very useful information about task division, as he observed or interpreted them in interaction with the Narragansett. Like previous writers, Williams noted the households of the planting season to have been located adjacent to the fields, of the same light frame and mat construction. He further provided a clear assignment of task by gender in the assembly of these houses, in an observation associated with a vocabulary word: "Wuttapúissuck, *The long poles*, which commonly men get and fix, and then the women cover the house with mats, and line them with embroydered mats which the women make (Williams 1973:117)." He later added, "The men make the poles or stakes, but the women make and set up, take downe, order, and carry the *Mats* and householdstuffe." This was a process which was probably done several times within a planting season, as Williams noted that "when 'tis warme Spring, then they remove to their fields where they plant Corne... when the worke of one field is over, they remove house to the other (Williams 1973:128)."

Williams was also fairly specific on gendered tasks involving subsistence production. He noted that tobacco "is commonly the only plant which men labour in; the women managing all the rest (Williams 1973:103)." Clearly the vast majority of agricultural practice was the province of women, but as with other practices described above, there was no *strict* prescription of labor by gender, and the divisions were often cross-cut by age as well:

> The Women set or plant, weede, and hill, and gather and barne all the corne, and Fruites of the field: Yet sometimes the man himselfe, (either out of love to his Wife, or care for his Children, or being an old man) will help the Woman which (by the custome of the Countrey) they are not bound to (Williams 1973:170).

Breaking up new fields was accomplished communally by all adults; children were also involved in the planting and tending, at times living in "watch-houses" in the fields in order to keep the birds away from young or ripening corn (Williams 1973:163). Processing the corn into meal was also specifically attributed to women, who used a "pounding Morter" (Williams 1973:121). Other described subsistence tasks included trapping and hunting, fish and shellfish collection, and uncultivated plant gathering, especially chestnuts, acorns, and walnuts for oil. Manufacture of canoes for fishing was portrayed as a task done by a solitary man, at the site where he felled his tree, "so he continues burning and hewing until he hath within ten or twelve days (lying there at his worke alone) finished" (Williams 1973:176). While Williams did not record any instances of women engaged in fishing or men in shellfishing, he did note that often women and children would accompany men to game trapping areas, perhaps to provide assistance as men occasionally did in the field. The gender division of labor that was depicted in the *Key* was one of generalized task responsibility, not one which would entail strict divisions of space to reinforce divisions of task.

For the most part, the materials used in the performance of these tasks were referred to only peripherally by Williams, though one reference to lithic material stands out. He noted the use of English iron implements, "stone formerly being to them in stead of *Knives, Awle-blades, Hatchets,* and *Howes*" (Williams 1973:121). The inclusion of hoes is curious, as elsewhere within the *Key*, the use of clam shell hoes was described. The contradiction may have reflected the use of more than one type of hoe, and in fact two different terms for hoes were recorded: *Anáskhig*, a hoe, and *Anaskhomwáutowwin*, "a breaking up How" (Williams 1973:170). One might guess that the first type was shell and the second was stone. Tools used for hunting and fishing were mentioned as traps, sharpened sticks, nets, sometimes iron spear heads, but oddly never stone projectile heads. Possibly the craft of knapping refined stone projectiles had been abandoned in favor of the newly available material, or for some reason was never observed in production or use by Williams.

Craft production observed by Williams is worth mentioning as well, in that it indicated a degree of specialization. While divisions of labor have been demonstrated along lines of gender and age, tasks were also sometimes divided to the level of the individual, though certainly age and gender may have directed those individuals in choosing a craft or task to focus upon:

> They have some who follow onely making of Bowes, some Arrowes, some Dishes, and (the Women make all their Earthen Vessells) some follow fishing, some hunting (Williams 1973: 215).

William Wood had noted that women produced woven feather cloaks, but Williams attributed this task to older men (Williams 1973:186). This variability may have been by social group (Massachusett versus Narragansett), but perhaps the craft was open to both men and women. Some crafts which might have lent themselves to specialization were instead apparently produced broadly, such as the currency for exchange, wampum; "most on the Sea-side make Money, and store up shells in Summer against Winter whereof to make their money (Williams 1973:215)." Taken together with all other notations of material production tasks, Williams detailed a rather multilinear and multivariate division of labor among the Narragansett. Further he showed that even divisions held "by custome of the Countrey" were often transcended in practice.

Williams' observations of a complex and cross-cutting division of labor are upheld by material evidence from the RI-1000 Narragansett graves site in North Kingstown, Rhode Island, excavated in 1982. Rubertone's (2001) analysis of sexed burials at this site indicated that there were not only significant differences between men's and women's grave goods, but also between younger and older individuals' grave goods. One of the major differences was in the types of associated tools, indicating changing production practices over an individual's lifetime (Rubertone 2001:155-163).

The observations made by European explorers and settlers of southern coastal New England allow us to offer some general conclusions about the gendered division of labor and the materials associated with the performance of these gendered tasks. The nature of gender relations can also be derived, to a certain degree, from this record. Though men and women were occupied in different productive tasks, they were prone to assist one another when necessary without cultural prohibition. On the level of food production, the efforts of both were valued equally, though in the production of surpluses women's work may have been given somewhat higher value. Roger Williams did note that an important reason given to him for the practice of polygamy was "desire of Riches, because the Women bring in all the increase of the Field, &c., the Husband onely fisheth, hunteth, &c (Williams 1973:206)." Given that the work of women was thus valued, it is reasonable to assume that women would have had free access to the necessary resources.

We can also make some assessment of the materials used in the performance of production tasks. At no point in the cited ethnohistoric sources was the manufacture of lithic implements described; while we cannot definitively say that women were involved in the manufacture, we also cannot say that they were not, and there would have been no physical limitation on their ability to do so. In their responsibilities as fishers and hunters, men would clearly have had need of refined projectile points, and it is plausible to suppose that men were in fact the manufacturers of these tools. Women, on the other hand, would have had need of more multipurpose cutting implements for their many tasks, including processing of food, manufacture of housing elements, and craft production. Thomas Morton (1972:57-8) observed, in 1637, that

> They love not to bee cumbered with many utensilles, and although every proprietor knowes his owne, yet all things (so long as they will last,) are used in common amongst them... I have observed that they will not be troubled with superfluous commodities. Such things as they finde, they are taught by necessity to make use of.

Thus tools and other possessions were often shared, and due to the practice of seasonal mobility, many items were simply produced, discarded, and reproduced on demand rather than curated (also noted by Sassaman 1992, Luedtke 1997). These would have been tools of low manufacture time, expediently produced in the form appropriate to the immediate task. The Sandy's Point site was therefore likely a focal point for women's production, and the lithic assemblage associated with it was therefore heavily used and in part produced by women.

SANDY'S POINT SOCIAL LANDSCAPE AND LITHIC ASSEMBLAGE

The area of analysis from Sandy's Point was excavated in 1992 as part of a University of Massachusetts Boston field school in environmental archaeology directed by Stephen Mrozowski. This site had originally been identified through a testing survey, and subsequent fieldwork documented a wide distribution of Native American material and features, including a lithic workshop, a shallow midden, and cornhills. The field school focused on an area adjacent to the field of cornhills, which had been defined through testing and remote sensing. Using a strategy of "large-scale, open area excavation units"

(Mrozowski 1994:48), a total of 33 contiguous 2 by 2 meter units were opened and excavated to sterile B-horizon soils, in both stratigraphic and arbitrary 5 cm levels.

Although several of the tested areas of the site were dated to cultural periods through diagnostic artifacts and radiocarbon dates, the age of this area was somewhat ambiguous. A carbon sample from a hearth feature returned an early Late Woodland date (750 ±50 BP), but was horizontally associated with European trade materials from the early 17th century (Mrozowski 1994:50). The unit field forms and vertical distribution of cultural material showed no separation of distinct occupation, though according to ethnohistoric reports it seems likely that the site was only seasonally reoccupied. If this were the case, the periods between use were too short to allow distinguishable occupational strata. The radiocarbon date itself may indicate that reuse has caused a stratigraphic "flattening," and temporal distinctions are only visible where deliberate deposition occurred, such as hilling for corn cultivation. While a few of the cornhill features do overlie subsoil features, there is no indication that the subsoil features date to a significantly earlier period, and the simplest explanation for the layering may be that the boundaries of the field shifted slightly over the years. In other words, the location of the light summer house structure in one year may have been covered in a subsequent year by the encroaching edge of the field. Cultural material was recovered vertically within approximately 25 cm depth below the natural cap of windblown sand, and is densest within a 5-10 cm span of this (approximately 40-50 cm below datum). Therefore, it is reasonable to treat the material from the discrete arbitrary levels as undifferentiated accumulation from seasonal occupations spanning over a period of years, and as no significant or useful vertical distributions occur, the horizontal patterning is the sole focus of the analysis to be discussed below.

After elimination of natural soil anomalies, the cornfield periphery was left with a set of features which can be confidently identified, and which form a small window onto the social landscape of the site's occupants (Figure 2). These features fall into several categories. First, the cornhills themselves, which were evident in the organic A-horizon soils. These were partially excavated, and the remainder were removed in their entirety for soil flotation.

A second feature category recorded was postholes of varying size which were identified at the interface of the A-horizon with glacial subsoil, and extended into the subsoil to depths of 15-30 cm. The positive features of this type form the outlines of two overlapping light structures, consistent with the ethnohistoric observation of temporary and portable structures used in seasonal agricultural activities. One feature within the bounds of these structures was identified as a hearth.

Finally, at the northwest corner of the excavated area, a series of long narrow features was identified in the A-horizon soils. Though functional identification was not made at that time, Mrozowski later speculated that these features may have matched the furrow-like markings included on Samuel de Champlain's maps of aboriginal villages along the Cape (Stephen Mrozowski 1999, personal communication). He proposed that they might either be actual plowed furrows (of European agricultural technique) or planks laid out for drying corn or processed fish or shellfish. Further review of the field documentation forms indicates that the soil matrix below this feature contained a large amount of charcoal and fire-cracked rock, and at least one feature identified as a hearth. This recalls William Wood's description of how Native women would cure fish and lobster, "erecting scaffolds in the hot sunshine, making fires likewise underneath them (by whose smoke the flies are expelled) till the substance remain hard and dry" (Wood 1977:114). These features are represented on the plan map of the excavated units.

The aggregate lithic assemblage associated with this area is consistent with models for a late prehistoric, semi-sedentary group with partial subsistence dependence on agriculture (Sassaman 1992). It is composed largely of locally procured stone, and exhibits the qualities of unstandardized and expedient tool production for the most part. To gain a clearer picture of how this relates to the gender division of labor,

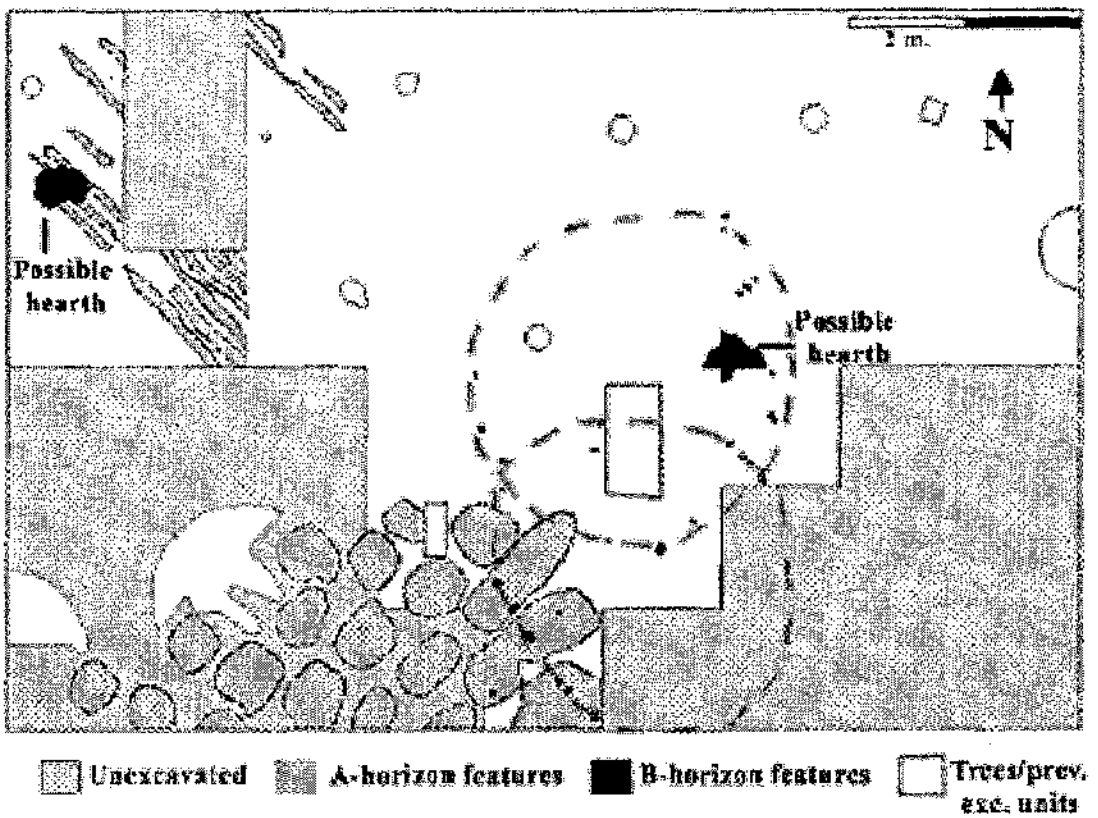

Figure 2: Plan map of open excavation area.

especially the kind described by the ethnohistoric records, I looked at the types of variation in material densities, material types, tool form, and production technology within the site area. To begin I characterized the spatially evident working areas, then I compared them to each other and to the adjacent open space. The observed distributions were established as statistically significant, non-random patterns of deposition.

Dwelling structures

The structure, as defined by the area enclosed by a set of postholes, wholly encompassed several of the excavations units and cut through several more. These units contained non-local stone, including Saugus Jasper and chert, in proportions varying between 10.1% and 38.8%. In fact, 87% of the chert on the site was within these units; at least two of these pieces are gunflints or gunspalls, while the remainder are small retouch flakes. The Saugus Jasper was almost entirely reduction waste with the exception of one preform/blank which was recovered from the extreme periphery of the structure's outline, making it unclear whether it was inside or outside the structure. Interestingly, the chert was most heavily concentrated within the southern end of the set of postholes, while the Saugus Jasper was mostly in the northern end. These concentrations may be associated with two temporally separate structures, as the patterns of the postholes suggest. Overall these excavation units had very high densities of lithic material relative to the rest, particularly when compared to those units lying immediately outside the structure. This distribution of densities is discussed in more detail below. Also present were 6 broken rhyolite projectile points, 5 biface tools (quartz, quartzite, and rhyolite), 2 preform/blanks, and 11 utilized flakes, as well as several utilized cobbles. These artifacts, and the associated debitage, suggest that a wide range of tool production strategies were in use, from formal biface reduction and rejuvenation to extremely expedient flake tool production.

Cornfield

As can be seen on the plan map (Figure 2), the edge of the field of cornhills abutted or overlapped the structural outline, or at least its earlier placement. Because of this overlap, there is no way to tell if the lithic material recovered from the excavated cornhill features was associated with the earlier structure, pulled up by roots, or deposited in the cornhills themselves. It is worth noting, however, that 94% of this material included only small retouch flakes or generic chipping debris, mostly rhyolite, though there were a few flakes of chert and argillite. The remaining material involved larger flakes, one with evident use wear, and one fragment of a finished projectile point. The presence of chert might suggest that this material was in fact associated with the earlier structure. As flotation and analysis of the cornhills farther away from the structure(s) are ongoing, I was unable to make an assessment of lithic tool use in the field, although this is definitely a line of evidence to be investigated in the future.

Drying/smoking platform area

The possible drying/smoking platform in the northwest block was evident in four excavation units. An additional four units directly adjacent to the feature were excavated. All of these units had very low densities of lithic material, with 2.5 flakes/m^2, while the mean unit density at the site is 10.6 flakes/ m^2. On average the proportion of non-local stone was 23%, which is consistent with the aggregate site composition. However, the fraction by unit was quite variable, wherein two units contained no non-local material while three others had 30% or more. This fraction consisted almost entirely of Saugus Jasper, with the exception of one small flake of chert. The lithic material in these units also tended to be larger on average than the mean; for all flakes over 2 cm in length, the site mean was 2.73 cm, while in the vicinity of the drying area the mean length was 3.28 cm.

This high mean size was due to the fact that the subassemblage had a *proportionately* greater share of large flakes, unlike other areas which were dominated by small waste flakes. Not surprisingly, some of these large flakes have evidence of edge wear. These utilized flakes were of a variety of base materials, including rhyolite, quartzite, and (surprisingly) Saugus Jasper. Along with the expedient flake tools were other implements:a highly refined rhyolite projectile point, two Saugus Jasper biface tools or preform/ blanks, a large rhyolite biface tool, and two utilized cobbles. Like the tools associated with the household structure, the forms and degrees of refinement of the tools in this area range from standardized and formalized to amorphous and expedient. However there was no indication that lithic tool production was occurring in this area beyond a few biface retouch flakes and the expedient flake tools, leading to the question of why the Saugus Jasper preforms were present in this area. Were they left behind, or had they been used in this area for food processing tasks?

The open area not directly associated with features is characterized by two distinct patterns of discard behavior. On the one hand, a high-density unit in the northeast corner consisted almost entirely of rhyolite reduction waste, primarily biface thinning flakes and flake fragments, and a few pieces of quartz. No formal refined bifaces were found in this unit. The unit immediately to the south, though lower in density, matched this with the exception of two fragments of broken projectile points. Only one very small piece of non-local material (chert, possibly Pennsylvania jasper) was found within these two units. On the other hand, the low-density open space units did contain a mix of implements: some refined tools, including one projectile point and four biface tools, and some unrefined, two utilized cobbles and four utilized flakes. This space also reflected a mix of stone procurement sources, with 19.5% of the subassemblage as non-local material.

DISCUSSION

First, what does the patterning of lithic material types tell us about gendered procurement practices? The bulk of the assemblage consisted of the readily available rhyolite beach cobble, and there was no significant preference in the use of that material. In other words, rhyolite was used to make all types of implements, from the highly refined and stylistically recognizable projectile points to the completely unrefined utilized flakes and cobbles. It is conceivable that any individual could have gleaned raw material from the shoreline; both men and women had work which would have brought them there on a regular basis – men to launch their fishing canoes and women to collect shellfish and lobster. In the nature of these tasks, however, women probably spent the greater amount of time on the beach itself and therefore may have made the greater contribution to the supply of raw material. Additionally, collecting or gleaning was a practice to which they would have been accustomed, having also the responsibility for collecting non-domesticated plant resources. The cobbles found on the shore could have been carried back to the household area to be stockpiled. The unusually high-density units in the northeast corner of the excavation area, consisting almost entirely of such local material, may have been associated with such a collection or a lithic workshop, easily accessible to any individual in need of raw material.

The non-local raw material types showed a much more spatially distinctive patterning. The chert, for example, was heavily concentrated in one of the structures, as retouch flakes and a few gunflints or gunspalls. A concentration of Saugus Jasper reduction debris was also within the dwelling, while none was recovered from the high-density units, suggesting this material was not necessarily freely accessible. It is very interesting to note, however, that the end-products are concentrated in the vicinity of the drying/smoking platform, as two preform/blanks and one low-retouch hand tool, not as refined or finished projectile points. Our assumptions about rare or highly valued materials might lead us to believe that they would only be used to produce highly refined tools associated with men's work. If we interpret the placement of the preforms as an accidental discard of valued material, unassociated with food processing tasks, why is there a low-retouch hand tool made of the same material there? It is perhaps a mistake to assume these were preforms for projectile points; perhaps these were to be cutting tools made for (or by) women for use in their own work. Let us also not assume that because Saugus Jasper was used for these purposes that it was not necessarily a valued material. It may have been the material itself, not the form to which it was shaped, that was of value.

Material density combined with distribution of tool forms and degree of retouch has also distinguished working areas. The drying/smoking platform area was in some ways fairly consistent with Luedtke's (1997) characterization of a "woman's toolkit" associated with gender-specific tasks. A low density scatter of large utilized flake tools and biface retouch flakes support the idea that women were using expedient tool manufacture to perform food processing work. Unlike her study, however, a small number of biface tools were also included in the sub-assemblage, including the Saugus Jasper items noted above as well as two made from rhyolite. Refitting studies may show that the retouch flakes were removed from these associated bifaces. It is possible that the inclusion of the more refined tools stems from the proximity of this working area to the dwelling, a focus for so many different tasks, whereas Luedtke's study sites were shellfish processing locations removed from the main habitation sites.

The distribution of highly refined projectile points within this area can be used as a starting point for the interpretation of men's activities on this site. Of nine projectile points identified, five were found within the household itself. Possibly these items were cached in the structure, though only two were recovered from within the same excavation unit. Alternatively, they were manufactured within the structure; the relatively high density of reduction debris associated with the structure would support this interpretation. While initially it might seem counterintuitive to think that lithic processing might occur within a living structure given the dangers of flying debris, there is a logic to it, in that if the manufacturer were

the only one in the structure at the time then the danger to others is eliminated. Roger Williams noted that elder men might provide assistance to women in the field (Williams 1973:170); if the infirmities of age prevented such men from hunting or fishing, perhaps they also occupied their time in making tools for others, and the dwelling was a safe and comfortable place to do so.

Another point to consider is the reduction debris which represents 90% of the lithic assemblage by count, and is by far the most visible portion of the lithic record. Even if the number of refined object pieces is less than the low- or unrefined pieces, the bulk of the debris must have been generated in making the refined objects. What this means is that the expedient technology practiced by women actually contributed very little to the total assemblage; if this were the only manufacturing technique in practice on the site, the whole assemblage might resemble the drying/smoking area deposition. The activity of men is therefore quite visibly represented in the archaeological record materially, but it is spatially shaped by the activities of women. For example, the structure itself, in part constructed and wholly maintained by women, shaped the deposition of debris when used as a locale for lithic manufacture. Also, if the high-density area was associated with a raw material stockpile, then women's procurement and storage decisions may have determined this location. The material culture is only one part of our interpretation of the archaeological record; spatial context, representing the social organization of space, is a crucial interpretive element, and when sites are assessed solely on the basis of aggregate assemblage composition, this element is lost. Here, it is clear that the performance of gender roles has materially structured this space.

This is perhaps the most important insight to be gained from the lithic evidence at this site, because it challenges the assumptions that chipped stone tool manufacture always occurred at a remove from the dwelling areas. When we find that this activity took place in this arena, at whatever level of skill or intensity, we are forced to reconsider our conceptions of the spatial division of labor and isolation of gendered activities. Ultimately we must reassess our ideas about women's participation in lithic procurement, manufacture and use, as well as our ideas on men's participation and activity in the "domestic" sphere. With evidence from both the ethnohistoric and the material records of so much production taking place in this arena, is there even any utility in the concept of "domestic space" in the analysis of gendered labor, whether or not men are included in the activity?

Overall this assemblage suggests to me that gendered work conducted in and around the household overlapped spatially, materially, and technologically. All of these axes of analysis are intertwined to the point where no significant correlations can be made between any two attributes of the sub-assemblages in order to make a predictive model. Thus the application of alternative, social theories becomes crucial, for to look to material analyses alone for explication of social or cultural processes yields no clear answers. Through a consideration of practices enacting the needs and goals of the individual, and how those are carried out spatially and materially, one may gain a more coherent picture. When a critical ethnohistoric description of daily practices is added to the interpretation, it becomes clear that those needs and goals are fulfilled not only by the material itself, but also by the contributions of others. Recall what Thomas Morton observed: "yet all things (so long as they will last) are used in common amongst them (Morton 1972:57-58)." While there is no single appropriate framework for the investigation of Native American social structure, I have found that this type of focus serves to remind us of the humanity of our subject, and our responsibility in the ways that they are represented.

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THE MANHANSETS OF MANHANSACK-AHAQUATUWAMOCK: AN ANALYSIS

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ABSTRACT

Locally manufactured ceramics from Sylvester Manor, Shelter Island, New York were analyzed to determine if cultural continuity existed between prehistoric Native American ceramics and Colono ware from the historic period. Ceramics from the Sebonac period Native American occupation on the property were compared to Colono ware recovered from a historic trash midden dating from the destruction of the first dwelling in the early 1730s. Differences in thickness, temper, surface treatment and decoration, color, manufacturing technique, and vessel form were examined to determine if the creolized characteristics of Colono ware indicated a continuation of an already established Native American tradition or an introduction of traits possibly associated with African and European residents on the island.[1]

INTRODUCTION

Native Americans on "Paumanack", the Algonquian name for eastern Long Island, faced a rapidly changing world during the seventeenth and eighteenth centuries. The arrival of Europeans for trading purposes, their population decline from European diseases, their subjection to other Native American groups for protection, and the establishment of European settlements caused a major transformation in their traditional lifestyles. Recent archaeological excavations at Sylvester Manor, a northern plantation on Shelter Island, New York, are shedding new light on the important roles that Native Americans played on eastern Long Island during the colonial period (Figure 1). Sylvester Manor offers a unique opportunity to study Native Americans in colonial society because it contains intact archaeological remains from that time period and thousands of associated unpublished primary documents dating from the 1640s to the present. In addition to the historical documentation, an examination of locally manufactured ceramics from 1000 years ago through the 1730s is beginning to unravel the complex roles that the Manhansets, the Algonquian tribe that resided on Shelter Island, played in the daily operation of Sylvester Manor and in colonial society on eastern Long Island.

HISTORY OF THE MANHANSETS

Members of the Algonquian family have resided on Manhansack-Ahaquatuwamock, an eight thousand acre island between the north and south forks of Paumanack, for approximately four thousand years. Even though the exact date of European contact is unknown, the arrival of Europeans for trading purposes transformed the traditional lifestyle of the Manhansets. European diseases, such as smallpox, typhus, influenza, and measles, greatly decreased the Native American population on Long Island. Around 1600, the Pequots of southern Connecticut expanded to subjugate the Manhansets and other communities on eastern Long Island, including the Shinnecock, Montauk, and Corchaug Indians, to tributary status. To

[1] This article was excerpted from my M.A. thesis "On the Mend: Cultural Interaction of Native Americans, Africans, and Europeans on Shelter Island, New York", which was completed in 2002 at the University of Massachusetts Boston.

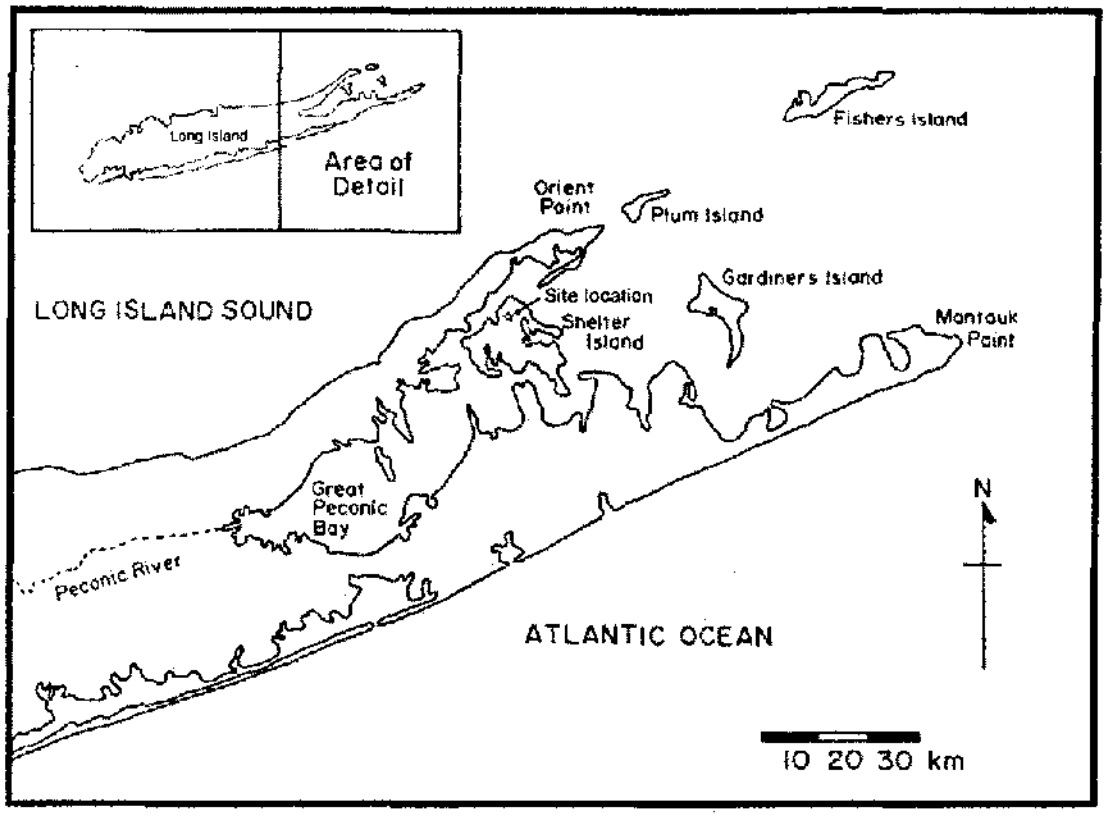

Figure 1. Map of the Island.

form larger and stronger political units, the Native Americans on Paumanack paid tribute to the Pequots in exchange for protection. Thus, the groups on eastern Long Island became closely connected through language, kinship, and lithic and ceramic traditions to Pequot communities in Connecticut (Ales 1993; 151; Strong 1997: 147, 154; Witek 1990: 42-44, 46).

As Spain, Holland, and England all claimed Long Island and the Connecticut River Valley as their domain, Europeans made alliances with local Native American groups to validate their claim and to establish and monopolize trade networks. When the Pequots united with the Dutch, the tributary Manhansets produced wampum as part of their annual payment to the Pequots. Wampum, an Algonquin word meaning "string of white shell beads" (Ales 1993: 28), had previously been used by Native Americans as both a type of currency and a decorative ornament. The Peconic Bay, which surrounds Shelter Island, was one of the most important sources of quahog and whelk shells in the region used to produce the purple and white wampum beads. Both the Dutch and English adopted wampum as currency during the seventeenth century and the center of its production was focused along the shores of eastern Long Island (Strong 1997: 69, 144, 146, 147, 151-154; Ales 1993: 28-29).

The Native American inhabitants of eastern Long Island were strategically positioned between Dutch settlers in New Netherland, English settlers in New England, and the Pequots, Narragansetts, Niantics, and other Native American groups in Connecticut during the first half of the seventeenth century. When the English built Fort Saybrook at the mouth of the Connecticut River in 1635, they demanded that the Pequots acknowledge English sovereignty by relinquishing two warriors who had killed two English traders and by paying a fine of wampum and pelts. When the Pequots refused to comply with their

demands, the Pequot War resulted in 1637 and decimated the Native American population in Connecticut for two years (Strong 1997: 154-158).

Algonquian sachems on eastern Long Island, particularly Wyandanch of Montauk and his elder brother Youghco of Manhansack-Ahaquatuwamock, the chief sachem of Paumanack, used this colonial conflict to advance their own interests by manipulating other Native American groups and engaging one colony against the other. On May 29, 1637, three days after the massacre of an estimated eight hundred Native Americans at a Pequot village near Mystic, Connecticut, the sachems of Long Island terminated their tributary status to the Pequots. Wyandanch approached Lion Gardiner, engineer and commander at Fort Saybrook and asked to trade with the English. Gardiner responded that there would be no trade or alliance until all Pequots taking shelter on Long Island were executed. Wyandanch replied, "I will go to my brother, for he [Youghco] is the great Sachem of all Long Island and if we may have peace and trade with you, we will give you tribute as we did the Pequits" (Gardener 1980: 137-138). Gardiner sent Thomas Stanton, an English interpreter, to Manhansack to search for refugees from Connecticut. Stanton discovered that Youghco had kept Wyandanch's promise and was not sheltering Pequot refugees on the island (Strong 1997: 156; Ales 1993: 31; Gardener 1980: 137-138).

In July 1637, Youghco and Wyandanch approached Israel Stoughton, a captain in the Massachusetts Bay militia, again requesting an alliance with the English. The following month, Youghco and Wyandanch presented Stoughton with forty fathoms of wampum to be distributed to Massachusetts Bay and Connecticut officials and sent five Pequot heads to confirm their allegiance. The sachems agreed to become tributaries of the English and shelter no Pequot refugees. The sachems of eastern Long Island sought an English alliance to advance their own diplomatic interests. With the Pequot population decimated and severely weakened, other Native American groups would attempt to control and collect their wampum, an extremely valuable resource in the area. Native American sachems on Paumanack decided to form an alliance with the English for their future security and protection, instead of allying with the Dutch or Narragansetts (Strong 1997: 158; Ales 1993: 31-33).

The first permanent English settler on Paumanack reinforced the relationship between the local Native Americans and the English. On May 3, 1639, Youghco and his wife, Aswaw, sold Manchonat, an uninhabited island at the mouth of the Peconic Bay, to Lion Gardiner for ten coats of trading cloth. Gardiner renamed the island after himself and moved his family there the following year. The further establishment of two towns in 1640, Southampton on the south fork and Southold on the north fork, initiated large-scale English settlement in the area (Tooker 1911: 90-91; Mallmann 1985: 12; Strong 1997: 160, 166-167; Dyson 1960: 29; Ales 1993: 36).

In 1644, Ninigret, chieftain of the Niantic Indians of Connecticut, sent a Narragansett captain to Wyandanch at Montauk to secure their support for an uprising against the English. Wyandanch took the captain prisoner and presented him to Lion Gardiner. With a letter of warning to Governor Eaton, Gardiner sent the prisoner and ten Native American guards to New Haven. Due to bad weather, the group "went to Shelter-Island, where the old Sachem dwelt- Waiandance's elder brother, and in the night they let him go, only my letter they sent to New-Haven" (Gardener 1980: 144). Youghco did not appear to support the same level of friendship with the English compared to his younger brother. Wyandanch and Lion Gardiner had become friends and allies, an advantageous relationship that would continue to benefit the Montauk sachem and English settlers after Youghco's death. The English utilized this connection to strengthen their alliance with the Native Americans for greater access to land, while Wyandanch exploited this association to gain power and authority within the Native American and English communities (Ales 1993: 38; Strong 1997: 21, 235-236).

In September 1644, Youghco, Wyandanch, and other sachems from Paumanack appeared before the second annual meeting of the United Colonies in Hartford to reconfirm their position as English tributaries. In the signed certificate of agreement, Youghco acknowledged English authority, validated the legitimacy of the Stirling Patent, and accepted the supremacy of English courts in all affairs involving English citizens and their property. He also assented not to bribe other Native American tribes nor harm or kill any European livestock. English domestic animals often roamed freely, so Native Americans would kill stray livestock that destroyed their crops. In return, the four sachems were promised that they would "enjoy full peace without disturbances from the English or any in friendship with them" (Ales 1993: 39). Through this arrangement, the English commissioners gained the exclusive purchase rights from Native Americans for land on eastern Long Island (Strong 1997: 171, 184-185; Ales 1993: 38-39; Strong 1994: 563).

The Native Americans on Paumanack also maintained contact with the Dutch, even after their arrangement with the English. It appeared that Youghco and the other sachems of eastern Long Island wanted to form alliances with both the English and Dutch for trading purposes and military protection. In May 1645, Wittaneymen, sachem of the Shinnecock who claimed to represent Youghco, negotiated an agreement with the Council of New Netherland to protect several towns in the center of Paumanack. This friendship with the Dutch was again confirmed in August 1647 after word of a Native American conspiracy against Europeans on Long Island reached Dutch officials. Peter Stuyvesant, governor of the Dutch West India Company, sent Cornelis Van Tienhoven, the colonial secretary, to eastern Long Island to investigate why the Native Americans had broken their alliance with the Dutch. After Youghco and Wyandanch reported that the peace agreement was still in effect, Van Tienhoven gave them three coats and other gifts (Ales 1993: 41, 43; Strong 1997: 187, 192).

The relationship between the English and Dutch continued to disintegrate, partially from the uncertainty over their alliances with local Native American groups. The English were particularly concerned that Dutch peace expeditions into eastern Long Island involved the distribution of arms. Governor Eaton of New Haven sent a letter to Stuyvesant claiming that the Dutch were selling contraband weapons to the Native Americans on Long Island. The English believed that the weapons would encourage attacks against them and promote Dutch settlement in eastern Long Island. During a Dutch investigation of weapon smuggling, it was revealed that Govert Lockerman, a Dutch trader, visited Youghco on Shelter Island near the end of 1647 to reportedly buy game fowl and venison. Lockerman detailed giving one pound of powder as a present to Youghco while in Gardiner's Bay. The English were convinced that Lockerman's visit with Youghco concerned more than the purchase of geese. Meanwhile, Youghco continued to pay tribute, including his yearly tribute to English Thomas Stanton in May 1649, and bestow presents, such as sixty fathoms of wampum to Governor Winthrop in 1647 (Strong 1997: 192, 193; Ales 1993: 43, 46, 46). To protect English interests on Eastern Long Island, Governor Eaton of the New Haven Colony and Governor Edward Hopkins of the Connecticut Colony began to acquire more land on eastern Long Island for the English. Within two years, Eaton secured almost the entire north and south forks of Paumanack for the English (Strong 1997: 193-196, 300-301).

On June 9, 1651, Thomas Middleton, Thomas Rouse, Constant Sylvester, and Nathaniel Sylvester in partnership bought Shelter Island and nearby Robin's Island for sixteen hundred pounds of good Muscovado sugar to establish a provisioning plantation for their sugar plantations on Barbados. Of the four men, Nathaniel Sylvester, younger brother of Constant, was the sole partner to relocate permanently to Shelter Island and had to report his personal trade with the "English Dutch Swedes or Indians" (Middleton *et al.* 1652:2) to the other partners (Strong 1997: 202; Smith 1998: 38, 43-44; Middleton *et al.* 1652: 1-3).

Meanwhile, the Manhansets were exploiting the information of the island's new owners to advance their own interests. Youghco sent Cockenoe, a local Native American interpreter who understood the

English political system, to complain to the United Colonies on September 2, 1652 that Thomas Middleton and his agents were trying to evict him from his island. Cockenoe argued that the four partners held a fraudulent title of ownership because neither James Farrett nor Stephen Goodyear, the previous English owners, had paid the Manhansets for the island. This charge was probably correct because new property owners negotiated and paid local Native Americans for land, even after purchasing the property rights from the English.

The United Colonies could not dismiss a complaint from one of the most influential sachems on eastern Long Island, especially when the English were concerned with Dutch attempts to recruit Native Americans in case of war with the English. Though no direct report survived detailing the commissioners' findings, Youghco and three of his elders -- Actoncocween, Captain Yowoconogus, and Sonquoquoequahesick, received payment for the island on December 27, 1652. A later document, dated March 23, 1653, confirmed that the Manhanset sachem Youghco gave Captain Nathaniel Sylvester and Ensigne John Booth full possession of the island for the four partners. Youghco delivered "one turfe and twige" (Mallmann 1985: 17) to the two men, symbolizing the transfer of ownership of the property. Then, Youghco

> with all his Indians that were formerly belonging to the said Island of Ahaquatawamock did freely and willingly depart the aforesaid island, leaving the aforesaid Captain Nathaniel Sylvester and Ensign Booth in full possession of the same" (Mallmann 1985: 17).

Numerous Manhansets joined local communities of the Montauk, Corchaug, and Shinnecock, while others remained on Shelter Island. After Youghco's death in 1653, Wyandanch became the next "grand sachem" of eastern Long Island (Mallmann 1985: preface, 16-17, 24; Tooker 1981: 181; Witek 1991: 175; Ales 1993: 49, 64; Strong 1997: 202).

With the legal title from the Manhansets, Nathaniel Sylvester quickly established his permanent residence on Shelter Island through the construction of a dwelling, warehouse, and various outbuildings to form the core of Sylvester Manor along the eastern shore of Gardiner's Creek. When Sylvester married Grissell Brinley between July and August 1763, three African slaves were also brought to Sylvester Manor: the first among numerous transported from Barbados to Shelter Island. Therefore, Nathaniel Sylvester relied on a combination of African slaves, indentured slaves, and local Native Americans to provide labor. These workers produced goods, such as oak barrel staves, agricultural crops, and livestock, for export to Barbados and performed other chores necessary for the daily operation of the plantation, including domestic service and skilled artisans (Grissell Sylvester 1685: 1; Freiberg 1992: 320; N. Sylvester 1680: 2; Coldham 1984: 165).

As a proprietor of Shelter Island, Nathaniel Sylvester became involved in local politics, particularly witnessing land purchases and agreements between Native Americans and English settlers. To procure money for tribute and other fines, Wyandanch sold his only available resource, land. For example, Sylvester witnessed a deed on September 20, 1654 when Wyandanch sold Samuel Mayo and Daniel Whitehead "Camusit", now known as Horse Neck, for three coats, three shirts, two cuttels, three hatchets, three hoes, two fathoms of wampum, six knives, two pairs of stocking, and two pairs of shoes. In May of 1656, Sylvester was further involved in the dispute between Samuel Andrews, who purchased the land from Whitehead, and the town of Huntington as both parties claimed to have deeds from the local Native Americans for the purchase of Horse Neck. Andrews traveled to Nathaniel Sylvester's home on Shelter Island to get the confirming deed from Wyandanch on May 4, 1658 before the arrival of the town representative (Mayo 1654: 1, 2; Barck: 1, 2, 19; Ales 1993: 64).

Other documentary evidence details the lifestyle of the Manhansets during Nathaniel Sylvester's ownership of Shelter Island. In 1657, the Manhansets were permitted to continue going to nearby Robin's Island to fish and collect shells for wampum production (Mallmann 1985: preface). Quaker visitors also described the Manhansets during their trips to Shelter Island. In 1659, John Taylor described that "a great many *Indians* lived on it, and they were Friendly and Sober, and made Serviceable to Friends for Guides, &c when we traveled in the Countries" (Wortis 1973a: 109). Nathaniel Sylvester sent an Indian guide named Robin with Taylor when he visited the nearby towns of Gravesend, Seatancott, Oyster Bay, and Hempstead. George Fox, founder of the Society of Friends, later led a two hour service through a Native American interpreter to approximately one hundred Manhansets, including the King and his council, during this first week of the island. The following Sunday, Fox again guided a large gathering for the Manhansets and arranged for future meetings for them every two weeks (Wortis 1973: 108-111; Freiberg 1992: 414; Penney 1911: 224-25; Fox 1975: 128-129).

Events in 1659 caused a major transformation in the lives of Native Americans living on eastern Long Island and directly affected their future relationship with Europeans. Wyandanch died from an apparent poisoning in the second half of the year. Europeans no longer needed a "Grand Sachem of Long Island" (Ales 1993: 62) to negotiate land deeds as they owned the majority of the land on Paumanack. Furthermore, a major smallpox epidemic began and continued through 1664, killing an estimated two-thirds of the existing Algonquian population. This smaller populace had to develop new strategies to negotiate with the continually growing English and Dutch population. These developments were major factors that led to a decline in Native American sovereignty, deterioration in their traditional ways of life, and a transformation in labor relations with Europeans in the latter half of the seventeenth century. With an increasing dependence on European goods, Native Americans became further incorporated into the European labor system after this date, often as whalers, domestics, unskilled laborers, and guides (Strong 1997: 233-35, 237; Ales 1993: 68; Strong 1994: 565).

After the English conquest of New York in 1664, the implementation of new laws further restricted the freedoms of the Manhansets. "Duke's Laws" denied the Manhansets from holding powwows or other religious celebrations where large groups would congregate, forbid them to sell land without the approval of the governor, and restricted them to trade only with licensed Europeans for furs, weapons, gunpowder, and alcohol (Ales 1993: 75; Dyson 1960: 23-24; Strong 1994: 567-69; Stone 1983: 78-79). Duke's Laws also caused European settlers to strengthen their land claims from Native Americans before the governor reviewed them. On July 22, 1666, Isaac Arnold and Nathaniel Sylvester witnessed a document describing the words of Chegono from May 19, 1666. This Native American confirmed that "Catawamock", an early name for Shelter Island, was the land of Wyandanch's father, thereby confirming the legality of the four partner's purchase of the property (Maro 1666:1; Nicolls 1666: 1-3).

In response to the pressures from the English to purchase more Native American land, some individuals within the Manhanset and Montauk tribes rebelled against their leadership in 1669 and sought assistance from Ninigret, the Niantic sachem. They traveled to Rhode Island, negotiated an alliance of tributary status, and agreed to pay yearly tribute. Early that summer, the Montauks sent Ninigret five pounds in wampum and the barrel from the late Wyandanch's gun with the pledge "that they would bee subject unto him for the future" (Ales 1993: 88). Afraid of an uprising, the men of Easthampton went to Montauk and confiscated the tribe's guns. When questioned about the alliance by Rhode Island officials, Ninigret claimed that a yearly tribute was promised when he returned Wyandanch's daughter in 1653. Governor Arnold of Rhode Island forbade Ninigret to collect tribute from the Montauks by force, only if they were willing. The Native Americans, who sent tribute due to their weakened state, agreed not to pay Ninigret more tribute and acknowledged the Governor of New York as their "Chiefest Sachem" (Ales 1993: 88-89; 91; Strong 1997: 250). To further isolate them from Connecticut during King Phillips' War in 1675, Governor Andros of New York ordered that neither alcohol, guns, nor ammunition be sold, that they be

disarmed and remain in their own villages, and that all canoes were secured. Guns were returned to the local Native American groups that September, with the exception of the Manhansets and Montauks because they had paid tribute to Ninigret a few years earlier. However, this isolation policy adversely affected the economic prosperity of eastern Long Island because whaling companies had relied on Native American men for labor during the winter months since the mid-seventeenth century. Four Manhansets were granted an exemption to this rule to man two whaling vessels (Ales 1993: 75, 85, 88-89, 91-92; Dyson 1960: 23-24; Strong 1994: 567-69; Stone 1983: 78-79, 248; Strong 1997: 250; Matthiesen 1986: 14).

The use and periodic abuse of alcoholic beverages further contributed to weaken the position of Native Americans on Paumanack. On July 8, 1672, the New York Court granted Nathaniel Sylvester's petition for constabulary powers to arrest unruly Native Americans on Shelter Island because Sylvester claimed that the Manhansets had

> yet sometimes in his absence, & at other while hee hath been there present, have presumed in their Drink to breed Disturbance and make Comotions there, the apprehensive of the Dangr whereof hath been ye occasion of great fights and trouble in his family (O'Callaghan 1858 Vol. XIV: 671).

Sylvester, or another person in his absence, was granted the ability to arrest unruly Native Americans, resulting in further English control of the Manhansets. The colonial government further acknowledged that the presence of the Manhansets on Shelter Island was strictly a courtesy of Nathaniel Sylvester as Sylvester permitted only Ambusco, late Sachem of Southold, and his family to emigrate to Shelter Island (O'Callaghan 1858 Vol. XIV: 670-71, 703; Witek 1991: 175).

Despite Nathaniel Sylvester's complaint to New York officials, alcohol trade with Native Americans had become an important colonial enterprise. Sylvester was apparently providing local Native Americans with rum that he received from Barbados and liquor from his cider mill at Sylvester Manor. Alcohol was a regular method of payment for furs, labor, and other services that the Manhansets provided. Native Americans infused alcohol in their celebrations and mourning rituals, but the liquid also became a method in which they dealt with the transformation of their society. Local Native American abuse of alcohol continued as Nathaniel Sylvester wrote Governor Andros twice in 1675 complaining about the drunkenness of Native Americans in nearby East Hampton "to the disquiet of others, at least himself & whole family" (O'Callaghan 1858 Vol. XIV: 713; Mancall 1995: 66, 43, 41).

After Nathaniel Sylvester's death in 1680 and Grissell Sylvester's death in 1685, Giles Sylvester, their eldest son, oversaw the daily operation of Sylvester Manor. Giles remained on the island with his nine unmarried siblings and continued trading with merchants in Rhode Island and Massachusetts and the Manhansets.

An important source of commerce at Sylvester Manor was the ongoing trade with members of the Manhanset tribe which Nathaniel Sylvester began after his arrival on Shelter Island. Giles Sylvester's account book with excerpts from 1680, 1682, 1687-89, 1692, and 1701 documented numerous exchanges with at least fifty local Native Americans, including four females, and one African male. This book detailed Giles's dependence on Native Americans for labor for a variety of activities and recorded their reliance on him for certain goods. Sylvester utilized three avenues of trade: the barter of goods, the exchange of labor for merchandise, and the promise of future labor to obtain supplies (Giles Sylvester 1680: 3, 15, 25).

Native Americans on Shelter Island performed a variety of activities including thrashing and cutting cords of wood. In 1682, Giles hired seventeen Manhansets, including a man named Sachem, for reaping wheat at the rate of one pound for every three and a half days of labor. Most Native Americans were credited with one shilling for a day's work at Sylvester Manor, except on several instances when Harry, Calo, and Wiamoxon were paid lesser amounts. As many activities were unspecified in the account book, these Native Americans could have undertaken other tasks that did not pay the standard amount. Other Native Americans performed specialized duties, such as Harry who made the Cider that Sylvester sold to the Manhansets and Isaac and Lawrence who took messages "to ye main" (Sylvester 1680: 16, 8a) and to New London for Sylvester (Sylvester 1680: 7a, 8a, 5a, 16, 33, 14, 32).

Two of the most important items that Giles Sylvester used to pay for Native American goods and labor were cloth and alcohol. Native Americans sought yards of broad cloth, cotton, and duffel, a coarse textile, from trade with European settlers. Sylvester also traded pints and quarts of Bajan rum and quarts, gallons, and barrels of cider and cider water produced at Sylvester Manor's cider mill. The typical price for a pint of rum was one shilling six pence while a quart was three shillings in 1688 and 1689. However, Sylvester charged members of the Manhanset tribe differing amounts for the same quantities of cider and cider water. For example, Giles charged Isaac, Niantois, and Sunsett each three shillings for six quarts of cider in 1688. With each gallon of cider costing six Native Americans two shillings in 1688, Giles charged Lawrence and Manhandup only one shilling six pence for a gallon of cider on January 4 and 9, 1689. Giles Sylvester also charged differing amounts for barrels of cider to European colonists and Native Americans. Jasper Griffin and John Gosby paid 15d for a barrel of cider, while Wiam paid one pound for the same amount in 1688 (Sylvester 1680: 2-42, 5a-16a; Strong 1997: 153).[2]

Giles likewise exchanged goods and services for Native American products. Giles Sylvester often bartered for produce that the Native Americans grew or collected, particularly bushels of pears and cranberries, and occasionally fish. Ambusco, the sachem that Nathaniel Sylvester permitted to relocate to Shelter Island, traded a bushel of Indian corn for one bushel of apples in 1688. Likewise, Goussons and Jo brought loads of wood to Shelter Island, while Wiam built a canoe in order to obtain duffel and alcohol. One item that Nathaniel both sold to the Manhansets and purchased from them were hundreds of nails (Sylvester 1680: 3, 39, 5a, 12, 19, 17, 22, 39, 37).

Not only did Giles Sylvester trade with Native American men but squaws and Africans as well. Three women, identified as Pepan Squaw, Squaw Hannah, and Young Squaw, bought quarts and gallons of an unspecified type of alcohol from Giles Sylvester in 1692. Squaw Hannah paid for her purchase with deerskin, while Smiths Squaw traded ten bushels of corn for two yards of duffel. In July 1688, Black John, an African listed in Nathaniel Sylvester's 1680 Inventory, bought two gallons of cider at four shillings and two gallons of water cider at two shillings from Giles Sylvester. Probably belonging to one of Giles's younger brothers, the account book never detailed how Black John repaid Giles Sylvester for the alcohol he purchased (Sylvester 1680: 25, 34, 6a, 41; Sylvester 1681: 1-3).

On March 5, 1698, Nathaniel Sylvester, then a resident of East Hampton, contracted Hanable, a Manhanset Indian, to hunt for wolves and to search the woods, meadows, and marshlands on Sachem's Neck for missing and mired cattle during a six week period starting on March 20. As this land was now the property of William Nicolls, Nathaniel Sylvester was probably retrieving all his livestock from this section of the island. Hanable received six royalls at the signing of the contract and would obtain an additional six royalls at the end of the six weeks. If Hanable failed to locate all the livestock, he agreed to pay his employer ten pounds sterling. This Native American only earned about three shillings a day but ran

[2] Editor's note: Twenty shillings (20d) equal one pound.

the risk of a debt twice his salary for the six weeks labor (Sylvester 1698: 1; Strong 1994: 29; Strong 1997: 284).

After Nathaniel's death in April 1705, his young son Brinley Sylvester inherited this estate on Shelter Island and received the manor house, its surrounding acreage, and all its appurtenances on Shelter Island after his marriage in 1718. Brinley maintained the plantation on Shelter Island in addition to his mercantile business in Newport, Rhode Island. Meanwhile, Sylvester set about improving the property he inherited on Shelter Island. The original manor house and other outbuilding were dismantled to reinforce a new Georgian landscape complete with a new symmetrical house, completed in 1735. Yellow Dutch brick and ceramic roofing tiles from the original Manor house, along with other domestic trash, were spread across the yard covering the ornamental cobbled surface and other architectural remains, in essence burying the seventeenth century facade and refuse of Sylvester Manor. The current 240 acres of Sylvester Manor have remained in the possession of descendants of Nathaniel Sylvester with few alterations to Brinley Sylvester's façade and landscape (Nicolls 1719: 169; Mallmann 1985: 46; New York Superior Court 1735: 14-17).

LOCALLY MANUFACTURED CERAMIC ANALYSIS

The social history of the Manhansets was utilized to establish a framework for the analysis of locally manufactured pottery sherds recovered from archaeological deposits within different areas of Sylvester Manor. Late Woodland ceramics recovered from two two-by-two-meter units in an undisturbed, stratified, Native American habitation dating from approximately 1000 AD until 1200 AD were utilized to establish a chronology specifically for Native American ceramics on Shelter Island until the establishment of Sylvester Manor in 1652. These ceramics were compared to locally manufactured ceramics, referred to as Colono ware, from a 1652-1735 trash midden located to the south of the present Manor house. I utilized Leland Ferguson's definition of this ceramic:

> all low-fired handbuilt pottery on colonial sites, whether slave quarters, 'big houses,' or Indian villages" (Ferguson 1992: 19).

so the ceramics could be understood in terms of their creole nature. All ceramics were compared and analyzed for their thickness, temper, surface treatment and decoration, manufacturing technique, color, and vessel form. Locally made ceramics from Shelter Island were analyzed to determine whether the creolized characteristics of Colono ware recovered in the trash midden indicate a continuation of an already established Native American tradition or an introduction of traits possibly associated with the African and European residents of Sylvester Manor.

Locally manufactured ceramics were separated into three assemblages for analysis, depending on their vertical location and association with European artifacts. First, 251 Native American sherds dating from the Late Woodland period recovered beneath a depth of 30 centimeters were examined to understand the local pottery tradition on Shelter Island before European contact (Figure 2). Second, forty Native American ceramics from the upper thirty centimeters on the peninsula were analyzed separately due to the presence of European artifacts from slope erosion (Figure 3). Finally, one hundred and thirty-five sherds of Colono ware from the historic trash midden were examined in order to detail locally manufactured ceramics from the Historic Period on Shelter Island, revealing the changes in pottery characteristics due to the influence of both European and African residents (Figures 4 and 5).

Ceramic analysis revealed a continuity of Native American ceramic traits from the Late Woodland through the Historic Period at Sylvester Manor. Variations in color remained relatively uniform with

Figure 2. Native American sherds from below 30 cm at the Sylvester Manor habitation site.

Figure 3. Native American sherds from 20-30 cm at the Sylvester Manor habitation site.

Figure 4. Pottery sherds from the trash midden at Sylvester Manor.

Native American ceramics ranging between orange and tan, while Colono ware was predominately brown. While all ceramics represented coil built manufacture, overall sherd thickness decreased from an average of 7.76mm for Native American ceramics below 30 cm to 6.63mm for the denser, higher-fired fabric of Colono ware. Shell tempering occurred in the bulk of the sample, except for one grit-tempered base sherd from the Native American habitation site and seven mica and sand-tempered sherds in the trash midden. Native American ceramics in the habitation site, however, contained a small amount of sand, possibly the result of natural impurities in the clay source. Vessel shape evolved from elongated, conoidal pots with slightly indented necks in the Late Woodland to globular vessels with flat bottoms in the Historic Period.

Surface treatments and decoration on interior and exterior surfaces also changed from brushed to smoothed between the Late Woodland and Historic Periods. Native Americans on Shelter Island utilized brushing on both interior and exterior surfaces as their primary method of surface treatment and decoration during the Sebonac Phase. While interior surfaces were either brushed, smoothed, or undecorated, exterior surfaces displayed greater variety including smoothed, brushed over cord-marked, net impressed, shell stamping and dragging, and undecorated. Windsor Brushed, Sebonac Stamped, Windsor Net-impressed, and Windsor Cordmarked, representing four distinct pottery styles of the Windsor Tradition, were uncovered from the Native American habitation site (Figures 6, 7). In contrast, the Colono ware from the historic trash midden exhibits smoothing as its predominant surface treatment on interior and exterior surfaces. Random brushed marks and undecorated interiors also occurred, while exterior surfaces exhibited brushing, shell stamping and dragging, punctate, and cord-marking (Figure 4). The historic trash midden thus appears to contain a mixture of Contact and Historic period Colono ware which were not able to be separated for this analysis.

Figure 5. Burnished pottery sherd with horizontal groove below its neck.

Figure 6. Examples of Windsor Brushed pottery from the Sylvester Manor habitation site.

Figure 7. Examples of Windsor Brushed pottery from the Sylvester Manor habitation site.

However, one ceramic sherd was noticeably distinct from other pottery recovered from the historic trash midden. This ceramic sherd, from a globular vessel, is shell tempered, exhibits a highly burnished surface treatment on its interior and exterior surfaces, and displays a horizontal groove on its exterior just below the neck (Figure 5). Lucianne Lavin, an expert on Native American ceramics in Connecticut, describes this sherd as "atypical of Native American ceramics" because it does not fit the traditional ceramic styles for eastern Long Island and Connecticut. This sherd could represent the first evidence of African-American ceramic manufacture at Sylvester Manor as it is more reminiscent of Colono ware recovered in the Chesapeake region than Native American manufacture on eastern Long Island. Additional research on locally made ceramics on Barbados would expand our understanding about the pottery traditions that African slaves would have transported with them to Shelter Island.

Ceramic analysis from Sylvester Manor supports the continuation of an already established Native American ceramic tradition on Shelter Island from the Sebonac Phase through the Historic Period. Windsor Tradition ceramics during the Late Woodland period showed direct continuity with their closest neighbors on eastern Long Island and coastal Connecticut. Furthermore, locally manufactured pottery from the trash midden revealed physical alterations from the introduction of European and African residents on

Shelter Island. One modification was the emergence of flat-bottom vessels, possibly representing a transformation in Native American cooking traditions. Ongoing excavations at Sylvester Manor should permit vessel analysis of locally manufactured ceramic sherds to be conducted allowing the Contact Native American component to be separated from the Historic Period in the trash midden.

CONCLUSION

Ongoing archaeological excavations, material culture studies, and historical documentation at Sylvester Manor are continuing to reveal the important and complex roles of the Manhansets in the colonial period. Manhanset labor, services, and goods were essential to the success of the plantation from its establishment through the eighteenth century. Furthermore, the Manhanset's employment of various political, social, and economic strategies against the English, Dutch, and other Native Americans and their ability to adapt made them a viable and active force in colonial society. Archaeological excavations at Sylvester Manor are just beginning to unravel the importance of Native Americans in colonial history. Though outside the scope of this analysis, an excavation area to the east yielded a high density of lithic debris in a midden; further analysis may tie these two areas together stratigraphically. This project will continue to provide new and valuable data and reshape our knowledge about Native Americans on eastern Long Island.

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THE GLAZIER BLADE CACHE: 30 REMARKABLE BLADES FOUND IN GRANBY, CONNECTICUT

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ABSTRACT

This paper presents the details of discovery and excavation, as well as a brief statistical analysis of the Glazier Blade Cache. The cache consists of thirty extraordinarily long, for the most part narrow, and universally thin siltstone bifaces. Mean length of the Glazier Blades is 13.62cm (5.36 inches). Mean width is 4.65cm (1.83 inches). Mean thickness was 1.17cm (.46 inches). Two dates derived from charcoal found in association with the blades are essentially identical: 1630±80 BP (Beta-94953) and 1590±60 BP (Beta-94954). These dates are calibrated to AD 425 and AD 450, respectively.

Well-intentioned phone calls from people anxious to know the significance of their archaeological "discovery" is one of the occupational hazards of archaeology. More often than I care to remember — or admit — I have trudged halfway across the state and patiently explained that, unfortunately, the "petrified elephant's foot" found in the tomato garden was just an iron concretion—but anybody could have made that mistake. And certainly it gets tiresome explaining why you really don't think you can be of much help verifying that the rock an eight-year-old found is a meteorite fragment, or explaining why you make it a habit not to search for artifacts in caves where callers have dreamt pirate's treasure would be found. And I have yet to call back the woman from Bristol, Connecticut who left a message on my answering machine, desperately seeking the aid of an archaeologist because — well, of course — giant bees were digging a hole in her backyard.

THE GLAZIER BLADE CACHE DISCOVERY

The examples I have just enumerated have all actually happened to me, so you will understand that it was with some trepidation that I returned the phone call of a Mr. Ron Glazier who was eager to have an archaeologist assess the significance of what he had found in his backyard in north-central Connecticut (Feder 1996). Ron had been given my name by a local car dealer who, himself, is an avid follower of all things archaeological. I must admit that I fully expected that Mr. Glazier had found something along the lines of my petrified elephant's foot or meteorite fragment. After all, his description of what he had found, a cache with sixteen stone blades, one of which, according to Ron was more than seven inches in length, just seemed too good to be true, especially in someone's backyard and, even more especially, just about five minutes from my house. Since it was so close, I decided to pay Ron a visit, fully prepared to disappoint yet another accidental archaeologist, having to explain for the hundredth time that the basalt in the Farmington Valley naturally breaks along straight planes and as a result of freezing and thawing, commonly producing long, thin, prismatic blade-like forms. "Yes, they do look very regular indeed, but they are entirely natural," I was ready to tell Ron.

There was only problem with this nice, rather neat scenario I was prepared to play out. I was completely wrong about the discovery on Glazier's property. When I walked into Ron and his wife Dottie's house, it was immediately obvious that Ron had found exactly what he said he had found; a

remarkable cluster of sixteen enormous flaked blades. Having the opportunity to examine these blades and the ensuing excavation of the area in which they were found makes up for all the petrified elephant feet, meteors, dreamt treasure, and giant bees I have ever or, I suspect, will ever be called on to investigate.

CONTEXT OF DISCOVERY

I first saw the original collection of Glazier's sixteen blades in late 1991. Ron had found the first one as the result of sheer serendipity. There had been an enormous rain storm just before his initial discovery and this led to Ron's examining his property for any storm damage that might have resulted. A storm drain at the front of his house directs water away from the street through a buried pipe that emerges from a slope to the rear and north of his house. From there, the water runs down the slope into a pond that holds the impounded water of Bissell Brook.

Due to the severity of the downpour and the resulting substantial flow of water through the drain, there had been a fair amount of erosion directly in front of where the pipe emerges from the ground. When examining the depression excavated by the water spilling out of the pipe, Ron noticed a sharp piece of stone poking up out of the soil. He bent over and pulled up on the mud-encrusted object and immediately recognized that it was not just a rock but a stone tool. Had the pipe been positioned as little as 20cm in either direction, water flowing out would not have caused enough erosion to have exposed the top of the cache. In another bit of happenstance, Ron had grown up in Ohio farm country and, as a boy, had walked plowed fields looking for arrowheads. It is entirely possible that had Ron been unfamiliar with lithic artifacts, a mud covered chunk of rock might have made no impression on him at all and the cache might have remained unrecognized and undiscovered.

Subsequent rainstorms and subsequent forays into the backyard to assess their impact led to additional discoveries of large stone bifaces in the same spot just below the storm pipe. In the couple of years Ron poked around in the disturbed soil just beyond the pipe's exit, he had recovered the sixteen remarkable blades lying on his dining room table there in front of me in 1991.

As impressed as I was, I was unable at that time to accept Ron's invitation to test the area around the place he described as the location where he found the blades because of scheduling, the weather, and, I will admit, a foolish assumption on my part. After a couple of years of rain and Ron examining the ground just below the drainage pipe, I assumed that he had found all of the artifacts secreted therein. I could only hope that perhaps some flakes, other small artifacts, or even organic remains unnoticed or unrecognized by Glazier might still be in place and, if we were lucky, these items might help us determine the cultural affiliation and age of the cache. It was not until the summer of 1993, however, with a large field school crew focusing on the McLean Game Refuge, that I had the time and a group with sufficient expertise to investigate the area around where I presumed the complete cache had already been recovered.

Our strategy in 1993 was to examine the area at the base of the slope from which the drain pipe emerged, between that slope and an artificial earth berm that separates Ron's property from the impounded waters of Bissell Brook. In July of 1993, we laid in four one-square-meter excavation units. We added one additional one-square-meter unit in August. Three of the original four units were located, respectively, to the east, west, and north of the find spot as shown me by Ron. The other original square was located exactly over the spot where Ron had found the sixteen blades in his possession. The final unit excavated in August was positioned immediately south of this square.

As indicated, I was not terribly confident we would find anything. I hoped that, perhaps, we would be lucky enough to recover some debitage or, even better, some charcoal for dating. If we were very lucky, perhaps we would find that the cache was part of a larger site on the property.

In three of the four one-square-meter units we excavated initially, the situation was, depressingly, much as I expected it to be. Troweling down in three-centimeter increments and passing all matrix through one-eighth inch mesh hardware cloth, we found not so much as a flake in the three units located adjacent to where Ron had found the sixteen blades. Just as disappointingly, we did not find even a whisper of charcoal or any other datable material that we could associate with the blades in those three one-square-meter units.

The unit situated directly over Ron's find spot, however, was quite another story. Much to my surprise, we soon determined that additional blades yet remained in the cache, protected by their depth from the erosional impacts of the placement of the storm drain. In fact, by the time we had completely excavated the pit that housed the cache, *fourteen* additional blades had been recovered by my crew which included Barbara Calogero, Marc Banks, Kristen Janowski, Noel Coonce, Mike Zajko, Andrea Rand, and Pete Godwin (with additional assistance provided by Ron and Dottie's nephews).

Of these final fourteen of what grew to be, therefore, a thirty-blade cache, at least nine were positioned *in situ*. As nearly as we can tell, these nine were still in their original place of deposit (Figure 1). It was clear that these overlapping nine blades had been neatly stacked and tightly clustered in three distinct layers in a shallow pit. From top to bottom, one stratum of five blades was found, roughly oriented in a north-south line (some pointing north, others south), laid out flat on top a layer of three more blades directly beneath them with the same orientation. Finally, one blade, again oriented roughly north-

Figure 1. The Glazier Blade Cache. Seven blades can be seen in this photograph. The five visible toward the top of the photo are *in situ* and probably where they were originally positioned in the cache. The two blades lower in the image likely eroded out of the cache as a result of water flowing through the pipe located just above the feature.

south, was located at the bottom of the entire pile. The five other blades the we excavated were just a bit downslope from the tightly clustered nine just mentioned. These five most likely overlaid the nine found by us in their original context and appear to have washed out of the cache at some time in the past. Though we cannot be certain, it seems likely that the sixteen blades originally found by Glazier had been stacked in layers above these in the cache before they were exposed by rain water flowing out of the drainage pipe.

GLAZIER BLADE MORPHOLOGY

The entire assemblage of thirty blades is a remarkable grouping (Table 1; Figure 2). They range in length from 11.70 to 18.00cm (4.61 to 7.08 inches). Their mean length is 13.62cm (5.36 inches). At their widest point from edge to edge they range from 3.90 to 5.70cm across (1.54 to 2.24 inches). Mean width is 4.65cm (1.83 inches). Maximum thickness measured from face to face ranged from 1.01 to 1.34cm (.40 to .53 inches). Mean thickness was 1.17cm (.46 inches).

Summarizing those numbers briefly, the Glazier Blade Cache consists of thirty extraordinarily long, for the most part narrow, and universally thin bifaces (Figure 3). They are not broad blades; the blades do not constitute a Meadowood cache. Meadowood cache blades are differently shaped and only about half the size of the Glazier Blades (Granger 1981; Ontario Archaeological Society 2001). Further, there is no evidence of burning; the blades are not part of a cremation burial. The basic form and proportions of the blades are vaguely reminiscent of Clovis points, though none are fluted and none exhibit basal grinding or the typically deeply concave bases of paleo points in the Northeast.

The points exhibit some variability but reflect, overall, a remarkable consistency of form and size. A graph displaying blade lengths with horizontal lines representing the mean (μ) and +1 and –1 standard deviation (s) (Figure 4, top) shows a distribution fairly tightly clustered about the mean. The standard deviation for length is rather small (1.34cm) and most specimens fall within +1 and - 1 standard deviation from the mean. Only three of the blades are just slightly more than one standard deviation below the mean and four are more than one standard deviation longer than the mean. At 18cm, one of those four, GBC-006, a truly stupendous specimen, is more than three standard deviations longer than the mean length.

A graph of width shows much the same thing (Figure 4, middle), with a tight clustering about the mean. Here again, the standard deviation is small (.47cm) and there are a nearly equal number of blades with widths beyond +1 and –1 standard deviation from the mean. Interestingly, the widest blades deviate from the mean more than do the narrowest ones. Width is an easy thing for a tool maker to control so it would seem that this was intentional.

The same format graph for thickness (Figure 4, bottom) has a somewhat different appearance, indicating an even tighter clustering about the mean than was the case for length or width. In this case, only a couple of specimens exhibit a thickness more than one standard deviation above the mean. On the other hand, a substantial number, six altogether (20% of the blades in the cache) exhibit a thickness more than one standard deviation *below* the mean.

What do these descriptive statistics signify? Essentially, it seems clear that the manufacturer had a pretty clear intention of what the end product was to look like and there is a substantial amount of consistency in the artifacts. The tool maker obviously desired to produce impressively long blades of a certain width and thickness and was able to accomplish this pretty consistently with the Glazier blades.

TABLE 1: TABLE SHOWING LENGTH, WIDTH, AND THICKNESS OF ALL OF THE GLAZIER BLADES. THE LENGTH IS DEFINED AT THE MAXIMUM MEASUREMENT FROM THE BASE TO THE TIP OF THE BLADE. WIDTH IS DEFINED AT THE MAXIMUM MEASUREMENT FROM EDGE TO EDGE. THICKNESS IS DEFINED AS THE MAXIMUM MEASUREMENT FROM ONE FACE TO THE OTHER FACE OF THE BLADE. THE MEAN, STANDARD DEVIATION, AND COEFFICIENT OF VARIATION FOR EACH OF THESE VARIABLES APPEAR AT THE BOTTOM OF EACH RESPECTIVE COLUMN.

ACCESSION	Length	Width	Thickness
GBC-001	13.71	4.45	1.15
GBC-002	11.70	3.98	1.25
GBC-003	13.02	4.78	1.22
GBC-004	14.29	5.15	1.33
GBC-005	13.35	4.10	1.25
GBC-006	18.00	4.71	1.25
GBC-007	13.57	4.62	1.12
GBC-008	12.00	4.76	1.15
GBC-009	16.50	4.83	1.22
GBC-010	12.00	4.76	1.15
GBC-011	13.90	4.43	1.34
GBC-012	13.00	4.15	1.06
GBC-013	14.40	5.22	1.23
GBC-014	15.12	4.72	1.25
GBC-015	15.50	5.70	1.20
GBC-016	14.18	4.64	1.07
GBC-017	13.22	4.64	1.22
GBC-018	12.25	4.65	1.12
GBC-019	13.98	4.17	1.20
GBC-020	13.82	4.11	1.15
GBC-021	12.82	4.55	1.17
GBC-022	14.03	4.54	1.02
GBC-023	13.28	5.49	1.12
GBC-024	13.45	4.32	1.04
GBC-025	13.79	3.90	1.15
GBC-026	12.61	4.63	1.12
GBC-027	12.22	5.58	1.13
GBC-028	13.16	5.28	1.25
GBC-029	12.61	4.62	1.01
GBC-030	12.97	4.02	1.04
MEAN	**13.62**	**4.65**	**1.17**
Standard Deviation	1.34	0.47	0.09
Coefficient of Variation	.099	.101	.074

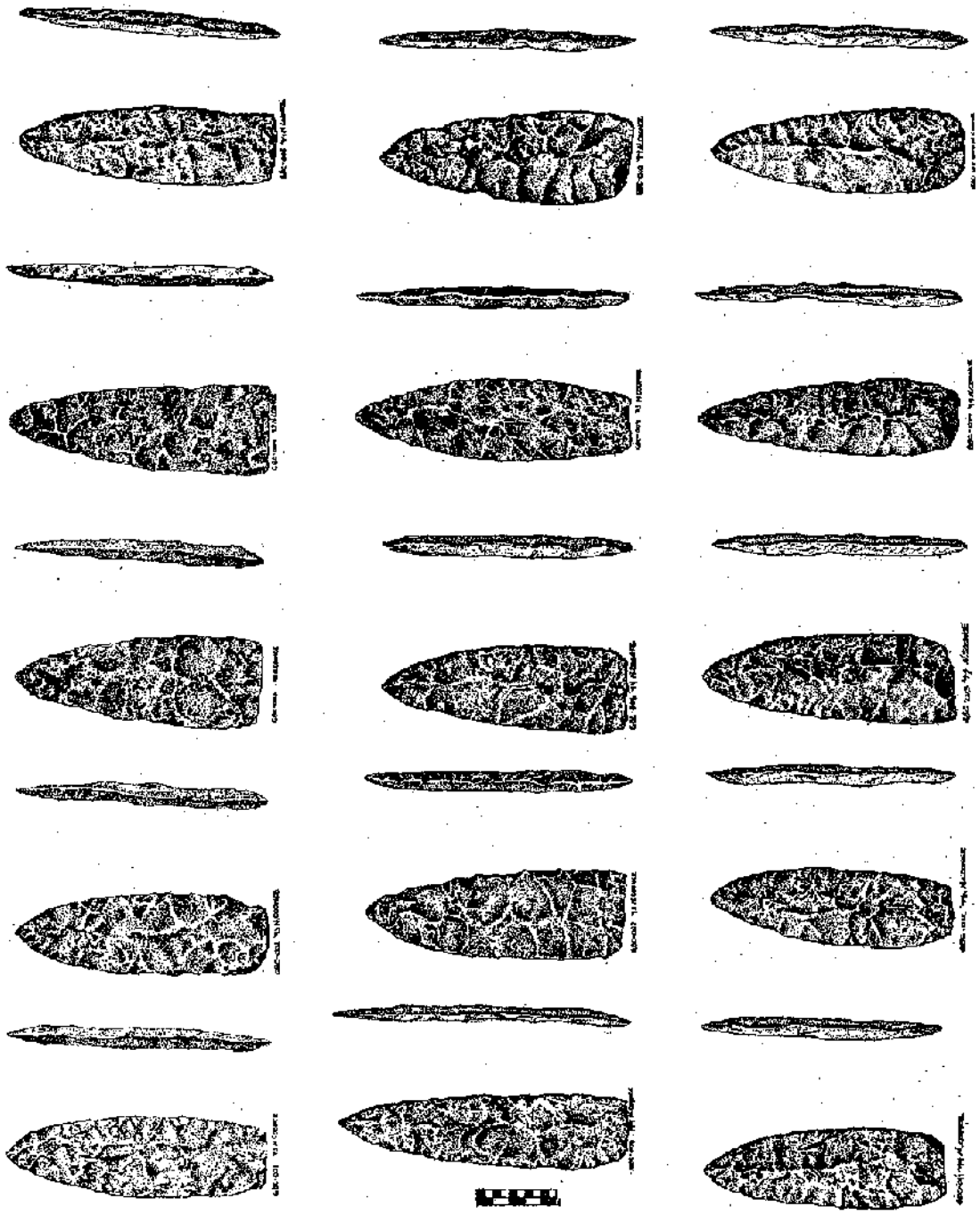

Figure 2. Detailed drawings of the entire Glazier Blade Cache. One face of each blade is depicted along with an edge view. All drawings were made by Noel Coonce.

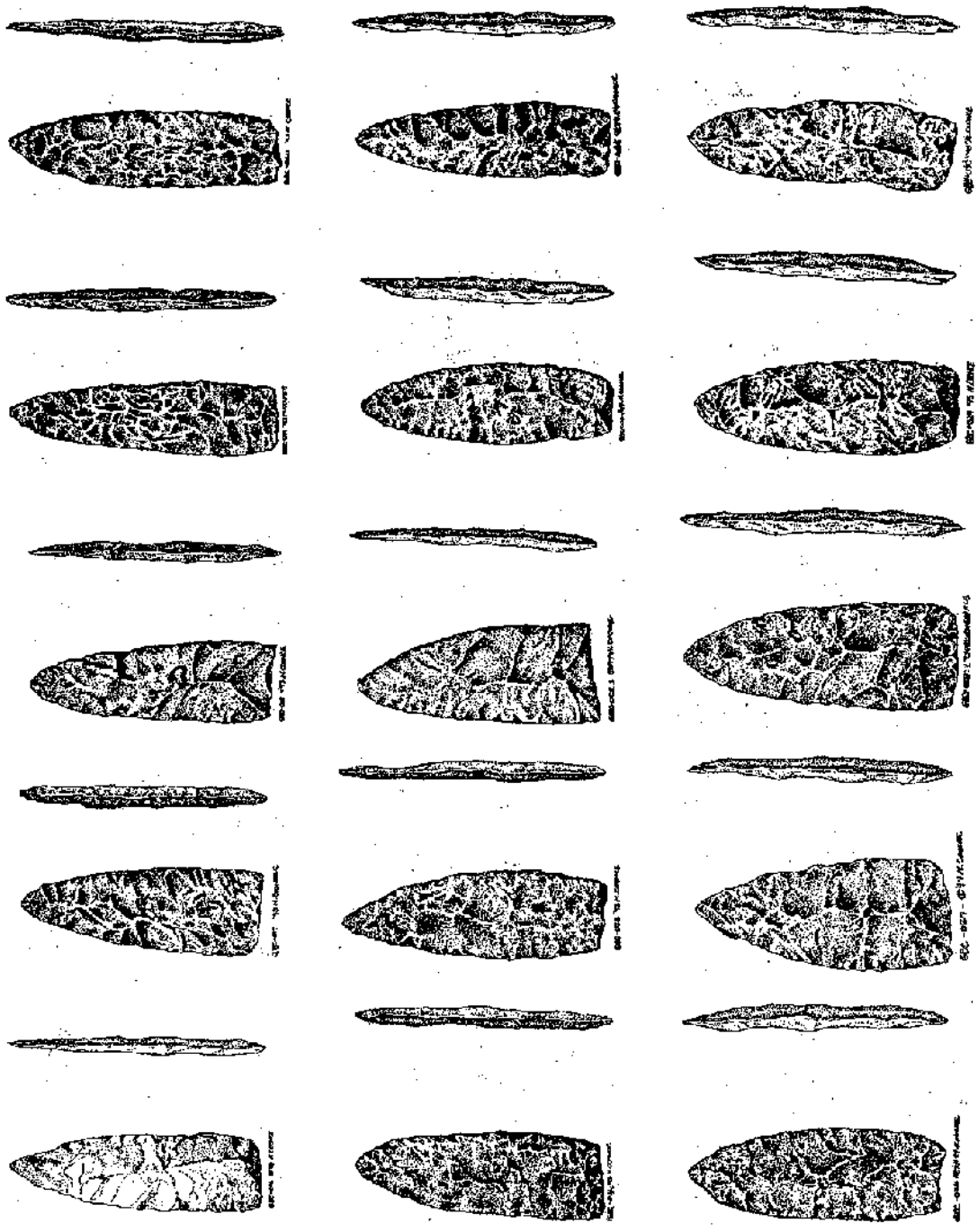

Figure 2. Detailed drawings of the entire Glazier Blade Cache. One face of each blade is depicted along with an edge view. All drawings were made by Noel Coonce (continued).

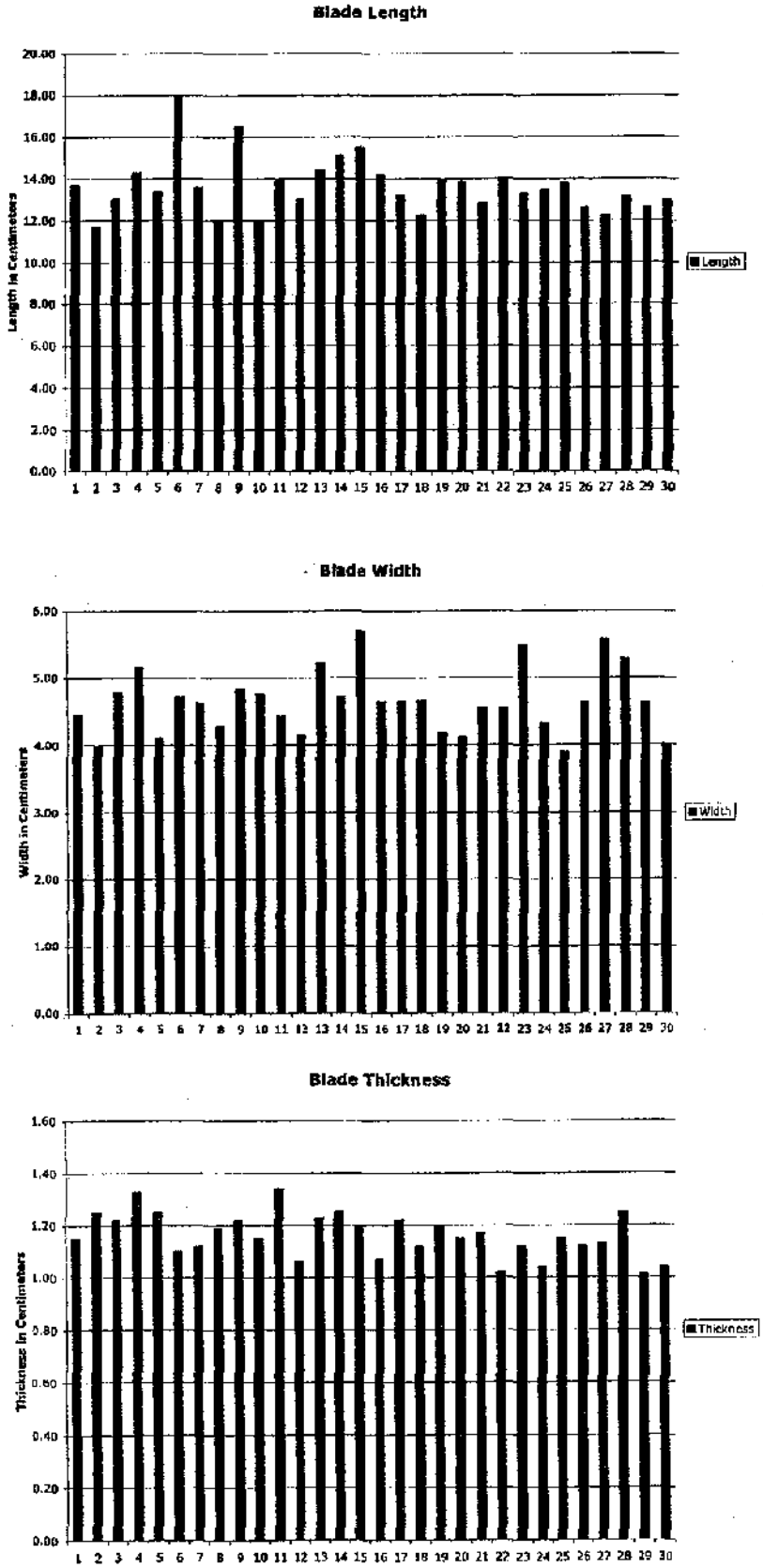

Figure 3. Histograms depicting the length, width, and thickness of each of the Glazier Blades.

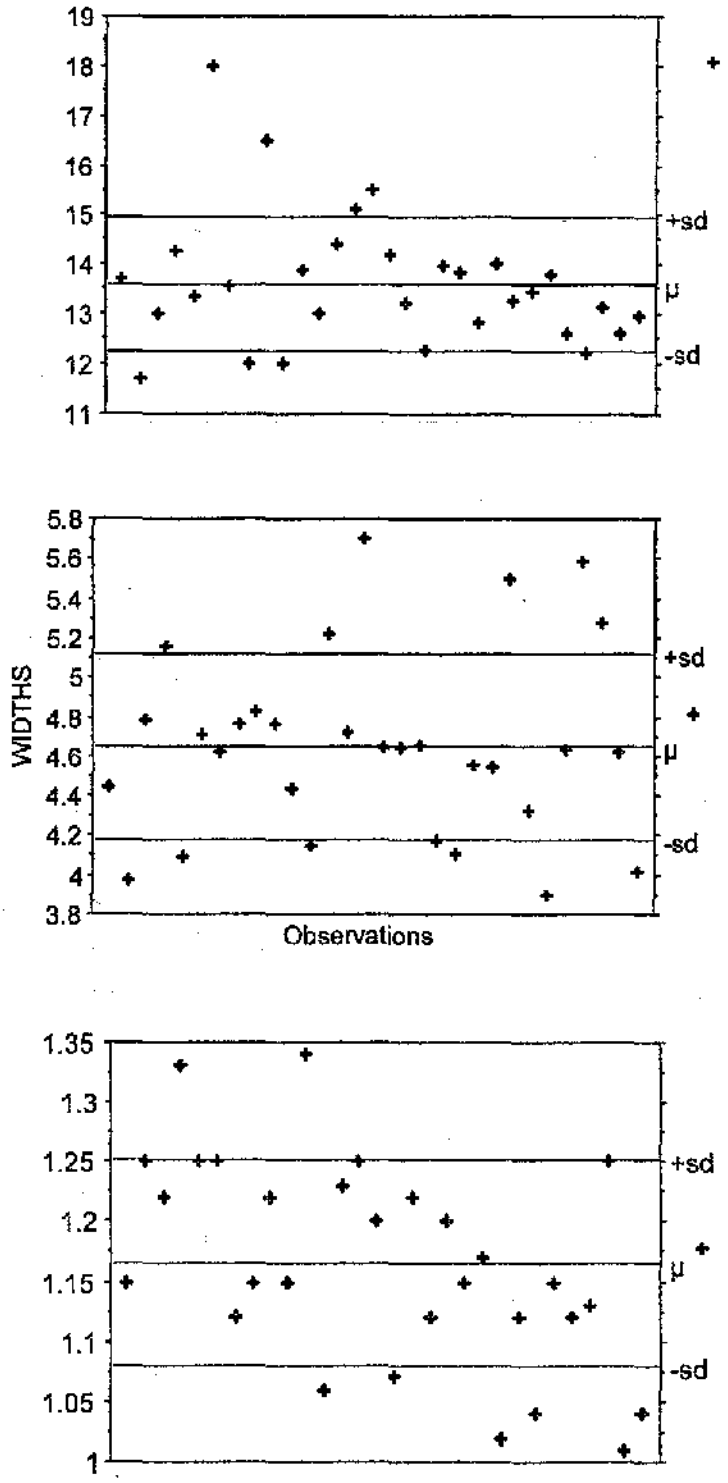

Figure 4. Scattergram of the length, width, and thickness of each of the Glazier Blades. The value of each blade appears as a plus mark, the mean value (μ) of each of these variables appears as a horizontal line, and the values of +1 and −1 standard deviation from the mean also appear as lines on the graph. Plus marks situated between +1 and −1 standard deviation lines, represent blades that lie within one standard deviation of the mean. Any plus marks above the +1 standard deviation line or below the −1 standard deviation line represent blades that are more than one standard deviation from the mean.

Beyond this, the standard deviations for all three variables (length, width, and thickness) are small and comparing them is instructive. Fortunately or not, this requires a short diversion into a discussion about statistics. It is somewhat problematic to compare directly the standard deviations among different variables with different means. For example, a standard deviation of 1.0 in a variable with a mean of 20.0 reflects a relatively small degree of variation (1.0 is small compared to 20.0), meaning the actual, measured values cluster very tightly about the mean and individual cases tend not to stray very far. The same standard deviation of 1.0, however, represents a far greater amount of variation proportionally and far greater dispersion in a variable whose mean is only, for example, 2.0 (1.0 isn't so small when compared to 2.0).

Dividing the standard deviation by the mean to calculate a statistic called the *coefficient of variation*, allows for a more direct comparison of the degree of clustering or dispersion among different individual variables with different means ($V=s/\mu$ where V is the coefficient of variation, s is the standard deviation, and μ is the mean). When the coefficients of variation of two or more variables are compared, the one with the smallest V indicates the least amount of variation and, therefore, in our application, the greatest degree of consistency on the part of the tool maker. In the contrived example given above, where the mean is 20 and the standard deviation is 1.0, the coefficient of variation is a very low .05, showing that the individuals in the sample are clustered closely around the mean for that variable. For a variable with a mean of 2.0 with a standard deviation of 1.0, the coefficient of variation is .5, a much larger number indicating, therefore, a greater degree of variation or, viewed from the other direction, less consistency in the sample for this variable.

Enough of the statistics lecture. The coefficients of variation for the widths and lengths of the Glazier Blades were very nearly the same: for width V=.101; for length V=.099. This means that the tools exhibit about the same level of variation for width and length. The coefficient of variation for thickness (V=.074), however, was quite a bit (about 25%) lower than that determined for either length or width suggesting that the maker's tolerance for blade thickness may have been a somewhat more restrictive. Under most circumstances, thickness is a more difficult variable for a knapper to control. The smaller coefficient of variation for thickness reflects greater consistency and indicates great skill on the part of the tool maker or makers.

When we compare the metrical variables of the Glazier blades one to another, we find less correlation than might have been expected. For example, graphing length against width shows only a very weak correspondence between these two variables (Figure 5, top). The correlation coefficient (Pearson's r; Table 2) derived here is +.170, showing a fairly low level of correspondence between blade length and width (a perfect, positive correlation between two variables results in a correlation coefficient of +1.0). In other words, longer blades in the cache tend to be wider, but the tendency is not a strong one.

The necessities of the manufacturing process seem to have caused longer blades to be thicker (Figure 5, middle) and the correlation coefficient here is a bit higher at +.324 (Table 2). This indicates that there is a somewhat stronger degree of relationship between length and thickness than that seen between length and width, with longer blades tending to be a bit thicker.

Finally, when you graph thickness against width (Figure 5, bottom), there is only a vaguely positive correlation between the variables with a correlation coefficient of +.190 (Table 2). There is a very slight tendency for wider blades to be a bit thicker. All of this merely bears out what was stated previously; the goal of the knapper seems to have been long, narrow, thin blades.

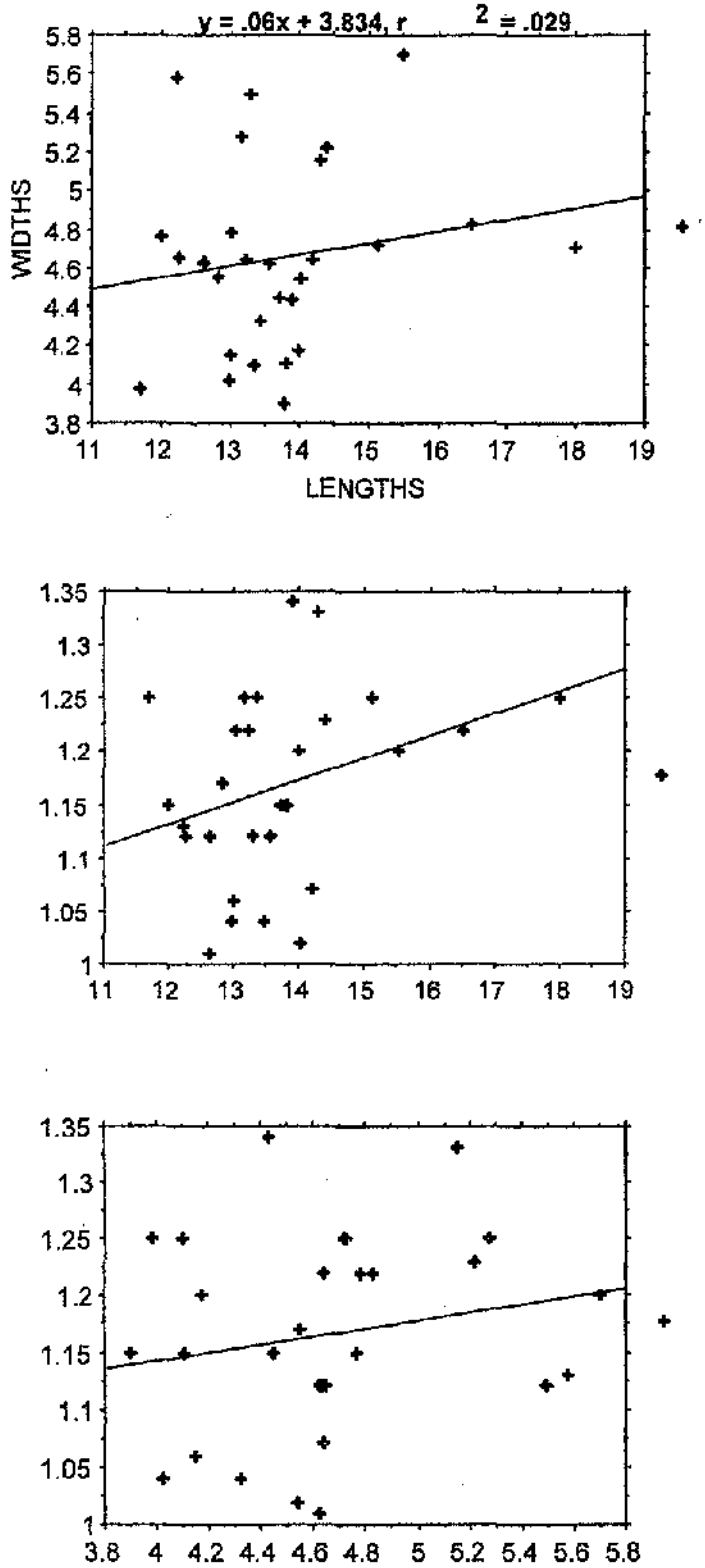

Figure 5. Scattergrams and linear regressions comparing length and width, length and thickness, and width and thickness of the Glazier Blades. The formula for each regression appears above its respective graph.

TABLE 2: R^2 AND PEARSON'S R SHOWING DEGREE OF CORRELATION BETWEEN GLAZIER BLADE LENGTH AND WIDTH, LENGTH AND THICKNESS, AND WIDTH AND THICKNESS.

	r^2	Pearson's r
Length by Width	.029	.170
Length by Thickness	.105	.324
Width by Thickness	.036	.190

It was impossible to identify the raw material of the blades macroscopically. A fairly heavy, powdery rind had developed on all of the blade surfaces, obscuring the actual appearance of the fresh rock. Based on the surface appearance of a single blade that the property owner had taken a wire brush to, it was obvious that the blades were not made of flint, jasper, chert, basalt, quartz, or quartzite. A thin-section conducted on one of the blades indicates that the raw material is a non-local siltstone (Calogero and Philpotts n.d.).

Although weathering has taken its toll on the blade surfaces, large flake scars are apparent on all the blades. We have even x-rayed the entire assemblage, producing images where the flaking is a bit more obvious. Large flake scars, some crossing to the midline of the blade surface but not passing beyond it are apparent on all of the blades (see Figure 2). There was no fine, retouch flake scarring visible on any of them.

Finally, in excavating the cache feature itself we were able to extract small bits of charcoal sufficient for two standard count radiocarbon dates. The two dates we derived from the charcoal are essentially identical: 1630±80 BP (Beta- 94953) and 1590±60 BP (Beta-94954). These dates are calibrated to AD 425 and AD 450, respectively.

I have avoided any speculation about the meaning of the cache itself. In truth, it is impossible to determine the intention was of the person or persons who dug a shallow pit along a small stream in north-central Connecticut nearly 1600 years ago. We do not and, perhaps, can never know why they carefully placed thirty very large, finely made stone blades into that pit and then buried them.

Certainly a substantial amount of labor was invested in the manufacture of these objects. Was the cache simply a utilitarian feature, a storage pit for incomplete tools that the maker had every intention of returning to? That seems unlikely. The size of the Glazier Blades argues against them simply being stored pre-forms or blanks. What could they have been pre-forms for? We have no finished chipped stone tools in the Farmington Valley that even approach their size. Was the cache an offering? Were the blades set into the ground as part of a ceremony whose purpose we can only speculate about? Perhaps.

None of this is particularly clear and all such speculations are beyond the scope of this descriptive presentation. What is clear, however, is that in placing these objects in the ground, the ancient inhabitants of the Farmington Valley have created a time capsule of sorts. This unintentional time capsule is providing us a window through which the past has been made, however indistinctly, visible to us in the present.

ACKNOWLEDGEMENTS

I must begin by recognizing the key role the incredibly generous people, Ron Glazier and Dottie Foote, have played in all this by extending to us the privilege of excavating on their property and really opening up their home to us. Without Ron's curiosity and cooperation, without Ron and Dottie's great interest and recognition of the significant find on their land, and, it should be added, without the generous provision of their bathroom facilities, none of this would have been possible. Thanks are also due to those who excavated at the site: Barbara Calogero, Marc Banks, Kristen Janowski, Noel Coonce, Mike Zajko, Andrea Rand, and Pete Godwin. I must acknowledge the special contribution of Noel Coonce in the form of the spectacular drawings of the blades presented in Figure 2. The artistry of her illustrations surely are worthy of the artistry of the blades themselves. And, finally, thanks to the anonymous knapper or knappers who produced the splendid blades that make up the Glazier Blade Cache. Your intention could not have been to have archaeologists retrieve your handiwork and ponder its significance, but we greatly appreciate and, in our study, honor the work you did 1600 years ago.

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TWO CLAY POTS AND AN ANTLER HARPOON FROM SMITH COVE IN NIANTIC, CONNECTICUT

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The Institute for American Indian Studies, a small museum and educational and research center in Washington, Connecticut houses the Edward H. Rogers archaeological collection. Rogers was an educator and an amateur archaeologist. His collection contains thousands of Native American artifacts, mostly from various localities in Connecticut. One locus rich in Native American prehistory is Smith Cove in the Niantic section of Lyme in the southeastern portion of the state.

During the 1930s and 1940s, a number of amateur and professional archaeologists excavated within the general area of the Cove, including Rogers (Rogers 1935; Russell 1947). Shell middens, "camps," and Native burials were reported from digs, particularly on the adjacent Tubbs and Clark farms. Many artifacts and features were uncovered during extensive sand and gravel operations on the Clark farm.

Artifacts included hundreds of clay pottery shards, a steatite bowl fragment, and many stone, bone, and antler tools (Russell 1947:40). Except for projectile points, the kinds of stone tools are not identified in the published literature. Bone and antler tools are described, however; they included awls, needles, harpoons, fish hooks, and arrow points. Many of the stone and bone arrow points were found during excavations of the burials, embedded in the skeletal remains, indicating that the deceased had been shot and killed by arrows (Rogers 1935:2; Russell 1947:40-41).

Figure 1 is a photograph of one of the antler harpoons from the Tubbs site. The harpoon was found in a shell heap by William O. Beebe and sold to collector Morris Bull prior to ending up in Rogers' collection. This specimen represents a unilateral type of harpoon, exhibiting three barbs on one side. It was manufactured from deer antler.

Figure 1. Harpoon - found by Wm. O. Beebe, Smith's Cove Shell Heap, Niantic Conn.

Figures 2 and 3 are reconstructed pots from the Cove. Figure 2 was excavated from the Tubbs site by Edward Rogers. It is uncollared with a long neck and a pointed base. The container is nine and five-

eighths inches in height, has a mouth diameter of five and one half inches, and a capacity of one gallon. Its greatest circumference is 25 inches. Its body is cord-impressed. Decoration consists of parallel, horizontal rows of brushing about the neck from the lip to the shoulder of the pot. It is an example of the Windsor Brushed style, a pottery type dated to the late Middle Woodland and Late Woodland periods in southern New England and Long Island (Lavin 1987; McBride 1984; Smith 1950).

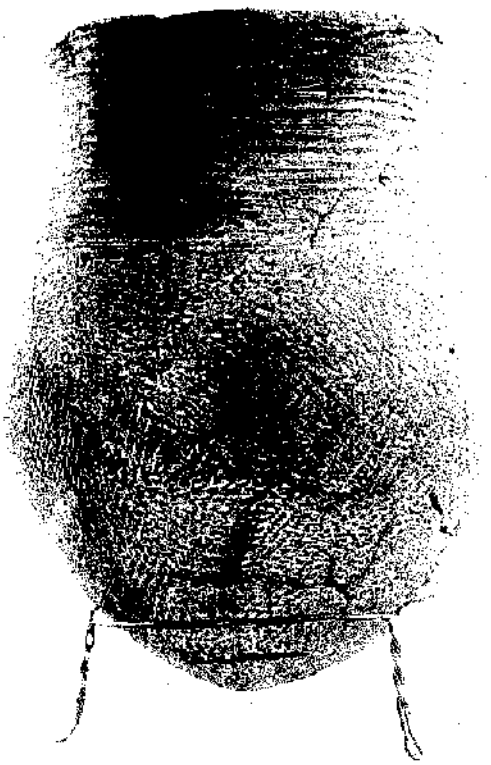

Figure 2. Reconstructed Windsor Brushed pot from Smith Cove.

Figure 3. Reconstructed Niantic Stamped pot from Smith Cove.

The pot shown in Figure 3 was recovered from the "Smith Cove Shell heap". The exact location of the shell heap was not given and so it is unknown if it was the same heap that contained the antler harpoon. The pot is 11.5 inches in height, has a mouth diameter of eight and one-half inches, and a capacity of two gallons. Its greatest circumference is 31 inches. The body of the pot was cord-impressed while its neck and collar had been smoothed. Decoration consists of a row of parallel vertical scallop shell stamps around the base of the neck, one row of similar stamping around the base of the collar, and a third and found row at the top of the collar and top of the lip. The central portion of the collar is encircled by a band of seven parallel, horizontal rows of shell stamping. Beneath its four rim points is and "X" motif also produced by scallop shell stamping. The pot is a fine example of Niantic Stamped, a pottery type dated to the Late Woodland period (Lavin 1987; McBride 1984; Smith 1950).

The locality appears to have contained occupations from other time periods as well. Projectile points and pottery indicate a large Late Woodland component but small numbers of Late Archaic and Middle Woodland points are also present. In my perusal of the pottery collection from the Tubbs site housed at the Peabody Museum of Natural History at Yale University, I noted a goodly number of net-impressed

shards, also indicative of a Middle Woodland component at that site. To date, there is no thorough published site report for any of these cultural loci. However, Rogers did write an extensive unpublished report on the Tubbs site (Rogers ND). Rogers and his party excavated at Tubbs from 1932 to 1938. The huge number and variety of artifacts and ecofacts they recovered, and the presence of numerous cultural features that included artifact caches and food caches indicate a significant long-term settlement.

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