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Hammerstone with handle, Macauley 6 Site.

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The Macauley 6 Site: A Multi-Component Site in Livingston County, New York

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The Macauley 6 Site (Mac 6) (Cda 32) is one of fourteen sites near the confluence of the Genesee River and Canaseraga Creek that are known collectively as the Macauley Complex. Mac 6 was excavated by students in field schools conducted by Wendell Rhodes, then Chair of the Department of Anthropology at SUNY Geneseo. Excavation at Mac 6 began in 1967, but almost all the work was done between the summers of 1970 and 1975; a few more units were dug in 1978 and 1987. The artifacts from the site have been stored at SUNY Geneseo since their excavation. This report is based on an examination of those artifacts and the surviving documents relating to the excavation.

Site Description

The Macauley 6 Site (Mac 6) (Cda 32) is located a few kilometers south of the village of Geneseo, New York. The site is on the first terrace of the east bank of the Genesee River about 200 m north of its confluence with Canaseraga Creek. Figure 1 shows a portion of the topographic map for the USGS Geneseo quadrangle on which I have marked its location. East of the site, the terrain slopes upward to a ridge about 3 km distant and 180 m above the site. West of the river is a broad, flat plain that is now the floodplain of the Genesee River and the bed of "Lake Geneseo," a peri-glacial lake that extended from near Dansville, New York northward to a point near Fowlerville, New York (Muller et al. 1988:126).

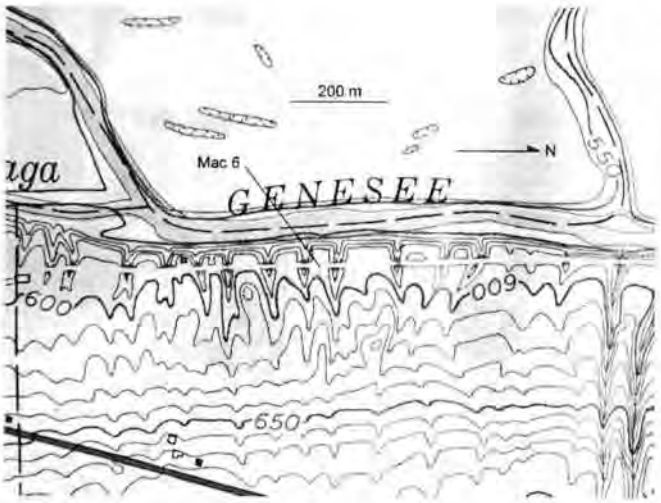

Figure 1. Map showing location of the Macauley 6 (Mac 6) Site. The map is copied from USGS topographical map of the Geneseo quadrangle, dated 1978.

As is evident from Figure 1, the east bank of the river is punctuated by numerous gullies that are the result of erosion from waters flowing down from the ridge to the east toward the river. Mac 6 is bounded on the north and south by two such gullies. Near the west end of the site is the bed of an abandoned railroad that was excavated in the 1850s (Cook 2000:7). Nearly all of the Mac 6 excavations are east of this railroad bed, but, as will be described below, a few are between the railroad bed and the river. The east edge of the site is now bounded by the right-of-way of Interstate 390; however, at the time of the excavation, the highway had yet to be built.

The soil at the site is Ottawa loamy fine sand, rolling phase (USDA 1956:79). The topsoil is very thin: 7 to 10 cm over most of the site. This shallow layer indicates that the site was never plowed, although it may have been used as pasture. The topsoil layer is somewhat thicker near the old railroad, which may indicate that excavated soil from the railroad construction was placed on the original surface or that topsoil has washed down the slope.

Excavations

The majority of the excavations at the site were done in 5 ft by 5 ft (1.5 m by 1.5 m) units, termed "quads" by the field school students. These units were located with respect to two datum stakes, denoted Locus 1 and Locus 2. The primary datum for Locus 1 was about 16 m (52 ft) east of the abandoned railroad bed. Unfortunately the exact spatial relationship between these two datum stakes is not recorded. A crude sketch in the files indicates that Locus 2 was north of Locus 1 and some evidence suggests that the Locus 2 datum stake was about 27 ½ ft west of the Locus 1 stake. The size of the mesh in the screens used at Mac 6 is not recorded, but based on general practice at the time of the excavations it was probably ¼ in.

There were other excavations at Mac 6 in addition to the 5 ft by 5 ft units in Loci 1 and 2:

- Test Pits 1 through 8. Two typed sheets and a map (that I have marked "Map 3") in the Mac 6 site files

contain some information about these excavations. Map 3 (marked "Not to Scale") locates seven of these pits in the Locus 1 grid and the typed sheets list the artifacts found in them. The eighth pit was located "20 feet west of the railroad bed" and is not shown on Map 3. The typed sheets state that these pits were 2 ft square.

- Test Blocks. Two "Test Blocks" were also excavated at Mac 6. A sketch map of these test blocks in the Mac 6 site files shows that Test Block 1 was 14 ft (4.3 m) square and Test Block 2 was 16 ft (4.9 m) square. A rough map shows the Test Blocks to be east of the river, but does not show the railroad bed. This may mean that the Test Blocks were between the railroad bed and the river.

Because of the uncertain location of both the Test Pits 1–8 and the Test Blocks, I have not included the artifactual data from these excavations in the analysis.

Several units, more than 100 ft to the east of the datum, but apparently part of Locus 1, were excavated. One of the student notebooks states that these units were dug in order to gather data prior to the building of the interstate highway that now bounds the eastern edge of the site. One of these pits, N30/E260, is recorded as having dimensions 2 ft by 3 ft (0.6 m by 0.9 m). I infer from this that perhaps other units at the eastern edge of the site may not have been 5 ft by 5 ft.

Artifactual Data

Lithics

There are three general classes of lithic artifacts in the collections from the Mac 6 Site: chipped stone artifacts, ground stone artifacts, and rough stone artifacts. The chipped stone artifacts numbered 846 (exclusive of debitage) and are identified in Table 1. A few words of explanation regarding some of the categories:

- Biface fragments are those chipped stone artifacts that could not be identified more specifically.
- If the angle of the working edge was steep, the artifact was called a scraper. A few artifacts had more than one edge that showed use-wear or was retouched. If one edge was "sharp" and another edge was "scraper-like" I called it a knife/scraper.

Almost all the chipped stone artifacts were made of Onondaga chert. A notable exception was a scraper made of a yellowish-brown chert that had a smooth surface that may indicate that it was glacier borne. A pebble was also found that seemed to be of the same material.

Measurements were made of the angle that the working face of the scrapers made with the opposing surface, using a carpenter's T-Bevel and a protractor to make the measurements. Figure 2 is a histogram of the measured working-edge angles of the scrapers. The average is 58.9 degrees. The bin with the most entries (the mode) is 61 to 65 degrees but the distribution is skewed a bit to the left. Some more information about scraper edge-angles from other sites and what the Mac 6 data might mean is given in the Appendix.

Ground stone artifacts are detailed in Table 2 and rough stone artifacts in Table 3. A scatter diagram of all lithic arti-

Table 1. Chipped Stone Artifacts.

Category	Count
Biface fragment	67
Chert nodule/pebble	27
Core	11
Debitage	7373
Drill/fragment	68
Knife/fragment	99
Knife/scraper	5
Point/fragment	441
Point preform	5
Scraper/fragment	100
Utilized flake	3
Unknown	20
Total (excluding debitage)	**846**

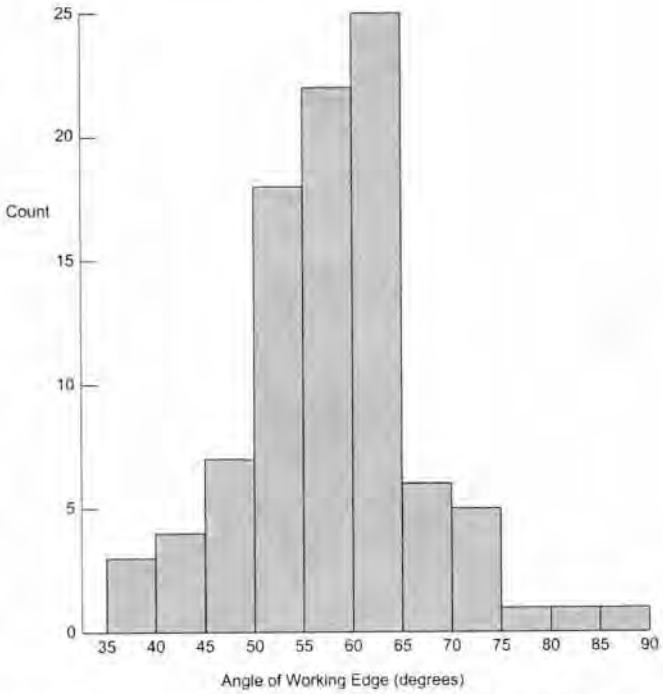

Figure 2. Histogram of scraper edge angles at the Macauley 6 Site (Mac 6).

facts from Locus 1 is shown in Figure 3. In order to keep the scale of the figure at a reasonable level, I have not shown the Locus 1 excavations east of E150, nor that for Locus 2, which contained a small number of units compared with Locus 1 (22 *vs.* 231).

Ceramics

Prehistoric ceramic artifacts consisted of potsherds and pipe sherds. These are listed in Tables 4 and 5 respectively. A scatter diagram of the density of prehistoric potsherds from Locus 1 is shown in Figure 4. Five of the pipe bowl sherds have flared rims.

Other Prehistoric Artifacts

A few fragments of calcined bone, contained in 8 different

Table 2. Ground Stone Artifacts.

Category	Count
Adze/fragment	1
Bannerstone fragment	1
Celt /fragment	4
Ornament	4
Pestle/fragment	4
Vessel fragment/gneiss fragment	55
Total	**69**

Table 3. Rough Stone Artifacts.

Category	Count
Axe	1
Chopper/fragment	3
Gouge/fragment	1
Hammerstone/anvilstone	85
Hematite	1.3 kg
Hoe	4
Metate fragment	1
Muller	6
Netsinker/fragment	252
Nutstone	1
Sharpening stone	1
Total	**355**

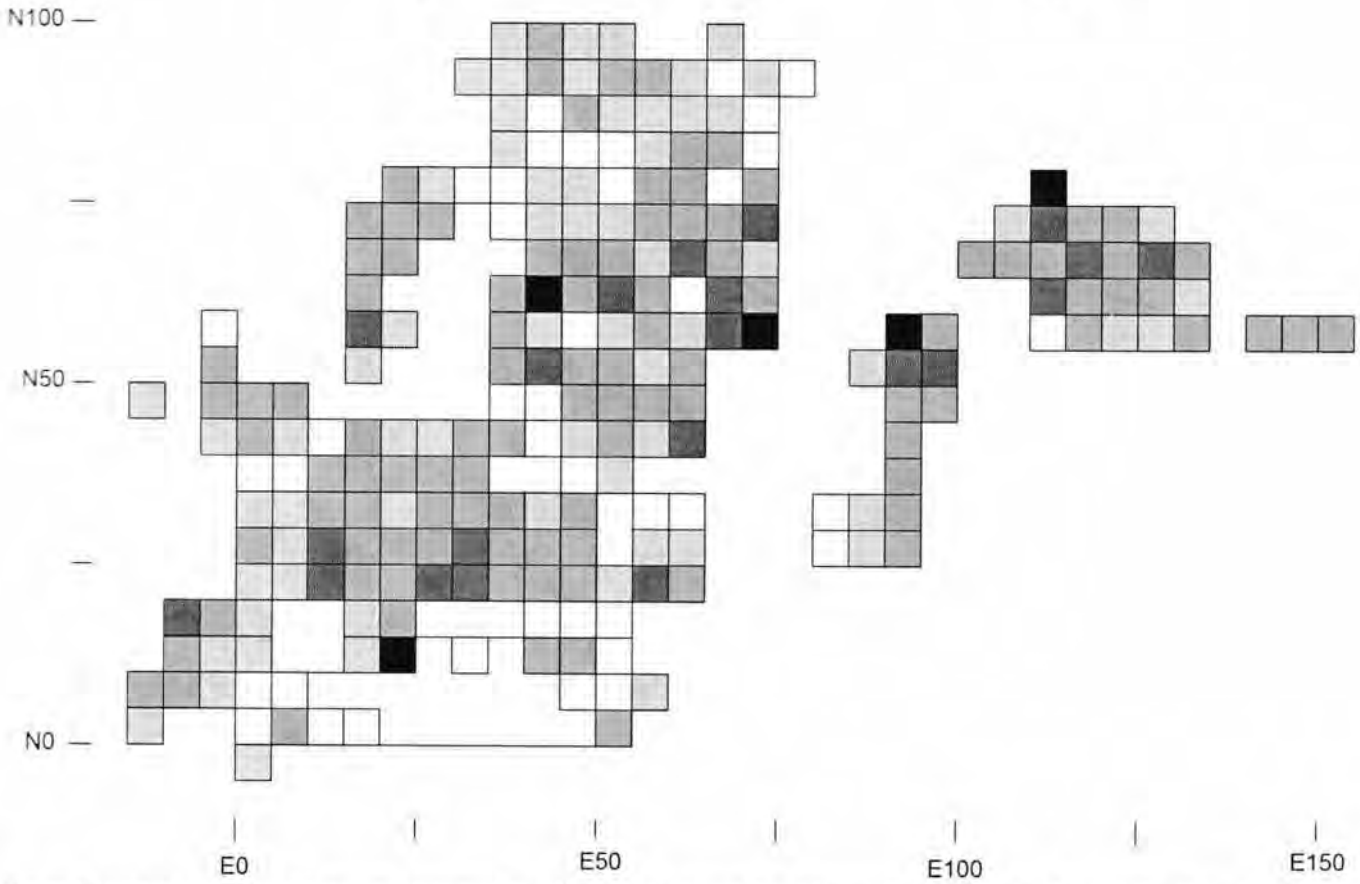

Figure 3. Distribution of lithic artifacts at the Macauley 6 Site (Mac 6) Locus 1 (excluding debitage). Key: 20% shading denotes 1–2 artifacts; 35% shading denotes 3–6 artifacts; 60% shading denotes 7–14 artifacts; 100% shading denotes 15–33 artifacts.

Table 4. Potsherds.

Category	Count
Bodysherds	
Plain	1920
Decorated	82
Rimsherds	
Plain	27
Decorated	69
Total	**2098**

Table 5. Prehistoric Pipe sherds.

Category	Count
Bowl Sherds	
Plain	8
Decorated	6
Missing	1
Stem Sherds	
Medial	5
Distal	1
Total	**21**

bags, are in the collections. There are also 11 bags containing charcoal. These are discussed below. According to the data in the Mac 6 documentation, the pH of the soil at Mac 6 measured between 5.0 and 6.0. Thus, I have judged that, because of the acidity of the soil, the bone and bone fragments, perhaps exclusive of the teeth, are not remains left by the prehistoric users of the site.

Historic Artifacts

In addition to the prehistoric artifacts there are a few historic artifacts in the collection. These artifacts are listed in Table 6. The first entry in the table is the count of the bags of what appear to be historic bone, teeth, and shell. The historic era musket balls, kaolin pipe sherds, and trade beads will be discussed in detail below.

Features

I developed a database of information in the Mac 6 records regarding potential features. There are 144 entries in this database. Because of the lack of what I believe to be credible evidence about the possible features, I was unable to

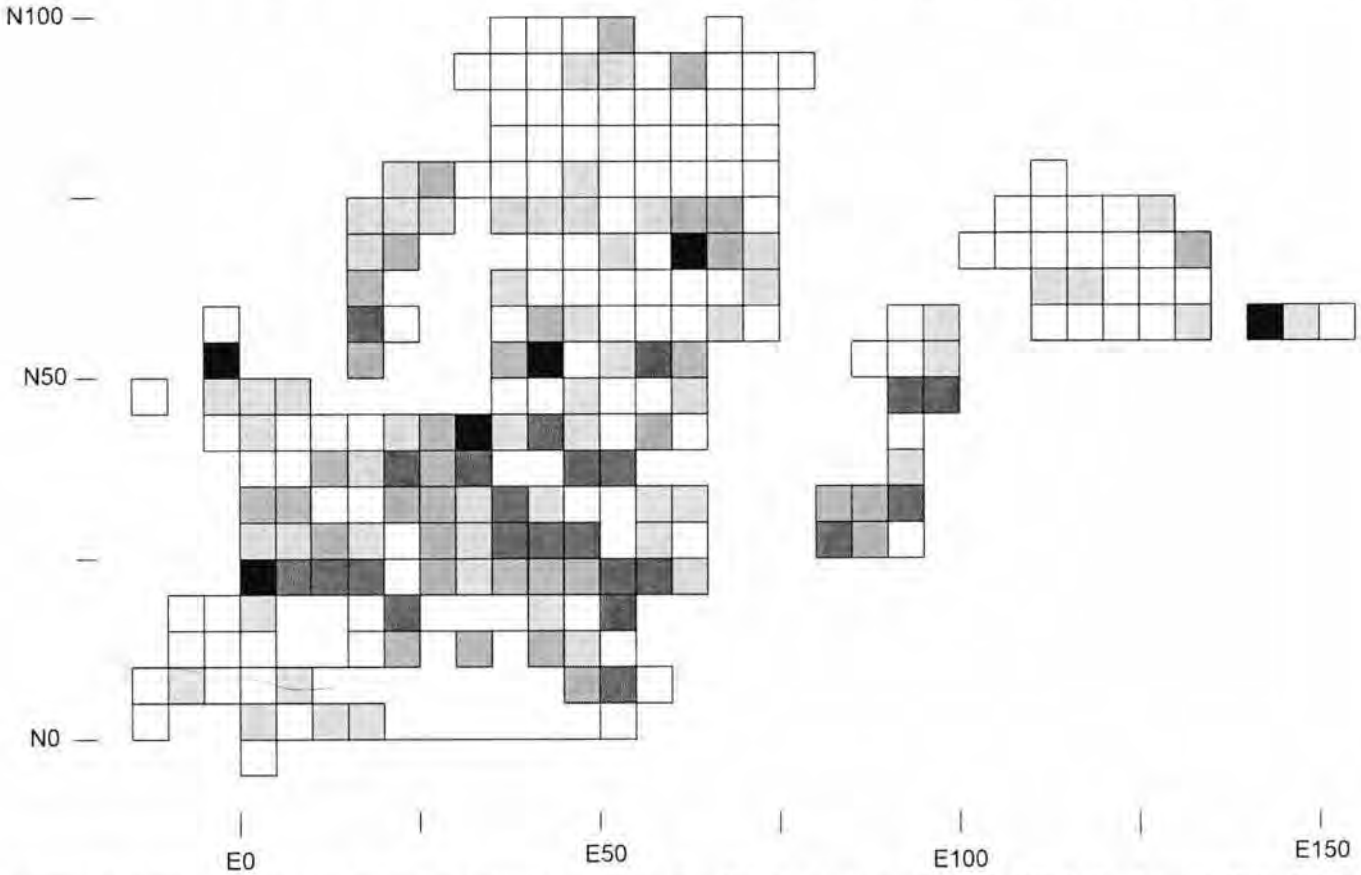

Figure 4. Distribution of potsherds at the Macauley 6 Site (Mac 6), Locus 1. Key: 20% shading denotes 1–3 sherds; 35% shading denotes 4–10 sherds; 60% shading denotes 11–31 sherds; 100% shading denotes 32–97 sherds.

characterize the vast majority of the entries. In addition there are six features described in a report in the files, presumably written by Rhodes. Table 7 lists the 17 features that seem to me to be adequately characterized (including those listed by Rhodes). Three of these features merit some comments:

Feature 6-104

A sketch in the files labeled "Possible Post-Mold Pattern" was entered in the database as Feature 6-104. I have redrawn the sketch and it is shown in Figure 5. The sketch looks much like the outline of a house. The outline is slightly oval and measures about 10 by 12 ft. A troubling fact is that there is no record of the details of the post molds that are pictured in the sketch. No data regarding depth, diameter, or profiles of the post molds are extant. The characterization of the pattern as being a "possible pattern" seems to imply some doubt in the mind of the sketch-maker as to its validity. In any case, if it is truly the remains of a house, it seems to fit the common understanding of the "wigwams" of Algonquin or Point Peninsula people who may have inhabited the Mac 6 Site before the advent of the longhouses of Iroquois times; however, houses similar to this were also used by Native Americans after longhouses came into use.

Feature 6-081

I am skeptical of the characterization of Feature 6-081 as a nut storage pit. There are no artifacts or ecofacts from N60/E55 in the collection that would imply that the feature was, indeed, a nut storage pit. The notebook kept by the student who was excavating the unit states that he found "... a few charred nuts ... and some small bits of charcoal...." This does not, to me, constitute good evidence that this was a nut storage pit. It could just as likely, or perhaps more likely, have been a secondary refuse pit. I have found no record of whether the C^{14} date (see Table 10) was obtained from the nutmeats or the charcoal.

Table 6. Historic Artifacts.

Category	Count
Bone, teeth, shell	105 bags
Glass	5
Metal	
Buckshot	1
Musket ball	3
Other	4
Kaolin Clay Pipe sherds	
Bowl sherd	3
Stem sherd	7
Potsherd	1
Trade beads	5

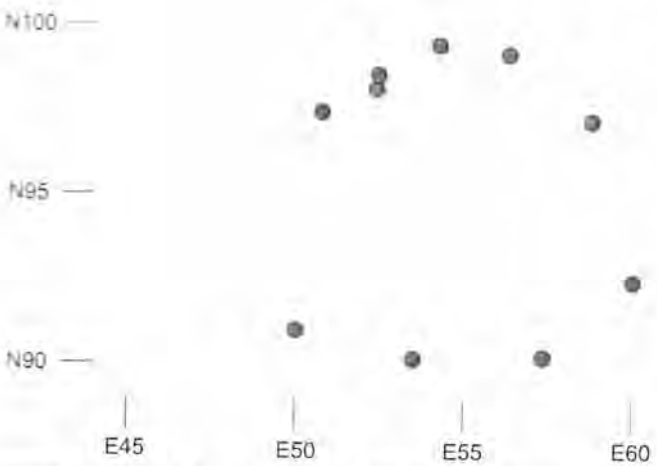

Figure 5. Sketch of possible post mold pattern at the Macauley 6 Site (Mac 6), Feature 6-104.

Table 7. Mac 6 Features.

Feature Category	Feature Number	Unit(s)
Charred area	6-034	N30/E30
Charred area	6-085	N65/E45, N65/E50
Earth oven	6-044	N45/E85, N45/E90, N50/E85, N50/E90
Hearth	6-042	N45/E45
Hearth	6-046	N45/E95
Hearth	6-052	N50/E45
Hearth	6-060	N50/W5
Hearth	6-065	N55/E45, N55/E50, N60/E45, N60/E50
Hearth	6-067	N55/E65, N55/E70N, N60/E65
Hearth	6-097	N80/E60, N80/E65, N85/E60, N85/E65
Probable hearth	6-002	N0/E55
Probable hearth	6-010	N20/E0
Probable hearth	6-054	N50/E50
Possible hearth	6-018	N20/E25
Possible house	6-104	N90/E50, N90/E55, N95/E50, N95/E55
Nut storage pit	6-081	N60/E55
Post mold	6-020	N25/E0
Rock feature	6-001	N0/E0

Feature 6-001

This was called a "rock feature" in the report by Rhodes. In all, there were 27 features at Mac 6 reported as being "rock features." Their common occurrence makes one wonder what their purpose was. A likely option is that they were the remains of earth ovens. At other sites at Macauley there have been rings of rocks that might have bounded a hearth. Sketches on UR sheets show that is not true of many of the "rock features" at Mac 6. For whatever reason, there seems to have been no further information about these features that would allow an adequate characterization.

Analysis

Periods of Occupation

The Mac 6 Site was inhabited, probably episodically, from the Archaic to the post-contact period. The artifacts these occupants left behind, particularly their projectile points and pottery, tell us much about periods of occupation.

Table 8 lists the several types of projectile points found at the Mac 6 Site, using the cluster concept of Justice (1995). These data indicate that the site was occupied from early in the Late Archaic period into the Late Woodland.

The ceramics data show use of the site in the Early Woodland and Late Woodland periods. Of the 2098 sherds recovered from the site, I judged that 297 were Vinette I. This pottery style began in the Early Woodland and extended into the Middle Woodland (Ritchie and MacNeish 1949:100). Given this fact, it is possible that some of the pottery also comes from the Middle Woodland.

Table 9 shows the results of an analysis of the 69 decorated rimsherds by Dr. William Engelbrecht. Many of the rimsherds were very small, leading to a number of sherds that could not be typed and sherds for which the type was uncertain. All the identifiable sherds were from the Late Woodland period. Dr. Engelbrecht was able to suggest possible identifications for many of those in the uncertain category and these identifications also were types from the Late Woodland. Figure 6 illustrates some of these rimsherds.

Five of the fifteen prehistoric pipe bowl sherds had flared rims, a style present in the Late Woodland period (Ritchie 1980: 312, 313).

The pipe and potsherd data corroborate the conclusions derived from the projectile points with regard to occupation periods.

Fragments of stone vessels found at the Mac 6 Site offer another insight into who used the site and when. Based on the examination of the vessel fragments by Dr. Jeffrey Over of the SUNY Geneseo Department of Geology, the fragments came from at least two different stones; hence there must have been at least two vessels. Vessels made of steatite (soapstone) were a not-uncommon artifact in New York State, made and used by the Susquehanna soapstone culture (Ritchie 1980:162; Truncer 2004:30, 31). The presence of the Susquehanna Broad projectile points (Ritchie 1971) is evidence that the Mac 6 Site was occupied at some point by people of that culture. The shape of the vessels, as inferred from the fragments, and the lug handle on one of the fragments (c.f. Ritchie 1980:174) seems to place them squarely in the Susquehanna tradition. The dissonant fact is that these fragments were gneiss, a stone almost as hard as chert, rather than steatite, which is soft. However the exterior of many of the vessel fragments shows what clearly are chisel marks (c.f. Ritchie 1980:162). It was surely a labor- and time-intensive task to fashion these vessels.

Radiocarbon dates are also a record of the times of habitation of the site. I have found records of four radiocarbon date determinations, which are shown in Table 10. There are

Table 8. Mac 6 Projectile Points and Identifiable Chert Fragments.

Point Cluster	Count	Time Period
Brewerton	36	Late Archaic (Justice 1995:115)
Lamoka	125	Late Archaic (Justice 1995: 127)
Susquehanna	23	Late Archaic/Early Woodland (Justice 1995: 167)
Meadowood	5	Early Woodland (Justice 1995: 170)
Snyders	4	Middle Woodland (Justice 1995: 201)
Jacks Reef	4	Middle Woodland (Justice 1995: 217)
Triangular	12	Late Woodland (Justice 1995: 220)

Table 9. Decorated Rimsherds.

Description	Count
Castle Creek Punctate	3
Cayuga Horizontal	2
Iroquois Linear	7
Ontario Horizontal	3
Owasco Corded Collar	11
Owasco Corded Horizontal	2
Owasco Corded Oblique	1
Ripley Plain	1
Sparta Dentate	1
Uncertain	23
Untyped	15
Total	**69**

Figure 6. Some representative examples of the rimsherds from the Macauley 6 Site. **a.** Iroquois Linear; **b.** Owasco Corded Collar; **c.** Ontario Horizontal; **d.** Castle Creek Punctate.

also records of three other C^{14} dates on Feature Record sheets or tags in the artifact bags, although there are no records in the Mac 6 files of their sample numbers or a report from the dating laboratory. I have, nevertheless, included these in Table 10. I have assumed one-sigma uncertainty dates for these samples of ±100 years since that is about the uncertainty of the other determinations. I assume the laboratory (Teledyne Isotopes) submitted uncorrected dates; hence I have corrected the dates to calendar dates using calib5.10.3 (Stuiver and Reimer 1993:215-230). The radiocarbon dates, although they do not cover the entire time span represented by the lithics and ceramics, do nothing to contradict the information provided by those data.

The presence of the kaolin pipe sherds and the trade beads are evidence of use of the site by Native Americans after contact with Europeans. These artifacts also can be dated, at least approximately; hence we can get an idea of the later use of the site. The diameter of the bore of the pipe stem can date kaolin clay pipes. Binford (1962:19) gives a formula that, transformed into bore diameters measured in thousandths of an inch, is:

DATE = 1932-2.45 x BORE_DIAMETER

Applying the calculation to the seven kaolin pipe stem sherds from Mac 6 yields an average date of A.D. 1761.

Table 10. Mac 6 Radiocarbon Dates.

Sample Number	Feature Number	C^{14} Date (BP)	Corrected Date (B.C.)
I-5095	6-034	2705 ±95	793–947
I-5133	6-067	4180 ±110	2622–2893
I-6830	6-065	4390 ±110	2900–3115
I-6831	6-081	3970 ±100	2297–2586
Unknown	6-085	4280 ±100	2741–3027
Unknown	6-086	4250 ±100	2665–2940
Unknown	6-097	4155 ±100	2623–2878

There are five glass trade beads in the Mac 6 collection. Using the Kidd and Kidd classification system (Kidd and Kidd 1970:67), all of the Mac 6 beads can be classified as Ia2 S/M op [opaque] Black; they measure about 7 mm in length. Wray (1982:46, 47) lists short opaque black beads like these (Ia2) being found at several sites located within a few km of Mac 6, that he dates between A.D.1745 and 1820.

The musket balls provide little dating information. Shumway (1985:13, 16, 18, 20) cites bore diameters of English rifles made between about A.D. 1730 and 1820. The reported bores range from 0.48 to 0.63 in (12.2–16.0 mm). The Mac 6 musket balls measure about 14 mm in diameter, about midway in this range. It is also possible that the Mac 6 musket balls were meant to be used in either French or Dutch guns. Wray (1985:106) states that Dutch guns have been found in seventeenth-century burials in Western New York State and a French gunflint was found at the Squashpatch Site, a kilometer or so from Mac 6.

Site Utilization

To get some idea of where the various groups lived on the site, I plotted the artifacts for each of the groups represented at Mac 6 on maps of Locus 1. In some cases there were too few artifacts to make a judgment. The Lamoka and Brewerton artifacts seemed to be quite widely scattered over the site. I also made plots of the distribution of the potsherds with similar results. This lack of patterning can be interpreted as being due to many, perhaps short-term, occupations over the centuries. There is no reason to believe that a group of hunter-gathers would choose to live in the exact same spot as their ancestors (or enemies), and in fact, if the occupations were decades or centuries apart, there would be little if any visible evidence of where earlier occupations might have been located.

The locations of the artifacts that reflect the occupancy of the people who lived on the site during the time of European contact, namely the kaolin pipe sherds, the trade beads, and the musket balls, were also plotted. This plot is shown in Figure 7, and indicates a sharp contrast to the plots of the prehistoric occupations. Perhaps this speaks to a single or limited occupation of the site in the late seventeenth or early eighteenth centuries.

If the data about the features had been more complete, the location of storage pits, hearths and secondary refuse disposal pits might have allowed us to make more specific

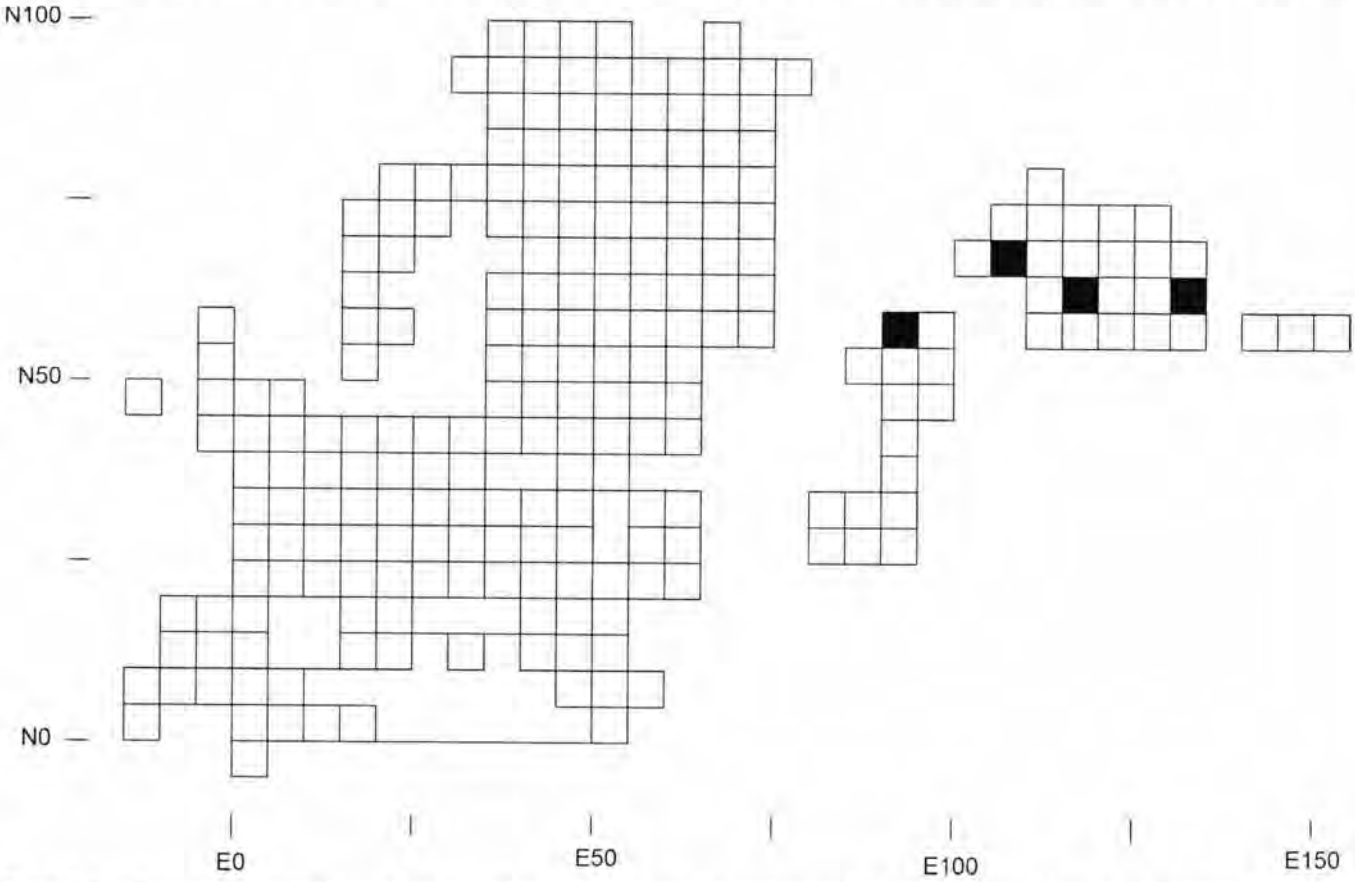

Figure 7. Post-European-contact artifacts at the Macauley 6 Site (Mac 6), Locus 1. From the top left: N65/E105 contained 5 trade beads; N60/E115 contained one musket ball; N60/E130 contained eight pipe sherds; N55/E90 contained two musket balls and two pipe sherds.

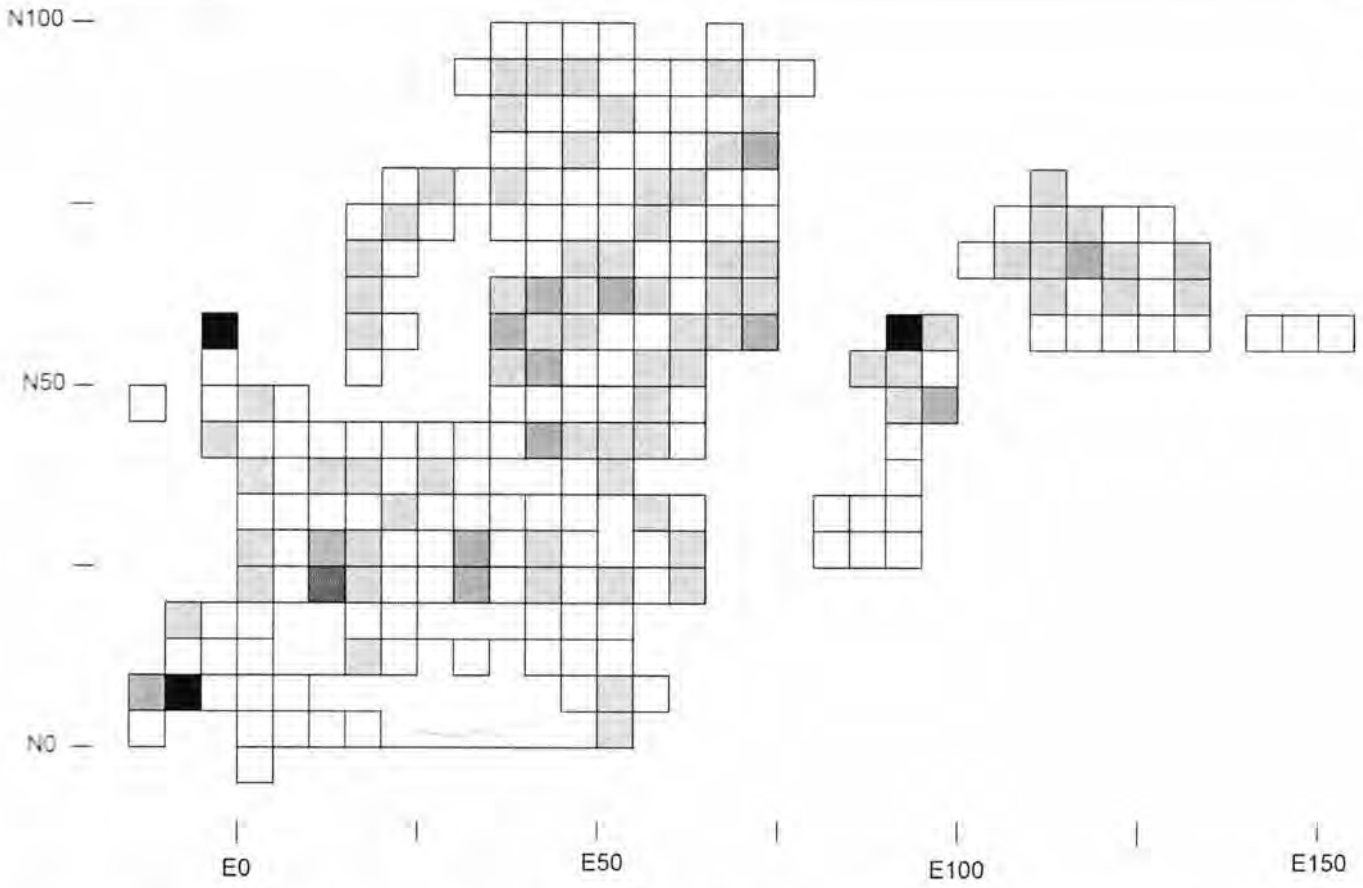

Figure 8. Distribution of debitage at the Macauley 6 Site (Mac 6), Locus 1. Key: 20% shading denotes 1–2 flakes; 35% shading denotes 3–29 flakes; 60% shading denotes 30–156 flakes; 100% shading denotes 157–837 flakes.

statements about where various activities had been conducted at the site. We are left with debitage as a marker of activity areas. These data are plotted in Figure 8, a scatter plot of the debitage. This plot shows several areas that might have been sites of tool manufacture and reworking or locations where chert flakes were placed in a secondary refuse disposal area, which location should have been designated as a feature. From the extant feature data, it appears that unit N55/W5 may have been one such area.

Intensity of Occupation

I was struck by the relatively large number of Lamoka artifacts at the Mac 6 Site, as shown in Table 8. To investigate this apparent anomaly further, I calculated a "points per year of potential occupation" for each of the groups that left artifacts in or on the ground. Using Justice's analysis based on projectile point clusters (1995) regarding the times of occupation and the data from Table 8, I calculated values for points per year (PPY). These are shown in Table 11. Although these calculations probably are only order-of-magnitude, they do provide some hints about who lived on Mac 6 and when. It would appear that the Lamoka phase shows the greatest intensity of use, while the Middle Woodland shows the lowest.

Table 11. Intensity of Occupation.

Group	Occupation	Points	PPY
Lamoka	3500-2500 B.C.	117	0.12
Brewerton	3000-1700 B.C.	33	0.03
Susquehanna	1300-1000 B.C.	23	0.08
Snyders/Jacks Reef	A.D. 100-900 *	8	0.01
Levanna/Madison	A.D. 1000-1500	12	0.03

* Justice (1995) gives A.D. 100 as the beginning of the use of Snyders points and A.D. 900 as the end of the use of Jacks Reef points.

Subsistence

The presence of a large number (252) of netsinkers and fragments indicates that net fishing was a substantial activity and must have provided a portion of the subsistence of the users

of the site. Similarly, the presence of large numbers of projectile points speaks to the probability of hunting as a major activity. The acidity of the soils at Mac 6 seems to have precluded the finding of faunal remains from the prehistoric period. The probable presence of nutmeats indicates that this resource was also a part of the diet of the inhabitants. In fact, given the widespread presence of oaks in the Genesee Valley, it would be surprising if acorns were not a dietary staple. There is no evidence of maize in the collection, although it was most assuredly part of the diet of Late Woodland peoples. Although there were a few mollusk shells in the collection, it seems doubtful that, due to acidity of the soil, they are prehistoric; but rather that they were more recently carried to the site by raccoons or other animals. This, of course, does not mean that shellfish were not part of the prehistoric diet.

Figure 9. Proximal fragment of a drill, notched for hafting.

Some Unusual Artifacts

A Hafted Drill—An interesting chipped stone artifact in the Mac 6 collection is the proximal fragment of a chert drill (Accession Number 6.1598) (Figure 9). The unusual feature of this artifact is the presence of notches that seem to have been made in order to attach a haft to the drill. Such notches

Figure 10. Hammerstone with handle.

are not unknown (see for example the photograph of several notched "perforators" found at the Lamoka Lake site, the type site for the Lamoka phase (Ritchie 1980:70). However this is the first such drill that I have seen among the artifacts from the Macauley sites. In addition, this drill does not look a great deal like those from Lamoka Lake; those drills can be described as being quite "triangular" in overall shape. They look more like very slim projectile points (although not at all like a Lamoka point). Although the "bit" of this artifact from Mac 6 is missing, it is clear from the surviving fragment that it had a "bit" similar to those from sites in Central and Western New York State (See the drills pictured in Ritchie 1980:95, 114, 182, 186, 233), or for that matter, other drills in the Mac 6 collection. It would surely be very efficient to haft a drill and provide the required torque, either with a bow or merely by rotating the haft between the palms. One wonders why this technology was not more common.

A Hammerstone with a Handle—Another unusual artifact (Accession Number 6.0291) (Figure 10) found at Mac 6 is a hammerstone with a "handle." The stone weighs 639 gm (22.5 oz) and is about 17.5 cm (6.9 in) long. Normally we think of a hammerstone as a more or less spherical stone that has been used to strike another object: a small one to knap a spear point, or a heavy one to drive a pointed timber into the ground. Such use usually leaves some marks on the stone that enable us to label it as an artifact. Figure 10 clearly shows the marks that have been made on the face of this tool as it was being used. The unusual feature is what I have called the handle—the part of the stone that extends downward and to the left in the photograph. As can be seen from the photo, a third part, probably 5 to 10 cm long, of the original stone is missing. It is, of course, not known whether this missing portion was present when the stone was used as a hammer. The handle would have afforded the user a significant mechanical advantage. The impacting "head" would be traveling at a much higher velocity than could be obtained by holding a conventional stone in the user's hand. This makes me wonder why many such hammerstones have not been found in the archaeological record. Even Archaic peoples knew about the increase in velocity that could be given to a spear when an atlatl was used—exactly the same principle as exhibited by a hammerstone with a handle. It is even possible, although I do not know this, that Archaic peoples made what we in the twenty-first century would recognize as a hammer by lashing a stone in the forks of a wooden stick. Perhaps the answer lies in the fact that the artifact, as found, was broken; if the tensile strength of sandstone is not great enough to withstand the stresses encountered in pounding, the "handle" would break and I'd say, although this is merely intuitive, that the break would be about in the region exhibited by this example.

Conclusions

Native Americans periodically occupied the Mac 6 Site from as early as 3000 B.C. until about A.D. 1800 as evidenced by projectile points at one extreme and glass trade beads at the other. Early occupants were undoubtedly residentially mobile hunter-gatherers and their presence was sporadic, although the banks of the Genesee may have been a frequent stop on their travels. More sedentary occupants may have arrived at the beginning of the Early Woodland about 1000 B.C. The finding of Vinette I pottery and a few Meadowood points provide evidence of such an occupation. The Jacks Reef and Snyder projectile points are evidence of a Middle Woodland presence at Mac 6 and if we include the use of Vinette I pottery in the Middle Woodland period, the ceramics data do not contradict this. Late Woodland occupation is in evidence by the triangular points and the pottery. Post-contact occupation is apparent from the presence of trade goods: glass beads, kaolin pipes, and musket balls.

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Appendix

Scraper Edge-Angle Measurement and Its Significance

When I first measured the angle of the working edge of prehistoric chipped stone scrapers, I think I was motivated by the quotation on the title page of my sophomore physics text, ascribed to Lord Kelvin (William Thomson), the nineteenth-century British physicist:

> When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.... [Thomson 1883].

The obvious next thing was to plot a histogram of the data and calculate the average. The average was 58.9 degrees and the histogram is shown in Figure 2. That done, I began to wonder what these data might mean about the uses to which scrapers were put and what they might tell us about the people who used the scrapers.

Uses of Scrapers

First a small digression on the probable uses of scrapers by prehistoric peoples: My own assumptions, either the results of intuition or long-forgotten education, were that scrapers were used to remove hair and flesh from hides, and were used to form objects of wood or bone. Wilmsen (1970:70) adds shredding (of plant materials), and working horn. Ray (1937:304) reports finding scrapers in Texas with iron oxide on their edges.

Edge angle vs. Use-Life

Wilmsen (1970:71) suggests that the mechanics of resharpening a scraper results in the steepening of the edge angle. Morrow (1997:77, 84) reports some experimental evidence that an edge angle increases about 2 degrees each time an edge is resharpened. Both Morrow and Blades (2003) have used this fact to try to draw some conclusions about mobility of the users of the scrapers. My critique of this use of the data is that both of them make an implicit assumption that the assemblages they used in their studies contained tools that had been discarded. My experience with the Macauley projectile point assemblages is that they contain about two-thirds as many functional points as point fragments. I interpret this as meaning that many of the points in the assemblages were lost, not discarded. I see no reason not to expect the same for scrapers.

Other Researchers' Measurement of Edge Angles and Their Data

I have found four references to researchers who have measured edge angles of scrapers. All four are concerned with "paleo-scrapers." While my data are not from a Paleo-Indian site, it seems not illogical to assume that efficient edge angles should be similar irrespective of the time of use; the tasks for which scrapers were used must have been the same. Blades (2003) measured edge angles of assemblages from France. Wilmsen (1970), Morrow (1997), and Swader (2009) measured edge angles of Paleo-Indian scrapers from sites in the United States. Swader also has data from a Late Woodland (Oneonta) site in Wisconsin. Table A1 lists the data presented by these other researchers.

I'm not sure what to make of these data. The Mac 6 Site angles are substantially smaller than most of those in the cited references, but perhaps not extremely so. Wilmsen suggests (1970:71) that different edge angles were used for scraping different materials. In fact, one of his data sets has a bimodal distribution, which would suggest such an interpretation. Other possibilities that come to mind:

- Chert may have been more "precious" to other people than to western New Yorkers and they didn't lose their tools so readily; hence they may have continued to resharpen them.
- Others may have used their scrapers past the optimal edge angle because chert for new ones was "precious."

Table A1. Measurements of Edge Angles.

Study	No. of Assemblages	Avg. Edge Angle
Blades (2003:148)	3	78
Wilmsen (1970:64)	7	55–68
Morrow (1997:80)	7	68–78
Swader (Paleo)(2009:19)	1	61
Swader (L. Woodland)(2009:19)	1	82

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The Macauley 7 Site: A Native-American and Historic Site in Livingston County, New York

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The Macauley 7 Site (Mac 7) (Cda 44) is one of the sites located a few kilometers south of the village of Geneseo, New York that are collectively known as the Macauley Complex. Field school students from SUNY Geneseo excavated the site in the 1970s and 1980s. Dr. Wendell Rhodes, then Chair of the Department of Anthropology at SUNY Geneseo, directed the work of the students. This document is a result of a review of the artifacts from those excavations and the extant documentation relating to the excavation.

Site Description

The site is located a few hundred meters north of the confluence of the Genesee River and Canaseraga Creek on the first terrace of the east bank of the Genesee. The site is indicated on the map in Figure 1, a portion of the USGS topographic map of the Geneseo quadrangle. As can be seen from the figure, the site is from 50 to 80 ft (15 to 24 m) above the river. East of the site the terrain slopes gradually to a ridge about 3 km distant and 180 m above the site. West of the Genesee River is a plain that is the former bed of a periglacial lake called Lake Geneseo (Muller et al. 1988:126). This lake was two or three km wide at this point and extended south to near Dansville and north to near Fowlerville. The northern portion of the plain is now the floodplain of the Genesee River.

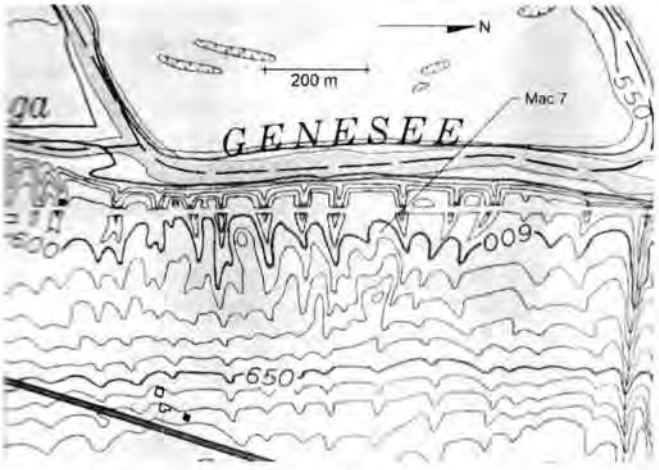

Figure 1. Map showing location of the Macauley 7 Site (Mac 7). The map is copied from USGS topographical map of the Geneseo quadrangle, dated 1978.

The soil at the site is Ottawa loamy fine sand, rolling phase (USDA 1956:map 3, 72). The soil below the plow zone is " ...very strongly acid ...." Core samples were taken by the excavators of Locus 3—one of three areas excavated at the site—and the plow zone was found to be 9 in (23 cm) deep. The results of this core sample agree with the USDA Soil Survey cited above. Notes on at least one tag from Locus 1 reports the transition between mantle and sand to be 5 ¼ in (15 cm); this would indicate that not all the site had been plowed.

Sources of Data

Artifacts

The artifacts themselves and the tags that are in the bags are the primary sources of the data on which this report is based. The tags in the artifact bags contain fields for the unit number from which the artifact came, the date of excavation, the depth at which the artifact was found, the names of the excavators, and a remarks field.

Extant records:

- The Unit Record sheets (UR sheets) that field-school students completed as they were doing the excavation.
- The Inventory Record sheets (IR sheets) that list the artifacts found in each of the excavated units. These seem usually to have been completed within a few days of the excavation.
- The existing notebooks that were completed by the field-school students.

Excavations

There were three major areas of excavation at the Mac 7 Site:

Locus 1

Locus 1 contained 16 units. Eleven of these were clustered around N0/E0 but there were four units centered at N0/E140, and a single unit at N100/W5.

Locus 1 was excavated in 1973, 1974, and 1975. The units in Locus 1 were 5 ft by 5 ft square. A map of the units in Locus 1 is shown in Figures 3, 5 and 7.

Locus 2

A new datum was used for Locus 2, the location of which with respect to the datum for Locus 1 is unknown. Twenty-two units were dug at Locus 2 in 1987 and 1988. These units were also 5 ft square. A map of the units in Locus 2 is shown in Figures 4, 6, and 8.

Locus 3

A report in the files entitled "Site Report—Mac 7—Mound" written by a group of student excavators states that the location for Locus 3 was chosen because there was a hillock there that was thought to be a possible foundation of a building. There is no indication in the report as to where Locus 3 was in relation to Locus 1 or Locus 2. The excavation at Locus 3 consisted of two trenches, labeled "N-S Trench" and "E-W Trench." According to the text of the report, the E-W trench was 25 ft long (five 5 by 5 units) and the N-S trench was 20 ft long (four units). The trenches formed an "L," opening to the southwest. Outside this pair of trenches was a "Rock Pile," the precise location of which is unclear. The map in the report shows it 5 ft (1.6 m) south of the E-W Trench and parallel to it. A student notebook shows the rock pile at the west end of the E-W Trench and at an angle to it. I favor the notebook location inasmuch as the sketch was made by the excavator. The report states that Locus 3 was dug with shovels and the dirt was screened for artifacts. From the depth data on the tags it appears that the excavation stopped, arbitrarily, at a depth of 15 in (38 cm).

Table 1. Chipped Stone Artifacts.

Category	Count
Biface fragment	12
Cache blade	1
Core	3
Debitage	5126
Drill/fragment	7
Knife/fragment	5
Point/fragment	56
Point perform	6
Scraper	5
Utilized flake	1
Missing/unidentified	2
Total (excluding debitage)	**98**

Table 2. Rough Stone Artifacts.

Category	Count
Chert nodule/fragment/pebble	9
Hammerstone/anvilstone	7
Muller	1
Total	**17**

In addition to the three loci described above, ten 2 ft by 2 ft test pits were dug in 1974, the exact location of which is unclear. There are two conflicting descriptions of the location of these excavations. Probably the best information we have is contained in a document in the files entitled "Macauley 7." This document states that the test pits were on "... a small intermediate ridge immediately south of the Mac 7 ridge and north of the Mac 6 ridge...." The topographic map in Figure 1 does show a ridge near the south edge of Mac 7.

There is no record of the screen size used at the Mac 7 Site. In the 1970s usual screens were ¼ in mesh.

Artifactual Data

Lithics

Three classes of lithic artifacts were found at the Mac 7 Site: chipped stone, rough stone, and ground stone. The chipped stone artifacts number 98, exclusive of debitage, and are detailed in Table 1. Two of the drill fragments were unusual; they were proximal fragments and were notched as if they were intended to be hafted. A similar drill fragment was found at the adjacent Mac 6 Site. Biface fragments are those bifaces that I was unable to categorize further. Rough stone artifacts totaled 17 and are shown in Table 2. Ground stone artifacts numbered three: two gorget fragments and a nutstone.

Ceramics

There were both prehistoric and historic potsherds excavated at the Mac 7 Site. The prehistoric potsherds numbered 70 and are listed in Table 3. There were also 78 sherds that were historic, all from Locus 3. They are detailed in Table 4.

Glass

There were a number of shards of glass uncovered at the Mac 7 Site (see Table 4). The flat glass shards are probably window glass. Two shards are of what is called "black glass;" they are discussed in detail below.

Table 3. Prehistoric Potsherds.

Category	Count
Bodysherds	
Plain	65
Decorated	1
Rimsherds	
Plain	1
Decorated	3
Total	**70**

Table 4. Historic Artifacts from Locus 3.

Potsherds	
Creamware, green design	6
Redware, lead-glazed	8
Stoneware	7
Whiteware, undecorated	41
Whiteware, blue design	12
Unknown	4
Total	78
Glass	
Black glass fragments	2
Container glass shards	4
Flat glass shards	5
Unknown	4
Total	15
Metal	
Buttons	3
Nails	10
Sheet, steel	6
Sheet, not steel	1
Unidentified	5
Total	25

Metal

Metal artifacts are listed in Table 4. The nails all have a rectangular cross section. Of the seven artifacts made of sheet metal, six were fragments of flat sheets; one was rolled into a cone. Several of these artifacts were made of a material that resisted corrosion, perhaps pewter.

Faunal Artifacts

There were 18 bags containing more than 164 bones or bone fragments (two bags contained so many fragments that I did not count them). Based on the acidity of the soil, I judged them all to be historic. Similarly two bags contained claw fragments, also judged to be historic. The only possible prehistoric faunal remains were fragments of 15 teeth:

- Five bear or pig fragments
- Three white-tailed deer fragments
- One unidentified non-human fragment
- Six unidentified fragments.

Floral Ecofacts

Three small fragments of bark, one of which was charred were found at the site.

Features

The reports of features raise almost as many questions as they answer. For this reason, the following is a narrative description of possible features as indicated by notes on UR sheets and the tags in the artifact bags. The reader can judge whether the information leads to the conclusion that a feature was unearthed. The feature numbers are mine.

Feature 7-01: Locus 1, N0/E0

The tag for artifact 7.093 reads: "Found in association with possible rock features." The UR sheet shows the location of the artifact in the southeast corner of the unit. It shows three rocks from 4 to 8 in away. There is no mention on the UR sheet of soil discoloration or other artifacts in close proximity. My judgment is that there is no association between the artifact and the rocks; in short, there is no feature here.

Feature 7-02: Locus 1, N0/E5

The data for the following description comes from the two UR sheets for this unit, completed a few days apart, and from five of the tags from this unit. The earlier UR sheet (dated 7/6) shows widely scattered rocks in the unit with a concentration about 10 or 12 in (25 or 30 cm) in diameter just east of center in the unit. The second UR sheet, dated 7/10, and presumably deeper in the unit, shows less overall scatter but an oblong concentration 10 or 12 in (25 or 30 cm) wide and two ft (60 cm) long north of the concentration in the layer above. A note on this UR sheet reads: "Rocks: approx. 6 [in]–8 [in]." It seems plausible that these two sketches represent the same concentration of rocks. One tag refers to a "rock feature;" another tag to a "possible rock feature." There is no mention of fire-reddened soil, charcoal, or ashes. It seems this is an enigmatic "rock feature" and there is not enough information to further characterize it.

Feature 7-03: Locus 1, N0/E135

The only record of this possible feature is a bracket and associated note on the UR sheet for N0/E135, dated 9/29/73. The bracket is located at the bottom of the plan view of the unit and extends from about 28 to 40 in (70 to 100 cm) east of the west wall of the unit. The note reads: "Charcoal 7[in]–20[in]." This suggests a secondary refuse pit about 12 in (30 cm) in diameter and 13 in (33 cm) deep. Strongly mitigating against this possibility is that there are no other artifacts in this region on this or other UR sheets for this unit. The lack of information precludes even a guess as to whether this was a feature.

Feature 7-04: Locus 1, N5/E0

Two records of this possible feature exist:

- A note on the UR sheet (7/13/73) that reads: "found near stone were several small charcoal chips—possibly pieces of charred nuts."
- The 'Remarks' field on tag 7.320 reads: "Charcoal and possibly charred nuts found with stone." The "stone" referred to is an anvilstone, found 14 in (25 cm) deep near the NE corner of the unit. Probably it is unwise to make too much of the differences between these two statements of the charcoal/charred nuts. It is tempting to suggest that this is a secondary refuse pit, but there are no other indications of this on the (several) other UR sheets for this unit that are from different levels in the unit. Perhaps, if there were really charred nuts found, they were in an animal burrow. Another possibility is that this is the remains of a hearth. The anvilstone that was near the charcoal is slightly reddened, perhaps by fire, tending to support the hearth hypothesis. There doesn't seem to be enough information to make a judgment about whether this was a feature.

Feature 7-05: Locus 1, N10/E0

The sketches on the UR sheets for this unit show a "battleship" progression of the presence of chert flakes in this unit. The sheet dated 7/10 has a semicircular outline near the center of the west wall and a note indicating a "concentration of larger flint chips." A sheet dated 7/12 shows a larger outline, 12 in or so (30 cm) wide following the west wall north from the center to the north wall and then eastward for about 3 ft (90cm). A third UR sheet, also dated 7/12, shows a narrower area along the west and north walls. These sketches are borne out by the chert flake counts. The spread of the flakes appears to me to evidence an activity area rather than a disposal area.

Feature 7-06: Locus 1, N10/E0

This possible feature is recorded on the UR sheet dated 7/13/73. An area about 8 by 24 in (20 by 60 cm) is shown on the UR sheet centered at the north wall of the unit. From the date on the UR sheet I infer that the area is 11 in (28 cm) or more below the surface. The sketch implies that the area extends northward beyond the bounds of the unit. The note on the UR sheet reads: "substantially sized pieces of charcoal (burned nuts) near 2 large firebroken rocks." Although there is no mention of fire-reddened soil, this could be the remains of a hearth.

Feature 7-07: Locus 2, N0/E50

This possible feature was identified by the fact that five point preforms were found within a few inches of each other and all at 10 in (25 cm) depth. This led me to speculate that perhaps they were part of a cache. A more extensive analysis of the contents of the unit revealed that almost all the artifacts from the unit were found at about this same depth. One way to explain this is that this was a work area for tool production that was abandoned. Another possibility is that it was a later cache that was buried at a depth that, by chance, ended up at the same depth as the other artifacts in the unit. Without further information, either explanation seems plausible.

Feature 7-08: Locus 2, S5/E10

The S5/E10 UR sheet shows the outline labeled "FTR#1" that is an oval about 30 by 48 in (75 by 120 cm) in size. A note on the front of the UR sheet reads: "a possible fire hearth ...." A note on the obverse side of the sheet reads: "21 rocks almost forming a circle 6 [in. depth]." There is no mention of charcoal, ashes, or fire-reddened soil. A point pre-form (7.231) was found within the oval at the same depth. It shows no evidence of potlidding or fire reddening. There is not enough evidence to say that this was a hearth.

Feature 7-09: Locus 2, S5/E20

The record of this possible feature is on the UR sheet for S5/E20 and an accompanying stratigraphic drawing. The UR sheet shows a "blackened area," 11 in (28 cm) deep and about 14 in (35 cm) wide in the N–S direction and 18 in (45 cm) long in the E–W direction. A note on the UR sheet reads: "several large flint chips found at the same depth—also several fire-cracked rocks." The stratigraphic

drawing shows a basin-shaped feature about 7 in (18 cm) deep. There are no chert flakes in the collection that are specifically assigned to this area of the unit. This is probably a hearth, based on the size and shape of the feature and the "blackened earth" statement on the UR sheet.

Feature 7-10: Locus 2, S10/E0

The only record of this possible feature is on the UR sheet for the unit. It shows a roughly circular area about 10 in (25 cm) in diameter labeled "Burn Area." There is no record of what characteristics the excavator used to form this conclusion. There is no profile drawing, nor is there any indication of the depth of the "burn area." The data are too limited to make an identification.

Feature 7-11: Locus 3, Rock Pile

There is no extant record of whether the pile of rocks was at the surface or buried. The only hint is a statement in the "Site Report—Mac 7—Mound:" "Once test trenches were ... depleted ... a further site survey of the mound area was done. This revealed a huge rock formation..." It seems plausible that the rock pile was buried or else it would not have required a "survey" to discover it. Furthermore, according to the report, the hillock was first thought to be a foundation. Had the rock pile not been buried, the students, apparently eager to find a foundation, probably would have started their excavation there. It is evident that this "rock pile" is a feature. The question remains as to whether it was made by prehistoric people or by a historic farmer clearing his field of rocks. The only information in the records is that none of the artifacts were found among the rocks. Neither is there any record of finding charcoal or fire-cracked rock in the "rock pile." If there was no charcoal or fire cracked rock in the feature, that probably rules out an earth oven and the default explanation is that it is an historic feature.

Feature 7-12: Locus 3, Rock Pile

The evidence for this possible feature is on the UR sheet and a student notebook entry by the excavator. The UR sheet contains a sketch showing a roughly circular area near the SE corner of the excavation. The accompanying note reads: "fire-pit ashes and charcoal inside rock pile quad. 6 [in]–10[in]." The notebook contains a similar sketch and the statement: "After removing many rocks by shovel ...we... uncovered a fireplace pit..." The latter makes me think the 6-in dimension on the UR sheet refers to the depth of the possible fire pit below the ground level. The above data are not complete enough to make a statement other than that this was a possible hearth.

In summary, probably only two (Features 7-05 and 7-09) of the twelve possible features have enough data to adequately characterize them. Feature 7-11 is also a feature but it is uncertain what its origin was—either in time or function.

Analysis

One gets a sense from a cursory look at the data that the kinds of artifacts from the three loci are different from each other. Table 5 quantifies these differences. The numbers in the "Other" entries in the table do not include bone, all of which I judged to be historic. The numbers in parentheses represent teeth and charcoal, which may be either prehistoric or historic. The data in the table show quite clearly that Locus 3 is a historic component and that Loci 1 and 2 are prehistoric. Hence I shall lump Loci 1 and 2 together for most of the analysis and treat Locus 3 separately.

Time of Prehistoric Occupation

In the absence of radiocarbon dates, the lithics and ceramics provide the best source of data regarding the times of occupation of the site by prehistoric people. The occupation was probably episodic; the banks of the Genesee were presum-

Table 5. Artifacts by Locus.

Artifact	Locus 1	Locus 2	Locus 3
Prehistoric			
Lithic	57	46	8
Potsherd	58	4	3
Other	(1)*	-	(15)*
Historic			
Potsherd	-	-	78
Other	-	-	40

*Represent teeth and charcoal which may be either prehistoric or historic.

Table 6. Projectile Points and Fragments—Loci 1 and 2.

Point Style	Count
Lamoka	14
Brewerton	9
Susquehanna Broad	6
Meadowood	4

Figure 2. Middle Woodland potsherds from the Macauley 7 Site (Mac 7). They are identified as probable Point Peninsula Corded.

ably visited often by bands of foragers and collectors. Probably the river afforded resources of fish and shellfish and, no doubt, gave easy access to transportation. The length of stay is indeterminate, although the presence of pottery is evidence that the occupation was probably more sedentary than a hunting or fishing camp.

One marker of the period of occupation is the projectile point styles found at the site. These data are shown in Table 6. The table gives the count of the projectile points and identifiable point fragments that were found in Loci 1 and 2 using the cluster concept developed by Justice (1995). The Lamoka and Brewerton points date to the Late Archaic; the Susquehanna Broad points are from a transitional period between the Late Archaic and the Early Woodland; and the Meadowood points are from the Early Woodland..

The potsherds show a slightly different picture. Pottery came to the northeast at the beginning of the Early Woodland period. In fact, it is the use of clay pots that marks the beginning of the Early Woodland. The earliest pottery style found in New York State is classified as Vinette I. The Middle Woodland lasted from about A.D. 200 to A.D. 900. Loci 1 and 2 yielded 13 Vinette I sherds. I judged three rimsherds to be of Middle Woodland vintage, based on the style and workmanship of the decoration. The two refit rim sections containing these sherds are shown in Figure 2. I have classified them as probable Point Peninsula Corded (Ritchie and MacNeish 1949:102). Although no projectile points from the Middle Woodland period were found at the Mac 7 Site, the pottery makes it clear that the site was occupied during this period.

In sum the evidence from the projectile points and potsherds is that these portions of the site were occupied in the Late Archaic, as well as the Early and Middle Woodland periods. There is no evidence that the portion of the site covered by Locus 1 and Locus 2 was occupied in the Late Woodland period or in the time after European contact.

Prehistoric Site Utilization : Loci 1 and 2

In order to obtain some sense of the way Locus 1 and Locus 2 were used by their inhabitants, I made several density plots. Figure 3 shows the density of lithics at Locus 1 and Figure 4 shows the lithics density at Locus 2. These plots are unremarkable except that the density is somewhat higher at Locus 1. The plots of potsherds found at Locus 1 and Locus 2 are shown in Figures 5 and 6 respectively. These plots show three interesting characteristics:

- A heavy concentration of potsherds in the area of Locus 1 centered at N0/E140;
- Very few potsherds at Locus 2; there were four sherds, all in one unit;
- A relative paucity of potsherds at either Locus 1 or Locus 2.

Although the excavated units in both Locus 1 and Locus 2 tend to be concentrated in a few areas, the ceramics data

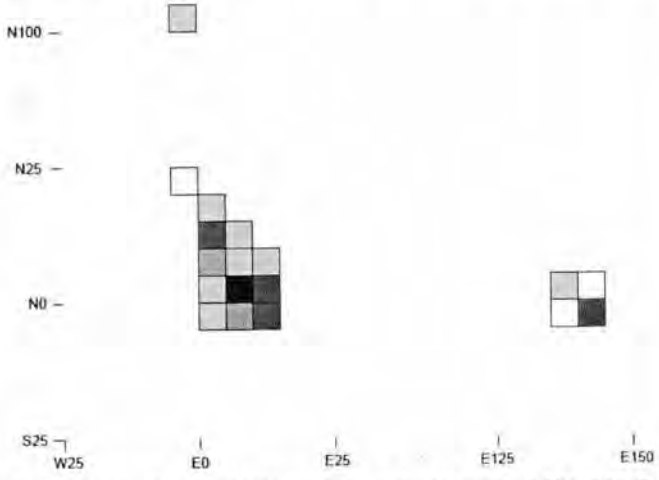

Figure 3. Distribution of lithic artifacts at the Macauley 7 Site (Mac 7) Locus 1. Key: 20% shading denotes 1–2 artifacts; 35% shading denotes 3–4 artifacts; 60% shading denotes 5–8 artifacts; 100% shading denotes 9–15 artifacts.

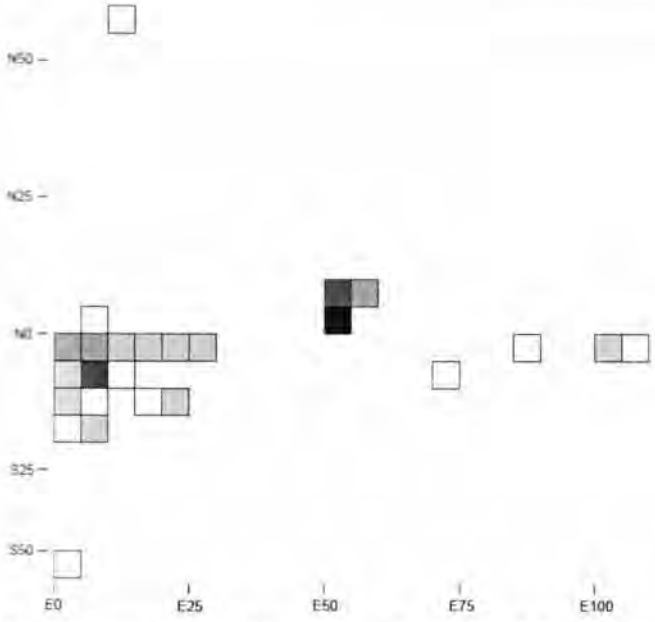

Figure 4. Distribution of lithic artifacts at the Macauley 7 Site (Mac 7) Locus 2. Key: 20 % shading denotes 1–2 artifacts; 35% shading denotes 3–4 artifacts; 60% shading denotes 5–8 artifacts; 100% shading denotes 9–15 artifacts.

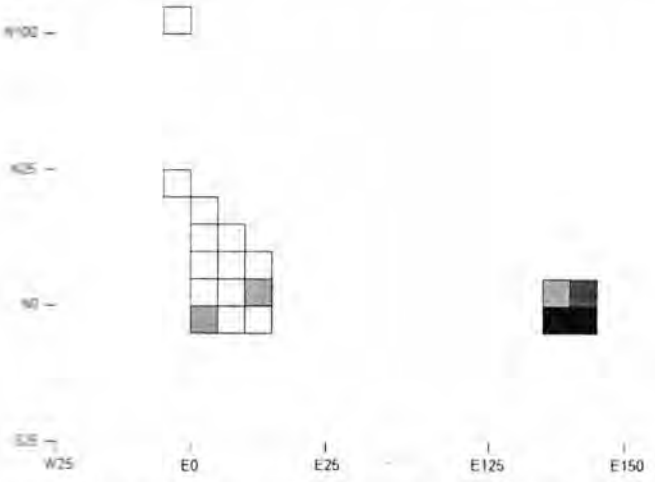

Figure 5. Distribution of potsherds at the Macauley 7 Site (Mac 7) Locus 1. Key: 35% shading denotes 3–5 sherds; 60% shading denotes 6–10 sherds; 100% shading denotes 11–21 sherds.

we have show Early and Middle Woodland occupation at Locus 1 and Early Woodland occupation at Locus 2.

Another characteristic of the site is apparent in Figures 7 and 8, which are plots of the density of debitage at Locus 1 and Locus 2, respectively. These plots show much debitage in almost all the units at both loci, implying that both these areas were sites of intensive tool manufacture and/or reworking during one or more periods of occupation. There were about four times as many chert flakes per unit at Locus 1 and 2 of Mac 7 as at Mac 6, the adjoining site.

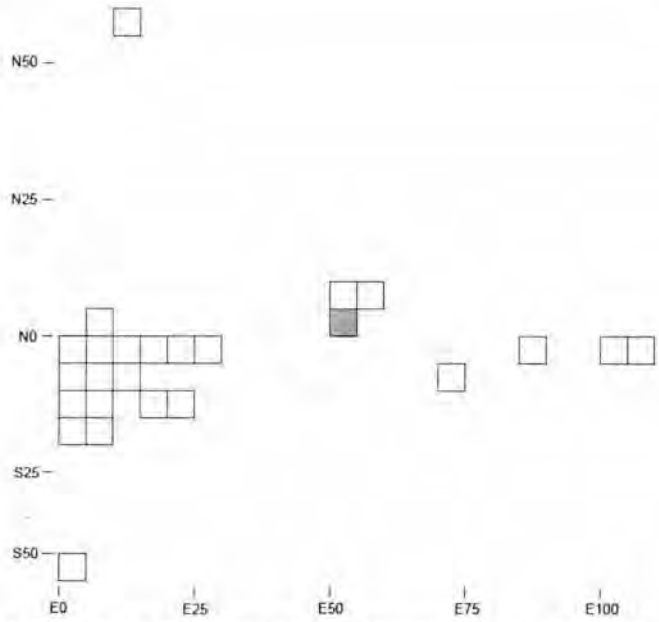

Figure 6. Distribution of potsherds at the Macauley 7 Site (Mac 7) Locus 2. Key: 35% shading denotes 3–5 sherds.

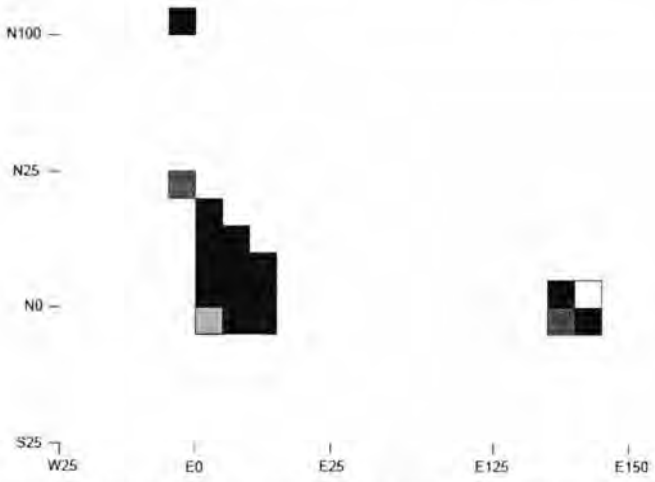

Figure 7. Distribution of debitage at the Macauley 7 Site (Mac 7) Locus 1. Key: 35% shading denotes 6–24 flakes; 60% shading denotes 25–119 flakes; 100% shading denotes 120–585 flakes.

The combination of the high count of debitage and the relatively few potsherds at the site leads me to speculate that perhaps the site was primarily a tool making/reworking site, at least for most of its periods of habitation. Had there been more information about features at Mac 7, we might have been able to infer more about the activities at Locus 1 and Locus 2.

Intensity of Prehistoric Occupation

A rough idea of the number of people that used the site at various time periods can be obtained by the use of a concept

I have called "intensity of occupation." The metric of this concept is "points per year of occupation" (PPY). This metric uses the styles of projectile points as a means of assigning time periods. Using the information in Justice (1995) about the periods of use of point styles and the data from Table 6, I calculated the following values for points per year (PPY) (Table 7). Although these calculations are only order-of-magnitude, they do provide some hints about who lived on the Mac 7 Site and when. The Susquehanna PPY is by a factor of four greater than that of the Lamoka, and a factor of ten greater than the Brewerton or the Meadowood.

Prehistoric Subsistence

Other than the projectile points, there is no archaeological evidence regarding the subsistence of the occupants of the Mac 7 Site. The high incidence of netsinkers at other Macauley sites is not evident at Mac 7; however, it is difficult to believe that the river did not provide fish and shellfish for the occupants. Projectile points imply hunting of game animals, but the acidity of the soil may be credited for the relative lack of prehistoric faunal remains at the site.

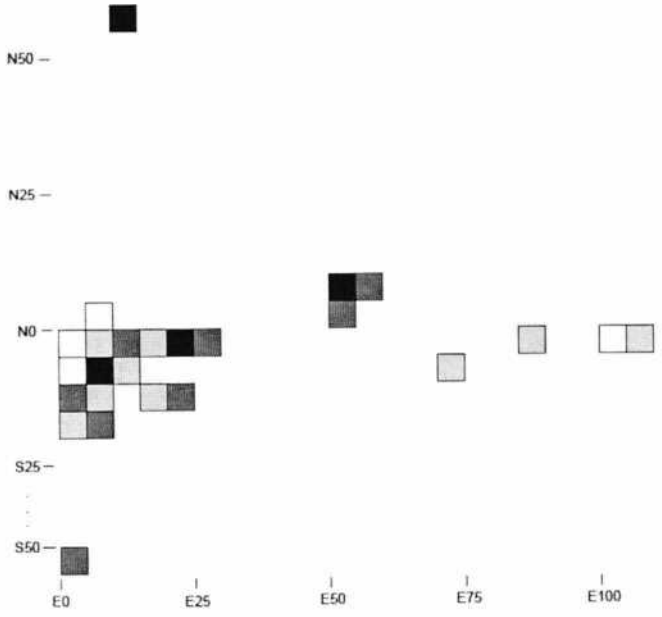

Figure 8. Distribution of debitage at the Macauley 7 Site (Mac 7) Locus 2. Key: 20% shading denotes 1–5 flakes; 60% shading denotes 25–119 flakes; 100% shading denotes 120–585 flakes.

Historic Occupation: Locus 3

Although there are a few prehistoric lithics and potsherds at Locus 3, it is almost surely predominantly an historic component. There is no evidence that the "rock pile" was an earth oven and the majority of the other artifacts are clearly historic. The historic artifacts that were found at Locus 3 are shown in Table 4. The data in that table furnish some clues to the time Locus 3 was used.

- The redware dates to the early nineteenth century. The whiteware is probably somewhat later, probably the mid-nineteenth century (Kristi Krumrine, personal communication 2013).
- The flat glass dates to the twentieth century. Glenny Glass Company 2004 (www.glennygls.com/).
- Judging by their thickness, the container fragments are twentieth century.
- "The 'black glass' is actually very dark olive-green..." McKearan and McKearan (1948:423) (see discussion below).
- As mentioned above, the nails have a rectangular cross section, but have rectangular heads. This dates them to the early nineteenth century (Sutton and Arkush 1998:167).
- The sheet steel fragments are very corroded. Their age is indeterminate.
- The lightly corroded metal objects are also of undetermined age.

It seems likely that the flat glass fragments, the nails, and perhaps the sheet metal fragments point to a structure on the site.

The "black glass" is actually very dark olive-green. McKearan and McKearan (1948:423) state that "The demand for wine bottles blown from very dark olive-

Table 7. Projectile Point Styles as Indicators of Intensity of Occupation.

Point Style	Occupation Period	Points	Points Per Year	Source
Lamoka	3500–2500 B.C.	14	0.014	Justice 1995: 115
Brewerton	3000–1700 B.C.	9	0.006	Justice 1995: 127
Susquehanna	1300–1200 B.C.	6	0.06	Justice 1995: 167
Meadowood	1300–500 B.C.	4	0.005	Justice 1995: 170

green... glass known as black glass led to the establishment of many glass houses [in England] in the late seventeenth and early eighteenth centuries." Examples of the use of this glass, made in the United States until at least the middle of the nineteenth century, are illustrated in several plates in that volume. Both bottles and other objects are illustrated. A black glass button was recovered in the fill from a grave at the Boughton Hill Site near Victor, New York (Wray and Graham 1966:13). Boughton Hill was the location of a large Seneca town that was destroyed by the French in 1687. Graham (1964:opp.181) also has a photograph of a number of black glass buttons from unnamed Seneca sites. Thus it seems certain that black glass objects were known to the Seneca. However, the Mac 7 black glass shards are far too large to have been button fragments. Furthermore, there is no other evidence that Mac 7 was occupied by Native Americans after the Middle Woodland period, which ended about A.D. 900. My conclusion is that the Mac 7 black glass shards are detritus left by the colonial settlers.

Conclusions

The Mac 7 Site contained three loci, two of which are prehistoric occupations. The lithic artifacts from these two loci point to the Archaic and Early Woodland periods. There are some potsherds that probably date to the Middle Woodland period. An unusually large quantity of chert debitage indicates that the site was the location of considerable tool manufacture or reworking. The lack of information about the features that may have been present at the site seriously limits the further characterization of the site. The artifacts from the Locus 3, the historic locus, indicate that this area was used from perhaps late in the seventeenth century, and surely from early in the eighteenth century into the twentieth century.

Acknowledgements

Thanks are due to Dr. Rose Marie Chierici, Chair of the Department of Anthropology, for allowing me to have access to the artifacts from the Mac 7 Site, and for supplying a workspace and computer. Dr. Paul Pacheco helped identify several of the more obscure artifacts and supplied helpful suggestions. Kristi Krumrine identified the teeth and the historic pottery. Esmeralda Askenas checked much of the data in the tables in this report. Without these persons, this work could not have been completed nearly so well. Any errors are, of course, my responsibility.

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The Squashpatch Site

Richard N. Maxson, State University of New York at Geneseo

The Squashpatch Site (Nda 032) is one of the fourteen sites cumulatively known as the Macauley Complex, located in Livingston County, New York. Squashpatch is somewhat removed from the rest of the Macauley Complex; it is on the south bank of Canaseraga Creek, about 0.6 km upstream from its confluence with the Genesee River. Field schools from SUNY Geneseo excavated the site in the mid-1970s under the direction of Dr. Wendell Rhodes, then chair of the Department of Anthropology at Geneseo. This report is based on the artifacts and documentation from those excavations that are extant at the Department of Anthropology at SUNY Geneseo. Dr. Rhodes seems to have surmised that the Squashpatch Site was at or near an Indian village destroyed by General Sullivan on his military expedition to this area in 1779. Two student notebooks from the excavation contain what appear to be notes from a lecture by Rhodes to the field school. The Appendix includes excerpts from these notes, along with an assessment of this possibility.

Site Description

The Squashpatch Site (Nda 032) is located on the first terrace of the eastern bank of Canaseraga Creek, a tributary of the Genesee River. A map showing the site location is in Figure 1, a photograph of a portion of the USGS 7.5' topographical map of the Sonyea quadrangle. The contour interval is 20 ft. The site is about 40 ft (12 m) above the streambed. Canaseraga Creek is an underfit stream that flows through the southern portion of the former bed of Lake Geneseo, a periglacial lake that extended from Fowlerville, New York south to Dansville, New York (Muller et al.1988). At the site, the creek is at the eastern edge of the former lakebed. East of the site, the terrain rises gradually to a ridge about 6 km east and 200 m above the site. Drainage from this slope has left many gullies cut into the soils that formed the banks of Lake Geneseo. Two of these gullies bound the site to the north and south. The topographical map, from which the figure is copied, is dated 1972 and is probably a good representation of the terrain as it existed at the time of the excavations. Since then the site has changed significantly; a superhighway (I-390) now covers the site. The soil at the site was Odessa silt loam, very gently sloping phase.

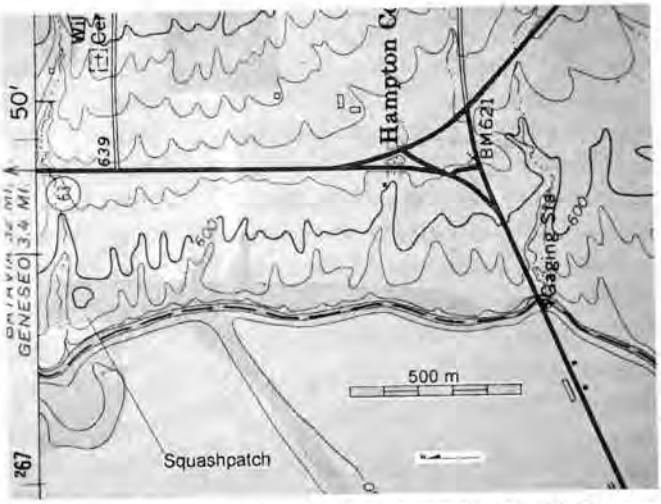

Figure 1. Map showing location of the Squashpatch Site (Nda 32). The map is copied from USGS 7.5' topographical map of the Sonyea quadrangle, dated 1972 (photo inspected 1976).

The USDA Soil Survey for 1956 describes it as:

> This soil formed in highly calcareous [containing calcium-carbonate] clays and silts that were deposited in glacial lakes.... The surface soil... is medium to slightly acid in reaction. The upper subsoil is neutral, and the lower subsoil, alkaline [USDA 1956:map 3, 72].

At the time of the excavation, the land had been used for agriculture and the excavations showed plow scars, evidenced by several references in the student notebooks.

Sources of Data

The primary source for the data that underlie this report is the artifacts themselves. In the 1990s the original paper bags that contained the artifacts were replaced by polyethylene bags and the information that was written on the bags was transcribed onto tags that were placed in the bags. Almost no written records of the Squashpatch Site excavation are extant except several of the student notebooks. Many references to "a student notebook" will be found in this report.

Excavations

The Squashpatch Site was excavated in the summers of 1976, 1977, and 1978. In 1976 the site was laid out in a 5 ft by 5 ft grid. In 1977, a new datum was established and the grid was changed to 2 m by 2 m. The 1978 excavations were on the same grid as the 1977 excavations. The exception to this practice is the excavation of Feature 5, which had been discovered at the end of the 1976 season and only partially excavated. Two more 5 ft by 5 ft units were excavated at the beginning of the 1977 season to complete the excavation of the feature. Sixty-five 5 ft square units were excavated in the 1976 field school and thirty 2 m by 2 m units were excavated in the 1977 and 1978 field schools. A number of 2 ft by 2 ft test pits were also dug in 1976, but some of their locations are not now known with precision.

In order to map the entire site, I transformed all the coordinates to meters and established yet another datum, this one outside the southwest corner of the excavated area.[1]

Table 1. Chipped Stone Tools.

Description	Count
Biface fragment	17
Core	2
Drill/fragment	9
Knife/fragment	3
Point/fragment	86
Point perform	2
Retouched/utilized flake	2
Scraper/fragment	13
Total	**134**

Table 2. Ground Stone Tools.

Description	Count
Chopper	1
Mano/muller	2
Pestle/fragment	2
Total	**5**

Table 3. Rough Stone Tools.

Description	Count
Hammer/anvilstone	14
Netsinker/fragment	10
Total	**24**

[1] The details of this transformation are presented in the Squashpatch Report, dated October 4, 2011, in the files in the Department of Anthropology, SUNY Geneseo.

STENCIL font is used to denote the transformed unit coordinates indicated in this paper; this distinguishes them from the original unit coordinates.

There is no record of the mesh size of the screens used in the excavations at the Squashpatch Site; however it is plausible that they were made with ¼ in mesh since this was considered standard practice in the late 1970s. Apparently, the procedure was to excavate to the bottom of the plow zone, about 10 in (25 cm), unless evidence of a feature was present.

Artifactual Data

Prehistoric Artifacts

Lithics

Table 1 lists the chipped stone artifacts. Most of the designations are self-explanatory. The exception to this is what I have called biface fragments. These are pieces of chert that have been chipped on both faces, but which I was unable to otherwise classify. All the chipped stone artifacts were made of Onondaga chert except one scraper fragment that was made from an exotic chert, probably Upper Mercer or Flint Ridge. There were five ground stone tools in the collection. They are listed in Table 2. Rough stone tools are listed in Table 3. A map of the site showing a plot of the distribution of the lithic tools is shown in Figure 2.

Table 4. Prehistoric Potsherds.

Description	Count
Plain sherds	774
Decorated bodysherds	41
Decorated rimsherds	
Bainbridge Collared Incised	1
Dansville Corded	1
Ontario Horizontal	7
Owasco Corded Collar	1
Untyped	11
Total	**836**

Table 5. Other Squashpatch Artifacts.

Description	No. of Records
Fauna	
Bone	611
Shell	83
Unknown	1
Flora (charcoal)	9
Soil	1
Total	**705**

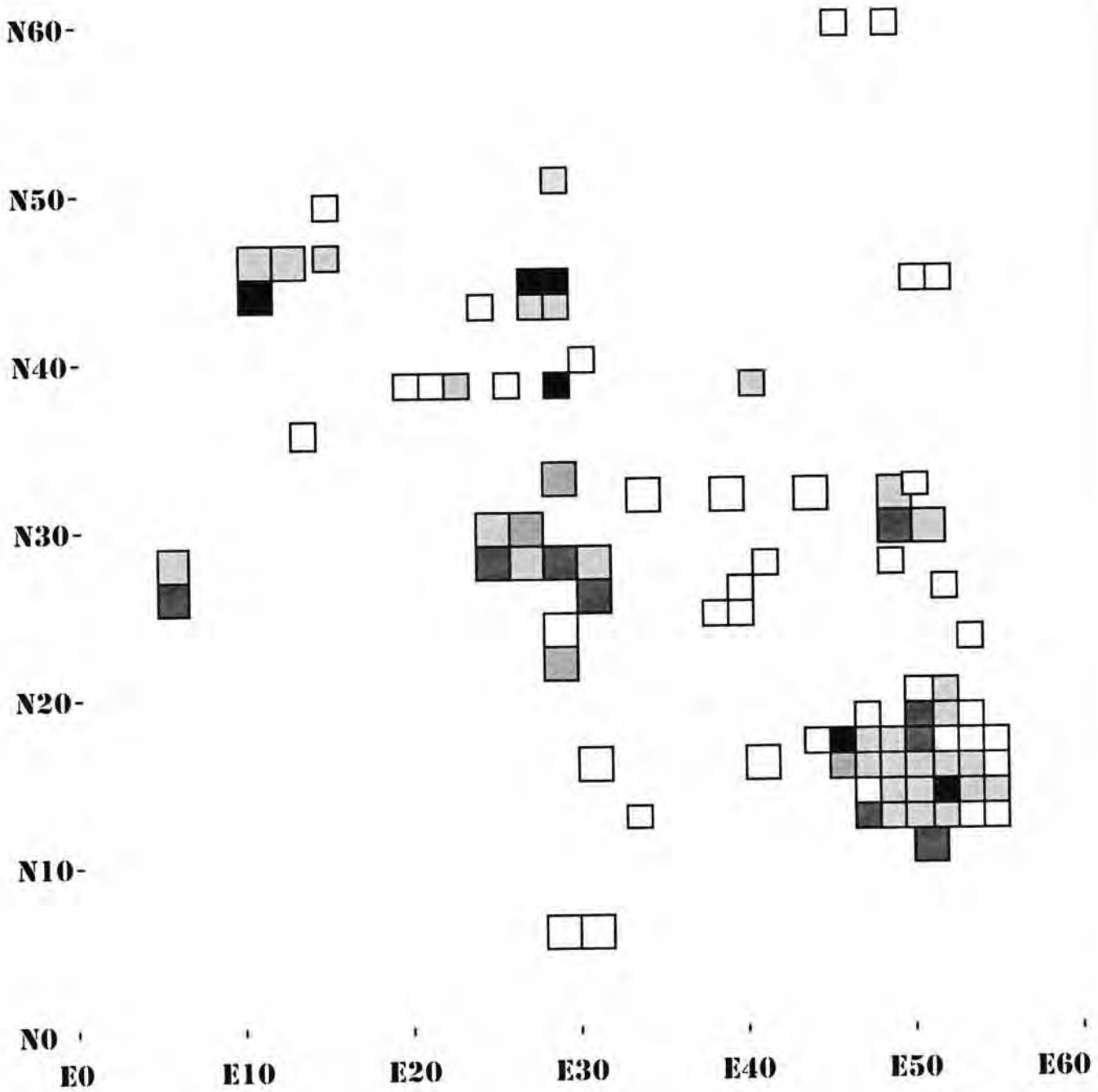

Figure 2. Distribution of stone tools at the Squashpatch Site. Key: 20% shading denotes 1–2 tools; 35% shading denotes 3 tools; 60% shading denotes 4–5 tools; 100% shading denotes 6–9 tools.

Ceramics

The prehistoric ceramic artifacts consisted of 836 potsherds, 27 pipe sherds and one bead. Table 4 describes the potsherds, as classified. Figure 3 shows the distribution of potsherds across the site.

Other

Table 5 presents an overview of other artifacts from the site. It is apparent from Table 5 that bone artifacts predominate in this category. With the exception of about 10 small calcined bone fragments, all the bone in the collection is unburned. The distribution of bone across the Squashpatch Site is shown in Figure 4. It is difficult to ascertain the age of the bone; the possibilities are discussed in the Analysis section below. The radiocarbon age of one of the charcoal specimens is also discussed in the Analysis section; it relates to a

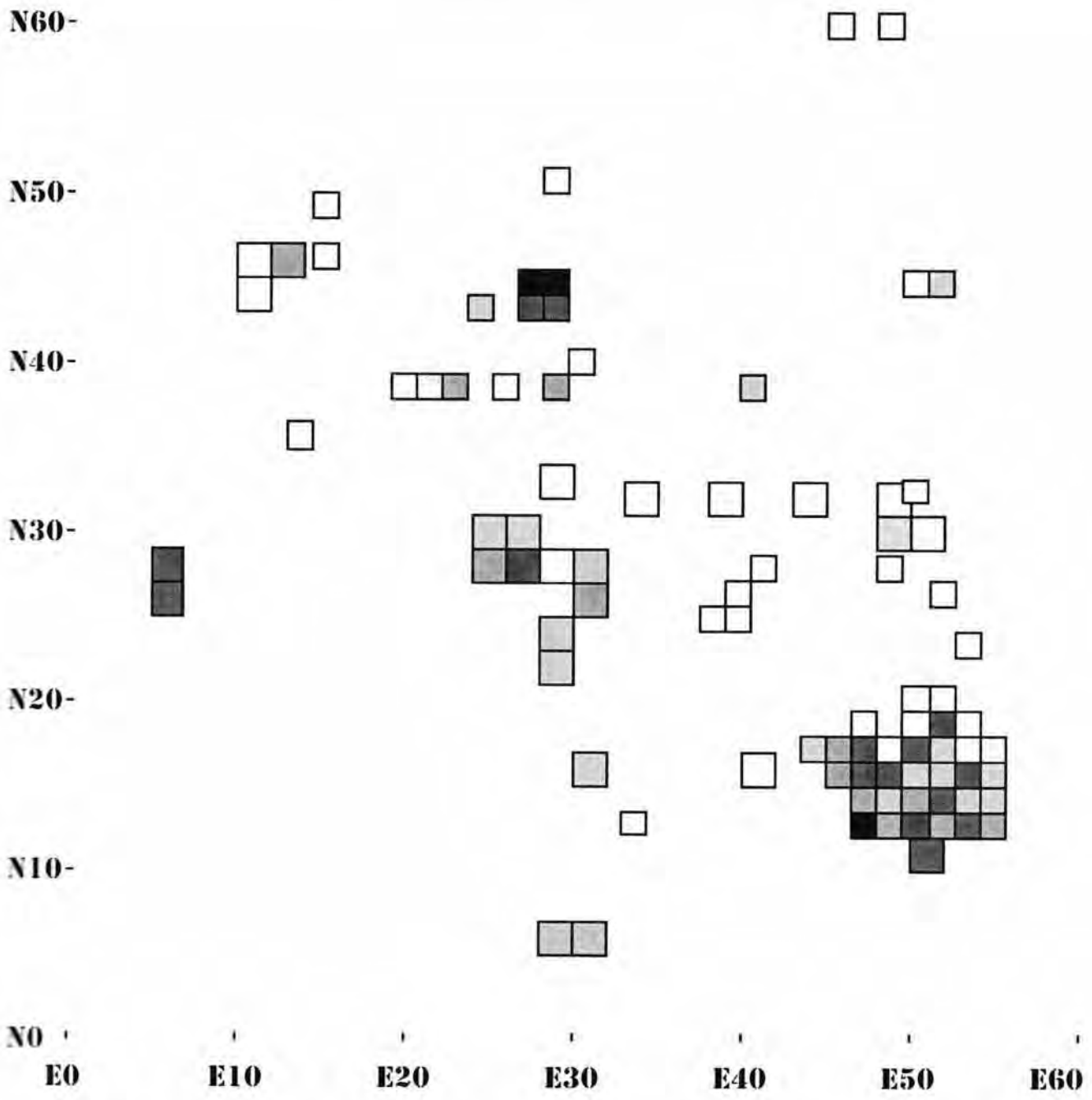

Figure 3. Distribution of prehistoric potsherds at the Squashpatch Site. Key: 20% shading denotes 1–3 sherds; 35% shading denotes 4–7 sherds; 60% shading denotes 8–20 sherds; 100% shading denotes 21–54 sherds.

sample taken from one of the features believed to be a refuse pit.

Historic Artifacts

Table 6 lists the historic artifacts found at the Squashpatch Site. They include a substantial amount of building materials (brick and nails) as well as a miscellaneous assortment of other historic artifacts.

Features

I found five features mentioned in the Remarks fields of several of the tags and/or mentioned in one or more student

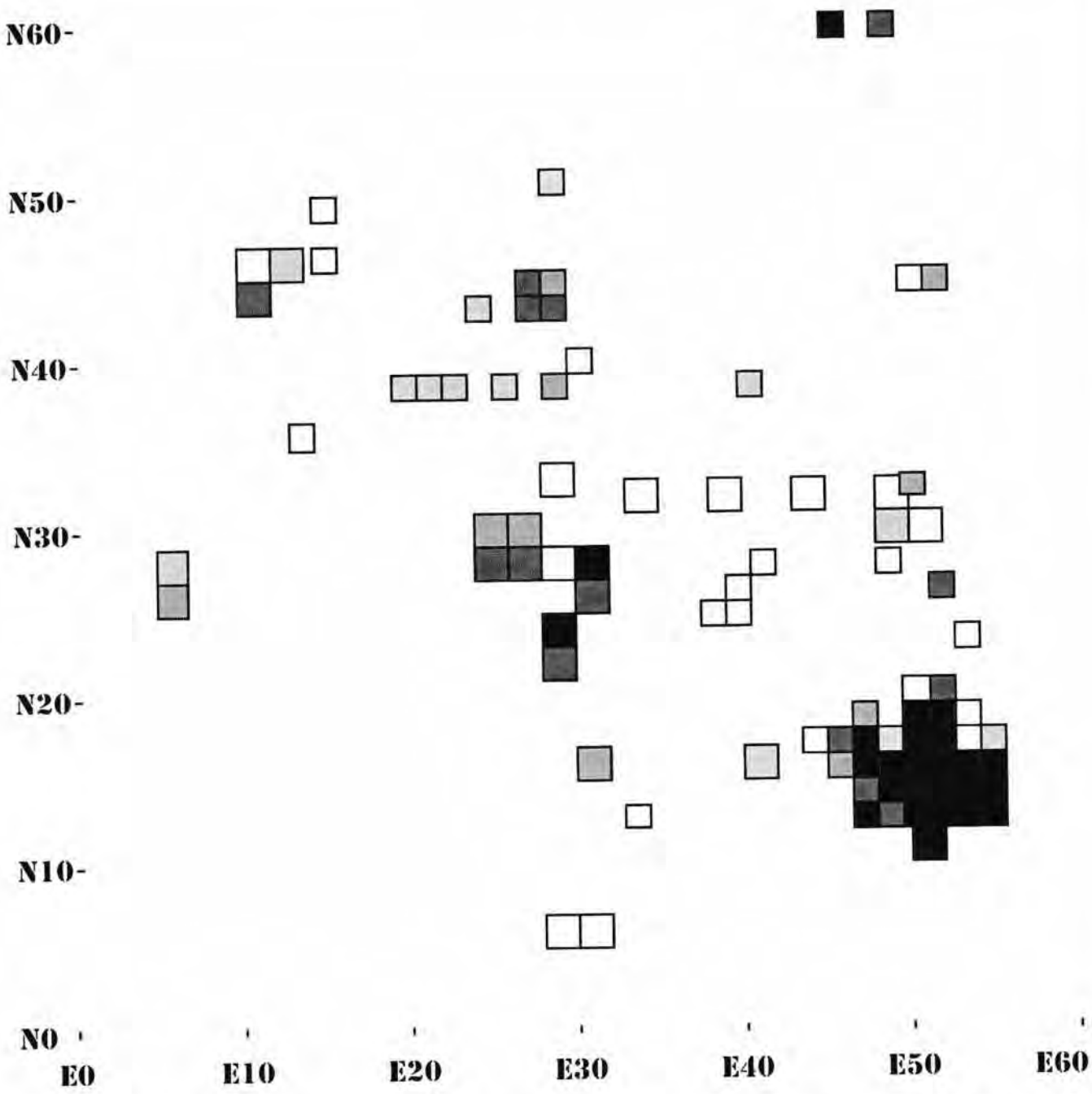

Figure 4. Distribution of Bone at the Squashpatch Site. Key: 20% shading denotes 1–4 grams; 35% shading denotes 5–12 grams; 60% shading denotes 13–44 grams; 100% shading denotes 45–155 grams.

notebooks. In addition, there were many references, both on the tags and particularly in the student notebooks, to "fire pits" and "postholes." It is possible, though it seems unlikely, that these turned out not to be what they were first thought to be. More likely, the records of these anomalies are no longer available. The five known features are mapped in Figure 5. Following are descriptions of these features using information that I have from the student notebooks and from those artifacts that were designated on the tags as being from a numbered feature.

Feature 1

There are no artifacts in the collection labeled as being from Feature 1, nor did I find any reference to Feature 1 in the student notebooks. However, and this is only speculation, the number of potsherds and

Table 6. Historic Artifacts at Squashpatch.

Description	Count
Brick fragments	160
Glass	
Container shards	20
Window-glass shards	2
Metal	
Nails	18
Other	34
Pipesherds (kaolin clay)	4
Potsherds	7
Total	**245**

chert flakes in unit **N38/E28** (See Figures 3 and 6) make me suspect that this unit contained a refuse pit that was not otherwise recorded. A further hint that this unit contained a feature is the tag in the bag with SQPH.1872, a pestle fragment. The artifact in that bag came from unit number **N38/E28** and the "Remarks" field on that tag reads, in part: "Feature ?" Also, the tag says that the pestle fragment was found at a depth of 14 in, a few inches below the plow zone. **N38/E28** was the first unit that was excavated in 1976 and one notebook says that excavation of this unit had begun in 1973. Possibly this was "Feature 1," although no definitive record of this is extant.

Feature 2

Feature 2 was a large rectangular pit measuring about 2 ft by 4 ft (60 cm by 120 cm). It was located in units **N42/E27**, **N42/E28**, **N44/E27** and **N44/E28**. It was discovered at the bottom of the plow zone, about 25 cm (10 in) below the surface. It continued down another 30 cm (12 in). Found in the feature were a Madison point, many chert flakes, several unidentified pieces of chert, charcoal, and a decorated rimsherd. This sherd is missing from the collection, but there is a sketch of it in a student notebook that shows near-vertical markings at the rim and the notebook says that they had been made with a cord-wrapped implement. Another student notebook characterized the feature as a fire pit, although there is no reference to fire-reddened earth. From the presence of the artifacts described above, I believe it was a refuse pit into which charcoal, along with the other artifacts, had been deposited.

Feature 3

A student notebook reports an area of darkened soil near the bottom of the plow zone in **N44/E27**. It was about 30 cm (12 in) wide and ran north to south the length of the pit. A few days later, her notebook entry reads: "Feature # 3 turned out to be plow lines."

Feature 4

There are no artifacts from Feature 4 in the collection, nor did I find any reference to Feature 4 in the student notebooks.

Feature 5

The northern part of Feature 5 was excavated in 1977: units **N17/E47** and **N17/E48**. These were 5 ft by 5 ft square units adjoining the same size units to their south that had been dug in 1976. A pestle, some pottery, bone, chert flakes, and charcoal were found in the portion of the feature excavated in 1976. According to the sketch in a student notebook, the portion of the feature that was excavated in 1977 was semi-circular and about 1.2 m (4 ft) in diameter. It was at the boundary with the units to the south that had been excavated the previous year. A charcoal sample was taken from Feature 5 along with several anvilstones, only one of which was given an accession number, but which is missing from the collection. Other artifacts in the collection that were found in Feature 5 in 1977 are two brick fragments, some bone fragments and five plain body potsherds, badly eroded. The feature extended down 22 in (56 cm). From the artifacts recovered from Feature 5, it appears to have been a secondary refuse receptacle.

Feature 6

Feature 6 was probably also a refuse pit. It was located in the northwest corner of **N25/E30**, a 2 m by 2 m unit, excavated in 1977. The pit was nearly circular, about 80 cm (31 in) in diameter, and was slightly enlarged at the bottom. It was discovered at the bottom of the plow zone, 28 cm (11 in) below the surface and continued down another 95 cm (37 in). The pit contained much pottery and bone. The collection contains four projectile point fragments: a Brewerton, a Normanskill (both Late Archaic) and two other unidentified fragments that also were found in Feature 6. The ceramics from Feature 6 that are in the database are contained in 167 bags. Among them are some Vinette I sherds (Early Woodland), a Dansville Corded sherd, and three Ontario Horizontal sherds (all Late Woodland). Although the points and sherds from this pit are of widely varying ages, which seems curious at first, it could be explained by assuming that soil from the area

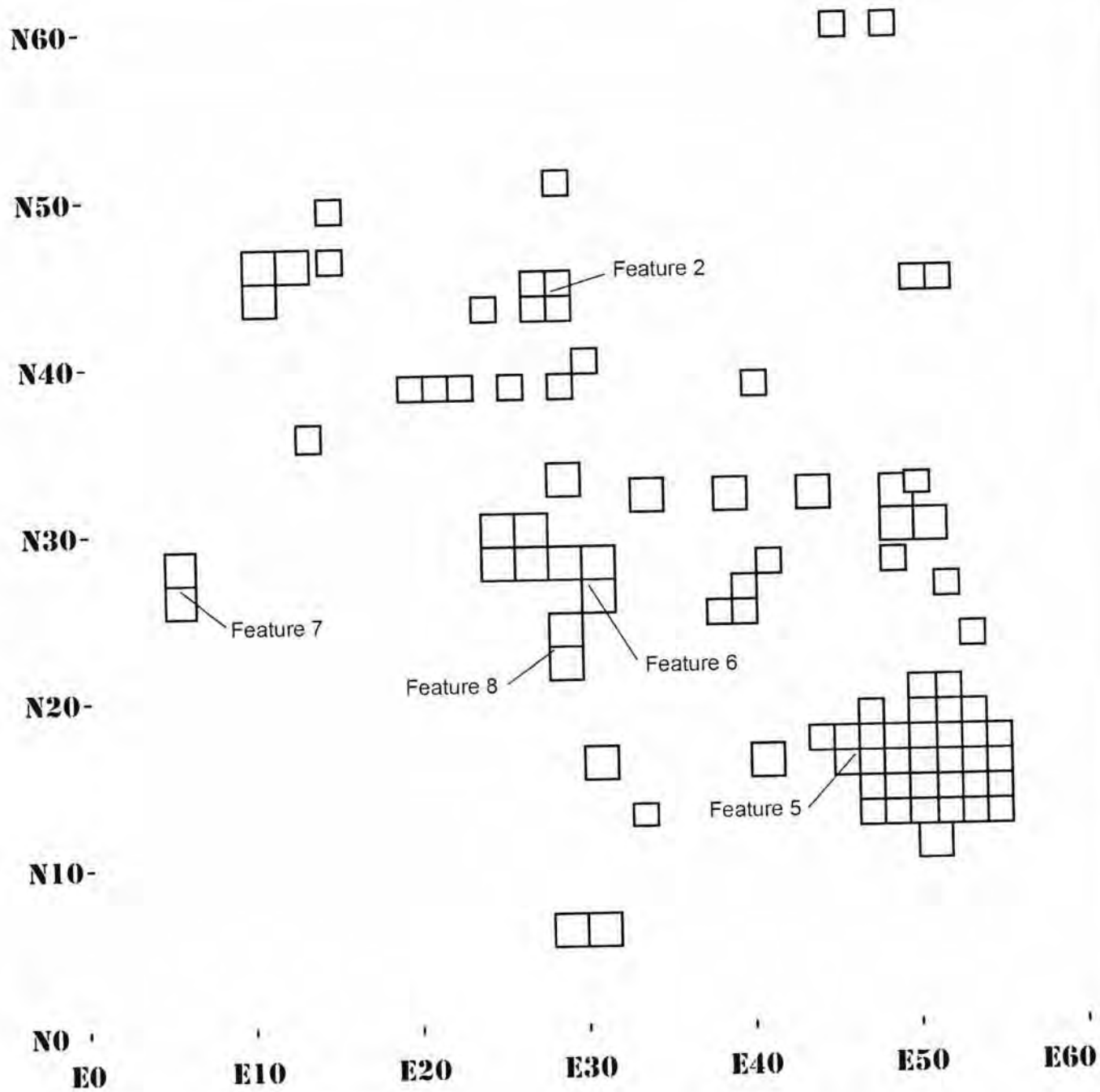

Figure 5. Numbered features excavated at the Squashpatch Site.

surrounding the pit was used as part of the backfill and this soil contained the points and sherds from earlier occupations. Other artifacts from this feature are some charcoal, two bags of shell fragments and the soil sample listed in Table 5. The notebooks contain descriptions of several other artifacts that are not labeled on the tags as being from Feature 6. One that was possible to identify was a nearly complete clam shell that is probably SQPH.1206 although this tag contains no unit or feature number. Similarly the notebooks mention numerous bone fragments that are not identified on the tags as coming from this feature.

A paper by Mary Ann Niemczycki (1986:35) contains illustrations of two Late Woodland rimsherds that came from the Squashpatch Site. One of them is clearly SQPH.1265, which, according to the tag, is from Feature 6; the other seems not to be

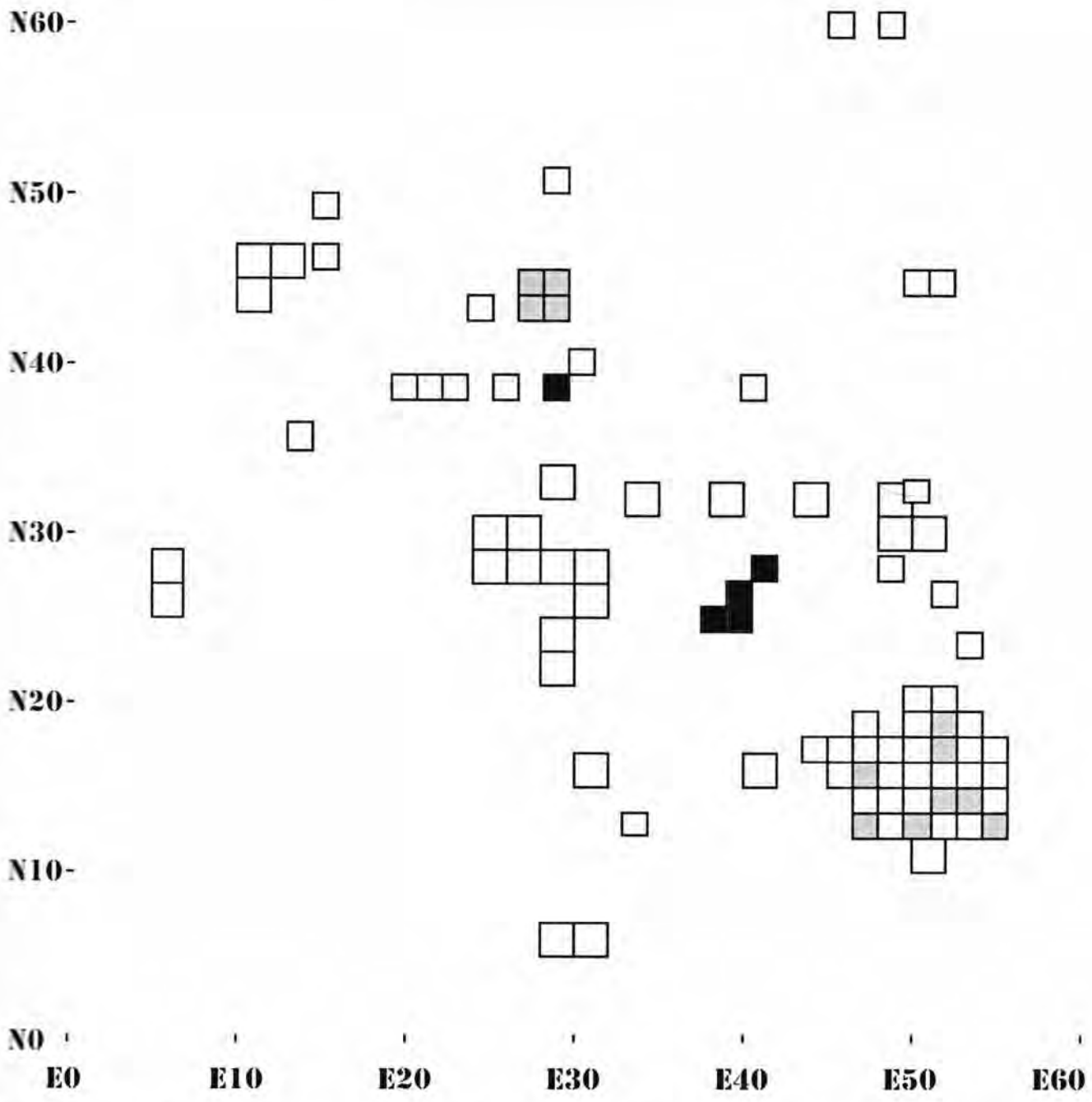

Figure 6. Distribution of debitage at the Squashpatch Site. Key: 20% shading denotes 1–2 flakes; 100% shading denotes 110–139 flakes.

extant in the collection. Niemczycki states that a charcoal sample, taken from "the bottom of the pit" was dated to A.D. 1305 (Niemczycki 1986:36).[2]

Feature 7

Most of Feature 7 was in unit **N27/E5**, although a small portion was in the unit to the south. Both these units were 2 m by 2 m, excavated in 1977. The feature was roughly circular and judging from the sketch in a student notebook, 60 cm (24 in) or so in diameter. The deepest artifact listed in the notebook was found at a depth of 52 cm (20 in). Lithic artifacts in the database that are attributed to Feature 7 include two Brewerton Side-Notched points, a Madison point, a Levanna point, a netsinker, and a hammerstone. Ceramic artifacts included 33 plain sherds and

[2]Niemczycki appears to have believed that Squashpatch and Mac 4 are the same site (Niemczycki 1986:36); this is clearly mistaken.

a decorated bodysherd. Again we see a mixture of ages of artifacts from this pit. Charcoal, bone and shell also came from Feature 7. Two student notebooks contain a sketch of a rimsherd that is not in the collection, but is attributed to this feature. It appears to have an Ontario Horizontal motif and the rim is slightly castellated. As was true of Feature 6, this feature appears to be a refuse pit.

Feature 8

Feature 8 was located in the northwest corner of **N21/E28** and the southwest corner of **N23/E28**. From the sketch in a student notebook, the feature appears to be 70 cm (28 in) or so in diameter. The deepest artifact reported in the notebook was at 44 cm (17 in) depth. A Madison point is the sole artifact in the collection that is attributed to Feature 8, although the notebook reports finding bone and shell in the feature. It appears from this internal evidence that Feature 8 was also a refuse pit.

Analysis

Periods of Occupation

A cursory look at the artifacts from the Squashpatch Site indicates that there was a human presence at the site during the prehistoric period, the post-contact period, and after the appearance of European settlers, probably from the early 1800s, up to modern times. The projectile point types found at the site provide some answers to the question of the prehistoric occupation. The data regarding these points are presented in Table 7. I have organized these data using Justice's cluster concept (Justice 1995: 6, 9).

These data indicate occupation in the Archaic and again in the Late Woodland period. The single Susquehanna point bridges the Archaic and the Early Woodland periods. The two Meadowoods and the few Vinette I potsherds indicate an occupation, perhaps minimal, in the Early Woodland.

The ceramics support a period of occupation in the Late Woodland. Although I was unable to classify about half of the decorated rimsherds, those that were identifiable point to proto-Iroquois times. Three of the identified types found in the Genesee Valley have been dated by Niemczycki (1984:27, 30).

- The Owasco Corded Collar sherds date to the Middle Owasco, A.D. 1100 to 1200.
- The Bainbridge Collared Incised sherds are Late Owasco, A.D. 1200 to 1300.
- The Ontario Horizontal belongs to a Transitional Phase dating from A.D. 1250 to 1350.

Regarding the one sherd identified as Dansville Corded, MacNeish (1952:45) dates that style to "[l]ate prehistoric times." The radiocarbon date that Niemczycki (1986:36) gives for Feature 6 where two Squashpatch sherds were found is A.D. 1305 (645 B.P.) ±80. Assuming that this was an uncalibrated date and performing the calibration using calib 5.10.0 (Stuiver and Reimer 1993) we get a one-sigma range of dates from A.D. 1282 to A.D. 1328 and A.D. 1341 to A.D. 1395. These dates fall in the Late Woodland period.

The presence of the kaolin clay pipes indicates presence at the site during the post-contact period. The single pipe stem sherd has a bore diameter of about 1.8 mm. Although it is risky to determine a date on the basis of one sample, this bore diameter indicates a date of about A.D. 1780 using the procedure devised by Binford (1962:19).

The one gunflint provides some help in dating the occupation of the site. According to Wilkinson (1971:9, 21), the flintlock rifle began to be used about A.D. 1650 and "by the early eighteenth century it was more or less standard on all firearms" and "by the middle of the nineteenth century [flintlocks] were obsolete." This doesn't narrow the possible time frame much, but the gunflint is almost surely French (Hamilton and Emory 1988:Figure 2). Although French influence in western New York State probably waned significantly after the French and Indian War, Hamilton and Emory (1988:26-27) state that the English used at least some French gunflints throughout the Revolutionary War. Thus, the gunflint found at the Squashpatch Site probably dates to before 1800, perhaps much before.

Livingston County was settled soon after the Revolutionary War. The village of Williamsburg, a few hundred meters east of the Squashpatch Site, was settled in A.D. 1792 (Turner 1851:258). The building materials found at the site indicate that one or more substantial structures were at or near the site in historic times. The chief indicator of time are the nails that were excavated. The older ones are rectangular in cross section but machine-made. According to Sutton and Arkush (1998:166–168), such nails were in widespread use from about 1830 to 1890. The other building materials are harder to date with any specificity.

Table 7. Squashpatch Points and Identifiable Point Fragments.

Cluster	Count	Age
Brewerton	20	Archaic (Justice 1995: 115)
Lamoka	7	Archaic (Justice 1995: 127)
Meadowood	2	Early Woodland (Justice 1995: 170)
Susquehanna	1	Archaic to Early Woodland (Justice 1995: 167)
Triangular	13	Late Woodland (Justice 1995: 220)

Site Utilization

The plot in Figure 2 shows a fairly even, but not dense, scatter of stone tools across the site. Figure 3, a map of the density of occurrence of potsherds at the Squashpatch Site, similarly shows a scatter of artifacts across most of the site. Both of these maps show a distinct tendency for higher artifact density in a generally northwest-southeast direction. It is worth pointing out that both these plots, as well as the other site maps, do not make allowance for the difference in area (and presumably volume) between the 5 by 5 ft units and the 2 by 2 m units; they are plots of the raw data. Figure 6 is a plot of the density of debitage across the site. There are two locations with a high density of flakes. The one near **N28/E40** is probably an area of tool manufacture or repair. The other, near **N40/E30**, may be a refuse disposal pit (see the above discussion of Feature 1).

In an attempt to gain more information about how the site was used during the two prehistoric time periods, I plotted the distribution of both Late Archaic and Late Woodland projectile points on a map of the site. These maps are shown in Figure 7. I can discern no pattern of earlier vs. later occupation of the site. This is perhaps not surprising; the occupation was probably episodic and one group of occupants may have had little knowledge (or concern) about previous episodes of habitation.

In post-contact times, the presence of kaolin clay pipe fragments and a gunflint indicate an occupation, probably, although not certainly, by Native Americans. A plot (not included in this report) of these artifacts that date to the post-contact but pre-settlement period shows them scattered across the southeast quadrant of the site. However the data points are few, and probably not a lot of weight should be given to this apparent tendency. The plow scars, found at the depth of 30 cm (12 in) or so, attest to the fact that the area was being tilled shortly before the site was excavated. It seems reasonable to believe that the entire site was cropped for a considerable period between A.D. 1800 and the near-present.

Intensity of Occupation

If one divides the number of projectile points found at the site by the number of years these points were in widespread use, one obtains an estimate, perhaps to within an order-of magnitude representing "points per person-year." It seems plausible that this number may represent the "intensity of occupation" even though that occupation may have been episodic. Justice (1995) places early Lamokas, of which there were seven, at 3500 B.C. (Justice 1995: 129) and late Brewertons (20) at about 1700 B.C. (Justice 1995:115). Thus the calculation for the Late Archaic becomes (7 + 20)/(3500 – 1700) = 0.02. This is about the same value as for the Mac 2 Site and considerably smaller than the Mac 3 Site and the Mac 4 Site (Maxson 2010:56). For the Late Woodland period, Justice dates early Levannas at A.D. 700 (Justice 1995:228) and late Madisons at contact (Justice 1995:224), say A.D. 1500. In this case the calculation is 13 /(1500 – 700) = 0.02 points per year. This is about the same as the Mac 2 Site, the site for which we have comparable data (Maxson 2010:48).

Subsistence

The presence of a relatively large amount of bone in the collection is evidence of the use of animals as a part of the diet of the inhabitants of the site. The bone seems to be in too good a condition to be from the Late Woodland period, 700 or 800 years ago. The white settlers who used the site in colonial to fairly recent times probably used deer and other wild animals for food as well. This moves the age of the bone artifacts a big step closer to the present. Also to be factored into the discussion is the probable alkaline nature of the soils at the Squashpatch Site, a condition that would have impeded destruction of the bone.

The plot of the distribution of bone across the site, shown in Figure 4, does not provide any definitive answers to the question of when the bone was deposited. The plot does show a striking concentration of bone in the cluster of units in the southeast corner of the site. There was also some concentration of both lithics and pottery in this cluster (Figures 2 and 3), although not as distinctly as that of the bone (Figure 4).

Neither does the plot of the building materials, Figure 8, show a particularly high density in the southeast cluster area. Thus, none of these plots provide a clue to the reason for the density of artifacts in this area of the site. One explanation for this density is that it represents a historic dump. It contains many objects that would be considered the detritus of reasonably modern living and it is near the periphery of the site. Additional support for this interpretation is that 14 of the 17 glass container fragments came from the southeast cluster. The presence of the prehistoric artifacts in this same area makes a plausible argument for the location of the historic dump over a prehistoric disposal area. Parenthetically, the existence of the southeast cluster itself may be due to the excavation strategy; it probably encouraged the formation of such clusters. If I am digging a unit because there were many artifacts in contiguous units, I am likely to find many artifacts in the unit I am digging—a self-fulfilling prophecy. The netsinkers and shell fragments at Squashpatch show that fish and shellfish also provided items of subsis-

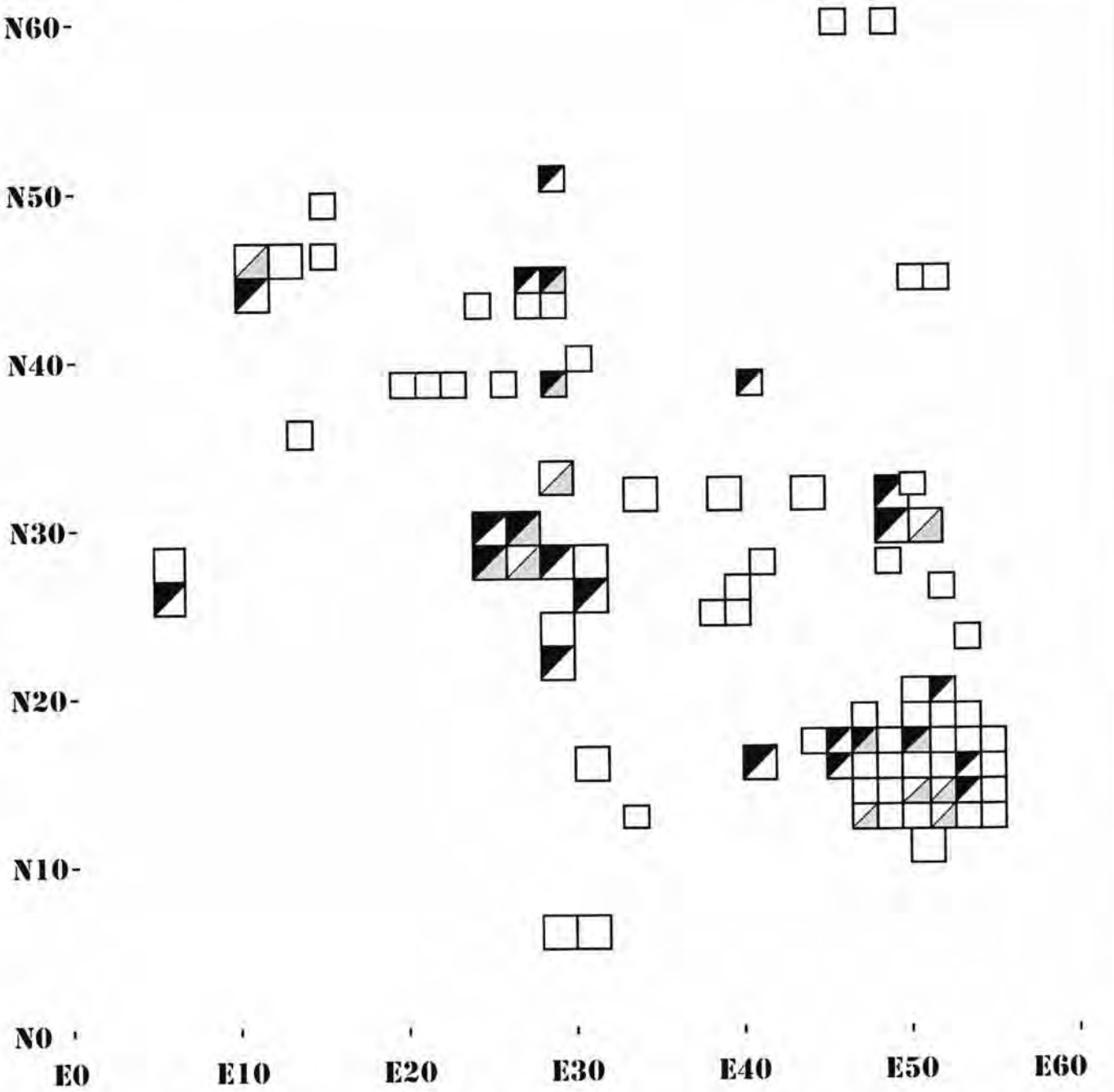

Figure 7. Location of the Archaic and Late Woodland projectile points at the Squashpatch Site. Key: light shading denotes Late Woodland points; dark shading denotes Late Archaic points.

tence to the, probably prehistoric, inhabitants of the site.

Evidence of Trade

Evidence that there was inter-cultural contact in prehistoric times is the presence of exotic chert: a fragment of an end scraper made of either Upper Mercer or Flint Ridge chert. Not surprisingly, evidence of contact between the Iroquois and the white traders also exists. The kaolin clay pipe fragments and the gunflint are examples of this contact.

Although the Geneseo Mound is not directly related to the Squashpatch Site, it is interesting to note that at least one of the intrusive burials in the mound dates to the colonial period. The construction and primary use of the Geneseo Mound, located a few km north of the Squashpatch Site, dates to the Hopewell period. Ritchie found several intrusive

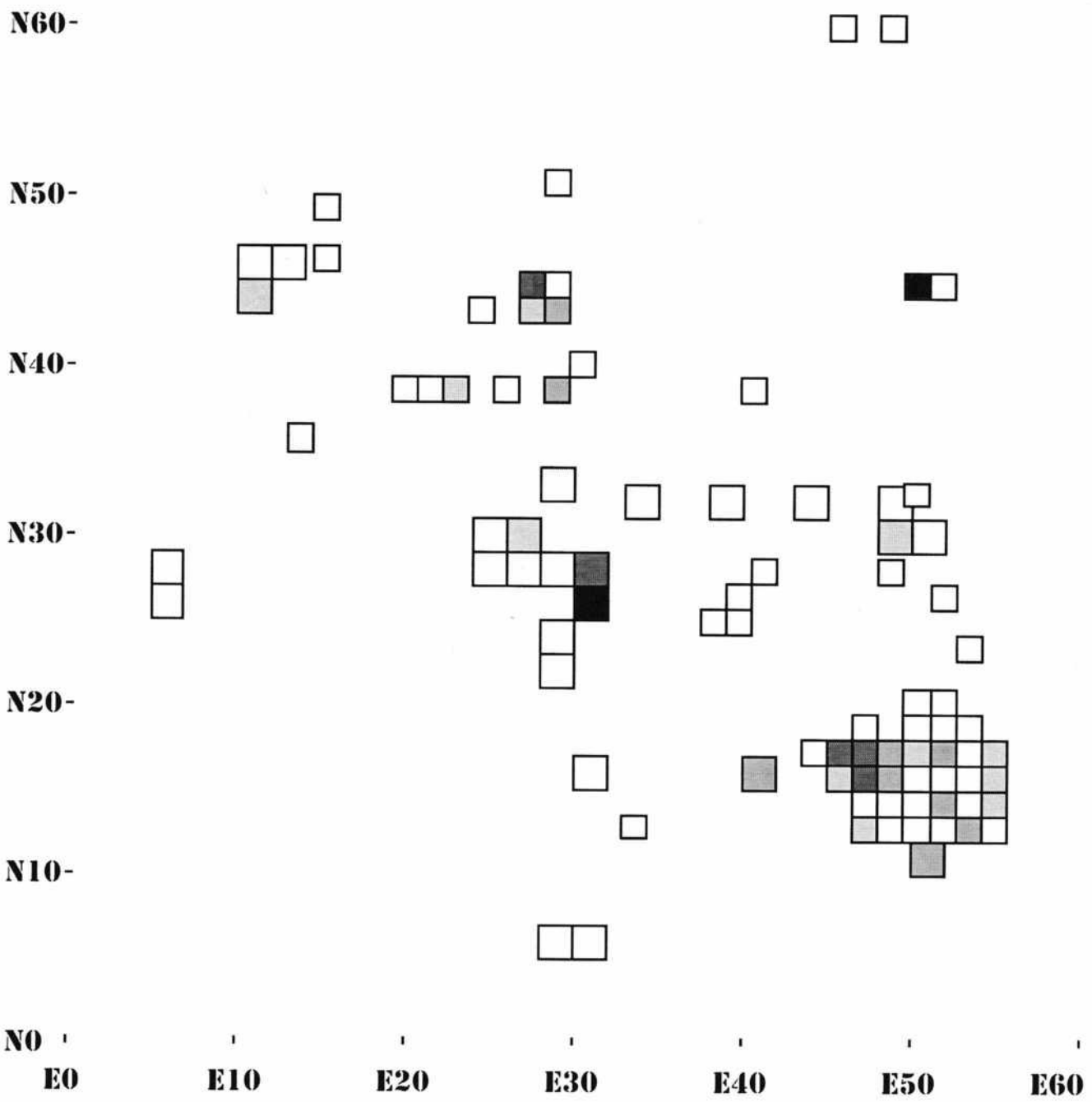

Figure 8. Distribution of historic building materials at the Squashpatch Site. Key: 20% shading denotes 1–2 artifacts; 35% shading denotes 3–6 artifacts; 60% shading denotes 7–13 artifacts; 100% shading denotes 14–31 artifacts.

burials in the mound when he excavated it in the 1930s. One of these burials, denoted Intrusive Burial 2, contained a trade axe (Ritchie 1938:20), thus adding to the evidence from Squashpatch that Natives in this region were trading with Europeans during the time before colonization of western New York State.

Conclusions

The Squashpatch Site was occupied or utilized by humans from Late Archaic times to the near-present, a period of more than 5,000 years. Prehistoric and pre-colonial occupation was probably episodic, but the site afforded the transportation and subsistence resources that were important to

those peoples. Specifically, projectile points speak to the Late Archaic period, and both pottery and points indicate occupation in the Woodland period. Post-contact evidence consists of the presence of European pipe sherds and a gunflint. The site was probably used for agriculture during the colonial period and certainly so in later times.

Acknowledgements

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Appendix

The Sullivan Campaign and the Squashpatch Site

Apparently Dr. Rhodes thought that the Squashpatch Site was at or near an Indian village that was destroyed by General John Sullivan during the Revolutionary War. The notebook kept by student Karen Lufkin contains notes of a lecture that read:

> Gen. John Sullivan led an expedition against the Seneca Nation and other tribes in the Iroquois Confederacy in 1779 under orders of Gen. George Washington.... Between September 12–16, Gen. Sullivan's army was in the present Geneseo township, traveling from the southern point of Conesus Lake, west through Groveland & Geneseo towards the Keshequa and Canaseraga Creeks crossing near their confluence, traveling west north west towards the Genesee River, across the Genesee River, over the Cuylerville flats to Little Beard's Town.
>
> Between the Conesus Lake inlet and the Canaseraga Creek, Sullivan sent out Lt. Boyd & a large scouting party to try and find a village on the Canaseraga near the Genesee. They made it to the deserted village & were headed back, but were lured into an ambush at the Groveland Ambuscade.... ... The surveyor, Lodge, was surprised by the same party in surveying for a bridge to be built near the Conesus inlet, & in his haste to return to the base camp, left his compass behind. The accuracy of his surveying may be in doubt from Conesus to Cuylerville as a result.
>
> Sullivan's maps indicated the capital of the Seneca Nation to be 2 mi further north of the village reconned by Boyd's scouts, near the confluence of the Genesee River. This was the capital before 1768 when it was abandoned & moved to Little Beard's Town (Cuylerville) on the west side of the Genesee River, and is in the area we are digging in at the Squashpatch. The Genesee River erodes the confluence with the Canaseraga at a rate of 10 ft/year according to Larry Smith, a geology student I've talked with, which would place the confluence at that time about 4/10 of a mi further south than it presently is. The Indian village of Genesee was close to Williamsburg on the E side of the Genesee. According to Clark, this village was not destroyed during Sullivan's campaign because it was already abandoned or too small to bother with. In 1750 the Moravian missionaries reported 40 houses here. [Notes taken by student Karen Lufkin from a lecture given by Dr. Wendell Rhodes] .

The other extant reference to the Sullivan expedition is in student Terry Kelly's notebook, which reads: "It is posited that Squash Patch is the site of an Indian village that was burned by Sullivan during the Revolutionary War" (Notes taken by student Terry Kelly from a lecture given by Dr. Wendell Rhodes).

My comments on the above have to do with the "lost compass." I have reviewed the journals of the men in Sullivan's army that were published by Frederick Cook (Cook 1887). There are five journal entries that mention the episode of the Indians firing upon the surveying party. These are the journals of Lt. William Barker (Cook 1887:11), Lt. Erkuries Beatty (Cook 1887:31), Dr. Jabez Campfield (Cook 1887:59), Maj. Jeremiah Fogg (Cook 1887:99), and Thomas Grant, a member of the surveying party (Cook 1887:142). All mention the mortal wounding of a member of the party. Dr. Campfield's description reads "...one of whose men they wounded and took all his instruments" (Cook 1887:59). The other four accounts make no mention of lost instruments and, in particular, Thomas Grant, who was probably the only one of the five who was present at the altercation, is silent on the subject of a compass or other instruments. From these accounts I find it difficult to have a great deal of confidence in the idea of a lost compass, or for that matter, that there was only one compass as part of the surveyors' equipment.

The surveying party was led by Lt. Benjamin Lodge. His maps of the route of the march have survived (Lodge 1779). It is Map 5 of this set that has permitted me to assess the possibility that the Squashpatch Site and the Indian village are the same or at least in the same vicinity. I have superimposed Lodge's map on a contemporary map of Groveland to see if the location of the village that Lodge called Cossawauloughley is near the Squashpatch Site. This composite map is shown in Figure A1. The chief difficulty in making a superposition of the maps is deciding where Sullivan's army crossed the inlet to Conesus Lake. I placed the crossing point near the present bridge, which may be a mistake, but it seemed plausible that his soldiers chose a spot that others have since used. An examination of the figure shows that the village was about 700 m (0.4 mi.) south of the Squashpatch Site.

Figure A1. An overlay of Lodge's map of the route of the Sullivan Campaign on a modern map of the area. Conesus Lake is at the right (east). The village of Geneseo is just off the top edge of the map. Sullivan's route is the double line going through the "O" and "V" of Groveland. The set of small hand-drawn squares just west of Hampton Corners is Lodge's depiction of the village in question. Compare this with the location of the Squashpatch Site in Figure 1.

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Preliminary Archaeological Evidence for a Decrease in White-Tailed Deer Body Size in New York during the Holocene

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*Estimates of white-tailed deer (*Odocoileus virginianus*) live weight are derived from the measurement of the astragalus bone from three prehistoric sites in central New York State: the Hiscock Site in Byron, Genesee County; the Lamoka Lake Site in Tyrone Township, Schuyler County, and the Cole Gravel Pit Site in Caledonia Township, Livingston County. Results from the three sites are then compared to each other, to body size estimates derived from deer bones at the Engelbert Site (Beisaw 2007) in Nichols, Tioga County, and to modern deer populations in New York State. The results suggest a decrease in the average live weight of deer between the Late Archaic and the Late Woodland/Protohistoric periods.*

Introduction

The study of variation in the body size of animals has provided valuable ecological, physiological, and archaeological data (e.g., Damuth and MacFadden 1990; Puputi and Niskanen 2008; Reitz and Wing 1999:172). Changes in the body size of white-tailed deer (*Odocoileus virginianus*) (Purdue 1983, 1986, 1989; Purdue and Reitz 1993; Rue 1980) have been linked to climate change, latitude, habitat productivity, population density, and predation pressure (Purdue and Reitz 1993; Severinghaus 1979; Wolverton et al. 2009; Yerkes 2005:249). Body size is not only informative on deer ecology. Since white-tailed deer have been one of the most important prey species used by humans in the eastern United States, knowledge of deer body size and how it has changed over time is likely to provide valuable information on human foraging efficiency and adaptation to the environment.

The weight of a deer is one measure of body size, but so many variables affect deer weight that it is difficult to accurately estimate the weight of a single individual at time of death from archaeological faunal remains. Weight is affected by numerous factors, including the age and sex of the individual, food availability, season, weather, and reproductive status (e.g., Hesselton and Sauer 1973; Moen and Severinghaus 1981; Rue 1980). Bones grow slowly, but body weight can fluctuate rapidly in response to changing conditions, and an animal may continue to gain weight after a bone has reached its maximum size.

Keeping these caveats in mind, Purdue (1986, 1987) developed a method of estimating deer body size from the astragalus, a compact bone from the lower hindlimb that preserves well in archaeological sites. Using white-tailed deer bones from archaeological sites, Purdue has provided evidence that, in the Midwest, deer were relatively small during the Middle Holocene and became relatively larger during the Late Holocene (Purdue 1989, 1991). In contrast, deer in the southeastern United States decreased in size over approximately the same time period (Purdue and Reitz 1993). In both cases, the change in size is linked to changes in availability of high-quality food due to changes in climate.

In this paper, deer live weight estimates are derived from bones from three sites in central New York State: the Hiscock Site in Byron, Genesee County, the Lamoka Lake Site in Tyrone Township, Schuyler County, and the Cole Gravel Pit Site in Caledonia Township, Livingston County (Figure 1). Results from the three sites are then compared to each other, and to body size estimates derived from deer bones at the Engelbert Site (Beisaw 2007) in Nichols, Tioga County, New York (Figure 1).

Methods

Calculation of deer live weight followed methods developed by Purdue (1987). The estimates derived from this equation are considered an approximation of the Fall-Early Winter

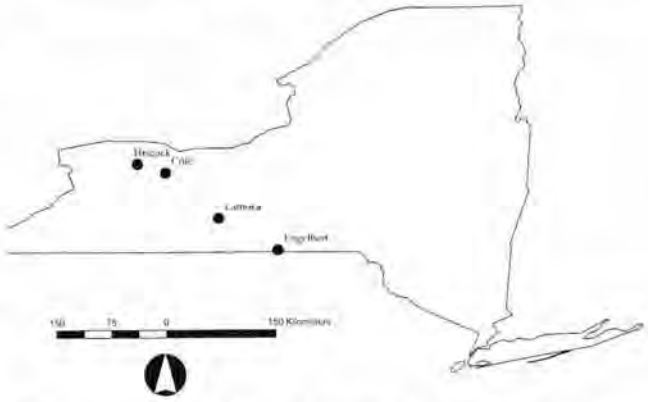

Figure 1. Map of New York State showing the location of sites used in this study.

live weight of deer in good health. The live weight of an animal is the weight of the entire individual, including all internal organs and blood. Dressed weight (also known as hog-dressed weight [Hamerstrom and Camburn 1950; Rue 1980:111]) is the weight after blood and both lower (e.g., stomach, intestines, and reproductive organs) and upper (e.g., heart, lungs, windpipe) internal organs have been removed. Live weight can be estimated from dressed weight using regression equations derived from direct measurement of deer (e.g., Hamerstrom and Camburn 1950; Hesselton and Sauer 1973:89).

Other terms used to describe partially butchered deer are sometimes used imprecisely. Field dressed weight is the weight of a deer after the lower internal organs have been removed (Rue 1980:111), but is sometimes used interchangeably with dressed weight. The definition of other terms, such as hanging weight and carcass weight, can vary, but generally exclude body parts like the upper internal organs, the head, feet, and skin.

Purdue measured bones from the lower leg of over 200 modern deer from eight localities. Live weights of deer were either directly measured or derived from dressed weights (Purdue 1987:3). Three measurements were taken from each astragalus: distal width (ASDW), medial depth (ASMD), and medial length (ASMLEN). Astragalus volume (ASVO) was calculated using the formula:

$$ASVO = (ASMD/2) \times (ASMLEN/2) \times ASDW \times pi$$

Regressions for estimating deer weight were then calculated (Purdue 1987: Table 5). Because of the difficulty in determining sex from individual astragali, the regression for combined sexes (where BW=body weight) is used:

$$Ln\ BW = -9.49655 + (1.40109 \times ln\ ASVO)$$

Purdue's (1987) methodology was used here to calculate deer live weight from the following site samples of astragali. Samples were limited to astragali from which the necessary measurements could be taken and that did not show evidence of burning or other modification that might affect measurement.

Results

Hiscock Site–Early Holocene

At the Hiscock Site, one astragalus was found in proximity to over 200 other deer bones, most of which are thought to represent a single partially complete deer skeleton aged one to one and a half years old (Madrigal 2003). This deer is thought to have been killed by a carnivore, as opposed to human hunting (Madrigal 2003). The bones were recovered in or at the base of a Holocene peat unit known as the "Woody Layer." An unconformity separates the "Woody Layer" into an older horizon that dates to approximately 9000–8000 B.P. and a younger horizon that dates to approximately 2000–500 B.P. (Laub 2003). The deer bones have not been directly dated, but as many of the deer bones in the "Woody Layer" were found resting on the top of the "Cobble Layer" and "Fibrous Gravelly Clay," both of which date to the Pleistocene (Laub 2003), these deer bones are thought to date to the earlier part of the Holocene. The single Hiscock astragalus is from an individual with an estimated live weight of 66.0 kg.

Lamoka Lake Site–Late Archaic

Several excavations have taken place at the Lamoka Lake Site beginning in the 1920s (Gramly 1983; Ritchie 1932, 1969; Madrigal 2001). Based on eight radiocarbon dates obtained from the site between 1951 and 1962 (Ritchie 1969:43) and three radiocarbon dates obtained from the site in 2000 by Rutgers University, the Late Archaic

Table 1. Summary of deer live weight estimates. S.D. = standard deviation (Engelbert data from Beisaw 2007: Table 25). "Combined Lamoka LA" includes all specimens from RMSC Lamoka LA, UC Lamoka LA, and BMS Lamoka LA (see Appendix).

Assemblage	N	Average Wt (kg)	S.D.	Range (kg)	Approximate Age (years B.P.)
Hiscock	1	66.0	—	—	9000–8000
Combined Lamoka LA	49	77.0	19.5	47.6-155.3	4300–4500
RMSC Lamoka LA	*39*	*76.9*	*19.3*	*52.3–155.3*	*4300–4500*
UC Lamoka LA	*5*	*71.5*	*20.6*	*47.6–94.7*	*4300–4500*
BMS Lamoka LA	*5*	*83.7*	*22.8*	*57.9–115.0*	*4300–4500*
RMSC Cole LA	8	75.7	18.0	55.5-112.6	~3900
BMS Lamoka W	6	76.8	14.0	62.6–94.1	1300–1000
Engelbert	38	64.5	18.6	34.4–119.2	870–330

(LA) occupation at Lamoka Lake Site dates to approximately 4300–4500 B.P.

Astragali dating to the Late Archaic at Lamoka Lake were obtained from three separate excavations. The RMSC Lamoka LA sample consists of 39 astragali from which measurements could be taken. These were obtained from some of the first excavations conducted at the site in the 1920s by the Rochester Museum of Arts and Sciences, now the Rochester Museum & Science Center (Ritchie 1932; Madrigal 1999). The BMS Lamoka LA (Late Archaic) sample was excavated from Lamoka Lake in the 1980s by the Buffalo Museum of Science (Gramly 1983; Madrigal 2000) and consists of five astragali. The UC Lamoka LA sample was excavated in 1990-1991 by Utica College (Madrigal 1999, 2001) and consists of five astragali.

Based on astragali measurements, the estimated live weight of deer from the RMSC Lamoka Lake LA assemblage ranges from 52.3 to 155.3 kg, with an average of 76.9 kg. The average weight of deer from BMS Lamoka LA is 83.7 kg (range: 57.9–115.0 kg) and from UC Lamoka LA is 71.5 kg (range: 47.6–94.7 kg) (Table 1). An Analysis of Variance (ANOVA Single Factor) indicates that there is not a statistically significant difference ($F=0.485297$, $p=0.61863$) between the three Late Archaic (LA) Lamoka Lake Site assemblages: RMSC Lamoka LA, UC Lamoka LA, and BMS Lamoka LA. Therefore, for the rest of the paper, these three samples are combined into a single Late Archaic assemblage (Lamoka LA) that consists of 49 astragali with an average estimated body size of 77.0 kg (Table 1).

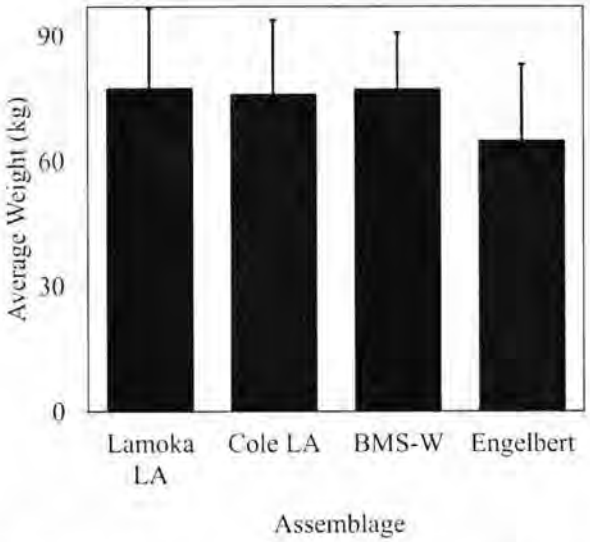

Figure 2. Estimated average live weight (with one standard deviation) of white-tailed deer by assemblage. Engelbert Site data from Beisaw 2007.

Lamoka Lake Site–Middle Woodland

A separate Middle Woodland occupation has also been identified at Lamoka Lake (Gramly 1983). No radiocarbon dates are associated with this occupation at the Lamoka Lake Site, but based on associated artifacts, the Woodland Period occupation at the site dates to approximately 1300–1000 B.P. (Gramly 1983; Madrigal 2001). The Buffalo Museum of Science sample (BMS Lamoka W) consists of six astragali. The average deer weight calculated from the BMS Lamoka W assemblage is 76.8 kg with a range of 62.6 to 94.1 kg (Table 1).

Cole Gravel Pit Site–Late Archaic

The Cole Gravel Pit Site was excavated by the RMSC between 1966 and 1971 following the identification of archaeological remains during commercial gravel stripping. A total of 296 features and 16 human burials were excavated (Hayes 1966; Hayes and Bergs 1969). Artifacts from the site are consistent with a Late Archaic occupation (Hayes 1966; Hayes and Bergs 1969; Madrigal 2006) and radiocarbon dates of 3890 ±120 B.P. (Y-2346) and 3980 ±160 (Y-2345) were obtained from two different features at this site (Hayes and Bergs 1969). Therefore, the Cole sample is attributed to approximately 3900 B.P. Eight astragali from the site (RMSC Cole LA) were measured. Estimated deer weights range from 55.5–112.6 kg with an average of 75.7 kg.

Engelbert Site–Late Woodland

The Engelbert Site has a complex history of occupation, excavation, and interpretation; however, the bones in question can be broadly attributed to a Late Woodland to Protohistoric time period, or approximately 870 to 330 B.P. (see Beisaw 2007 for a detailed analysis of the Engelbert Site chronology). Beisaw (2007) obtained measurements from 38 astragali from non-burial contexts at the Engelbert Site. Body size estimates range from 34.4 to 119.2 kg with an average weight of 64.5 kg.

Site Comparisons

The deer from the Hiscock Site is smaller than the average deer from all other assemblages except the Engelbert Site, but is within the range of variation seen in all assemblages and fits into the most abundant weight class (60.1-70 kg) at Lamoka Lake (LA). Because only a single specimen was measured, no firm conclusions regarding deer body size during the early Holocene can be drawn.

There is no statistically significant difference in deer body size between the two Late Archaic sites (Combined Lamoka LA and RMSC Cole LA: $F=0.034096$, $p=0.854181$). Nor is there a significant difference between

Table 2. Frequency distribution of deer body size estimates. (Engelbert data from Beisaw 2007:Table 25).

Weight (kg)	Lamoka LA	Cole LA	BMS W	Engelbert
30–40	0	0	0	2
40.1–50	1	0	0	5
50.1–60	6	2	0	14
60.1–70	15	1	3	8
70.1–80	10	2	1	1
80.1–90	6	2	0	2
90.1–100	6	0	2	5
100.1–110	3	0	0	0
110.1–120	1	1	0	1
120.1–130	0	0	0	0
130.1–140	0	0	0	0
140.1–150	0	0	0	0
150.1–160	1	0	0	0
Total	49	8	6	38

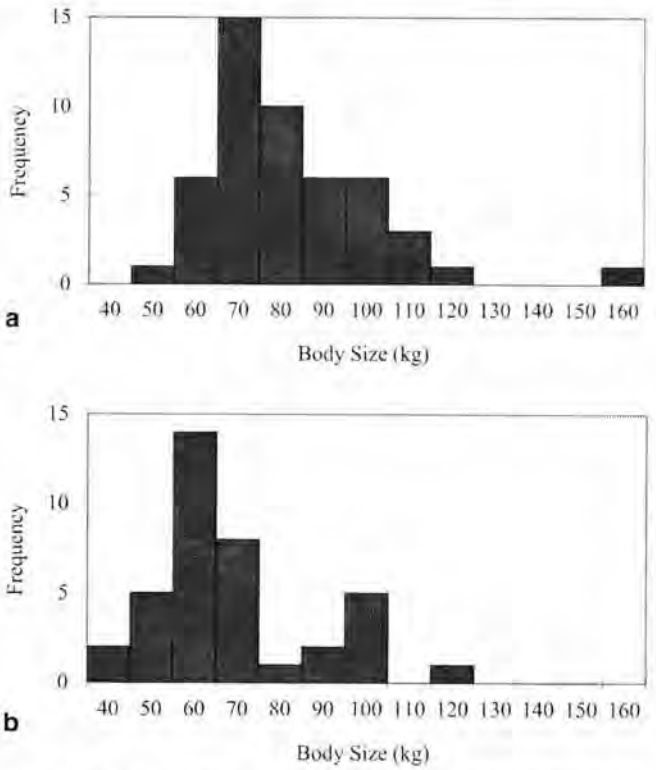

Figure 3. Distribution of estimated live weight of white-tailed deer from **a.** Lamoka Lake Site (LA) and **b.** Engelbert Site. Engelbert data from Beisaw 2007.

the BMS Lamoka W (Middle Woodland) assemblage and the two Late Archaic assemblages (Combined Lamoka LA: F=0.000732, p=0.97851; RMSC Cole: F=0.016364, p=0.90033) (Figure 2).

In contrast, deer from Lamoka LA are significantly larger (F=9.19; p=.003) than deer from the Late Woodland/Protohistoric Engelbert Site (Figure 2). There is no statistically significant difference between Engelbert and the two other assemblages (RMSC Cole LA: F=2.406985, p=0.127959; BMS Lamoka W: F=2.393748, p=0.129324). Note that the small number of astragali identified from RMSC Cole LA and BMS Lamoka W may have had an effect on these comparisons.

The frequency distribution of body size estimates was also examined (Table 2). For Combined Lamoka LA there is a unimodal distribution, with the most abundant size range being 60.1 to 70 kg (Figure 3). In contrast to the Combined Lamoka LA sample, there is an apparent bimodal distribution in the deer from the Engelbert Site (Figure 3). At this site, the two peaks may represent male and female deer (Beisaw 2007:220). Sample size for the RMSC Cole LA and BMS Lamoka W assemblages are too small to be enlightening, but are presented in Table 2 and appear to be generally consistent with the Combined Lamoka LA sample.

Discussion

Focusing on the two largest assemblages, the data show a distinct difference in estimated deer size between the Late Archaic and the Late Woodland/Protohistoric periods in central New York. Average deer size decreases by 16.3%, from 77.0 kg during the Late Archaic at Lamoka Lake to 64.5 kg during the Late Woodland/Protohistoric at Engelbert. There is no evidence for a change in average deer size from the Late Archaic to Middle Woodland, although, as already mentioned, the small sample size of the Middle Woodland assemblage makes any conclusion tentative.

Native New York deer populations were greatly reduced or extirpated throughout much of the state by the late 1800s before populations began to increase again in the early 1900s (Severinghaus and Brown 1956). In general, the central and western portion of New York State has larger deer than either the Adirondack or Catskill regions of the state (Moen and Severinghaus, 1981; Severinghaus and Brown, 1956).

Hesselton and Sauer (1973) obtained live weights of deer at four locations in western (Chautauqua County), central (Seneca County), and southeastern (Delaware and Dutchess Counties) New York State. Average live weight of 1.5 year old males at the four locations ranged from 55.3 to 67.1 kg, and 1.5 year old females ranged from 52.6 to 57.6 kg. Data for older males was not available, but 2.5 yr old females ranged from 58.5 to 61.7 kg and females 3.5 years and older ranged from 61.2 to 64.0 kg.

In comparison, estimated average live weight for all Late Archaic Lamoka Lake deer (which presumably

includes males and females of all ages, including fawns and yearlings) is 77.03 kg, or about 10 kg greater than the largest average group (1.5 year old males from Seneca County) in Hesselton and Sauer's (1973) study. It is also about 25 kg greater than the average (51.8 kg) of all deer sex and age groups in their study. The Late Woodland Engelbert Site deer average is closer to that of twentieth-century deer, but still greater than that of almost all of the samples. This suggests that average deer size in central New York continued to decrease into the Historic period and at least up until the late twentieth century.

Finally, there is one major outlier among the Lamoka Lake Site deer. The largest astragalus (RMSC Lamoka (LA) #226) is calculated to have come from a white-tailed deer with a live weight of 155.3 kg, or 342.4 lbs, which would place it among the largest deer ever recorded in New York State. Late nineteenth-century records include a male deer killed in Franklin County with a dressed weight of 286 lbs (130 kg) and estimated live weight of 357 lbs (162 kg); one from Essex County with a dressed weight of 299.5 lbs (136 kg) and live weight of 375 lbs (170 kg); and one from Warren County with a weight prior to butchery (i.e., had been bled) of 388 lbs (176 kg) (Seton 1909:70-71). All of these were from the northeastern part of the state. In the twentieth century, occasional white-tailed deer with actual or estimated live weights over 400 lbs (181 kg) have been shot by hunters in various Midwestern states (Rue 1980:129-130).

Conclusion

The data presented here suggest that the average size of white-tailed deer in New York has decreased from the Late Archaic period (approximately 4500 B.P.) to the Late Woodland/Protohistoric periods, and into the twentieth century. Yet with large samples from only two archaeological sites, any conclusions must be considered, at best, tentative. White-tailed deer are one of the most common animals identified at New York archaeological sites, and the astragalus is one of the bones most likely to survive taphonomic processes, so there is a great potential for additional research on deer body size in New York. Future research at sites of different time periods should add to the database and provide more information on how deer body size changed over time, and investigations into the reasons for these changes.

Acknowledgements

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Appendix

White-tailed deer astragali measurements.

Key
ASDW=distal width
ASMD=medial depth
ASMLEN=medial length
ASVO=volume
Hiscock: Hiscock Site
Lamoka: Lamoka Lake Site
Cole: Cole Gravel Pit Site
BMS: Buffalo Museum of Science
RMSC: Rochester Museum & Science Center
UC: Utica College
H: Early Holocene
LA: Late Archaic
W: Middle Woodland

Assemblage	Catalog Number	ASDW	ASMD	ASMLEN	ASVO	Live Weight (kg)
Hiscock-H	186	25.9	22.3	38.5	17464.5	66.0
BMS Lamoka LA	1	28.4	26.7	43.6	25966.1	115.0
BMS Lamoka LA	2	26.4	24.6	39.4	20096.7	80.3
BMS Lamoka LA	69	25.7	20.8	37.9	15912.0	57.9
BMS Lamoka LA	364	28.2	25.1	41.4	23015.1	97.1
BMS Lamoka LA	365	26.8	21.6	39.4	17913.3	68.4
RMSC Lamoka LA	222	25.3	23.5	38.0	17744.4	67.5
RMSC Lamoka LA	224	26.3	24.1	39.5	19663.5	77.9
RMSC Lamoka LA	225	24.3	23.0	37.6	16504.9	60.9
RMSC Lamoka LA	226	38.2	25.0	42.9	32177.4	155.3
RMSC Lamoka LA	228	24.0	22.3	37.3	15678.9	56.7
RMSC Lamoka LA	229	25.2	22.7	37.1	16668.3	61.8
RMSC Lamoka LA	233	27.7	22.7	39.2	19358.9	76.2
RMSC Lamoka LA	234	26.9	23.9	45.0	22722.3	95.4
RMSC Lamoka LA	235	26.6	23.7	38.8	19211.1	75.4
RMSC Lamoka LA	237	25.8	23.2	38.1	17911.1	68.3
RMSC Lamoka LA	238	26.1	24.6	38.5	19414.5	76.5
RMSC Lamoka LA	239	26.3	23.7	37.9	18553.8	71.8
RMSC Lamoka LA	241	27.2	24.1	40.4	20799.7	84.3
RMSC Lamoka LA	243	28.6	26.2	42.6	25070.7	109.5
RMSC Lamoka LA	246	24.8	23.5	38.9	17805.7	67.8
RMSC Lamoka LA	247	27.4	24.5	40.3	21247.7	86.8
RMSC Lamoka LA	250	23.4	22.0	36.6	14798.2	52.3
RMSC Lamoka LA	253	25.5	22.8	36.9	16849.7	62.7
RMSC Lamoka LA	255	26.5	24.6	38.5	19712.0	78.2
RMSC Lamoka LA	256	25.3	22.4	37.9	16869.3	62.8
RMSC Lamoka LA	257	25.5	23.1	39.0	18042.9	69.1
RMSC Lamoka LA	258	28.1	25.3	41.7	23283.7	98.7
RMSC Lamoka LA	259	28.7	25.7	40.8	23635.5	100.8
RMSC Lamoka LA	260	25.8	22.9	39.4	18282.7	70.3

Assemblage	Catalog Number	ASDW	ASMD	ASMLEN	ASVO	Live Weight (kg)
RMSC Lamoka LA	261	25.0	22.1	39.0	16923.4	63.1
RMSC Lamoka LA	262	26.0	22.1	38.3	17284.4	65.0
RMSC Lamoka LA	265	25.4	24.5	41.7	20381.0	81.9
RMSC Lamoka LA	267	28.3	25.5	40.4	22898.0	96.4
RMSC Lamoka LA	268	24.5	22.4	36.5	15732.5	57.0
RMSC Lamoka LA	269	25.5	22.6	38.6	17471.3	66.0
RMSC Lamoka LA	272	25.0	23.5	40.0	18456.9	71.3
RMSC Lamoka LA	273	24.4	21.4	37.3	15296.9	54.8
RMSC Lamoka LA	276	27.7	26.0	43.3	24492.4	106.0
RMSC Lamoka LA	278	26.2	23.8	38.5	18855.1	73.4
RMSC Lamoka LA	279	26.6	23.7	37.8	18715.9	72.7
RMSC Lamoka LA	280	25.3	22.5	37.3	16676.4	61.8
RMSC Lamoka LA	282	27.8	23.9	40.9	21343.0	87.4
RMSC Lamoka LA	283	26.3	23.8	36.7	18042.2	69.0
RMSC Lamoka LA	286	27.5	24.4	39.8	20974.7	85.3
UC Lamoka LA	50	27.6	25.0	40.5	21948.0	90.9
UC Lamoka LA	51	27.9	25.6	40.3	22606.8	94.7
UC Lamoka LA	52	25.3	23.5	37.8	17651.0	67.0
UC Lamoka LA	53	23.8	22.5	37.6	15813.8	57.4
UC Lamoka LA	54	22.5	21.4	36.6	13841.0	47.6
RMSC Cole LA	50	24.7	22.3	35.7	15444.0	55.5
RMSC Cole LA	441	25.3	25.5	39.1	19812.0	78.7
RMSC Cole LA	655	25.6	22.4	36.1	16258.7	59.7
RMSC Cole LA	1160	25.8	22.4	37.8	17157.3	64.3
RMSC Cole LA	1521	25.0	23.9	39.0	18301.7	70.4
RMSC Cole LA	1654	26.8	24.6	40.0	20711.9	83.8
RMSC Cole LA	1827	28.4	26.8	42.8	25585.1	112.6
RMSC Cole LA	2363	27.8	23.4	39.3	20079.0	80.2
BMS Lamoka W	416	25.9	22.5	38.1	17438.0	65.8
BMS Lamoka W	419	27.9	25.6	39.8	22326.3	93.1
BMS Lamoka W	1002	27.7	25.1	41.2	22497.8	94.1
BMS Lamoka W	1121	25.6	22.5	37.2	16828.9	62.6
BMS Lamoka W	1123	28.7	20.8	37.7	17675.7	67.1
BMS Lamoka W	1124	25.8	23.9	40.7	19710.7	78.2

NEW YORK STATE ARCHAEOLOGICAL ASSOCIATION

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Minutes of the Concurrent General Business Meeting
And Executive Committee Meeting
NYSAA 96th Annual Meeting
Clarion Hotel, Poughkeepsie, New York
April 27, 2012

Opening:
NYSAA President Sherene Baugher called to order the General Business meeting at 7:30 pm on April 27, 2012.

Present:

Officers Present:

President Sherene Baugher; *Vice-President* Sissie Pipes; *Treasurer* Fred Assmus; *Corresponding Secretary* Abigail Herlihy; and *Recording Secretary* Lori Blair.

Chapter Roll Call:

Present: Adirondack, Auringer-Seelye, William M. Beauchamp, Chenango, Frederick M. Houghton, Finger Lakes, Lewis Henry Morgan, Metropolitan, Mid-Hudson, Incorporated Orange County, Incorporated Upper Susquehanna, Triple Cities, and Van Epps-Hartley.

Absent: Lower Hudson, Long Island, and Thousand Islands

A. Reports of the Officers

President: Sherene Baugher

- opening remarks and thanks to the hosting chapter.
- encouraged submitting information to Griffin Hamell for posting to website.

Vice-President: Sissie Pipes –

- mentioned the crisis of proposed State layoffs about this time last year; there was a big letter writing campaign and the results were that layoffs didn't happen.
- NYAC is discussing fracking issue and proposed regulations concerning these activities.

Treasurer: Fred Assmus – on file

➢ **Motion to accept treasurer's report by Ruth Wakeman, 2nd by Meg Springate. Passed.**

Corresponding Secretary: Abigail Herlihy Report on File.

- Currently 606 members compared to 599 in 2010 and 579 in 2011. As of April 2012, there were 347 at-large members.

Recording Secretary: Lori Blair. Report on file.

- The minutes of the April 2011 General Business meeting were reviewed and approved at the November 2011 Executive Committee Meeting.
- The minutes of the November 2011 Executive Committee Meeting were reviewed.

➢ **Motion by Greg Hunt, 2nd by Maureen Kennedy to accept the minutes of the November Executive Committee Meeting as written. Passed.**

B. Report of the Committees

Awards and Fellowships

- The committee met and the awards will be presented after the banquet on Saturday.

Chapters and Membership –

High School Clubs- Christina Rieth (on file)

- There has been positive feedback on newsletters and opportunities for involvement.
- See Christina with any questions.

Publications –

Bulletin – presented by Bill Englebrecht – report on file

- #126 is at the printers (computer problems led to delay).
- #127 is being edited ~ out later this year. Bill noted some problems with graphics; please check bulletin for requirements.
- Research and Transactions are available for sale.

Newsletter – Sissie Pipes

- Deadline is mid-May for next issue; send information to Sissie.

Finance – Fred Stevens – no formal report

- No budget (as in past it is based on the past year's money).
- Presented a list of concerns including charters, tax exempt certificate usage, tax id, calendar vs. fiscal year; etc.

Legislative – Doug Mackey

- No report.

Library – Long Island Chapter

- No report.

Archives – Bill Bouchard

- No report.

Public Service Award – Sherene Baugher

- Have not made an award yet. Sherene encourages chapters to think about people in the areas for nomination.

Program for 2013- Laura Johnson-Kelly

- The 97th NYSAA annual meeting will be co-hosted by the Finger Lakes and Thousand Island Chapters. It will be held April 26–28, 2013 at the Ramada Inn in Watertown and include a tour of Sackets Harbor.
- Send papers to Laura.

Special Appointees

ESAF Liaison –Tim Abel – (read by Lori Blair) report on File

NYAC Liaison – presented by Sissie Pipes

- Program today is on the impact of the economy on archeology.
- NYAC is making $500 contribution to the Funk Foundation.
- Fall meeting will be held in October in conjunction with Iroquois Conference.

Funk Foundation – Paul Huey and Ed Curtin

- Paul Huey is newly appointed so hasn't attended any meetings yet but is honored to have been appointed.
- Ed welcomed Paul to the board.
- After approximately a 2-yr moratorium, they are now accepting applications for grants up to $2,000. Applications are due October 1, with awards in December.
- Several recent awardees have presented their results while a few others have not yet done so.
- They are looking to put more information on the website concerning grants, contributions, applications. www.funkfoundation.org
- Contact Ed with any questions.
- Ed will submit a paragraph about the Funk Foundation to Sissie for the newsletter.

Society for Pennsylvania Archaeology – Fred Assmus

- The annual meeting was held two weeks ago; mostly speakers from western PA.
- Next year's meeting will be in Uniontown a week before NYSAA's.

ASPI- Ann Morton

- ASPI continues along quietly, producing brochure which will be updated shortly. The brochure describes what sites are and how to protect them.
- Recent questions concerning metal detecting; NYAC has a statement and will use that as a template.

PANYC –no report; flyer on program was made available

Website – Griffin Hamell
(www.nysaa-web.org)

- only a few chapters have provided information.
- newsletters are posted.
- there is an events calendar and photos.
- can link to chapter blogs and websites.

Facebook – Tim Abel reported there were 266 "hits" on facebook page

OLD BUSINESS – none

NEW BUSINESS

Elections – Dolores Elliott

204 ballots returned. Results: President~Sherene Baugher; Vice-President~Lisa Anselmi; Corresponding Secretary~Laura Johnson-Kelly; and Recording Secretary Lori J. Blair.

- Laura Johnson-Kelly requested that chapter secretaries let her know which of their members have email or web access.

➢ **Motion by Fred Stevens, 2nd by Dolores Elliott for NYSAA to contribute $300 to the Funk Foundation. Voted, accepted and Passed.**

➢ **RE: Fisher Fund: there was still a question about an accounting of expenditures. Jon Lothrop of the NYSM said John Hart of the NYSM is in charge of the Fisher Fund. The fund supports historic archeological research in NYS. The past year focused on production of a catalog for the Fisher exhibit at the Museum. A motion was made by Abigail Herlihy to table the decision for contributing to the Fisher Fund, 2nd by Meg Springate. Motion passed.**

Archeology Posters

- NYSAA was going to produce the poster for 2012. however, NYSDOT will be funding a poster produced by Hartgen and DOT about recent archeology in Utica, NY.
- NYAC would like NYSAA to do the poster in 2016. A ballpark figure to produce the poster is about $ 1,100.00. There may be a state agency to grant money to do a poster to cover professional designer.

At-Large Membership

- There was a discussion about at-large membership fees.

➢ **Motion by John Lathrop, 2nd by Mike Cinquino to consider changing dues of at-large membership. One abstention. Motion passed.**

Misc.

Dolores Elliott brought up shakiness of Triple Cities Chapter. They haven't met in two years. She suggested that NYSAA think about how to revitalize the chapters that are inactive and wavering.

➢ **Motion by Ed Curtin to adjourn, 2nd by Fred Stevens. Passed.**

The meeting adjourned at 9:50 pm.

Respectfully submitted,
Lori J. Blair
NYSAA Recording Secretary

Guidelines for Manuscript Submissions

General

The Bulletin is a journal devoted to the dissemination of scholarly articles relating to the archaeology of New York State and its environs. It is published annually by the New York State Archaeological Association. Authors should submit an original and two copies of each article, including an abstract and a complete list of references cited in the text, to the editor, Charles F. Hayes III, 246 Commodore Parkway, Rochester, NY 14625-2032. The editor may reject or return an article to the author for revisions, on the basis of either content or style. Authors may request peer rreview of their article. Upon acceptance, authors are asked to submit their article in electronic format—either Windows or Macintosh format. Most current word processing programs can be accommodated. Please see section on *Figures*, below for requirements for electronic submission of images.

Manuscript Organization

Please organize your manuscript as follows:

- Title, author, institutional or chapter affiliation
- Abstract - a single paragraph of 100 to 150 words
- Text
- Acknowledgements
- References cited
- Tables (with captions)
- Figures (with captions listed on a separate page)

Manuscripts should be written as clearly and succinctly as possible. They should be unjustified and double-spaced, on one side of 8 1/2" x 11" paper. Only one space should follow periods and pages should be numbered in the upper right hand corner. Endnotes are to be used instead of footnotes, but they should be used sparingly.

Headings

Primary headings should be flush left, bolded, and at the same font size as the text, with only the first letter of each word capitalized. Secondary headings should be flush left, unbolded, and at the same font size as the text, with only the first letter of each word capitalized. Tertiary headings should be flush left, in italics, and at the same font size as the text, with only the first letter of each word capitalized.

Measurement Units

In order to avoid errors in translation, measurements may be in either English or metric units, as appropriate to the content of the article; however, for further clarification, one may wish to include conversions in parentheses. Commonly used units of measurement such as feet, yards, miles, meters, centimeters, kilometers, and hectares are abbreviated as follows (without periods):

inches	in	meters	m
feet	ft	centimeters	cm
yards	yd	kilometers	km
miles	mi	hectares	ha

In-Text Reference Citations

In-text reference citations should follow the simple *American Antiquity* style within parentheses immediately following the material to which the citation refers (for particulars, see *American Antiquity*, Volume 57, number 4, pp. 749-777). Simple citations should include author's last name and year of publication unseparated by a comma, and if appropriate, the page number(s) preceded by a colon (Smith 1978:222) or Smith (1978:222). Citations involving two authors should include both names; those involving three or more authors should use the first author's name followed by et al. (e.g., Brown et al. 1987). Where more than one publication is being referenced, they should be ordered alphabetically within the parentheses and separated by semi-colons (e.g., Barton 1986; Davis 1975; Wilson 1999). Where there are several references for the same author within a set of parentheses, these are separated by commas (e.g., Adams 1975, 1985; Brown 1988).

Quotations

Quotations of five lines or less should be included in the text; double quotation marks are used. The citation should follow the form indicated above for in-text reference citations, but should always include page number(s). Quotes of more than five lines should be inset in a block and double spaced without quotation marks. Citations, including page numbers, should follow in brackets.

Tables

If at all possible tables should be set up in the same word processing format as the text. They should be as simple as possible and include a short descriptive title above the table itself. Tables should be numbered consecutively as they will appear in text. All tables should be referenced in the text.

Figures

All photos and line drawings are designated as figures and numbered consecutively as they are referred to in the text. **Captions should be submitted on a separate page, not as part of the illustration**. A light pencil marking on the back of the photo or drawing should identify the particular illustration. Photos and drawings should be high quality images reproducible at sizes appropriate to the journal. Authors bear the responsibility for obtaining written permission for the reproduction of any materials protected by U.S. copyrights. Film-based photographic prints and original drawings are preferred, but figures may be submitted as digital image files *if they are suitable for publication*. Digital image files which do not meet the following specifications will be rejected. Photographs should be submitted as rgb or greyscale tiff or pdf files only, 8" x 10" or 5" x 7" at a minimum of 300ppi. Line art should be submitted as bitmap tiff or pdf files at a minimum of 1000ppi. **No other formats, such as jpg, doc, etc. will be accepted.** If the graphic was created in digital form, **submit individual files, not printouts, and do not include the images in a Word document**. Contributors may be required to provide photographic prints or hard copy drawings if digital image files are not useable for publication. Photocopies are never acceptable.

References Cited

The list of references cited should include all references cited in the text (except personal communications), and conversely, only references cited in the text should be listed. **Authors bear the responsibility for double-checking the accuracy of each and every citation used**. The list should be alphabetized by the author's last name, then first name and middle initial. Multiple entries by the same author should be in chronological order with the earliest first. Do not use n.d. unless absolutely necessary—if the date is truly unknown. The format for references should follow the *American Antiquity* Style Guide (see *American Antiquity*, Volume 57, number 4, pp. 749-777). Examples of the most commonly needed formats are listed below:

1. Book with single author

Bradley, James W.

1987 *Evolution of the Onondaga Iroquois: Accommodating Change 1500-1655 A.D.* Syracuse University Press, Syracuse, New York.

2. Book with multiple authors

Burt, William H. and Richard P. Grossenheider

1976 *Peterson Field Guides: Mammals*. 3rd ed. Houghton Mifflin, Boston.

3. Edited book (author is editor)

Morris, William (editor)

1978 *The American Heritage Dictionary of the English Language*. Houghton Mifflin, Boston.

4. Translated book

van den Bogaert, Harmen Meyndertz

1988 *A Journey into Mohawk and Oneida Country 1634-35*. Translated and edited by Charles Gehring and William Starna. Syracuse University Press, Syracuse.

5. Reprinted book

Hale, Horatio E., editor

1963 *The Iroquois Book of Rites*. Reprinted with an Introduction by William N. Fenton, University of Toronto Press, Toronto. Originally published 1883, D.G. Brinton, Philadelphia.

6. Multivolume set

Thwaites, Reuben G., editor

1959 *The Jesuit Relations and Allied Documents: Travel and Explorations of the Jesuit Missionaries in New France, 1610-1791*. 73 vols. Reprinted, Pageant, New York. Originally published 1896-1901, Burrows Brothers, Cleveland.

7. Titled volume in a series

Wray, Charles F., Martha L. Sempowski, and Lorraine P. Saunders

1991 *Tram and Cameron: Two Early Contact Era Sites*. Charles F. Wray Series in Seneca Archaeology, Vol. II, edited by Charles F. Hayes III. Research Records No. 21. Rochester Museum & Science Center, Rochester, New York.

8. Article in an edited book

Wade, Mason

1988 French Indian Policies. In *History of Indian-White Relations*, edited by Wilcomb E. Washburn. Handbook of North American Indians, Vol. 4, William G. Sturtevant, general editor, pp. 20-28. Smithsonian Institution, Washington, D.C.

9. Article in a journal

Murray, Jean E.

1938 The Early Fur Trade in New France and New Netherland. *Canadian Historical Review* XIX:367.

10. Article in edited volume in a series

Noble, William C.

1992 Neutral Iroquois Smoking Pipes. In *Proceedings of the 1989 Smoking Pipe Conference*, edited by Charles F. Hayes III, Connie C. Bodner, and Martha L. Sempowski, pp. 41-49. Research Records No. 22. Rochester Museum & Science Center, Rochester, New York.

11. Presented paper

Ceci, Lynn

1985 Shell Bead Evidence from Archaeological Sites in the Seneca Region of New York State. Paper presented at the Annual Conference on Iroquois Research, Rensselaerville, New York.

12. Dissertation or thesis

Drooker, Penelope B.

1996 *The View from Madisonville: Continuity and Change in Late Prehistoric Protohistoric Western Fort Ancient Interaction Patterns*. Ph.D. dissertation, State University of New York, Albany. University Microfilms, Ann Arbor, Michigan.

13. Manuscript in press

Brown, William T.

2000 Early Days in Livingston County. New Horizons Press. In Press.

14. Unpublished manuscript

Wray, Charles F.

1978 Field notes: Fugle Site. MS on file, Rochester Museum & Science Center, Rochester, New York.

15. Web pages and electronic documents

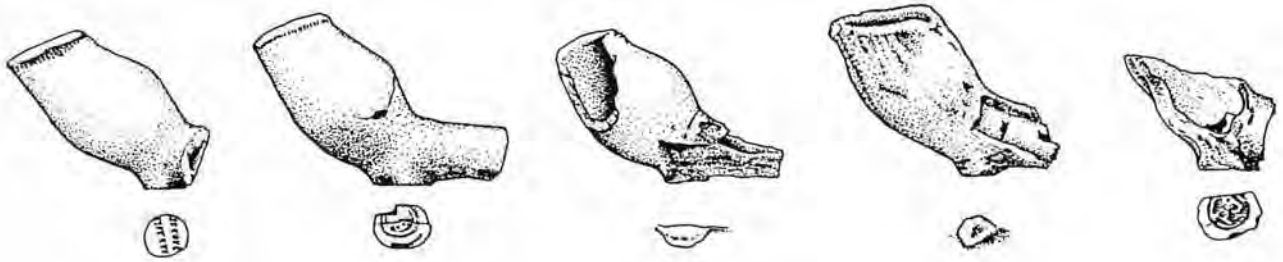
Sharp, John

2008 *Washington District of Columbia Biographies: Louis Deblois*. Electronic document, http://genealogytrails.com/washdc/bio_deblois_1.html, accessed July 15, 2009.

NEW YORK STATE ARCHAEOLOGICAL ASSOCIATION

The Archaeology of Maspeth, Long Island, New York and Vicinity

The New York State Archaeological Association is proud to announce the sale of its latest Researches and Transactions publication, Volume XVIII, Number 1. This issue is entitled *The Archaeology of Maspeth, Long Island, New York and Vicinity*, by Stanley H. Wisniewski and Ralph S. Solecki. 104 pages. 59 illustrations. The cost is $10 for NYSAA members, $15 for non-members, plus $2 shipping and handling. Make checks payable to NYSAA and mail to William Engelbrecht, 16 Atlantic Avenue, Buffalo, NY 14222.



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