Excavations at the Boland Site, 1984–1987: A Preliminary Report

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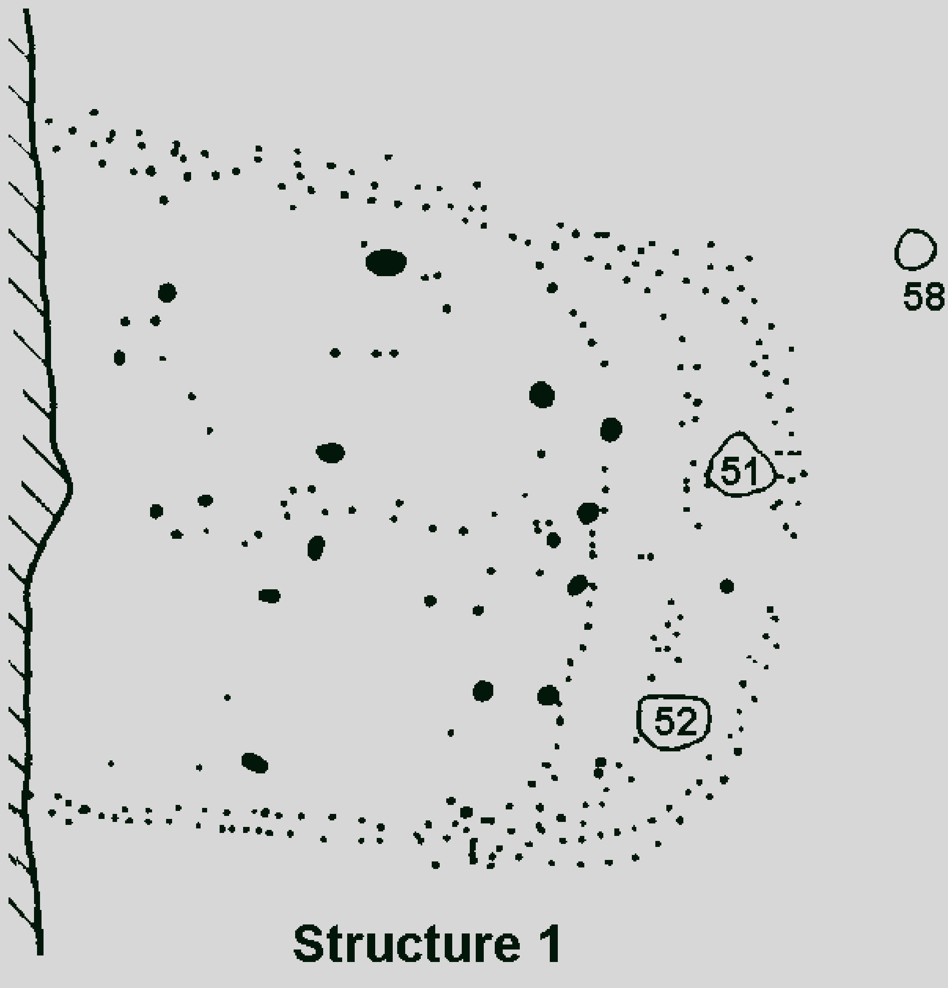

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EXCAVATIONS AT THE BOLAND SITE, 1984-1987: A PRELIMINARY REPORT

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PREFACE

Boland was not an easy site to dig. Apart from the usual problems with funding, logistics, weather, and vandalism, Boland provided challenges that were uniquely its own. Most of these stemmed, directly or indirectly, from the fact that the site was an active topsoil mine, and was constantly being nibbled away and sold to gardeners and landscapers. This circumstance was no accident: by state law, commercial topsoil had to be a highly organic loam, and Late Woodland middens in alluvial valleys were among the best sources of such soils in the county. Many archaeological sites along the Susquehanna and Chenango rivers had previously been destroyed by mining—Castle Creek and Willow Point, to name just two illustrious examples. At least the Boland site was in good company.

Our first two years of work involved more politics than archaeology. When we first became interested in the site in 1982, the landowner was unwilling to let us dig. Changing his mind took a great deal of persuasion and many months of effort; even after our field work began in 1984, we constantly had to negotiate (and dodge heavy machinery) in order to keep going. In was not until after our 1985 season that the state imposed new mining restrictions, which allowed us to finish our work in relative peace. We are grateful to the many people who played key roles in helping us gain access to the site and continue working there. Among them were Pat Snyder, Brad Griffin, Joe Moskiewicz, Louise Basa, Ed Curtin, and Margaret Kelley of the New York Department of Environmental Conservation; Dolores Elliott and David Dixon of the Broome County Historical Society; Donald Grunder and Lee Cirba from the Town of Fenton; Ross McGuire and Michele Morrisson of the Roberson Center for the Arts and Sciences; Al Dekin of SUNY-Binghamton; and Ellie McDowell-Loudan of SUNY-Cortland. We also thank Bruce Fullem, archaeologist with the New York Division of Historic Preservation, who found time to visit the site once in 1985.

Funding for various stages of the work was provided by Boland's Topsoil, Inc., the Roberson Center for the Arts and Sciences, the National Geographic Society (grant no. 3637-87), the State University of New York at Binghamton, and the University of North Carolina at Chapel Hill. The earthmoving machines and skilled drivers needed for our mechanical stripping operations were provided by Boland's Topsoil, Inc. and Barrett Paving Materials, Inc. To all these companies and institutions, and to all the individuals who made these gifts possible, we are deeply indebted.

No excavation can happen without a dedicated field crew, and in this respect we were blessed many times over. Most of the excavations were accomplished by students enrolled in SUNY-Binghamton's archaeological field school. The initial field school was taught by Peter Siegel and spent two weeks at the site in 1984; subsequent field schools were taught by Susan Prezzano and spent a full ten weeks at Boland each summer from 1985 through 1987. The students were, in 1984, Karen Jao and Joe Nytch; in 1985, Carol Balderston, Uzi Baram, Vanessa Bohrer, Tom Evans, Victoria Giannola, Tim Jones, Steve Langdon, Mike Lindeman, Rick Quest, and Carol Spoor; in 1986, Danielle Desruisseaux, Katherine Dropp, Elayne DuBois, Royce Duda, Raquel Gil, Jennifer Jones, Jennifer Kiely, Adrian Leighton, Lisa Mangan, Maria O'Donovan, and Jeanne Williams; in 1987, Christine Kiely, Art Knippler, Jennifer Lavin, Eamon McDaniel, Cathy Malloy, Adrienne Morgan, Tim O'Brien, and Wolf Ziegenhagen.

For four weeks in 1985 and again in 1986, the field crew was supplemented by high-school students enrolled in SUNY-Binghamton's Interdisciplinary Summer Research Program. This program was organized by Richard Quest and Carol Kull, who kept things going (and everyone happy) with remarkable skill. Our ISRP students were, in 1985, Nicole Akel, Jim Barnes, Luke DalFiume, Theresa DeBonis, Sean Forbes, Vincent Gallagher, Bryan Hathorn, Adrian Leighton, Ashley Smith, and David Wolkoff; in 1986, Hope Engler, Shannon Foster, Kirstie Gianuzzi, Anne Beth Litt, Amy McNichols, Thomas Mollen, Paul Quast, Emily Soltano, Joel Tishcoff, and Daniel Weinberg.

Other crew members, both paid and volunteer, who worked in the field at various times were Doug Bailey, Cynthia Began, Nancy Benco, Peter Berniato, David Bernstein, Dan Caister, Dan Cassedy, Nancy Chabot, Lynne Clark, Meg Conkey, Anita Cook, Ed Curtin, Linda Davidson, Al Dekin, Dolores Elliott, Bob Ewing, Jim Gibb, David Gitlitz, Abigail Gitlitz, Deborah Gitlitz, Sandra Gray, Ed Hood, Stan Jaskiewicz, Frank Jolley, Jake Kilmarx, Andrea Lain, Tom Langhorne, Jennifer Lavin, Karleen Leeper, Sue Lobo, Janice MacDonald, Tom Maher, Kathy Martin, John Mergetanski, John Miller, Melody Pope, John Pryor, Les Rountree, Blythe Roveland, Abelardo Sandoval, Edna Scott-Davies, Murray Shapiro, Peter Siegel, Caroline Steele, Laurie Steponaitis, Francoise Sweeney, Beth Turcy, Dean Veres, Nina Versaggi, David Wallace, Fessy Washburn, Rusty Weisman, Chloe Zemek, and members of the New York State Archaeological Association's Chenango Chapter. All contributed greatly to the project's success.

Many people also helped in the laboratory. Linda Budinoff and Adrian Leighton volunteered considerable time in processing the artifacts that came in from the field; Chloe Zemek spent many hours sorting flotation samples; Jen Jones drew composite profiles and compiled information on stratigraphy; Jen Kiely organized field records and entered artifact data on the computer; Nina Versaggi and Randy Daniel shared their knowledge of stone tools; Linda Carnes identified and provided background information on the European trade goods. Bob Funk, Herb Kraft, Dean Snow, and Trawick Ward offered much helpful advice and information. The artifact photographs were taken by Bruce Wrighton and Linda Carnes. Feature profiles were drafted by David Fuerst. The excavation maps were drawn by Jon Lothrop, Caroline Steele, Jen Jones, and Andrea Lain. To all these individuals we are grateful.

Finally, we wish to thank Jim Boland, the site's owner and topsoil miner extraordinaire, who graciously (even if sometimes reluctantly) allowed the archaeological work to proceed. It's fair to say that, without him, this project would never have gotten off the ground.

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CHAPTER 1

INTRODUCTION

The Boland site was first brought to our attention by an amateur archaeologist in 1981. A series of visits over the following year convinced us that further investigations would be worthwhile for two reasons. First and foremost, surface artifacts indicated that the site had been heavily occupied in the one or two centuries following AD 1000, a time when intensive maize agriculture was first adopted. Relatively few sites of this period had previously been excavated, and the Boland site held promise of providing significant new information on the earliest farming communities in the region. A second consideration had less to do with scientific questions than modern realities: at the time of our visits the site was rapidly being destroyed by topsoil and gravel mining. Given the rate at which mining seemed to progress, we estimated that the site would be gone by the end of the decade. Sadly, this prediction proved all too true. The last undisturbed remnant of the site was loaded by backhoe into dump trucks on the afternoon of September 15, 1987.

This volume presents the results of our excavations at Boland, which took place during the four summers from 1984 to 1987. These excavations revealed evidence of several overlapping communities, including a palisaded village dating to the Carpenter Brook phase (ca. AD 1000-1100), and an eighteenth-century Indian settlement that was probably part of the historically documented village called Otsiningo. The excavations, artifacts, chronology, and conclusions are treated at length in subsequent chapters. Here we describe the site and its location, discuss its geological and environmental setting, and briefly provide background on related settlements in the region.

LOCATION AND DESCRIPTION

The Boland site (SUBi-1106) was located in the Town of Fenton, Broome County, New York, near the present-day village of Hillcrest (Figure 1). It was situated on the east bank of the Chenango River, approximately 7.5 km above the confluence with the Susquehanna River. Its UTM coordinates were 4667400 m N and 426700 m E.

At the time of our first visit, the surface scatter covered approximately 5.3 ha (Figure 2). However, this was certainly less than the site's original extent. To the west and south of the 1981 scatter, mining operations had removed large tracts of topsoil, taking all traces of the site with it; a high density of artifacts extended right up to the edge of the mine, and archaeological features could be seen in the vertical mine escarpment. To the east and north, construction of New York Route 7 and associated businesses had covered the original surface with meters of modern fill. Based on the accounts of local informants, early aerial photographs, and our own observations in the field, the site originally could

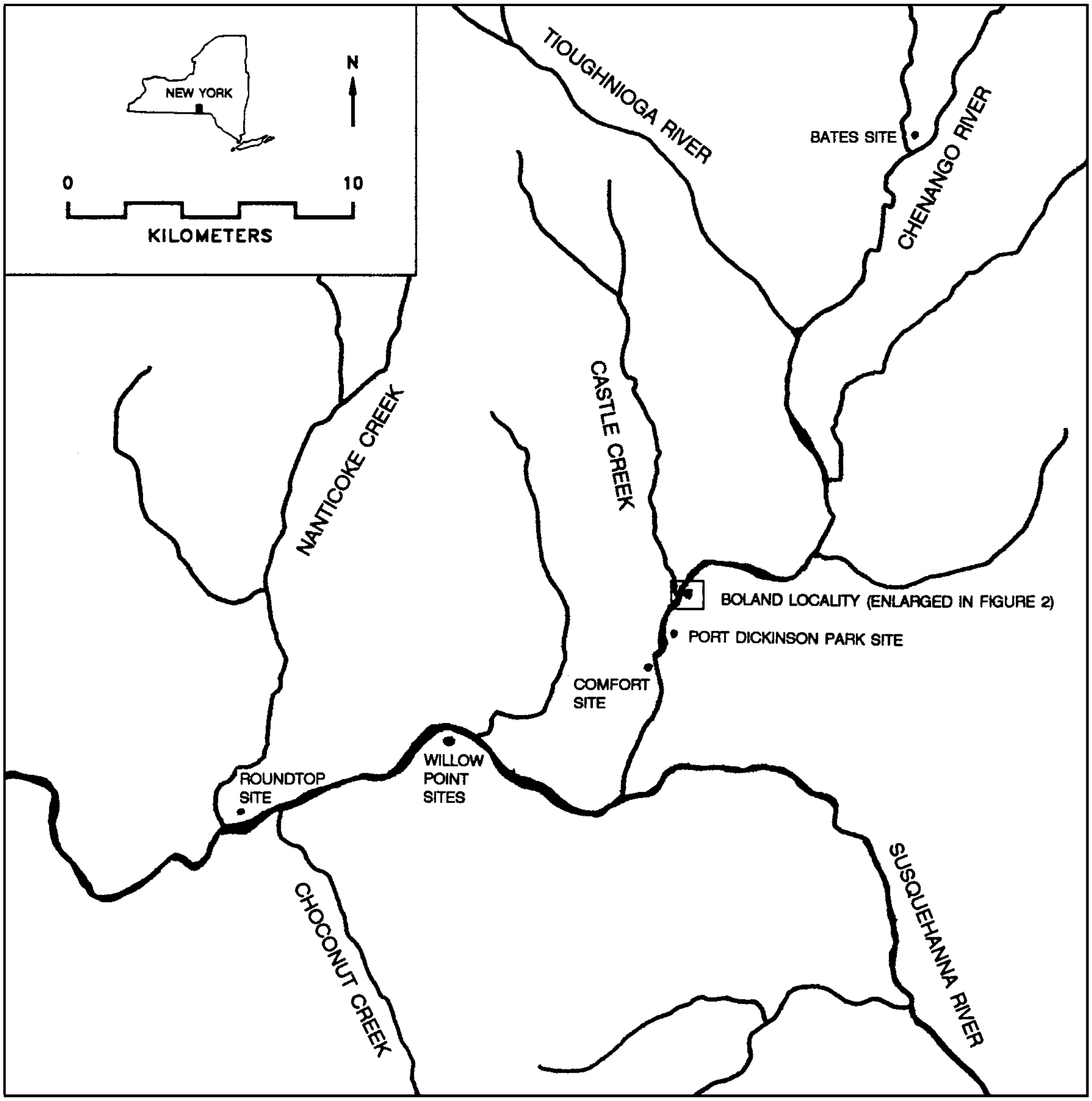


Figure 1. The Lower Chenango region.

have been twice as large as it was on the day we first saw it.

GEOLOGICAL SETTING

The Chenango Valley is part of a subdivision of the Appalachian Uplands known as the Susquehanna Hills (Thompson 1977:31-33). This area is drained largely by the upper Susquehanna River. The Chenango River, a major tributary of the Susquehanna, is about 129 km long and flows in a south to southwest direction (Cadwell 1972:4). Upland areas are moderately steep with flat hilltops rarely exceeding 550 m in height. Valleys are broad with gentle topography (Coates 1963:19).

Shales of Devonian age are the predominant bedrock type. These have their origins

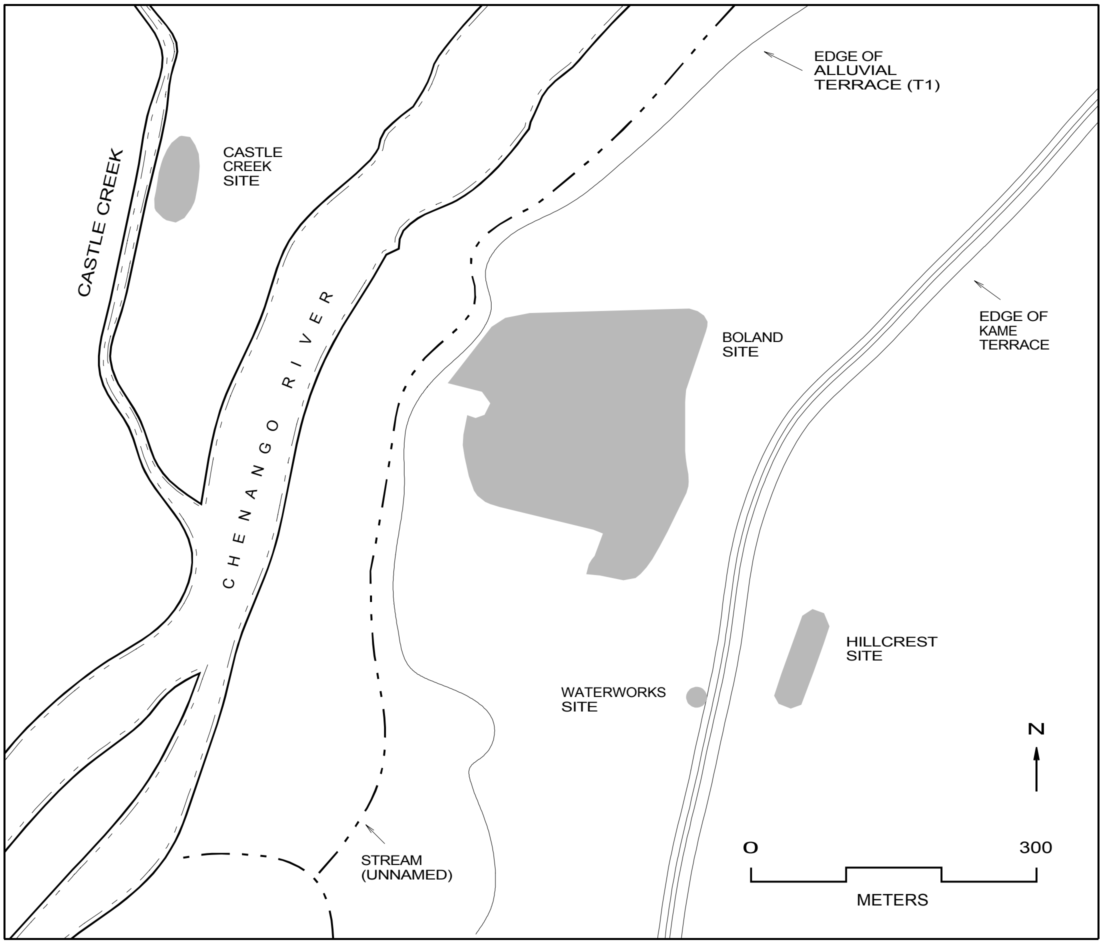


Figure 2. The Boland locality prior to modern construction and mining. Topography is based on a 1937 aerial photograph (Figure 3). Stippling represents the Boland site's extent in 1981, after portions had already been destroyed.

in marine deposits associated with a broad sea which covered the eastern United States for most of the middle Paleozoic (Cadwell 1972:2; Coates:1963:19; Thompson 1977:23). Sediments composing these shales in central New York derive from an ancient mountain chain, the ancestors of the Adirondacks, which arose in the east. Another mountain building phase during the beginning of the Mesozoic uplifted the sediments permanently above sea level, creating the Appalachian Uplands which extend from central New York south to Georgia. Subsequent geologic events eroded these shales to an almost featureless plain. This area was again uplifted. Erosion from the end of the Mesozoic, primarily in the form of running water, has created the negative relief so prominent in the area (Coates 1963:19-23, 25; Thompson 1977:23). Evidence of the ancient peneplain can be seen in the pervasive presence of flat ridge tops of approximately the same elevation.

Glacial and Holocene Geology

Of more direct significance to the Boland site is the immediate postglacial and Holocene geology of the Chenango Valley. Unfortunately, few studies of the glacial geomorphology of the area have been undertaken while decades of farming, mining, and river channelization have permanently altered the topography, steam flow, and soil deposition patterns of the lower reaches of the Chenango (Coates 1963:31). A detailed search of historic records combined with aerial photographs, soil survey data, and geologic studies contributed to a basic interpretation of the geologic and environmental component of Boland, but this picture still remains sketchy.

Over 17,000 years ago, during the height of the last major glacial period in central New York known as the Wisconsin phase, a single ice sheet approximately 915 m thick advanced to a position at least 64 km south of the Binghamton area (Coates 1963:29, 100). This sheet would have covered even the highest peaks in the area. A brief advance during late Wisconsin times known as the "Valley Heads," which is responsible for many of the topographic features in the Finger Lakes region, stopped north of the area (Coates 1963:29). Specific land forms in the Chenango Valley can be traced to the period of deglaciation following the previous major Wisconsin advance.

Cadwell (1972) has documented six phases of ice retreat in the Chenango River and has correlated many topographic features as well as stream locations to this period. During the first phase, the most important in creating topographic features near the site, the ice sheet retreated north from Binghamton to Chenango Forks about 10 km north of Boland. When the upland ice margin was positioned across the location of the site, a tongue of ice extended down the valley probably as far as Binghamton (Cadwell 1972:52). Meltwater flowing laterally to the ice flow deposited stratified materials between the bedrock valley wall and the ice, forming an elongated flat-surfaced kame terrace approximately 2.4 km long in the vicinity of Hillcrest. This terrace is currently elevated about 15 m above the valley floor and is located just east of Boland (Cadwell 1972:52; Coates 1963:113). During this time the kame knolls situated at the mouth of Castle Creek were also deposited. Further retreat of the ice formed a plug in the river channel about 6 km above Boland, causing the river from Kattelville to Port Crane to be temporarily diverted 5 km west of its present location (Coates 1963:102, 111). This area, located approximately 2 km from Boland, now contains a small stream (Thomas Creek) and is quite marshy.

By the time the ice front had retreated to Chenango Forks, the volume of melt water increased dramatically. It was at this time that most of the sand and gravel (valley train) was deposited in the lower Chenango and in adjacent sections of the Susquehanna valley (Cadwell 1972:53-54). These deposits extend from Chenango Forks to Castle Gardens in Vestal, and, together with lake clay, meltwater, and alluvial deposits, reach thicknesses of up to 61 m above the original bedrock channel (Coates 1963:31, 102). These broad, generally flat deposits contribute to the lack of rugged relief in the area (Coates 1963:97). They are a major source of gravel and account for the profusion of gravel mining operations along the banks of the Chenango and Susquehanna in this location. In contrast, the steeper slopes and narrower valleys of the Delaware River in the nearby Catskill mountains have resulted in none of the substantial glacial outwash and terrace development typical of the Chenango and Susquehanna (Coates 1963:31; 1976).

Holocene topographic features, which began forming at the end of the glacial period approximately 10,000 years ago, are products of stream flow, alluvial deposits, river migration and entrenchment. The Chenango and Susquehanna, initially migrated freely across their till-filled valleys leaving low river terraces of fluvial deposits in their wake. In many places these rivers became entrenched and now show little evidence of movement during the last several thousand years (Coates 1976:85).

Figure 3. Aerial photograph of the Boland locality in 1937. Dashed lines delimit the Boland site in 1981; solid lines delimit the 1984-1987 excavations. Area depicted is the same as that in Figures 2 and 4.

A 1937 aerial photograph made by the Soil Conservation Service shows evidence of older river channels in the Boland locality (Figure 3). The easternmost and probably oldest channel scar ran along the edge of the Hillcrest kame terrace. In the 1830s this old channel became the route of the Chenango Canal, and later it was covered by New York Route 7 and Interstate Highway 88 (see Figure 4 in Chapter 2). Another old channel was located west of the site, just off the edge of the alluvial terrace. This scar appears on the 1961 USGS topographic map as an active secondary river channel and may have been the main channel before the river migrated to its present position. The secondary river channel was approximately 200 m from Area 1 and 250 m from Area 3, the two most thoroughly investigated archaeological areas at Boland. The age of the active secondary channel is uncertain, but it may be relatively recent. In the area immediately south of Boland, where Phelps Creek enters the Chenango River, a complex of islands and river channels appears on all extant eighteenth, nineteenth, and twentieth century maps. The later maps show much change in location of channels and shape of islands and shore line, indicating that Phelps Creek was forming an active delta at this location. One geologist (Filmer 1928) attributed this phenomenon to increased silt runoff from Phelps Creek, a product of deforestation during the nineteenth century.

Even so, several clues indicate that the secondary river channel west of the Boland site may have existed in prehistory. Deeds from the 1840s (Broome County Deed Book 32:131) describe a parcel of land in this location bounded on the east and north by a stream called Island Brook and on the west by the Chenango River. Island Brook must be the secondary river channel since early maps show no other watercourse on the property (Anonymous 1859; Burr 1839:34; Everts et al. 1876). The presence of this channel in the early nineteenth century, prior to major deforestation and intensive farming, suggests that it was not the result of modern disturbances.

Early maps also attest to the Chenango River's stability in this locale. The river's main channel, as well as the two major islands within that channel, maintained roughly the same shape and location throughout historic times. (The islands are situated at the mouth of Thomas Creek which flows through the original postglacial Chenango channel.) Such stability, even over a period of intense settlement, was probably a result of local topography. The right bank of the river was in places 3 m high and contained interspersed gravel knolls, all factors inhibiting the river's westward migration.

Over the past 50 years, stability has been superceded by rapid change, as modern construction and mining have drastically altered the local landscape. In the 1940s, mining destroyed the large gravel knoll across the river from Boland where the Castle Creek site was located, and Route 7 was built on an artificial embankment over the old channel scar east of the site. In the 1950s, topsoil mining ravaged the alluvial terrace just south of Boland (quite possibly removing parts of the site itself), fill was dumped north and east of the site to create room for roadside buildings, and Castle Creek was diverted into a new channel north of its former location. During the 1960s, topsoil mining moved into the active floodplain just west of Boland, and the Chenango River was straightened to make room for the construction of Interstate Highway 81 (on the river's right bank). By the early 1970s, more fill had been added north and east of the site. Finally, beginning in the early 1980s, topsoil mining resumed on the Boland site itself, and large-scale gravel mining gutted the nearby floodplain, creating a series of large ponds which eventually became linked and captured a part of the river's flow. Nowadays, the Boland locality bears little resemblance to the way it looked at the time of its Indian occupation.

Soils

Soil deposition, site topography, and its effect on site formation is difficult to interpret from the scant data on natural processes in this portion of the Chenango Valley. Elevation readings taken on the Boland property indicate that the field rises to the west at least as far as the excavation limits. The lower, eastern section of the field is adjacent to the oldest channel scar abutting the kame terrace. The main occupation areas at Boland appear to be situated on an alluvial terrace between a secondary channel and this ancient channel scar. Areas of higher elevation received less recent soil deposition as evidenced by the absence of buried topsoil and the shallowness of the artifact-bearing soils which are often entirely within the plow zone. Specific descriptions of soil deposition processes in Area 3 are contained in Chapter 3.

The Boland site is situated on Tioga silt loam (Giddings et al. 1971:79-80), which is one of the most productive agricultural soils in Broome County and the type most often used for topsoil. These are deep, well-drained soils that have formed in recent deposits on flood plains. They often flood briefly in the spring and usually dry out within two or three days. The top 23 cm of a typical soil profile is brown silt loam (10YR 5/3) with an abrupt smooth boundary; below this layer, and to a depth of 66 cm, is a pale-brown to light yellowish brown (10YR 6/4) silt loam.

ENVIRONMENTAL SETTING

Reconstruction of environments at the Boland site over the past thousand years is based on several sources. These include studies of recent environmental conditions and vegetation types, palynological studies, historic accounts, and paleobotanical analysis from nearby archaeological sites (Jones 1988). The Chenango Valley has been classified by Thompson (1977:92-95) as part of the Oak-Northern Hardwood Zone which predominates to the west but also extends up the Chenango and Susquehanna valleys. Typical trees of this zone include chestnut, oaks, hickories, and other hardwoods (Braun 1950:393-396). The surrounding hills in Broome County fall into the Northern Hardwood zone and are covered by sugar maple, beach, yellow birch, hemlock, and white pine (Thompson 1977:95-96). Winters are cold and snowy, with warm summers. The number of frost-free days per year averages between 130 and 140, which is somewhat less than in the Great Lakes plain to the north, a result of the higher elevation and steeper slopes of the Chenango and Susquehanna drainage (Thompson 1977:75-77).

The closest extensive palynological studies were performed in conjunction with two major archaeological investigations in the upper Susquehanna drainage around Oneonta, about 75 km northeast of Boland. The paleoenvironmental sequence reported in Funk and Rippeteau (1977) depicts cool, moist conditions during the 1,500 years preceding the Late Woodland. This period was characterized by an oak-hemlock-chestnut maximum. By AD 1100, roughly the date of the major component in Area 3 at Boland, warmer conditions prevailed and the present-day mixed deciduous-coniferous forest was in place.

Paleobotanical analysis of the nonfood plants from Boland found in pit features showed the presence of ash. Nut taxa included black walnut, hickory, and possibly butternut. Seeds of the mustard, grass, spurge, and knotweed families were also found and may represent either food plants or weeds that grew near the settlement. Among the fruits identified were bramble and plum or cherry. Maize of the Northern Flint variety was recovered from several features at Boland. This hardy corn with a maturation cycle of 100 days was the prevailing form grown in the late prehistoric Northeast (Heidenreich 1971:173; Prezzano 1986:15-17). Other crops plants recovered included bean, sunflower, and possibly peach (see Appendixes A and B).

In 1743, the botanist John Bartram (1751) travelled up the Susquehanna and its tributaries to Onondaga territory. Tree species recorded include locust, oak, hickory, walnut, pitch pine, black oak, white pine, poplar, sugar maple, sugar birch, laurel, spruce, yew, chestnut, beech, "linden ash," and hazel. This variety of tree species agrees well with the modern characterization of this area as of Oak-Northern hardwood zone.

OTHER INDIAN SITES IN THE LOWER CHENANGO REGION

Boland represents only one of a large series of Middle Woodland and Late Woodland sites which occupied the Chenango Valley floodplain from Binghamton to Chenango Forks. Most sites have been destroyed by topsoil mining, river channelization, or road construction during the past 50 years. As a result, only a handful have been investigated. For present purposes, we discuss only the sites located close to Boland and fall within the same late prehistoric-early historic time interval.

One site, known as Castle Creek, was located on a kame knoll only 500 m to the northwest, across the Chenango River. This site, for which the latest Owasco phase (AD 1200-1300) is named, was excavated during the 1930s and early 1940s (Ritchie 1934, 1944) and produced evidence of palisades and partial house patterns. Good preservation conditions resulted in the retrieval of carbonized plant remains including maize and beans, as well as fragments of nets and baskets. Castle Creek was probably occupied about 100 years after the palisaded village in Area 3 at Boland. The site was destroyed by topsoil and gravel operations during the 1940s.

The Hillcrest site, located on the kame terrace approximately 300 m southeast of Boland, is primarily known through the discovery of Indian burials during the construction of a housing development in 1936 (Elliott 1977). These burials, salvaged by amateur archaeologists, contained grave goods dating to the eighteenth century and may be directly associated with the historic Indian component uncovered at Boland. Whether a habitation site also existed in this location is unknown.

Situated just west of Hillcrest, at the edge of the valley, is the Waterworks site. Here, more than 50 years ago, workers building the Town of Fenton's waterworks discovered a small ceramic vessel of the Kelso Corded type, which probably dates to the Castle Creek phase (AD 1200-1300). Local tradition holds that the vessel was found with a burial, but this allegation cannot nowadays be confirmed. Little else about the site is known. The reconstructed vessel now resides in the archaeological collections of the State University of New York at Binghamton.

The Comfort site, located 3.3 km south of Boland on the Chenango's west bank, was excavated in 1971 and 1972 by the Triple Cities Chapter of the New York State Archaeological Association (Giannola 1988; D. Elliott, personal communication). Artifacts and features from two components were uncovered, one prehistoric and the other historic. The former component was marked by a ceramic assemblage dominated by the type Sackett Corded, which clearly belonged to the middle Owasco Canandaigua phase; it also included a number of storage pits and a possible longhouse. The latter component was evidenced by the presence of eighteenth-century European trade goods; pits and burials but no definite structures were found.

A fifth important site is Port Dickinson Park, located 1.8 km south of Boland near the mouth of Phelps Creek (Beauregard 1986). Excavations in 1985 revealed a series of small settlements, probably seasonal camps, dating between AD 300 and 1000. Many post molds were uncovered, some of which defined a squarish or oval structure approximately 3-4 m in diameter. A feature associated with the structure was radiocarbon dated to 1010 $\pm$ 75 years: AD 940. Port Dickinson is the only Hunter's Home phase component with evidence of a structure. In addition, the site produced an eighteenth-century glass bead, indicative of an Historic occupation in the vicinity. The site was destroyed by highway construction in 1986.

Two other sites in the region are of direct relevance to Boland. Roundtop, located approximately 17.5 km southwest of Boland on the north bank of the Susquehanna River, is one of the largest and best reported Carpenter Brook phase sites in New York (Ritchie and Funk 1973:186). Excavations uncovered at least one house and dozens of pit features. Bates, situated on the Chenango River about 18 km north of Boland, is a major Canandaigua phase site. A palisade line and possible longhouse were discovered (Ritchie and Funk 1973:226-252).

HISTORIC SETTLEMENT AND LAND USE IN THE BOLAND LOCALITY

Eighteenth-century reports by Europeans travelling through the lower Chenango Valley make reference to an Indian village called Otsiningo (Elliott 1977). Each succeeding report depicts the village or villages in various locations between present-day Chenango Forks and Binghamton. The first reference, in 1726, indicates that inhabitants of this dispersed settlement were originally Onondagas and "Shawanese" Indians. By 1753 groups of Oneidas, Tuscaroras, and Nanticokes were also established in the valley. During the next 26 years, additional groups including the Conoys, Mahicans, and Cayugas settled in the area. Many of these groups moved here after petitioning the Iroquois for protection against Europeans. Settlement appears to have been in many separate villages on both sides of the river, but in diplomatic relations the entire settlement was treated as one entity. Archaeological traces of eighteenth-century occupation at the Hillcrest, Comfort, and Port Dickinson Park sites (just described), and at the Boland site itself almost certainly relate to this community. Otsiningo was destroyed in 1778 during the Clinton and Sullivan campaign of the Revolutionary War.

After the war, several groups of land speculators from Massachusetts and New York attempted to gain legal authority to sell off the area around the confluence of the Susquehanna River. The final agreement called for Massachusetts to receive payment from the sale of the land west of the Chenango, provided they first bought the land from the Indians (Hinman 1981:7-8). Historical documents place the first of the 1787 treaty meetings between the Indians, probably Oneidas, and the Massachusetts proprietors for the sale of the land at or directly south of the Boland property (Lawyer 1900:126; Wilkinson 1967:35). This seems to indicate that an Indian settlement was located nearby. Early histories claim that the Oneida sold all land but retained use rights for at least seven years for a half-mile square portion near the mouth of the Castle Creek known as the "Castle" (Wilkinson 1967:36). Inspection of deeds and the original survey maps show that the original 1788 parcel at the mouth of Castle Creek directly across the river from Boland is indeed a half mile square. This lot was called the "Castle Lot" when it was sold two years later (Broome County Deed Book [1790] 2:198-199). Apparently, Indians still lived in the valley during the first stages of White settlement.

The Boland property was originally part of the large Clinton and Melcher patent (Hinman 1981:17). Through the early 1800s it saw use as a horse farm until the 1840s when the lot was broken up into smaller crop farms (Broome County Deed Book [1848] 32:131). The bulk of the lands remained in crops until the 1950s when relatives of the current owner bought the land for topsoil mining (Broome County Deed Book [1969] 1145:992). The old farmland saw intensive mining during the 1960s probably in conjunction with the building of Interstate Highway 81. Additional mining began in the 1980s and culminated in the destruction of the site.

In the 1830s, the Chenango canal was built along the eastern boundary of the property adjacent to the kame terrace. In the 1940s, New York Route 7 (Brandywine Highway) was built along the path of the canal. Recently, this road was further improved and became part of Interstate Highway 88.

SUMMARY

The Boland site is situated on an alluvial terrace in the Chenango River valley. The main areas of excavation lie approximately 300 m from the main river channel. The river has occupied the same channel during at least the last 200 years. The floodplain was subject to brief spring floods but dried out quickly. Surrounding soils are the richest in the area and very conducive to agriculture. Climate has remained essentially the same during the past thousand years, the main period of occupation at Boland. Although the growing seasons were short compared to the Great Lakes plain in New York, they provided sufficient time to grow flint corn, the main crop during the Late Woodland period. A mixture of hardwood and coniferous trees comprised the main forest types in the area. Paleobotanical analysis of samples from Boland attest to the presence of nut trees. Besides nuts and agricultural crops, a nearby swampy area surrounding Thomas Creek, and the river itself could have provided food resources to the inhabitants of Boland.

The valley surrounding Boland was heavily occupied during the Middle and Late Woodland stages. It was again densely inhabited during the eighteenth century. The location of a few of the discovered sites can be attributed to unique postglacial landforms. Both the Hillcrest site located on a kame terrace and the Castle Creek site located on a kame knoll were situated above annual flooding but on nearly level ground adjacent to good agricultural soils. Preservation was excellent at both these sites. The Port Dickinson and Comfort sites, like Boland, were located on the floodplain.

During the eighteenth century, a dispersed community called Otsiningo, composed of many Indian groups, extended along both banks of the Chenango from Binghamton to as far as Chenango Forks. Although the settlement was destroyed during the Revolutionary War, groups of Indians resettled the area immediately across the river from Boland in the 1780s. From the early nineteenth until the mid-twentieth century, the Boland property was used as farmland. The Chenango Canal was built along the eastern edge, but no other significant building occurred within the area. During the 1960s through the 1980s this property, along with adjacent areas, became the site of topsoil and gravel mining.

CHAPTER 2

EXCAVATIONS

Even though the Boland site was discovered in 1981, circumstances did not permit field work to begin until 1984. During the intervening years, topsoil mining had destroyed the western half of the site and reduced the extant portion to only 2.6 ha (Figure 4).

Indeed, the mining continued throughout our four years of work there. This factor greatly affected our excavation strategy, not to mention our nerves. Deciding when, where, and how to dig involved a kind of archaeological triage: saving one part of the site usually meant letting another be destroyed. On a number of occasions in 1984 and 1985, excavation plans had to be rapidly altered because of sudden changes in the direction and pace of mining. Also, in 1984 and 1985 we never knew whether we would be allowed to return the following year, or whether any of the site would be left. This is why we relied so heavily on mechanical stripping. Fortunately, just after the 1985 season, the state imposed restrictions on the mining operation; these restrictions allowed us to excavate carefully what was left of the palisaded village, without having to make use of bulldozers.

The field work started in May 1984; our first objective was to delineate areas of the site that were likely to produce the most data. A controlled surface collection was carried out, the vertical escarpment at the edge of the mine was carefully examined, and several test units were dug. As a result of these preliminary investigations, four areas of high artifact density were discovered (Ewing and Steponaitis 1984). Unfortunately, just after the surface collection was finished, two of these areas were obliterated by mining. Thus, all subsequent investigations focused on the two areas that remained: Area 1 in the southwestern corner of the site, and Area 3 in the center (Figure 4). Area 1 was rapidly excavated in July 1984, just days before it was destroyed by mining. Excavations in Area 3 began the same month and continued intermittently until September of 1987, when the last vestiges of the site were hauled away in trucks.

Generally speaking, two kinds of excavation were employed. *Mechanical stripping* involved removing the plow zone with a bulldozer or road grader, cleaning the surface with shovels, mapping all features, then excavating the features by hand. This method opened large areas very quickly, but sacrificed all the artifacts and information in the plow zone. Moreover, in places where undisturbed midden existed below the plow zone, much of this was also inadvertently destroyed. Needless to say, we used mechanical stripping only when absolutely necessary, usually in areas slated for immediate destruction by mining.

Where time permitted, our preferred method was *manual excavation*. This entailed laying out contiguous excavation units and digging them with shovels. Units were usually 2 by 2 m and occasionally 1 by 2 m in size. During the early stages of our work, soil was

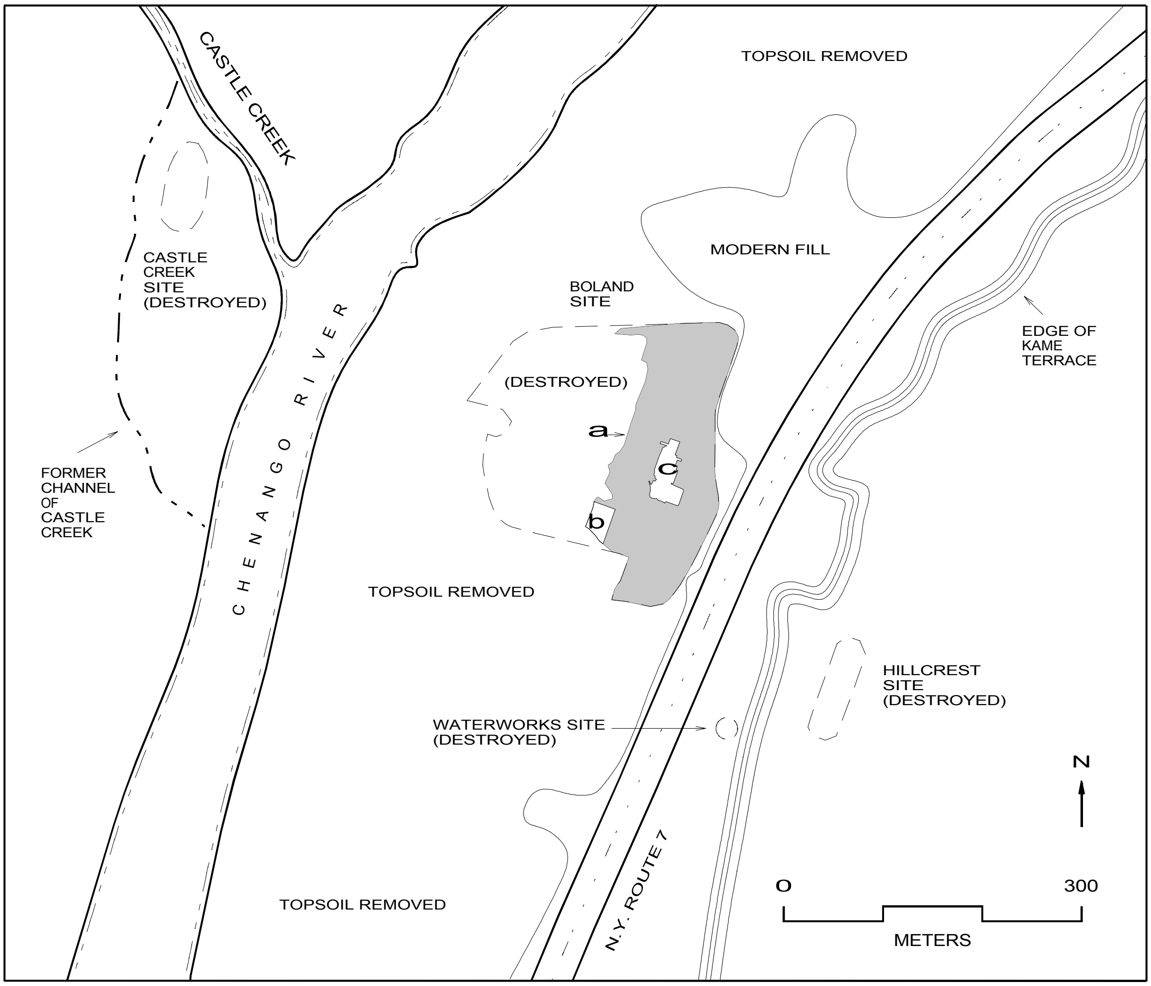


Figure 4. The Boland locality at the start of field work (May 1984), showing areas of subsequent investigation: (*a*) limits of controlled surface collection; (*b*) major excavations in Area 1; (*c*) excavations in Area 3.

removed in 10-cm arbitrary levels. But as our familiarity with the site grew, we shifted to digging by "natural" levels. The soil from all levels was dry-screened through 1-cm (.375 in) hardware cloth. Flotation samples were taken selectively from the excavated levels in Area 3.

All pit features and hearths, except those severely damaged by mining, were excavated with trowels. The usual method involved bisecting the soil stain, removing one half (along with some of the adjacent subsoil if necessary), drawing the profile, then removing the second half according to any natural layers observed. Fill was dry-screened through 1-cm mesh, and flotation samples were taken whenever possible.

Post molds were investigated more selectively. Highest priority was given to excavating questionable soil stains in order to assess their true nature. In addition, a sample of post molds from each structure, the palisade, and surrounding areas was also excavated. The methods used were essentially the same as those just described for pits, except that soil samples were taken only when significant amounts of charcoal were observed, or when sherds suitable for thermoluminescence dating were found.

Horizontal and vertical control was maintained at the site with reference to an arbitrary metric grid oriented 30° east of magnetic north, or 19.5° east of true north. The datum was located at the southern margin of the 1984 surface scatter, at an approximate elevation of 258 m (847 ft) above sea level. Excavation units were designated by the grid coordinates of their northeast corners.

SURFACE INVESTIGATIONS

Two conditions aided us in this phase of investigation. First, the entire Boland property was periodically plowed to facilitate topsoil removal which resulted in good surface visibility. Second, we had the "benefit" of a vertical mining cut that extended the entire length of the property and which exposed all the soil layers to the depth of ca. 3 m. Given these conditions, we concentrated our initial efforts on collecting the plowed field and profiling the mine escarpment in order to assess the extent of the archaeological deposits.

Controlled Surface Collection

The controlled surface collection took place on May 1, 1984, soon after the field had been plowed. Surface visibility was ideal. All prehistoric and historic artifacts were collected in 20 by 20 m squares. Over 160 prehistoric sherds, approximately 680 debitage fragments, a variety of stone tools, and numerous pieces of fire-cracked rock were recovered (Table C.1 in Appendix C). Diagnostic artifacts included seven Levanna points, and one Madison point, as well as Carpenter Brook Corded, Sackett Corded, Kelso Corded, and incised neck and collar sherds. One eighteenth-century glass bead and several late-nineteenth-century-to-recent Euroamerican artifacts were also found.

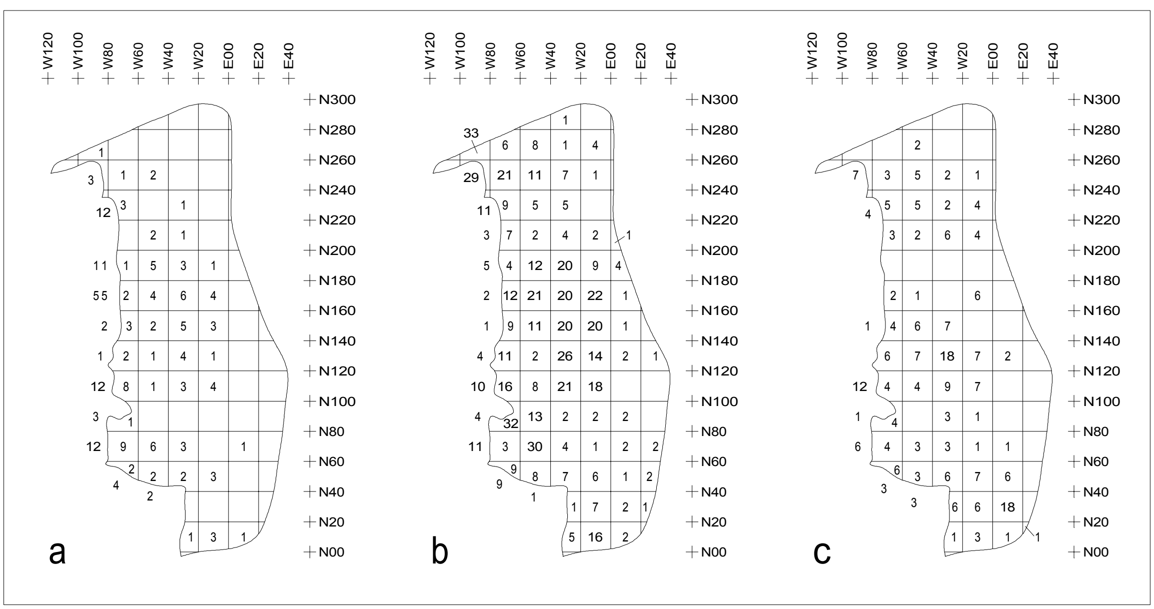


Figure 5. Densities of surface material in controlled surface collection. The number of artifacts in each collection unit is shown for: (*a*) prehistoric pottery; (*b*) flaked stoned debitage; and (*c*) fire-cracked rock.

Distribution maps of this material revealed areas of high and low artifact density. The entire eastern end of the field yielded very few artifacts. This section corresponded to the area of lower elevation associated with an ancient channel scar. A pottery concentration could be seen in the central portion of the field between N100 and N200 (Figure 5*a*). Pottery counts were also high in the southwest corner of the field. The distribution of debitage (Figure 5*b*) was similar to that of pottery, with high concentrations in the center and the southwestern corner of the field. In addition, two other areas of lithic concentration were discovered: in the extreme northwestern corner around N260, and at the southern edge between N00 and N20. Counts of fire-cracked rock (Figure 5*c*) were especially high in the southern half of the field, south of N140.

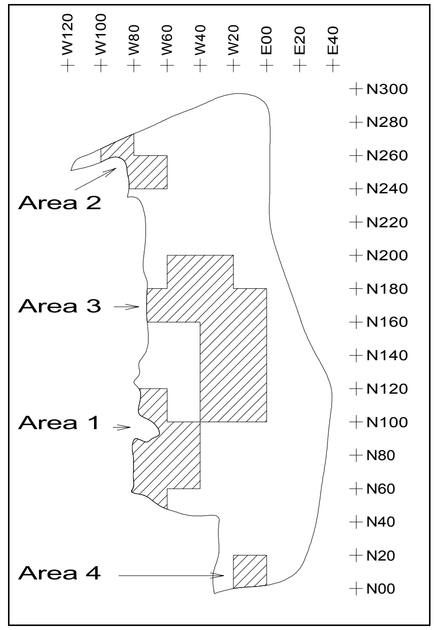


Figure 6. Areas of high artifact density. Hatching denotes units with pottery densities greater than 4 sherds per 400 m^2 or debitage densities greater than 12 pieces per 400 m^2.

Figure 6 depicts the four areas of highest artifact density, based on pottery and debitage. Area 1 had both high lithic and pottery counts; diagnostic artifacts included a Levanna Rough, three Carpenter Brook Corded, one Sackett Corded, one Kelso Corded, and two indeterminate incised-collar sherds, as well as two Levanna points. Area 2 was marked by a high lithic density; diagnostic artifacts included a Sackett Corded and a Levanna Rough sherd. Area 3, the largest artifact concentration, was also marked by high counts of lithics and pottery, with pottery highest in the central portion of the area; two Levanna Rough, one Sackett Corded, an indeterminate incised neck, an indeterminate incised collar, a Levanna point, and an early gunflint was recovered. Area 4 contained high counts of debitage; no diagnostic artifacts were found.

Investigation of the Mine Escarpment

In addition to the surface collection, the entire face of the mine escarpment was inspected for obvious features and midden deposits. We also cleaned and recorded soil profiles at 40 m intervals starting at N80. Figure 7 depicts the location of middens and features discovered during this phase of investigation.

It was obvious that the entire field had been subject to plowing. In most cases, the recently plowed soil was almost indistinguishable from an underlying medium-brown silt loam layer, which was probably an old plow zone. The plow zone averaged 40 cm in depth. In three places, lenses of dark-brown silt loam, often containing flecks of charcoal and artifacts, were present just below the plow zone (Figure 7). These lenses appeared to be prehistoric middens. Two segments stretched at least 20 m with one lense adjacent to Area 1 and the other associated with Area 3. The soil layers in several other locations consisted of plow zone immediately above a light tan subsoil, which seemed to be devoid of artifacts. None of these soil layers contained gravel or clay. Depth to the glacial gravel beds was over 3 m.

A number of features were exposed in the escarpment. Four post molds could be seen between N55 and N80; although their clustering was suggestive, it was impossible to determine at the time whether they belonged to a single structure. Two pits (Features 1 and 7) and three hearths (Features 2, 6, and 8) were also observed. The former were both about 80 cm in maximum diameter and extended about 25 cm below the plow zone. The latter were shallow lenses of charcoal and burned earth 50-85 cm in diameter and generally about 5 cm thick. None of these features yielded diagnostic artifacts, except Feature 1 which was excavated during the mechanical stripping of Area 1 (see p. 18). Not surprisingly, all of these features occurred in areas of high surface-artifact density. Four post molds, one pit, and two hearths coincided with Area 1; one hearth fell within Area 2; and a pit occurred in Area 3.

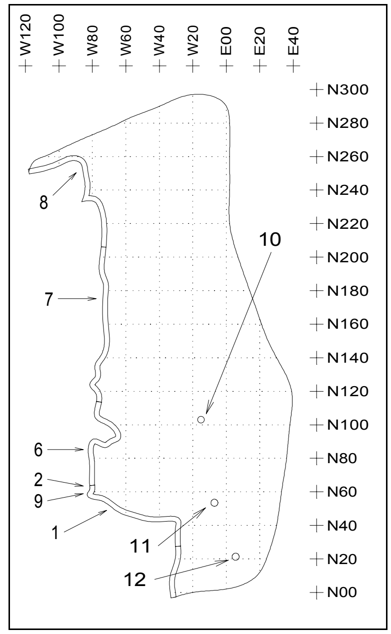


Figure 7. Middens and features observed during surface investigations. Double line represents mine escarpment; black areas are exposed middens. Features are designated by numbers.

During the month following our inspection of the mine escarpment, topsoil mining within the southern portion of field uncovered three more features containing burnt earth (Features 10, 11, and 12). Although all were greatly disturbed by bulldozing and thus could not be excavated, their locations were mapped. Feature 11 contained 60 rough-body sherds, an indeterminate corded neck sherd, and chert debitage.

Summary

Controlled surface collection indicated that prehistoric artifacts concentrated in four distinct areas. Two of these (Areas 2 and 4) were destroyed by mining soon after our surface investigations began. The two that survived (Areas 1 and 3) contained not only high densities of debitage and pottery, but also middens and features that could be seen in the escarpment.

Most of the diagnostic artifacts found on the surface dated to the Owasco period; a small percentage dated to the Iroquois period. The presence of a glass trade bead and a gun flint revealed the presence of an early historic component at Boland.

EXCAVATIONS IN AREA 1

Our excavations here began with four small units, which were called Test Units 1-4. These were opened in May 1984, shortly after the controlled surface collection was finished (Ewing and Steponaitis 1984). All were 1 by 2 m in size with the long dimension oriented north-south. Their northeast corners were located at N82W78, N47W46, N71W50, and N107W73, respectively. These units confirmed the presence of a thin, undisturbed midden below the plow zone. In addition, Test Unit 1 revealed seven post molds (which were later found to be part of a larger pattern; see Figure 8).

Due to a lack of funds, no further work was done until July. At that time, we learned that Area 1 was about to be destroyed by mining. With only three days' notice, a large volunteer crew was assembled, a bulldozer and road grader were borrowed, and, on the morning of Saturday, July 14, some 640 m^2 in Area 1 were mechanically stripped. The heavy machines removed not only the plow zone, but much of the underlying midden as well; in essence, we kept cutting until we reached a soil light enough to make intruding features easily visible. Mapping and feature excavation commenced the same day and continued through Sunday. On Monday, the western half of our excavation was swallowed by the mine. Over the next few days, we did some additional mapping and feature excavation in what was left of our block, and opened a fifth 1-by-2-m test unit at N59.5W65.5. Shortly thereafter, Area 1 was completely mined away.

All in all, the excavation of Area 1 was a frustrating experience. We did what we could in the little time we had, and learned a few things: at least five walls and 11 pit features were uncovered (Figure 8). But a great deal of information was irretrievably lost.

Stratigraphy

Data from the five test units supplemented the stratigraphic information obtained from inspection of the mine escarpment. As before, three distict layers were observed. From top to bottom, these were plow zone, midden, and subsoil.

The plow zone comprised a homogeneous, medium-brown silt loam. In several units, this layer was up to 40 cm thick, suggesting that soil deposition had occurred during the last 200 years. Diagnostics recovered from the plow zone included Levanna Rough and Sackett Corded sherds. Also present were indeterminate corded necks, an incised neck, two incised collars, and rough body sherds (Table C.2 in Appendix C).

An undisturbed midden was encountered below the plow zone in Test Units 2, 4, and 5. This dark-brown silt loam was about 6-12 cm thick and contained only prehistoric artifacts. All diagnostic sherds within this zone were of the type Carpenter Brook Corded, which dates to the Carpenter Brook phase (Table C.2 in Appendix C).

At the base of all the excavations (and directly below the plow zone in Units 1 and 3) was a light-brown subsoil. No artifacts were found in this layer.

Post Molds

Excavations revealed approximately 300 post molds in Area 1 (Figure 8). At least five distinct lines indicative of walls could be discerned. The longest line, Wall 1, extended over 24 m and was oriented 21° east of grid north (30.5° east of true north). Both ends were cut off by the mine escarpment. Several sections of this wall contained paired posts. The three excavated post molds extended 20-28 cm below the subsoil surface. One contained a rough body sherd, while another contained a Sackett Corded neck sherd--probably dating to the Carpenter Brook or Canandaigua phase. An indeterminate point and a core were removed from the tops of two other post molds. An elongated, charcoal-

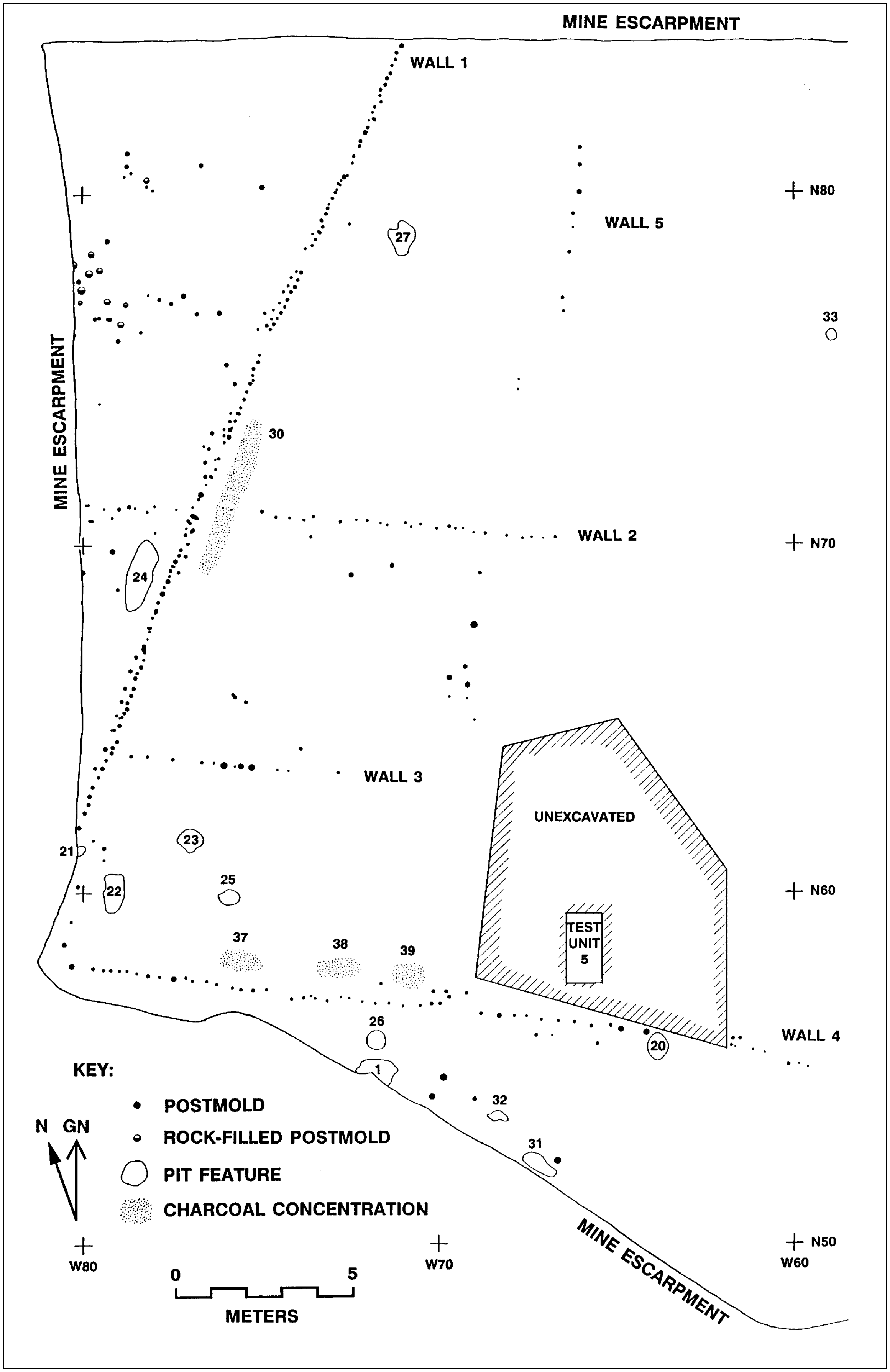


Figure 8. Plan of Area 1 excavations.

rich pit (Feature 30) extended along the central portion of this wall and was probably associated with it.

The three other lines of posts, Walls 2-4, were parallel to one another and oriented approximately 95° east of grid north (114.5° east of true north). These lines were almost perpendicular to Wall 1. Their western ends were truncated by the mine escarpment and their eastern ends were destroyed by plowing or mechanical stripping. (The depths of excavated post molds within these walls decreased markedly from west to east, the easternmost stains being only 1-3 cm deep.) Wall 2 was 17 m long and consisted of a single row of posts. This wall was superimposed over Feature 30; if the latter was indeed associated with Wall 1, then Wall 2 was the younger. The single row of Wall 3 extended for only 6.75 m. Three large post molds approximately 20 cm in diameter were part of this wall. Sections of Wall 4, which extended for 21 m, were double-rowed. Adjacent to Wall 4, and oriented in the same direction, were three elongated charcoal stains (Features 37, 38, and 39) that were similar to Feature 30. One post mold in Wall 4 contained several pieces of a corn effigy pipe (Figure 56*d-h*), an artifact that dates stylistically to the Owasco period.

Another short line of post molds, Wall 5, was found at approximately W66 between N76 and N82. It was 4.8 m long and oriented 8° east of grid north (27.5° east of true north). The stains comprising this wall were severely truncated, and may represent only a subset of the posts that were originally part of this alignment. The rest were probably plowed or stripped away.

The impact of mining and plowing complicates the interpretation of these walls, but their straightness suggests that they were sections of longhouses. Two of the three parallel east-west rows may have been associated with the same structure. The distance between Wall 2 and Wall 3 was 7 m, while Wall 3 and Wall 4 were 6.1 m apart. Although both distances are within the range of recorded longhouse widths for New York and Ontario Iroquois sites, the evidence leans towards Wall 3 and 4 belonging to the same structure. The charcoal stains (Features 37-39) next to Wall 4 may represent the remains of slash pits, which are sometimes found inside of longhouse walls (see Chapter 5).

Other post-mold patterns were also discernable in Area 1. An elongated cluster of post molds between N65 and N70 at W69 may be the remnant of a wall or internal partition. Also noteworthy was the a cluster of rock-filled post molds near the mine escarpment around N80. What this cluster represents is unknown.

Basins

Four of these pits were found in Area 1. All were roughly circular in plan and had flat or slightly rounded bottoms.

Feature 1. This circular, flat-bottomed pit (Figure 9) was first observed in the mine escarpment, and later was more fully exposed by mechanical stripping. At least three-fourths of the feature remained intact. Its fill consisted of unstratified greyish-brown silt with charcoal flecks (Zone I). The excavated portion was approximately 120 cm in diameter and 23 cm deep. Stratigraphically, this feature began at the base of the plow zone (it had obviously been truncated by the plow, but we could not determine to what degree). Four prehistoric sherds (one Sackett, one indeterminate corded neck, and two rough body), one piece of debitage, and several fire-cracked rocks were discovered in the fill (Figure 45*a*). This assemblage suggests an Owasco date, probably in the Carpenter Brook or Canandaigua phase. Flotation samples removed from the feature contained traces of maize cobs and kernels, wood bark, and two seeds of the mustard family.

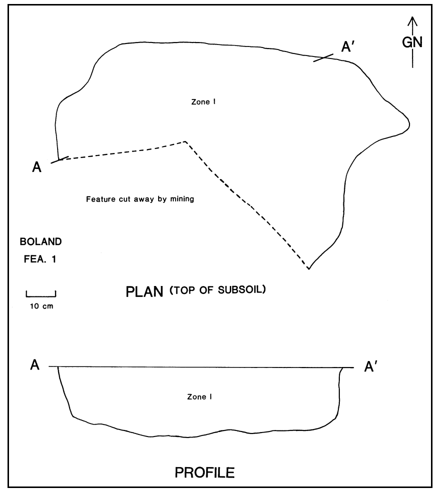


Figure 9. Feature 1.

Feature 20. This pit was discovered just south of Wall 4 (Figure 10). Unstratified brownish grey silt with charcoal flecks comprised the fill (Zone I). Roughly oval and flat-bottomed in shape, it was 78 cm long, 61 cm wide, and 17 cm deep. In profile this pit resembled Feature 1. Four sherds were retrieved including a large Levanna Rough rim, an unclassified neck, an indeterminate corded-neck, and a rough body sherd (Figure 45*b-c*). Several pieces of fire-cracked rock and one piece of chert debitage were also discovered. The pottery suggests a date in the Carpenter Brook phase. No soil samples for flotation were taken.

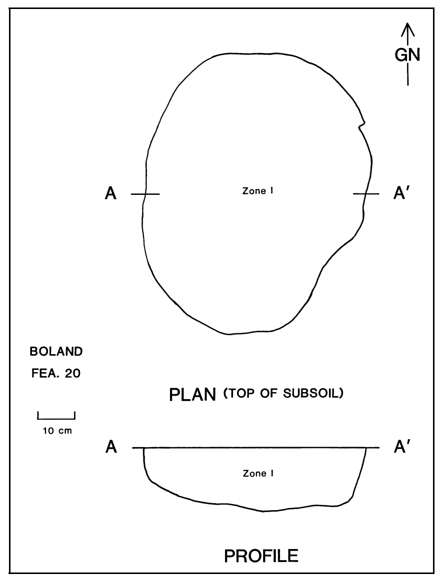


Figure 10. Feature 20.

Feature 26. This small circular pit (Figure 11) was situated just north of Feature 1 and south of Wall 4. Its fill consisted of grey-brown silt with charcoal flecks (Zone I). The pit, approximately 52 cm in diameter, is extremely shallow with a depth of only 2 cm below the subsoil surface. Plowing or mechanical stripping probably severely truncated this feature. No artifacts were recovered, and so this feature could not be temporally assigned. The flotation sample contained wood charcoal and five unidentified seeds.

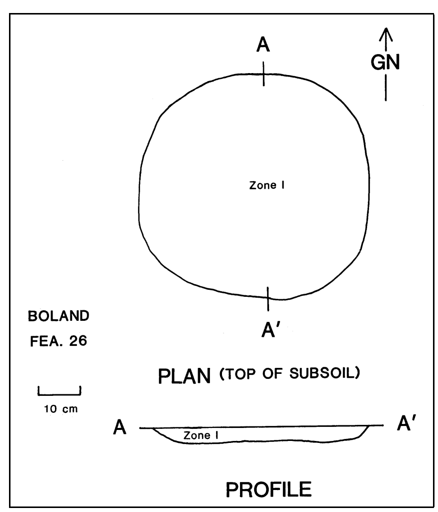


Figure 11. Feature 26.

Feature 33. This pit (Figure 12) was located in the eastern section of the excavated area. Although circular in plan view, it was similar in profile to the irregular Feature 27. Fill consisted of unstratified dark brown silts (Zone I). Diameter of the feature was 33 cm and maximum depth was 13 cm. Because no artifacts were recovered, this feature could not be chronologically assigned. No flotation samples were taken.

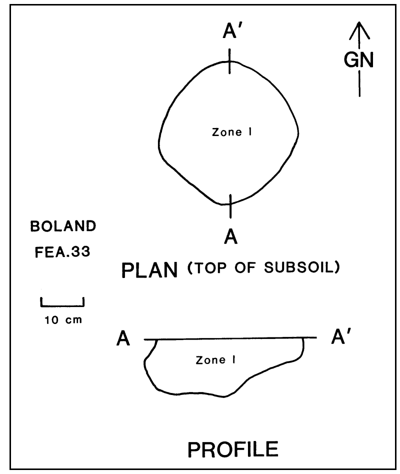


Figure 12. Feature 33.

Irregular Pits

This catchall category encompasses pits with highly irregular shapes. Three such features were excavated, all somewhat oblong in plan.

Feature 22. This unusually shaped pit (Figure 13), discovered near the western edge of the mine escarpment, was filled with an undifferentiated dark brown silt (Zone I). It was 110 cm long, 60 cm wide, and had a flat bottom only 9 cm below the subsoil surface. The feature appeared to have been truncated by plowing or mechanical stripping. An indeterminate corded-neck sherd, a two small rough body sherds, four flakes, and one fire-cracked rock comprised the artifacts retrieved from the fill. Lacking diagnostic artifacts, this feature could not be attributed to any period more specific than the Late Woodland stage. Flotation samples contained traces of maize cob, a small amount of wood charcoal, and several seeds. Among the seeds identified were two hawthorn, one bedstraw, and one plum.

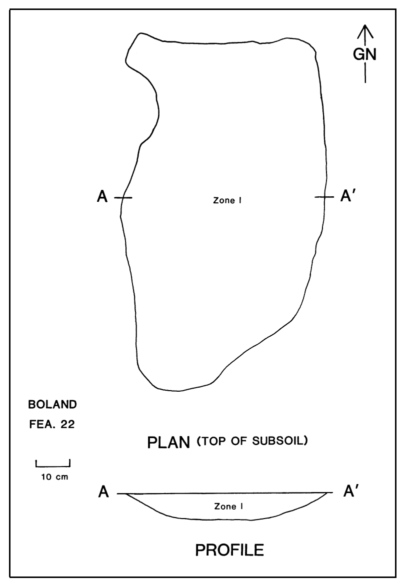


Figure 13. Feature 22.

Feature 24. This elongated pit was located near the mine escarpment west of Wall 1. The feature was 214 cm long, almost 75 cm wide, and only 22 cm deep (Figure 14). It was filled with dark brown silt (Zone I) with large concentration of charcoal and fire-reddened earth at the bottom (Zone II). No artifacts were recovered, so the feature could not be assigned to a specific phase. Flotation samples yielded wood charcoal and seeds from the mustard, grass, and spurge families.

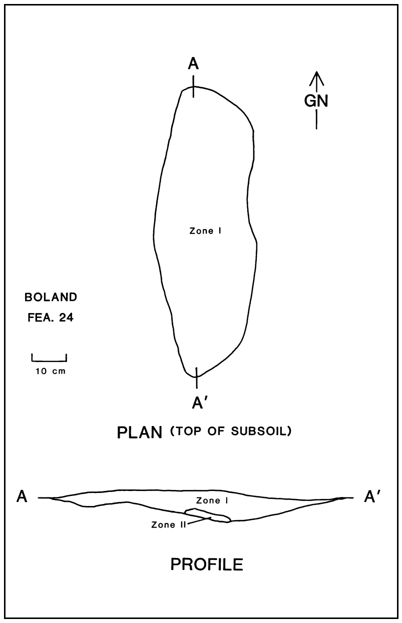


Figure 14. Feature 24.

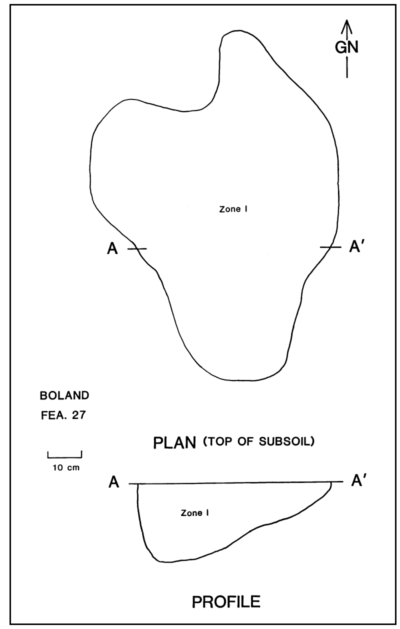


Figure 15. Feature 27.

Feature 27. This irregular, shallow pit (Figure 15) was located east of Wall 1 in the northern third of the excavated area. The fill was a greyish brown silt with a moderate amount of charcoal (Zone I). The feature was somewhat disturbed by rodent activity, as evidenced by sections of loose fill and a rodent hole only 3 cm to the south. The pit's horizontal extent was 1 m in a north-south direction and 80 cm in an east-west direction. The profile had an irregular shape with the eastern half more steeply sided. Maximum depth was 24 cm below the subsoil surface. Three flakes were retrieved from the fill. The lack of diagnostic artifacts prohibited our assigning this feature to a specific phase. Flotation analysis revealed wood charcoal and one seed each of mustard, bedstraw, and bramble, as well as either walnut or butternut shell fragments.

Charcoal Concentrations

We use this term to describe certain areas exposed by mechanical stripping where the soil was unusually rich in charcoal fragments. These probably were pits, even though their outlines were not very distinct. Unfortunately, all were destroyed by mining before they could be properly excavated.

Feature 30. Time permitted only a brief investigation of this oblong stain consisting of charcoal and dark-brown silt adjacent to Wall 1 (Figure 8). This feature was 4.5 m long but was only 75 cm wide. A hasty exploration with a trowel revealed that the feature was at least 10-15 cm deep, but its full depth and profile were never determined. No artifacts were found, but we did obtain a flotation sample that yielded traces of maize cobs, as well as mustard, composite, and bedstraw seeds. A wood charcoal sample yielded a radiocarbon age of 1,880 ± 60 years: AD 70 (Beta-24509) which, if correct, would place this feature in the early phases of the Middle Woodland stage. But there are at least three good reasons for doubting the accuracy of this date. First, as mentioned previously, this feature seems to be associated with Wall 1, and it is unlikely that such walls (i.e., belonging to longhouses or palisades) were built prior to AD 1000. Second, no Middle Woodland artifacts were found anywhere in area. Third, the presence of maize strongly suggests a Late Woodland origin.

Features 37, 38, and 39. These charcoal concentrations were aligned along the northern side of Wall 4 in a position analogous to that of Feature 30 with respect to Wall 1. Their horizontal dimensions were, respectively, 115 by 60 cm, 125 by 53 cm, and 90 by 75 cm. Mining destroyed these features before they could be excavated.

Summary

Area 1 produced evidence of several fragmentary walls, probably indicative of longhouses. Patterns of overlap among these walls suggested at least two building episodes, one with longhouses oriented north-south, the other with longhouses oriented east-west. Scattered among these structures were a number of pits. All were truncated by plowing and mechanical stripping; none were very deep.

Also present beneath the plow zone, at least in some parts of the excavated area, was an undisturbed sheet midden, which consisted of dark brown silt and corresponded to the lenses observed in the mine escarpment. Because mechanical stripping removed most of this layer, its full extent was never determined.

Area 1 clearly was occupied during the Owasco period. Diagnostic sherds suggest that the sheet midden and features date to the Carpenter Brook and (possibly) the Canadaigua phases. Later sherds, of types dating to the Castle Creek phase and the Iroquois period, were found as well, but only in plowzone and surface contexts.

EXCAVATIONS IN AREA 3

Our excavations in Area 3 started inauspiciously on July 14, 1984. The previous afternoon we had carefully laid out a staggered line of three 1-by-2-m units not far from the mine's edge, in a place that seemed archaeologically interesting and relatively safe. When we arrived to begin work, however, we found that the mine's large backhoe had moved to within a few meters of these units and was about to destroy them. Very quickly (since a large volunteer crew was now milling around, waiting for something to do) we strung out a new series of units 20 m east of the old ones and out of harm's way. All three units were excavated that same day; post molds, undisturbed midden, and a relatively high density of artifacts were found.

A small crew returned in August and dug eight more 1-by-2-m units, contiguous with the ones that had been excavated previously. Many additional post molds were uncovered, but no house or palisade walls could be discerned. By the end of the 1984 season, 22 m^2 had been opened with encouraging, but still inconclusive, results (Figure 16).

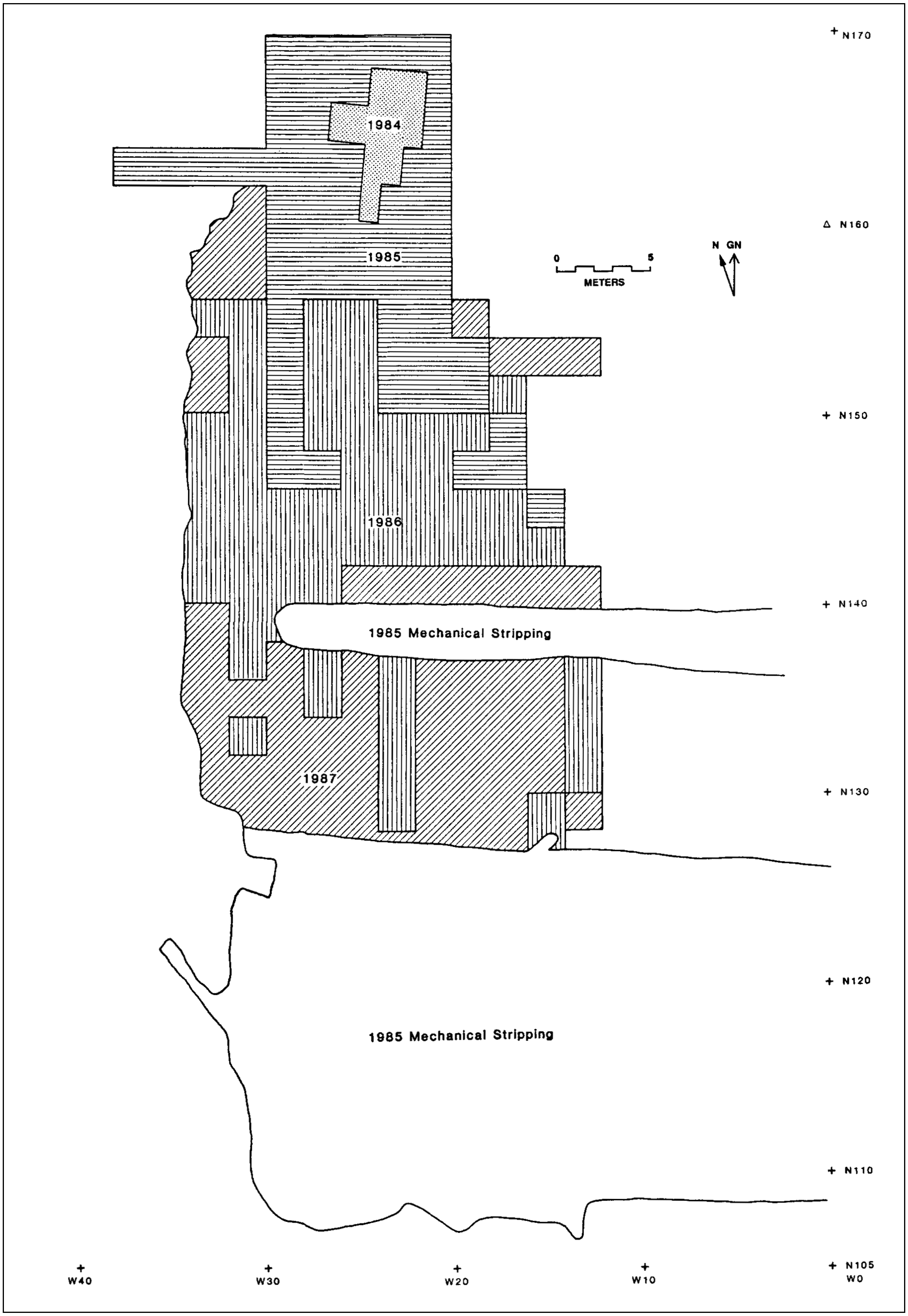


Figure 16. Progress of excavations, Area 3.

Full-scale excavations commenced in June 1985. While re-establishing our grid with a transit, we discovered that our 1984 units had been inaccurately oriented, a few degrees off from grid north. Apparently, the original error had occurred on the first day of the 1984 excavations, when we quickly moved our units to escape the backhoe. Because subsequent units had been triangulated off the initial set, this one mistake had ramified through all our 1984 excavations. Once discovered, the mistake was corrected and all excavations from 1985 onward proceeded on the true grid.

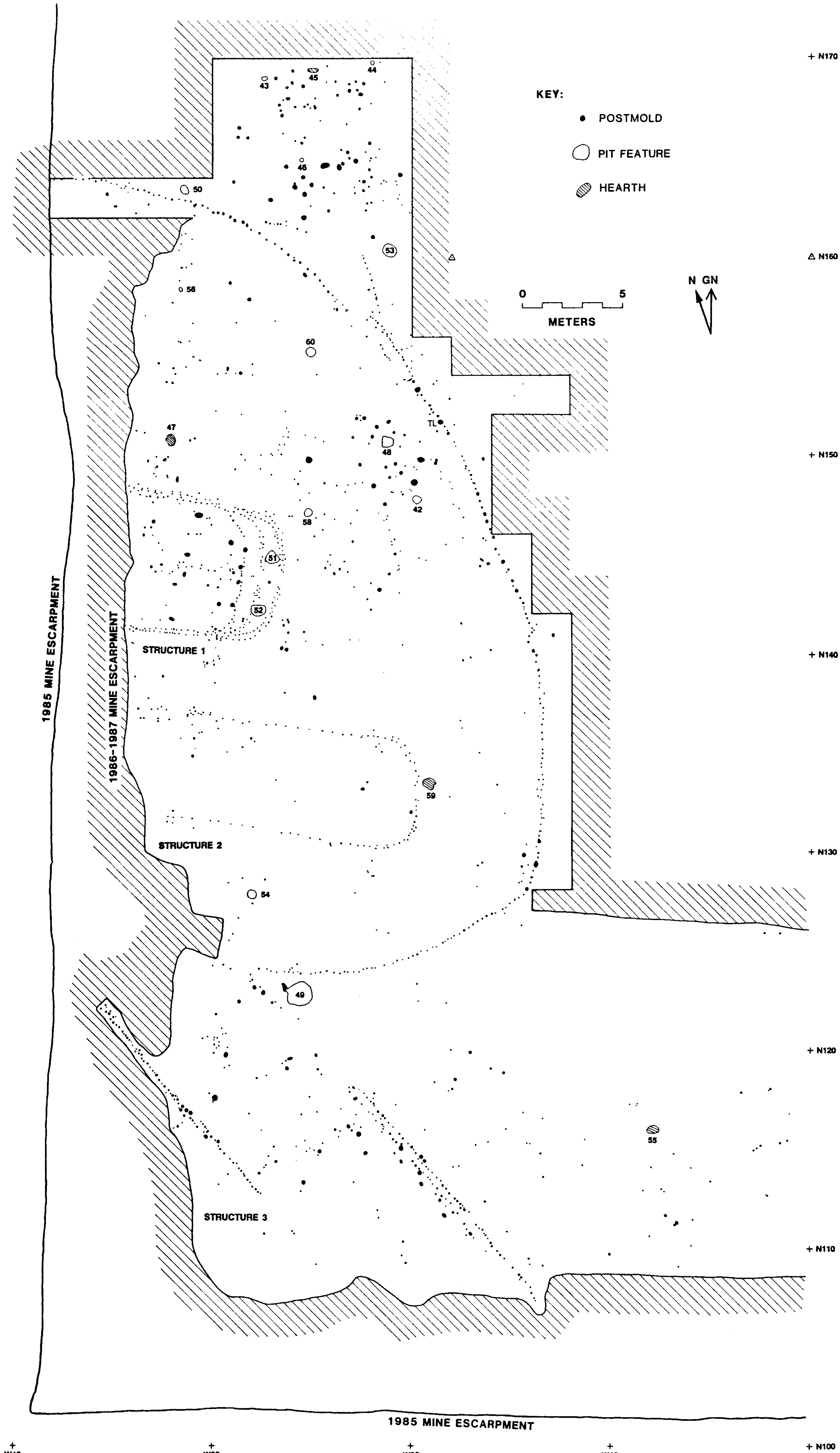
Our primary goal in 1985 centered on gathering evidence of village settlement. Prior work at Boland was performed under time constraints that did not allow for extensive systematic retrieval of artifacts or detailed stratigraphic investigations. It was hoped that controlled manual excavations would allow us to retrieve valuable data.

One of the very first units excavated in 1985 uncovered a line of evenly spaced post molds. Our efforts concentrated on following this line and in exposing the area surrounding the pattern. When we had uncovered approximately 10 m of this line, the curve of the pattern demonstrated that these post molds were the remnants of a village fortification or palisade line. We then concentrated our efforts on the excavation of a series of units along the W28 line and perpendicular to but within the palisade wall. We anticipated that this series of units would bisect any longhouse patterns within the village compound. During the final stages of the 1985 field season, excavation in two adjacent units of this series exposed the wall of a longhouse (Structure 1). Approximately 154 m^2 were manually excavated by the end of 1985 (Figure 16).

In July 1985, time constraints forced us to investigate the southern portion of Area 3 (south of N126) with mechanical stripping. We first investigated this area by excavating five trenches (four formed the sides of a rectangle) They were as wide as bulldozer blade and as deep as the top of the subsoil. Subsequent mechanical stripping in Area 3 subsumed all but one of these trenches (Figure 16). The stripping revealed two parallel lines of double-rowed post molds forming the sides of a longhouse (Structure 3). Excavations also disclosed a curved line of post molds at the northern end of the stripped area. Further investigations revealed these post molds formed the southern end of the palisade line uncovered in the manually excavated area. By the end of the 1985 field season, much of the eastern wall of the palisade had been uncovered by manual excavations.

Major flooding during the spring of 1986 caused severe erosion and washed away a 3-m-wide strip along the mine escarpment at the site's western edge. Unfortunately, this strip contained still-unexcavated portions of at least two longhouses and the southern palisade. Field work in 1986 began after floodwaters receded and concentrated on exposing the remaining portion of Structure 1. Most of the area within the compound and north of the N140 line was also uncovered. Except for three units, all of the remaining sections of the eastern portion of the palisade was exposed. Three series of units were dug south of the N140 line to search for other longhouses. Two of these series, one along the W22 line and the other along the W26 line encountered the wall of another longhouse (Structure 2). A total of 224 m^2 were excavated in 1986 (Figure 16).

Figure 17 *(facing page)*. Plan of Area 3 excavations. TL denotes the palisade post mold that produced a thermoluminescence date of AD 1033 ± 73.



KEY:
POSTMOLD
PIT FEATURE
HEARTH
0
5
METERS
N GN
+ N170
Δ N160
+ N150
+ N140
+ N130
+ N120
+ N110
+ N100
W40
W30
W20
W10
W00
1985 MINE ESCARPMENT
1986-1987 MINE ESCARPMENT
1985 MINE ESCARPMENT
STRUCTURE 1
STRUCTURE 2
STRUCTURE 3
TL
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
58
59
60

During the 1987 field season, investigations centered on exposing Structure 2 and excavating the rest of the area within the village compound including the remaining sections of the palisade line. One line of units along N154 was excavated to trace out soil deposition to the east of the palisade. Shovel skimming and excavations joined the 1985 stripped area with the manually excavated units. A total of 240 m^2 were opened in 1987 (Figure 16).

By the end of the 1987 field season, we had systematically excavated 640 m^2 in Area 3. The manually excavated area totalled 192 units, most which were 2-by-2 m in size. An additional 512 m^2 were mechanically stripped. Nineteen features, hundreds of post molds and thousands of artifacts were uncovered (Figure 17). Three longhouses and a palisade line were exposed. The following sections present the results of this work.

Stratigraphy

The soil profiles in Area 3 revealed three major zones (Figure 18). Uppermost was a plow zone, 25-30 cm thick, that consisted of a medium-brown silt loam (Munsell 10YR 4/3). This deposit blanketed the entire excavated area.

Below the plow zone was a dark-brown silt loam (Munsell 10YR 3/2), relatively rich in charcoal and artifacts. We refer to this deposit as the "organic layer." It was thickest (ca. 20 cm) along a crescent-shaped band that ran through the northern and eastern portions of the manually excavated block. On either side of this band, the organic layer thinned

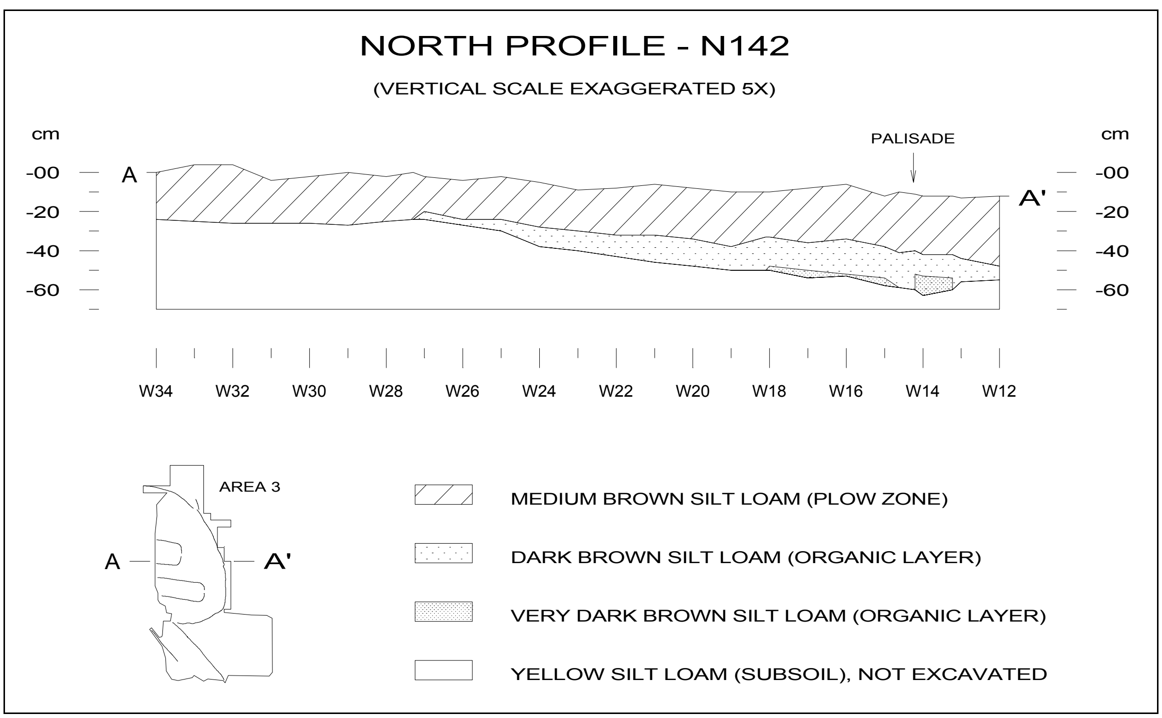


Figure 18. Stratigraphic profile of Area 3 at N142, looking north.

until it eventually disappeared; it was virtually absent in the units south of N148 and west of W24. It was also scarce in the westernmost units along the N164 line: in N164W34 the organic soil was missing entirely, while in N164W36 several centimeters of sterile, light-tan silt were layered between the plow zone and a horizon containing small pockets of organic soil. (This silt may have been a flood deposit; because it was found only in one unit at the edge of the mine escarpment, its full extent could not be determined.) Where the organic layer was thickest, its base was occasionally marked by patches of even darker soil (very dark brown, Munsell 10YR 3/1).

Lowest in the sequence was a light tan, compact, silty subsoil (Munsell 10YR 4/4). Almost all the features we found intruded into this layer; apart from these intrusions, the deposit was culturally sterile.

The artifact counts for each stratum are presented in Appendix C (Table C.3), and the chronological implications of these counts are discussed in Chapter 4. For present purposes, it suffices to say that most of the artifacts in the organic layer appear to have been dropped during the Carpenter Brook phase. The plow-zone assemblage reflected a mixture of components: besides earlier artifacts like those in the organic layer, it also contained diagnostics of the Castle Creek phase, the Iroquois period, and the Historic period.

Formation Processes. The stratigraphy in Area 3 was simple, but the processes that led to its formation were undoubtedly complex. Reconstructing these processes requires that we look not only at the topography of the constituent soil layers, but also at the distribution of artifacts within those layers.

In modern times, the surface of Area 3 was nearly level, sloping gently downward to the east (Figure 19). Yet the topography here was not always this even. The contours of the *subsoil* surface show that this area was once marked by a prominent linear depression, oriented roughly north-south and extending from N170W26 to N128W14 (Figure 20). This depression was eventually filled with midden, which appeared in our excavations as the organic layer.

When the thickness of the remnant organic layer (i.e., the portion that survived plowing) is mapped and compared with the distribution of cultural features (Figure 21), some interesting patterns become apparent. Little organic soil was found near the longhouses; here, the subsoil generally occurred immediately below the plow zone. The organic layer appeared as a thin lense at the eastern ends of the longhouses and became thicker towards the palisade. The deepest patches were found along the palisade and just outside the gate. Excavations and shovel testing revealed that the organic layer disappeared within 8 m of the palisade's exterior except in the area northwest of the gate, where the layer extended 12 m from the palisade. Only along its northern stretch did the palisade diverge from the deep organic deposits.

In short, the palisade was situated atop an ancient depression filled with midden. The key question is, was the palisade built before or after the depression was filled? Ideally, we would have liked to measure the elevations at the tops of the palisade post molds, for these would have defined the surface in which the original posts were placed.

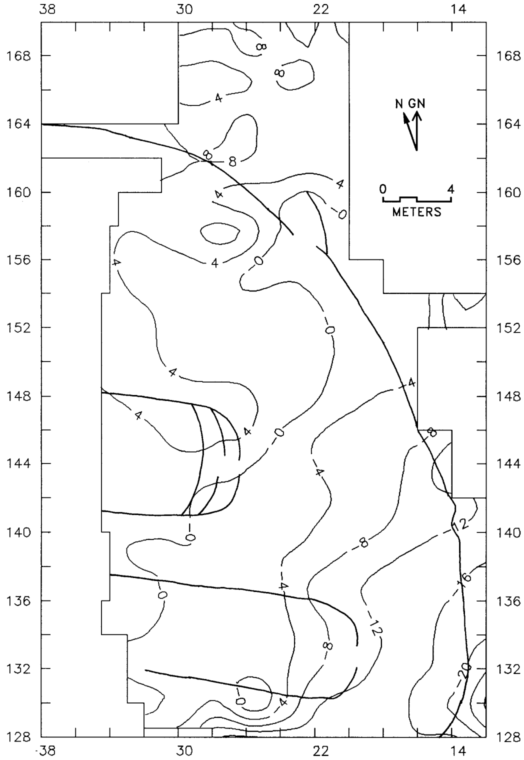


Figure 19. Topographic map of plow zone surface (contour interval, 4 cm).

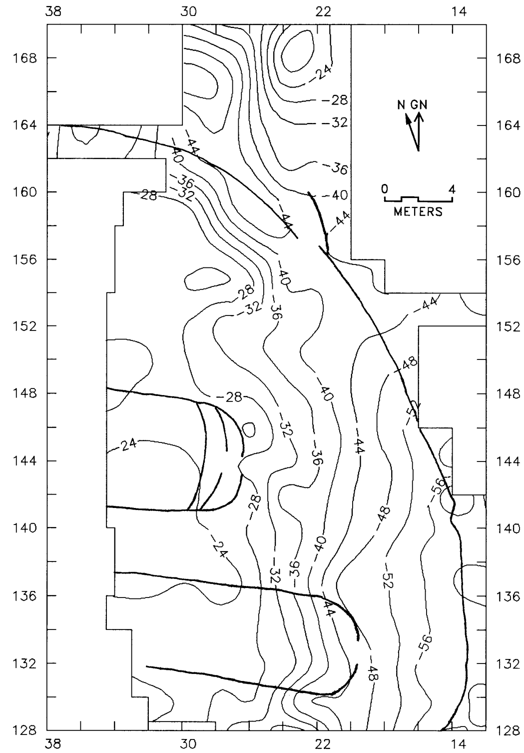


Figure 20. Topographic map of subsoil surface (contour interval, 4 cm).

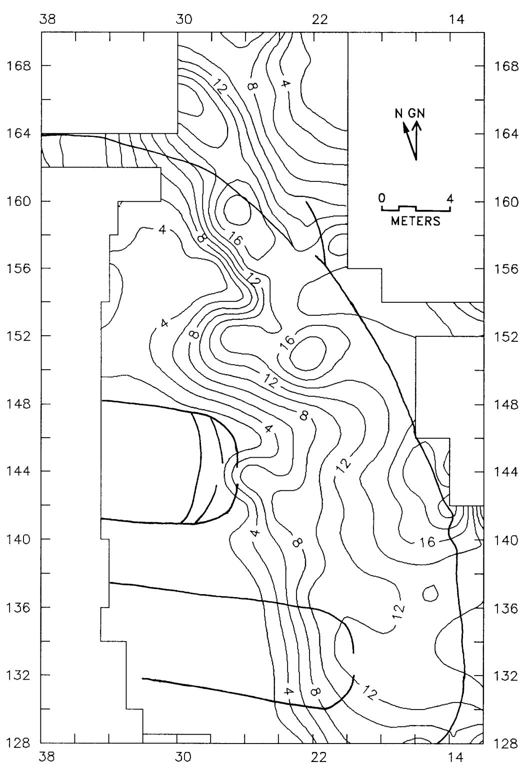


Figure 21. Isopatch map of organic layer thickness (cm).

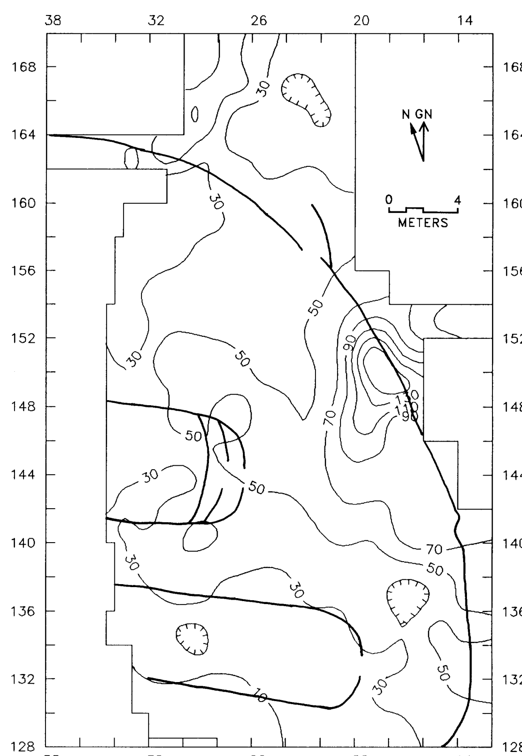


Figure 22. Isopleth map of total sherd density (count/m^3).

Unfortunately, the post molds were visible only where they intruded into the lighter-colored subsoil; they could *not* be reliably discerned within the organic soil, which had the same color and texture as the post molds themselves.

As a result, we must approach the question differently. If one assumes that the palisade posts were originally sunk to approximately the same depth, then the elevations of the post-mold bottoms should generally parallel the topography of the original surface. Figure 23 plots two sets of points relative to location along the palisade (measured in linear distance): one set comprises the elevations of post-mold bottoms (taken from the excavated sample of palisade posts), and the other comprises the elevations of the subsoil surface at the same coordinates where the post molds were found. A resistant line was fitted to each set of points using the LOWESS method (Cleveland 1979). The two lines are virtually parallel, which indicates that the living surface on which the palisade stood was similar in shape to the subsoil surface. This, in turn, strongly suggests that the palisade was built in a topographic depression, *before* the latter was filled with midden.

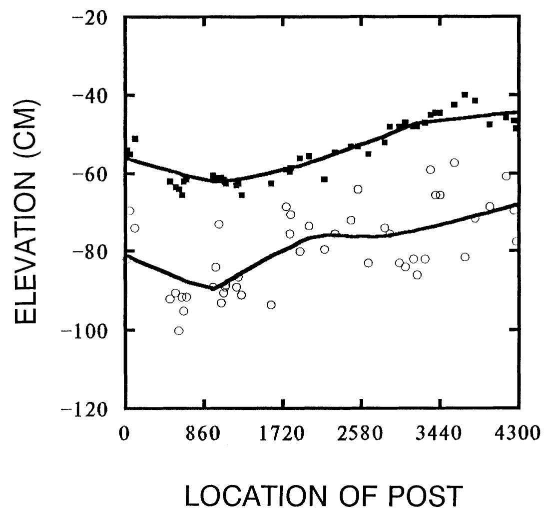


Figure 23. Elevations of the subsoil surface (solid squares) and post-mold bottoms (open circles) along the palisade north of N120. Location is measured as linear distance along the palisade.

Further evidence that palisade and longhouse construction preceded the midden accumulation can be seen in the distribution of pottery. Note that sherd density (i.e., the total weight per cubic meter of excavated soil) was highest in two places near the palisade: (*a*) just outside the door of the northern longhouse, and (*b*) just outside the palisade gate (Figure 22). These locations correspond to some of the thickest deposits of organic soil, and also to logical areas for refuse dumping relative to the walls and entrances shown on the map. The fact that these structures seem to have constrained the pattern of refuse accumulation strongly implies that they existed when the dumping took place.

Post Molds

Excavations in Area 3 exposed the remains of a palisade and three longhouses. Two of the houses were inside the palisade and appeared to be contemporary with it. The third house, located south of the other two, overlapped with the palisade and therefore must have been associated with a different occupation. The houses within the palisade were oriented 117° east of true north, while the one outside was oriented 158° east of true north. The virtual absence of superpositioning and rebuilding within the palisaded compound greatly facilitates description of community patterns.

Palisade. Approximately 64 m of the palisade line were excavated. The post molds consistently appeared at the base of the organic layer wherever this layer was present; elsewhere they occurred immediately below the plow zone. The posts were placed in a single row, with an average spacing of about 33 cm. A break in the palisade wall was found at N157W22; next to this break was a line of post molds that angled outward from the palisade. This pattern probably represents a gateway with a protective wall or screen. A few of the posts contained large sherds, possibly placed around the base of a post to prevent wobbling. In one instance, several large Carpenter Brook Corded sherds and a fire-cracked rock were found along the sides of a large post mold (Figure 48). A sherd from this post mold was themoluminescence dated to AD 1033 (UWTL-52). Other diagnostic artifacts removed from palisade posts include two Carpenter Brook Corded sherds and two Sackett sherds (Figure 46*a-d*). Both the date and the pottery types are consistent with the Carpenter Brook phase.

Structure 1. The walls of this building (Figure 24) were marked by double rows of staggered posts. The posts averaged 6.1 cm in width, with most ranging between 4 and 9 cm. A gap in the north wall near where the three ends diverged was caused by a rodent burrow. Where the walls coincided with the organic layer (only at the structure's easternmost end), the post-mold stains appeared stratigraphically below this layer. Average depth of post molds associated with the inner wall was 23 cm.

Three separate ends were discernable in the excavated pattern, spread over a distance of slightly less than 2 m. The innermost line consisted of a single row of post molds that showed no doorway. The second end, formed by a staggered double row of posts, contained an 80-cm-wide doorway. The third and outermost row formed the clearest pattern; this end also had an 80-cm door opening. Given the few apparent replacement posts, this may be the younger of the two outer ends.

Structure 1 had rounded ends and parallel straight sides; the excavated portion was 8 m long and 6 m wide. Although the pattern

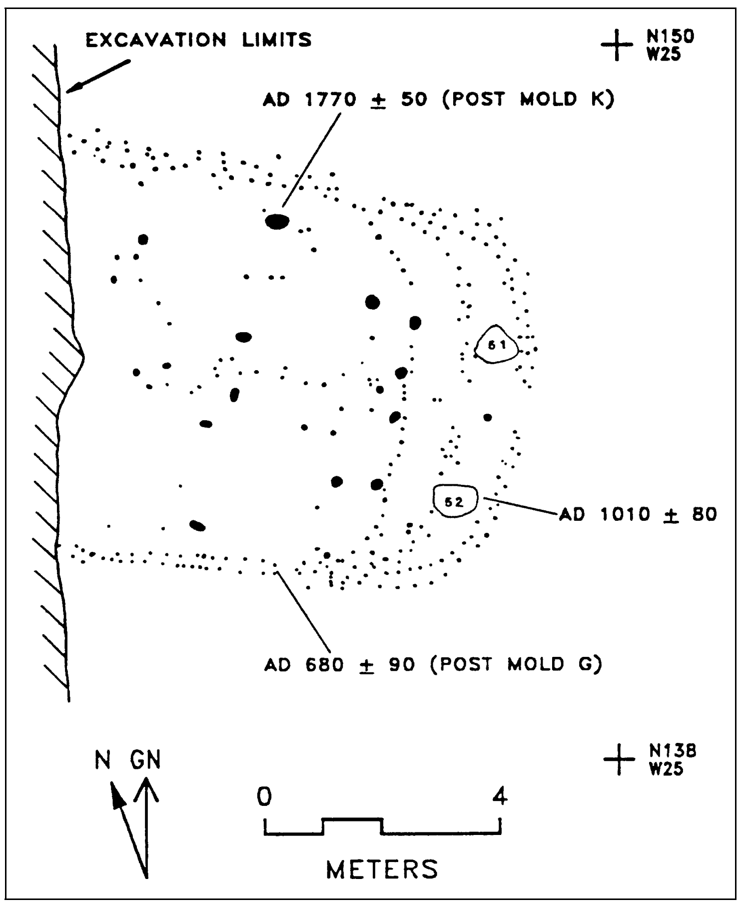


Figure 24. Structure 1.

was incomplete, certain field observations allow us to estimate this structure's minimum length. Cleaning of the mine escarpment at the start of the 1985 season uncovered a post mold which we later discovered to be directly in line with the north wall of Structure 1. This post mold was similar in width, depth and shape to the longhouse post molds. Unfortunately flooding removed 3 m from the end before it could be excavated. If this post mold formed part of the wall, then adding the length of a second curved end yields a minimum overall length of 14 m.

In addition to the possible internal end division, Structure 1 exhibited several other important interior patterns. First, no hearths were discovered within the longhouse. Many, if not most, Iroquois-tradition longhouses contain hearths running down the midline of the structure. The absence of hearths in this structure may be the result of plowing which could have removed hearths and other shallow features while leaving the bottom portions of post molds. Two storage pits (Features 51 and 52) were found at either side of the doorway just inside the longhouse. These features are discussed in more detail below.

Inside the longhouse were several large posts arrayed symmetrically about the midline of the structure. When a line is drawn connecting the midpoints between pairs of these large posts, the line precisely bisects the two doorways at the east end. This regularity suggests that these paired posts were indeed part of the structure. Several of the posts were oval in horizontal cross-section and cone-shaped in profile. This shape could have resulted from movement of a loose post around its basal point. These posts may have been internal roof supports although comparative evidence from other excavated longhouses is lacking.

Several of the post molds contained diagnostic artifacts. A Levanna point, two Levanna Rough sherds, and a Carpenter Brook Corded sherd were discovered in wall and end post molds (Figure 46*e-g, i*). One interior post mold adjacent to the wall contained several pieces of a Carpenter Brook Corded pot (Figure 46*e*). Another interior post mold near the eastern end contained the bowl of a plain elbow pipe. These artifacts are chronologically similar to those derived from the organic layer and indicate that Structure 1 dates to the Carpenter Brook phase.

Wood charcoal samples from two post molds were submitted for radiocarbon dating. The sample from a wall post had a radiocarbon age of 1270 ± 50 years: AD 680 (Beta-24510). The other sample came from one of the large interior post molds and yielded a radiocarbon age of 180 ± 50 years: AD 1770 (Beta-24511). These problematic dates are discussed more fully in Chapter 4.

Structure 2. Over 14 m of Structure 2 were excavated (Figure 25). If the length of another curved end is added to the excavated dimensions, minimum length of Structure 2 would have been 15.5 m. Side posts appeared widely spaced and single rowed but this was probably a result of obliteration of posts by plowing. Virtually all excavated posts were extremely shallow. The end consisted of a staggered double row that was overlain by relatively thicker soil layers and thus was less affected by plowing than the sides. Where the organic layer existed, the post molds appeared stratigraphically beneath it. Width of the longhouse was 5.5 m; the width of the entrance was approximately 70 cm. A few posts were found inside the longhouse, but these exhibited no obvious patterning related to

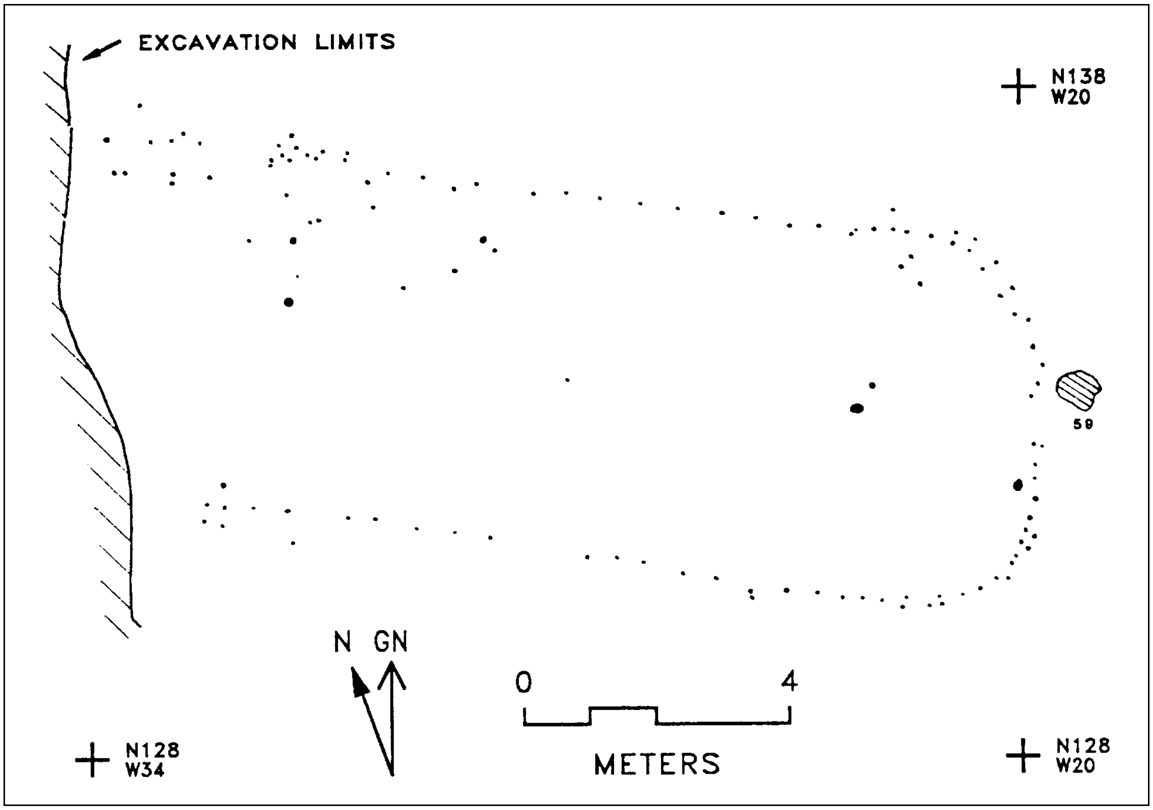


Figure 25. Structure 2.

interior divisions or other structural features. A break in the line of post molds delineating the south wall was probably caused by plowing.

By virtue of its placement, orientation, and stratigraphic position (i.e., posts appearing below the organic layer), this longhouse is clearly contemporary with Structure 1 and the palisade. It therefore dates to the Carpenter Brook phase.

Structure 3. Besides orientation, Structure 3 exhibited several other elements that differed from the longhouses inside the palisade (Figure 26). The posts comprising the two side walls were somewhat wider, ranging from 3 to 32 cm and averaging 8.2 cm in diameter. The structure itself, at 6.75 m, was wider than the two other longhouses, although still within the range of Owasco-Iroquois longhouses. Minimum length (in this instance, without adding the curved ends since no end survived) was approximately 23.5 m. The east wall consisted of two rows of posts that did not exhibit the staggered pattern seen in the other longhouses. The west wall was double rowed only in places. The two rows of the east wall were more widely spaced than those of the west wall. Both walls ended abruptly; apparently the remainder of the post molds forming the sides were obliterated by plowing or mechanical stripping. Although we did not have enough time to excavate these post molds systematically, a quick investigation revealed that the stains near the ends were very shallow. Inside the longhouse near the center was a vaguely linear pattern of post molds, perpendicular to the walls, that may have been an internal partition.

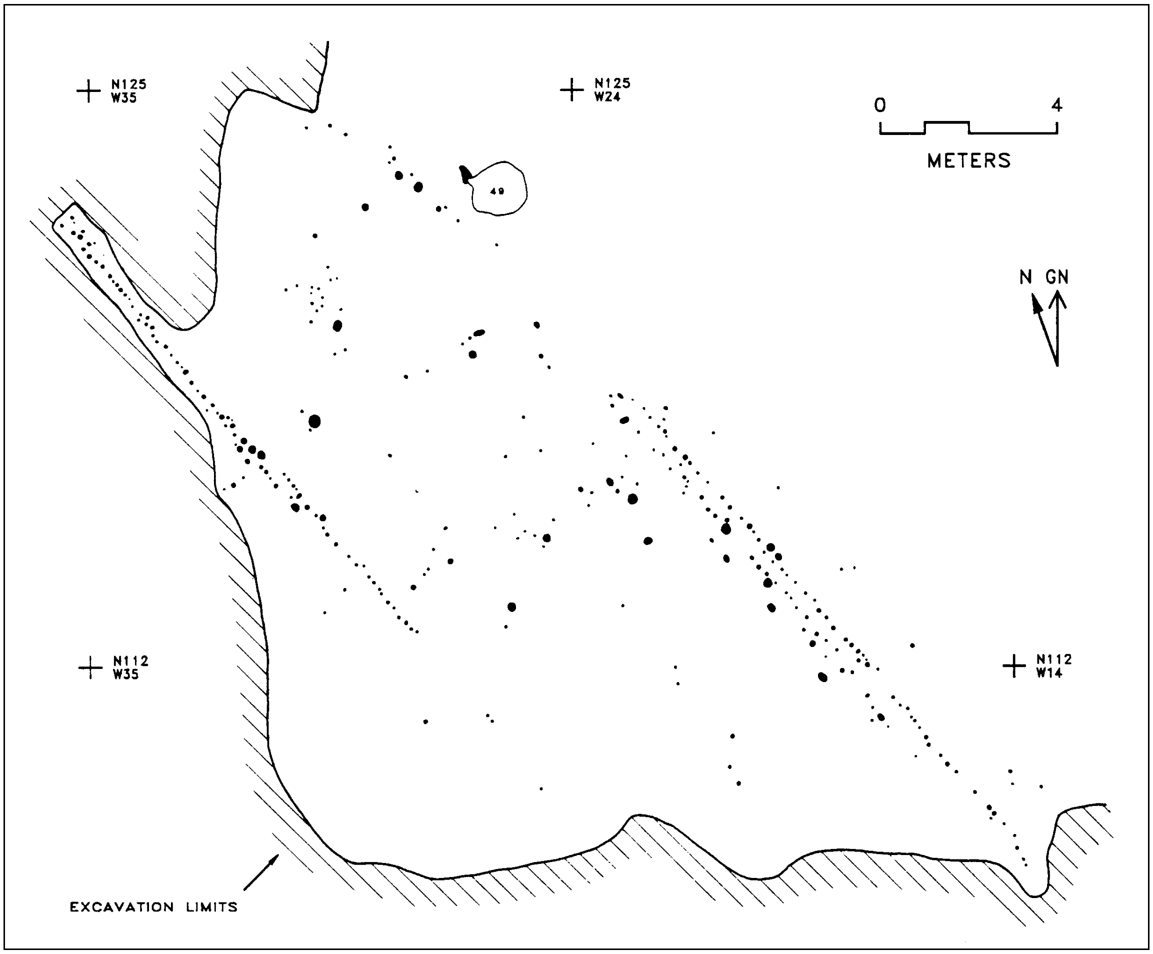


Figure 26. Structure 3.

This structure can be dated to the Owasco period based on the diagnostic artifacts found in the general vicinity. The phase assignment is far less certain. If Structure 3 is contemporary with the nearby Feature 49, then it was built during the Carpenter Brook phase. On the other hand, the presence of later diagnostics among the sherds recovered during mechanical stripping suggests that the longhouse could just as well date to the Castle Creek phase.

Other Post Mold Patterns. Excavations uncovered posts in two curved rows, just north of Structure 1 in unit N152W26. This pattern may comprise part of a longhouse end. After an intensive search, no other posts associated with this pattern were found. Elevation of this section of the site was comparatively high and little organic soil was deposited. If this pattern is indeed a portion of a longhouse, the other associated posts may have been destroyed by plowing.

To the north of the palisade, excavations uncovered a large number of post molds, many of which were bigger than those making up the palisade and longhouse wall. Little patterning was evident among these posts making it difficult to determine the type of structure or structures that existed here. One exception consists of four posts that form a rectangular pattern in unit N164W24. Excavation of these posts revealed that all were similar in depth, angle, and shape. A similar pattern was found in unit N150W20 within the palisade. Post molds in both of these patterns were discovered at the base of the organic layer, which suggests they were associated with the palisaded village.

Hearths

These features were identified by the presence of fire-reddened earth, indications of in situ burning, and a shallow profile. Fire-cracked rock, charcoal, and fragments of calcined bone were also associated with a few of these features. Virtually all hearths discovered in Area 3 appeared truncated by plowing.

Feature 45. Excavations at the northern perimeter of Area 3 uncovered a hearth (Figure 27) some 8 m outside the palisade line. The hearth, discovered in unit N170W24 at the base of the plow zone, intruded into the organic layer (dark-brown silt). This stratigraphic position, above the level where the majority of post molds were discovered, indicates Feature 45 was part of a later component than that associated with organic layer and the palisaded village. The entire feature consisted of a shallow fire-reddened basin filled with displaced fire-reddened earth (Zone I) interspersed with charcoal flecks and seven fire-cracked rocks. Other fire-cracked rock littered the surface of the surrounding organic layer, but it was difficult to positively associate these rocks with the feature. No internal stratification was evident. The hearth was approximately 4 cm deep and 50 by 20 cm in horizontal extent. In addition to the fire-cracked rocks, the fill contained two Onondaga chert flakes and four pieces of pottery, including a Kelso Corded rim fragment, an indeterminate-corded rim, and two rough body sherds. Plant remains included a maize kernel, a bedstraw seed, and a cherry or plum pit. The pottery suggests a *terminus post quem* in the late Owasco period; the pit probably dates to the Castle Creek phase, but, given its proximity to Feature 43, it might be a Historic feature that happened to include some earlier sherds in the fill.

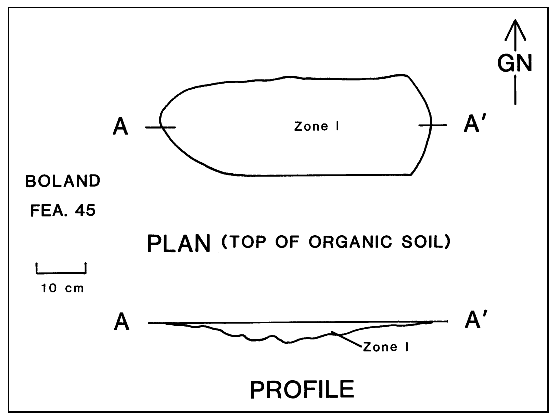


Figure 27. Feature 45.

Feature 47. An oblong fire-reddened stain with charcoal flecks comprised the only remains discovered of this hearth (Figure 28) located in N152W32 just north of Structure 1. The feature intruded into the subsoil from the base of the plow zone in an area that contained little organic soil. Plowing had removed most of the hearth. The feature was 60 by 45 cm in horizontal extent and about 4 cm deep. The fill (Zone I) contained fragments of calcined bone, 9 cupules and 6 kernels of maize, and two Onondaga chert flakes. No fire-cracked rocks appeared associated with the hearth. A lack of diagnostic artifacts and an

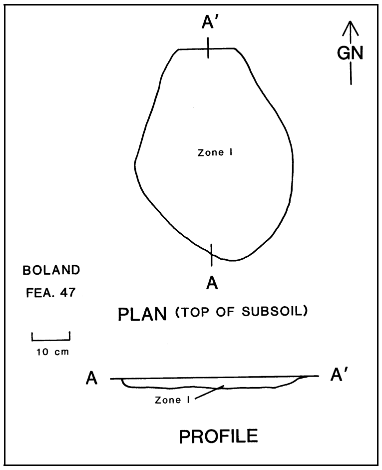


Figure 28. Feature 47.

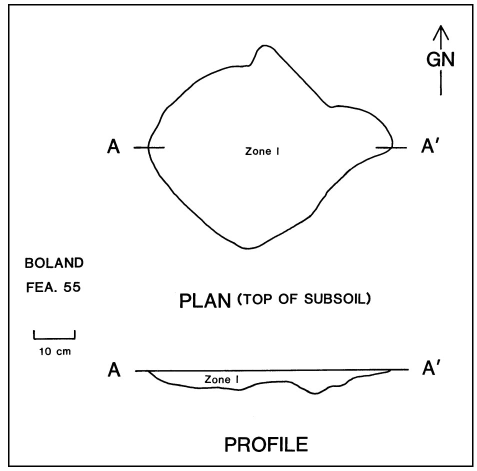


Figure 29. Feature 55.

ambiguous stratigraphic position (relative to the organic layer) make dating this feature difficult. Its proximity to Structure 1 suggests contemporaneity with the palisaded village.

Feature 55. Mechanical stripping exposed an oval hearth (Figure 29) east of Structure 3 and outside the palisade line at N116W8. This feature began at the base of the plow zone and intruded into the subsoil. The fill (Zone I) consisted entirely of fire-reddened silt. Dimensions of the hearth were 60 by 44 cm, with a depth of approximately 6 cm. Excavation yielded no artifacts; flotation yielded 2 unidentifiable seeds. This feature is difficult to date because of the lack artifacts and contextual information.

Feature 59. Immediately east of the doorway to Structure 2 was an oval hearth (Figure 30). This feature, located in unit N134W18, contained charcoal mixed with medium-brown silt (Zone I) within a shallow fire-reddened basin. The feature occurred at the base of several centimeters of organic soil. Dimensions of the irregularly shaped feature were 37 by 30 cm with maximum depth of 2 cm. The feature yielded no artifacts. It occurred at the same stratigraphic level as Structure 2 and was probably contemporary with the palisaded village.

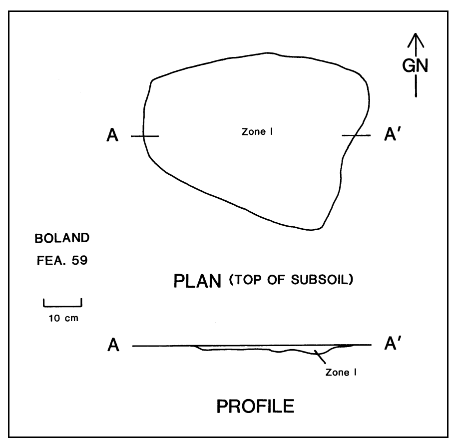


Figure 30. Feature 59.

Smudge Pits

These features are small, straight-sided circular to slightly oval flat-bottomed pits that are filled with corn cobs and/or wood charcoal. Most archaeologists assume that the cobs were burned in situ to create a dense smoke. Binford (1967) made the first detailed analysis of these features, calling them smudge pits. He suggests they were used in curing hides.

Another suggestion is that smoke was made to repel insects. None of the Boland smudge pits contained artifacts. All are located immediately below the plow zone in the northern section of the excavated area.

Feature 43. This smudge pit (Figure 31) was located approximately 8 m north of the palisade line. It began at the base of the plow zone and intruded into the organic layer in unit N170W26. This stratigraphic position clearly indicates that the pit postdates the the organic layer. Uppermost in the central portion of the feature was a medium brown silt similar in color and texture to the plow zone (Zone I). Underneath the silt and along the sides wa a layer of fire-reddened earth (Zone II), which in some places was over 6 cm thick. Corn cobs and wood charcoal covered the bottom third and a portion of one side (Zone III). Many of these cobs were whole but none contained kernels. The position of the cobs at the base of the pit corresponds to Binford's (1967) description of smudge pits discovered on sites in the middle and lower Mississippi Valley. No artifacts were recovered from the fill. Apart the abundance of maize (420 cupules and 1 kernel), the flotation sample contained a hickory shell fragment, a sunflower achene, and a bedstraw seed. The pit's dimensions were 30 by 23 cm, with a maximum depth of 8 cm. Given its location at the base of the plow zone, this feature was probably truncated by the plow. A sample of corn removed from Zone III was radiocarbon dated to 170 ± 70 years: AD 1780 (Beta-24512) after adjustment for isotopic fractionation. This date and the stratigraphic position of the feature strongly indicate a Historic-period origin.

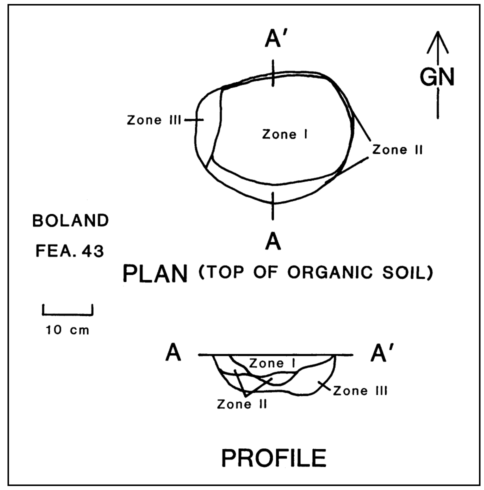


Figure 31. Feature 43.

Feature 44. This small oval pit (Figure 32), uncovered beneath the plow zone, intruded into the subsoil in unit N170W20, in an area outside the palisade and in the general vicinity of Feature 43. The fill consisted of wood charcoal and corn cobs with no discernable stratification (Zone I). Flotation yielded 2,021 cupules and 41 kernels of maize. A fire-reddened soil matrix suggested in situ burning. The feature extended 20 by 16 cm and was only 2 cm deep, clearly having been truncated by plowing. Its similarity in type as well as stratigraphic position and location to Feature 43 argue for a Historic-period origin. No artifacts were recovered.

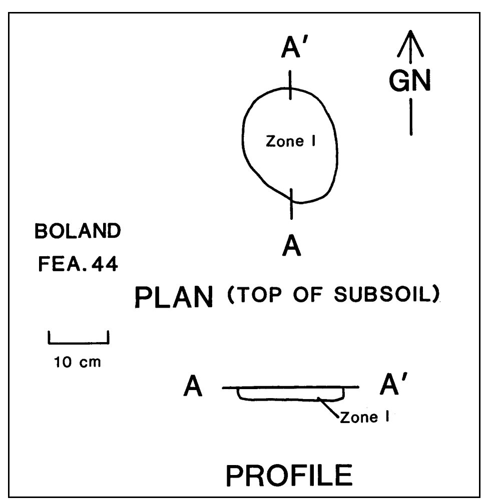


Figure 32. Feature 44.

Feature 46. This feature occurred at the base of the plow zone in unit N166W25 and intruded into the organic layer (Figure 33). Its fill contained much wood charcoal (56 g) and maize (152 g of cobs and kernels), but no artifacts. The charred plant remains (Zone II) were concentrated in the bottom two-thirds of the feature and were overlain by dark-brown silt mottled with charcoal (Zone I). This smudge pit was approximately 20 cm in diameter and 20 cm deep. Its similarity to Feature 43, its stratigraphic position, and its location in the northern section of the site where most of the eighteenth-century artifacts were recovered all suggest a Historic-period date.

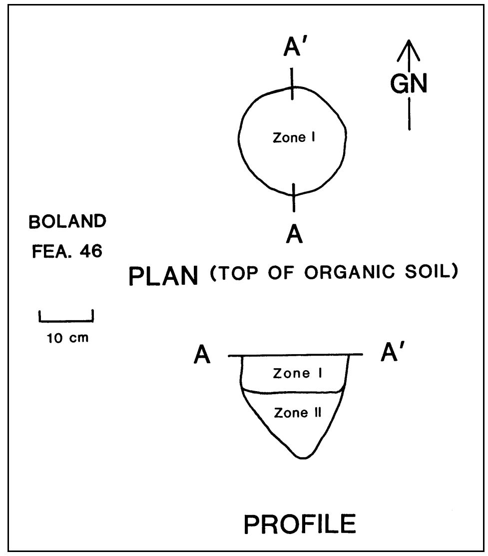


Figure 33. Feature 46.

Feature 56. This smudge pit (Figure 34) started at the base of the plow zone and intruded into the organic layer and subsoil of unit N160W30. Charred maize formed almost all of the fill (Zone I); 29 cobs and 1,470 cupules were recovered. Interspersed among cob remains were several thin lenses of fire-reddened earth probably from in situ burning (Zone II). The bottom of the feature contained a concentration of wood charcoal. No artifacts were found. This slightly oval feature (20 by 18 cm), was 21 cm deep with straight sides and a flattened bottom. The stratigraphic position of Feature 56, its location in the northern section of the site, and its similarity to Feature 43 (which was radiocarbon dated) suggest a Historic origin.

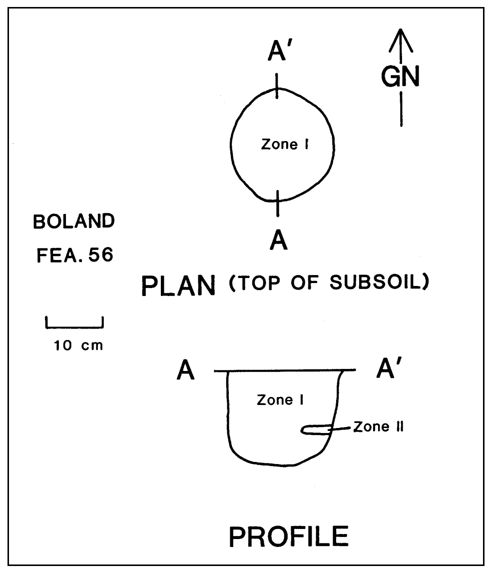


Figure 34. Feature 56.

Feature 57. Flood-induced erosion of the mine escarpment just prior to the 1986 field season exposed and removed a smudge pit northwest of the main excavations, at approximately N167W35. The feature began at the base of the plow zone and intruded into the organic layer. As in Feature 56, the fill consisted largely of charred maize cobs; six measurable cobs and 1,026 cupules were recovered. No artifacts were present. Dimensions and shape of this smudge pit were difficult to estimate but it was approximately 30 cm in diameter and at least 12 cm deep with a round base. This feature probably dates to the Historic period based on its stratigraphic position, location in the northern section of the site, and similarity to the radiocarbon-dated Feature 43.

Basins

As in Area 1, these pits were generally circular in shape and had sloping sides with flat or rounded bottoms. Most were shallow in relation to their diameter; only one was as deep as it was wide.

Feature 42. This pit (Figure 35) started at the base of the plow zone and intruded into both the organic layer and subsoil in unit N148W18. The fill was composed of three distinct zones. Dark-brown silt and wood charcoal (Zone I) formed a narrow lens at the top. This zone was probably a secondary deposit since no signs of in situ burning were observed and the amount of charcoal was relatively small. Zone I lay on top of a dark brown silt (Zone II) which comprised the major portion of the feature fill. The base of the pit was filled with mottled dark-brown and yellow silt (Zone III), a mixture of churned up subsoil and organic soil. The feature was 46 cm in diameter and 52 cm deep. Its greater depth in comparison to other basins was probably more apparent than real, in that this was the only basin whose outline was visible *within* the organic layer. A Kelso Corded rim, an unclassified corded rim, and 12 body sherds (10 rough, one plain, and one eroded) were recovered from the dark-brown silt layer. Four Onondaga chert flakes and one fire-cracked rock were also found in this layer. The flotation sample contained hickory-nut shell, a maize cupule and kernel, and seeds of bedstraw, knotweed, and plum or cherry. This feature's visible intrusion through the organic layer implies that it postdates the palisaded village. The one diagnostic sherd probably dates to the late Owasco period, most likely to the Castle Creek phase.

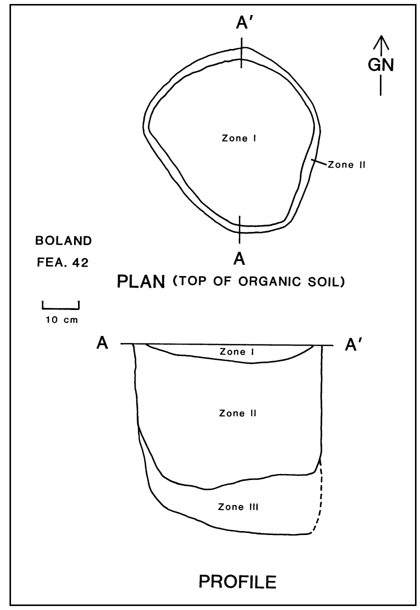


Figure 35. Feature 42.

Feature 48. This somewhat irregular pit (Figure 36) was located within the palisade in unit N152W20. It originated at the base of the organic soil and intruded into the light tan subsoil. Several post molds were located in the vicinity of this feature but the nature of the structure or structures represented is unknown. Sides of the pit sloped inward while the bottom was narrow and rounded. The feature was 51 cm long, 43 cm wide, and 19 cm deep. Dark-brown silt with a small amount of charcoal flecks (Zone I) comprised the fill. Associated

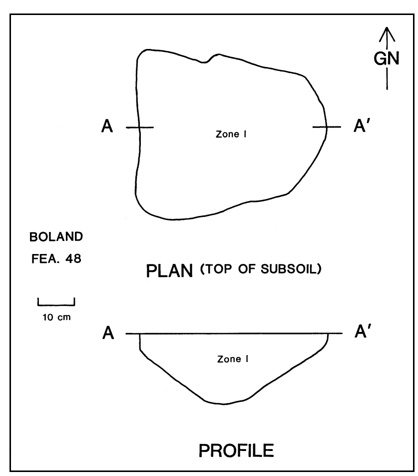


Figure 36. Feature 48.

artifacts included two eroded body sherds and two fire-cracked rocks. The location and stratigraphic position of this feature suggest an association with the palisaded village.

Feature 49. Mechanical stripping exposed a shallow, basin-shaped pit (Figure 37) just south of the palisade line, in a location to which the organic layer did not extend. This feature originated at the base of the plow zone. Its diameter was 128 cm, and it intruded 20 cm into the subsoil. The fill consisted mostly of loose dark-brown silt (Zone I). A small lens of wood charcoal mixed with silt (Zone II) was located at the bottom. Near the center and base of the feature was a cluster of artifacts which appeared to have been intentionally placed. These artifacts (Figure 50) included a netsinker, an abrading stone, and a small hammerstone that also showed signs of use as an abrader. Four Carpenter Brook Corded sherds (two rims plus two necks) and 17 rough body sherds were also found near the center of the pit, as were many pieces of fire-cracked rock. Two Onondaga chert flakes were removed from the dark brown silt near the sides of the pit. The flotation sample yielded seven hickory-nut shells, nine maize cupules, nine maize kernels, and two seeds of the mustard family. The diagnostic pottery indicates a Carpenter Brook phase date.

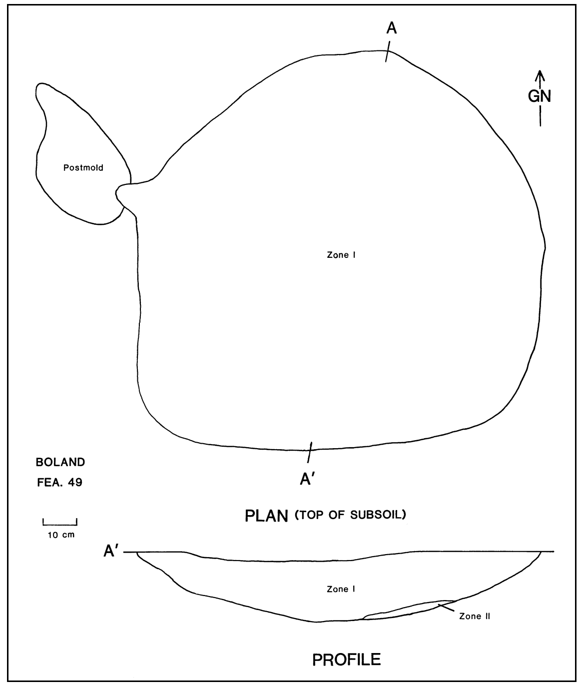


Figure 37. Feature 49.

Feature 50. This roughly circular feature (Figure 38) was located within unit N164W30 and just outside the palisade in the northern section of the site. It originated at the base of the organic layer, which was very thin in this area. The fill consisted of an undifferentiated dark-brown silt (Zone I). One rough body sherd and a fragment of calcined bone were recovered. Flotation produced six seeds, of which only three were identifiable: one bedstraw, one of the mustard family, and one of the grass family. The pit was approximately 53 cm in diameter and 15 cm deep with a rounded bottom. Its location below the organic soil suggests an early date, perhaps in the Carpenter Brook phase.

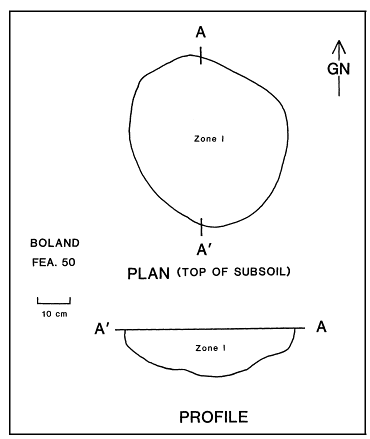


Figure 38. Feature 50.

Feature 51. Astride the doorway of Structure 1 were two roughly circular features. One of these, Feature 51 (Figure 39), was located in unit N146W26 immediately below the plow zone and extended 13 cm into subsoil. This feature was approximately 75 cm in diameter with a flat bottom and sloping sides. A medium brown silt mottled with subsoil (Zone I) comprised the fill. No artifacts or identifiable plant remains were recovered. Based on its location inside the longhouse opposite Feature 52, the pit is clearly associated with the palisaded village and almost certainly dates to the Carpenter Brook phase.

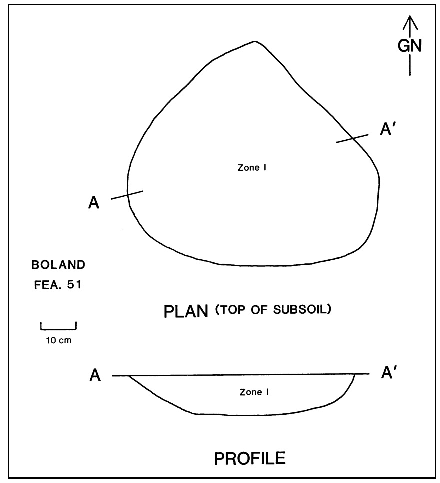


Figure 39. Feature 51.

Feature 52. One of the most informative features at Boland, this was the second circular pit located next to the doorway of Structure 1 (Figure 24). It appeared immediately below the plow zone and intruded directly into the light tan subsoil. (The organic layer began just east of this pit.) It was filled with a greasy dark brown silt containing large amounts of wood charcoal (Zone I). This zone lay on top of a mottled, medium-brown and light-tan silt layer (Zone II). No evidence of in situ burning was apparent. The fill probably represents deposition of refuse into an old storage pit. The feature had sloping sides and a flat bottom. Depth was approximately 18 cm, and the horizontal dimensions were 69 by 63 cm. Its location immediately below the plow zone probably indicates that the top portion was removed by plowing. Eight large rim and neck sherds of the Carpenter Brook Corded and Levanna Rough types were removed from this feature along with 28 rough and 4 eroded body sherds (Figure 49). A pipestem, probably a section of an early elbow pipe based on shape and the oval cross-section, was also discovered. Other artifacts included a netsinker, eight Onondaga chert flakes, and several fire-cracked rocks. The plant remains included five hickory-nut shell fragments, as well as two cupules and two kernels of maize. A sample of the wood charcoal was radiocarbon dated to 940 $\pm$ 80 years: AD 1010 (Beta-21533). Both the diagnostic pottery and the date strongly point to a Carpenter Brook phase origin.

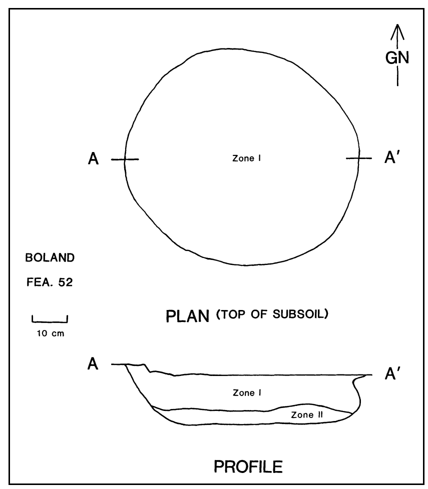


Figure 40. Feature 52.

Feature 53. This basin-shaped pit (Figure 41) was found just north of the palisade line in unit N162W20. It was located under about 8 cm of organic soil and intruded into the light tan subsoil. The profile of this feature was irregular, in that its eastern side had a ledge near the top. The fill consisted of dark brown silt with patches of light tan subsoil (Zone I). No internal stratification was observed. The feature was 67 cm in diameter and over 38 cm deep. The fill yielded two rough body sherds and one fire-cracked rock. Among the carbonized plant remains were one black-walnut shell, nine domesticated beans, two maize cupules, one maize kernel, and one bramble seed. Stratigraphic position of this feature suggests contemporaneity with the palisaded village and a relatively early date, probably in the Carpenter Brook phase.

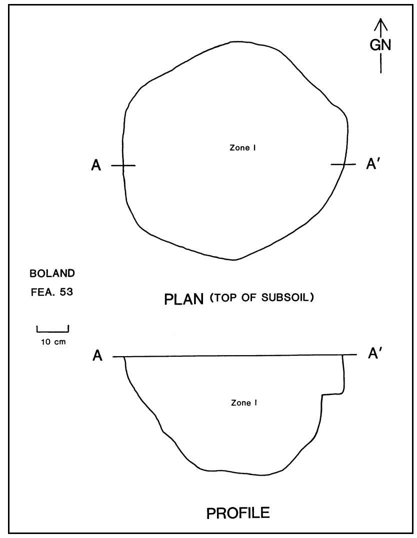


Figure 41. Feature 53.

Feature 54. This basin-shaped pit (Figure 42) was found during mechanical stripping within the palisade just south of Structure 2. It originated at the base of the plow zone and intruded directly into the light tan subsoil. Uppermost in the fill was a dark brown silt with charcoal and fragments of burnt earth (Zone I). This zone lay atop a light-tan silt (Zone II) which, in turn, overlay a medium-brown silt (Zone III). Within Zone III was a narrow lense of light tan silt (Zone IV) similar in texture and color to Zone II. The feature was 67 by 57 cm in horizontal extent and 18.5 cm deep with a rounded bottom and sloping sides. The dark brown silt yielded four rough body sherds and one fire-cracked rock. The flotation sample yielded one hickory-nut shell, two beans, four maize kernels, and one maize cupule. This feature was difficult to place chronologically because it occurred in an area without organic soil and lacked diagnostic artifacts. The presence of maize and beans is consistent with an Owasco-period date, perhaps contemporary with the palisaded village.

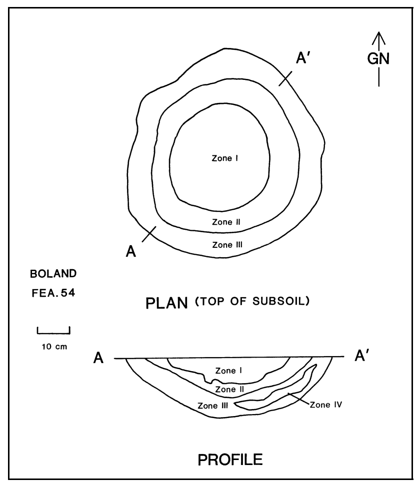


Figure 42. Feature 54.

Feature 58. Located just east of Structure 1, this shallow, basin-shaped pit (Figure 43) had a fill consisting of two strata: a dark brown silt (Zone I) above a very light yellow silt (Zone II). The feature appeared beneath the organic layer and intruded into the light tan subsoil. A post mold was adjacent to the north side of the feature. The feature was 10 cm deep and 42 by 30 cm in horizontal extent. No artifacts were recovered from any of the soil zones; plant remains included three maize cupules. The feature's location and stratigraphic position suggest contemporaneity with the palisaded village and a date in the Carpenter Brook phase.

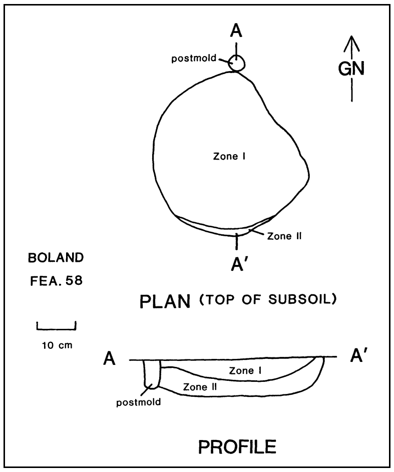


Figure 43. Feature 58.

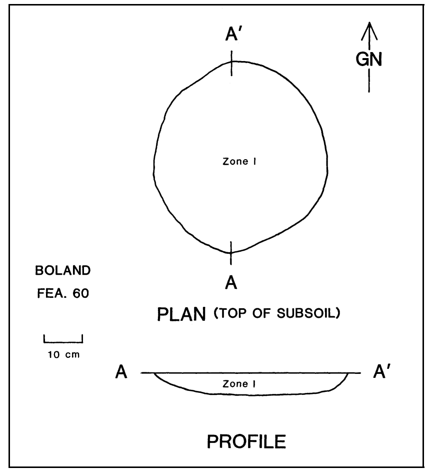


Figure 44. Feature 60.

Feature 60. This circular pit (Figure 44) was located within the palisaded area in unit N156W24 It was discovered at the base of a narrow lens of organic soil and extended into the light tan subsoil. Feature fill was composed of medium brown silt with no internal stratification (Zone I). The feature was only 6 cm deep and 50 cm in diameter. One eroded body sherd and one fire-cracked rock were recovered from the fill. Its location and stratigraphic position suggest an association with the palisaded village and a Carpenter Brook phase date.

Summary

Excavations in Area 3 revealed a long history of human presence. Diagnostic artifacts indicated that the area was sporadically visited in Terminal Archaic and Middle Woodland times. The most intense habitation, however, clearly occurred during the Late Woodland stage, specifically in the Owasco and Historic periods. The features and other deposits can be grouped into at least four distinct occupations, each of which is described more fully below. Here, we simply recognize these occupations and allude to their chronological position. A more detailed discussion of chronology is reserved for the following chapter.

Palisaded Village Occupation. Most of the archaeological remains in Area 3 pertained to a village consisting of at least two longhouses (Structures 1 and 2) surrounded by a palisade. A number of features could be linked to this occupation with reasonable confidence by virtue of their location, stratigraphic position (below the organic layer), or diagnostic artifacts. These include two hearths (47, 59) and seven pits (48, 50, 51, 52, 53, 58, 60). One other pit (49) may have been part of this occupation, but its association is tenuous. The same can be said of the possible structure denoted by the cloud of postmolds just outside the palisade gateway, between N160 and N170.

Plowing and mining greatly affected our archaeological picture of this community. The excavated eastern portion of the palisade was 38 m in diameter and enclosed some 630 m^2. Judging from the palisade's curvature and the distribution of surface artifacts, the entire village could easily have been twice that large, encompassing 1200-1300 m^2. How many houses the village contained will never be known, but it is worth noting that a third longhouse may have once stood inside the palisade just north of Structure 1, as suggested by an appropriate space and some indistinct traces of walls in that vicinity.

Also part of this occupation was an undisturbed stratum of dark brown silt (the organic layer), a combination of prehistoric midden and buried humus. This layer was thickest along the palisade and very thin or nonexistent in the vicinity of the longhouses. The eastern side of the palisade originally ran along a slight topographic dip, while the houses were placed side-by-side on elevated ground. Here plowing obliterated any organic soil that may have once existed.

Diagnostic artifacts and absolute dates clearly place this village in the Carpenter Brook phase (AD 1000-1100). The lack of rebuilding and the low artifact density both suggest a short-term occupation.

Structure 3 Occupation. This occupation was marked by a longhouse (Structure 3) located just south of the palisaded village. Because the structure and the palisade overlapped, they could not have been contemporary. A pit (Feature 49) and a hearth (Feature 55) were uncovered in the general vicinity of this longhouse, but whether they were associated with this occupation is difficult to say.

Structure 3 clearly dates to the Owasco period, but exactly when within this period is uncertain. The pottery from Feature 49 is diagnostic of the Carpenter Brook phase (AD 1000-1100), yet many of the sherds in the general collection picked up during mechanical stripping near this structure are suggestive of the Castle Creek phase (AD 1200-1300). For now, it is impossible to be sure which attribution is correct.

Kelso Occupation. This is by far the most tentative of our occupations. It consists of one hearth (Feature 45) and one pit (Feature 42) that contained some Kelso Corded pottery. This type, taken at face value, suggests a date in or near the Castle Creek phase (AD 1200-1300). But given how few sherds each pit contained, such a chronological assignment is far from certain. Indeed, the possibility exists that these are Historic features containing incidental, earlier inclusions.

Be that as it may, diagnostic sherds found in these features and the plow zone leave little doubt that Area 3 was used, at least somewhat, during the Castle Creek phase. The nature of this use is far from certain. It may have been associated with the occupation of Structure 3 (just discussed), or perhaps it resulted from activities peripheral to the Castle Creek site, some 500 m away.

Historic Occupation. European trade goods--including glass beads, bottle fragments, gunflints, kaolin pipes, and various objects of iron, copper, and brass--mark a small but significant Historic Indian component concentrated in the plow zone, principally in the northern part of Area 3. The style of these trade goods is consistent with the second quarter of the eighteenth century, a time when this portion of the Chenango Valley was home to a dispersed village called Otsiningo.

Several smudge pits were found on the northern end of the site. Some of these features (Features 43, 46, and 56) occurred at the base of the subsoil and intruded into the top of the organic soil. This stratigraphic position reveals that these features do not date from the same period as the longhouse and palisade, but derive from a later component that has been more severely disturbed by plowing. A sample of maize extracted from Feature 43 was radiocarbon dated to the eighteenth century. The similarity in location, morphology and stratigraphic position of the other smudge pits to Feature 43 suggest they may also date to the eighteenth century.

Two other smudge pits (Features 44 and 56) were also encountered at the base of the plow zone, but intruded directly into the light tan subsoil, that is, they occurred in a place where the organic layer did not extend. These features are difficult to date because of their ambiguous stratigraphic position and lack of diagnostic artifacts. But their similarity in shape and content to the radiocarbon-dated smudge pit (Feature 43), plus their location on the north side of the site where the majority of European trade goods were discovered could indicate an association with the Historic occupation.

CHAPTER 3

ARTIFACTS

The assemblage recovered during our 1984-1987 investigations included Native objects made of pottery and stone, as well as European trade goods made of glass, clay, metal, and stone. Unlike at the nearby Castle Creek site (Ritchie 1934, 1944), bone and shell were not preserved.

We describe the Boland artifacts in the sections that follow. Much of our classification and nomenclature relies on established typologies, which we have in some cases modified for the sake of parsimony or to fit the material at hand. Temporally sensitive prehistoric artifacts--pottery, clay pipes, and flaked stone points--are described first. Named types within these artifact classes are arranged in chronological order with the earliest forms appearing first. The types of chipped, rough, and polished stone tools are arranged in alphabetical order. Unclassified and indeterminate artifacts classes are described last. The unclassified categories include whole or partial artifacts of unusual form or with unique decorations that do not fit any known type. Indeterminate artifacts are fragments too small or eroded to classify further. Chronological, geographical, and other background information is included with each type description.

PREHISTORIC POTTERY

In the past, New York ceramics have been classified with reference to neck and collar decorations (Lenig 1965; MacNeish 1952; Ritchie and MacNeish 1949). The major exceptions are several types of Early Woodland and Point Peninsula ceramics. The Early Woodland Vinette I type includes thick sherds with exterior *and* interior cord-roughening (Ritchie and MacNeish 1949:100). Several Point Peninsula ceramic types are classified by the presence of designs created by stamping or rocking techniques on smoothed surfaces (Ritchie and MacNeish 1949:100-106). In both cases, either rim, neck, or body sherds can be assigned to a specific type.

Morphological characteristics such as rim and base shape, as well as surface treatment and decorative technique, are considered temporally sensitive attributes. These characteristics are used to assign ceramics to a general period. The earliest vessels were small, bag-like, and thick-walled with little neck constriction and pointed or conoidal bases (Ritchie 1969:194, 213; Ritchie and MacNeish 1949:100). Vessels became larger and more finely made throughout the Middle Woodland. By Owasco times, bases were semi-conoidal and necks constricted while rims were flattened and outflaring. Cord-roughened surface treatment, a trend begun in the Point Peninsula tradition, continued throughout the Owasco period and was replaced by smoothed surface treatment in early Iroquois times (Ritchie 1969:254, 290-294; Ritchie and Funk 1973:165; Ritchie and MacNeish:1949:107; Snow 1980:315). A small percentage of Middle Owasco vessels were collared, a form that increased in frequency to become the preferred vessel shape by Iroquois times (Bradley 1987:17; Ritchie 1969:291, 302-303; Ritchie and Funk 1973:168). Iroquois vessels were large, thin-bodied wares with globular bases and smooth surface finish.

The allocation of pottery to the established types generally centers on decorative motifs. Unfortunately, early efforts at classification tended to create types that differed only marginally and failed to separate components either spatially or temporally. This is particularly true for Iroquois ceramics where geographic location rather than formal or decorative variation was often a primary component of a ceramic type (Pratt 1960, 1976). Recently, there has been a trend towards collapsing categories into types that incorporate more variety or rely on characteristics besides decoration (Bradley 1987:18, 191-193; Lenig 1965; Niemczycki 1984; Pratt 1976). Associated with this trend is the recognition that morphological characteristics such as collar shape and height are chronologically sensitive attributes of Late Woodland and Historic period ceramics although these characteristics have not yet been incorporated into a ceramic typology (Bradley 1987:18, 54, 58-61). It has also been recognized that local development of ceramic form and decoration does not always follow the neat progression outlined above which is almost wholly based on ceramics from Mohawk and eastern Finger Lakes sites. Niemczycki (1986), for example, recognized that classic Castle Creek ceramics were absent on many late Owasco-Iroquois transitional sites in the Genesee Valley. Instead, these sites contained an assemblage composed of earlier Owasco types combined with Ontario Iroquois pottery.

Inclusion of sand or crushed rock (grit) into ceramic paste during vessel manufacture was the prevailing tempering technique in all Woodland periods in central New York (MacNeish 1952; Ritchie 1969:213, 291; Ritchie and MacNeish 1949; Snow 1980:315). The only exception to this practice emerged during the protohistoric period in the Upper Susquehanna Valley near the Pennsylvania border where pottery from several sites contained shell temper (Crannel 1970; Hatch 1980:279). Because of Boland's proximity to these sites, all sherds were carefully inspected for evidence of shell temper; none was discovered.

Apart from the use of shell temper, paste characteristics in Point Peninsula, Owasco, and Iroquois ceramics are not considered chronologically sensitive. Although Ritchie and MacNeish (1949) described general paste characteristics, these descriptions were too vague to help with dating. Preliminary work by Prezzano (1986) on several sites in the Upper Susquehanna and Chenango valleys has indicated that chronological differences in paste characteristics do exist. Middle Woodland sherds, for example, are generally sand-tempered and dense, Owasco period sherds are tempered with crushed rock and have large lateral pore spaces, while Iroquois sherds are thin, dense, exhibit small pore spaces and are usually tempered with finely ground rock. But these criteria have not been sufficiently fine-tuned to be used in typing sherds or in determining chronological placement.

The following ceramic typology is based partially on established schemes, but has been amended to best fit the Boland ceramic assemblage. In naming types, we have followed a consistent descriptive terminology: "corded" refers to designs of patterned cord impressions, usually made with a cord-wrapped stick or the edge of a cord-wrapped paddle; "rough" refers to an unpatterned surface treatment of overlapping cord impressions, made with a cord-wrapped paddle; "stamped" refers to impressed designs made with a tool lacking cordage; and "incised" refers to designs inscribed with a stylus while the paste was still wet. In addition to the named types, we have also made considerable use of indeterminate and unclassified categories. Such categories allow tabulation of smaller sherds which may not fit into an established type but can still provide useful information.

Sherds containing at least a portion of the vessel lip are here called rims. Sherds without lips, but containing at least a portion of the vessel above the inflection point (where the curvature of the vessel changes directions [Shepard 1956:226]) are called necks. Vessel fragments originating from below the inflection point are referred to as body sherds. Only rims and necks are assigned to named types, while body sherds are classified separately as rough, smoothed, dentate-stamped, or eroded. The only exception to this rule is the type Point Peninsula Rocker-Stamped, which includes sherds from all vessel portions.

Point Peninsula Rocker-Stamped

(Figure 51*a*, Figure 54*a*)

Sample. 3 sherds, including 1 rim.

Background. The Middle Woodland decorative technique called rocker stamping has a wide geographic and temporal range. Vessels from central New York are small to medium in size with conoidal bases and everted pointed lips. Decoration is executed over a smooth surface finish and can occur anywhere on the vessel exterior, thus, this classification includes body sherds as well as rim and neck sherds.

Sorting Criteria. Pottery with designs executed by rocking a curved tool over the smoothed exterior surface of a vessel.

Additional Characteristics. In most rocker-stamped pottery, including two examples from Boland, a toothed rocking tool was used to create dentate patterns. Lips on rim sherds (including the Boland example) are pointed. Vessel paste is sandy and dense.

Chronological Position. Occurs throughout the Point Peninsula culture, but is most common during the early portions of the Kipp Island phase (ca. AD 600).

Geographical Distribution. This type occurs throughout most of the Northeast and Upper Great Lakes area, including New England, southern Ontario, the Upper Delaware Valley, and as far west as northern Minnesota.

References. Funk 1976:281; Kinsey 1972:459; Ritchie 1969:221, 229; Ritchie and MacNeish 1949:102-103; Snow 1980:274.

Carpenter Brook Corded

(Figure 46*a, d-f, h-i,* Figure 48*a-f,* Figure 49*a, c-d,*
Figure 50*a-c,* Figure 51*b-o*, Figure 54*c*)

Sample. 222 sherds, including 54 rims and 168 necks.

Background. Ritchie and MacNeish first described this type as Carpenter Brook Cord-on-Cord; here we have changed the name for the sake of simplicity and to make it consistent with the rest of our nomenclature. The characteristic neck decorations consist of corded-stick designs superimposed over a cord-roughened surface. Ritchie and MacNeish, and later Whallon (1968), attempted without success to further divide this type based on the corded-stick designs. Clemson Island pottery, which is abundant in central Pennsylvania but also occurs in south central New York, is very similar to Carpenter Brook Corded. Carpenter Brook and Clemson Island pottery often occur in the same occupation levels. In general, Clemson Island sherds are distinguished from Carpenter Brook by the presence of a row or rows of punctations around the rim. Hatch (1980) has subdivided the Clemson Island sherds found at the Fisher Farm site into several types. Vessels are medium to large with slightly constricted necks, conoidal bases, and thickened or everted lips.

Sorting Criteria. Corded plat, oblique, and herringbone designs appearing on vessel necks which have been cord-roughened. Vessels are collarless. Rim sherds have flattened lips.

Additional Characteristics. Almost all of the Carpenter Brook sherds uncovered at the Boland site have very thick walls (13-15 cm), weakly constricted necks, and very broad, flat, thickened to slightly everted rims. Surfaces are heavily cord-roughened in most cases, although many sherds show some smoothing of the cord-roughened neck. Designs are primarily corded plats although a few oblique designs are present.

Chronological Position. In central New York, Carpenter Brook pottery occurs primarily during the Carpenter Brook phase (AD 1000-1100) of the Owasco period.

Geographical Distribution. In 1949, Ritchie and MacNeish recognized the wide geographic distribution of this type. Subsequent excavations have uncovered Carpenter Brook sherds as far south as the West Branch of the Susquehanna, east to the Delaware Water Gap, north and east into the upper Hudson drainage, and west into Ontario.

References. Funk 1976:281; Hatch 1980; Kinsey 1972:279-281; Niemczycki 1984:27, 40, 135; McCann 1971; Ritchie and MacNeish 1949:108.

Levanna Rough
(Figure 45*b*, Figure 46*g*, Figure 52*a-f*, Figure 54*b*)

Sample. 233 sherds, including 29 rims and 204 necks.

Background. Levanna Rough is similar to Ritchie and MacNeish's Levanna Cord-on-Cord. Two changes have been made to the application of this type, however. First the "cord-on cord" designation has been dropped since this term does not describe accurately the surface and/or decorating technique of these sherds. Levanna Rough sherds exhibit cord-roughening over the entire exterior of the vessel. Only on the exterior lip are corded-stick decorations sometimes present. Thus, very little of the cord-on-cord treatment is present on these sherds. Second, all neck and rim sherds that exhibit a surface treatment of cord-roughening over the entire neck but that have an absence of corded-stick designs are included in this category. As a result, neck and rim sherds may be included that are actually Carpenter Brook Corded sherds with the cord stick designs not present due to the small size of the sherds. Given the similarity in the chronological and geographic distribution of Levanna Rough and Carpenter Brook Corded inclusion of these sherds in the Levanna Rough category should cause no major problem in interpretation.

Sorting Criteria. Cord-roughening over entire exterior surface of vessel. Rims are flat. Except for an occasional row of corded-stick design on the lip, these vessels are undecorated.

Additional Characteristics. Three sherds (Figure 52*a-c*) included in this category are classic Levanna Cord-on-Cord; that is, sufficient sections of the rim and neck survive to determine that no corded-stick decorations are present. The Levanna Rough sherds from the Boland site are similar in several morphological characteristics to the Carpenter Brook Corded sherds. Rims are broad, flat and thickened to slightly everted. Vessel walls are very thick (ca. 12-15 mm). Necks are only slightly constricted.

Chronological Position. In central New York, Levanna Rough sherds are generally associated with the Carpenter Brook phase although they occur in small amounts on Canandaigua phase and Castle Creek phase sites in the Finger Lakes region.

Geographical Distribution. When the Levanna Cord-on-Cord type was first described by Ritchie and Funk, its geographic distribution was unclear because there had been few excavations of early Owasco sites. Subsequent excavations reveal that Levanna Rough sherds occur on sites south to the West Branch of the Susquehanna River in central Pennsylvania, in western New York, east to the Upper Delaware River and northern Hudson valleys as well as throughout central New York.

References. Funk 1976:300; Hatch 1980:280; Kinsey 1972:461-462; Niemczycki 1984:31, 135; Ritchie and MacNeish 1949:108.

Sackett Corded
(Figure 45*a*, Figure 46*b-c*, Figure 52*g-n*, Figure 54*d-e*)

Sample. 172 sherds, including 29 rims and 143 necks.

Background. Following Lenig (1965), Sackett Corded includes four types previously described separately by Ritchie and MacNeish (1949). These are Owasco Corded Oblique, Owasco Herringbone, Owasco Corded Horizontal, and Owasco Platted. Lenig observed that these four types co-occur both temporally and spatially on Late Woodland sites in the Mohawk region. Subsequent to his analysis, several archaeologists working in other areas have adopted this type including Niemczycki (1984) for the western Finger Lakes region and Kinsey (1972) for the Upper Delaware region in northeastern Pennsylvania and northern New Jersey. Bases of vessels are semi-conoidal, rims outflaring, and necks constricted with a pronounced shoulder area.

Sorting Criteria. Corded horizontal, platted, oblique, and herringbone designs appearing on vessel necks which have been smoothed. Rims are flattened.

Additional Characteristics. Many of the Sackett Corded sherds recovered from the Boland site are similar in morphological characteristics to the Carpenter Brook Corded and Levanna Rough sherds (for example, see Figure 52*g*, Figure 46*b*, and Figure 54*d*). Sherds of both types are thick with a slightly constricted neck and thickened lip. Although all Sackett Corded necks have been smoothed, some sherds exhibit a residual cord-roughening. Moreover, both types were found in the same stratigraphic context. These similarities may indicate that sherds of both types originate from a component transitional between the Carpenter Brook and Canandaigua phases. Several Sackett Corded sherds discovered in Area 1 are more typical of Sackett Corded pottery found on other sites, in that necks are constricted and all traces of cord-roughening have been removed (see Figure 45*a*).

Chronological Position. In central New York, Sackett Corded sherds predominate in the Canandaigua phase. They also appear in smaller percentages on earlier Carpenter Brook phase sites as well as on later Castle Creek phase sites. According to Ritchie and MacNeish, the Owasco Herringbone variant appears as early as late Point Peninsula times, although, at present, this occurrence has not been convincingly demonstrated.

Geographical Distribution. Sackett Corded pottery is widely distributed throughout central New York. It is fairly common in the Upper Delaware Valley, and in northern New Jersey. It occurs south to the West Branch of the Susquehanna in central Pennsylvania, and is found on sites as far north as eastern Ontario.

References. Funk 1976:300-301; Kinsey 1972:462; Lenig 1965:6-7; Niemczycki 1984:31, 135; Ritchie 1969:290-291; Ritchie and MacNeish 1949:110-112.

Kelso Corded
(Figure 53*a-c*, *e-g*, Figure 54*g*)

Sample. 87 sherds, including 55 rims and 32 necks.

Background. This category contains pottery with horizontal corded-stick designs on low to medium, channeled (this descriptive term follows Bradley 1987:18) or rounded collars. Much research has focused on the temporal and spatial distribution of corded-collared vessels because these types are assumed to be transitional between the earlier Owasco corded, uncollared vessels and the later Iroquois incised, collared vessels. In Eastern New York, including the Upper Susquehanna, southern Champlain and Mohawk valleys, as well as much of northeastern Pennsylvania, two distinct corded-collared types are present. The earlier type, Kelso Corded, was defined by Lenig (1965) to consist of collared vessels with corded horizontal motifs recovered from late Owasco and early Oak Hill sites in the Mohawk Valley. Kelso Corded, as defined by Lenig, includes all pottery originally designated as Owasco Corded Collar and Bainbridge Collared Incised by Ritchie and MacNeish. This type also includes MacNeish's (1952) Iroquois pottery types known as Hummel Corded and Dansville Corded as well as all Oak Hill pottery with horizontal corded motifs on collared vessels. The later type, Oak Hill Corded, was defined by Lenig to include only collared vessels with non-horizontal corded motifs. Niemczycki argues that

Lenig's distinction between Kelso Corded and Oak Hill Corded is arbitrary for north-central and western New York (the Finger Lakes area and the Genesee Valley). Corded-collar vessels are present in minor amounts during the Owasco period and incised ceramics appear by AD 1200. The corded-collar technique forms a minor element in transitional Iroquois ceramic assemblages from these areas. Later collared vessels are decorated with variations of corded horizontal motifs rather than the vertical, oblique or nested triangle designs of the Mohawk Oak Hill type. Tuck (1971) observed that corded collared vessels are also not abundant on Late Owasco sites in the Onondaga tribal area where types usually associated with the Middle Owasco period appear to persist up to Iroquois times.

Sorting Criteria. Corded designs consisting mainly of horizontal elements, supplemented by vertical, oblique, or opposed oblique elements appearing on channeled or rounded collared vessels.

Additional Characteristics. The majority of the Kelso Corded sherds from the Boland site are decorated with parallel corded horizontal lines occasionally interrupted with parallel corded vertical lines. Several sherds are decorated with parallel oblique incised lines below the collar. Two rim sherds contain shallow circular notches at the collar edge (Figure 53*e*). Collars are short in height.

Chronological Position. Middle Owasco to Oak Hill times (AD 1100-1400), but predominating during the Castle Creek phase (AD 1200-1300).

Geographical Distribution. Kelso Corded pottery occurs south of the Adirondacks, in the Mohawk and Upper Susquehanna valleys. It is present in the Upper Delaware Valley in Pennsylvania. It occurs as a minor type west to the Genesee Valley.

References. Ritchie and MacNeish 1949:112-114; Lenig 1965:6; MacNeish 1952:79; Kinsey 1972:463-464; Niemczycki 1984:27, 134.

Castle Creek Incised
(Figure 54*f*)

Sample. 1 rim sherd.

Background. Ritchie and MacNeish named this pottery type after the Castle Creek site where it was found in significant numbers. Neck incising also appears on Bainbridge Collared Incised sherds. Body sherds are sometimes checked-stamped, that is, paddled with a square-toothed tool.

Sorting Criteria. Collarless everted rim with a smoothed neck decorated with incised vertical or oblique parallel lines. Lips are flattened.

Additional Characteristics. The one example of this variety from Boland has short oblique cord-impressions on the interior and exterior lip, which is a common design element on sherds of this type found at other sites.

Chronological Position. Castle Creek phase (AD 1200-1300)

Geographical Distribution. This type occurs in the Mohawk, Upper Susquehanna, and Chenango drainages. It is also present in the Juniata Valley and the Upper Delaware Valley of northern Pennsylvania. It is rare to absent on Late Owasco sites in western New York.

References. Kinsey 1972:463; Lenig 1965:6; Niemczycki 1984:134; Ritchie and MacNeish 1949:114-115; Tuck 1971.

Oak Hill Corded
(Figure 53*d, h*, Figure 54*h*)

Sample. 6 sherds, including 3 rims and 3 necks.

Background. See the above description of corded-collared vessels. The extent of Oak Hill pottery in the lower reaches of the Upper Susquehanna in New York is unknown. Little research has been done on time periods later than Castle Creek in this area.

Sorting Criteria. Corded collared designs consisting of vertical oblique, opposed oblique, and opposed filled triangles. Collars are channeled to rounded in profile and short in height.

Additional Characteristics. Two rims, decorated with parallel oblique and vertical lines may be from the same vessel. One rim may have incising on the neck (Figure 53*d*). One collar piece is decorated with a triangular motif filled with parallel oblique corded-stick lines.

Chronological Position. Late Owasco to early Iroquois times. In the Mohawk drainage, occurs during the Oak Hill phase (AD 1300-1400).

Geographical Distribution. Oak Hill is most prevalent in eastern New York in the Mohawk drainage. It becomes increasingly rare in central and western New York.

References. Ritchie and MacNeish 1949; Lenig 1965:6; MacNeish 1952:62; Kinsey 1972:468; Niemczycki 1984:134.

Unclassified Rim and Neck
(Not illustrated)

Sample. 25 sherds, including 8 rims and 17 necks.

Description. This category contains sherds that do not fit any of the above classifications or any other known New York ceramic types. All but three of these sherds are decorated with corded-stick designs. The non-corded sherds consist of a deeply incised neck sherd, a neck sherd and collar sherd decorated with punctates executed with a hollow tool, and a neck sherd that appears to have been engraved after the clay had dried. Three of the corded-stick rims are collared.

Indeterminate Corded
(Figure 45*c*)

Sample. 175 sherds, including 69 rims and 106 necks.

Description. This designation includes neck and rim sherds decorated with corded-stick designs but which have an unknown surface treatment, that is, the surface treatment may be either smoothed or cord-roughened. Most of these sherds are small and show some surface erosion. All come from vessels that are uncollared. Most of these sherds probably date to the Owasco period.

Indeterminate Plain
(Not illustrated)

Sample. 55 neck sherds.

Description. Most of these sherds probably originate from necks with smooth surface treatment that are decorated with either incising or a corded stick. These sherds come from either collared or uncollared vessels and probably date anywhere from the Middle Owasco to the Iroquois period.

Indeterminate Incised Neck
(Not illustrated)

Sample. 29 neck sherds.

Description. This class includes all thin-walled pottery with designs of incised parallel vertical or opposed oblique lines over smoothed necks. It consists of sherds from collarless vessels as well as neck sherds which may come from collared vessels. This category may include sherds from vessels of the following named types: Bainbridge Collared Incised, Castle Creek Incised Neck, and incised neck variants of Castle Creek Beaded, and Castle Creek Punctate. Incised oblique neck designs also occur as a minor decorative technique on variants of Kelso Corded, Chance, and several early Iroquois types. This technique appears confined to eastern New York and northeastern Pennsylvania. These neck sherds have incised parallel vertical or opposed oblique lines. Many sherds were too small to determine if they derived from collared vessels, or if rims were beaded or punctated. Several exhibited cord-roughened bodies.

Chronological Position. Late Owasco to early Iroquois (AD 1200-1450), although a few early Owasco sites in the Mohawk drainage contain sherds with incised necks.

Geographical Distribution. Sherds with this treatment occur most frequently in the Upper Susquehanna and middle Mohawk valleys, and in the Upper Delaware drainage.

References. Kinsey 1972:463; Lenig 1965:9, 52-54; MacNeish 1952:78; Niemczycki 1984:132-134; Ritchie 1969:312-313; Ritchie and MacNeish 1949:110, 114-115.

Indeterminate Incised Collar
(Figure 53*i-n*)

Sample. 51 sherds, including 15 rims and 36 necks.

Description. This class includes most of the Iroquois collared types defined by MacNeish (1952) and Lenig (1965:6-8). Incised-collar pottery is a minor element at Boland, with most sherds being too small or eroded to fit into a more specific category. Incised-collar sherds are thin-walled pottery with motifs composed of incised lines on collars whose surfaces have been smoothed or polished. Incised motifs consist of parallel horizontal (Figure 53*i, k-l*), opposed oblique (Figure 53*m*), or nested triangular designs (Figure 53*n*) on collars. Generally, these sherds are fine paste wares with smoothed surface finish. All examples from Boland have low, rounded to straight collar profiles. A range of incising styles from fine shallow lines (Figure 53*m*) to deep broad gashes (Figure 53*i*) are present. Several collars have basal notching.

Chronological Position. Although incised-collar vessels may occur in trace amounts during the late Castle Creek phase, they constitute the dominant style during the Iroquois and early Historic periods (AD 1400-1650).

References. Bradley 1987:30-31, 38, 54-56, 192-193; Lenig 1965:6-8; MacNeish 1952; Ritchie 1969:313, 320.

Indeterminate Eroded
(Not illustrated)

Sample. 51 sherds, including 6 rims and 45 necks.

Description. Eroded pottery includes sherds whose surfaces have been removed by weathering. Many of these sherds retain enough morphological characteristics to be assigned to a rim, neck, collar, or body category. Although such sherds are not diagnostic, retention of lip shape, collar, or interior decorative technique enables many of them to be at least allocated to a general time period. Three rims were flat-lipped and collarless and thus were probably Owasco sherds. The remaining three rims derive from collared vessels. Two of the collared sherds had corded-stick decorations across the lip which indicate they may be Castle Creek or Oak Hill phase sherds. Forty uncollared neck sherds were also uncovered.

Rough Body
(Not illustrated)

Sample. 4,015 sherds.

Description. The overwhelming majority of body sherds from Boland had exteriors roughened with a corded paddle. This technique persisted for hundreds of years. It first appears during the early Middle Woodland (ca. AD 100) and continued to be the preferred surface treatment until the Oak Hill phase (AD 1300) of the Iroquois tradition (Ritchie 1969:230, 292-294).

Smoothed Body
(Not illustrated)

Sample. 287 sherds.

Description. A minority of body sherds appeared to have no cord-roughening on the exterior. These sherds may be smoothed body sherds associated with Iroquois vessels or sherds from sections vessels which were missed by cord-roughening treatment.

Dentate Stamped Body
(Not illustrated)

Sample. 5 sherds.

Description. Besides the dentate examples of Point Peninsula Rocker Stamped, two varieties of dentate-stamped pottery occur during the Middle Woodland. In the past, these have been classified by complexity of designs. All examples from Boland are fragmentary and have not been assigned to a specific type. These sherds are decorated with single, or multiple parallel, dentate stamped lines. One example has a chevron design composed of opposed oblique dentate lines. Vessel paste is sandy and dense. One sherd has a scraped interior (the treatment Ritchie called "channeled"). The dentate stamping technique appears during the early part of the Point Peninsula tradition and peaks in frequency during Kipp Island times (Ritchie 1969:206; Ritchie and Funk 1973:117; Ritchie and MacNeish 1949:100-103).

Eroded Body
(Not illustrated)

Sample. 1,528 sherds.

Description. This class includes sherds that are too eroded to determine surface treatment or decoration.

CERAMIC PIPES

Pipes are classified by general shape, angle of bowl to stem, bowl shape, method of decoration, and presence or absence of effigies. Except for Lenig's (1965:11-17) typology of pipes from Mohawk Valley sites, most classifications have remained at a general descriptive level. Unfortunately, pipe morphological and decorative terms have not been applied consistently.

Many pipe attributes have a clear temporal distribution. Clay pipes of a simple tubular shape appeared during the Early Woodland Stage and continued to be the major form throughout Early Point Peninsula times (Ritchie 1969:179, 194; Ritchie and Funk 1973:117). By the Kipp Island phase, the number and variety of pipes multiplied along with a trend towards increasing angularity between pipe bowl and stem. This trend continued throughout the Owasco period. Point Peninsula and early Owasco stems were usually oval in cross section, although round and subtriangular shaped stems were also present. By the Carpenter Brook phase, simple decoration and at least one effigy form (Corn Effigy) appeared. Early decorations, commonly made with a corded stick, became more finely executed (pointillé work). Bowl forms became increasingly more bulbous or vessel-shaped during the Canandaigua phase. This period also witnessed an increase in animal effigies. Designs may be incised, punctated, or executed with a corded-stick (Ritchie 1969:252-253, 294).

Trumpet shaped pipes, a form closely associated with the Iroquois tradition, began to appear during the Chance phase and became increasingly more elaborate. Effigy pipes were more common with many pipes designed to have human or animal replicas facing the smoker, or with the bowl opening serving as the mouth of the effigy (Bradley 1987:38, 41; Lenig 1965:55-56; Ritchie 1969:303, 313, 320; Tuck 1971:241-243). In the Onondaga heartland marked decrease in clay-pipe manufacture occurred during the latter half of the sixteenth century (Bradley 1987:61). Whether this also occurred in other Iroquois areas is not known. After 1600, pipe making was renewed, with a resumption of earlier forms (Bradley 1987:122-123).

Here the named types are described first in general chronological order, followed by indeterminate classes. Little is known about the geographical distribution of pipe forms, and so this heading is excluded from the descriptions. Kaolin pipes are treated in the section on European trade goods, while stone pipes are described in the section on polished stone artifacts.

Plain Elbow

(Not illustrated)

Sample. 1 whole bowl.

Sorting Criteria. Bowls are cylindrical in shape, and generally straight-sided. The angle where the bowl meets the stem is significantly greater than 90°. Decorations are absent.

Additional Characteristics. This bowl was categorized as an Elbow pipe based on bore position.

Chronological Position. Late Point Peninsula and Owasco periods. Elbow pipes occur primarily during Owasco times with pipes become progressively more right angled through time. Plain bowls, although they occur throughout the time period, predominate during the earlier phases of the Owasco tradition.

References. Ritchie 1969:294; Ritchie and Funk 1973:165.

Corn Effigy
(Figure 56*d-h*)

Sample. 1 bowl in 15 fragments.

Background. Corn Effigy are pipes with bowls modelled after corn cobs. The corn kernels are formed by scraping and incising between kernels (see Ritchie 1969: Plate 100.4), by modelling and inscribing each kernel with fine corded stick impressions, or by deep linear incising (Tuck 1971: Plate 6, example 10). Many of these corn effigies occur on obtuse-angle pipes.

Sorting Criteria. Pipe bowls incised or molded to resemble corn cobs.

*Additional Informatio*n. Because the Boland pipe bowl is in several fragments, pipe shape could not be determined. The kernels were formed by modelling and fine corded-stick impressions.

Chronological Position. These pipes have been found on Hunters Home and Carpenter Brook phase site in the Chenango drainage and on Castle Creek and Oak Hill phase sites in Onondaga country, although the latter may not be obtuse-angle pipes.

References. Ritchie 1969:295; Ritchie and Funk 1973:165; Tuck 1971:240.

Willow Point
(Figure 55*f*)

Sample. 1 bowl fragment.

Background. Vasiform pipes, the general category to which this type belongs, have bowls with globular lower portions, constricted necks, and flaring rims (Tuck 1971:240). Some appear to represent miniature pots. Various attempts to subdivide this category have resulted in a profusion of confusing names and subcategories, yet the Willow Point pipe remains the most consistently described type. It is named after the location of the Clark site, an Oak Hill phase component about 10 km southwest of Boland (Ritchie 1944:59-61).

Sorting Criteria. Willow Point pipes have vasiform bowls whose lower portions are decorated with alternate zones of vertical and horizontal lines with the vertical lines spaced in tight zones separated by blank areas or areas etched with horizontal lines. Often, the horizontal element is the cordage twist from a finely executed vertical corded stick impression (pointillé work). The upper portion of the pipe bowls are cylindrical to slightly flaring in shape and are usually decorated with closely-spaced horizontal lines. Designs may be either incised or corded-stick impressions.

Additional Characteristics. In the Boland example, the globular lower portion has been decorated with zones of three finely executed vertical corded stick impressions.

Chronological Position. Vasiform pipes occur most frequently during the Castle Creek and Oak Hill phases.

References. Bradley 1987:19; Lenig 1965:13-15; Ritchie 1969:303; Tuck 1971:240-241.

Ringed Trumpet
(Figure 55*h-j*)

Sample. 5 fragments of 4 bowls.

Background. Trumpet pipes are strongly associated with the Iroquois tradition. The bowls occur on slender stems with the angle of the bowl to stem approaching a right angle. Bowl forms vary from conical to rims that flare horizontally from the bowl. Earlier forms (often called "Proto Trumpets") are generally undecorated. Later forms are usually ringed or have collar-like rims.

Sorting Criteria. Bowls with flared often horizontal rims. Bowls are decorated with bands or rings separated by deeply incised lines. The rings are sometimes incised with several finely executed parallel horizontal or vertical lines.

Additional Information. One Boland example (Figure 55*h-i*), represented by four fragments, is almost identical to those illustrated in Bradley (1987:Figure 2*f*) and Tuck (1971:Plate 34.8).

Chronological Position. This pipe form arises during the Chance phase and continues throughout prehistoric and historic Iroquois times.

References. Bradley 1987:38, 41, 194; Lenig 1965:16-17; Ritchie 1969:313, 320; Tuck 1971:242.

Rimless Ringed Trumpet
(Figure 56*c*)

Sample. 1 fragment.

Background. This late pipe form has been given various names in the literature. Bradley (1987:192-195) in his Onondaga pipe descriptions apparently calls these pipes "ringed trumpet." Tuck (1971:239) has included some of these pipes in with either ring-bowled trumpet, or with rimless trumpet.

Sorting Criteria. Bowls are cylindrical in shape with slightly concave sides. The juncture between the bowl and the stem is gradual, not abrupt. Rims are not flaring. Bowls are decorated with parallel horizontal or opposed oblique incised lines. Punctates at base of bowl are common.

Additional Information. The Boland fragment is almost identical to the whole pipe illustrated in Tuck (1971:Plate 42.5).

Chronological Position. This pipe is a late variant derived from earlier trumpet forms. Many examples are from historic (1600-1650) sites.

References. Bradley 1987:192-195; Lenig 1965:16-17; Ritchie 1969:320; Tuck 1971:239; White 1961:96.

Indeterminate Effigy
(Figure 55*m-q*)

Sample. 5 fragments of 3 bowls.

Description. Both human and animal effigy pipes appear as a minor pipe form during the Canandaigua phase and then begin increasing in frequency, variety, and elaboration through Iroquois protohistoric and historic times. Earlier forms, appearing in Middle and Late Owasco times, consist of appliqué figures on traditional pipe forms. Many later effigy pipes have bowls shaped like animal or human faces turned towards the smoker. One possible effigy (Figure 55*m-n*) from Boland are two fragments to a highly eroded face. This effigy may have been a appliquéd piece deriving from the front of the bowl base. Two other molded fragments, decorated with incising and punctates, appear to be portions of a stylized mouth (Figure 55*p-q*). The final example comes from a bulbous or vasiform bowl fragment decorated with pointillé work that has three punctates arranged in a triangle (Figure 55*o*). Other examples, some slightly more elaborate, have been uncovered in eastern and central New York (see Ritchie 1969:100.3) and are believed to be stylized human faces.

Chronological Position. Canandaigua phase through Historic Iroquois.

References. Bradley 1987:30,38; Lenig 1965:13-16; Ritchie 1969:295, 313, 320; Tuck 1971:241.

Indeterminate Pointillé
(Figure 55*k-l*, Figure 56*b*)

Sample. 16 bowl fragments.

Description. These fragments are decorated with very fine stamped or cord-impressed lines. The discernable decorations are all nested triangles with one example of opposed oblique nested triangles. Several may be from vasiform or bulbous shaped bowls. None are large enough to classify further.

Chronological Position. Pointillé execution occurs primarily from the Late Owasco through the early Iroquois phases.

References. Bradley 1987:24; Lenig 1965:15; Ritchie 1969:295; Tuck 1971:240-241.

Indeterminate Incised
(Figure 55*a, d-e*)

*Sampl*e. 10 bowl fragments.

Description. Four of these bowl fragments are cylindrical in shape and decorated with horizontal parallel incised lines. They originate from either the upper portions of trumpet or vasiform pipes. Another example derives from the bulbous base section of a vasiform pipe. One bowl fragment is plain except for an incised line encircling the outside rim. The remaining fragments are too small to identify further.

Chronological Position. Incised decorative techniques occur during the Middle Owasco through the Iroquois period.

References. Ritchie 1969:294-295.

Indeterminate Punctated Bowl
(Figure 55*g*)

Sample. 1 bowl fragment.

Description. This fragment displays punctations made with a hollow tool. These punctations form a filled triangle.

Chronological Position. Punctation decoration appears during the middle Owasco Canandaigua phase and continues as a minor form throughout the Owasco and early Iroquois period.

Indeterminate Bowl
(Not illustrated)

Sample. 36 fragments.

Description. This category includes all bowl fragments with no decoration. They cannot be assigned to a particular period.

Indeterminate Stem
(Figure 49*e*, Figure 55*b-c, r,* Figure 56*a*)

Sample. 45 fragments.

Description. Ten fragments are whole stem cross-sections. All other fragments were partial. One almost complete stem (Figure 49*e*) is relatively broad, thick, and oval in cross-section with convex sides and probably derives from an early Elbow pipe (Ritchie 1969:294). Five other whole stem cross-sections (Figure 55*r*) have narrow straight sides. These may be the stems to historic Iroquois pipes or terra cotta imitations of historic kaolin pipes. None of these pipe stems appear to be bored out with metal tools, and thus are probably aboriginally made.

Chronological Position. Pipe stems tend to be oval during the late Point Peninsula and early Owasco periods. Narrow, straight-sided pipe stems are associated with the Iroquois period.

FLAKED STONE POINTS

Points are considered the most chronologically sensitive stone tools. Ritchie (1971) devised a typology for New York points which is still used today with few additions or modifications. There has been, however, a rethinking of the basic assumptions behind using points as indicators of narrow slices of time or associating them with particular cultural traditions. Snow (1980:160-163) has observed that many point types occur over a broad geographic area often on sites radiocarbon dated to separate phases. If one considers points as tools adapted to specific tasks within certain ecological environments, and disregard the association of points to narrowly defined normative cultural types, much confusion is eliminated. Points can be characterized as falling into several broad geographic and temporal trends. We begin our discussion with the Late Archaic (4000-1700 BC) since earlier points are exceedingly rare in central New York. Two point traditions have been defined for the Late Archaic. The first tradition contains points that are generally broad bladed and side notched. These are often associated with the Lake Forest Archaic, a series of cultures inhabiting the drainage systems of the Saint Lawrence and Great Lakes that show similar material cultural adaptations. Points include the Brewerton series, as well as the Otter Creek and Vosburg points defined by Ritchie (1971). The second tradition, often called the "Small Stemmed Point" tradition, is associated with the Mast Forest Archaic defined by Snow (1980:223-232). Within central New York, cultures of the Mast Forest occurred in the Delaware and Susquehanna drainages. Points included in this tradition are the Lamoka, Beekman Triangle, and Squibnocket.

Two point traditions are associated with the Terminal Archaic (1700-700 BC) (Snow 1980:235-259). The first, or "Broadpoint" tradition contains large, broad points that in central New York were often made of exotic materials. These points were used by many cultures along the Atlantic seaboard, and probably represent a "minor technological innovation" (Snow 1980:247). Points included in this tradition are the Susquehanna Broad, Genesee, and Snook Kill types. The second tradition, Snow suggests, grew out of the types associated with the Mast Archaic. This tradition includes Orient Fishtail points. These medium-sized narrow points, associated with the drainages of southern New England and the Hudson river, rarely occur in central New York.

In central New York, the Early Horticultural period (700 BC-AD 1000) defined by Snow (1980:261-305), which includes the Early and Middle Woodland Stages described by Ritchie (1969), is associated with few projectile point types. The earliest cultural system, known as the Meadowood phase, is often identified by the presence of Meadowood points and cache blades. These points are rarely found in the Susquehanna drainage. Occasionally Adena points from the central Ohio drainage have been found in central and western New York. These probably were trade items and do not indicate migration of Adena peoples into New York. In central New York, during the latter portions of the Early Horticultural period (the phases Ritchie named Kipp Island and Hunters Home) Jack's Reef corner notched and pentagonal points occur. Another large point known as Fox Creek has been found in the Susquehanna, Mohawk, and Hudson drainages. These are attributed to the Fox Creek culture defined by Funk (1976:287-293).

The earliest thin-blade, triangular projectile points, known as Levanna, occur rarely on Hunters Home sites. These points, which represent true arrowheads, are the predominant type found on Late Woodland Owasco sites. Levanna points gradually become smaller, with more concave sides. They also become less equilateral in form. By Iroquois times, points are narrow based with incurvate sides. This triangular point type, known as Madison, was the prevailing point type until the early historic period when it was replaced by a metal triangular point form.

The overwhelming majority of points in central New York are manufactured from Onondaga chert. One exception is that a large percentage of Terminal Archaic broad points made of jasper, rhyolite, or other exotic materials. Middle Woodland points were also sometimes manufactured from foreign stone, although not quite as often. Finally, Late Woodland Levanna and Madison points were occasionally made of quartz or quartzite.

Susquehanna Broad
(Figure 57*a*)

Sample. 1 whole point.

Background. Susquehanna Broad points are part of a Broadspear tradition which appears during the terminal Archaic along the Atlantic Seaboard. Many of the Susquehanna Broad points recovered from central New York are manufactured from rhyolite.

Sorting Criteria. Corner-notched to semi-lozenge shaped broad points with triangular shaped blades, jutting obtuse-angled shoulders, constricted stems and bases narrower than shoulder.

Additional Characteristics. The one example from Boland is manufactured from Onondaga chert.

Chronological Position. Susquehanna Broad points are associated with the Terminal Archaic (Transitional period) between approximately 1200 and 700 BC

Geographic Distribution. These points are found in the Susquehanna Valley in New York and Pennsylvania, the Upper Delaware Valley north of the Delaware Water Gap, the Hudson and Mohawk valleys, and the Finger Lakes area including the Genesee Valley.

References. Ritchie 1971:53-54; Snow 1980:235-260.

Jack's Reef Corner-Notched
(Figure 57*b-d, k*)

Sample. 5 points, including 1 whole and 4 broken examples.

Background. This point was named by Ritchie after the Middle Woodland type site of central New York. Besides Onondaga chert, points may be manufactured from jasper or other raw material.

Sorting Criteria. Broad, thin, ovoid to pentagonal corner-notched points of medium size with basally flaring stems and straight bases. The length to width ratio of these points is approximately 1.25.

Additional Characteristics. The four examples from Boland are made of Onondaga chert.

Chronological Position. Kipp Island phase through the Carpenter Brook phase (AD 700-1100)

Geographical Distribution. These points primarily occur in central New York, although they have been found on several sites in western, northern and eastern New York.

References. Ritchie 1971:26-27; Snow 1980:281, 315.

Levanna
(Figure 57*e-i*, Figure 59*b-c*)

Sample. 27 points, including 11 whole, 12 broken, and 4 preform examples.

Background. The shape of Levanna and the later Madison points fall along a continuum. The majority of early Levanna points are equilateral in shape; over time they become increasingly isosceles in form. Sides are usually straight becoming somewhat concave. The distinction, therefore, between late Levanna and early Madison is somewhat arbitrary (Snow 1980:315). Included in this category are two Levanna preforms. Most of the Levanna points appear to have been fashioned from flakes. Several have broken tips and impact fractures.

Sorting Criteria. These are medium to large (2.2 to 7.6 cm) predominantly equilateral points with straight to concave bases that are as broad as they are long.

Additional Characteristics. All examples are of Onondaga chert.

Chronological Position. Occurs primarily during the Owasco period (AD 1000-1350). It is a minor type during the middle and late Point Peninsula phases (AD 700-1000).

Geographical Distribution. Levanna points and similar medium to large triangular points occur throughout the Northeast and middle Atlantic region during the early portions of the Late Woodland.

References. Bradley 1987:24, 31; Ritchie 1971:31-32; Snow 1980:281, 315, 321.

Madison
(Figure 57*j*)

Sample. 1 whole point.

Background. In New York, Madison points are primarily composed of Onondaga chert. In the Onondaga heartland, and probably throughout the Iroquois territory, these points become increasingly isosceles in form up to the Garoga phase when they reach the maximum length-to-width ratio. Thereafter they become slightly broader.

Sorting Criteria. Small (ca. 1.9 to 3.97 cm), thin triangular points, flat in cross section and generally isosceles in shape.

Additional Characteristics. The one Boland example is strongly isosceles in shape with incurvate sides. This point is composed of Onondaga chert.

Chronological Position. Madison points are associated with the Iroquois culture and occur during the later portions of the Late Woodland stage (AD 1300-1650). They decline in frequency during the historic period, and virtually disappear by AD 1650.

Geographical Distribution. Madison points occur throughout the eastern United States and southern Ontario during the later portion of the Late Woodland stage.

References. Bradley 1987:24-31, 41; Ritchie 1971:33-34; Snow 1980:315.

Unclassified Point
(Figure 57*n-o*)

Sample. 2 whole examples.

Description. Two small triangular projectile points remain unclassified. One point (Figure 57*n*) is manufactured from rhyolite and has a narrow, straight base that has been finished by fine chipping. It is equilateral in form with straight to slightly excurvate sides. The second point (Figure 57*o*), slightly pentagonal in shape and manufactured from quartz, may be a Beekman Triangle, a Late Archaic point first described by Funk (Ritchie 1971:121). Beekman Triangles are considered a variant of New England point type known as Squibnocket. Beekmans are found in the Hudson valley but their precise distribution is unknown.

Indeterminate Point
(Figure 59*e*)

Sample. 99 fragments.

Description. This category includes segments of broken points which cannot be identified further. The majority of these fragments are point tips. Seventy-six of these tools are manufactured from Onondaga chert, one base segment is of Pennsylvania jasper, while another is a midsection to a quartz point. One point tip fragment is of an unknown chert variety. A heavily ground base fragment of an exotic variegated light flint is the stem section of an Adena or other large point type (Figure 59*e*). Two bases of Onondaga chert are notched. All other fragments are probably segments of Levanna points.

OTHER FLAKED TOOLS AND DEBITAGE

Categories of flaked-stone tools have been traditionally based on tool function derived from association of tool shape with modern Euroamerican examples. Detailed investigation of lithic tool use through use-wear analysis or other techniques has not yet been fully exploited. Most tools are difficult to place temporally. Major exceptions are tools made from the bases of projectile points.

Tools are scarce at the Boland site. Most are manufactured from flakes or from reused points. Gravers and drills are the most numerous curated lithic tools. No complete knives and very few scrapers were uncovered. Except for a few rhyolite and jasper tools, Onondaga chert is the predominant lithic raw material. Flakes and tools recovered indicate that the source of this flint was locally derived river cobbles. In the following section, the tool categories are followed by the debitage descriptions.

Core
(Not illustrated)

Sample. 71 examples.

Description. Cores are modified pieces of stone that represent the initial stages of biface or flake blank production. Cores are nodules with one or more flakes removed and with at least one negative bulb of percussion. All cores from the Boland site were of Onondaga chert.

Chronological Position. Cores occur during all phases of prehistory.

Drill
(Figure 57*l-m*, Figure 58*a-d*)

Sample. 12 examples, including 7 whole and 5 broken tools.

Description. Drills are rod-shaped punching tools that exhibit alternate bifacial retouch along the working edge. They are usually biconvex or diamond-shaped in cross section. These tools are shaped and have finished bases. Bases of drill are extremely variable. Three of the Boland site drills are of the expanded-base type (Figure 58*a, e*), while one has a Y-shaped base (Figure 58*b*). Three examples appear to have been manufactured from

Levanna points (Figure 57*l-m*). These have ground bases. The other drills lack bases. Several of these tools have heavily ground points possibly as result of punching or piercing activities (Figure 57*m*).

Chronological Position. Drill base form may be indicative of chronological position. The three examples manufactured from Levanna points probably date to the Owasco phase. None of the other Boland drills are diagnostic of any specific period. Drills were replaced by European tools in protohistoric Iroquois or early Historic times.

References. Ritchie 1969:67, 70, 95, 101, 171, 193, 233, 240, 251, 290; Ritchie and Funk 1973:41, 72, 96, 192, 204, 211, 224.

Graver
(Figure 58*e-h*)

Sample. 23 examples.

Description. A graver exhibits a triangular-shaped projection formed by retouch. Gravers may be manufactured by either unifacial or bifacial retouch. The Boland examples were all manufactured from flakes which, apart from the graver end, were unmodified.

Chronological Position. Gravers are recovered from sites of all phases of prehistory. Gravers were very quickly replaced by their metal equivalents during the protohistoric period.

References. Ritchie and Funk 1973:192, 252.

Perforator
(Not illustrated)

Sample. 3 examples.

Description. These punching tools have a large projection, formed by retouch, that ends in a converging point. Perforators were manufactured from flakes, which apart from the point, were left unfinished.

Chronological Position. Perforators occur throughout prehistory. Perforators were replaced by European tools in the protohistoric Iroquois or early Historic period.

References. Bradley 1987:125; Ritchie 1969:193.

Retouched Flake
(Figure 58*k, n*)

Sample. 52 examples.

Description. A retouched flake shows intentional modification of edges by flake scars that extend at least 2 mm from the edge of the tool. All or part of the flake edge may be modified.

Chronological Position. These tools are not associated with a particular period.

Scraper
(Figure 58*i-j, l-m*)

Sample. 5 examples.

Description. Scrapers are tools that have been manufactured by regularized edge retouch to produce a continuous edge suitable for scraping (that is, with a relatively steep edge angle). These tools may be either unifacially or bifacially modified flakes, or prepared tools. The Boland examples include two fragments (an end scraper and a side scraper) that are bifacially modified plus two uniface scrapers. The scraper category differs only in degree of flaking from the retouched category.

Chronological Position. Scrapers occur throughout prehistory. The form of some scraper bases can indicate time period (for example, some are fashioned from broken point bases). None of the Boland scrapers could be assigned to any particular period.

References. Ritchie 1969:62, 158-159, 251, 287; Ritchie and Funk 1973:93, 120, 135, 192, 204, 211, 224, 252.

Unclassified Biface
(Figure 59*d, f-h*)

Sample. 4 examples.

Description. The unclassified biface category includes unusually shaped tools that do not fit any of the above categories. Four of these tools are manufactured from exotic raw materials. These include a large biface of greenish chert which has been roughly shaped and exhibits little edge retouch. One face of this tool shows polishing. This chopper-like tool may be an unfinished woodworking tool. A triangular biface is manufactured from light tan mottled chert. This very thick biface, biconvex in cross-section, may represent a Levanna preform. Two very rough bifaces of rhyolite and crystalline rock are also included in this category. The three Onondaga chert bifaces appear unfinished. One is very water-worn.

Indeterminate Biface
(Figure 59*a*)

Sample. 52 examples.

Description. The biface category consists of two subcategories. It includes blanks or unfinished tools exhibiting flake removal on both surfaces. These are probably tools that broke during manufacture. They vary in thickness and are often irregular in outline. The second subcategory contains broken fragments of finished tools (scrapers, knives, points, etc.) that were too small to be further identified.

Flake
(Not illustrated)

Sample. 10,198 examples.

Description. Lithic material with remnants of striking platforms and bulbs of percussion. At present, Boland flakes have not been subdivided into categories based on reduction stage. Several appear to be the result of bipolar reduction and may, in fact, represent small cores. Besides Onondaga chert, 169 flakes of Pennsylvania jasper, rhyolite, and quartz were discovered at Boland. Many flakes showed signs of heat exposure.

Chunk
(Not illustrated)

Sample. 1,016 examples.

Description. The chunk category includes all unmodified flint nodules uncovered at Boland. Chunks may be chert intentionally transported to the site or may represent naturally occurring flint. Eighteen chunks are of jasper and rhyolite and 922 chunks are of Onondaga chert.

ROUGH STONE TOOLS

This category includes both roughly flaked and ground tools manufactured from cobbles. Of all artifact classes, rough stone tools are perhaps the least studied. Categories traditionally have been based on assumptions drawn from obvious evidence of use-wear. Except for ground/chipped discs, replication studies or detailed analysis of use-wear have rarely been undertaken. None of the rough stone tools recovered from Boland are diagnostic of a particular period although several classes of artifacts (chipped discs, for example) are known to occur in greater numbers on Late Woodland sites.

Abrader/Anvil/Hammerstone
(Figure 47*a*, Figure 50*e-f*, Figure 60*b-d*, Figure 61*a-d*, Figure 62*a-d*)

Sample. 55 examples.

Description. Many of the rough stone tools recovered from Boland show multiple use, generally as various combinations of abraders, anvils, or hammerstones. Rather than artificially separate these tools into classes, we have chosen to discuss them as a group.

Abraders have ground, or rubbed surfaces often with narrow channels or grooves resulting from abrasion with hard objects such as stone or bone. Striations are often present. Several of the examples from Boland are tabular shaped stones (Figure 62*c*). Anvils are cobbles or large stones with at least one flattened side which displays pecked, or crushed areas resulting from their use as platforms for percussive activities. Anvils often have depressed or concave areas from repeated battering. Included in this category are pitted "nutting stones" which have deep depressions on one or more faces (Figure 61*a*). Three examples from Boland fit into this latter category. Hammerstones are whole or fragmentary pebbles or cobbles that have battered, scarred, or pitted edges resulting from use as percussors. Several examples from the Boland site have pits on opposite faces (bipitted hammerstones) (Figure 60*d*). Included in the hammerstone category are "pecking stones," or "pebble hammerstones," which are small pebbles with shallow pitting. The one example of this subcategory at the Boland site is an oval flint nodule with pecking on one end (Figure 61*d*). The frequencies of specific combinations are as follows: 9 abraders, 2 abrader/anvils, 10 abrader/hammerstones, 4 abrader/anvil/hammerstones, 5 anvils, 10 anvil/hammerstones, and 16 hammerstones.

Chronological Position. Abraders, anvils, and hammerstones occur throughout prehistory. Abraders were also used throughout the early Historic period.

References. Bradley 1987:125; Ritchie 1969:67, 70, 95, 114, 159, 161, 240, 251, 310.

Chopper
(Figure 60*a*)

Sample. 4 examples, including one chopper/anvil.

Description. Choppers are medium to large cobbles which are roughly flaked to produce an angular working face. The flaking may be either bifacial or unifacial. Large examples of these tools often show evidence of use as anvils. Generally, the natural shape of the cobbles is only slightly altered. These tools may have been used as heavy hide scrapers.

Chronological Position. These tools occur throughout prehistory.

References. Ritchie 1969:62, 96, 111, 159, 161.

Drilled Stone
(Figure 65*a*)

Sample. 1 example.

Description. A smoothed water-worn stone recovered from Boland contains a hole drilled through the center. One edge of this hole is cone-shaped suggesting that it was drilled from this edge. This stone may have been used as a net weight.

Disc
(Figure 63*a-c*)

Sample. 9 examples, including 5 whole discs and 4 fragments.

Description. Discs are flat circular cobbles which have been chipped on one or both edges, and occasionally notched. Grinding of the edges is also common. Ritchie claims that these tools are hoes or tilling implements, an opinion based on their almost exclusive occurrence during the Late Woodland Stage. Recent replication experiments by Lindner (1983) have shown that these discs were not used as hoes. They appear most frequently on sites with strong evidence of fishing. Bradley (1987:210), Lindner (1983), and Wren (1914:84) have hypothesized that these disks are bottom weights for seines.

Chronological Position. Chipped and/or ground discs are primarily found on Late Woodland sites.

References. Bradley 1987:210; Lindner 1983; Ritchie 1969:186, 240, 308; Ritchie and Funk 1973:207, 211, 222, 225, 240, 252; Wren 1914:84.

Grooved Abrader
(Figure 65*b*)

Sample. 2 fragments that fit together.

Description. Grooved abraders, include tools called sinew stones and sharpening stones. These are grouped together because the distinction between these two tools is somewhat arbitrary. Grooved abraders are cobbles, generally flattened in cross-section, that show grooves or incising along their edges from repeated rubbing. Sinewstones have very wide, deep rounded or v-shaped grooves along their edges. Traditionally, archaeologists have assumed that these tools were used to form leather thongs or straps from sinew. But no evidence of their actual function has been gathered. Sharpening stones show grooves or incising on their edges and faces, presumably from sharpening tools.

Chronological Position. These tools occur throughout the prehistoric sequence in New York. Sinew stones become more elaborate from the Kipp Island phase onwards.

References. Ritchie 1969:159, 161, 257; Ritchie and Funk 1973.

Mano
(Figure 47*b-c*)

Sample. 5 examples, including 1 hammerstone/mano combination.

Description. Manos or mullers are hand-held food processing tools. They are oval or round with one or more flat surfaces apparently produced from grinding food. They may be polished or show striations. None of the Boland examples were carefully pecked into shape, although some mullers from other sites exhibit this manufacturing technique. Manos often show additional use as hammerstones or anvils. The terms "muller" and "mano" have been used interchangeably in Northeastern archaeological literature.

Chronological Position. These tools occur throughout prehistory. In the Onondaga territory, manos, as well as other food processing tools, are present on Onondaga historic sites until at least AD 1650.

References. Bradley 1987:125; Ritchie 1969:62, 101, 111.

Mortar/Grinding Stone
(Figure 64*b*)

Sample. 9 examples.

Description. These are thick stone slabs with plane surfaces. Mortars have shallow to deep concave grinding surfaces. Grinding stones usually display flattened surfaces that have been ground smooth. Both may be polished from grinding activities. The distinction between mortars and grinding stones is subtle. Both tools functioned as the base or platform for the processing of plant and animal foods, and were used in combination with manos or mullers. All examples from Boland are fragments and may be pieces of either mortars or grinding stones.

Chronological Position. Mortars and grinding stones occur throughout prehistory but increase in number during the Late Woodland stage. They are present on historic Onondaga Iroquois sites until at least 1650.

References. Bradley 1987:125; Ritchie 1969:62, 63, 70, 308, 310.

Netsinker
(Figure 49*b*, Figure 50*d*, Figure 63*d-h*)

Sample. 63 examples, including 56 whole netsinkers and 7 fragments.

Description. Netsinkers are generally flat oval pebbles or cobbles which have chipped notches on opposing sides. The majority of the examples from Boland are side-notched netsinkers, although one end-notched sinker was also recovered. Size range was enormous with the smallest example only 21 mm, and the largest over 110 mm in length. The prevailing opinion is that these chipped rocks served as fish-net weights. There is at least one discovery from central New York of netting attached to these tools (Ritchie 1969:186). Some netsinkers may have also served as weights to bird netting or other activities requiring weighted fabric or cording.

Chronological Position. Netsinkers are found on Archaic as well as Woodland stage sites. They are among the most numerous rough-stone tools recovered from Owasco sites in central New York.

References. Ritchie 1969:157-158, 161, 186-188, 278.

Pestle
(Figure 64*a*)

Sample. 2 fragments.

Description. Pestles are large, cylindrically shaped cobbles that show battering and grinding from use along the sides and ends. These tools are often shaped by pecking and grinding. Pestles are believed to have been used in conjunction with wooden troughs or mortars formed from tree stumps. Pestles frequently occur on Late Woodland sites and probably were used to grind maize and other foodstuffs.

Chronological Position. Pestles occur throughout prehistory in New York, but are strongly represented in the Late Woodland stage. During the historic Iroquois period, pestles were used until 1650.

References. Bradley 1987:125, Ritchie 1969:97, 112, 310.

POLISHED STONE TOOLS AND ORNAMENTS

This class contains all tools and ornaments that were manufactured by intentional polishing. These curated tools and ornaments may have been initially pecked or flaked to obtain a rough form, but final preparation entailed smoothing and polishing of most surfaces.

Celt/Adze
(Figure 65*c*)

Sample. 1 fragment.

Description. The fragment of a wood working tool from Boland is too small to definitively classify as either a celt or adze. Celts and adzes are curated tools which are manufactured through considerable alteration by pecking, flaking, and grinding. Celts are bilaterally symmetrical and triangular in shape with a tapered poll end. Surfaces, particularly the biconvex working edge may be polished. Examples recovered with wooden handles still attached clearly show that these tools were hafted with the blade parallel to the handle while adze blades, which are asymmetric in cross-section, were hafted with the blade perpendicular to the blade (Bradley 1987:210). Raw material is usually fine-grained.

Chronological Position. Celts and adzes occur throughout prehistory. They were one of the first stone tool classes replaced by European tools.

References. Beauchamp 1897:12; Bradley 1987:210; Ritchie 1969:62.

Red Slate Bead
(Figure 66*a-e*)

Sample. 5 examples.

Description. Both red slate and catlinite beads have been discovered on Iroquois sites. Sources of catlinite are in Minnesota while red slate sources are located in the Lake George area. The Boland specimens seem to be made of the latter material (but without a detailed mineralogical analysis it is difficult to be sure). Four of the five beads are triangular in form, two with concave sides (Figure 66*b-e*). All four beads are drilled longitudinally. Three of these triangular beads are polished. The fourth bead, thick and unpolished, has an off-center hole which is "split-out" from the base up to the center giving it the appearance of being unfinished (Figure 66*e*). The fifth bead is half of a broken square bead with portion of drill hole remaining on an unpolished side (Figure 66*a*). It appears to have split when drilled longitudinally. A large hole is drilled horizontally through the center of the polished flat face. Similar beads have been found on Susquehannock sites in Pennsylvania (Kent 1984:169), occasionally with glass beads placed in the drilled center.

Chronological Position. Stone beads begin to increase in frequency during protohistoric Iroquois times. On Onondaga sites, catlinite and red slate beads begin to replace shell beads in popularity by the late 1600s. Red slate is the preferred raw material for beads at the Onondaga Sevier site dated between 1700 and 1720.

References. Bradley 1987:102, 130, 205-207; Kent 1984:169.

Platform Pipe
(Figure 65*d*)

Sample. 1 fragment.

Description. An edge portion of a stone platform pipe was uncovered during excavations at the Boland site. This segment, composed of granite or possibly pegmatite, is highly polished with lateral striations. A portion of the inner bore hole is present.

Chronological Position. Platform pipes date to the Middle Woodland stage and are most frequent during the Kipp Island phase. They disappear by Owasco times.

References. Ritchie 1969:205, 210, 294; Ritchie and Funk 1973:117.

Indeterminate Polished Stone
(Not illustrated)

Sample. 5 fragments, including 2 used as hammerstones.

Description. These polished fragments show grinding and polishing on one or more faces. The Boland examples may represent portions of celts, adzes, abraders, or grinding tools.

EUROPEAN TRADE GOODS

The earliest artifacts discovered on Iroquois sites that are composed of European materials were made from copper and copper alloys, glass, and iron (Bradley 1987:69). Ornaments constructed from kettles, are the most common non-native artifacts on protohistoric sites from the mid-sixteenth century to the 1600s. The presence on sites of scored and folded copper and brass scraps indicate many ornaments were manufactured locally rather than traded in. Iron tools, such as awls and celts, were manufactured from trade axes and often were similar in shape, and presumably in function, to their prehistoric stone counterparts. Beads were not common on these protohistoric sites (1987:60-78).

During the first half of the seventeenth century, kettles were still used as a source of raw material rather than as implements. Complete examples of iron trade axes, however, are found on Onondaga sites that date to this period. European ornaments began to appear in the form of thimbles and rings by the second quarter of the seventeenth century. Thimbles were most likely of Dutch origin, while the rings, which usually have religious motifs, derived from the French. By the second half of the seventeenth century, with the larger influx of trade goods, more intact implements appeared. Kettles began to be used as cooking pots (1987:130-135).

Firearms and associated materials appeared on Iroquois sites by 1625. The presence of iron casts and lead bars indicate that the Iroquois were manufacturing their own lead balls by 1650 (1987:142-145, 152). Soon after the first European examples appeared around 1650, the Iroquois manufactured their own gunflints to about 1675. These were gradually replaced by European mass-produced wedge shaped gunflints (Kent 1984:27-40). Historic ceramics and European kaolin pipes appeared on sites by the mid-seventeenth century and increased in frequency throughout the historic period. Glass beads became abundant during the early historic period. Because of their abundance, variety, and brief stylistic trends, beads are important temporal markers on historic Iroquois sites (Bradley 1987:158-162).

Several types of trade goods were found in the plow zone at Boland, with glass trade beads being the most numerous. Also retrieved were scrap metal, metal objects, bottle glass, kaolin pipe fragments, lead shot, and other items. No Euro-American ceramics older than the mid-nineteenth century were recovered. Description of these and other late historic artifacts are not included. In the following sections, glass objects are listed first followed by metal, ceramics, and lithics.

Glass Bead
(Figure 67*a-p*)

Sample. 16 beads, including 9 whole and 6 broken examples.

Description. Several colors and types of beads were retrieved from Boland. Five of the beads uncovered are wire-wound and 10 are drawn. Two of the broken bead segments (Figure 67*n-o*) fit together. The beads are classified according to the Kidd and Kidd (1970) typology and otherwise described in Table 1. All are of varieties that are commonly

Table 1. Glass Beads.

Variety[a]	Color	Diameter (mm)	Length (mm)	Completeness[b]	Figure Reference
IIa1	red (opaque)	8.8	7.0	W	67*d*
IIa1	red (opaque)	8.1	8.4	W	67*e*
IIa8	black (opaque)	8.5	12.8	W	67*g*
IIa15	white (opaque)	6.5	13.2	W	67*h*
IIa40	blue (opaque)	10.9	10.0	W	67*b*
IIa40	blue (opaque)	8.4	7.6	W	67*c*
IIa55	dark blue (clear)	8.0	8.0	F	67*a*
IIbb13	white with blue and red stripes (opaque)	7.9	10.8	F	67*f*
WIb1	light gray (clear)	10.9	10.0	W	67*i*
WIIc3[c]	milky white (translucent)	10.9	9.4	W	67*j*
WIIc5	amber (clear)	13.9	12.2	F	67*o*
WIIc5	amber (clear)	14.6	16.1	F	67*p*
WIIc12	dark blue (clear)	10.0	9.7	W[d]	67*k-l*
WIIc12	dark blue (clear)	10.0	10.0	F	67*m*
WIIc12	dark blue (clear)	12.1	9.8	W	67*n*

[a] After Kidd and Kidd (1970).
[b] Key: W, whole; F, fragment.
[c] Assignment to this variety is a best approximation, rather than an exact fit. The bead conforms to the definition in every respect, except that it is translucent rather than clear. In this respect, it is much like Brain's (1979) variety WIIA8.
[d] This bead consists of two fragments that were found separately but fit together.

found on eighteenth century sites (e.g., Brain 1979; Good 1972; Stone 1974). Following Brain (1979:98-115), these varieties range in date as follows (typological equivalents and mean dates of archaeological occurrences are given parenthetically): IIa8 (Brain's IIA5), 1600-1890 (1745); IIa15 (Brain's IIA1), 1600-1836 (1739); IIa40 (Brain's IIA7), 1600-1836 (1737); IIa55 (Brain's IIA6), 1600-1890 (1749), but mostly found on sites dating between 1700 and 1740; IIbb13 (Brain's IIB5), 1699-1836 (1747); WIb1 (similar to Brain's W1A7), 1680-1833 (1741); WIIc3 (Brain's WIIA8), 1673-1799 (1736); WIIc5 (Brain's WIIA4), 1680-1833 (1752); WIIc12 (Brain's WIIA3), 1650-1833 (1739). Variety IIa1 has no equivalent in Brain's classification, but similar beads have been found at sites ranging in age from 1670 to 1833 (Cleland 1971:79-80 [Type 8]; Good 1972:122, Plate 5 [Type 129]). Based on these ages, the mean date of the Boland bead sample is 1743.

Glass Bottle
(Figure 68*f-h*)

Sample. 20 fragments, including 1 piece modified into a tool.

Description. These fragments represent all portions of bottle glass manufactured earlier than the mid-nineteenth century. Later glass recovered from Boland is not considered here. The most unusual piece discovered originates from the basal portion of a dark green blown-glass bottle (Figure 68*f*). This heavily pitted segment shows intentional modification by bifacial flake removal and shaping to form a blade or large scraper. The tool measures 50.9 mm by 26.0 mm. Eleven medium green body fragments show pitted interior and exterior surfaces. These probably date to the late seventeenth to the early eighteenth century. Two pale green portions of seventeenth to eighteenth century pharmaceutical bottles were also identified (Noel Hume 1969:Figure 17). One piece derives from the basal section of the bottle and contains the kick with pontil scar. The other fragment is a body piece. We also identified a basal portion of a mallet style bottle of dark green glass. This piece originates from the late eighteenth century to early nineteenth century. Two thermally altered dark green body fragments were also recovered. These pieces show the characteristic bluish layer typical of heat exposure. Both pieces are pitted on the interior.

Brass Ring
(Figure 68*o*, Figure 69)

Sample. 1 fragment.

Description. This cast brass "Jesuit" ring has an engraved pattern of several vertical chevrons bounded by two curved lines which in turn are surrounded by short oblique dashes. This pattern is reminiscent of the "rended heart" motif described by Cleland (1972:204). It also corresponds to the "incised abstract" category defined by Wood (1974:94). The two sites in western New York where similar rings have been found are said to have been occupied between 1625 and 1710 (Wood 1974:Table 1), but the criteria by which these dates were assigned are not at all clear. Cleland (1972:207) cites convincing evidence that engraved (as opposed to cast) designs were rare before 1700, which suggests that our specimen is of eighteenth-century vintage. The plaque is 12 by 9.5 mm.

Brass Thimble
(Figure 68*n*)

Sample. 1 nearly whole example.

Description. This specimen is patterned-stamped on the crown, a decorative technique that occurs on many post-1700 thimbles (Noel Hume 1969:256). It is 20.5 mm in length and 16 mm in diameter across the crown. A hole has been drilled into the top of the crown to allow suspension by a leather thong or string. Other examples of thimbles used as tinklers (personal ornaments) have been discovered at the Tomotley site in Tennessee (Baden 1983:186, 208) at the Guebert site in Illinois (Good 1972:135), and at Conestoga town in Pennsylvania (Kent 1984:205).

Iron Axe
(Figure 70)

Sample. 1 blade section.

Description. This iron axe is related to the "straight blade" variety described by Bradley (1987:200). No maker's mark is visible, even after the axe cleaning by electrolysis. The specimen originally broke along the line where the blade meets the socket; only the blade was recovered. This blade is 115 mm long and 65 mm wide at the bit. The poll end is 40 mm wide. These dimensions correspond to those of the small axe type that were manufactured after the mid-seventeenth century by either the Dutch or the Basques (1987:199).

Lead Shot
(Figure 68*i-k*)

Sample. 3 whole examples.

Description. These lead shot range in size from 9.2 to 11.4 mm (.368-.456 caliber). Two of the lead shot have flattened sides, an indication that they were fired. One example shows teeth marks probably obtained when the shot was temporarily held in the mouth while the gun was loaded. One shot still retains a stem remnant from manufacture (Figure 68*k*). This attribute indicates use of a gang mold, a form of manufacture popular until the nineteenth century. Two examples also show patch impressions from cloth (Figure 68*j-k*).

Miscellaneous Iron
(Figure 68*e*)

Sample. 1 fragment.

Description. This piece is 37.9 mm long and 23.3 mm wide. It may represent a portion of a lockplate with pan but is too severely corroded, even after electrolysis, for positive identification.

Sheet Brass
(Figure 68*o-s*)

Sample. 13 fragments.

Description. These fragments, many of which show modification, probably originate from trade kettles. Two pieces have rivets indicating possible use as kettle patches. One thin curved piece has two impressed parallel bands on the convex surface. Another fragment with a pierced hole may have been used as a dangle.

Clay Pipe
(Figure 68*a-d*)

Sample. 38 fragments, including 13 stems and 21 bowls.

Description. All the bowls are made of kaolin. Two bowl fragments can be dated, at least roughly. One is an undecorated rim (Figure 68*b*) with an almost straight profile that is characteristic of the period between 1720 and 1820 (Noel Hume 1969:Figure 97.18). The other (Figure 68*b*) has embossed ridges and a portion of what may be a coat of arms; pipes of this general style seem to have been most common between 1730 and 1820 (Noel Hume 1969:Figure 97.20-21, 97.25; Oswald 1975:91. The remaining bowl fragments are plain and lack distinctive features. Twelve stems are also made of kaolin. Two of these stems are too small to measure, and a third is a mouthpiece. The rest have bore diameters as follows: one stem, 1.6 mm (4/64 in); six stems, 2 mm (5/64); two stems, 2.4 mm (6/64). These diameters yield an estimated date of 1736 using Binford's (1972) formula. One terra cotta fragment was also recovered. This pipe may be of local manufacture. Its bore diameter was 2.8 mm (7/64 in) while the outer diameter was 9.6 mm. The stem is very similar in size and shape to a kaolin pipe stem rather than an aboriginal pipe (Henry 1979; Mitchell 1983).

Gunflint
(Figure 68*l-m*)

Sample. 2 whole examples.

Description. Both gunflints were made of exotic chert with a waxy luster. One is mottled brown-grey while the other is banded grey. These are musket-sized gunflints of the wedge-shaped gunspall, or Clactonian type. Spall-type gunflints are often regarded as Dutch (Hamilton 1968). The larger gunflint is 24.5 mm long, 23.2 mm wide, and 7.5 mm thick. The smaller is 17.3 by 23.3 mm with a thickness of 8.7 mm. The smaller has visible cortex, while the larger has a reworked pitted edge.

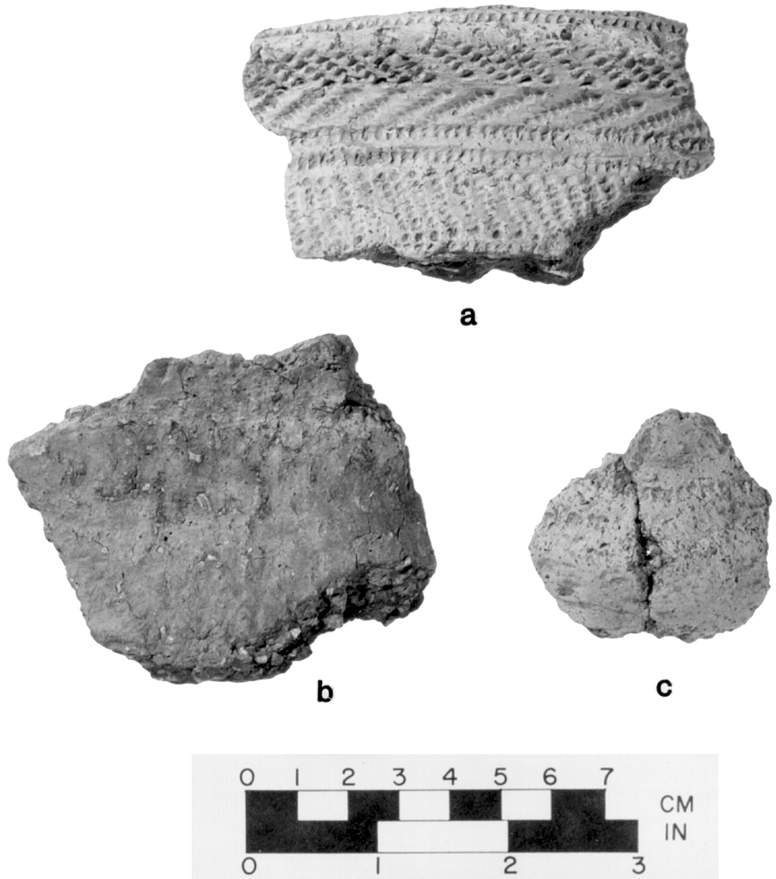


Figure 45. Pottery from Area 1 features: (*a*) Sackett Corded; (*b*) Levanna Rough; (*c*) indeterminate corded. (Proveniences: *a*, Feature 1; *b-c*, Feature 20.)

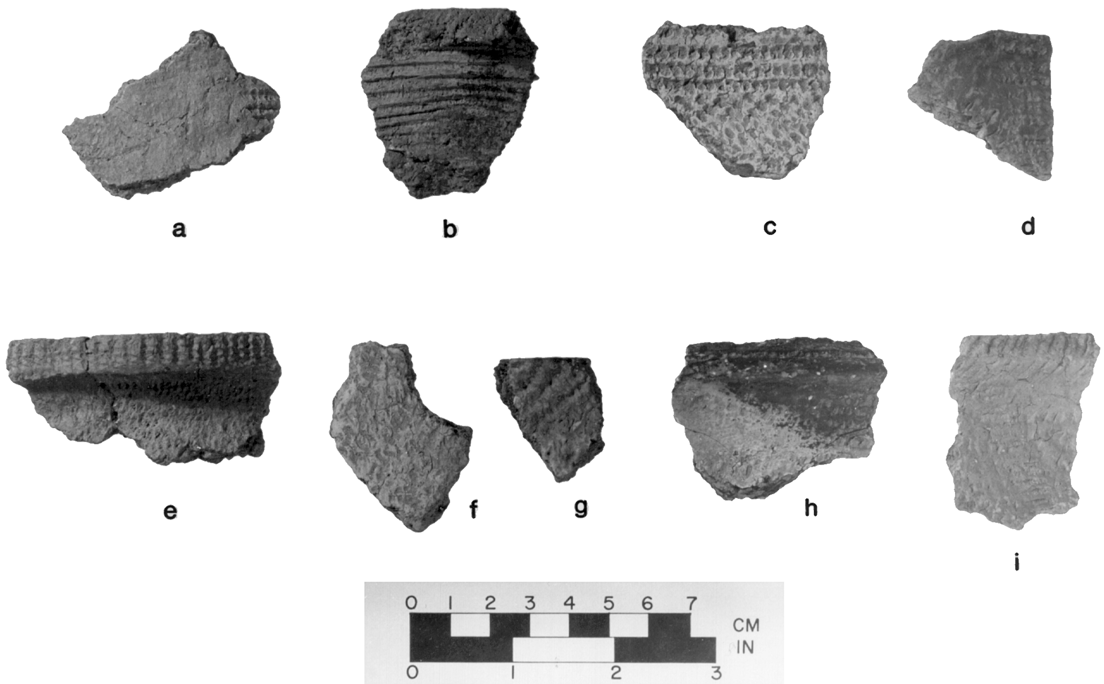


Figure 46. Pottery from Area 3 post molds: (*g*) Levanna Rough; (*a, d-f, h, i*) Carpenter Brook Corded; (*b-c*) Sackett Corded. (Proveniences: *a-d*, palisade; *e-g*, *i*, Structure 1; *h*, N146W22.)

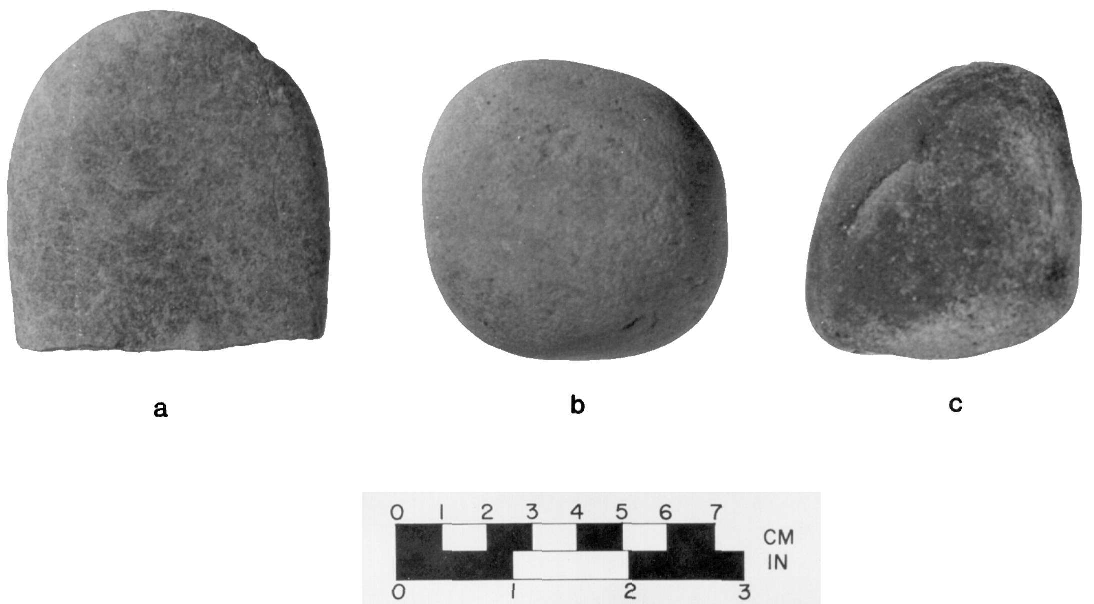


Figure 47. Rough stone tools from Area 3 post molds: (*a*) abrader/anvil; (*b, c*) mano. (Proveniences: *a*, N132W22; *b*, N146W22; *c*, Structure 1.)

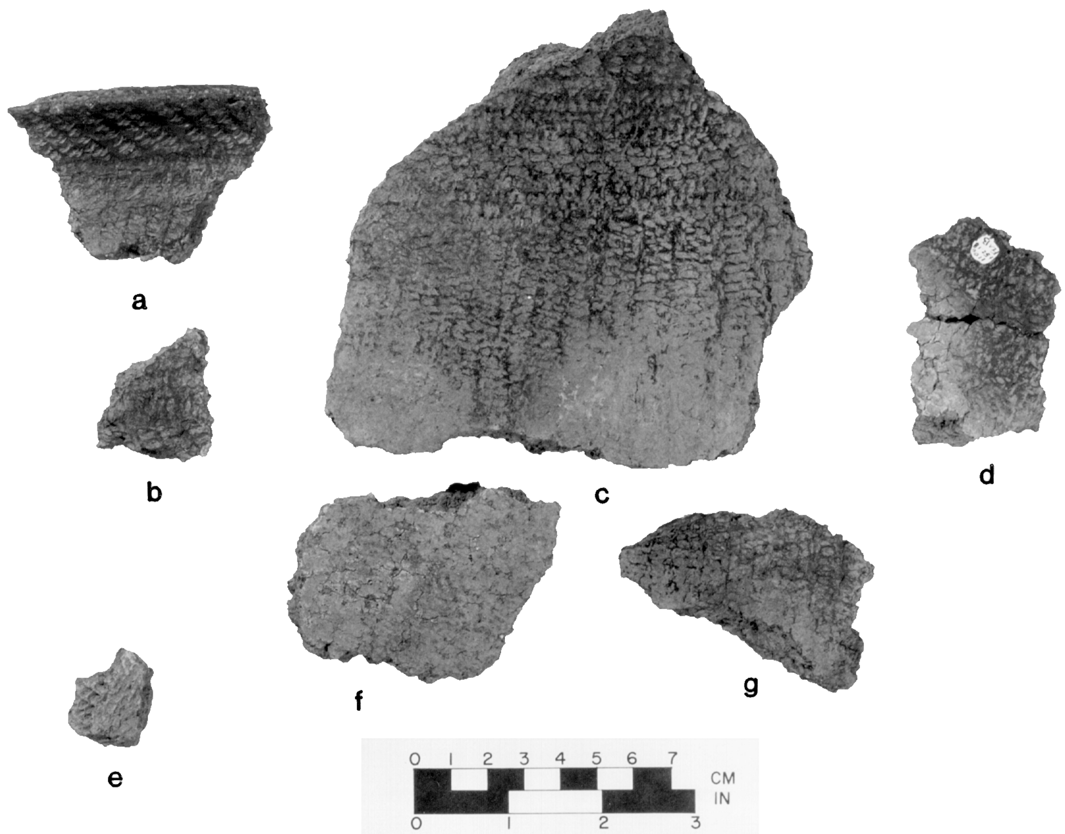


Figure 48. Pottery from palisade post in unit N152W18: (*a-g*) Carpenter Brook Corded, (*c*) yielded a thermoluminescence date of AD 1033 ± 73.

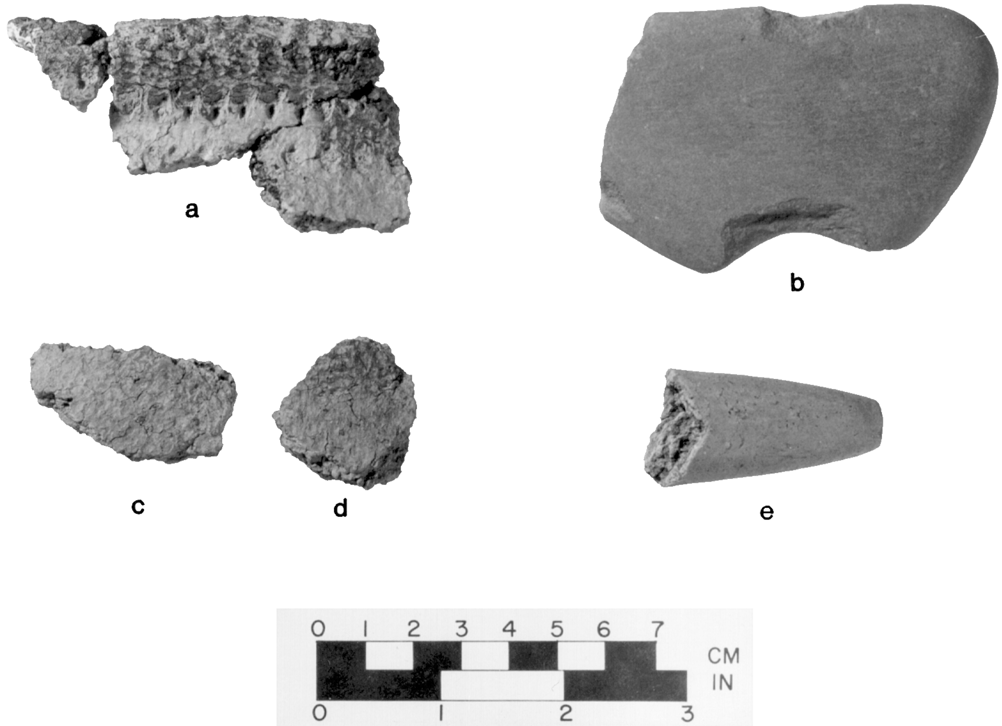


Figure 49. Artifacts from Feature 52, inside Structure 1: (*a, c-d*) Carpenter Brook Corded; (*b*) netsinker; (*e*) indeterminate pipe stem.

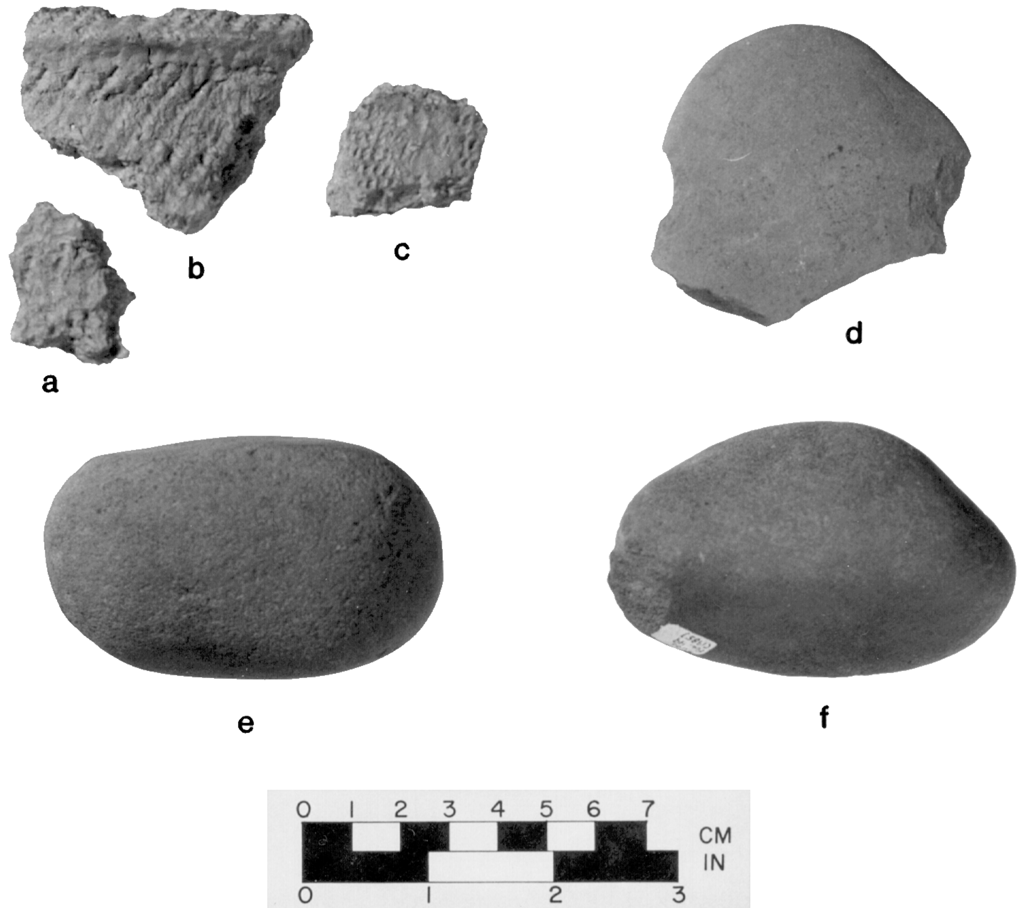


Figure 50. Artifacts from Feature 49: (*a-c*) Carpenter Brook Corded; (*d*) netsinker; (*e*) abrader; (*f*) abrader/hammerstone.

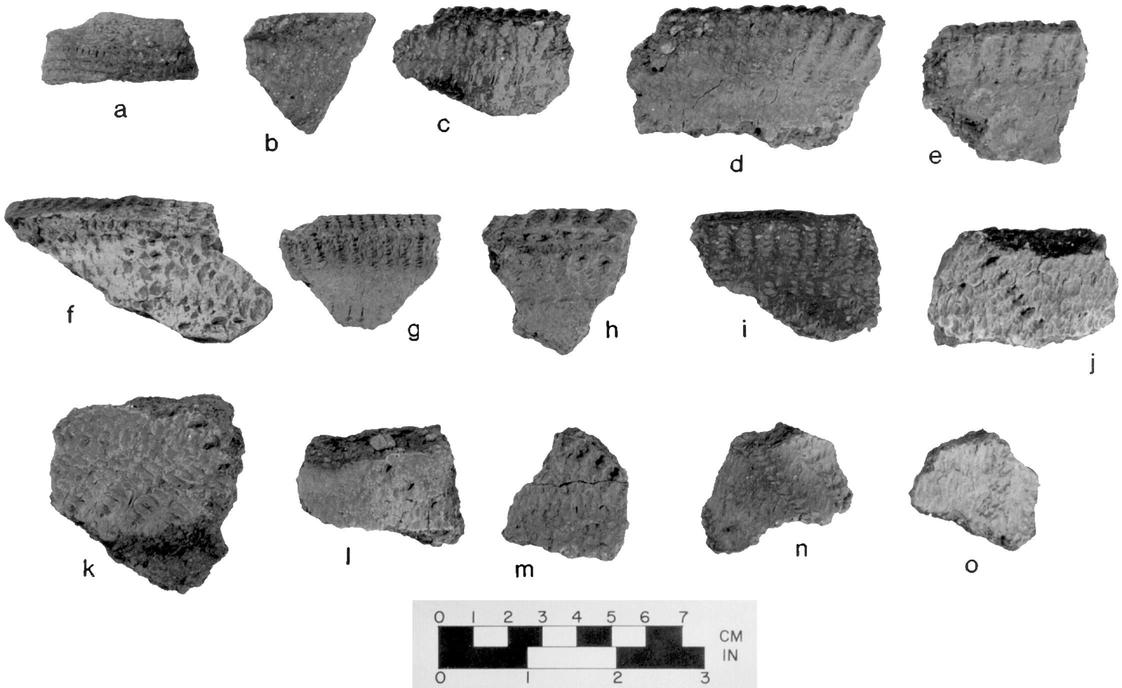


Figure 51. Point Peninsula Rocker-Stamped and Carpenter Brook Corded pottery: (*a*) Point Peninsula Rocker-Stamped; (*b-o*) Carpenter Brook Corded. (Proveniences: *a*, Area 3 mechanical stripping; *b*, N132W16 organic; *c*, N138W28, plow zone; *d*, N148W18 organic; *e*, N136W14 organic; *f*, Test Unit 4 organic; *g*, N150W24 mixed organic and plow zone; *h*, N144W26 organic; *i*, N146W22 organic; *j*, Area 3 mechanical stripping; *k*, N150W16 organic; *l*, N148W24 organic; *m*, N148W18 organic; *n*, N146W14 organic; *o*, N152W20 plow zone.)

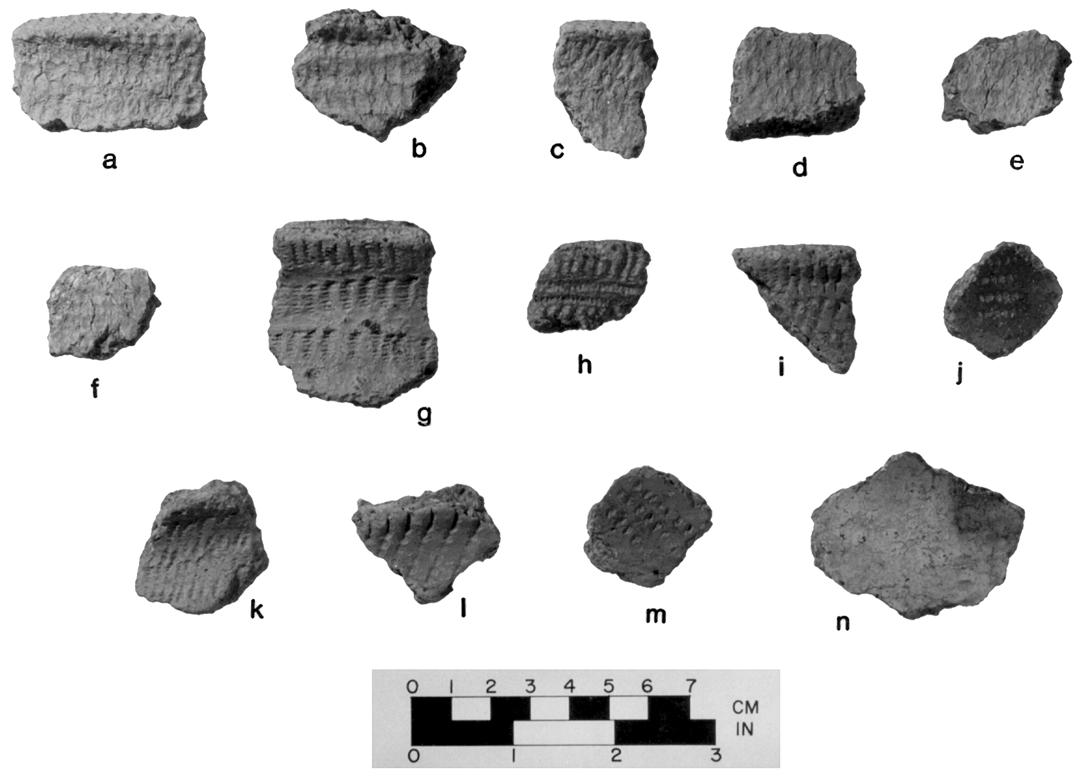


Figure 52. Levanna Rough and Sackett Corded pottery: (*a-f*) Levanna Rough; (*g-n*) Sackett Corded. (Proveniences: *a*, general surface collection; *b*, N162W26 organic; *c*, N148W30 plow zone; *d*, N138W18 organic; *e*, N150W18 mixed organic and plow zone; *f*, N152W24 organic; *g*, N148W24 organic; *h*, N156W30, plow zone; *i*, N134W14 plow zone; *j*, N134W14 organic; *k*, N164W22 plow zone; *l*, N142W28, plow zone; *m*, N170W28 plow zone; *n*, N142W32 plow zone.)

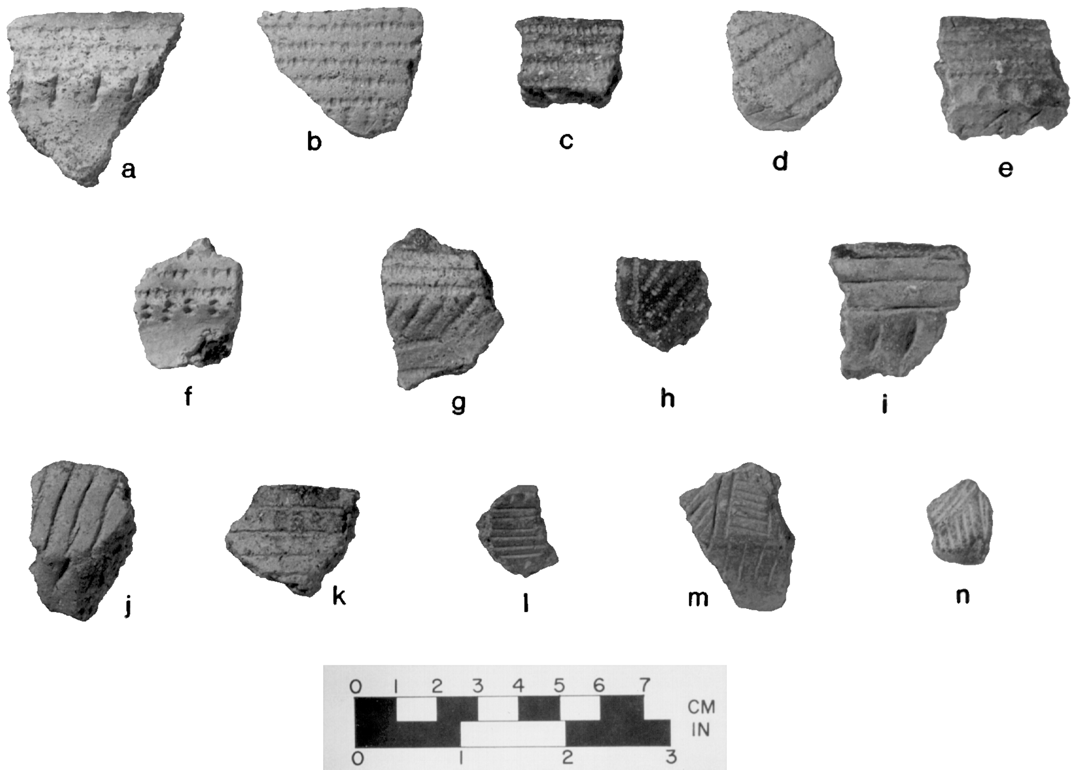


Figure 53. Collared and incised pottery: (*a-c, e-g*) Kelso Corded; (*d, h*) Oak Hill Corded; (*i-n*) indeterminate incised. (Proveniences: a, controlled surface collection; b, N144W14 organic; c, N170W26 plow zone; d, N152W16 plow zone; e, N164W34 plow zone; f, N130W12 organic; g, N152W20 plow zone; h, N168W26 plow zone; i, N158W28 plow zone; j, N158W32 mixed organic and plow zone; k, N164W34 plow zone; l, N162W29 plow zone; m, N154W14 organic; n, N168W28 plow zone.)

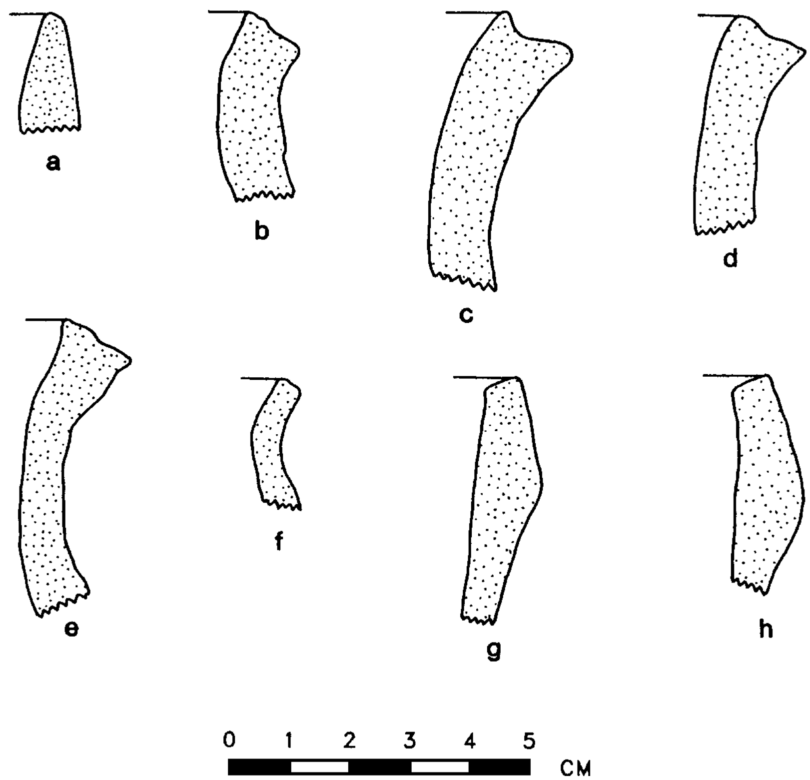


Figure 54. Pottery rim profiles: (*a*) Point Peninsula Rocker-Stamped; (*b*) Levanna Rough; (*c*) Carpenter Brook Corded; (*d*-*e*) Sackett Corded; (*f*) Castle Creek Incised; (*g*) Kelso Corded; (*h*) Oak Hill Corded. (Proveniences: *a*, Area 3 mechanical stripping; (*b*) general surface collection; (*c*) N152W18 post mold B; (*d*) N146W22 post mold I; (*e*) Feature 1; (*f*) Area 1 general surface collection; (*g*) Area 3 general surface collection; (*h*) N158W32 mixed organic and plow zone.)

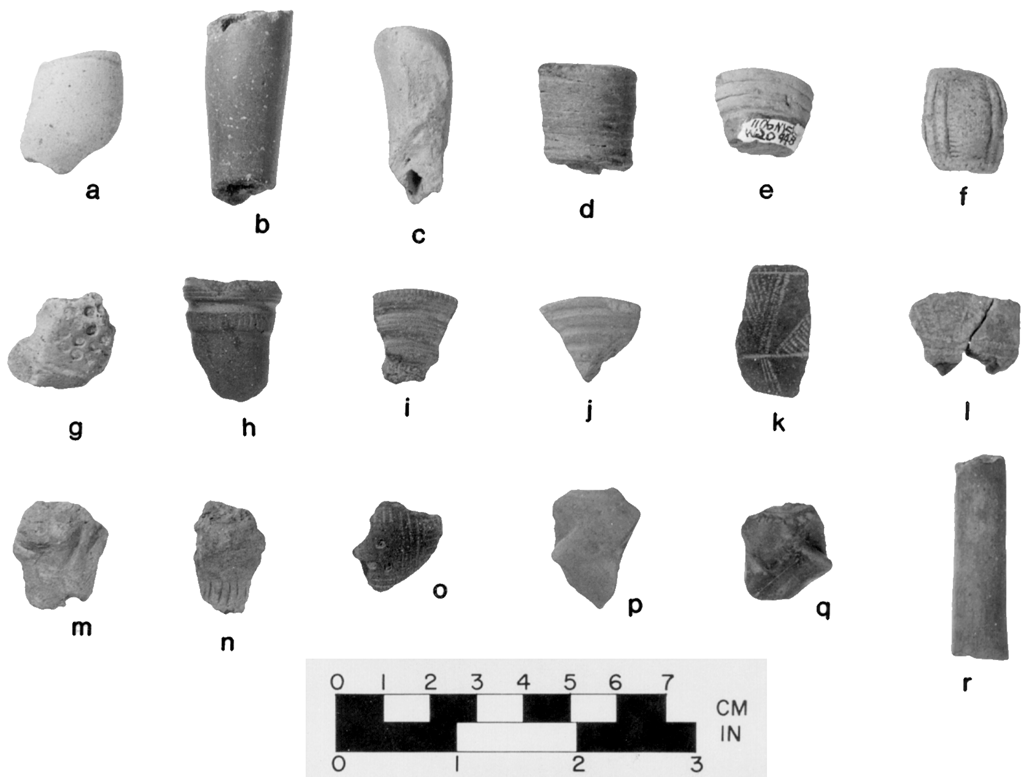


Figure 55. Prehistoric pipe fragments: (*a, d-e*) indeterminate incised bowl; (*b-c*) indeterminate incised bowl; (*f*) Willow Point; (*g*) indeterminate punctated bowl; (*h-j*) ringed trumpet; (*k-l*) indeterminate pointillé; (*m-q*) indeterminate effigy; (*r*) indeterminate stem. (Proveniences: *a*, N170W26 plow zone; *b*, N164W36 mixed organic and plow zone; *c*, N150W20 plow zone; *d*, N152W32 mixed organic and plow zone; *e*, N156W20 plow zone; *f*, N136W22 plow zone; *g*, controlled surface collection; *h*, N150W24 mixed organic and plow zone; *i*, N142W28 plow zone; *j*, N136W24 plow zone; *k*, N136W18 organic; *l*, N154W12 plow zone; *m*, N152W24 plow zone; *n*, N152W18 organic; *o*, N148W20 plow zone; *p*, N158W30 plow zone; *q*, N158W32 plow zone; *r*, N144W14 mixed organic and plow zone.)

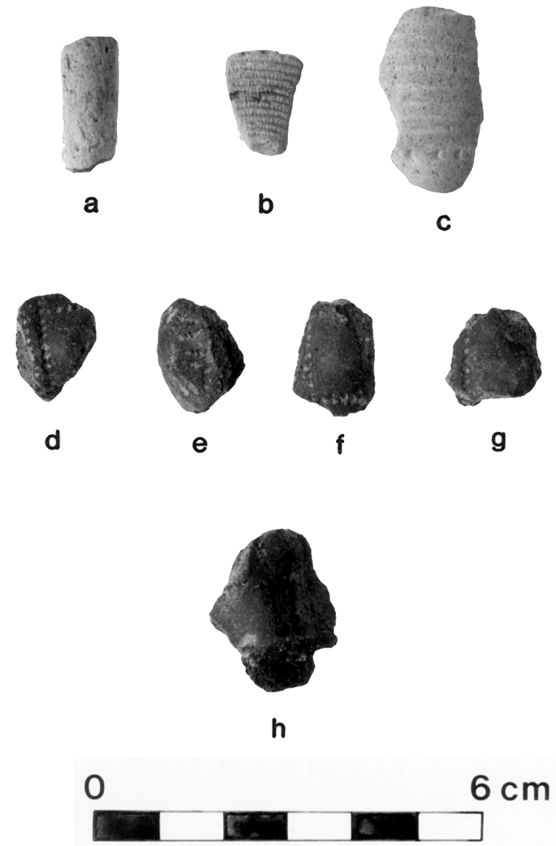


Figure 56. Prehistoric pipe fragments: (*a*): indeterminate stem; (*b*) indeterminate pointillé; (*c*) rimless ring trumpet; (*d-h*) corn effigy. (Proveniences: *a*, controlled surface collection; *b*, N162W23 plow zone; *c*, controlled surface collection; *d-h*, Area 1 postmold.)

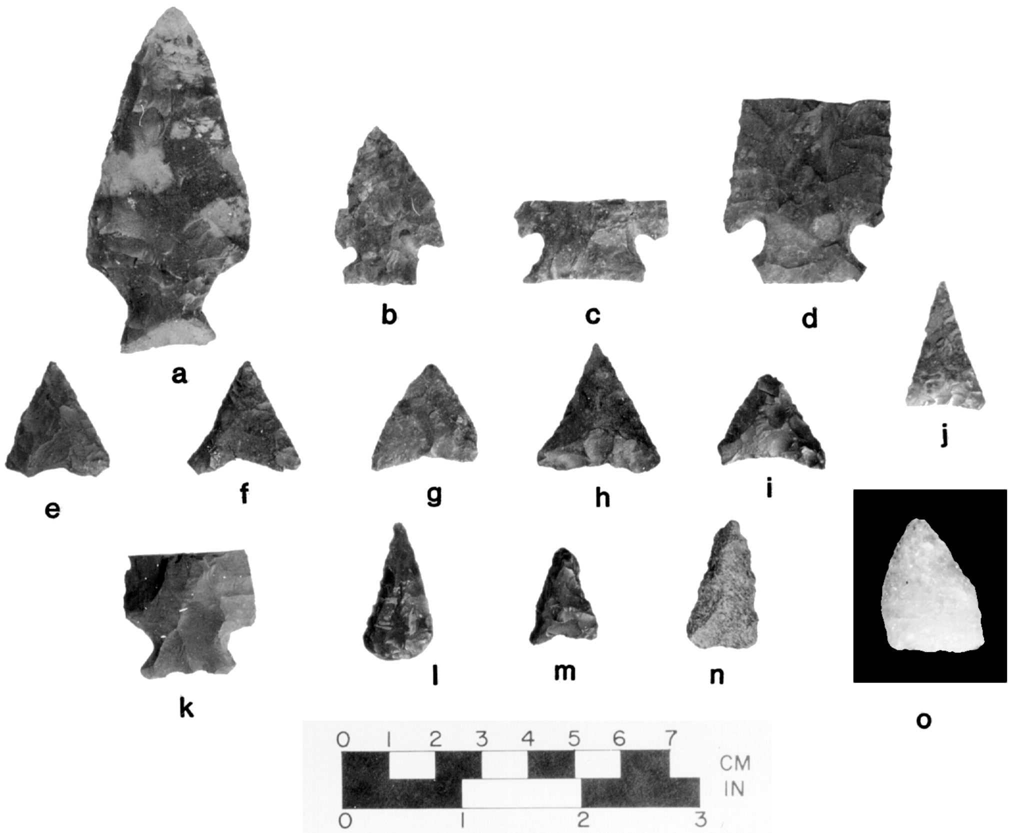


Figure 57. Flaked stone points and drills: (*a*) Susquehanna Broad; (*b-d, k*) Jack's Reef Corner Notched; (*e-i*) Levanna; (*j*) Madison; (*l-m*) drills made from Levanna points; (*n*) ryholite unclassified point; (*o*) quartz unclassified point. (Proveniences: *a*, general surface collection; *b*, N158W26 mixed organic and plow zone; *c*, N170W20 plow zone; *d*, N162W28 plow zone; *e*, N148W16 organic; *f*, N148W28 post mold; *g*, N132W22 plow zone; *h*, general surface collection; *i*, N158W26 mixed organic and plow zone; *j*, controlled surface collection; *k*, general surface collection; *l*, N136W16 organic; *m*, N150W30 organic; *n*, N150W24 mixed organic and plow zone; *o*, N154W22 organic.)

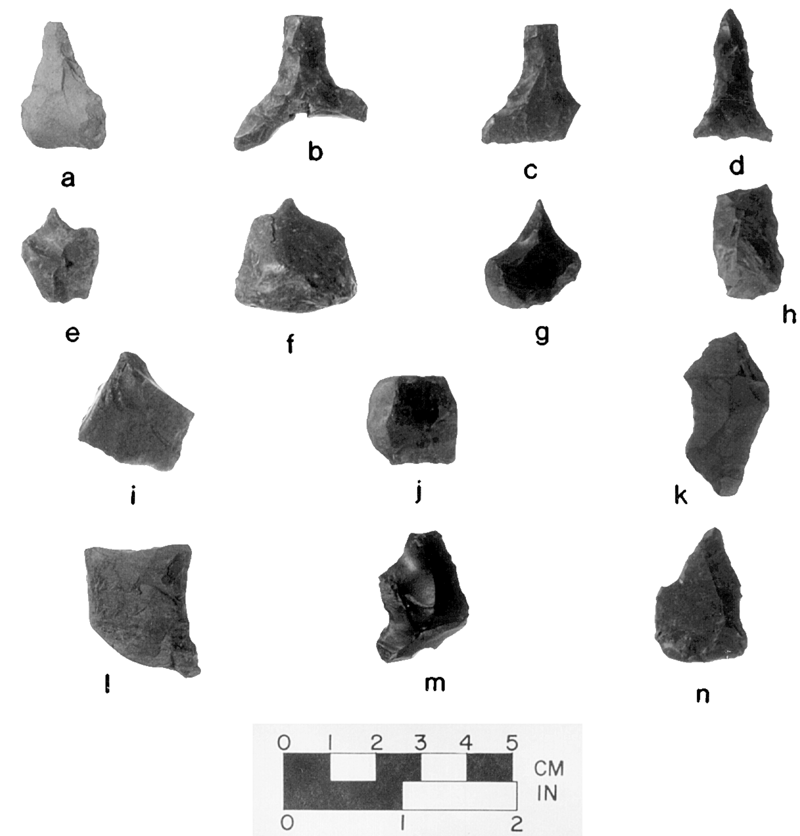


Figure 58. Flaked stone tools: (*a-d*) drills; (*e-h*) gravers; (*i-j, m*) scrapers; (*k-l, n*) retouched flakes. (Proveniences: *a*, N154W32 organic; *b*, N144W26 organic; *c*, N146W26 organic; *d*, N130W20 mixed organic and plow zone; *e*, N164W25 organic; *f*, N170W28 plow zone; *g*, N154W20 organic; *h*, N164W28 plow zone; *i*, Area 3 mechanical stripping; *j*, N150W32 plow zone; *k*, N146W14 organic; *l*, N144W30 plow zone; *m*, N168W23 plow zone; *n*, general surface collection.)

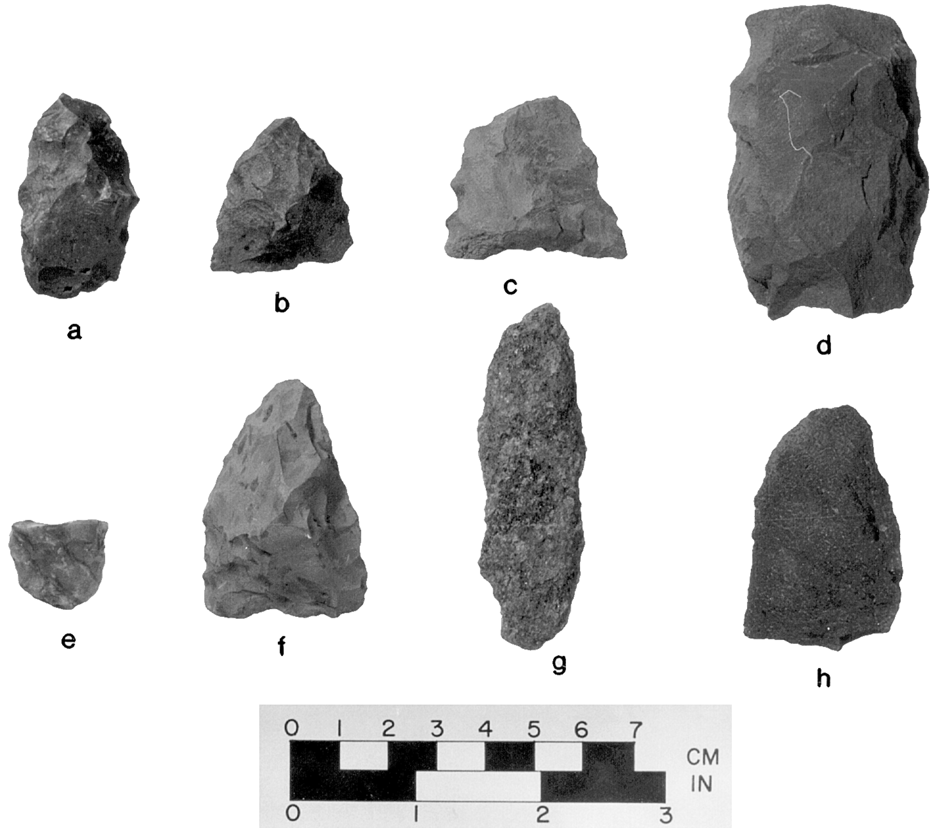


Figure 59. Indeterminate and unclassfied bifaces, Levanna and indeterminate points: (*a*) indeterminate biface; (*b*-*c*) Levanna point preforms; (*d, f-h*) unclassified bifaces of unknown materials; (*e*) indeterminate rhyolite point. (Proveniences: *a*, N150W22 plow zone; *b*, general surface collection; *c*, N132W16 organic; *d*, N134W22 plow zone; *e*, N150W26 mixed organic and plow zone; *f*, N144W14, mixed organic and plow zone; *g*, N152W26 plow zone; *h*, N168W25 plow zone.)

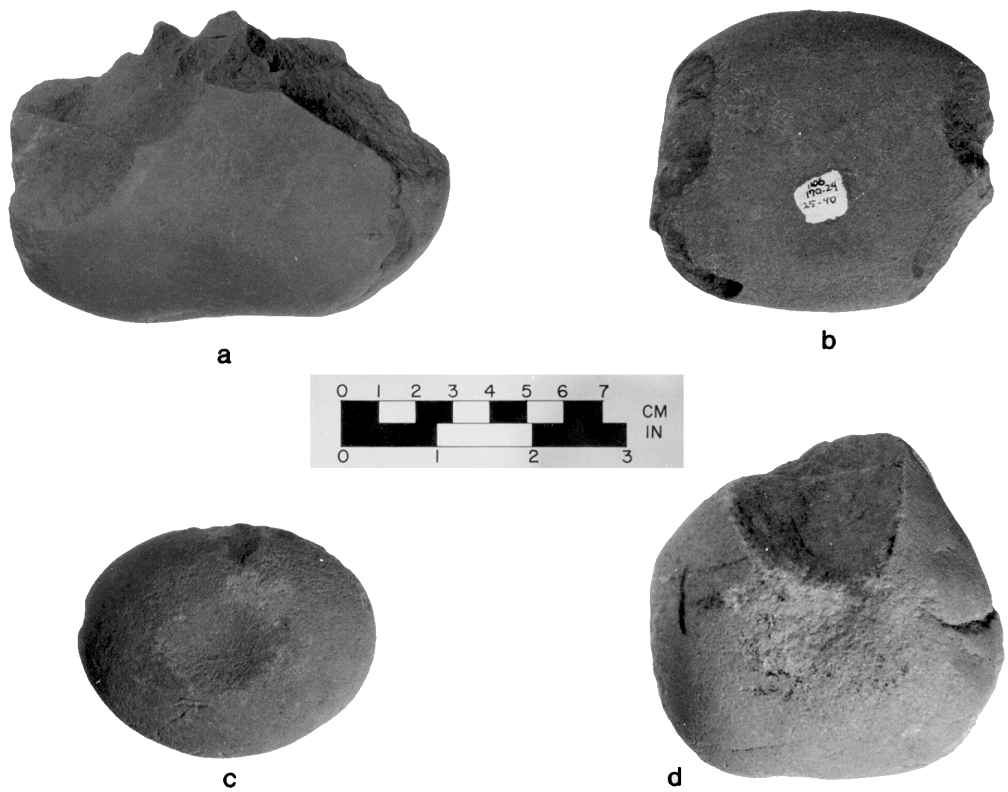


Figure 60. Choppers, anvils, and hammerstones: (*a*) chopper/anvil; (*b*) hammerstone/anvil; (*c-d*) bipitted hammerstones. (Proveniences: *a*, N150W26 organic; *b*, N170W24 organic; *c*, N160W28 plow zone; *d*, Area 3 mechanical stripping.)

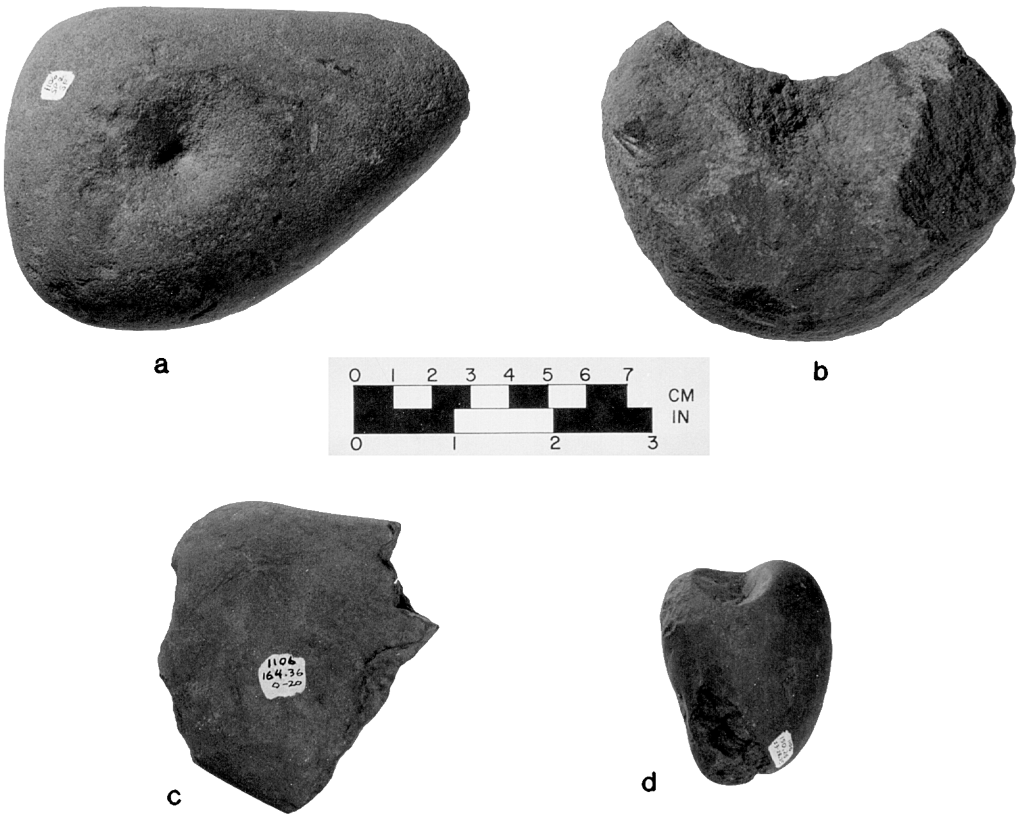


Figure 61. Abraders, anvils, and hammerstones: (*a*) anvil; (*b*) anvil/hammerstone; (*c*) abrader/hammerstone; (*d*) hammerstone. (Proveniences: *a*, controlled surface collection; *b*, N134W28 plow zone; *c*, N164W36 plow zone; *d*, N150W26 organic.)

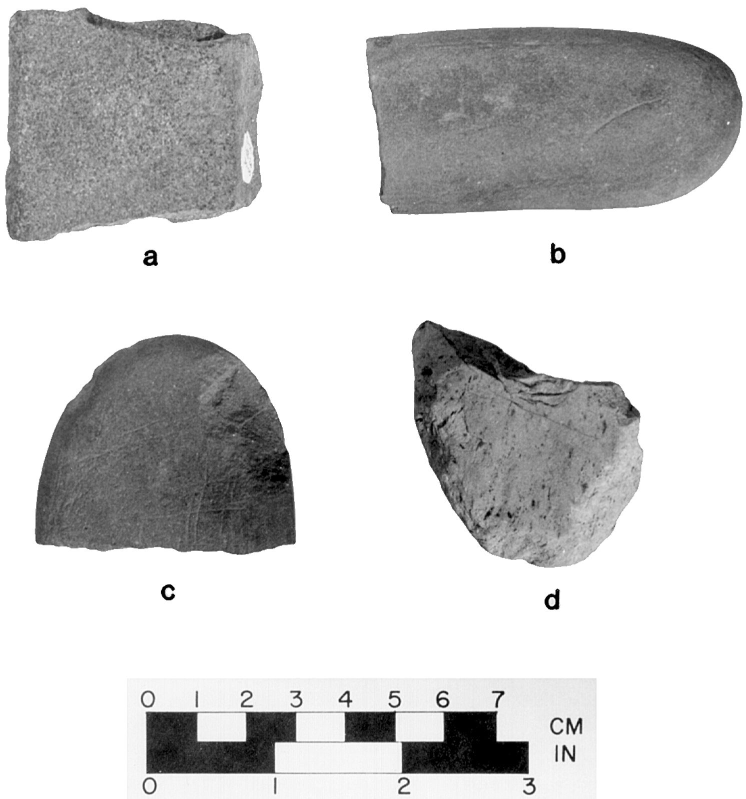


Figure 62. Abrader/hammerstones. (Proveniences: *a*, N168W26 organic; *b*, N166W27 plow zone; *c*, N164W25 plow zone; *d*, N132W24 plow zone.)

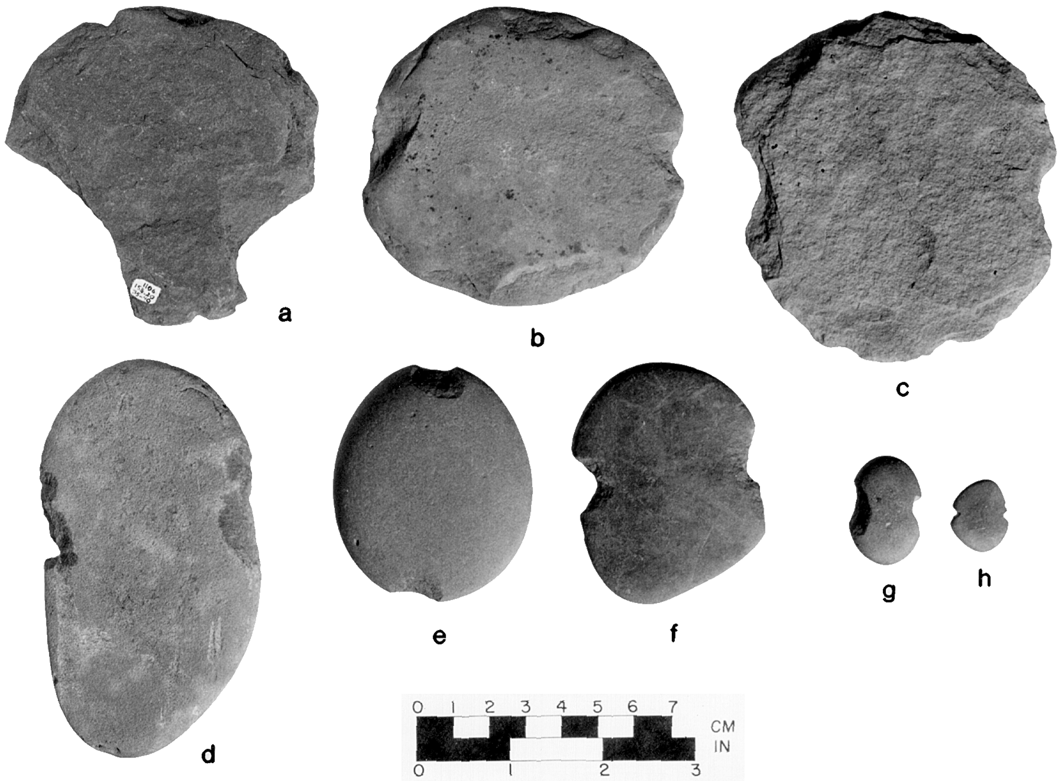


Figure 63. Discs and netsinkers: (*a-c*) discs; (*d-h*) netsinkers. (Proveniences: *a*, N158W20 organic; *b*, general surface collection; *c*, N136W20 organic; *d*, N162W25 plow zone; *e-f*, controlled surface collection; *g*, N130W26 plow zone; *h*, N150W32, mixed organic and plow zone.)

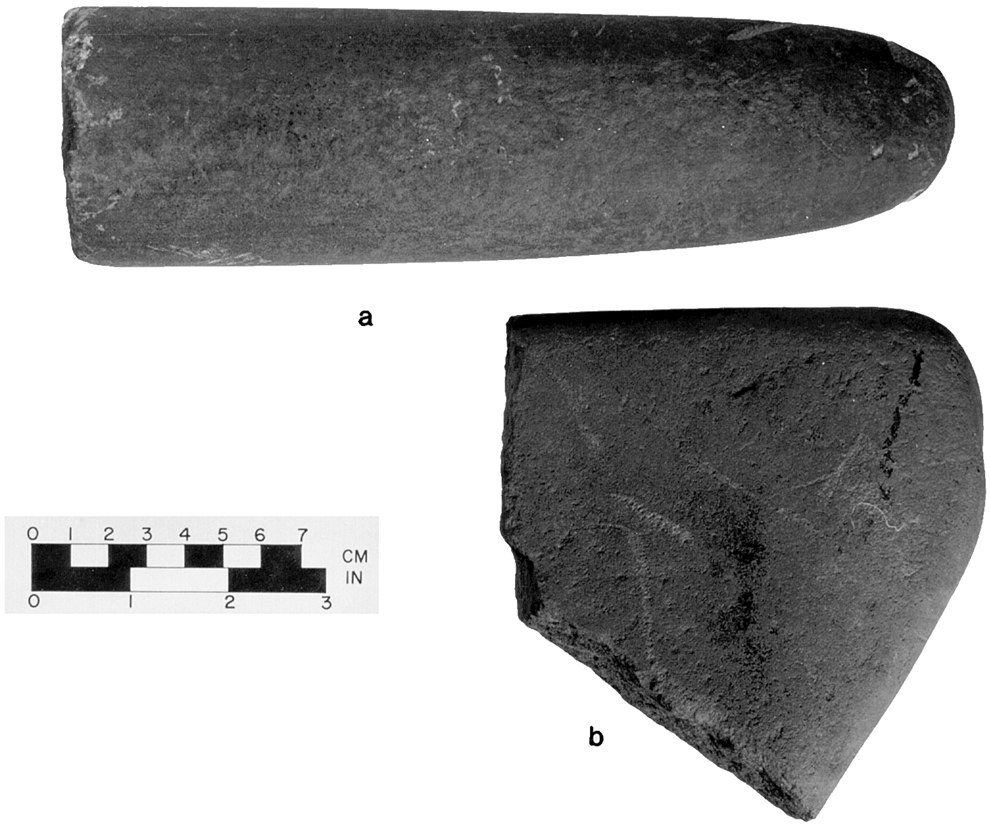


Figure 64. Pestle and mortar: (*a*) pestle; (*b*) mortar. (Provenience: *a*, Area 3 mechanical stripping; *b*, N146W30 plow zone.)

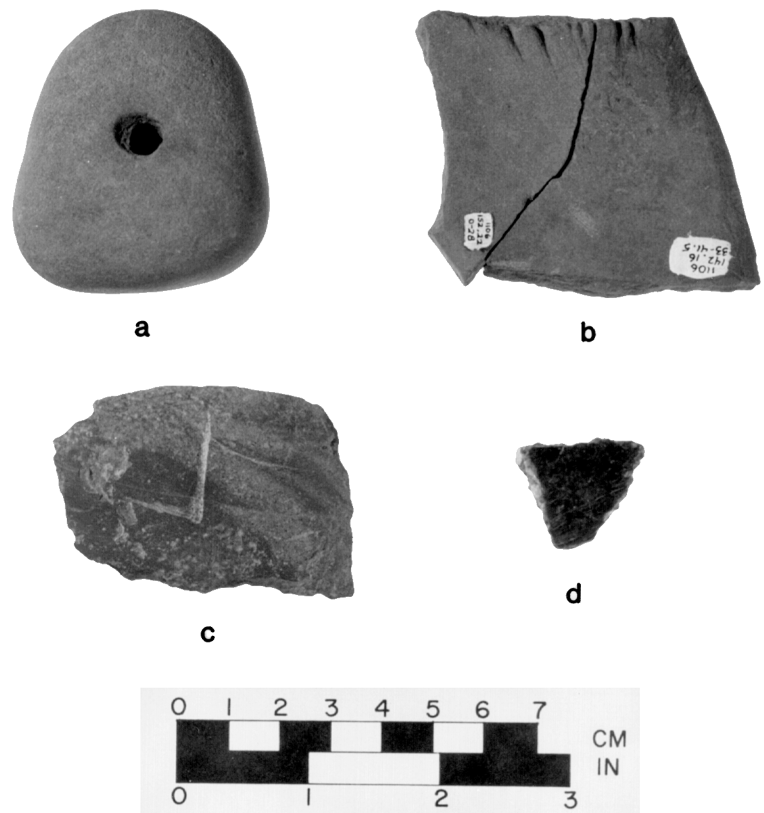


Figure 65. Abraded and polished artifacts: (*a*) drilled stone; (*b*) grooved abrader in two pieces; (*c*) celt or adze fragment; (*d*) platform pipe fragment. (Proveniences: *a*, N162W29 plow zone; *b*, N152W22 plow zone and N142W16 organic; *c*, Area 3 mechanical stripping; *d*, N154W20 organic.)

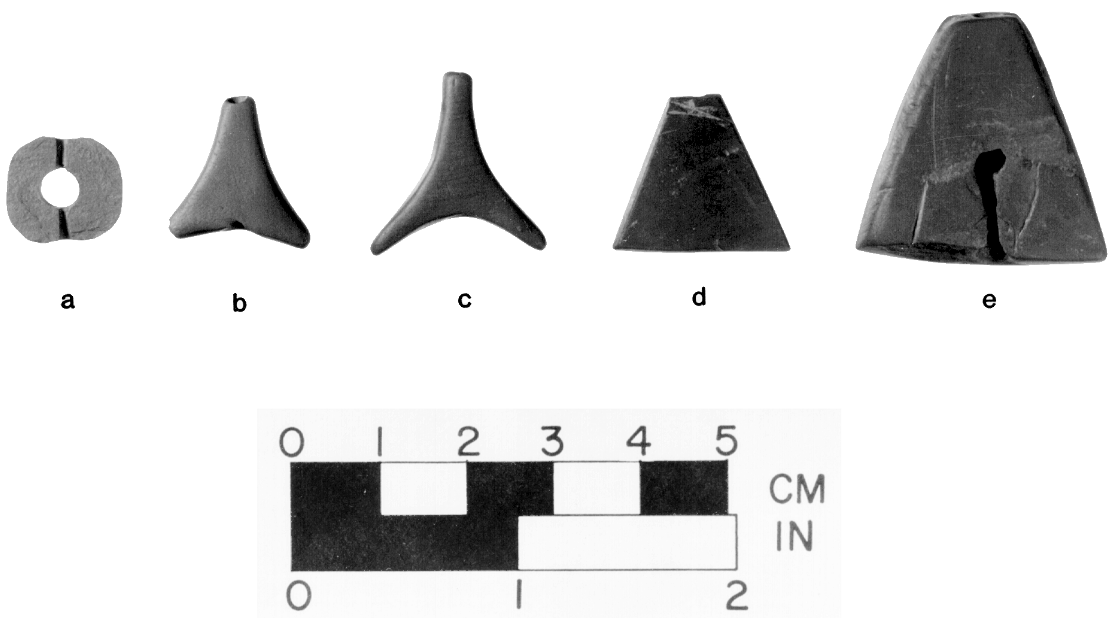


Figure 66. Red slate beads. (Proveniences: *a*, N138W22 plow zone; *b*, N152W16 plow zone; *c*, N162W25 plow zone; *d*, N170W24 mixed organic and plow zone; *e*, N136W22 plow zone.)

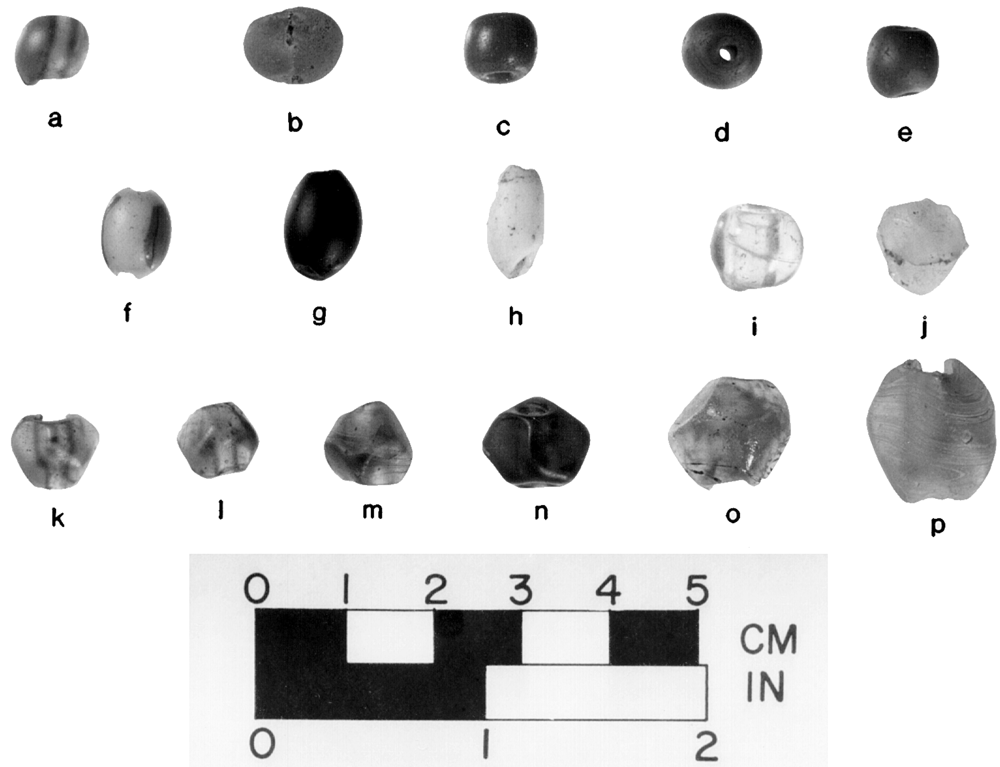


Figure 67. Glass beads: (*a*) IIa55; (*b-c*) IIa40; (*d-e*) IIa1; (*f*) IIbb13; (*g*) IIa8; (*h*); IIa15 (*i*); WIb1; (*j*) WIIc3; (*k-n*) WIIc12, *k* and *l* from same bead; (*o-p*) WIIc5. (Proveniences: *a*, N170W20 plow zone; *b*, N160W26 plow zone; *c*, N170W28 plow zone; *d*, Area 3 general surface; *e*, N164W20 plow zone; *f*, N170W22 plow zone; *g*, Area 3 surface; *h*, controlled surface collection; *i*, N162W26 plow zone; *j*, N152W32 mixed organic and plow zone; *k*, N154W28 plow zone; *l*, N170W20 plow zone; *m*, N158W22 plow zone; *n*, Area 3 surface; *o*, N156W32 plow zone; *p*, N170W22 plow zone.)

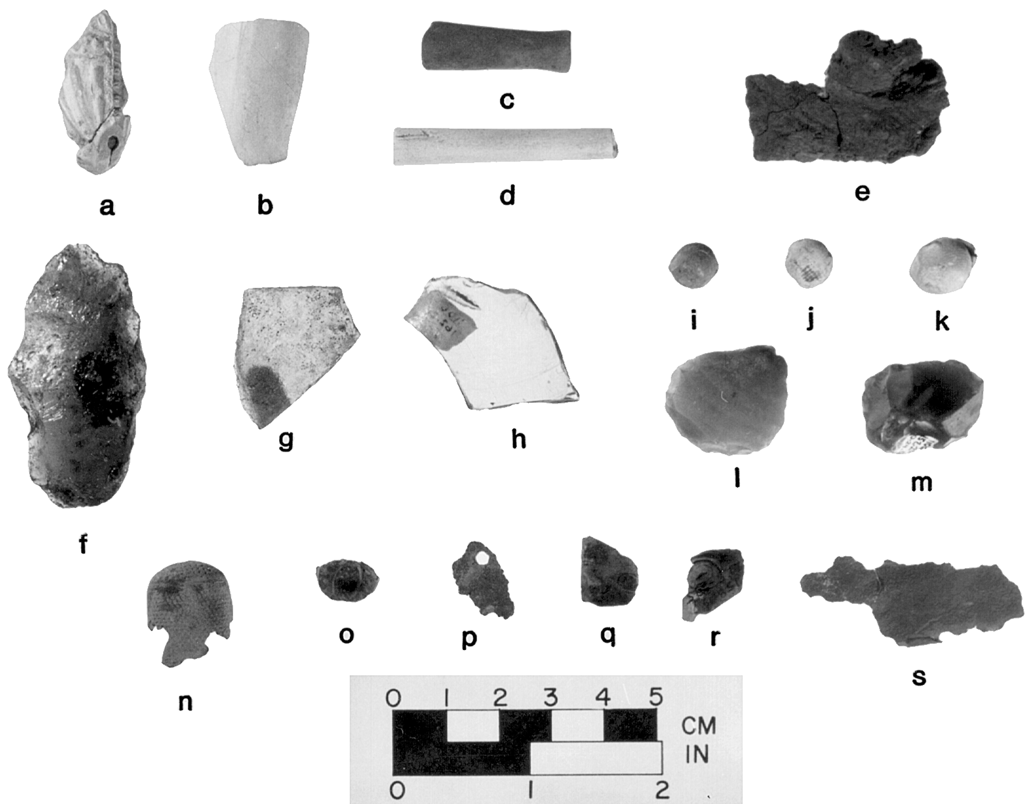


Figure 68. Historic artifacts: (*a-b*) clay (kaolin) pipe bowls; (*c*) clay (terra cotta) pipestem; (*d*) clay (kaolin) pipe stem; (*e*) miscellaneous iron, possible lockplate; (*f*) bifacially flaked glass-bottle sherd; (*g-h*) glass-bottle sherds; (*i-k*) lead shot; (*l-m*) gunflint; (*n*) brass thimble; (*o*) brass ring; (*p-s*) sheet brass. (Proveniences: *a*, N168W25 plow zone; *b*, N170W20 plow zone; *c*, N150W30 plow zone; *d*, N148W22 plow zone; *e*, N168W20 plow zone; *f*, N164W20 plow zone; *g*, N164W32 plow zone; *h*, N164W36 plow zone; *i*, N148W28 plow zone; *j*, N128W14 mixed organic and plow zone; *k*, N150W26 plow zone; *l*, controlled surface collection; *m*, N152W26 plow zone; *n*, N168W28 plow zone; *o*, N162W26 plow zone; *p*, N152W18 plow zone; *q-s*, N158W30 mixed organic and plow zone.

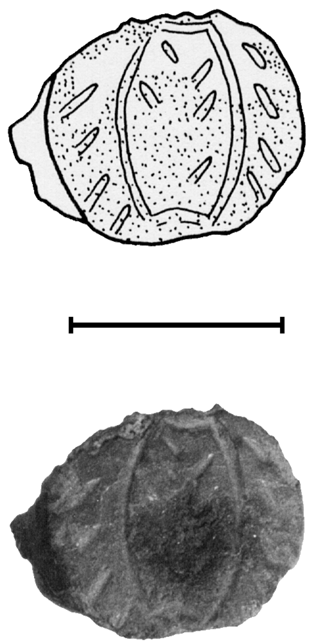


Figure 69. Brass ring. Stippling denotes eroded areas in which the design is indistinct. Scale bar equals 1 cm. (Provenience: N162W26 plow zone.)

Figure 70. Iron axe. (Provenience: Area 3 general surface collection.)

CHAPTER 4

CHRONOLOGY

The late prehistoric chronology in central New York is based primarily on a seriation of ceramic types developed by Ritchie and MacNeish (1949) and later expanded by MacNeish (1952). The Late Woodland stage is divided into two "traditions" or periods: Owasco (AD 1000-1300) and Iroquois (AD 1300-1550). The former is defined by the presence of flat-lipped vessels that have been surface treated by paddling with a cord-wrapped or square-toothed implement, and that have corded or incised decorations on the neck. Levanna points predominate during most of the Owasco period and are replaced toward the end of the periods by Madison points.

The initial Owasco phase, known as Carpenter Brook (AD 1000-1100), is recognized by the appearance of pottery types such as Levanna Rough and Carpenter Brook Corded. The second Owasco phase, known as Canandaigua (AD 1100-1200), is defined by several types, particularly Sackett Corded; Kelso Corded occurs in minor amounts. The third and final Owasco phase is known as Castle Creek (AD 1200-1300). This phase is defined by many types; incising on necks, checked-stamped or cord-roughened bodies, and a higher percentage of corded-collared vessels are typical attributes of pottery from Castle Creek sites. Castle Creek Incised and Kelso Corded pottery are two common types of this phase.

The Iroquois period is defined, in general, by the presence of pottery with plain or smoothed surfaces, and collars with incised decorations, although the earliest phase of this tradition, known as Oak Hill, is usually identified by the presence of corded collar vessels (the Oak Hill Corded type). Subsequent phases, such as Chance and Garoga of the Mohawk drainage, have incised vessels.

The Historic period begins around AD 1550 and ends about 1800. The starting date is based on the appearance of European trade goods on archaeological sites. Glass beads, clay pipes, and metal ornaments are among the best chronological indicators. Artifacts made of European materials are assumed to have gradually replaced those of native manufacture throughout this period. Native-made pottery, for example, becomes increasingly rare after 1650 and disappears by 1700 (Bradley 1987:121; Tuck 1971:171-195).

Local phases for the Iroquois and Historic periods have not yet been defined along the upper Susquehanna and its tributaries south of Oneonta. Contrary to what has often been assumed, the temporal and spatial distribution of pottery types was not uniform across all of central New York. For example, several pottery types found at the Castle Creek site that were thought to be diagnostic of the late Owasco period everywhere now appear to have only limited geographical distribution outside of the Upper Susquehanna and Mohawk region. Moreover, the incised-collar types normally associated with the Iroquois period are very rare in this portion of the Susquehanna drainage. This observation had led most archaeologists to assume that Iroquois sites are rare or absent. Although unlikely, the possibility exists that earlier pottery types were used in this region throughout the Iroquois period resulting in the classification of these sites as pre-Iroquois.

To determine chronology of the various occupations at Boland we used a combination of absolute and relative dating methods. The radiocarbon and thermoluminescence dates are presented first, followed by a discussion of the diagnostic ceramics and stratigraphy in relation to these dates.

RADIOCARBON DATES

In Area 1, we discovered only one feature (Feature 30) with sufficient carbonized remains for radiocarbon dating. We assumed, based on similar orientation, that this elongated feature was contemporary with a nearby wall of posts. The sample of wood charcoal had a radiocarbon age of 1880 ± 60 years: AD 70 (Beta-24509), placing the feature in the Canoe Point phase of the Middle Woodland. This date is probably wrong given the lack of Canoe Point diagnostics from Area 1. Artifacts in other nearby features and in test units dug in Area 1 were exclusively of the Owasco period.

Table 2. Walterbolk's (1983) Criteria for Evaluating Radiocarbon Dates.

Certainty of Association	Context	Example
Full certainty	The archaeological object itself furnished the sample.	Tree-trunk canoe, post of house, wagon wheel.
High probability	Direct functional relationship between sample and archaeological finds.	Charcoal in urn, carbonized grain in rubbish pit, hearth in house.
Probability	No demonstrable functional relationship, but quantity suggests one.	Charcoal concentration in rubbish pit.
Reasonable possibility	Similar to above, but fragments are small and scattered.	Particles of charcoal in a grave, "dark earth."

In Area 3, two features and two post molds with sufficient carbonized material were selected for dating. The samples we submitted fell into three groups, according to Waterbolk's (1983) criteria for evaluating dates (Table 2). One sample (Feature 52) corresponded to Waterbolk's "probability" group based on the large amount of wood charcoal present and its location within Structure 1. This feature also contained Carpenter Brook Corded pottery; hence we anticipated an early Owasco date. The radiocarbon age of 940 ± 80 years: AD 1010 (Beta-21533) fulfilled this expectation.

A second sample fell into Walterbolk's "high probability" group. It was taken from Feature 43 which we assumed, based on stratigraphic position, belonged to the Historic occupation. The sample was composed of maize; radiocarbon age, corrected for isotopic fractionation, was 170 ± 70 years: AD 1780 (Beta-24512) which agreed well with the estimated mid-eighteenth century date of the artifacts found in the plow zone in this vicinity.

The third set of samples fell into Waterbolk's "reasonable possibility" category. The two samples from this category derive from wood charcoal extracted from post molds associated with Structure 1. A good sample from this context would date the actual archaeological object, that is, the post of the longhouse, for which chronological information was desired and thus would be in the "full certainty" group. Unfortunately, the amount of charcoal removed from both post molds was quite small and furnished no data (shape, or orientation, for example) directly associating the wood charcoal with the posts. This condition lowered the probability that the samples were indeed related to the longhouse. The sample from the wall post mold yielded a date of 1270 ± 90 years: AD 680 (Beta-24510). Wood charcoal from one of the large interior post molds was dated to 180 ± 50 years: AD 1770 (Beta-24511). These dates which were assumed to come from carbonized post remains of the same structure do not agree. One appears to place Structure 1 in the terminal Point Peninsula phase, while the other date is historic. Neither date agrees with that obtained from Feature 52, or with the thermoluminescence date from pottery from a palisade post mold. Neither date agrees with the component age estimated from the diagnostic artifacts uncovered in post molds associated with the structure, or with artifacts found in the organic midden associated with the palisaded village. It is entirely possible that the charcoal submitted from both samples was not associated with the posts. Apart from the small size of the samples, another factor that may have affected the accuracy of these dates is admixture with foreign organic material. Both features are located immediately below the plow zone within the root zone. Each may have had foreign charcoal added to post mold contents.

Calibrated ages were calculated for the Boland samples with a program created by the University of Washington Quaternary Isotope Lab (Stuiver 1983). Table 3 presents the calibrated ages along with age ranges obtained from intercepts. These calibrations are based on 10- and 20-year tree-ring estimates, that is, radiocarbon ages on 10 or 20 adjacent tree rings are averaged for each calibrated age. Radiocarbon samples may be composed of twigs representing yearly growth or portions of 200-year old trees; the portion and combination of wood composing the sample will affect the date since atmospheric C-14 can vary yearly. For calibrating dates from wood samples whose "lifespans" could not be (or were not) determined, we used the more conservative 20-year curve. Maize, on the other hand, represents yearly growth and so the 10-year calibration curve was deemed more appropriate.

The calibrated age for Feature 30 in Area 1 is slightly later than the uncalibrated age, but it still does not correspond to the diagnostic Owasco artifacts found in features and post molds. The four calibrated dates for the radiocarbon sample taken from Feature 43 in Area 3 attest to the difficulty of dating material produced during the last 200 years due to increased variation in atmospheric C-14. These calibrated dates, however, still indicate that Feature 43, found above the soil layer associated with the palisaded village, derived

Table 3. Calibrated Radiocarbon Dates.

Area: Provenience	Uncalibrated Age (years BP)	Calibrated Dates (years AD): Lower Limits 2σ	Lower Limits 1σ	Intercepts	Upper Limits 1σ	Upper Limits 2σ
Area 1:						
Feature 30	1880 ± 60	1	65	118	250	215
Area 3:						
Feature 43	170 ± 70	1527	1623	1674, 1743, 1801, 1941	1955	1955
Feature 52	940 ± 80	960	1012	1039	1183	1260
Post mold R/ N148W30	180 ± 50	1640	1657	1673, 1753, 1796, 1945	1955	1955
Post mold G/ N152W30	1270 ± 90	610	660	716, 743, 757	880	970

from an Historic settlement. The calibrated age of AD 1039 for Feature 53 corresponds well with the Area 3 thermoluminescence date described below. It also agrees with the Area 3 diagnostic artifacts. The calibrated dates of the Structure 1 post molds remain problematical. Neither agrees with the diagnostic artifacts or other absolute dates for the palisaded village.

THERMOLUMINESCENCE DATE

Several large Carpenter Book Corded sherds (all from the same vessel), and two pieces of fire-cracked rock were recovered from a large post mold in the palisade line (the one labelled "TL" in Figure 17). These artifacts appeared to have been used to shore up a weak post. The age of the pottery, then, should be roughly equivalent to that of the palisade. A thermoluminescence date of AD 1033 ± 73 (UWTL-52) was obtained from one of these sherds, using the high-temperature method. Tests for potassium contamination, which renders such dates too young, proved negative. The date obtained is perfectly consistent with the pottery type.

CHRONOLOGY OF OCCUPATIONS AT BOLAND

The earliest trace of human presence at Boland was a stone point of the type Susquehanna Broad, which is characteristic of the Terminal Archaic, sometimes also called the Transitional period (ca. 1200-700 BC). Also present were a few rocker-stamped sherds and a platform-pipe fragment dating to the Middle Woodland period, probably to the Kipp Island phase (ca. AD 300-800). Apparently, neither of these early occupations was very large or very intensive.

The major occupations at Boland took place in Late Woodland times, after AD 1000. It is the chronology of these occupations to which we now turn.

Area 1

Patterns of overlap among walls imply that Area 1 had at least two episodes of occupation: one in which the structures were oriented north-south, and another in which they were oriented east-west. The sample of diagnostic sherds, though small, indicates that these occupations date mainly to the Owasco period.

Table 4. Diagnostic Sherds from Area 1.[a]

Pottery Type	Plow Zone and General Collection (n)	(%)	Midden and Features (n)	(%)	Totals (n)	(%)
Carpenter Brook Corded	0	0	3	50.0	3	20.0
Levanna Rough	2	22.2	1	16.7	3	20.0
Sackett Corded	1	11.1	2	33.3	3	20.0
Kelso Corded	0	0	0	0	0	0
Castle Creek Incised	1	11.1	0	0	1	6.7
Oak Hill Corded	0	0	0	0	0	0
Indeterminate incised neck	2	22.2	0	0	2	13.3
Indeterminate incised collar	3	33.3	0	0	3	20.0
	9	100	6	100	15	100

[a] Data compiled from Table C.2 in Appendix C.

A closer look at the type frequencies (Table 4) allows us to be even more specific. The presence of large and roughly equal percentages of Carpenter Brook Corded, Levanna Rough, and Sackett Corded suggests an occupation in the Carpenter Brook phase (AD 1000-1100), possibly lasting into the subsequent Canadaigua phase (AD 1100-1200). These were the only diagnostic types found in the undisturbed midden and features, which suggests that most, if not all, of the structures were built at this time. It is interesting to note that these three types occurred in roughly the same percentages here as in the Area 3 organic layer, which (as we argue below) was a virtually pure Carpenter Brook phase deposit.

Also present, but only in plow-zone and surface contexts, were the types Castle Creek Incised, indeterminate incised neck, and indeterminate incised collar. These types provide convincing evidence of settlement during the Castle Creek phase (AD 1200-1300) and the (early?) Iroquois period, either here or somewhere nearby.

Sadly, the one radiocarbon sample we submitted (from Feature 30, which in turn seemed to be associated with Wall 1) yielded a date in the Middle Woodland period. Given the complete absence of Middle Woodland artifacts in Area 1, as well as the improbability of longhouses being that old, we must regard this date as spurious.

Area 3

The chronological placement of the archaeological deposits in Area 3 is best considered by discussing each of the four occupations in turn. Unfortunately, only two of these--the palisaded village and the historic occupation--can be dated with some confidence. The other two provided insufficient evidence for anything but the most tentative assignments.

Palisaded Village. In Chapter 2 we discussed the association of soil layers with the longhouses and palisade in Area 3. We discovered that the organic layer was strongly correlated with the palisade line, and thus, by extension, contemporary with the village inside. In order to determine more precisely when this village was occupied, we must first take a closer look at the pottery the organic layer contained.

At least 97% of the diagnostic pottery and 100% of the projectile points recovered from the organic layer derive from the Owasco period (Table 5). Of these Owasco diagnostics, 61.1% belong to types that dominate during the Carpenter Brook phase (Levanna Rough, Carpenter Brook Corded), 24.5% are of a type that is dominant during the Canandaigua phase (Sackett Corded), and 11.8% are of types that dominate duringthe Castle Creek phase (Kelso Corded, indeterminate incised neck). Minor amounts of Oak Hill Corded and indeterminate incised collar, types that started being used during the Castle Creek phase and continued into the Iroquois period, were also found; these sherds probably originated higher in the deposit and either were brought into the organic layer by faunalturbation (Cornwall 1958; Stein 1983), or were included in traces of plow zone that were not separated from the organic layer during excavation.

A comparison of this assemblage to that from two nearby Owasco sites is instructive (Table 6). The Roundtop site, located on the Susquehanna River about 16 km downstream from Boland was radiocarbon dated to 880 $\pm$ 60: AD 1070 (Ritchie and Funk 1973:186) is widely considered one of the best examples of a Carpenter Brook phase village. Carpenter Brook phase pottery totals over 90% of the diagnostic pottery recovered, with Sackett pottery comprising 6%, and Kelso Corded 3.6% of the total. The Canandaigua phase Bates site, located on the Chenango River some 24 km upstream from Boland, has three somewhat conflicting radiocarbon dates but appears to have been occupied around AD 1190. Pottery retrieved from this site is exclusively of the type Sackett Corded. Boland, with an assemblage dominated by Carpenter Brook Corded, Levanna Rough, *and* Sackett Corded is ceramically intermediate between these two sites.

The presence of significant amounts of both Carpenter Brook and Canandaigua phase pottery types suggests two possibilities: either the assemblage represents a single ceramic complex chronologically transitional between those at Roundtop and Bates, or it represents a mixture of two chronologically distinct complexes, one associated with each phase. Various lines of evidence, discussed below, strongly support the first interpretation.

Table 5. Diagnostic Sherds from Area 3.[a]

	Manual Excavations						Mechanical Stripping			
	Plow Zone and Mixed Levels[b]		Organic Layer[c]		Features		General Collection		Features[d]	
Pottery Type	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)
Carpenter Brook Corded	90	22.7	93	30.4	22	81.5	1	7.1	3	100
Levanna Rough	124	31.2	94	30.7	1	3.7	1	7.1	0	0
Sackett Corded	83	20.9	75	24.5	2	7.4	4	28.6	0	0
Kelso Corded	42	10.6	29	9.5	2	7.4	6	42.9	0	0
Castle Creek Incised	0	0	0	0	0	0	0	0	0	0
Oak Hill Corded	5	1.3	1	0.3	0	0	0	0	0	0
Indeterminate incised neck	17	4.3	7	2.3	0	0	1	7.1	0	0
Indeterminate incised collar	36	9.1	7	2.3	0	0	1	7.1	0	0
	397	100	306	100	27	100	14	100	3	100

[a] Data compiled from Table C.3 in Appendix C, and from feature descriptions in Chapter 2.
[b] Includes all levels in which plow zone comprised more than 20% of the volume.
[c] Includes all levels in which the organic layer comprised 80% or more of the volume. Obvious Middle Woodland diagnostics are not tabulated.
[d] Includes Features 49 and 55.

Table 6. Diagnostic Sherd Frequencies at the Roundtop and Bates Sites, in Comparison to those in the Boland Organic Layer.

	Roundtop[a]		Boland Organic Layer[b]		Bates[c]	
Pottery Type	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)
Carpenter Brook Corded	294	58.6	93	30.4	0	0
Levanna Rough	149	29.8	94	30.7	0	0
Sackett Corded	30	6.0	75	24.5	226	100
Kelso Corded	18	3.6	29	9.5	0	0
Oak Hill Corded	0	0	1	0.3	0	0
Indeterminate incised neck	0	0	7	2.3	0	0
Indeterminate incised collar	0	0	7	2.3	0	0
	501	100	306	100	226	100

[a] Data compiled from Ritchie and Funk (1973:193).
[b] Data compiled from Table C.3 in Appendix C. Includes all levels in which the organic layer comprised 80% or more of the volume. Obvious Middle Woodland diagnostics are excluded.
[c] Data compiled from Ritchie and Funk (1973:252).

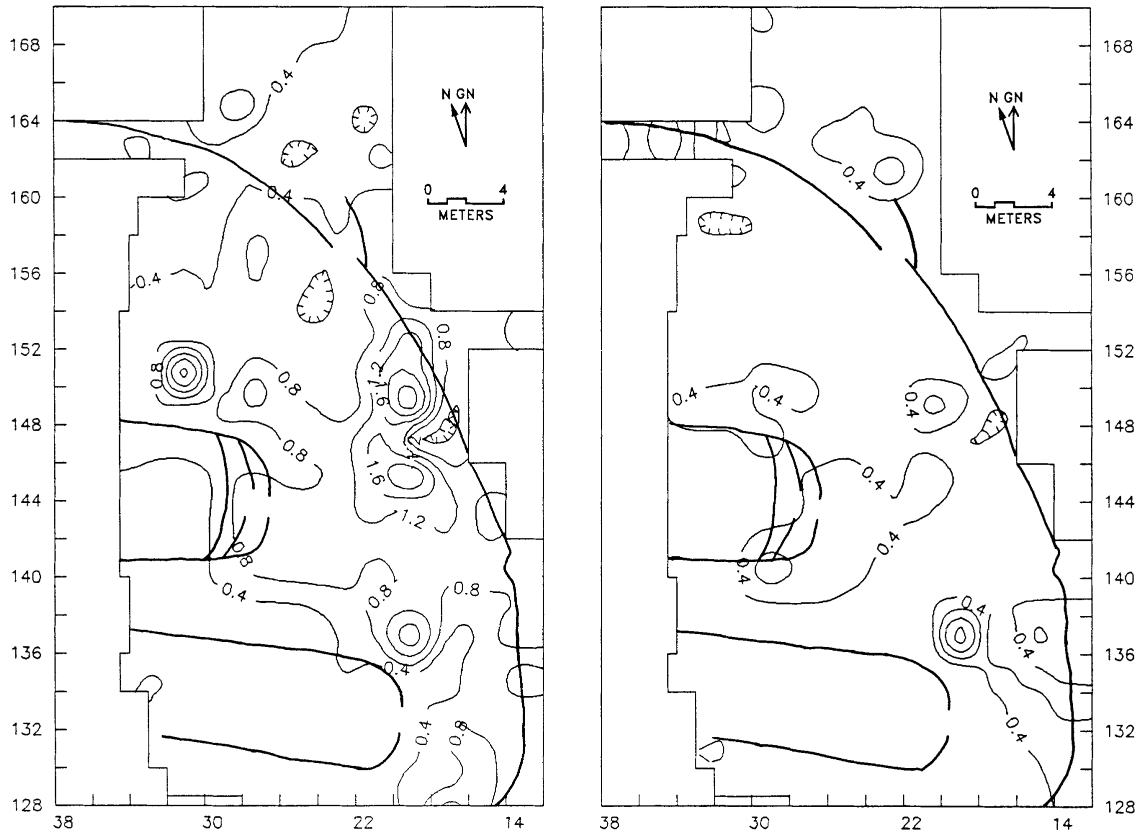


Figure 71. Spatial distribution of pottery types in Area 3: (left) density of Carpenter Brook Cord-on-Cord and Levanna Rough (sherds/m^3); (right) density of Sackett Corded (sherds/m^3).

First, the spatial distributions of types normally associated with the two separate phases are strikingly similar (Figure 71). Densities of the "early" types (Levanna Rough and Carpenter Brook Corded) and of the "late" types (Sackett Corded) are highest near the palisade wall just east of Structure 1, and moderately high within the middle section of the palisaded area. This spatial distribution makes perfect sense in relation to the houses and palisades, in that it conforms to refuse-disposal patterns commonly observed at other Late Woodland sites (see Chapter 5). It seems unlikely that such a coincidence of sherd distributions and structures is due to chance alone.

Second, the absence of overlap among structures, the meager evidence of rebuilding, and the generally low densities of artifacts all suggest that the palisaded village was briefly occupied, perhaps for only 15 years. Such a short time would hardly be enough for one ceramic complex to be entirely replaced by another.

Third, sherds found in the features associated with the palisaded and enclosed structures are consistent with those found in the organic layer. Besides the pit (Feature 52) within Structure 1 that contained Carpenter Brook Corded pottery, four structure and four palisade post molds contained Carpenter Brook Corded and Levanna Rough sherds, while two other palisade posts yielded Sackett Corded sherds (Figure 46).

Fourth, it is worth noting that the Sackett Corded sherds retrieved from the organic layer and palisade posts have several characteristics reminiscent of Carpenter Brook pottery. Several sherds have faint cord-roughened impressions on the neck. Moreover, some necks (such as the one illustrated in Figure 54*d*) were not as constricted as most Sackett sherds from other sites dating to the Canandaigua phase.

All these lines of evidence converge on the conclusion that the occupation of the palisaded village was relatively short and resulted in the deposition of most of the pottery in the organic layer. The next question to consider is, exactly when did this occupation occur?

From the standpoint of ceramics alone, the predominance of Carpenter Brook Corded and Levanna Rough would place the palisaded village's occupation in the Carpenter Brook phase. Moreover, the relatively high percentage of Sackett Corded presumably indicates a date relatively late in the phase, ca. AD 1050-1100.

The absolute dates from Area 3 provide reasonable (although not unanimous) support for this assignment. As discussed previously, the two radiocarbon dates from post molds in Structure 1 are inconsistent with each other and with the ceramic assemblage; one is far too early, the other far too late. Both must be dismissed as spurious. We are left then with two "good" dates: a calibrated radiocarbon assay of AD 1039 for Feature 52 (a pit inside the door of Structure 1), and a thermoluminescence date of AD 1033 for the palisade. These are slightly earlier than the expected date based on the pottery, but certainly close enough considering the margin of error in absolute dating, as well as the uncertainty in the calendrical limits of our ceramic phases.

Structure 3 Occupation. The mechanical stripping in the vicinity of Structure 3 yielded a small, and rather confused, assemblage of diagnostic pottery (Table 5). Some 43% of the diagnostics in the general collection (i.e., artifacts found in soil disturbed by the stripping operation) were of the types Carpenter Brook Corded, Levanna Rough, and Sackett Corded; taken together, these would date to the Carpenter Brook (AD 1000-1100) and possibly the Canandaigua (AD 1100-1200) phases. An additional 50% consisted of Kelso Corded and indeterminate incised-neck sherds; these types are suggestive of the Castle Creek phase (AD 1200-1300). The remaining 7% comprised a single sherd of indeterminate incised collar, which presumably dates to the very late Castle Creek phase or the Iroquois period (AD 1300-1550).

Feature 49, the only pit near Structure 3 that contained pottery, produced three sherds of Carpenter Brook Corded and thus probably dates to the Carpenter Brook phase. However, we cannot be sure whether this pit and the structure were actually contemporary.

So we are still left in a quandary. Virtually all the sherds fit comfortably within Owasco period (AD 1000-1300), but not within a single phase. The Feature 49 assemblage and a large minority of the general collection argue that Structure 3 dates to the early portion of this period, while the bulk of the general collection supports a later date. We have no way of deciding which of these interpretations is more likely correct.

Kelso Occupation. The only features assigned to this occupation were a hearth (Feature 45) and a cylindrical pit (Feature 42). Both had distinct outlines that intruded *through* the organic layer, suggesting that they were younger than the palisaded village. This inference is supported by the few diagnostic sherds recovered: each feature contained a Kelso Corded rim. Although the tiny sample hardly provides a firm grounding for chronological assignment, it does suggest the features date somewhere within the late Owasco or early Iroquois period, most probably the Castle Creek phase (AD 1200-1300). If this interpretation is correct, then the features pertain to the same settlement that left a small, but consistent percentage of Kelso Corded in the plow zone and organic layer (Table 5). Note that Structure 3 may also have been standing at the same time.

On the other hand, we must also recognize the possibility that the Kelso Corded sherds were not contemporary with the small features in which they were found, but rather were redeposited inclusions. In this case, the sherds simply provide us with a *terminus post quem*, and the features themselves could well date to the Historic period.

Historic Occupation. This occupation comprised nothing more than a few smudge pits and some artifacts in the plow zone, yet the matter of its dating is refreshingly straightforward. The European trade goods that marked this occupation are all typical of the eighteenth century: the mean manufacture date of the glass beads is 1743, and the estimated manufacture date of the kaolin pipe stems is 1736, and the Jesuit ring and brass thimble are of types that were produced after 1700 (see Chapter 3). Consistent with these stylistic indicators, the radiocarbon date from one of the smudge pits (Feature 43) yielded a calibrated age of AD 1743 (Table 3). All in all, this component probably dates between 1730 and 1750, a span that places it solidly within the period of the eighteenth-century Otsiningo settlement.

SUMMARY

Although there exists some scattered evidence that Boland was occupied as early as the Terminal Archaic, the first substantial occupations took place during the Owasco period. The longhouses in Area 1 were almost certainly built and used in this period, probably during the Carpenter Brook and Canandaigua phases. The palisaded village in Area 3 was also occupied during the Carpenter Brook phase. The precise dates of the Structure 3 and Kelso occupations are more ambiguous, but again they seem to fall within Owasco times.

The second major episode of habitation took place during the Historic period. The evidence from Area 3 suggests that this portion of the site was inhabited by an Indian community in the second quarter of the eighteenth century. This community was undoubtedly part of the Otsiningo village mentioned in the early historical accounts.

CHAPTER 5

SETTLEMENT AND COMMUNITY PATTERNS

Previous reconstructions of settlement and community patterns have assumed that, throughout the Owasco period, there was a trend toward larger, more organized, and better defended settlements with larger longhouses. This trend was believed to be the result of greater sessility, made possible by an increased reliance on maize horticulture (Ritchie and Funk 1973:359, 364). These developments were gradual "with no real explosion in any recorded trace on the earliest Owasco settlements" (Ritchie and Funk 1973:359). According to these reconstructions, elements of Owasco culture could be traced back into Middle Woodland times. Early Owasco settlements, like Middle Woodland sites, were often located on floodplains and lacked defensive fortifications, and typically consisted of a single elongated house lacking features present in later Owasco and Iroquois houses. Palisades, ditches, and embankments did not appear until middle Owasco times. By late Owasco times, villages, usually consisting of several houses, were situated away from the valleys, on steep-sided more easily defended hills. "True" longhouses--characterized by end doors, bench lines, and hearths placed down the center--first appeared to appear during the Oak Hill phase (Ritchie and Funk 1973:361; Bradley 1987:22).

These reconstructions were based on evidence gathered from a small number of sites scattered throughout central and eastern New York. Thus, many of the apparent patterns of Owasco settlement should be viewed as tentative and may not apply to every region. Indeed, Niemczycki's recent studies of Seneca and Cayuga development (1984, 1986) have shown that certain Owasco traits, previously assumed to be invariant, were absent outside of eastern and south-central New York.

Another problem influencing interpretations of settlement and community patterns is that most sites contributing data to theories on Owasco development were excavated by a slit trenching method that followed apparent patterns of post molds, and which exposed only a small area (Trigger 1981:12). Thus, in many cases, the number of structures, the internal configuration of houses, and the presence or absence of palisades were not established with certainty.

Despite its large number of excavated sites, the Susquehanna drainage south of Oneonta has been neglected in terms of a comprehensive regional study. The excavations at Boland together with excavations at other Owasco sites in this drainage provide an opportunity to examine and revise some of the theories on developments of Owasco settlement and community patterns. We focus our analysis and interpretations on the palisaded village in Area 3 because of the greater wealth of data collected there although we also make occasional comparisons using other patterns revealed in the mechanically stripped sections of Areas 1 and 3.

REGIONAL SETTLEMENT PATTERNS

Many Carpenter Brook phase sites excavated in New York are situated on the floodplain of rivers and or the shores of lakes rather than on hills away from the valley floors. Trigger (1981:12) has suggested that these early horticultural villages in New York as well as those in Ontario were only occupied seasonally since they were located on land that flooded during the spring. Furthermore, Carpenter Brook and Canadaigua phase sites contain a confusing array of post molds suggesting seasonal rebuilding episodes. The prime example of this type of settlement is Roundtop, situated on the north bank of the Susquehanna river. Several early Owasco habitation sites have been discovered in the hills surrounding the Susquehanna Valley, however, suggesting that more variation in settlement patterns existed, at least in this drainage (Ritchie and Funk 1973:360). The palisaded village in Area 3 at Boland is situated on a terrace within the floodplain of the Chenango River, a position similar to that of both Roundtop and Bates. Based on topography and recent flooding patterns, it is reasonable to assume this section of the Chenango Valley flooded rarely; year-round settlement was possible. Boland is also characterized by little evidence of rebuilding. Fortified villages are usually located on defensible hills. Access to Boland, however, was not restricted by topography. The Carpenter Brook phase occupation at Boland represents the earliest palisaded village in New York. Its chronological position, then, may account for its unusual location.

COMMUNITY PATTERNS AT BOLAND

The relative absence of overlap among prehistoric occupations in Area 3 provides an unusually clear glimpse of community patterns. Unfortunately, this is not the case for many other excavated Owasco sites. As Trigger (1981:12) has observed:

> Many of the interpretations of Iroquoian house outlines offered in Ritchie and Funk's *Aboriginal Settlement Patterns in the Northeast* were made tentatively, either because of the multiplicity of overlapping post molds in many Owasco sites or because of the small areas that were opened. It is unfortunate that many of these interpretations are now being accepted without a review of the evidence on which they were based.

Excavations at the Sackett site exemplify problems of community pattern interpretation. Ritchie and Funk (1973:216) suggested that houses present at this Owasco village were small and round. Recent analysis (Prezzano 1988) suggests that the post molds uncovered are actually the remains of longhouses. Care must be taken in comparing community patterns uncovered at Boland with other Owasco sites.

Palisade

The palisade line in Area 3 consisted of a single row of upright posts that showed reinforcements only in two areas. In the southern section of the eastern line of palisade posts, at approximately N132W14, a second row of about seven posts was situated in the interior near where the palisade turned to the west. Another row of posts at N155W22 was located just south of the doorway. The doorway at N157W22 was approximately 1 m wide and apparently was shielded by a screen composed of at least 12 posts that angled outward from the palisade.

Figure 72 shows the relationship between the depth and width of palisade post molds. Two groups of posts are apparent from this plot. The first group consists of posts between 8 and 12 cm wide; among these, width and depth are unrelated. The second group consists of posts that are between 15 and 35 cm wide. These have an average depth of 80 cm below datum or 25 cm below the top of the subsoil. Within this group there is a tendency for wider posts not to be shallower than 72 cm below datum or 18 cm below subsoil surface. These larger posts were interspersed at irregular intervals within the palisade line and may represent additional supports. Several occurred near the area where the palisade changed direction. Profiles of posts showed that they were tapered and blunt-ended. Distance between post edges averaged about 33 cm. No evidence of ditches or embankments was uncovered.

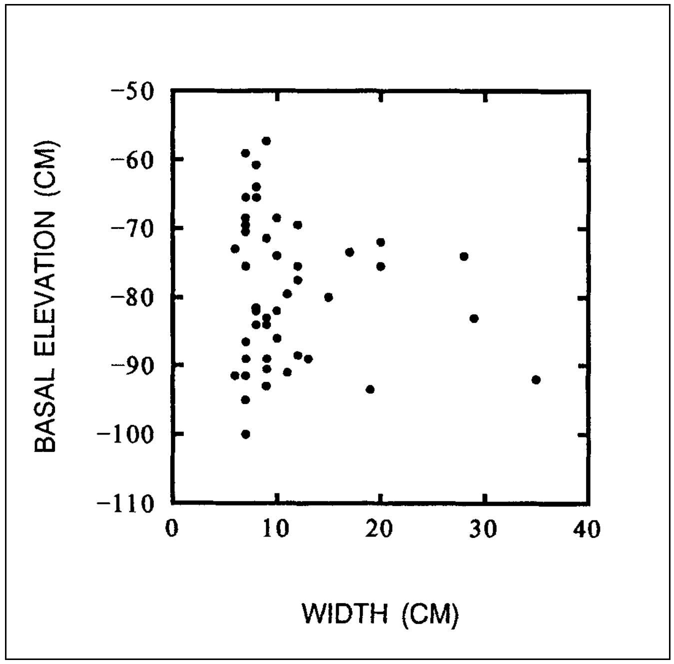


Figure 72. Scatter plot of depth versus width for palisade post molds. Depth is measured as the post's basal elevation with respect to datum.

At least two other Owasco villages in the Susquehanna drainage contained fortifications. The Bates site, which dates to the Canandaigua phase, contained a single palisade composed of posts 6.3 to 7.6 cm in diameter and 15.2 cm apart (Ritchie and Funk 1973:232). The Castle Creek site, which dates to the Castle Creek phase, contained two to three lines of posts within ditches. Judging from the field notes (Swart 1939), these post molds were approximately 11 cm in diameter. Many of the posts were positioned in ways that suggested repair of the palisade. Posts in the initial pattern were generally separated by about 30 cm.

One nearby site at which fortifications were allegedly absent was Roundtop, a Carpenter Brook phase village (Ritchie and Funk 1973). However, given the unusually high density of post molds found within the excavated area, superposition could easily have obscured any post-mold patterns associated with a palisade.

The limited tabulation by Jones and Jones (1980:69) provides some comparative information on palisades at Owasco and Iroquois sites. They found that many sites in New York, including the Canandaigua phase Sackett site, were surrounded by earthworks such as ditches and embankments (Ritchie and Funk 1973:166). Their study of the defenses at Indian Fort, a late prehistoric Iroquois site in Tompkins County, revealed an embankment that contained horizontal timber lacings apparently anchoring palisade posts. The gaps between the main posts were often filled with smaller posts suggesting that withes may have been fixed between the uprights. The walls and embankments were surrounded by a ditch. The Furnace Brook site, which dates to the Oak Hill phase, was surrounded by a similar palisade. Several other Oak Hill and Iroquois sites such as Garoga and Getman had multiple palisades (Jones and Jones 1980).

The evidence from Boland, combined with that from other sites, suggests that at least some early Owasco villages in the Susquehanna drainage villages were defended by single-rowed walls of posts. By Castle Creek times, ditches and multiple rows of larger posts were incorporated into the fortifications. In other areas, palisades appeared in the Canandaigua and Castle Creek phases and were elaborate from the start.

Middens

In Chapter 3, we discussed the association of midden soils (the organic layer) with the palisade line. The midden was thickest along the palisade line immediately in front of the structures, and outside the palisade to the northwest of the palisade gate. The midden layer thinned out approximately 8 m outside the palisade except in the northwest corner, where it extended 12 m beyond the palisade. It also thinned out about 6-10 m from the palisade within the village compound. The midden stopped short of Structure 1 but covered the eastern end of Structure 2.

A brief survey of the literature on the distribution of midden soils on New York and Ontario sites demonstrates that this association of midden and palisades occurred frequently. The refuse dumps of the Garoga phase Olcott site coincided with the stockade (Ritchie and Funk 1973:170). A trench excavated perpendicular to the Indian Fort site fortifications revealed that midden had built up on both the inside and outside of the palisade (Jones and Jones 1980:66-68). The description of middens on the extensively excavated late prehistoric Auger site probably typifies many Ontario Iroquois sites:

> [The] palisade line was covered with midden debris to a depth of about 50 cm, beginning some two meters inside the palisade and thinning out quickly on the slope outside; the midden disappeared completely at about five meters beyond the palisade . . . Since the thickest midden deposit lies over and immediately adjacent to the east palisade post molds, it appears that most or all of the garbage was deposited against the wall itself [Latta 1985:42].

Latta further identified an elliptical area of thick midden outside the palisade near a gateway that probably resulted from a pattern of dumping outside the village.

Warrick (1984:29), in his survey of Ontario Iroquois community patterns, identified three areas where refuse was most likely deposited: (*a*) in central open areas, (*b*) between or adjacent to house ends, and (*c*) on the village periphery piled up against the palisade. In effect, house locations determined midden locations. Trigger (1981:35) also recognized, from excavations in Ontario, that the Huron disposed of garbage in spaces between the ends of longhouses.

A striking similarity exists between disposal patterns at Boland and the examples just described. The ends of the two northernmost longhouses in Area 3 faced the eastern side of the palisade, an area where midden was particularly thick. A second area of deep midden was just outside the gateway, where a screen seems to have directed dumping to the northwest; that is, rather than walking around the screen and dumping garbage to the east, the inhabitants dumped garbage in the more accessible northwest area. It seems, then, that the prehistoric inhabitants of this village deposited house garbage within the compound, at the closest section of the palisade, or outside the village, adjacent to the gate. Warrick calculated, based on excavated Ontario sites, that the average distance that an Iroquoian would walk outside a longhouse door to deposit refuse was 9 m. At Boland, the distance from the door of Structure 1 to the thickest part of the organic soil adjacent to the palisade was 10.5 m, while the distance from Structure 2 to the palisade was 6 m.

Longhouses

Several factors have been proposed as influencing the placement of houses within palisaded villages, including topography, environment, defense, efficiency, and social organization. In general, Huron houses were oriented with one end downhill. Latta (1985:43) has suggested that this facilitated runoff. No data have yet been gathered on the topographic position of New York longhouses. The excavated ends of the two palisaded longhouses in Area 3 both pointed downhill revealing a pattern very similar to the Huron houses. The area east of the longhouses in the vicinity of the palisade was 10 to 24 cm lower than the longhouse ends. Time constraints prevented us from topographically mapping the portions of Area 1 and Area 3 that were mechanically stripped. Thus, the slopes of Structure 3 and Walls 1-4 are unknown.

In Ontario, village size appears to have increased throughout the prehistoric Iroquoian period. With this increase, it appears that village layout was planned more carefully. Longhouses were aligned parallel to one another allowing more to be located within a palisaded area (Noble 1969:19; Trigger 1981:35). Although this organized village plan is present on many late prehistoric and historic Iroquoian sites in New York (Ritchie 1969:316-319), the confusing superimposed house pattern data of most New York Owasco sites obscure any intentional alignments. The palisaded houses in Area 3 were aligned parallel to each other, which suggests that village planning may have occurred earlier in south-central New York than in Ontario.

Generally, number of houses on Ontario and New York Iroquoian sites increases through time. Most Carpenter Brook and Canandaigua phase sites appear to have contained a single structure rebuilt several times. The palisaded village at Boland contained at least two contemporary houses based on their similar orientation and lack of overlap. The unusually wide gap between Structure 1 and the northern palisade wall suggests that a third longhouse may originally have been present as well; this third longhouse might well have been located just west of the excavated area or have been destroyed by plowing.

The range of Owasco house forms has been the subject of much discussion. Several archaeologists suggest that "true" longhouses did not appear in New York until Oak Hill times (Bradley 1987:22; Ritchie and Funk 1973:361). Several elongated houses with end doorways and central hearths have been found at earlier sites, but superposition and incomplete excavation have made their interpretation difficult, and often they have not classified as longhouses (Ritchie and Funk 1973:180; Tuck 1971:24). In the Susquehanna drainage, the houses at Roundtop had rounded ends with doorways, and may have had interior hearths. Portions of the walls were double rowed. These houses are most likely an early form of longhouse. At Bates, Ritchie and Funk attempted to trace both circular and oblong house patterns among the excavated post molds. They commented that,

> since both these attempts at reconstruction fail to account for a large number of post molds, and neither can convincingly be shown to be intrinsically related to the various features existing within the enclosure, both efforts must be regarded as inconclusive [Ritchie and Funk 1973:232].

Circular houses were traced from the exposed post molds of the Castle Creek site during the 1939 and 1940 excavations, but an examination of site plans reveal linear patterns that may be segments of longhouses (Swart 1939). The Boland houses in the palisaded area were both round-ended. The end doors, standard widths, elongated form, and patterned post construction indicate that these structures were longhouses. Structure 3 and the possible structures in Area 1 also appear to be longhouses based on length-to-width ratio.

It appears, then, from the Roundtop and Boland data that round-ended longhouses were typical in the Susquehanna drainage. Virtually all excavated Seneca, Cayuga, Oneida, and Onondaga longhouses had square ends, while Mohawk houses had round ends (Ritchie and Funk 1973:363).

Longhouses varied greatly in length. In both New York and Ontario, longhouses tended to become longer throughout late prehistoric times. The original lengths of the Boland houses could not be measured since all of them lacked at least one end. Their minimum estimated lengths (14 m for Structure 1, 15.5 m for Structure 2, and 23.5 m for Structure 3) were several meters less than the complete lengths of the Roundtop houses (26.8 m). The longest wall in Area 1 extended for nearly 20 m.

Longhouse width was generally quite uniform. Several reasons for this standardization have been proposed, including (*a*) mechanical limitations imposed by wood types used in construction (Heidenreich 1971:116; Latta 1985:45; Warrick 1984:24), (*b*) optimal dwelling heights required to minimize interior wood-smoke problems (Warrick 1984:24), and (*c*) constraints dictated by methods of construction (Dodd 1984:257). New York and Huron houses were most often between 5 m and 7 m wide. The Boland houses in Area 3 were 6 m, 5.5 m, and 6.75 m wide and thus fit well with the general pattern.

A distinctive feature of the Boland longhouses is the placement of posts along the walls and ends. A staggered pattern was clearly evident. Warrick (1988:400) observed that this pattern probably facilitated attachment of the cross-brace poles and bark covering. Staggered posts are most prevalent on late prehistoric and contact houses, particularly on Neutral sites. At least two Huron sites, Ball and Auger, contained houses that had staggered posts on the sides but not the ends. Latta (1985:48) speculates that this provided more insulation in the areas adjacent to living quarters while the storage area required only a single wall. At Boland, Structure 1 had staggered post molds along the sides and end, while Structure 2 showed this pattern only along the end. The shallowness of the post molds in the latter structure may indicate that a second row was at least partly obliterated by plowing. Structure 3 appears to have had one wall of double-rowed posts.

Wall 1 in Area 1 showed an interesting pattern of segmentation, with its post molds arrayed in at least eight segments separated by narrow gaps and oriented in slightly different directions. Some segments were single-rowed, others were double-rowed. These segments may represent separate building episodes or simultaneous construction by different individuals or groups.

Density of post molds along walls was one of the most unusual aspects of the Boland houses. The density of 8.5 posts per meter in Structure 1 was very high when compared to those typical for other Owasco-Iroquois houses. This density figure incorporates only post molds from the sides of the longhouse and excludes potentially extraneous or obvious replacement posts, that is, posts that appeared out of sequence with the staggered pattern comprising the double wall. The Structure 3 post-mold density was also high, with 6.6 posts per meter. Warrick (1984, 1988) and Dodd (1984) have compiled data on structural aspects of longhouses using information obtained from Ontario Iroquois sites. Unfortunately, no comparable compilation exists from New York. Post-mold density of Ontario Iroquois longhouses, including those from Neutral and Huron sites, averaged between 2.4 and 3.6 posts per meter (Warrick 1988:45). This vast difference may well be due to variation in wood and/or building technique.

The density along the sides of Structure 2 was 2.5 posts per meter. As mentioned previously, post mold density of this structure was almost certainly affected by plowing. Area 1 post-mold densities ranged from 2.2 posts per meter in Wall 3 to over 5.5 posts per meter in Wall 1.

The post molds in the walls of Structures 1 and 2 were 4-9 cm wide. These posts were thus slightly smaller than the average post molds of Ontario Iroquois longhouses, which range from 7 to 9 cm (Dodd 1984:272; cf. Latta 1985:47). Wider posts in the walls may represent more important load-bearing structural elements that were intentionally pushed further into the ground. The plot of width against depth for Structure 1 post molds clearly shows that width varied little and that width was uncorrelated with depth (Figure 73). The only discernable pattern is that post molds 5 cm or less in diameter tended not to extend more than 53 cm below datum, or 30 cm below subsoil surface.

In contrast, a strong relationship exists between post mold depth and location. The interior posts of the double walls comprising Structure 1 were deeper than the exterior posts (Figure 74), the medians of the two groups being significantly different at the .05 level. This indicates that the interior row most likely represents the load bearing wall, while the outside wall functioned to secure wall covers. Given this observation, the widely spaced wall post molds of Structure 2 probably represent only the inner wall of a staggered pattern of posts. The shallower outer row was probably destroyed by plowing.

Profiles of the post molds associated with Structures 1 and 2 indicate that the posts were placed upright. At least one Iroquois site in Ontario revealed that wall posts alternately slanted inward and outward (Latta 1985:47).

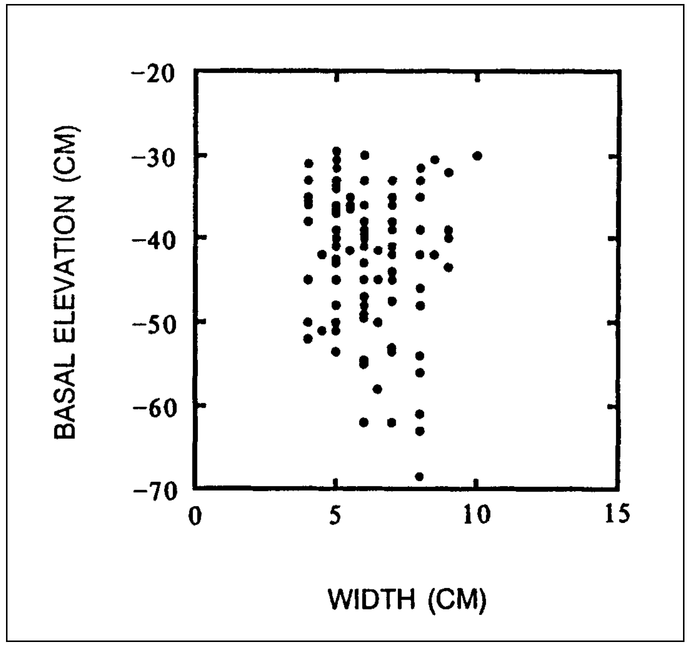


Figure 73. Scatter plot of depth versus width for longhouse post molds (Structure 1). Depth is measured as the post's basal elevation with respect to datum.

In Chapter 2, we discussed the presence of the three separate lines of post molds at the end of Structure 1. The innermost was a single line of posts with no apparent door. This pattern may represent a removable internal division separating living quarters from storage areas. Both ethnohistoric and archaeological evidence indicate that many Iroquois houses had storage areas at either end. There are no deep storage pits in Area 3, perhaps indicating food was stored above ground and possibly within the houses. The second interior line is a double row and may also represent a storage division, or more likely the initial end-wall. It shows evidence (irregularly placed post molds not in the original staggered pattern) that at least some of the posts were replaced. As mentioned previously, the outermost row has the clearest pattern of post molds, suggesting little or no rebuilding, and therefore probably represents a later end-wall.

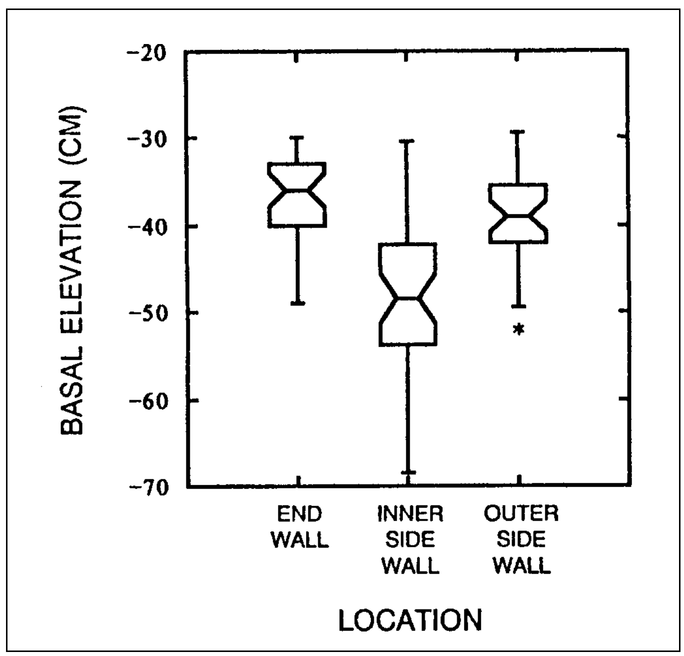


Figure 74. Post-mold depths in different parts of Structure 1: (left) end wall; (center) inner rows of the side walls; (right) outer rows of the side walls. Depth is the post's basal elevation with respect to datum.

Figure 74 illustrates that Structure 1 post molds along end walls were shallower than those along inner walls and comparable to those along the outer walls. Structure 2 end post were shallow with the interior end posts being deeper than the exterior ones. Two other structures at Boland, Structure 3 in Area 3 and the possible structure formed by Walls 3 and 4 in Area 1, lacked evidence of ends altogether. Although no mention is made of this phenomenon in the literature on New York sites, most Neutral sites and at least one Huron site have houses with weakly defined ends

(Fitzgerald 1982, 1984; Lennox 1981:221, 1984; Pearce 1983:2; Williamson 1983:56, 1983:7; Wright 1981). The assumption is that this phenomenon results from plowing. End posts of longhouses may not have been substantial and/or may not have been placed in the ground as deeply as those of the sides.

Latta discusses several factors that may have influenced the construction of longhouse ends. First,

> structural stress in longhouses rests on the wall posts which must bear the weight of the house structure and that of snow accumulation on the roof as well as wind pressure. The ends of the house bear relatively little weight and, hence, would not require substantial supports (cf. Lennox 1984:16) [Latta 1985:48].

Second, ends may have been removable. Longhouses that *do* have clear end-post patterns often show multiple ends, a product of longhouse expansion or temporary end removal for summer ventilation. Third, less formidable ends may have provided flexibility to the house frame. All of these factors may have resulted in an archaeologically observed pattern of shallow or missing end-posts (Latta 1985:48-49).

Structure 1 at Boland had large internal paired posts, features that have been found in longhouses at other sites as well. The Howlett Hill site (Tuck 1971) contained 3 oblong, rounded houses with end doors; all had two rows of internal supports. Parallel to and about 1.83 m in from each wall of the longhouse at the Kelso site were rows of large post molds 20.3 to 25.4 cm across. These were interpreted as internal support posts for bench-beds and lofts (Ritchie and Funk 1973:167). The fully excavated longhouse at the Getman site also contained internal supports (Ritchie and Funk 1973:Figure 28). The Auger site longhouses contained roof supports that ran along the center line; Latta asserts that stress caused by winter snow accumulation required these supports be added to houses, particularly old ones (Latta 1985:49). No criteria have been established by which to distinguish bench supports from roof supports.

In addition to these large paired posts, a line of smaller posts ran down the midline of Structure 1. These posts, which in places were double-rowed, were approximately the same diameter as the side and end posts. The interior of Structure 3 also contained a row of posts, although in this case the row was perpendicular to the side walls. There are many ethnohistoric examples of divisions within longhouses that separated the interior space into living quarters. These lines of posts may represent such divisions.

Features

Deep storage pits became more frequent and larger during the Late Woodland in eastern and south-central New York but were usually absent in north-central and western New York. In the Susquehanna drainage, storage pits were abundant at Roundtop, Bates, Comfort, Castle Creek, and Bainbridge (Ritchie and Funk 1973:181-182, 232-234, 360, 369; Giannola 1988). The early Owasco component at Boland, with its general absence of such pits, is more similar to north-central and western sites than to the other Susquehanna sites. Presumably, at villages lacking deep storage pits, food was kept in above-ground granaries or within longhouses. Detailed analysis of storage patterns on Late Woodland sites has not been undertaken.

In many Owasco and most Iroquois longhouses, hearths were placed along the center aisle. Houses at the Carpenter Brook phase Maxon-Derby site seemed have hearths along the wall rather then down the center. The Castle Creek phase Chamberlain site also appeared to have hearths along the wall. In both cases, we suspect the hearths and house forms were probably not contemporary. The houses identified at Maxon-Derby were very tenuous, while the hearths at Chamberlain were too close to the wall to have been usable. At Boland, no hearths were recovered from the longhouses. Plowing may have destroyed any that existed since hearths were generally shallow. Two exterior hearths were found within the palisaded village, but their association with the longhouses is not clear.

In Chapter 2 we discussed the association of Features 30, 37, 38, and 39 with Walls 1 and 4 in Area 1. The closest analogs to these oblong charcoal stains are slash pits found on Neutral Iroquois sites. These elongated pits are assumed to have contained wooden planks used as bench supports or room dividers (Dodd 1984:212, 214). The Area 1 stains were somewhat longer than the Neutral examples, and, since none of them were properly excavated, their function remains problematical.

Several smudge pits were discovered in the northern part of Area 3. Their stratigraphic location indicated they were associated with a later component or components than the palisaded village. Radiocarbon dating placed one smudge pit (Feature 43) in the eighteenth century. Lack of other chronological and contextual data limits analysis of these features and the small number of other features not associated with the early Owasco component.

SUMMARY AND CONCLUSIONS

Surface collection and excavations at Boland revealed a series of overlapping occupations dating from the Terminal Archaic to the Historic periods, and covering at least 5.3 ha of river terrace along the east bank of the Chenango River. The heaviest occupation occurred during the Owasco period.

Evidence of the Terminal Archaic is limited to one Susquehanna Broad point and some rhyolite and jasper debitage from Areas 1 and 3. Eight rocker- or dentate-stamped sherds and five Jack's Reef points comprise the entire Middle Woodland assemblage from Boland; most of these artifacts were found in Area 3. The low number of artifacts and the absence of features associated with these components suggest that these Archaic and Middle Woodland occupations were relatively minor or located in areas destroyed by mining.

The first substantial occupations in Areas 1 and 3 occurred during the Carpenter Brook phase of the Owasco period. These occupations fit well with previous models of Owasco-Iroquois development in some respects (such as location) but not in others. Like other early Owasco sites in this region, Boland is located on an alluvial terrace. Unlike other early Owasco sites, Area 3 produced evidence of a well-planned, multi-longhouse, palisaded village. This is the earliest such community yet excavated in New York. The longhouses show regularity in the placement of posts, construction, and interior features, and their width is similar to that of most Owasco-Iroquois longhouses. These data suggest that fortified, multi-longhouse villages originated during the Carpenter Brook phase and that such communities were present through virtually the entire Owasco period in New York. Instead of the gradual change in Owasco settlement and community patterns envisioned by previous models, the major shift occurred at the beginning of the period, presumably when more intensive agricultural practices were adopted.

The longhouse and palisade patterns show little evidence of rebuilding, which suggests that the palisaded village in Area 3 was occupied briefly in comparison to other Owasco sites. This is probably a result of local topography. Unlike many other Owasco and Iroquois sites, the land surrounding the village did not preclude settlement. Thus, although the Boland site may have been reoccupied many times, settlement on *exactly* the same location was not necessary.

Traces of later Owasco occupations were discovered at Boland as well. Areas 1 and 3 produced small, but consistent showings of pottery types strongly associated with the Castle Creek phase: particularly Kelso Corded, Castle Creek Incised, and indeterminate incised neck. Area 3 also contained a hearth and a small pit that were tentatively dated to this phase, as well as a longhouse (Structure 3) that *may* have been used at this time. Given the meager evidence, it is not at all clear whether this component was a community in its own right, or simply a zone of peripheral activities centered on the Castle Creek site, some 500 m to the northwest.

The presence of several incised-collar sherds, some Oak Hill Corded sherds, and a Madison point implies that Boland was also used during the Iroquois period. No features or post-mold patterns were associated with these artifacts. Few sites of this period have been found in the Susquehanna Valley south of Oneonta. The artifacts from Boland hint at a more substantial occupation in this region during late prehistoric times than previously suspected.

The latest Indian community at Boland dates to the second quarter of the eighteenth century. The spatial distribution of the European trade goods in Area 3 suggests that the bulk of the component was located north of our excavations. The northern excavated portion of Area 3 contained several smudge pits whose stratigraphic position suggest an association with this component. One of the pits was radiocarbon dated to ca. AD 1740. This early historic component is most likely a portion of the dispersed Otsiningo settlement that stretched along both sides of the lower Chenango River during much of the eighteenth century.

Boland illustrates several points about settlement and community pattern studies in New York and Ontario. As Warrick (1988:51) suggests, archaeologists need to "adopt a more realistic view of the complexity of Iroquoian village occupation." There is much variation, some of it regional, in the layout of villages and longhouses. Variations in longhouse length, shape, construction techniques, location of hearths and house entrances, presence or absence of benches, support beams and storage cubicles have been noted even within the same village (Trigger 1981:32). Detailed regional studies, using modern field methods and rigorous data collection techniques, are necessary to determine patterning in village layout. Only then will we understand the underlying social factors causing these variations.

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APPENDIX A

PLANT REMAINS: 1984 SEASON

by

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Plant remains from eight features at the Boland site were submitted for analysis to the Ethnobotanical Laboratory at the University of North Carolina at Chapel Hill. The samples were recovered by flotation, and the resulting light and heavy fractions were combined in each sample.

The methods used in analysis approximate those described by Yarnell (1974). Each sample was separated into size categories using a series of U.S. Standard geological sieves ranging in size from 6.35 to 0.21 mm. Only materials retained in the 2 mm and larger screens were sorted completely, using a stereomicroscope with magnifications ranging from 7 to 30x. Material remaining in screens finer than 2 mm was searched only for seeds, cultigen remains, and plant remains not found in the larger size category. An exception to this procedure was made for the sample from Feature 46. Since the bulk of this sample was composed of maize remains, maize cupules and kernels were not removed from the smaller size category. Table A.1 summarizes flotation sample components by feature, Table A.2 itemizes plant remains by weight and percentage, and Table A.3 presents seed counts.

The most abundant component in all samples except Feature 46 was wood charcoal, with which carbonized bark and stem fragments were included. The Feature 30 North sample contained a large number of well-preserved wood fragments, some of which were tentatively identified as ash (*Fraxinus* sp.). The sample from Feature 24 contained both fully carbonized and partially carbonized wood as well as uncarbonized plant remains. Uncarbonized remains were tabulated separately for all samples, since their association with prehistoric activities is unlikely because of rapid decomposition of organic materials at open-air sites. It is possible that some of the Feature 24 wood is of recent origin and was darkened or carbonized independently of human activity. However, because of the large quantity of wood charcoal in this sample, it is more likely that some of the archaeological wood was simply carbonized incompletely.

The sample from Feature 46 was the only one which contained a substantial proportion of plant food remains, consisting mainly of maize cob and cupule fragments. A smaller quantity of maize kernels also occurred in this sample. Based upon fully sorted material, the density of maize remains in the fill of Feature 46 is 30.4 g per liter, which is much greater than the density of total plant remains of any of the other samples. No extensive metric studies of these maize remains were undertaken. However, five cob segments were complete enough to allow for assessment of row number; three of these cobs were eight-row and two were ten-row. Several random measurements indicated that many cupules were over 10 mm wide. The kernels and kernel fragments observed were correspondingly wide and crescent-shaped (the concave portion of the crescent being formed by the missing embryo). These traits (low row number, wide cupules, and crescent-shaped kernels) have been used to characterize populations of maize that are typically found in the Northeast in prehistoric contexts and designated as Northern Flint (Brown and Anderson 1947). Features 1, 22, and 30 also contained small quantities of maize remains.

Feature 46 also contained four cotyledons of an unidentified legume, which represent a minimum of two complete seeds. These seeds are smaller than and otherwise dissimilar from those of the common bean (*Phaseolus vulgaris* L.) cultivated aboriginally. Rather, they are probably seeds of a wild or weed legume native to the East. Comparison of these specimens with a specialized seed identification manual (Delorit and Gunn 1986) failed to result in a secure identification below the family level. Although this legume may have been a food plant, its subsistence importance cannot be assessed.

Except for Feature 46, plant food remains were not abundant in the samples submitted for analysis. Therefore, little can be said about the subsistence patterns of Boland site inhabitants except that, as expected, maize seems to have been an important crop. Fragments of Juglans sp. nutshell (either walnut, *J. nigra* L., or butternut, *J. cinerea* L.) were identified in the Feature 21 sample. An additional identification of Juglans shell in the Feature 27 sample is uncertain. It is assumed that walnut and/or butternut were collected by Boland site inhabitants despite the small quantity of nutshell represented since its inclusion in cultural deposits would be unlikely otherwise. In addition, walnut and butternut were used for food by other prehistoric human populations in New York state (Johnson 1983) as well as in southern Ontario (Yarnell 1984) and at high elevations in the Southeast (Simpkins 1984).

Most of the carbonized seeds from the Boland site samples were in poor condition. Many of those that were identifiable could be only assigned tentatively to family. These included one or more each of the mustard family, grass family, sunflower family, and spurge family (see Table A.3), all of which may have been produced by weeds on or near the site and incidentally included in feature fill. Bedstraw seeds were present in two samples. This genus is frequently represented archaeologically in the East, but its use there, if any, is unknown. Peoples of northern Europe used the roasted seeds to make a beverage and the vegetable part of the plant for bedding (Uphof 1968). North American species of bedstraw vary in their habitat preferences from woods to waste ground (Fernald 1950), and the fruits of some species are covered with bristly hairs that aid in their dispersal by passing animals. Therefore, bedstraw seeds may have been unintentionally transported to the habitation area.

The remainder of carbonized seeds represent taxa of potential food plants. One seed of either knotweed or dock was found in the sample from Feature 22. The genus *Polygonum* is one of a number of starchy- or oily-seeded taxa adapted to disturbed areas that were cultivated or otherwise encouraged in parts of the East prehistorically (Yarnell and Black 1985). *P. erectum*, erect knotweed, was an important Middle and Late Woodland crop in Illinois (Asch and Asch 1985). However, since only a single seed was identified at Boland there is no reason to assume that either knotweed or dock was used for food at this site.

Seeds of the three fleshy fruit-producing taxa are more likely to reflect subsistence practices. Fragments of *Prunus* sp. pits (probably plum rather than cherry, which is also in this genus) and hawthorn seeds and entire bramble seeds occurred in Feature 22. One bramble seed was recovered from Feature 27. These seed types have all been reported from sites in the Southeast (Yarnell and Black 1985) as well as the Northeast (Yarnell 1984). At Boland the fruits were probably collected in late summer or early fall and eaten fresh or perhaps dried for winter consumption. Hawthorn and bramble both tend to colonize edges between woods and more open habitats, and all three taxa are more productive in open than in closed-canopy situations (Yarnell 1982).

Assuming that the ethnobotanical data reported here reflect the earlier occupation of the site, the Owasco inhabitants of the Boland site grew maize and collected walnut and/or butternut as well as fleshy fruits such as plum, hawthorn, and bramble. The presence of seeds of weedy species indicates some disturbance of forested areas, presumably as a result of agricultural clearing and other human activities.

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Table A.1. General Contents of Flotation Samples, 1984 Season.

Provenience	Soil Volume (liters)	Stone/ soil	Uncarbonized plant	Insect pupa?	Plant Remains	Residue < 2mm	Total
Feature 1	10.15	0.03	0.03	-	1.13	0.61	1.80
Feature 21	1.10	0.02	-	-	2.91	2.90	5.83
Feature 22	4.70	0.03	-	-	1.41	1.48	2.92
Feature 24	7.30	-	0.06	-	5.77	3.07	8.90
Feature 26	4.70	-	-	0.02	0.58	0.44	1.04
Feature 27	2.40	0.13	0.01	-	0.86	1.76	2.76
Feature 30 N	6.60	-	0.02	-	21.32	9.58	30.92
Feature 30 S	7.00	0.02	-	-	2.80	1.37	4.19
Feature 46	5.00	2.28	-	-	208.35	92.68	303.31
Total	48.95	2.51	0.12	0.02	245.13	113.89	361.67

Table A.2. Weights and Percentages of Plant Remains.

Provenience	Total plant remains	Wood/ bark	Unknown	Root/ rhizome	Maize cob/ cupule	Maize kernel	Juglans shell	seeds
F. I (g)	1.13	1.04	0.08	0.01	x	x	-	x
(%)	(99.9)	92.0	7.1	0.8	tr	tr	-	tr
F. 21 (g)	2.91	2.82	x	0.06	-	-	0.03	x
(%)	(100.0)	96.9	tr	2.1	-	-	1.0	tr
F. 22 (g)	1.41	1.22	0.11	0.01	x	-	-	0.07
(%)	(100.0)	86.5	7.8	0.7	tr	-	-	5.0
F. 24 (g)	5.77	5.72	0.01	0.03	-	-	-	0.01
(%)	(100.0)	99.1	0.2	0.5	-	-	-	0.2
F. 26 (g)	0.58	0.57	0.01	-	-	-	-	x
(%)	(100.0)	98.3	1.7	-	-	-	-	tr
F. 27 (g)	0.86	0.81	0.04	-	-	-	0.01?	x
(%)	(100.0)	94.2	4.7	-	-	-	1.2	tr
F. 30 N (g)	21.32	21.30	0.01	-	-	-	-	0.01
(%)	(99.9)	99.9	tr	-	-	-	-	tr
F. 30 S (g)	2.80	2.80	-	-	x	-	-	x
(%)	(100.0)	100.0	-	-	tr	-	-	tr
F. 46 (g)	208.35	56.38	0.10	-	151.23	0.63	-	0.01
(%)	(100.0)	27.1	tr	-	72.6	0.3	-	tr
Total (g)	245.13	92.66	0.36	0.11	151.23	0.63	0.04	0.10
Total. (%)	(99.9)	37.8	0.1	tr	61.7	0.3	tr	tr

Notes: Total percentages vary due to rounding error; tr=trace; x=less than 0.005.

Table A.3. Seed Counts.

Taxon	Provenience									
	F. 1	F. 21	F. 22	F. 24	F. 26	F. 27	F. 30 (N)	F. 30 (S)	F. 46	Total
Unknown	6	6	10	9	5	1	-	2	-	39
Brassicaceae? (Mustard family)	2	-	-	4	-	1	2	-	1	10
Asteraceae? (Composite family)	-	-	-	-	-	-	2	-	-	2
Poaceae (Grass family)	-	-	1	3	-	-	-	-	-	4
Euphorbiaceae? (Spurge family)	-	-	-	1	-	-	-	-	-	1
Fabaceae (Legume family)	-	-	-	-	-	-	-	-	2	2
Polygonum or Rumex (knotweed or dock)	-	-	1	-	-	-	-	-	-	1
Crataegus sp. (hawthorn)	-	-	2	-	-	-	-	-	-	2
Galium sp. (bedstraw)	-	-	-	-	-	1	2	-	-	3
Prunus sp. (plum)	-	-	1	-	-	-	-	-	-	1
Rubus sp. (bramble)	-	-	8	-	-	1	-	-	-	9

APPENDIX B

PLANT REMAINS: 1985-1987 SEASONS

by

C. Margaret Scarry

Our knowledge about the subsistence strategies of the Owasco populations is quite general. Remains of maize, beans, and squash have been recovered from Owasco sites (Cutler and Blake 1976; Ritchie and Funk 1973), and human bones from Owasco sites have produced carbon isotope ratios that indicate maize was a significant element in the diet (Vogel and van de Merwe 1977). Together these pieces of evidence suggest that, like their Iroquois descendants, the Owasco peoples obtained their food from maize agriculture supplemented by hunting and gathering. This description, however, could be applied to many late prehistoric populations in the Eastern Woodlands. To refine our understanding of Owasco subsistence economies, we need detailed analyses of systematically collected plant and animal remains.

The Boland site appeared to be a good place to begin investigating Owasco patterns of plant use. Excavations at the site in 1984 resulted in the recovery of several large samples of maize cobs and a scatter of other plant food remains (Appendix A). It seemed likely that further work at the site would produce plant data that could be used to shed light on Owasco subsistence strategies. Thus, in the 1985-1987 seasons a concerted effort was made to recover plant remains.

Unfortunately, the site did not produce the plant data that we had anticipated. Plant remains were sparse in most samples from the Boland site. Several large samples of maize cobs were recovered, but radiocarbon dates and associated artifacts indicate that these cobs, as well as the ones recovered in previous seasons, postdate the Owasco component. The analysis presented below, however, does add to the data base on which future studies can build.

The analysis that follows is organized in terms of three chronological components: early Owasco, Late Owasco, and Historic. The first includes features and midden associated with the Palisaded Village and Structure 3 occupations; most, if not all, of these contexts date to the Carpenter Brook phase (AD 1000-1100). (Two features assigned to the early Owasco component, 54 and 55, may actually be somewhat later, but they contained so few plant remains that deleting them would not have altered the results in any meaningful way.) The second component comprises two small pits from the Kelso occupation; these probably date to the Castle Creek phase (AD 1200-1300). The third and last component includes four Historic-period smudge pits that date to the first half of the eighteenth century.

METHODS AND MATERIALS

During the 1987 excavations, samples of plant remains were collected from all features and from selected portions of the midden deposits. A SMAP flotation system (Watson 1976) modified for use in a lab was used to extract the plant remains from the soil matrix. Flotation samples from features ranged in volume from 0.4 to 9.4 liters. Samples from the midden deposits ranged in volume from 3 to 4.5 liters. Besides the plant remains recovered by flotation, a few large specimens were also collected when they were encountered during the excavation. The most important of these were maize cobs collected from two smudge pits (Features 56 and 57) associated with the Historic component.

Plant samples from Owasco and Historic features as well as Owasco midden deposits and postmolds were submitted for analysis. Because of time and budget constraints, however, the samples from postmolds were not analyzed. This report discusses the contents of nine feature and six midden samples from the early Owasco component, two features from the late Owasco component, and four features from the Historic component. Table B.1 lists specific provenience information for the samples that were analyzed.

The lab methods used to process the plant samples followed standard archaeobotanical procedures. The samples were weighed then screened through a graded series (2 mm, 1.4 mm, 0.71 mm) of geological sieves to make sorting easier. The material in each size fraction was then examined under a stereoscopic microscope (10-30x). All plant materials greater than 2 mm in size were sorted, identified, and quantified. The remains in the smaller than 2 mm fractions were scanned. Seeds in these fractions were removed and identified but the remains were not otherwise sorted. Maize and nut remains were quantified by both count and weight. For the smudge pits where the quantities of maize cupules were large, counts were estimated on the basis of a 5 g subsample. Seeds were quantified by count only. Once the remains had been sorted, cob fragments with complete cross sections were subjected to a series of morphological analyses (see below). It is worth noting that, other than the cob measurements, the procedures used are comparable to those used by Gremillion for her report on the plant remains from the 1984 excavations at Boland (Appendix A).

Two lab assistants helped with the processing of the samples. Debra Leslie sorted and measured the remains from the four smudge pits. She also sorted two of the feature samples. Susan Hortenstine sorted the remaining feature samples and the midden samples. All identifications were made or confirmed by the author.

RESULTS

Plant remains were sparse in all samples, except those from the smudge pits from the Historic component. The common and scientific names of the plants identified in the samples are given in Table B.2. The contents of each sample are listed in Table B.3. For the purposes of discussion, the data from each component have been summarized by feature type (Tables B.4, B.5). The tabulations in the summary tables are based on taxon counts and percentages of those counts.

Early Owasco Contexts

The distribution of plant remains in contexts from the early Owasco component is shown in Table B.4. The general paucity of plant remains is readily apparent from this summary table. The total number of identified fragments from all the early Owasco samples combined is only 101. As a group, basin-shaped pits contained a larger and more varied assemblage than those from the hearths and midden deposits.

Throughout most of the Eastern Woodlands, late prehistoric populations grew maize, beans, and squash in gardens or fields. The population of the Boland site was no exception. Two members of this crop complex were present in the early Owasco samples. Maize remains were the most frequent and most abundant plant food remains in the samples. Cupules and/or kernels occurred in 12 of the 15 samples. Only one whole kernel was recovered. This kernel had the wide, crescent shape typical of the maize cultivar called Northern Flint by Brown and Anderson (1947) and Eastern Eight Row by Cutler and Blake (1976). Unfortunately, although isolated cupules were found in most samples, no measurable cob remains were recovered from the early Owasco features. Common beans were found in two basin-shaped pits (Features 53 and 54). Beans have also been recovered from the Roundtop site (Ritchie and Funk 1973), an early Owasco village located a few miles west of the Boland site. The Roundtop beans come from a context radiocarbon dated to A.D. 1070 $\pm$ 80 (Y-1534) and are among the earliest known from the Eastern Woodlands (Yarnell 1976). Given that the Boland site is roughly contemporaneous with the Roundtop site, the presence of beans at Boland confirms the early appearance of this crop in the Northeast. Squash remains were not recovered from the Boland site, but this third member of the late prehistoric crop complex has been reported from the Roundtop site (Ritchie and Funk 1973).

Recent research has indicated that in the midwest and portions of the southeast several indigenous starchy seed crops (chenopod, maygrass, erect knotweed) were grown (see Smith 1989 for a review of this work). Two seeds belonging to the knotweed family were found in the Boland samples. Unfortunately the specimens were too eroded for secure identification to species. Since no other members of the starchy seed crops were present, it seems most likely that the knotweed seeds came from a wild rather than a cultivated plant. On the basis of the current evidence, it does not appear that the starchy seed crops were grown by the inhabitants of the Boland site.

Besides maize and beans, one other domesticated plant was tentatively identified in the Owasco samples. A single fragment of what appears to be a peach pit was found in the midden sample from unit N154W12. Peach is an Old World crop. If the identification is correct, the specimen must be intrusive. Since peaches are known to have been raised by the Iroquois after contact (Fenton 1978), the specimen may be from the eighteenth-century component. It is worth noting that the sample in which the peach fragment was found came from outside the Owasco palisade line.

Nuts are the most abundant and readily available wild plant foods in the Eastern Woodlands. Picking nutmeats from their shells is a laborious and inefficient way to process large quantities of nuts for food (Swanton 1946). For this reason many Indian groups processed hickory nuts and walnuts for oil. To extract oil, the nuts were smashed then boiled shell and all in a large pot. The oil, which rose to the surface, was skimmed off and stored for later use; the shells, which sank, were discarded. The nutshells accumulated from processing oil, or preparing nuts in other ways, were often used for fuel (Lopinot 1984). It is not surprising, therefore, that nutshells are major components in many prehistoric plant assemblages.

Two types of nuts, black walnut and hickory, were present in the early Owasco samples from the Boland site, but neither was abundant. The dearth of nut remains may be a reflection of the general lack of plant food remains in the Boland samples. There may be other factors, however, contributing to the scarcity of nutshells. First, the Boland site is outside the range of many species of hickory. Thus, nuts may not have been as abundant as they were in areas to the south and west. Second, it is possible that the inhabitants of the Boland site relied on animal fats more than nut oil and therefore did not use as many nuts as their contemporaries elsewhere in the East. Third, the Boland population may have simply discarded nutshells rather than using them for fuel. Such a practice would decrease the chances that nutshells would be preserved through carbonization. Finally, the scarcity of nut remains may be a result of the annual settlement/subsistence round. It is possible that, after the maize was harvested, the population dispersed to fall hunting camps leaving the villages partially deserted. If so, then nut remains would be expected to be abundant in the fall hunting camps not in the village.

The only fruit represented in the early Owasco samples from the 1987 excavations was a bramble (raspberry or blackberry). Two other fruits, plum/cherry and hawthorn, were identified in the samples from the 1984 excavations (Appendix A). All three are summer ripening fruits from successional plants. The availability of such fruits would be enhanced by agricultural activities that provided openings for successional plants to flourish.

Despite the general scarcity of plant remains at the Boland site, the Owasco samples produced a few small seeds from herbaceous plants. Except for bedstraw, the herbaceous seeds could not be identified below the family level. All, however, come from families whose members favor open disturbed habitats. Like the fruits, their abundance would have been increased by human activities.

Late Owasco Contexts

Unfortunately, very few plant remains were recovered from the small cylindrical pit and the hearth associated with this component. The taxa represented were maize, hickory nut, plum or cherry, bedstraw, and the knotweed family (Table B.5). This range of plants is similar to that found in the preceding component, which suggests some degree of continuity in subsistence. Little more can be said on the basis of such a small sample.

Historic Contexts

The distribution of plant remains in contexts from the eighteenth-century component is shown in Table B.5. Examination of this table makes it clear that the samples produced very little information about the overall subsistence strategies of the Iroquois occupants of the Boland site. Except for the abundant maize remains, the assemblage is generally similar to that from the early Owasco component.

One plant is worth a special note, however. The sunflower seed is the first reported for this area. The specimen appears to be within the range of prehistoric domesticated sunflowers (Yarnell 1978). Unfortunately, the seed was incomplete and it was not possible to get its measurements for comparative purposes.

While the samples from the Historic component yielded few insights about the general subsistence strategy, the cobs from the smudge pits produced potentially useful information. Maize cultivars vary in several morphological attributes that are retained even when cobs are burned (Nickerson 1953). Analyses of cob characteristics often can help to determine what type of maize was raised and whether more than one cultivar was grown. Besides cob morphology, maize cultivars differ in their tolerance of weather and soil conditions, in the length of time between sowing and harvesting, and in the uses for which their grains are most suited. Thus, if the type or types of maize grown at a site can be determined, it is possible to gain some insights into crop production strategies and perhaps the uses for which the crops were intended. Morphological analyses of maize cobs can also provide information that is useful for tracing the development of modern maize cultivars.

The four smudge pits from the Historic component produced thousands of maize cupules and numerous cob fragments, but only 35 cobs (from Features 56 and 57) with complete cross sections were recovered. The number of rows of grain is a key characteristic for determining maize cultivars. Thus, only the cobs with intact cross sections were subjected to morphological analyses. The Boland cob sample is too small by itself to do more than identify the cultivar present. The metric data presented here, however, will provide a useful comparative base when maize remains are recovered from Owasco contexts.

For each cob, observations were made on eight morphological attributes. The procedures used followed the general methods described by Ford (1973). The attributes recorded include several that recent experiments by King (1987) have shown to be the most useful for distinguishing maize cultivars grown in the Eastern Woodlands. Row number was counted as close to the midsection as possible to avoid distortions caused by irregular rows at either end of a cob. The maximum diameter was also measured at the midsection. The width of an average cupule near the midpoint of the cob was measured in millimeters. Kernel thickness was also estimated from this cupule. Kernel thickness was estimated by measuring the distance between the lower glume of a cupule and the lower glume of the cupule above it. Strength of row pairing was coded as weak when cupule wings overlapped, moderate when a narrow groove separated adjacent cupules, and strong when the groove between cupules was wide. Cob shape was recorded as tapered when a fragment decreased in diameter toward the tip, straight, or cigar-shaped when a fragment tapered toward both ends or towards the butt. Cross section shape was coded as circular, quadrilateral, or elliptical. Presence or absence of irregular rows was also noted.

Summary descriptions of the cobs from the smudge pits are presented in Tables B.6 and B.7. Not surprisingly, the cobs exhibit the characteristics of Eastern Eight Row maize (Brown and Anderson 1947; Cutler and Blake 1976; Nickerson 1953). Most of the cobs have eight rows of grain and wide cupules. The single six-row cob probably came from a tiller; tillers often produce cobs that have reduced row numbers. The twelve-row specimen is from the butt of an ear, where extra rows are common. When the measurements of the Boland cobs are adjusted for shrinkage (Cutler and Blake 1976), the measurements fall firmly within the ranges of those reported for Northern Flint and Iroquois flour cultivars from New York (Nickerson 1953).

DISCUSSION

The plant assemblages from the Boland components are quite similar to assemblages reported from other late prehistoric and early historic sites in the area (Table B.8). The major difference between the assemblages is the absence of maize from late Middle Woodland contexts. The assemblages also vary in the presence or absence of small herbaceous seeds. This, however, is an artifact of differences in recovery methods. Small seeds are present in samples recovered by flotation; absent in samples recovered from large mesh screens.

The Owasco assemblage from the Boland site (early and late samples combined from all seasons) is comparable to those reported from other Owasco sites (Cutler and Blake 1976; Kaplan 1986; Ritchie and Funk 1976; Yarnell 1964). Together the assemblages present a picture of an agriculturally based economy. Maize remains were present in all Owasco sites for which reports of plant remains could be found. Note, however, that there may be a bias toward having a specialist examine remains when maize cobs are known to be present. Remains of fruits from successional plants are also reported from several sites. Use of wild resources, such as nuts, may have been selective and, perhaps, less intense than elsewhere in the Eastern Woodlands. This impression needs to be verified by quantitative analyses of large well preserved plant collections.

The Iroquois- and Historic-period assemblages are generally similar to those from Owasco contexts. This suggests continuity of subsistence strategies from prehistoric into early historic times.

This report has added a few taxa to the list of plants know to be used by the Owasco populations. Unfortunately, the analyses did not provide the kinds of data that are necessary for refining our understanding of Owasco and Iroquois subsistence strategies. Clearly larger assemblages suitable for quantitative analysis are desperately needed. The Boland excavations are a step in the right direction, however. Only by systematically collecting flotation samples will we ever get the kinds of data that we need.

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Table B.1. Flotation Samples Analyzed, 1985-1987 Seasons.

Component: Provenience	Context Type	Sample Volume (l)	Plant Weight (g)	Wood Weight (g)
Early Owasco:				
Feature 47	hearth	1.80	1.44	1.35
Feature 49	basin	1.40	1.73	0.75
Feature 50	basin	1.00	0.30	0.25
Feature 51	basin	9.40	0.60	0.60
Feature 52	basin	3.20	3.16	3.10
Feature 53	basin	4.60	0.59	0.40
Feature 54	basin	6.70	0.64	0.60
Feature 55	hearth	1.75	0.35	0.35
Feature 58	basin	1.00	0.15	0.10
N134W14 organic	midden	3.20	0.31	0.30
N134W16 organic (1)	midden	3.70	0.43	0.40
N134W16 organic (2)	midden	3.90	0.48	0.45
N134W18 organic	midden	4.50	0.35	0.25
N134W20 organic	midden	3.00	0.06	0.05
N154W12 organic	midden	3.80	0.51	0.45
Late Owasco:				
Feature 42	deep basin	3.20	0.70	0.65
Feature 45	hearth		0.06	0.05
Historic:				
Feature 43	smudge pit	1.40	2.43	0.10
Feature 44	smudge pit	2.00	26.45	11.00
Feature 56	smudge pit	0.50	104.71	3.10
Feature 57	smudge pit		107.56	

Table B.2. Common and Scientific Names of Plant Taxa Identified.

Category: Common Name	Scientific Name
Crops:	
Maize	*Zea mays*
Bean	*Phaseolus vulgaris*
Sunflower	*Helianthus annuus*
Peach[a]	*Prunus persica*
Nuts:	
Black walnut	*Juglans nigra*
Hickory	*Carya* sp.
Fruits:	
Bramble	*Rubus* sp.
Plum or cherry	*Prunus* sp.
Herbaceous:	
Bedstraw	*Galium* sp.
Knotweed family	Polygonaceae
Mustard family	Brassicaceae
Grass family	Poaceae

[a] Peach is tentatively identified from a single small fragment.

Table B.3. List of Identified Plants by Context.

Provenience	Sample Type[a]	Taxon	Part	Count	Weight (g)
		EARLY OWASCO PLANT SAMPLES			
Feature 47	F	unidentifiable		4	
	F	*Zea mays*	cupule	9	0.06
	F	*Zea mays*	kernel	6	0.01
Feature 49	F	Brassicaceae	seed	2	
	F	*Carya*	shell	7	0.05
	F	unidentifiable		6	0.03
	F	*Zea mays*	cupule	9	0.06
	F	*Zea mays*	kernel	9	0.03
Feature 50	F	Brassicaceae	seed	1	
	F	*Galium*	seed	1	
	F	Poaceae	seed	1	
	F	unidentified	seed	3	
Feature 51	F	unidentifiable		2	
Feature 52	F	*Carya*	shell	5	0.05
	F	unidentified	seed	1	
	F	*Zea mays*	cupule	2	0.01
	F	*Zea mays*	kernel	1	
	M	*Zea mays*	kernel	1	0.11
Feature 53	F	*Juglans nigra*	shell	1	0.01
	F	*Phaseolus vulgaris*	seed	7	0.10
	F	*Rubus*	seed	1	
	F	unidentified	seed	10	0.01
	F	unidentifiable		9	0.05
	F	*Zea mays*	cupule	2	0.01
	F	*Zea mays*	kernel	1	0.01
	M	*Phaseolus vulgaris*	seed	2	0.12
Feature 54	F	*Carya*	shell	1	0.01
	F	*Phaseolus vulgaris*	seed	2	0.01
	F	unidentified	seed	2	
	F	unidentifiable		3	
	F	*Zea mays*	cupule	1	0.01
	F	*Zea mays*	kernel	4	0.02
Feature 55	F	unidentified	seed	2	
Feature 58	F	unidentifiable		19	
	F	*Zea mays*	cupule	3	0.01

(continued)

Table B.3 (continued). List of Identified Plants by Context.

Provenience	Sample Type[a]	Taxon	Part	Count	Weight (g)
		EARLY OWASCO PLANT SAMPLES			
N134W14 organic	F	unidentifiable		2	
N134W16 organic (1)	F	*Carya*	shell	2	0.01
	F	unidentifiable		4	
	F	*Zea mays*	cupule	2	0.01
	F	*Zea mays*	kernel	1	0.01
N134W16 organic (2)	F	unidentified	seed	3	
	F	unidentifiable		7	0.01
	F	*Zea mays*	cupule	4	0.02
N134W18 organic	F	*Rubus*	seed	1	0.01
	F	unidentified	seed	2	
	F	unidentifiable		9	0.04
	F	*Zea mays*	cupule	3	0.02
	F	*Zea mays*	kernel	4	0.03
N134W20 organic	F	unidentifiable		1	
	F	*Zea mays*	cupule	3	0.01
N154W12 organic	F	*Prunus persica*?	seed	1	0.02
	F	unidentifiable		1	
	F	*Zea mays*	kernel	1	0.03
		LATE OWASCO PLANT SAMPLES			
Feature 42	F	*Carya*	shell	1	0.01
	F	*Galium*	seed	1	
	F	Polygonaceae	seed	2	
	F	*Prunus*	seed	2	
	F	unidentified	seed	3	
	F	unidentifiable		18	
	F	*Zea mays*	cupule	1	0.01
	F	*Zea mays*	kernel	1	0.01
Feature 45	F	*Galium*	seed	1	
	F	*Prunus*	seed	1	
	F	unidentifiable		1	
	F	*Zea mays*	kernel	1	

(continued)

Table B.3 (continued). List of Identified Plants by Context.

Provenience	Sample Type[a]	Taxon	Part	Count	Weight (g)
		HISTORIC PLANT SAMPLES			
Feature 43	F	*Carya*	shell	1	0.01
	F	*Galium*	seed	2	
	F	*Helianthus annuus*	seed	1	
	F	unidentified	seed	3	
	F	unidentifiable		6	0.01
	F	*Zea mays*	cupule	420	2.31
	F	*Zea mays*	kernel	1	
		HISTORIC IROQUOIS PLANT SAMPLES			
Feature 44	F	*Zea mays*	cupule	2021	15.31
	F	*Zea mays*	kernel	41	0.14
Feature 56	F	unidentifiable		2	
	F	*Zea mays*	cupule	161	4.60
	M	*Zea mays*	cob	29	
	M	*Zea mays*	cupule	1309	100.11
Feature 57	M	*Zea mays*	cob	6	6.95
	M	*Zea mays*	cupule	1026	100.61

[a] Key to sample type: F, flotation sample; M, macrobotanical sample.

Table B.4. Percentages of Plant Taxa in Early Owasco Contexts.

Category: Taxon	Basin (n = 7) count[a]	%	Hearth (n = 2) count	%	Organic (n = 6) count	%
Crops:						
Maize cupule	17	22.08	9	52.94	12	44.44
Maize kernel	15[b]	19.48	6	35.29	6	22.22
Bean	9[c]	11.69				
Peach[d]					1	3.70
Nuts:						
Black walnut	1	1.30				
Hickory	13	16.88			2	7.41
Fruits:						
Bramble	1	1.30			1	3.70
Herbaceous:						
Bedstraw	1	1.30				
Mustard family	3	3.90				
Grass family	1	1.30				
Unidentified	16	20.78	2	11.76	5	18.52

[a] For comparability, counts include only the specimens found in flotation samples.
[b] Count excludes one kernel that was collected separately during excavation.
[c] Count excludes two examples that were collected separately during excavation.
[d] Peach is tentatively identified from a single small fragment. If the identification is correct this must represent an intrusion from the historic component.

Table B.5. Percentages of Plant Taxa in Late Owasco and Historic Contexts.

	Late Owasco				Historic	
	Deep Basin (n = 1)		Hearth (n = 1)		Smudge Pit (n = 4)	
Category: Taxon	count	%	count	%	count[a]	%
Crops:						
Maize cob					0[b]	
Maize cupule	1	9.09			2,602[c]	97.67
Maize kernel	1	9.09	1	33.33	42	1.58
Sunflower					1	0.04
Nuts:						
Hickory	1	9.09			1	0.04
Fruits:						
Plum/Cherry	2	18.18	1	33.33		
Herbaceous:						
Bedstraw	1	9.09	1	33.33	2	0.08
Knotweed family	2	18.18				
Unidentified	3	27.27			3	0.11

[a] For comparability, counts include only the specimens found in flotation samples.
[b] Although none were found in flotation samples, 35 cobs were collected separately during excavation.
[c] In addition to this count, 2,335 cupules were collected separately during excavation.

Table B.6. Descriptive Statistics for Maize Cobs.

Statistic	Feature 56	Feature 57	All
Sample size	29	6	35
Mean row number	8.3	7.7	8.2
Mean cupule width (mm)	9.5	8.7	9.4
Mean kernel thickness (mm)	4.1	4.2	4.1
Mean maximum diameter (mm)	18.1	18.1	18.1

Table B.7. Frequency distributions of discrete attributes for Boland cobs.

Variable:	Feature 56		Feature 57		All	
Attribute	count	%	count	%	count	%
Row number:						
6	0	0.0	1	16.7	1	2.9
8	26	89.7	5	83.5	31	88.6
10	2	6.9	0	0.0	2	5.7
12	1	3.5	0	0.0	1	2.9
Row pairing:						
Weak	14	48.3	5	83.3	19	54.3
Moderate	9	31.0	1	16.7	10	28.6
Strong	6	20.7	0	0.0	6	17.1
Cob shape:						
Tapered	7	24.1	2	33.3	9	25.7
Straight	22	75.9	3	50.0	25	71.4
Cigar	0	0.0	1	16.7	1	2.9
Cross section shape:						
Circular	9	31.0	2	33.3	11	31.4
Quadrilateral	14	48.3	2	33.3	16	45.7
Elliptical	6	20.7	2	33.3	8	22.9

Table B.8. Comparison of the Boland Plant Assemblages with Assemblages from Other Late Prehistoric and Historic Sites in New York.[a]

Category: Taxon	Middle Woodland	Boland Owasco	Other Owasco	Boland Historic	Other Iroquois and Historic
Crops:					
Maize		X	X	X	X
Bean		X	X		X
Squash			X		X
Sunflower				X	
Peach				X	
Nuts:					
Black walnut	X	X	X	X	
Butternut			X		
Hickory		X	X	X	X
Acorn	X		X		X
Fruits:					
Bramble	X	X			
Plum/Cherry	X	X	X		X
Hawthorne		X	X		
Grape	X				
Blueberry					X
Herbaceous:					
Bedstraw	X	X		X	
Chenopod	X				
Pokeweed	X				
Composite family		X			
Knotweed family		X			
Legume family	X	X			
Mustard family	X	X			
Nightshade family	X				
Spurge family		X			
Grass family	X	X			
Sedge family	X				

[a] Middle Woodland (Kaplan 1986; Wagner 1978); Boland Owasco (Appendixes A, B); other Owasco (Ritchie and Funk 1973; Cutler and Blake 1976; Yarnell 1964); Boland Historic (Appendixes A, B); other Iroquois and Historic (Cutler and Blake 1976; Yarnell 1964).

APPENDIX C

ARTIFACT COUNTS

The three tables that follow show artifact counts by major provenience units. Artifact counts that pertain to more specific proveniences, such as individual features or structures, are presented in the text of the appropriate sections of Chapter 2.

Table C.1. Artifacts from General and Controlled Surface Collections.

Artifact Class: Artifact Type	General Collection[a]	Controlled Surface Collection
Prehistoric pottery:		
Point Peninsula Rocker-Stamped	1	
Carpenter Brook Corded	2	6
Levanna Rough	4	4
Sackett Corded	1	4
Kelso Corded	3	3
Unclassified rim and neck	2	3
Indeterminate corded	1	2
Indeterminate incised neck	1	1
Indeterminate incised collar	1	3
Indeterminate eroded	1	
Rough body	7	82
Smoothed body		16
Eroded body		38
Prehistoric ceramic pipes:		
Rimless Ringed Trumpet		1
Indeterminate pointillé		2
Indeterminate punctate bowl		1
Flaked stone points:		
Suquehanna Broad	1	
Levanna	1	7
Madison		1
Indeterminate	2	3
Other flaked tools and debitage:		
Core		1
Drill	1	
Retouched flake	2	
Graver		2
Indeterminate biface		4
Flake	5	682
Rough stone tools:		
Abrader/anvil/hammerstone	1	3
Disc	1	
Netsinker		9
Polished stone tools and ornaments:		
Indeterminate polished stone	1	
European trade goods:		
Glass bead		1
Gunflint		1

[a] This column includes all surface artifacts that lack more specific, intrasite provenience.

Table C.2. Artifacts from Area 1.

Artifact Class: Artifact Type	General Collection[a]	Plow Zone	Midden	Features
Prehistoric pottery:				
Carpenter Brook Corded			3	
Levanna Rough		2		1
Sackett Corded		1		2
Castle Creek Incised	1			
Unclassified rim and neck		1		1
Indeterminate corded	3	9	4	3
Indeterminate plain	1			
Indeterminate incised neck		2		
Indeterminate incised collar	1	2		
Indeterminate eroded	1	1		
Rough body	16	163	26	6
Eroded body				1
Prehistoric ceramic pipes:				
Corn Effigy				15
Indeterminate stem		1		
Flaked stone points:				
Indeterminate				1
Other flaked tools and debitage:				
Retouched flake	2			
Indeterminate biface		1		
Flake	38	121	9	13
Chunk				1
Rough stone tools:				
Disc	1			
Pestle	1			

[a] This category subsumes artifacts from Area 1 that do not have a more specific provenience. Artifacts from the controlled surface collection are not here included.

Table C.3. Artifacts from Area 3.

Artifact Class: Artifact Type	General Collection[a]	1985 Mechanical Stripping[b]	Plow Zone	Mixed Organic and Plow Zone	Organic Layer	Features
Prehistoric pottery:						
Point Peninsula Rocker Stamped		1			1	
Carpenter Brook Corded	2	1	52	38	93	25
Levanna Rough	2	1	67	57	94	1
Sackett Corded		4	52	31	75	2
Kelso Corded	2	6	29	13	29	2
Oak Hill Corded			3	2	1	
Unclassified rim and neck		1	7	2	8	
Indeterminate corded	2		71	21	57	2
Indeterminate plain	3	3	20	6	22	
Indeterminate incised neck		1	7	10	7	
Indeterminate incised collar		1	31	5	7	
Indeterminate eroded	1	2	22	6	17	
Rough body	14	15	1,002	1,728	746	210
Smoothed body	2		75	98	88	8
Dentate stamped body		2	1	1	1	
Eroded body	7	15	515	751	188	13
Prehistoric ceramic pipes:						
Plain Elbow						1
Willow Point			1			
Ringed Trumpet			4	1		
Indeterminate effigy			4	1		
Indeterminate pointillé			6	4	3	1
Indeterminate incised			6	1	3	
Indeterminate bowl			18	4	14	
Indeterminate stem			32	4	7	1
Flaked stone points:						
Jack's Reef Corner Notched		1	1	3		
Levanna	2		9	2	5	1
Unclassified				1	1	
Indeterminate	2	2	57	9	23	
Other flaked tools and debitage:						
Core	1		30	21	18	
Drill			3	1	6	1
Graver			11	5	5	
Perforator			3			
Retouched flake	1	1	30	8	8	
Scraper		1	4			

(continued)

Table C.3 (continued). Artifacts from Area 3.

Artifact Class: Artifact Type	General Collection[a]	1985 Mechanical Stripping[b]	Plow Zone	Mixed Organic and Plow Zone	Organic Layer	Features
Other flaked tools and debitage:						
Unclassified biface			3	1		
Indeterminate biface			29	4	13	1
Flake	57	188	4,889	2,916	1,207	73
Chunk	37	22	549	349	56	2
Rough stone tools:						
Abrader/anvil/hammerstone	2	4	28	7	7	3
Chopper			2		2	
Disc	2		1		4	
Drilled stone			1			
Grooved abrader			1		1	
Mano			2			3
Mortar/grinding stone	2	1	5			1
Netsinker	1	2	34	4	11	2
Pestle	1					
Polished stone tools and ornaments:						
Celt/Adze		1				
Platform pipe				1		
Red slate bead			4	1		
Indeterminate polished stone			3		1	
European trade goods:						
Glass bead	3		11	1		
Glass bottle			18	2		
Brass ring			1			
Brass thimble			1			
Iron axe	1					
Lead shot			2	1		
Miscellaneous iron			1			
Sheet brass		1	8	4		
Clay pipe	1		27	4	2	
Gunflint			1			

[a] This category subsumes all materials from Area 3 that could not be assigned a more specific provenience. Artifacts from the controlled surface collection are not included.
[b] This category includes artifacts that were found in disturbed and surface contexts during mechanical stripping in the vicinity of Structure 3 (i.e., south of N126).