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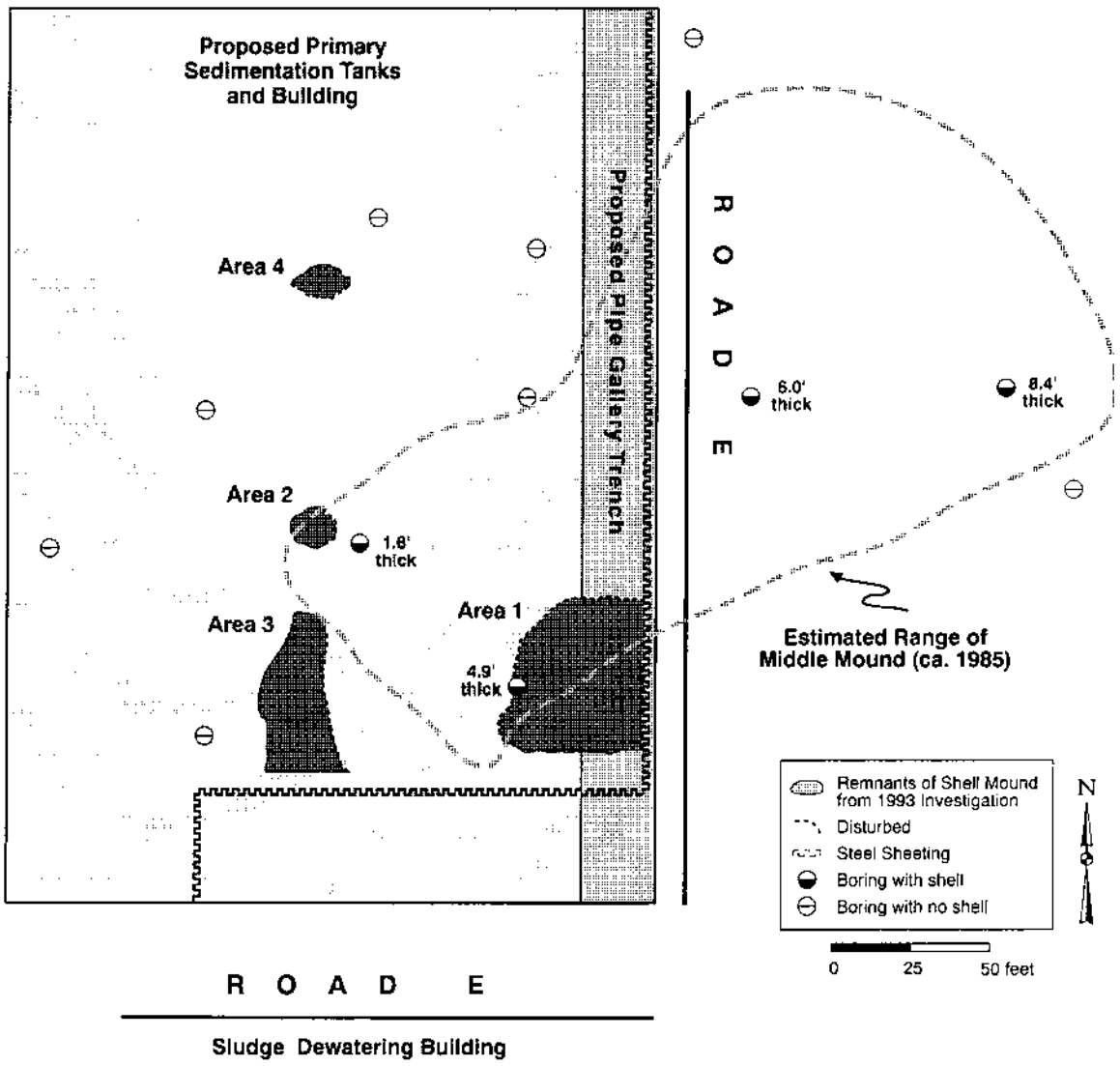

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The Haviland Site: The Early Archaic in Schoharie County

John P. Ferguson, State University of New York at Cobleskill, Iroquois Indian Museum

A preliminary report is made on the Haviland Site, an Early Archaic workshop in Schoharie County, New York. After three years of excavation and study, the site appears to represent a single component, with the most characteristic diagnostic artifacts being bifurcate points and thin oval knives. Over 1,500 artifacts have been identified so far, the majority of which are utilized flakes of local chert. Dating is slightly older than 8,400 B.P. The work has been carried out by the State University of New York Cobleskill and the Iroquois Indian Museum.

The Haviland Site is a single-component, Early Archaic workshop in Schoharie County, New York, located just west of Cobleskill, in what is now an alluvial corn field at the foot of adjoining hills. Its location coincides with the nearby conjunction of Cobleskill and West creeks. On the USGS 7.5' Richmondville, N.Y. Quadrangle, it is found in the southeast quadrant.

Brief History

Materials from the site were shown to the writer [1] in the early 1990s by Jerry Haviland, a surface collector of archeological artifacts. Systematic testing of the area with a standard 3/4-in soil auger in 1992 revealed a section below the present surface that was undisturbed by the plow. A test pit in that area was first made in 1993 by the Archeology Department of the Iroquois Indian Museum [2] with the permission of the Faculty Student Association, the owners, who have allowed the land to be used as part of the college farm of the State University of New York at Cobleskill. The test pit revealed an undisturbed workshop area just below the plow zone. Further investigation resulted in the recovery of a bifurcate point in that level, which was dated at 8405 B.P.

In 1994, the State University of New York at Cobleskill established its first Archeological Field School, and excavation in that year was done jointly by the Iroquois Indian Museum and SUNY Cobleskill. Field work in 1994 was under the supervision of professional archeologist, Elise Manning-Sterling. Year-round research has been done on the site since 1993, using winter facilities at SUNY Cobleskill and the Iroquois Museum. An exhibit on the site can be seen at the Iroquois Museum; materials from the site can be inspected by contacting the writer at the Museum or at SUNY Cobleskill. The continuing research on the site will be under the joint auspices of SUNY Cobleskill and the Iroquois Museum.

Site Size

In 1993, excavation took place within an area 15.2 m by 10.7 m (50 ft by 35 ft). Artifacts were found in all test pits. In 1994, excavation took place in an area 33 m by 25 m (108 ft by 82 ft), and artifacts were found in all the 14 units excavated. The site is likely to be larger in extent than the area so far excavated.

The excavated area is part of a corn field approximately 185 m by 140 m (600 ft by 460 ft), and in 1994 all artifacts found on the surface were measured in from a datum point and plotted on a map. While the surface artifacts closely resemble those excavated from the Haviland Site, no datable artifacts have been found on the surface except in the area excavated so far. The Haviland Site is not the only one on the College Farm. Surface artifact concentrations, some 0.5 mi away, reveal the probable presence of other Archaic Period sites as suggested by the presence of Kanawha, Vosburg, and Snook Kill points. Quite likely, these other Archaic sites were on the banks of a shifting Cobleskill Creek stream as it meandered through the valley thousands of years ago.

Ecological Setting

The Haviland Site is in alluvial soil of an ancient meander of Cobleskill Creek where it washed against the higher ground at the base of the hills to the north. The soil depth varies from 30 to 90 cm (1 to 3 ft), below which are layers of gravels which appear to be stream banks. The workshop residue is found only in depths to 45 cm (18 in) below the present surface.[3]

1. The author is Professor of Anthropology Emeritus, SUNY Cobleskill, and also Field Supervisor of the Archeology Department of the Iroquois Indian Museum of Howes Cave, New York. Trained as a cultural anthropologist, he considers himself an avocational archeologist, not a professionally trained one. The difference is important.

2. The department is made up entirely of volunteers. A list of those who have worked on the project is in the acknowledgments.

3. The geology of the site needs much study, more than the casual visits of professionals who have visited so far.

Modern farmers remember floods that put the area under water, and in a typical spring, pools of standing water are common. The small, pea-sized iron oxide nodules found in some places may have been formed by standing water rich in iron. The soil is acidic, with pH readings ranging from 5.4 to 7.8. Soil particle analysis reveals a basically sandy soil, with about 2% silt and clay and with gravel increasing as depth reaches gravel banks at 78 cm (30 in) and beyond.[4]

Soil flotation has resulted in the recovery of seeds, charcoal, and wood fragments - all very small. Nothing as large as a hickory nut has yet been found, and something as large as a wild grape seed was so unusual that it was noticed by the excavators. The closeness of the workshop strata to the surface makes it most problematical to assume that just because a carbonized seed is found at the same level as a bifurcated point, the seed is from the Early Archaic Period. Worm holes penetrate the entire site, and small seeds could easily fall down the holes through the soil as deep as the gravel.

The seeds that have been identified, such as oxalis and smartweed, do not encourage views that they are related to subsistence. These are plants that are typically found at the juncture of fields and woods, presumably swept into the water by a flooded stream as it eroded the edges of the valley. A modern seed collection is being made that helps somewhat to identify the seeds, but such work proceeds slowly.[5]

Efforts to identify the species of the very small wood particles have not been successful yet. The charcoal discovered so far has been unassociated with a feature, and the technique has not been developed yet to determine if the charcoal is the result of cultural or natural burning.

Most of the stone on the site is chert or flint. Some chert occurs as strata between limestone in the area, and pumpkin-size boulders of chert are found in the streams. The chert can be of excellent quality for tool making or shade off into a poor grade that almost resembles shale. While a large Esopus flint quarry exists a few miles north near Sharon Springs, little of that type of flint is found on the site. The workshop contains local materials; no jasper or exotic flint has been found, although a small quantity of light gray flint that had presumably been imported was worked at the site.

Fieldstone was split to make choppers or was used as hammers. A quartzite stone seems to have been associated with fires, for much is cracked and reddened, although other quartzite fragments show no signs of reddening and may have been used as hammers.

So far no recognizable antler or bone fragments have been found in two winters' work in microarcheology; presumably such fragments have not withstood the effects of the acidic soil.

Dating and Soil Stratification

The charcoal next to the bifurcate point (Figure lb) was dated at 8405 B.P.±65 yr via 14CAMS by the National Science Foundation-Accelerator Facility for Isotope Dating at the University of Arizona at Tucson. The sample was taken in 1993 from the culture-bearing strata 37 cm (14.5 in) below the ground level of Unit 6. Charcoal located at a depth of 30.5 cm (12 in) was dated at 3560 B.P.±55 yr via 14CAMS by the National Science Foundation-Accelerator Facility for Isotope Dating at the University of Arizona at Tucson. This sample was taken in 1993 from Unit 20. Charred material located at a depth of 32 cm (12.5 in) was dated at 280 B.P.±70 yr via 14C radiocarbon dating analysis at Beta Analytic of Miami, Florida. This sample was taken in 1993 from Unit 24.

The 8405 B.P. date is comparable with dates of bifurcates from other Early Archaic Period sites: a Kanawha Stemmed Point from a stratum dated 8160 B.P.±100 yr at St. Albans in West Virginia (Broyles 1966:27); a Le Croy Bifurcate Point dated 8250 B.P.±100 yr from St. Albans (Broyles 1966:27); and bifurcates dated from 8660 B.P.±350 yr to 8920 B.P.±325 yr at Rose Island in Tennessee (Chapman 1975:211).

The Haviland Site exhibits no stratigraphic layering. Even the plow zone shades imperceptibly into the soil below and is distinguishable only by modern corn stalks or other recent materials turned by the plow. As one excavates and keeps track of the Munsell soil colors, one notices that olive brown yellow (2.5Y4/4) gives way to clouds of yellowish red (5YR5/8) oxidation as one goes deeper. Because the soil can be very compact, the plow has only cut in 13-15 cm (5-6 in) in some places, with the maximum plow depth being 17 cm (10.5 in) on the site.

In some areas of the site, the Early Archaic layers have been covered by soil and other forms of fill, such as coal or cinders, that seem to have been spread there. The 3560 and 280 B.P. dates noted above are from areas where such fill covers the Early Archaic strata, but no artifacts or features have been yet discovered by excavation that relate to those periods. However, Late Archaic Snook Kill points and a single Levanna (almost a Madison) have been found on the surface within 0.5 mi. On most of the Haviland Site, the soil appears uniform from the surface down to the old stream bank gravel below.

Further 14C tests are critically important and await available funds. The Arizona tests were made possible through the kindness of Dr. Dean Snow. The Miami test was paid for by public contributions at the Iroquois Indian Museum.

4. Students and faculty at SUNY Cobleskill have helped with studies of pH, soil particle size, phosphorous tests, iron nodule analysis, microscopic organic remains, seed identification, and water flotation.

5. Finding literature to help in identifying seeds is difficult. Most useful is Martin and Barkley (1961). Seed identification was raised to new levels of sophistication by two semesters of work by SUNY Cobleskill honors student John O'Connor.

Typology

In order to communicate information about the site to others, the writer, with the help of many volunteers, particularly Joe Hart, developed a typology appropriate to the assemblage of artifacts. We perhaps suffer under the delusion that our classification system is crystal clear; like most typologies, it is plagued with unstated assumptions. In any case, it is presented in outline form in Table 1, and artifacts recovered from the Haviland Site classified according to this system are summarized in Table 2.

Table 1. Haviland Site Stone Tool Typology.

I. Chert/Flint
- A. Biface (flaked on both sides)
  - 1. Thin (<11 mm) (tn)
    - a. Point (notched)
      - i. Whole
      - ii. Base
      - iii. Fragment
    - b. Knife (pear-shaped)
      - i. Whole
      - ii. Base
      - iii. Fragment
    - c. Tip
    - d. Unclassified (uncl)
      - i. Whole
      - ii. Fragment
  - 2. Medium (11 to 20 mm) (m)
    - a. Whole
    - b. Base
    - c. Fragment
  - 3. Thick (above 20 mm) (tk)
    - a. Whole
    - b. Base
    - c. Fragment
- B. Uniface (one side deliberately shaped, the other basically unworked)
  - 1. Thin
  - 2. Medium
  - 3. Thick
- C. Flake
  - 1. Utilized (ut)
    - a. Spokeshave
    - b. Unclassified
  - 2. Unutilized
- D. Core

II. Non-Chert/Flint
- A. Hammerstone
- B. Abrader
- C. Anvil
- D. Chopper
- E. Pitted Stone

Stone was divided into chert/flint and non-chert/flint. The chert/flint was then separated into categories: (1) bifaces, (2) unifaces, (3) flakes, and (4) cores.

Bifaces

Bifaces show at least some symmetry. No attempt was made to determine usage, although some of the modification observed may have been the result of tool use. Bifaces were measured at their thickest point and separated into three categories: (1) thin (tn) (<11 mm), (2) medium (m) (11-20 mm), and (3) thick (tk) (>20 mm). Thin bifaces were separated into four categories: (1) points, (2) knives, (3) tips, and (4) unclassified. Points were classified as (1) whole (enough there to classify it, but can be missing tip or tangs) (11 items); (2) base (one side only; notched) (1 item); or (3) fragment (most of base gone; mid-section) (1 item).

All points are bifurcates (see Figure 1), except one (Figure 1h), which is a miniature stemmed point most resembling the "Neville-like point" in Robinson (1992:128). The largest point (Figure lb) most resembles the undated Kanawha in Chapman

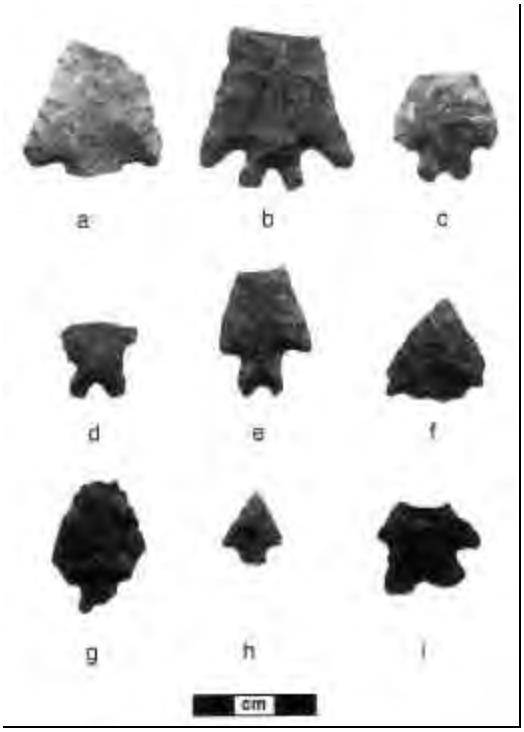

Figure 1. Bifaces, thin, points. a. AP-84; b. AO-165; c. AN-913; d. AO-596; e. AP-547; f. AO-201; g. AO-590; h. AO-981; i. AN-353.

(1975:259, J), but the narrowness of the base is not matched in other literature discovered by the author or his researchers, although it somewhat suggests the undated smaller Kanawha in Thomas (1992:190: line 3, no. 3). The other points shown in Figure 1 are all from below the plow zone, except one surface item (Figure 1i) from adjoining Site 57C. It at first may look like a LeCroy, but closer inspection reveals that it is missing both tip and left barb; therefore, it most resembles the Kanawha in Broyles (1971:58, row 4, no. 4). Not shown but collected from the surface by Jerry Haviland are three whole Kanawha bifurcates and a corner-notched, parallel-flaked point that seems related to the Abbott points in McNett (1985:104), although part of the base is missing. In general, in situ bifurcates from the Haviland Site may be said to be of the Kanawha type, very thin (4-6 mm), and with a narrower bifurcate fork width than is usual (see, in particular, Figure 1e).

Knives were identified (1) whole (entire or assembled from 2 pieces) (29 items); (2) base (92 items); or (3) fragment (16 items). Figure 2 shows the typical shape of these thin, bifacial knives with pointed tips and curved bases. In the archeological literature, Haviland knives most resemble the bifacial blade of Lewis and Lewis (1961:53, Figures h and i), the Type III blade (knife) of Broyles (1971:34, Figure d), the ovate knife of Funk and Wellman (1984:100, no. 14),the broad ovate blade of Funk (1976, Plate 9, no. 37), the broad, ovate bifacial projectile point preforms of Thomas (1992:194, lower right), and the Type 1 blades of Coe (1964:50, Figure

Table 2. Haviland Site Stone Tool Classification Summary.

	Whole	Tip	Base	Frag.	Total
Point	11	0	1	1	13
Knife	29	0	92	16	137
Biface, tn, un	16	41	0	31	88
Biface, m	30	1	9	5	45
Biface, tk	18	0	1	0	19
Uniface, tn	17	1	0	0	18
Uniface, m	29	0	0	0	29
Uniface, tk	9	0	0	0	9
Flake, ut	862	0	0	0	862
Flake, ut, uncl	325	0	0	0	325
Core	57	0	0	0	57
Hammerstone	14	0	0	0	14
Abrader	1	0	0	0	1
Anvil	2	0	0	0	2
Chopper	7	0	0	0	7
Pitted Stone	2	0	0	0	2
Fire-Cracked	43	0	0	0	43
Totals	1472	43	103	53	1671

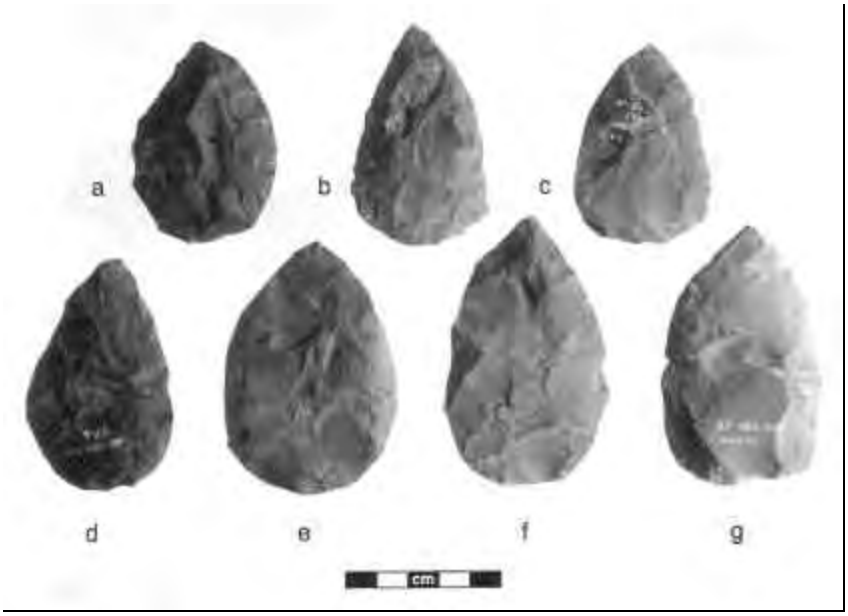

Figure 2. Bifaces, thin, knives. a. AO-40+A0-379; b. AO-626+A0-517; c. AP-592+AP-594; d. AO- 233+A0-138; e. AO-249+A0-130; f. AO-409+A0741; g. AO-589+AP-562.

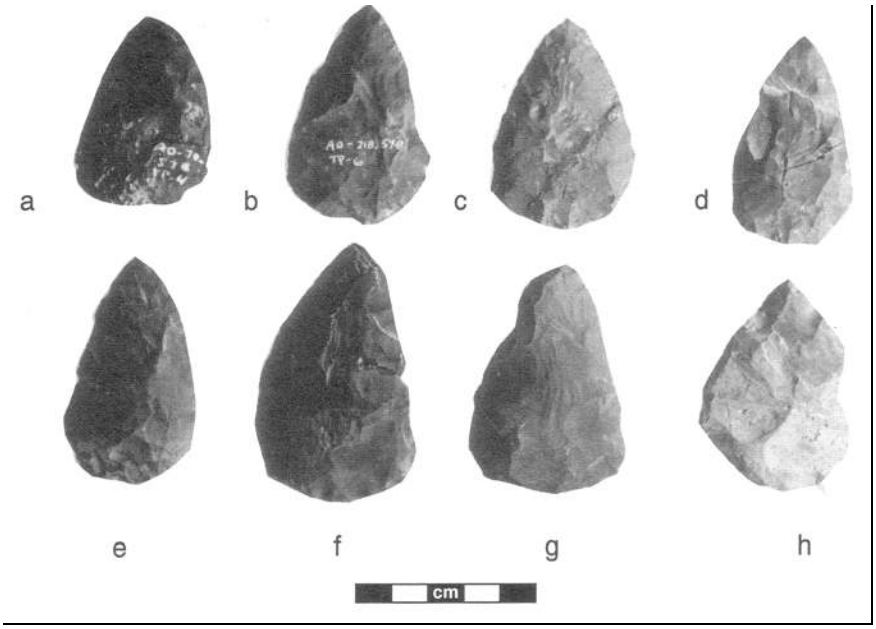

Figure 3. Bifaces, thin, knives. a. AO-64+A0-70; b. AO-61+A0-218; c. AP-549+A0-407; d. AP- 556+AP-552; e. AO-368+A0-400; f. AP-730+A0-445; g. AO-127; h. AO-247+A0-166.

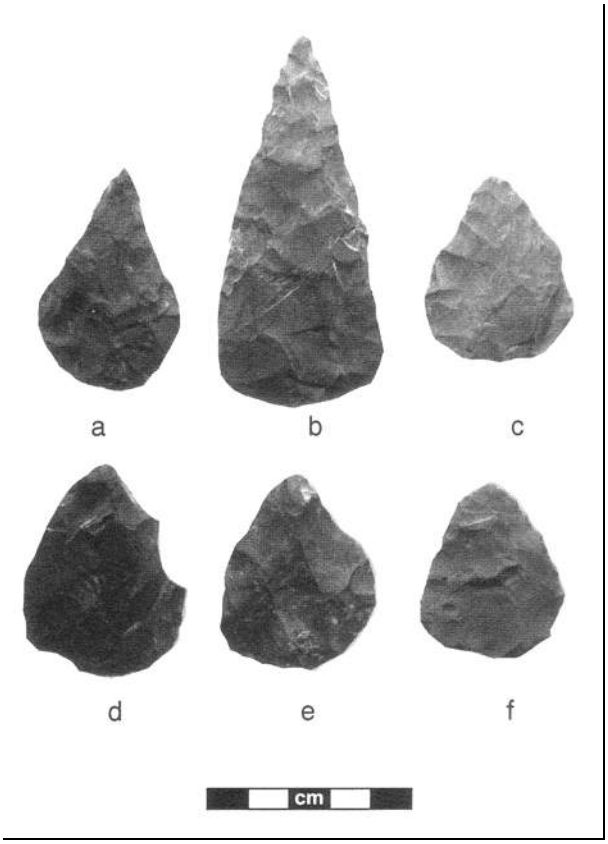

Figure 4. Bifaces, thin, knives. a. AO-478; b. AO-647+A0-998; c. AP-651; d. AO-764; e. AO-483; f. AP-726.

44, row c). The only narrow, trianguloid knife at the Haviland Site (Figure 4b) most resembles a Type VI blade of Broyles (1971:38, Figure k).

With the exception of one (Figure 2d), all the Haviland Site larger knives in Figure 2 are broken, snapped on a diagonal break. In Figure 3, all the larger knives except one (Figure 3g) are broken, but in Figure 4 all the smaller knives are intact, with only the larger broken (Figure 4b). After two years of discussion between the author and others, little agreement exists regarding the reason for the breakage, nor is it clear if the "knives" ever cut very much or if they were, perhaps, magnificent pre-forms of Kanawha point makers. The discovery of 92 bases, as yet unmatched to upper sections, suggests that whatever was going on in the workshop put much strain upon thin bifaces in use or manufacture.

The fact that no unifaces are snapped certainly provides food for thought. Many tools do show micro-chipping or "nibbling" on their edges from possible use, but show very little observable polish or smoothing down of sharp edges. Bifacial, thin tips (41 items) await assignment to any of the pointed biface types: points, knives, or unclassified tools.

Obviously some artifacts (16 whole items, 31 fragments) were difficult to type. Some resemble traditional ovoid scrapers but lack the characteristically steep edges at the working end. Figure 5 illustrates their variety. Figure Sc is the only one with careful symmetry; the others are definitely more casual in regard to shape but usually have a rounded base of what has been termed a "knife" above. Figure 6 illustrates a group of

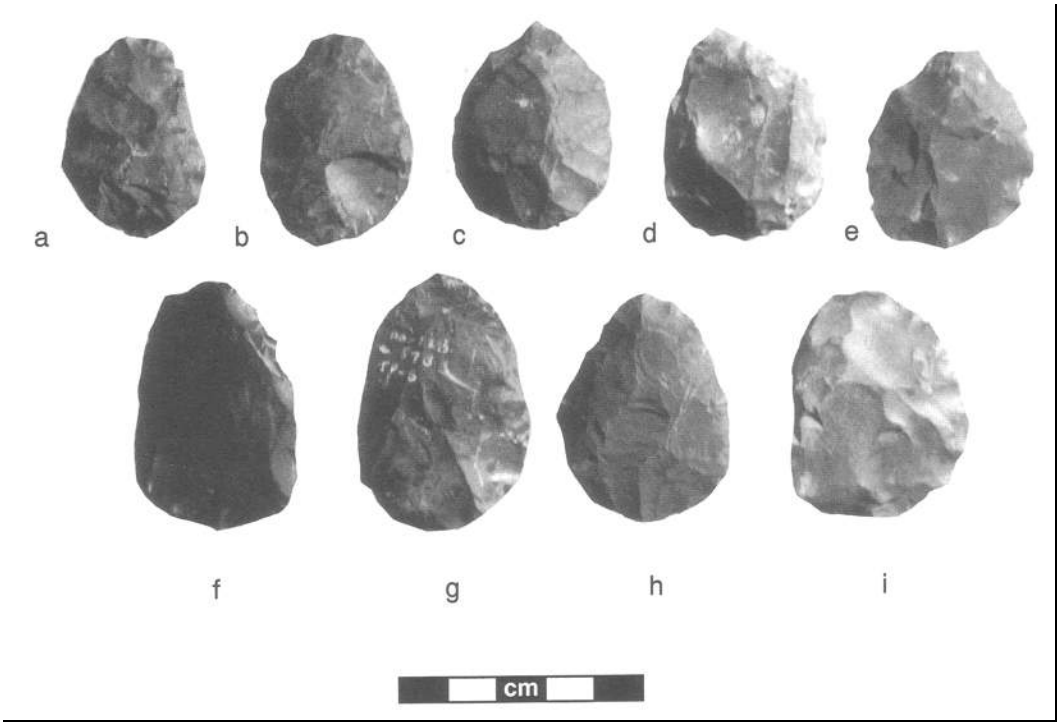

Figure 5. Bifaces, thin, unclassified. a. AP-653; b. AP-657; c. AO-47; d. AO-164; e. AO-780; f. AO-769; g. AO-128+A0-238; h. AO-723; i. AP-250.

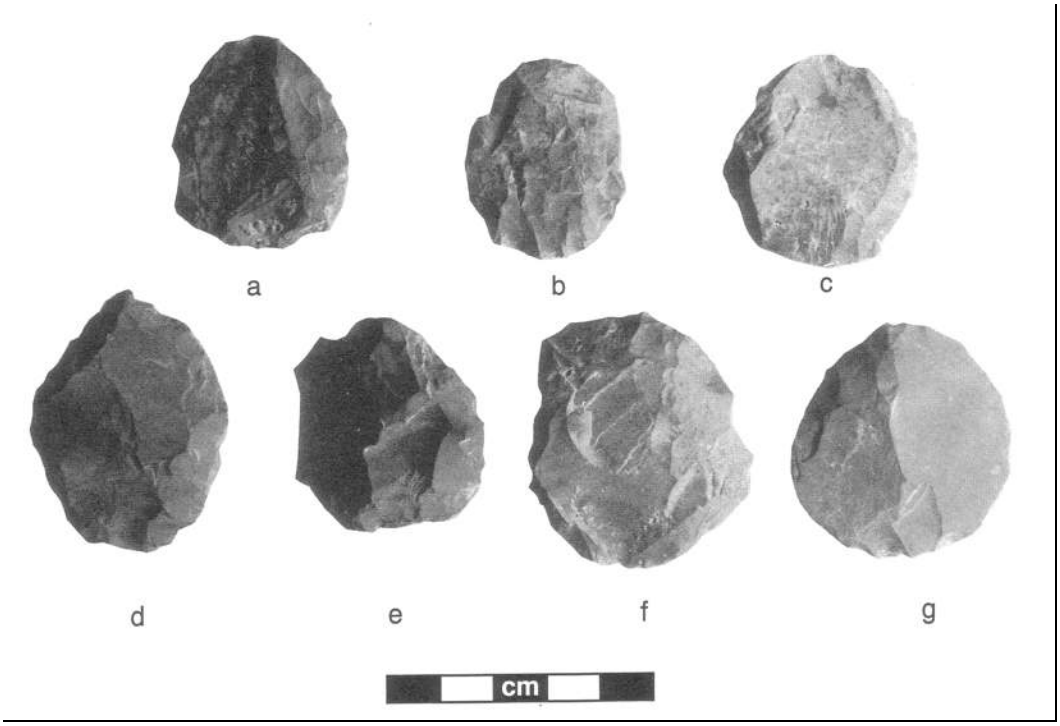

Figure 6. Bifaces, thin, unclassified. a. AO-572; b. AO-422; c. AO-572; d. AO-184; e. AO-351; f. AO- 458; g. AO-163.

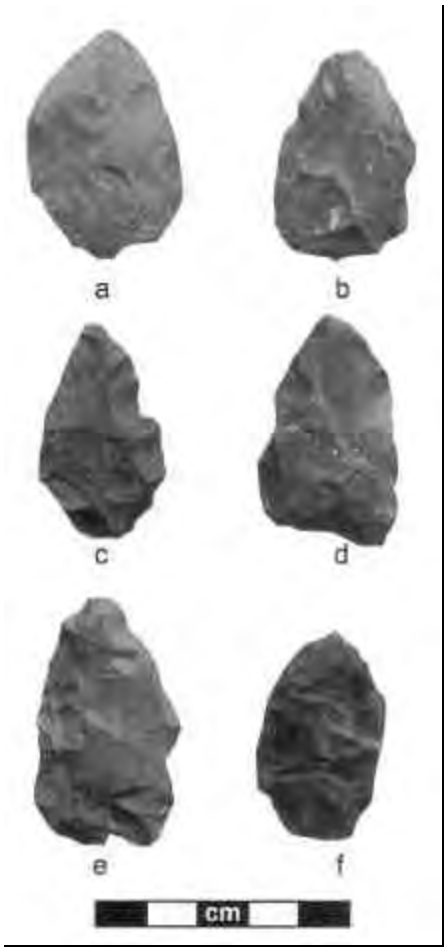

Figure 7. Bifaces, thin, unclassified, possible preforms. a. AO-372; b. AO-677; c. AO-54; d. AO-638; e. AO-344; f. AP-11.

unclassified thin bifaces that tend to have an oval shape and that are more like knives than scrapers. Figure 7 depicts a group of thin bifaces that may be preforms for projectile points, such as the smaller Kanawhas; on the other hand, they may have been completed artifacts.

Bifaces of medium thickness (11-20 mm) were basically of two types: working pieces in the process of being thinned (Figure 8b, c, d, and f), and completed tools, such as a knife scraper from a long but thick flake (Figure 8e) and an awl-like tool (Figure 8g) that is apparently unique, even to Dr. Robert Funk, who inspected it in the field and later in the SUNY Cobleskill laboratory. Most of the medium bifaces (30 items), however, are pieces being reduced, as are the 15 whole medium biface fragments found. Clearly, thinness was desired.

A total of 19 thick bifaces were typed. Using thickness (>20 mm) to sort produced some strange bedfellows, as can be seen in Figure 9. While most were clearly being thinned (Figure 9c), others (Figure 9b, d) seem to have been deliberately flaked to form a mound or pyramid near the center so that perhaps they could have been more easily pushed as planes. Still others (Figure 9a, e) may be choppers, with "turtle-back" humps (Figure 9e) or with the smooth outer part of the core left intact so that the chopper fits comfortably in the hand (Figure 9a). The latter have edges with pronounced serration.

Unifaces

Completed unifacial tools were uncommon. In a number of cases, the edges were slightly trimmed on the smooth, ventral side, almost as if the bifacial mentality had to have its

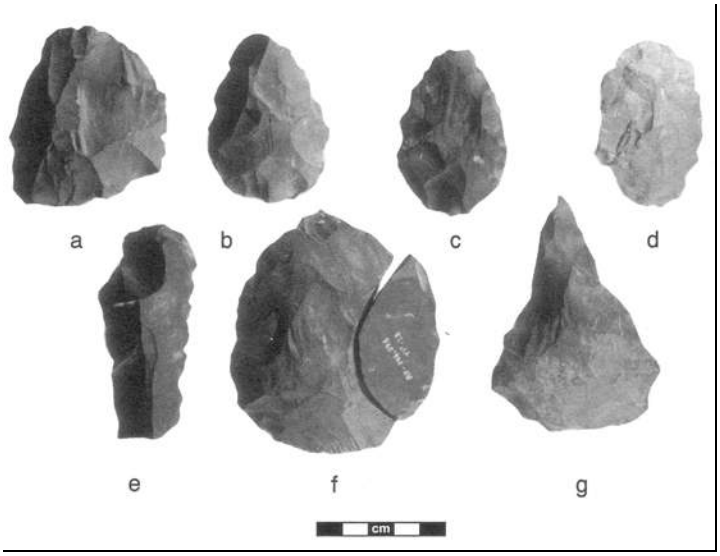

Figure 8. Bifaces, medium. a. AN-276; b. AO-428; c. AP-55; d. AP-13; e. AP-108; f. AO-60+AP-146; g. AN-981.

say before the piece was considered done. Most thin unifaces (total of 17 whole pieces) have the same outline as bifaces (i.e., a rounded base, excurvate tapering to a point), with a few exceptions (Figure 10b as oval and Figure 10f as rounded at both ends). Speculation regarding usage includes skinning, with a prying action (Figure l0a as a snapped corner); wedging (Figure 10e and g showing evidence of step-fractures from battering); and standard scraping with dorsal micro-flaking (Figure 10b, c, d, f, g, h, and i).

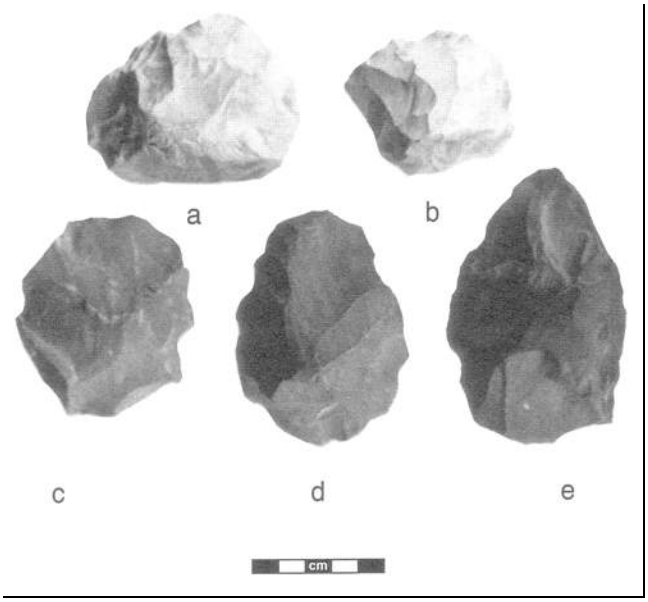

Figure 9. Bifaces, thick. a. AO-56; b. AP-551; c. AO-198; d. AO-748; e. AO-729.

All medium-thick unifaces (29 pieces, 11-20 mm) seem to have been used as scrapers. Some (Figure 11f, g, h, and i) are basically circular flakes, unmodified at the bulb of percussion. Others resemble a point (Figure 11b, c, d, and e); one clearly is designed to be used at both ends, and it exhibits fine controlled flaking to create a most symmetrical "turtle back" (Figure 11c). Another (Figure 11j) seems to be a rectangular plane, pushed with the thick, unmodified, bulb-of-percussion end.

Few in number, the thick unifaces (9 pieces) are also apparently scrapers. One (Figure 12b) is a standard end scraper, but it has an interesting spur that suggests earlier Paleoindian forms (McNett 1985:215, B; Ritchie 1965:29; Ritchie and Funk 1973:22). An eccentric flake (Figure 12d) was also modified to create a long, narrow spur which shows use as a scraper, and the end of one flake was slightly modified to create a small spur. Other thick unifaces seem to have been shaped to create a thick center mound ("turtle back") that could fit in the user's palm so that the tool could be easily pushed as a plane or grasped to use the sides as a cutter.

Flakes

Almost all flakes larger than 2 cm show utilization in a variety of ways (e.g., scrapers, spokeshaves, knives, gravers, or awl-perforators). This utilization of flakes (862 in number), often micro-flaked slightly, is most characteristic of the debris covering the workshop areas. Early Archaic workers apparently discov-

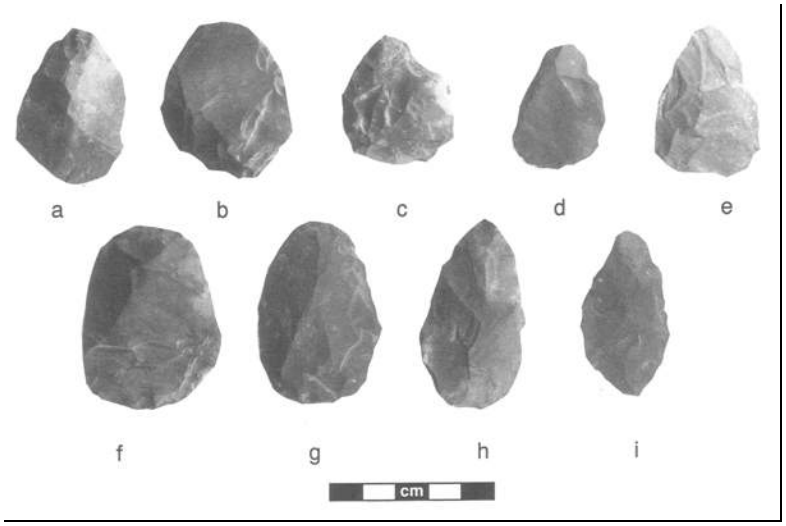

Figure 10. Unifaces, thin. a. AO-293; b. AP-159; c. AO-404; d. AO-527; e. AO-858; f. AP- 190; g. AO-525; h. AO-168; i. AO-306.

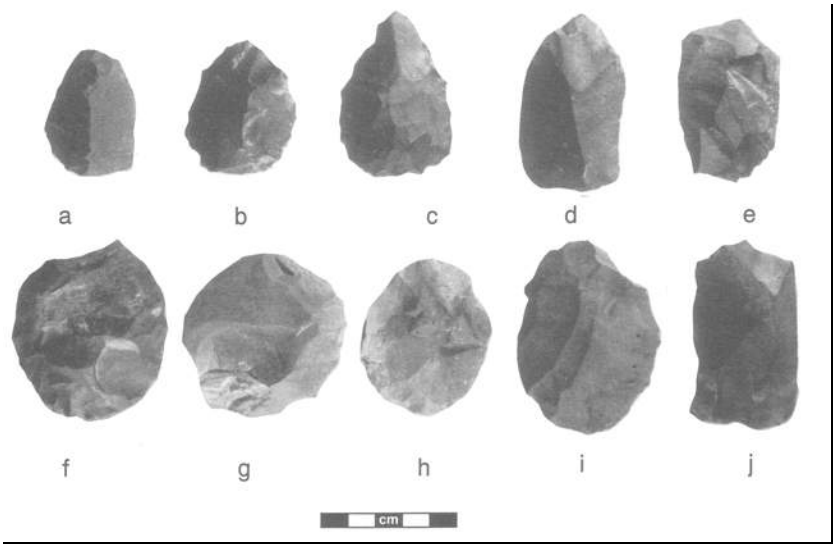

Figure 11. Unifaces, medium. a. AO-20; b. AO-881; c. AO-39; d. AO-124; e. AP-631; f. AO-464; g. AP-622; h. AO-496; i; AO-37; j. AP-43.

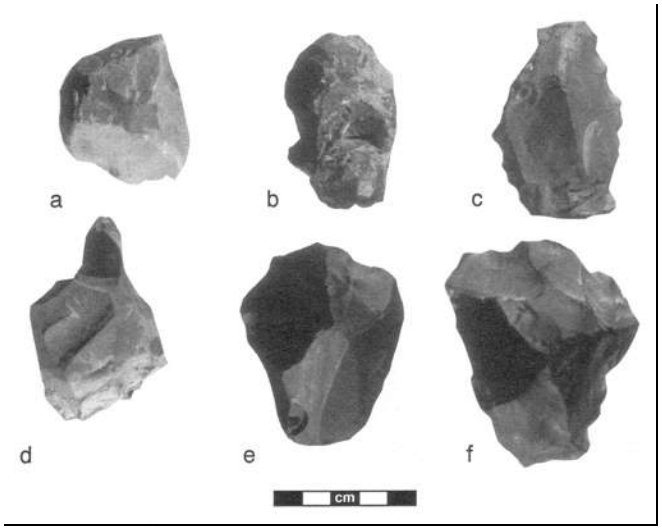

Figure 12. Unifaces, thick. a. AO-959; b. AO-58; c. AO-971; d. AO-528; e. AP-163; f. AO-968.

ered that the sharp local flakes dull quickly, as we confirmed experimentally; therefore, many flakes only show very light usage.

Not clear is whether sharp flake points may have been modified to create gravers. Some flake tips seem to have been sharpened by striking blows from opposite directions to remove very small flakes observable only under a microscope.

Cores

All cores (57 items) are of local chert/flint. A few show signs of having been briefly used as scrapers.

Hammerstones

Only a few (14) clearly identifiable hammerstones were found, suggesting that antler billets were used as hammers and either did not survive in the soil or were carried elsewhere. Many pieces (43 items) of fractured quartzite found on the site have been identified by visiting professional archeologists as fire-cracked, but the writer believes that many may be broken hammerstones, since no hearth has yet been located, and the fractured stone seems not to have been washed in but broken in the activities of the workshop.

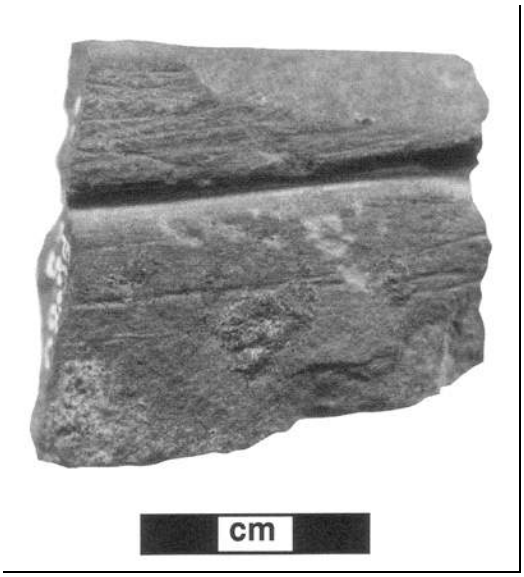

Figure 13. Abrader. AO-579.

Abraders

Only one abrader (Figure 13) has been found, perhaps a distant cousin of those pictured in Ritchie and Funk (1973:61, nos. 6 and 8). Grooved on both sides, the abrader also shows signs of beveling by grinding. In Figure 13, the grinding is visible in the upper right-hand corner of the abrader. This tool was in the immediate vicinity of and at the same level as finely made points and knives. However, no basal-, edge-, or tang-grinding has yet been noticed on Haviland Site artifacts.

Figure 15. Chopper split from fieldstone. AP-636+AP-637.

Anvils

Both anvils of large stone were surrounded by dozens of small flakes and seem to have been set in the alluvial soil so that the narrow end of the boulder was highest from the ground. It was this end that showed the most usage. Both stones were clearly imported, as nothing else resembling them in size (over 20 cm) was found in the area.

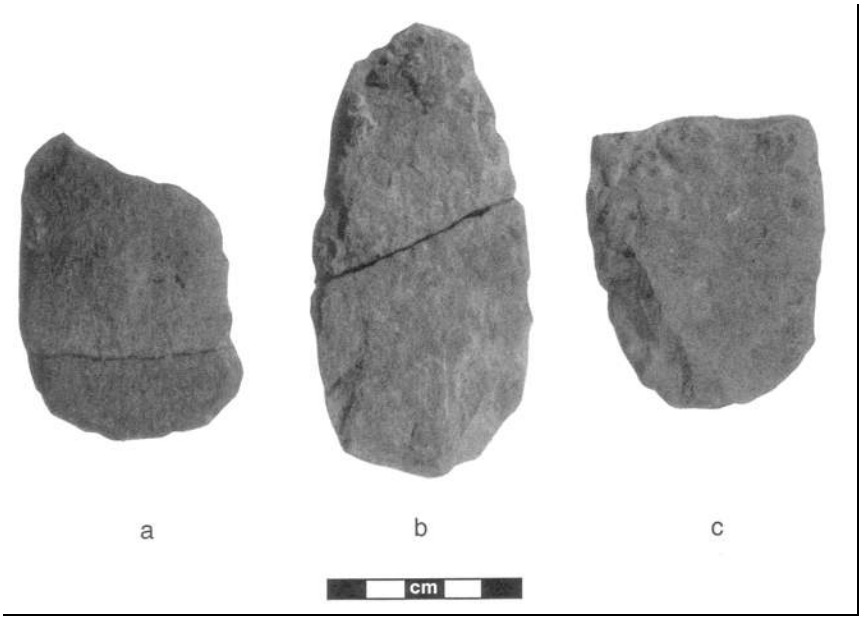

Figure 14. Choppers. a. AP-50; b. AO-980+AP-21; c. AO-863.

Figure 16. Chopper as spokeshave. AO-493.

Figure 17. Hammerstone - sledge? AO-95.

Choppers

Considerable variety in choppers was noted. The most conventional (Figure 14b) resemble a biface in general shape with a rounded base, flaking on both sides, and a tapering tip. These types of Haviland choppers most resemble those in Funk and Wellman (1984:98,109), McNett (1985:110, 277), and Thomas (1992:195). Another type was produced by splitting flat fieldstone (Figure 15) and then flaking the sharpest edge. One of these (Figure 16) showed possible use as a spokeshave. Some show beveling from grinding.

Larger fieldstone choppers were also found. The only one found in situ so far was formed by breaking off pieces of a heavy, thick (4.5 cm) fieldstone to produce a rectangular piece that is roughly shaped like a celt or sledge (Figure 17). It was found at the bottom of an intense workshop area in Unit 4. One end has been flaked to produce a crude cutting edge like that of an axe; the other end has a point of sorts with percussion scars around it. The tool seems to be part axe, part hammer, and part hoe (Figure 18). Possibly related are hoe-shaped tools with ground sides that are found on the surface of the surrounding field, but the Early Archaic provenience of these is not established. It is tempting to speculate that in this preagricultural period, such tools could have been used to mine the chert/flint boulders from the alluvial valley soil.

Pitted Stones

Only two pitted stones have been found, both on rather nondescript pieces of broken fieldstone.

Figure 18. Hoe? AP-542.

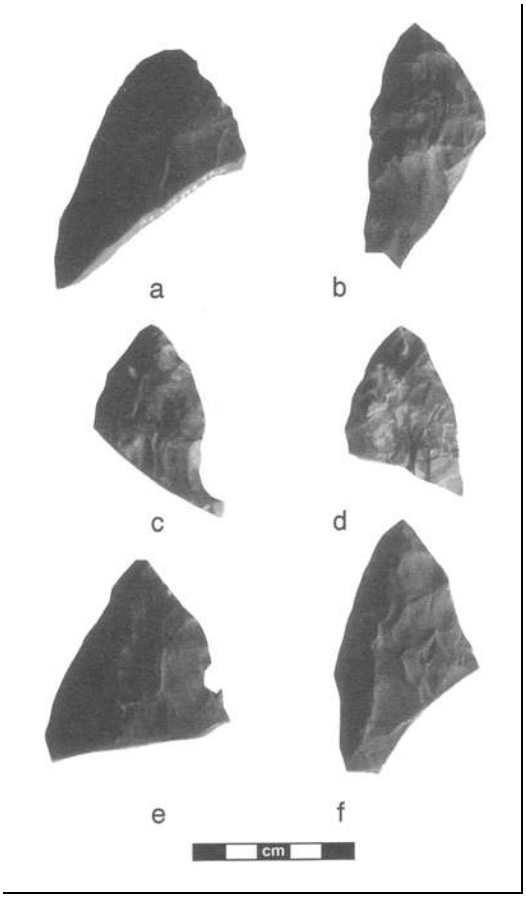

Figure 19. Anomalies. a. AO-243; b. AP-611; c. AP-727; d. AP-540; e. AO339; f. AP=540.

Anomalies in Typology

Figure 19 illustrates some of the more problematic pieces. All are thin-biface tips, one (Figure 19d) with only a corner of the base missing but with enough of the right-hand base present to suggest a very subtle stem. If more are discovered, they may be precursors of stemmed points to follow in the Middle and Late Archaic. It is large and broad for a point and oddly shaped for a knife. A similar combination of thinness and broadness may account for the fact that all the examples shown in Figure 19 are broken. Perhaps each piece was an unsuccessful tour de force.

Particularly enigmatic is the tip of a piece that has been thinned in the center on both sides (Figure 19b). The flaking is not centered as is classical fluting, and the flake scars lack terminal step fractures that might be expected. The size of the entire piece, if ever found, will be larger than the usual Clovis. It is most likely a knife.

Figure 20 illustrates either a pendant or a brook stone with a natural hole. Opinions differ.

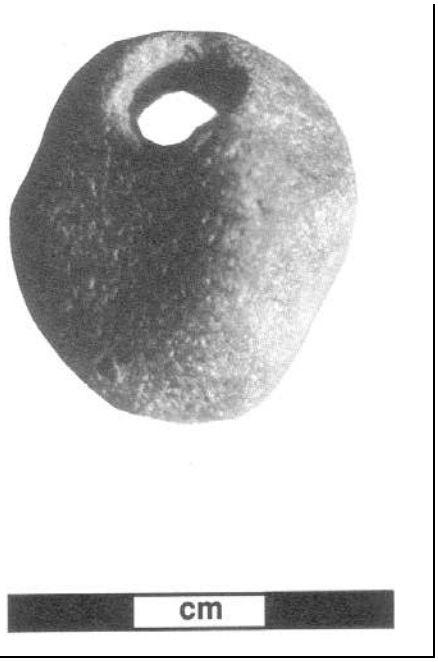

Figure 20. Pendant or natural brook stone. AP-557.

Workshop Activities

Figure 21 shows the distribution of excavated units at the site. Table 3 lists the total weights in grams of chert and the total numbers of tools and utilized flakes recovered from each excavated unit. These data suggest that workshop activity was centered in a cluster of excavation units, although units at the edges of the area removed from tillage by SUNY College still show activity. The site extends beyond the project area, but its total limits have not yet been determined. The distribution of tools and utilized flakes by count per excavation unit also indicates a clustering of workshop activity as well as evidence of knapping on a lesser scale over a 27 m by 38 m area (Figure 21, Table 3).

Future research will use computers to analyze artifact distribution by type to investigate possible specializations of workshop activity, something perhaps like the complex clusters developed for the Minisink Site by Evans (1985). No simple explanation of workshop activity has yet found favor, although speculation has enlivened many summer days and most of two winters. The predominant pattern is a mixing of artifact types, with the one exception of the rather isolated presence of two anvils, each surrounded by dozens of small flakes. Other high concentrations of chert/flint contained a bewildering mixture of unutilized flakes, utilized flakes, and tools in various states (e.g., most points and knives were broken). The thickness of the workshop debris varies from 10 to 15 cm (4 in to 6 in), and in some areas it is very concentrated,

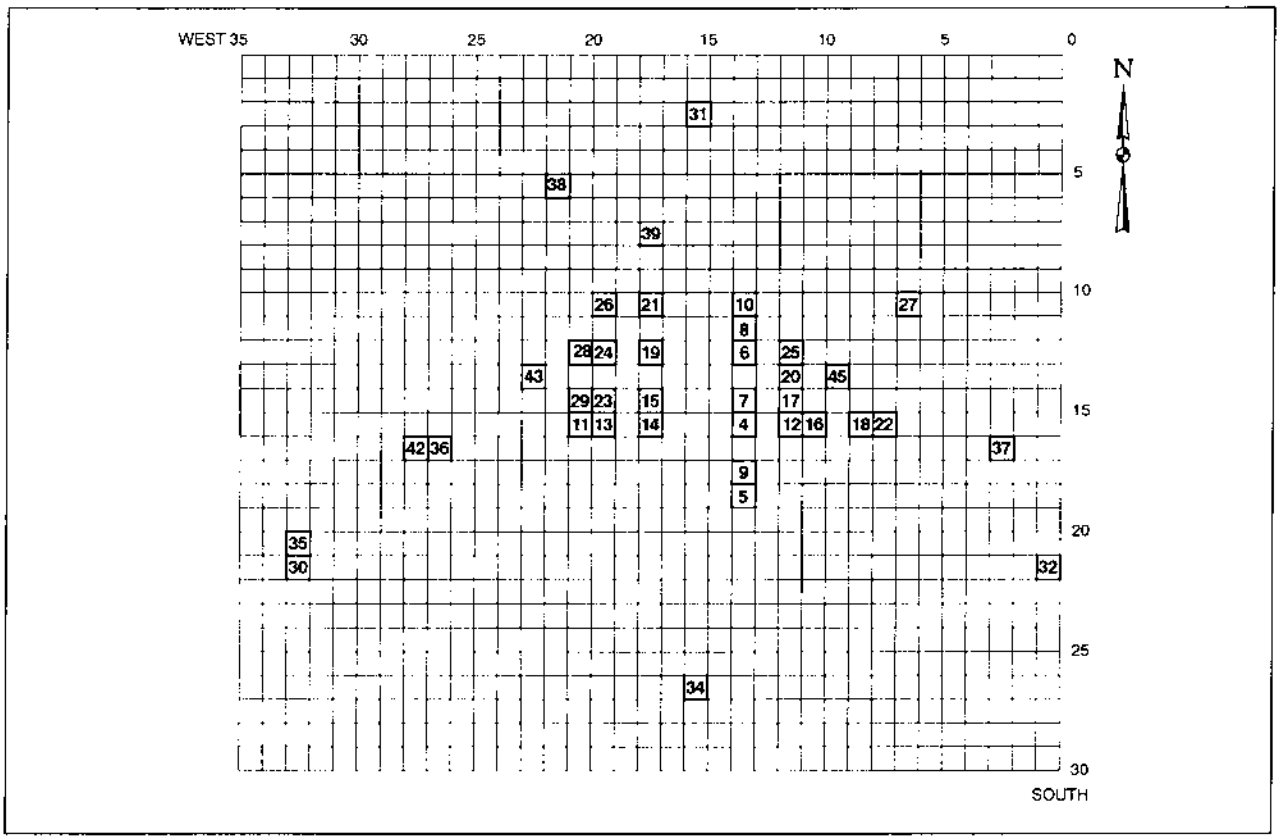

Figure 21. Distribution of excavated 1.0 m= units at the Haviland Site.

Table 3. Distribution of Cultural Material by Excavated Unit at the Haviland Site.

Unit	West Coordinate	South Coordinate	Weight*	Number*
4	13	15	5961	118
5	13	18	2785	14
6	13	12	7065	79
7	13	14	7233	66
8	13	11	1836	31
9	13	17	7995	65
10	13	10	4285	2
11	20	15	779	8
12	11	15	2181	49
13	19	15	1077	17
14	17	15	3405	34
15	17	14	6655	93
16	10	15	4285	87
17	11	14	3406	73
18	8	15	10873	106
19	17	12	4309	92
20	11	13	8406	119
21	17	10	794	18
22	7	15	4310	64
23	19	14	1807	32
24	19	12	1454	11
25	11	12	1424	15
26	19	10	726	7
27	6	10	1879	15
28	20	12	454	11
29	21	14	486	0
30	32	21	1506	12
31	15	2	1670	8
32	0	21	1352	4
33	37	16	775	5
34	15	26	1255	5
35	32	20	1114	0
36	26	16	460	4
37	2	16	2838	4
38	21	5	116	1
39	17	7	125	2
42	27	16	1692	20
43	22	13	345	2
45	9	13	626	6

* Total weight of recovered chert (g)
** Total number of recovered tools and utilized flakes (n)

* Total weight of recovered chert (g)
** Total number of recovered tools and utilized flakes (n)

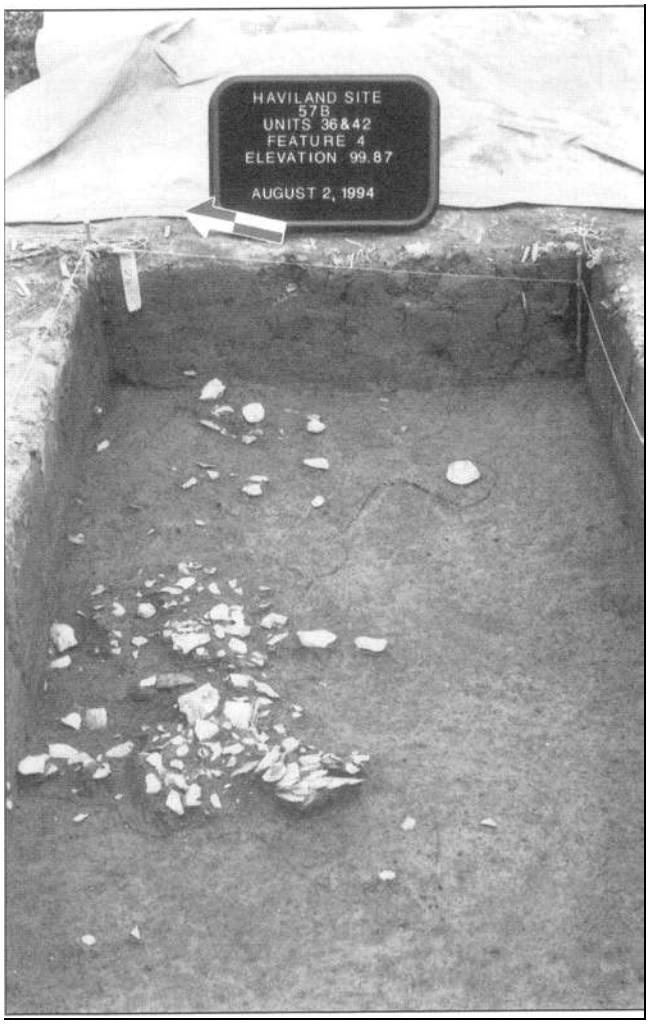

Figure 22. Typical workshop artifact and flake cluster.

almost as though swept in piles, but it does not seem to have been swept by water current (Figure 22). The silting that buried the site seems to have been gentle.

Broken pieces that fit together total 15, excluding one broken in excavation; all are knives. No pieces that fit together were side-by-side. Two parts of one knife were separated by 7.6 m (25 ft) horizontally and 18 cm (7 in) vertically. This fact gave birth to the facetious "Fury Factor Theory," that the creator/user of the beautiful knife was so furious when it snapped that the person threw it that long distance. Most broken pieces were, however, much closer - within 1.0 m of each other, suggesting that composure overcame fury.

On the other hand, the average vertical distance separating the broken pieces of the eight broken knives was 5.5 cm, which is half the depth of the entire cultural stratum at some parts of the site. All this interrelationship has reinforced speculation that the workshop represents a single occupation, but that question is still very much open.

Very promising is experimental knapping to emulate the artifacts and their usage, but the amazing skills of Early Archaic people are not yet within the grasp of anyone with time enough to volunteer for this project. If someone can create the hallmark of the Haviland Site - the thin bifaces - then we can learn what kind of activity snaps them in such distinctive fashion. The work has to be done using local chert, of which there is a good supply.

All possible cultural features so far have been eventually classified as natural discolorations in the soil produced by rodents and trees. Not found are hearths, storage pits, signs of habitation, middens, etc. The presence of charcoal and wood fuels hope that cultural features will yet be discovered.

Conclusion

This is a preliminary report on the Haviland Site, an Early Archaic workshop whose inhabitants specialized in thin points and bifacial knives. The site so far represents a single component - the bifurcate tradition. The ^{14}C AMS date of 8405 B.P.±65 yr fits well with other dated bifurcate sites. Research on the site will be continued under the joint auspices of the State University of New York at Cobleskill and the Iroquois Indian Museum.

The abundance of other artifacts offers an opportunity to study the material culture of a tradition not mixed with others, as most assemblages are in Schoharie County. The search will continue for hearths, habitation remains, and animal bone or antler.

Acknowledgments

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The Catskill Rockshelter, Town of Olive, Ulster County, New York

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The Catskill Rockshelter (NYSM 7011) is located in the Town of Olive, Ulster County, New York The excavation of two 5-ft squares has yielded evidence of three or four occupations in the Archaic, Early Woodland, and terminal Late Woodland/Contact periods. Most of the material inventory relates to the most recent occupation(s). The site is interpreted as a "back country" rockshelter for the exploitation of beaver and deer.

Introduction

The Catskill Rockshelter is located at the base of Mombaccus Mountain in the Town of Olive, Ulster County, New York. (Figure 1). Situated at an elevation of 700 ft AMSL, the rockshelter is formed by a ledge that faces southeast and overlooks a small drainage that collects water from the nearby mountains and eventually flows into Rondout Creek to the southeast. The site was partially excavated by Mr. James Burggraf of Samsonville, New York, in 1960. This report focuses on a sample obtained from the excavation of two 5-ft squares located on the talus slope. These excavation units did not penetrate below the humus (James Burggraf, personal communication, 17 October 1991). All excavated soil was screened through 1/2-in hardware cloth.

The rockshelter is composed of the local bedrock, the Middle Devonian Hamilton Group (Moscow Formation) of shale and sandstone (Fisher et a1.1970). This formation consists of what masons and locals know as "bluestone", a very fine-grained and highly compacted sandstone which varies in color from gray to black, to bluish black. Bluestone was quarried in the area of the rockshelter since the late eighteenth century, and then on a more commercial level beginning in the early nineteenth century. It is noteworthy that this normally destructive process probably saved the site from vandalism due to the huge pile of quarry waste which was deposited on the living surface and front of the rockshelter (J. Burggraf, personal communication, 17 October 1991).

The shelter consists of a rock face and overhang 3.2 m high, 2.5 m wide, and 3 m deep. It tapers towards the back where it becomes difficult to stand. Excavation was limited to Level l, which is a black humus with fragments of bluestone throughout. Overlying the humus and scattered around the rockshelter is a variety of twentieth-century garbage that has accumulated on the surface.

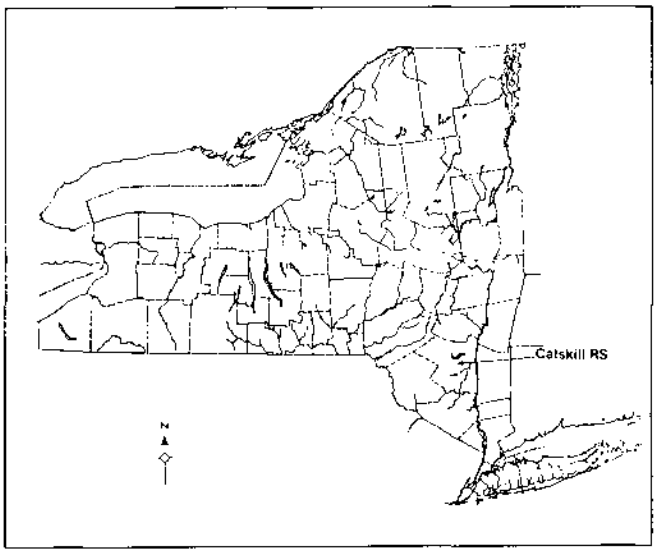

Figure 1. Map of New York showing site location.

Cultural Material

The cultural material excavated from the site may be roughly categorized by function as follows: general utility tools, weapons, fabricating or processing tools, domestic equipment, ornaments, recreational equipment, debitage, and faunal remains.

General Utility Tools

Several classes of general utility tools are present. These include knives, utilized flakes, scrapers, a multipurpose tool, and a hammerstone.

Knives (2): One tip; one almost complete example. Distinguished by thickness, sinuosity of edge, wear pattern, and minute step fractures along the working edge. Both examples are manufactured from western Onondaga chert (Figure 2).

Marginal biface (1): One fragment of chert shows moderate bifacial workmanship.

Utilized flakes (2): Both composed of gray-brown chert.

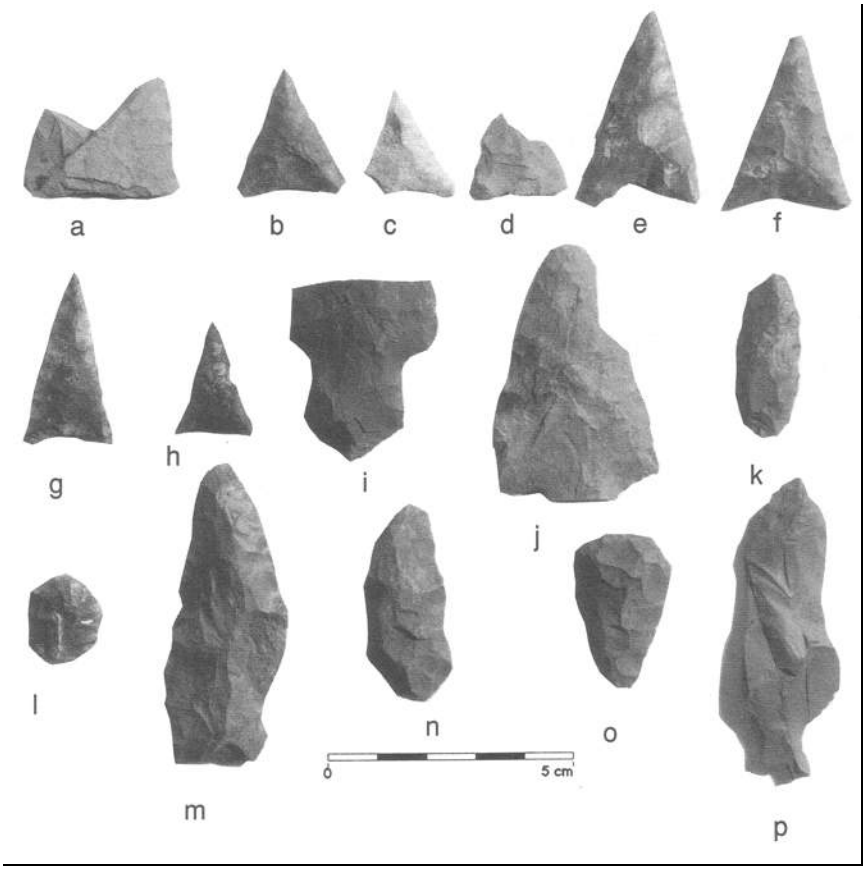

Figure 2. a-d. Levanna points; e-f. points transitional between Levanna and Madison; g-h. Madison points; i. Adena-Fulton Turkey Tail; j. Archaic point; k. drill; I. scraper; m-n. knives; o. strike-a-light; p. multipurpose tool.

Scraper (1): Trianguloid in shape. Moderate to heavy polish on distal working edge. Gray-black chert (Figure 2).

Multipurpose tool (1): This tool appears to have functioned as a knife, spokeshave, and graver. It is composed of waxy greenish-brown chert (Figure 2).

Hammerstone (1, see also below): One oblong cobble was utilized along its edges as a hammerstone. It also displays minimal bipolar wear.

Strike-a-light (1): One small gray chert strike-a-light. It measures 1.7 cm in length by 1.4 cm in breadth (Figure 2).

Weapons

Projectile points (13): Thirteen projectile points were found (Figures 2 and 3). These include one Archaic-like broad point, one projectile point tip, one base similar to Adena and Fulton Turkey Tail points (R. Funk, personal communication, 14 June 1995), four Levanna points, two Madison points, two points transitional between Madison and Levanna, and two perforated brass projectile points.

Gunflints (2): Two gunflints of mottled gray flint were found (Figure 3). The larger of the two measures 2.15 cm by 3.0 cm and is manufactured on a spall. The smaller measures 2.2 cm by 1.8 cm and is of blade construction. Similar examples from the seventeenth century are illustrated in Faulkner and Faulkner (1987: Figure 5.17, n-w). Similar eighteenth-century examples are shown in Hamilton and Emery (1988).

Fabricating or Processing Equipment

Perforating tools (2): One deer bone awl and one chert drill bit were found. The latter has an extended ovoid shape and displays heavy use-wear at the tip and lateral portions to a point halfway down its length, indicating that it was probably hafted (Figure 2).

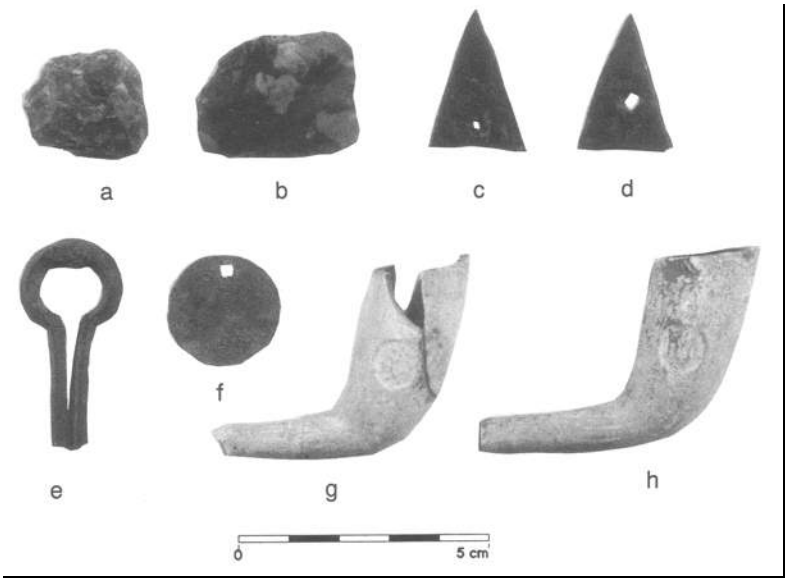

Figure 3. a-b. two gunflints; c-d. two perforated brass projectile points; e. mouth harp,; f. lead medal; g-h. two "R.T." pipes.

Domestic Equipment

Manos (3): Three nutting stones or manos were found. One is bi-pitted, while the other two display only one pit each. The largest of the three has a worn flat side attesting to its use in grinding or rubbing. All three have lateral battering, indicating additional use as hammerstones.

Pottery: A total of 168 fragments of Native American ceramics were found. These can be divided into groups comprising 11 vessel lots. Due to similarities in color, paste, and temper, 106 of the body sherds could not be assigned to specific vessel lots.

Vessel Lot 1. This vessel lot is represented by one large rim to-shoulder fragment (Figure 4). Pairs of incised vertical lines were used to construct zones which are filled with horizontal and oblique lines. Within alternating pairs of lines are punctates, which are used to create horizontal and oblique ladders. The base of the collar is encircled with oval punctates. The interior and exterior of the pot are smoothed over and range in color from brown to black.

Similar design elements consisting of horizontal and oblique incised lines in combination with punctates have been illustrated in the literature for sites further to the south (Funk 1989: Figure 5, no. 5; Kraft 1975: Figure 84, h, i; Moeller, 1992: Figures 10, 11, and 13; Skinner 1909a:Figure 14, c, Figure 17, g; Skinner 1909b: Figure 37, a; Witthoft 1959:Figure 2, F). This vessel is typed as Munsee Incised (Kraft 1975:138-146).

Vessel Lot 2. This pot is represented by two large rim-to-shoulder fragments and five smaller pieces (Figure 4). The decoration consists of short vertical lines or punctates near the lip above three incised horizontal lines. Below the horizontal lines are vertical lines which extend to the base of the collar. An overlay motif consisting of horizontal incisions creates a double ladder every 3 or 4 vertical lines. The base of the collar is decorated with large (1.2 cm long by 6.5 mm wide) punctates. The interior of the lip is decorated with short oblique fingernail nicks.

This vessel is typed as Kingston Incised (Ritchie 1952). The type description for Kingston Incised was originally defined by MacNeish and was to be included in Iroquois Pottery Types (1952). However, Kingston Incised along with Hudson Incised and Hudson Crescent Incised were eliminated from the volume because the editor believed them to be Mahican and not "true Iroquois types" (R. MacNeish, personal communication, 26 June 1995). The only published description of these types is as follows:

> Hudson Valley Incised has a row of circular notches at the lower rim edge; Hudson Valley Crescent Incised has slight, linear notches which are generally crescentic at the lower rim edge; and Kingston Incised has some of the parallel lines which fill plats crossed by numerous short lines or punctates, forming ladder-shaped elements, and has a variety of notch forms at the edge of the collar [MacNeish 1947, quoted in Witthoft 1959:40].

Kingston Incised had been assigned by Ritchie (1952) to the Chance Horizon, but there is increasing evidence that this type is a protohistoric and Historic Period ceramic type (Diamond

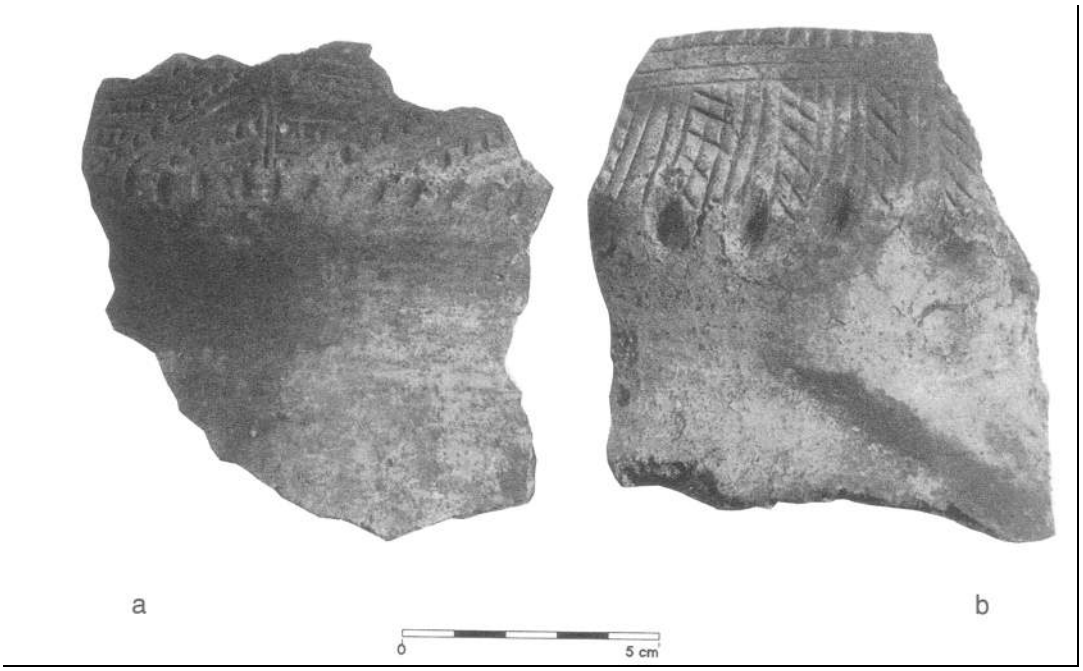

Figure 4. a. Vessel 1; b. Vessel 2.

1994). Kingston Incised has been found at a variety of sites in the Hudson Valley where it occurs with Contact or Historic Period materials. Kraft (1975:146) has noted that Munsee Incised (of which Kingston Incised is a subtype) has a temporal span of 1500-1700 in the Delaware Valley (see also Heye and Pepper 1915; Ritchie 1949).

Vessel Lot 3. This pot is represented by one rim fragment extending from the lip partially down the neck (Figure 5). It is characterized by an undecorated flat lip below which are three horizontal incised lines. Below this is a zone of oblique lines which extend to the edge of the collar, terminating in circular to oval notches. Ritchie (1952) defined similar fragments as Hudson Incised, a ceramic type that resembles Cayadutta or Otstungo Incised (see MacNeish 1952:76-78). Since the term Hudson Incised has not been used in the archaeological literature except at Bell-Philhower (Ritchie 1949) and Kingston (Ritchie 1952), I will use Cayadutta/Otstungo Incised to best describe this vessel, even though I am not postulating a Mohawk Iroquois origin or affiliation.

Vessel Lot 4. This vessel lot consists of six fragments of a collared pot (Figure 5). The lip is flat and slopes downward. The decoration on the outside edge consists of a horizontal row of small punctates, below which are three horizontal lines. On the collar, groups of oblique and horizontal lines are the primary decoration with small punctates as an overlay motif within the lines. Small oval notches at the base of the collar complete the arrangement. This vessel is black, both inside and out, with fine to coarse grit. Based on the presence of horizontal punctates, this pot is typed as Munsee Incised (Kraft 1975: Figure 83, g, Figure 84, h, i; Leslie 1973:116; see also Moeller 1992, Figure 10, No. 5).

Vessel Lot 5. This vessel lot consists of 15 collar fragments with decorations, and one neck fragment which cannot be mended to the others (Figure 5). The lip is flat, with small oblique incisions on the outside corner above three horizontal lines. Below the lines are groups of vertical and oblique incised lines within which are punctates forming horizontal ladders. Deep, angled notches are found at the base of the collar. The interior of the lip has small oblique nicks as a decorative element. This vessel is similar to that illustrated by Heye and Pepper (1915: Plate 23, a) from near Minisink Island. This pot is typed as Munsee Incised.

Vessel Lot 6. This vessel is represented by only one collar fragment (Figure 5). The fragment is from the base of the collar, showing pairs of notches in an upside down "V" pattern. Oblique incised lines are present above the notches. This vessel is too incomplete to type.

Vessel Lot 7. Two collar fragments of this pot mend to give us some idea of the complete decorative motif and collar profile (Figure 5). The vessel displays a flat lip which is decorated on the inside with oblique cord-wrapped-stick decorations. On the outside, the uppermost decorative element is an oblique cordwrapped-stick decoration. Below this are several rows of horizontal cord-wrapped-stick impressed decorations. These are

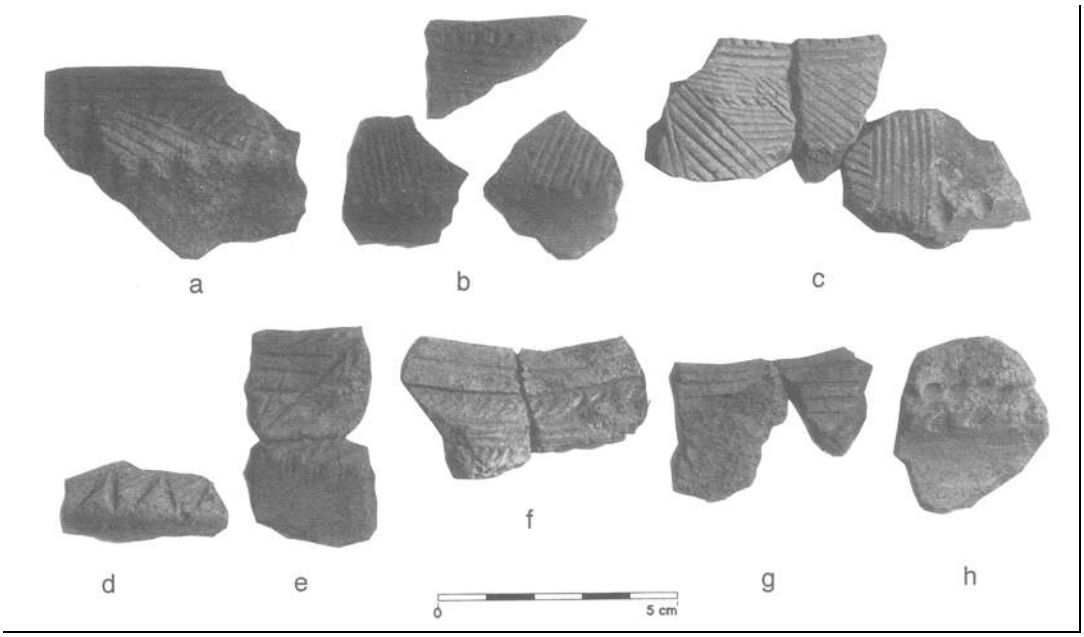

Figure 5. a. Vessel 3 (1 fragment); b. Vessel 4 (3 fragments); c. Vessel 5 (3 fragments); d. Vessel 6 (1 fragment); e. Vessel 7 (2 fragments); f. Vessel 8 (2 fragments); g. Vessel 9 (2 fragments); h. Vessel 10 (1 fragment).

interrupted by a pair of oblique incised lines, which are filled with punctates to create a rough ladder motif. The base of the collar is decorated with very small oblique oval notches.

This vessel combines cord-wrapped-stick impressions with incising as a method of decoration. Since it has both basal notches and a ladder motif, it could be Kingston Incised. At the type site, one pot that appeared similar to Cayadutta/Otstungo Incised was found that combined incised decoration with cordwrapped-stick impressions (NYSM 41511-41). Like the example from the Kingston Site, this vessel may be an idiosyncratic variant (see also Vessel Lot 8).

Vessel Lot 8. This pot consists of 6 rim and 14 body fragments (Figure 5). The inside of the lip has been beveled, causing the cross section at the rim to be almost pointed. This attribute is found regularly on Late Hudson Valley ceramics and appears to be a characteristic Hudson Valley trait (H.J. Brumbach, personal communication, 14 June 1995). On the beveled interior are tightly arranged short oblique cordwrapped-stick impressions. The outside of the rim lacks the short vertical punctates or incised lines common to the rest of the pottery sample. Instead, six horizontal incised lines form the main decoration. Within two rows are short oblique punctates which form a pair of horizontal ladders. This vessel is similar to other variants of Munsee Incised found at the site, although it may be considered more idiosyncratic.

Vessel Lot 9. This lot is represented by two collar fragments (Figure 5). They may be described as having a flat, Down-sloping lip, which is beveled on the interior. The interior bevel is decorated with large (1.0 cm) oblique fingernail (?) nicks. On the exterior, the collar decoration consists of two or more horizontal lines with oblique incising below. There are no vertical incisions or punctates at the top of the lip. Due to a lack of diagnostic attributes, this pot has not been typed.

Vessel Lot 10. This pot is represented by two collar fragments and nine body sherds (Figure 5). The fragments stand out from the rest of the collection due to the deep red brown (5YR5/4) color of the clay, and the medium to coarse grit. The two collar fragments are extremely worn and show a punctate design with several incised lines as a partial motif. The base of the collar is decorated with small ovate notches. Since only basal notches and vertical incised lines are evident, the vessel may by typed as either Cayadutta/Otstungo notched or Kingston Incised.

Vessel Lot 11. This pot is represented by one fragment from the base of the collar. Small angled notches are present with oblique incisions oriented left and right. The fragment is too small to type.

Ceramic leftovers. A total of 101 body fragments and 4 incised collared sherds were not categorized into vessel lots due to similarity in paste and temper among the 11 pots represented. The fragments are probably all terminal Late Woodland/Contact based on manufacturing technique and similarity to the vessels discussed above. The poor condition of Vessel Lots 6 and 10 is offset by the presence of basal notches, an attribute that

appears to have had its inception some time around A.D. 1500. In all the vessels represented, the temper is garnet amphibole metadiabase, a metamorphic composite that occurs in Dutchess County and the Hudson Highlands (F. Vollmer, personal communication, 21 September 1995). Garnet amphibolite and similar metamorphic rocks have been found in both chunky and crushed (grit) form on several Late Woodland sites in the Esopus drainage ranging in time from the Castle Creek Phase to the Contact Period. This temper may be similar to the metagabbro that Chilton (1994:57) has reported in ceramic vessels from the Goat Island Rockshelter in northern Dutchess County.

Ornaments

Medals (1): One pierced lead slug or medallion, measuring 2.1 cm in diameter, was found. A close examination of the medallion shows a small circular weak spot in the lead, which may indicate that it is a hammered and flattened piece of sprue (Figure 3).

Recreational Equipment

Smoking Pipes (23): Twenty-three fragments of ball clay smoking pipe were found. From this group two bowls are embossed "RT" in a circular cartouche with four small raised dots above and below the initials (Figure 3). Although Robert Tippet and sons are known to have produced pipes from c.1660 to the late eighteenth century, the bowl shape and angle are suggestive of pipes produced from 1680 to 1730 (Walker 1977:1732-1739). Similar pipes have been found on late seventeenth- and early eighteenth-century Iroquois sites (Bradley and DeAngelo 1981:121) as well as Munsee sites in the Delaware Valley from the same time period (Kraft 1975:155).

Mouth Harp (1): One brass mouth harp was recovered (Figure 3). Based on size and method of construction, this example fits the taxonomic description of a group of mouth harps (Sb, Tl, Va) found at Fort Michilimackinac (Stone 1974:142).

Lithic Debris

Debitage (5): Five fragments of grayish-black debitage were found. This should not be considered as representative, however, since the excavator often discarded flakes that lacked use-wear.

Faunal Remains

A total of 100 faunal items were uncovered (Table 1). These were analyzed by Sophia Perdikaris of Hunter College, New York.

Table 1. Faunal Remains Recovered from the Catskill Rockshelter.

Species	Common Name	No. of Individual Specimens
Class Mammalia		
Order Artiodactyla		
Cervidae		
Odocoileus virginianeus	White-tailed Deer	56
Cervus canadensis	American Elk (Wapiti)	6
Order Carnivora		
Ursidae		
Euarctos americanus	Black Bear	3
Procyanidae		
Procyon lotor	Raccoon	2
Mustelidae		
Lutra canadensis	River Otter	2
Canidae		
Canid sp.	Dogs	8
Mammalia unident.		1
Order Rodentia		
Sciuridae		
Marmota monax	Woodchuck (Marmot)	6
Castoridae		
Castor canadensis	Beaver	6
Class Reptilia		
Order Testudines	Turtles	
Emydidae		
Terrapene sp.	Box Turtle	9
Bivalve	Shell	1
Total NISP		100

Discussion

Nestled on the eastern edge of the mountains, the Catskill Rockshelter may be aptly described as a "back country" site. Back country sites are located away from navigable waters, in hilly or difficult terrain, and generally away from village site locations. In the case of the Catskill Rockshelter, a small brook approximately 100 ft away provides a source of water. An examination of the faunal inventory suggests that deer exploitation was important. The recovery of one scraper and several perforating tools may indicate that animals were being processed for hides at the site. The large volume of terminal Late Woodland/Contact Period pottery would imply that cooking was occurring on site, although some of the vessels may have been cached in the rockshelter.

Seasonality, specifically fall use, is suggested by the presence of nut-processing equipment and large numbers of deer

bone. However, several turtle fragments may point to the possibility of a summer- fall occupation. Although it is difficult to determine with which occupation they are affiliated, the presence of 11 terminal Late Woodland/Contact vessels and late projectile points may indicate that the bulk of the faunal inventory was the result of meals of the most recent inhabitants of the rockshelter.

The number of occupations, as well as the cultural affiliation of the inhabitants, may be summarized as follows. The first occupation is represented by one Archaic projectile point broken at the blade/stem junction. The second, in Early Woodland times, is defined by an Adena/Fulton Turkey Tail point. (It is noted that a third untyped projectile point tip was also found. This may imply another occupation.) Since no pottery from the rockshelter can be associated with the Early Woodland component, it is probable that the site was used only as a stopover point. The same is probably true for the Archaic Period occupation.

The third, a terminal Late Woodland/Contact occupation, or series of overlapping occupations, is related to the pottery, triangular chert projectile points, brass projectile points, lead ornament, mouth harp, and pipe fragments. The problem here is establishing the contemporaneity of the vast bulk of the excavated materials. Do the terminal Late Woodland/Contact items represent one component or several recurring occupations? While it is tempting to suggest a single-component occupation in the Contact Period, it is probably safer to take a conservative stance. This would entail viewing the later materials as an "assortment," rather than as a single-component assemblage. An assortment is "defined as a group of artifacts recovered from a site or level that has not been, or cannot be, established as an assemblage" (Funk 1993:126).

Although some of the vessels described here are commonly subsumed under the title "Iroquoian," this refers to incising in combination with a variety of design elements, rather than an ethnic affiliation. It is suggested here that the presence of Munsee Incised and Munsee design elements (specifically punctates used as a final overlay motif) point to an Algonquian affiliation. Kingston Incised, the other major ceramic type from the site, has been identified from the type site in Kingston, New York (Brumbach 1975; Ritchie 1952) as well as New Jersey (Ritchie 1949) and the coastal region of New York (Lopez and Wisniewski 1972: Plate 1, No. 1-2). To the north, this ceramic type has been found in Greene County, New York (Funk 1976:98-105) and along the Hudson in Dutchess County (Chilton 1994: Figure 36, Vessel Lot 12; Ritchie 1958: Plate 25, Nos. 3, 4, and 5). It occurs sporadically in the Northern Hudson Valley, being found in Rensselaer (see Huey, Feister and McEvoy 1977: Plate 10) and at the Goldcrest Site on Papscanee Island (L. Lavin personal communication, 14 June 1995). The ladder motif or punctate design that is a key diagnostic attribute of Kingston Incised is found only in small percentages in Mohawk territory (Mohawk Valley Ceramic Data Base, Bamann and Kuhn 1987).

An additional problem is assigning a terminus ante quem for the use of the rockshelter by Native Americans. The mouth harp, gunflints, projectile points, and lead ornament are not temporally diagnostic. However, the Tippet pipes do provide a bracketed range of 1660-c. 1730. This group of European items has parallels in other rockshelters and caves throughout the mid-Hudson region. Specifically the co-occurrence of Kingston Incised and Munsee series ceramics with late Contact Period goods from other multicomponent sites (Funk 1976:304, 98-105, 177-178, 181-182, 1978: Plate 24; Lenik 1989; Ritchie 1949, 1952, 1958:71-90; Weinman and Weinman 1971; Schrabisch 1936). In most, if not all of these situations, the European item most frequently found with Native American artifacts is the ubiquitous Robert Tippet pipe.

Based on the location of the site, the cultural affiliation of the Contact Period inhabitants is probably the Esopus, a band of Munsee speakers who inhabited what is now Orange and Ulster counties (see Fried 1975; Grumet 1991; Kraft 1986:xvii; Ruttenber 1872). By 1680-1730, the Esopus and other Munsee-speaking groups in the middle Hudson Valley had been displaced from their prime agricultural lands and forced into peripheral areas. Uplands, mountainous areas, and valleys on the edge of the Catskills were the "frontier" until purchased and cleared by Europeans. The Catskill Rockshelter is situated within the Hardenburgh Patent, which was sold in 1708 but not "improved" or cleared until much later. Sickler (1973) suggested that the first European settlers in the Town of Olive date to the 1740s. Even with the conservative assumption of Native American displacement from the valleys by the end of the seventeenth century, a rather large window of potential occupation between c. 1700 and 1740 remains for Native Americans to have used the rockshelter. Not coincidentally, this time period also overlaps with the later years of production for the "R. Tippet" pipe specimens found at the site.

It has been suggested that European diseases in the years between 1680 and 1715 substantially reduced the Native American population in Ulster, Orange, and Sullivan counties. While it is difficult to determine actual population counts, Grumet (1990:38) has estimated that the Munsee were outnumbered in their eastern homeland 100:1 by 1715. Those who survived disease and warfare were displaced and on the move. By 1730, Europeans and their descendents had control over the fertile river floodplains that had been the gardens of the Munsee and Esopus. Increasingly, Native Americans were forced to the periphery. The Contact Period specimens from the Catskill Rockshelter may represent the cultural assemblage of a group of people living on the margins of an expanded European presence, hunting and trapping for beaver or small game that were then used for sale or trade. Although the archaeological

sample is small, the appearance of six beaver bones points to this, albeit in a limited way.

The presence of late seventeenth- and early eighteenth-century European artifacts in rockshelters in apparent association with Native American artifacts is common in southern New York (Lenik 1989). A similar situation exists in northern New Jersey (Schrabisch 1930) and eastern Pennsylvania (Butler 1947). Recently, two additional rockshelters in the Hudson Valley have been brought to my attention. Mr. George Van Sickle (personal communication, 21 January 1992) has kindly allowed me to study the assortment from the Marbletown Rockshelter, a large limestone overhang that contains information ranging from the Middle Archaic to the Contact Period. This shelter has a large number of late ceramic forms such as Munsee Incised, Kingston Incised, Cayadutta/Otstungo Incised, and a large amount of late seventeenth- and early eighteenth-century European items. Included are forks, knives, musket balls, inverted baluster-stem wine glass fragments, slip-decorated earthenware, shoe buckles, sheet brass, and an iron triangular projectile point. Smoking pipe fragments are primarily "R. Tippet" forms.

A similar situation exists for "Nachte Jans" Rockshelter, a site in Katsbaan excavated in the 1950s and destroyed shortly thereafter by the construction of New York State Route 32 (Jeanne Goldberg, personal communication, 10 January 1995). Mr. Alvin Wanzer (personal communication, 14 October 1994), of Rhinebeck, New York, has graciously allowed me to study the collection. Again, Late Woodland/Contact ceramic forms include Chance Incised, Munsee Incised, Kingston Incised, and Cayadutta/Otstungo Incised. European items are substantial and include delft, slip-decorated earthenware, a Dutch "onion"-shaped wine bottle fragment, and pipes embossed "R. Tippet" in a cartouche.

The presence of large numbers of terminal Late Woodland/Contact Period ceramics in rockshelters in the mid-Hudson region may point to changing land use patterns. Displaced from their former lands, Native Americans such as the Esopus and Munsee may have sought to utilize those familiar structures on the landscape that did not require substantial labor or modification. Moreover, the size of the Catskill and Marbletown Rockshelters are limited and would not contain many people. In each case, based on the size constraints of the shelter, the inhabitants probably consisted of from one to seven individuals.

The Catskill Rockshelter is one of a growing number of identified sites in the mid-Hudson Valley that contain Contact Period materials. In most cases these sites are multicomponent, although one single-component occupation, which has not been discussed here, has been found and excavated. From a ceramic perspective, associations consist of Munsee Incised, Kingston Incised, and forms similar to Otstungo Notched. Typical design combinations that lack ladders or punctates and may be typed as Cayadutta/Otstungo Incised are also found in association with Contact Period materials. The latter may in fact fit Ritchie's (1952) and MacNeish's (unpublished 1952) Hudson Incised and/or Hudson Crescent Incised type schemata, although we will require larger sample sizes to determine the spatial limits and viability of these types.

Acknowledgments

This paper was written in memory of James Burggraf of Samsonville, New York, whose well-documented collections from the Hudson Valley have been an important source of information for prehistorians. I have no doubt that these materials, which have recently been donated to the New York State Museum, will continue to provide valuable insights into northeastern prehistory. Additionally, I would like to thank Lisa Anderson of the New York State Museum for allowing me to continue work on the collection from the Catskill Rockshelter. I am also grateful to Sophia Perdikaris of Hunter College for her analysis of the faunal materials. Richard MacNeish was also kind enough to supply me with some intriguing information on the history of his three Mahican ceramic types.

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Archaeological Investigations at the Seaford Park Archaeological Site

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With contributions by William Sandy, Cheryl Claassen, and Felicia Burgos

Phase III monitoring and salvage investigations were conducted at the Seaford Park Archaeological Site between 22 January and 4 May 1993. No artifacts or features were encountered. Samples of shell and soil were taken for seasonality, radiocarbon, and flotation analysis. Previous and current investigations at the site have attempted to shed light on the prehistoric settlement patterns of the native inhabitants without the benefit of artifacts or features on which archaeologists generally depend. The project was interesting not only for the information it yielded on prehistoric settlement patterns and land use of Long Island and coastal areas in general, but also because of the reliance on ecofacts (in the absence of artifacts) and the comparison of methodologies used over 26 years and five projects on the same site.

Introduction

The Seaford Park Archaeological Site (or the Cedar Creek Site) is located at, and currently buried beneath, the Cedar Creek Water Pollution Control Plant in Seaford, Suffolk County, New York. Originally consisting of three large shell mounds, possibly the largest on Long Island, and thought to be a prehistoric shellfish-processing station (Rutsch 1985; Wyatt 1976), the site had previously been found eligible for inclusion on the National Register of Historic Places. The site is situated on the south shore of Long Island, just south of Merrick Road and just east of the Wantaugh Expressway at N450100 and E6265000 on the USGS 7.5' Freeport, N.Y. map (Figure 1).

Phase III archaeological investigations were the direct result of a phased improvements program consisting of upgrading, expanding, and modernizing the Cedar Creek Water Pollution Control Plant. Specifically, one of three previously discovered shell mounds, referred to as the Middle Mound, already disturbed by up to 19 ft of hydraulic sand fill, would need to be at least partially removed for the construction of a primary sedimentation tank foundation and pipe gallery trench. The cultural resource management plan was salvage oriented and consisted of:

1) archaeological monitoring in and around the shell mound during its removal

2) data recovery in the form of gathering shell and soil samples for carbon dating, shell analysis, and soil flotation analysis; recording all measurements; recovering any and all artifacts

3) extensive photographic coverage of all field work for the county's proposed photo exhibit

4) verification and re-examination of shellfish, paleobotanical, and radiocarbon dating analysis results, as well as verification of the dimensions of the mound, previously examined by archaeologists during the 1960s, 1970s, and 1980s

5) the synthesis of all the previous archaeology at Cedar Creek and the incorporation of this site into a consideration of settlement patterns in a larger context.

Environment

The Seaford Park Archaeological Site is located the southeast part of New York State, in southeastern Nassau County on the south shore of Long Island. This portion of New York lies in the Atlantic Coastal Plains province (Schuberth 1968:cover page; Wulforst 1987:2) characterized by a flat plain with a gentle southward outwash slope in the southern part of the county due to the Wisconsin glacier. Extensive tidal areas and marshes are just south of the plain (Fuller 1914:184-185; Wulforst 1987:2). Prior to construction modifications, which began in the 1960s due to the building of the Cedar Creek Water Pollution Control Plant, the area was an intertidal salt marsh. The project area was cut by Cedar Creek which empties into Island Creek, which in turn empties into East Bay (Wyatt 1976:5). The marshes along these south shore bays

> begin to form whenever the water is shallow enough for eel grass to obtain foothold, usually a foot or 2 below low water mark, and where no strong currents are flowing. The dead grass and the fine silt entangled with it gradually accumulate until the ground rises well above low-water mark and marsh grass takes root upon it. The upbuilding continues until the marsh reaches a level covered only by occasional high tides. Part of the present salt marshes may have resulted from the advance of the sea over former fresh marshes or swamps, with the substitution of a salt water for a fresh water fauna. At the east end of Great South Bay, north of Long Beach, and in Jamaica Bay, where the water was originally very shallow, the marshes have taken possession of the greater part of the space inside the beaches, having a width in places of nearly 5 miles. They are not absolutely continuous, however, but are cut by many narrow and winding channels and here and there by more open spaces, such as Middle and East bays, near Jones Inlet [Fuller 1914 :185].

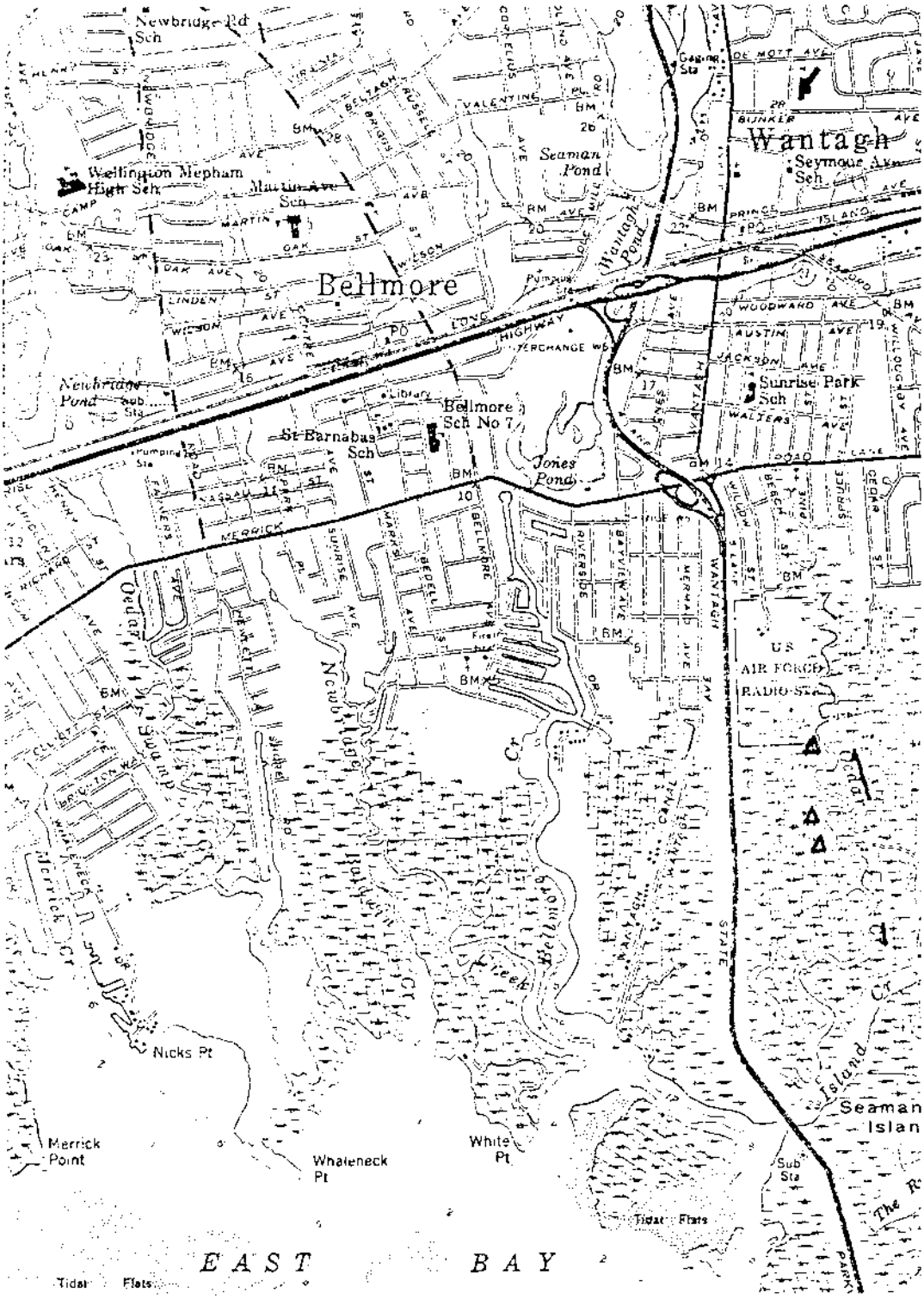

Figure 1. Detail from 1955 USGS 7.5' Freeport, N.Y. Quadrangle showing Cedar Creek and surrounding marsh.

The location of barrier islands to the south of Long Island's south shore created lagoon-like conditions in the bays that aided in the development of tidal or salt marshes (Schuberth 1968:200, 206). As the sea level rose, so did the marsh (Rutsch 1985:10). Water gradually became restricted to channels (Wyatt 1979b:13).

Before construction, the marsh here had been expanding both northward inland and vertically in elevation. The elevation of the marsh rose in direct correlation to sea level (Fuller 1914:185; Rutsch 1985:67-69; Wyatt 1979a:3). Rutsch (1985:10, 13) has described the original meadow mat, prior to construction and fill deposition, as a salt hay meadow. The meadow mat was actually an accumulated mass of organic decay probably consisting of mostly dead Spartina patens, which held the soil together (Wyatt, personal communication, 1993). The surrounding upland forests consisted of a chiefly oak-pine-hickory stand prior to the area's intensive utilization by Euro-American populations. The oak-pine-hickory assemblage is typical of a warm, humid to dry climate similar to conditions today (Rutsch 1985:80).

Previous Work

Prior to TRACKER-Archaeology Services' involvement in 1993, there had been several previous archaeological investigations at the Cedar Creek Water Pollution Control Plant, with each investigation preceding a different phase of construction. The first was conducted in 1967-1968 by Ronald Wyatt of the Nassau County Museum (hereafter NCM). In May of 1967, George H. Wilde, a local resident of Seaford, informed Ronald Wyatt that shell mounds existed in the vicinity of the proposed construction for a water treatment facility. Field work proceeded shortly thereafter. At this time, test trenches were attempted both manually and with a track-mounted power shovel. In addition, 7- and 9-ft long brass rods were used to probe the existing meadow mat to establish the horizontal parameters of the shell midden. Three large shell mounds were found. Consisting primarily of densely massed hard clam shell (*Mercenaria mercenaria*), the mounds were situated along the west bank of Cedar Creek. Only one or two pieces of deer leg bone and numerous charcoal flecks were present throughout a sample portion of the midden. The only artifacts recovered were seven waste flakes or debitage. Six of these flakes were surface finds from the Middle and South mounds, and the other was excavated from within the South Mound. The material of the flakes varied from gray chert, red jasper, and rhyolite to unidentifiable stone. The North Mound was found to be about 10 ft thick and about 13,625 sq ft in area. The South Mound, largest of the three mounds, was about 520 ft by 140 ft and ranged from about 3.5 ft to 9 ft thick. The Middle Mound, our current focus of work, was about 260 ft by 140 ft. Wyatt (1976:3,12) interpreted the site as a shellfish-processing station and suggested that an associated habitation site could have been located as near as present-day Merrick Road, where the terrain was higher and drier but still adjacent to south-flowing creeks.

In 1978-1979, Ronald Wyatt of NCM returned to the site to extract various samples from the middens. Analyses of these samples was to have included the identification of shellfish to species, the determination of seasonality as indicated by the shellfish, radiocarbon dating, and the study of sediment deposition. However, because of a change in Nassau County's administration and a staff reduction, the proposed analysis for the 1978 field work was not completed at this time. Wyatt discovered two additional flakes and confirmed the apparent lack of stratigraphy within the middens. At several locations, the mounds did contain lenses of organic mud, but by and large the middens were solid shell with negligible amounts of soil. Borings indicated the depth of the Middle Mound to be about 8.4 ft (Rutsch 1985:8; Wyatt 1978:3-4; 1979a:2-4, 6, 16, 19).

In 1984-1985, Edward Rutsch of Historical Conservation and Interpretation (hereafter HCI) and Edward Johannemann of Long Island Archaeology Project (hereafter LIAP) analyzed Wyatt's data, including the borings taken in the 1960s and 1970s. Rutsch and Johannemann (1985) determined that the North Mound lost about 6,600 sq ft due to the 1978 construction of the plant's Administration Building. In addition, the remainder of the North Mound remained buried under fill. This hydraulic sand fill created a compaction of about 33% which reduced the mound's original thickness from 10.5 to 7.5 ft. The Middle Mound had been filled with up to 19 ft of hydraulic sand fill. This produced a compaction of about 25% to 42%. A substantial portion of its eastern half had been impacted by construction of the Sludge Thickening Building in the 1970s and again in the 1980s. Only the western portion had remained to be uncovered and analyzed before its removal for the 1993 construction. The northwest edge of South Mound was destroyed in the course of the construction of the Sludge Dewatering Building. The last major remnant of this mound is the southwestern tip, and this portion is currently buried beneath 11 to 13 ft of fill (Rutsch 1985:8, 15, 23, 30, 40, Figure 713; Wyatt 1979b:3, 5).

HCI's shellfish analysis of the Cedar Creek middens concluded, "It is likely that the hard clams were collected from an intertidal environment and there is some indication that the clams were collected year round, including the cold months of the year" (Rutsch 1985:59). HCI's shell samples came from the North Mound and the South Mound. One sample of several hundred fragments came from an unspecified location. Virtually all of the shellfish gathered consisted of hard clam. No known samples came from the Middle Mound (Cammisa et al. 1993:21; Rutsch 1985:53-56).

HCI's radiocarbon samples on both shell and sediment came from the 1978 borings. Radiocarbon dates of shell for the

North Mound ranged from A.D. 550±90 yr to A.D.1210±90 yr. Radiocarbon dates of shell for the South Mound ranged from A.D. 630±100 yr to A.D. 825±100 yr. Radiocarbon dates of shell for the Middle Mound, the current project area, ranged from A.D. 885±100 yr to A.D. 1190±100 yr. This indicates the mounds were formed during the Woodland Period (Rutsch 1985:60, 62, 82).

The local stratigraphy that HCI documented, without the inclusion of shell midden, generally confirms Wyatt's: Stratum 1, sand fill; Stratum 2, peat; Stratum 3, silt and clay; Stratum 4, sand and gravel. Where shell midden occurs, in at least some cases, it overlies Stratum 4 (Rutsch 1985:71; Wyatt 1976: Figure 4).

HCI's pollen analysis indicated a surrounding floral community of mainly oak, pine, and hickory forest, which had remained unchanged for over 1500 years. The sharp rise in ragweed pollen recorded by HCI is probably related to human disruption of the local ecology. HCI's interpretation was that this was due to manmade clearings in the landscape by a small group of Native Americans using the site for shellfish gathering/processing and other activities (Rutsch 1985:80-81, 85).

In 1986, Edward Johannemann, of Sidney B. Bowne & Son, and Laurie Schroeder Billedello, of LIAP, conducted archaeological investigations at Seaford Park. Construction activities at this time were located near the three existing shell mounds on Cedar Creek. During this project, no cultural resources or shell debris were uncovered (Johannemann et al. 1986:7-8).

Archeological Sites in the Surrounding Area

The closest Woodland Period sites to the Seaford Park Archaeological Site are summarized below.

? The Ocean-Merrick Site situated about 2.25 mi northeast of the project area, near Massapequa Creek. Also a shell refuse site, shellfish were apparently collected downstream in an intertidal marsh and transported back to the site of present-day Merrick Avenue, perhaps via the creek. Occupation was from December-January (NCM site files).

? The Massapequa Lake Site, situated about 2.5 mi northeast of the project area near present-day Merrick Avenue. This is a blade cache site (NCM).

? Fort Massapequa Site located on Fort Neck about 2.25 mi east of the project area. Noted for its Contact Period component, the site also has a strong Woodland component both inside and outside the fort (Furman 1875:93-94; NCM; New York State Museum site files [hereafter NYSM]; Parker 1920:625; Smith 1950:119,120,162,163; Solecki, personal communication, 1993)

? North Pine Site situated about 4 mi northeast of the project area on the Massapequa Creek. Projectile points, flakes, and fire-cracked rock were discovered. This was a multicomponent site-Late Archaic through Woodland (NCM; Wyatt, personal communication, 1993).

? Dartmouth Street Site located about 2.5 mi east of the project area on Fort Neck. It is a sparse shellfish refuge site (NCM; Wyatt, personal communication, 1993).

Other Sites in the Area

? Cedar Creek Site located about 0.5 mile north of the project area. More shell remains were found (NCM; New York State Historic Preservation Office [hereafter NYSHPO] site files).

? "Village of the Merricks," a large settlement on Hicks Neck and on other points between there and Merrick Avenue. The shell mounds reported on Hicks Neck were up to 10 ft thick (NCM; NYSM; Parker 1920:625; Treadwell 1912:56-57).

? Seaford Creek Site, consisting of shell mounds, just south of Merrick Road on a creek with a sign of indeterminate age (twentieth century) posted in front reading "Ye Old Shell Banks" (Wyatt, personal communication, 1993).

? Squaw Island Shell Mounds, reported on the island that lies south of the Fort Massapequa Site (Furman 1875:82; Treadwell 1912:55).

? Swift Creek Shell Mounds, reported along the creek, probably along either Meadow Island, Junes Island, or both (Treadwell 1912:55).

? Long Beach Run Shell Mounds, reported on the south side of Long Beach Run which lies about 1.5 mi west of Swift Creek (Treadwell 1912:55).

Methods

Field Investigations

Archaeological field work was concurrent with the excavation for the foundation for the primary sedimentation tank and pipe gallery trench. Monitoring of the project area was initiated between 22 January and 16 April 1993, during which time the archaeologist remained in close phone contact with the county's field engineer. From 19 May, immediately after the dewatering of the site and commencing with the general

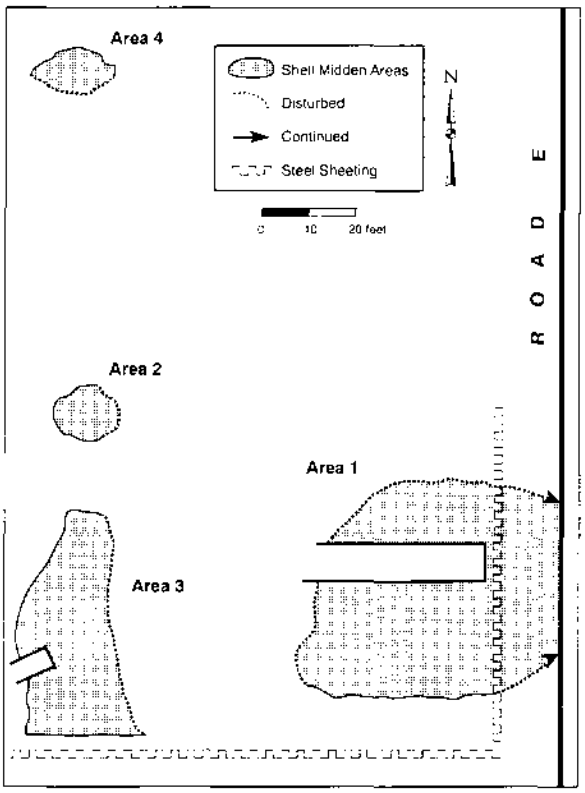

Figure 2. Plan of Areas 1, 2, and 3 showing Test Trenches 1 and 2.

contractor's excavation to elevations of -3 ft, the area was monitored daily.

During this time, whenever portions of the shell mound were discovered, the heavy equipment operator was directed to clear away any overlying fill and surrounding marsh soils to fully expose the shell mound. Field work thereafter proceeded with haste due to contractual time restrictions.

Four separate areas of midden were exposed. All portions of the shell midden were mapped, and elevations were measured along the top, base, and edges. Two test trenches (TT) were dug with the use of heavy equipment. TTl was excavated in Area 1 and measured approximately 37 ft long by 5 to 7 ft wide. TT2 was excavated in Area 3 and measured approximately 5 by 5 ft. Each TT was oriented on an east-west axis and was excavated to the base of the shell mound (Figure 2).

Stratigraphy from the north wall of TTl was mapped. Due to OSHA regulations, the south wall of TT1 was sloped back with the heavy equipment, making mapping of stratigraphy there impossible. However, it was noted that the stratigraphy of the south wall resembled that of the north wall. The north wall of TT1 was analyzed for microstratigraphy as well.

Column Sample 1 was taken from Area 1, TTl, from the top to the base of the shell mound, 0-210 cm, in 10-cm levels. Column Sample 2 was taken from Area 3, TT2, from the top to the base of the shell mound, 0-45 cm, in 5-cm levels. Each column sample measured 25 cm by 25 cm per level.

Each 10-cm level from Column Sample 1 and each 5-cm level from Column Sample 2 was weighed. All shell and any associated soil was dry screened through 0.5-in mesh by level and was then weighed a second time. Hinges were counted and examined for hammer-use. Species, other than hard clam were counted. Between 20 and 40 hard clam lips were extracted per level and bagged separately for later analysis.

Radiocarbon samples were taken from shell remains at three locations within Column Sample 1: at 70-80 cm below surface, at 140-150 cm below surface, and at 200-210 cm below surface.

Since there were virtually no soils separating the shell in the mounds, a soil sample was taken at the base of Column Sample 1 from 210-220 cm below surface. Another soil sample was taken from the base of Column Sample 2 at 45-55 cm below surface. Soil samples were also taken from a brown lens of probable marsh muck in Area 1 approximately 60 cm below surface, and a fourth sample was collected from a yellow lens in disintegrated shell at approximately 60 cm below surface from a second location in Area 1.

Remnants of shell midden from Middle Mound were examined in situ for crushed or whole shell and stratigraphic continuity. They were then photographed, mapped, and samples were extracted. Afterwards, the heavy equipment removed the shell separately and dumped it in an area where it was further examined for artifacts.

Shell samples for seasonality analysis were sent to Cheryl Claassen at Appalachian State University, North Carolina. Soil samples for flotation and floral analysis were sent to William Sandy, at Historic Conservation and Interpretation, New Jersey. Shell samples for radiocarbon analysis were sent to Beta Analytic, Florida.

Results

Field Investigations

Only the western portion of Middle Mound was exposed in our project area. The eastern section continued through the east wall of the project area and, as had been mapped in the 1970s and 1980s, lay buried beneath Road E and the Sludge Thickening Building.

As previously mentioned, four separate areas of shell deposits were exposed during the 1993 field investigations. We believe that these four areas were originally all part of the Middle Mound and were impacted in the 1980s during the construction of the Sludge Dewatering Building. At this time, the northern portion of the South Mound was thought to have been destroyed (Rutsch 1985:40). Only 15 ft had originally separated the South and Middle mounds (Rutsch 1985:32; Wyatt 1976:5). Since these

two mounds were situated so closely together, we believe that sections of the Middle Mound may also have been unintentionally destroyed at that time. The 1984-1985 expansion of the Sludge Thickening Building (Rutsch 1985:30) could have caused further damage. Pressure from the added hydraulic fill probably exacerbated the condition.

Area 1, which lay adjacent to the east wall of the project area and Road E, was the largest and most intact portion of the four shell deposits. It measured about 48 ft north-south by 43 ft east-west (where it disappeared through the east wall, under Road E) by 8.2 ft thick at its maximum depth. The north and west edges of Area 1 showed previous truncation.

Area 2 measured about 12 ft north-south by 14 ft east-west by 2 ft thick at its maximum depth. The east edge of Area 2 showed previous destruction. Area 3 measured about 49,5 ft north-south by 24.5 ft east-west by 2 ft thick at its maximum depth. The east edge of Area 3 showed previous destruction. Area 4 measured about 10 ft north-south by 17 ft east-west by 2 ft thick at its maximum depth. The south edge of Area 4 showed evidence of previous disturbance. The total area encompassing all four areas of shell deposits measured about 153 ft north-south by 116 ft east-west.

The general configuration of this portion of Middle Mound correlates with the results of previous investigations. However, the mound in our project area does not extend as far north along the east wall as previously mapped; instead, it lies further to the south. The mound is also somewhat smaller in size than previously estimated, about 40 ft smaller north-south and about 20 ft smaller east-west. This could be the result of subsequent destruction of the mound in our project area and/or to the miscalculation of the shell mound's estimated size, originally based on the 1978 borings (Rutsch 1985: Figure 6) (Figure 3).

The midden consisted of a solid layer of shell, mostly hard clam, lying flat, and badly crushed. Only a few other varieties of shell were evident; these included mussel, soft clam, whelk, oyster, and scallop. A boring taken in 1978 shows the compaction in Area 1 to be about 35% (Rutsch 1985: Figures 6 and 713, FF).

No stratigraphy was evident within the midden other than dark lenses of charcoal staining. The only area of noticeably thick charcoal concentrations was Area 4 where they were concentrated in sections up to 1.5 ft thick. Unfortunately, Area 4 was mistakenly destroyed by the heavy equipment before provenienced charcoal samples could be taken. No evidence of individual dumping of shell by the basket-load was evident in the analysis for microstratigraphy.

No artifacts, fire-cracked rock or faunal remains were found. No hammer use was evident on any of the shell hinges. Screening of each level of column samples produced virtually no soil. This confirmed our visual assessment of no soil stratigraphy within the mound. However, some of the shell in our column samples was so crushed and decomposed that between approximately 12% (no charcoal staining) and 60% (heavily charcoal stained) fell through the 0.5-in screen.

Laboratory Analyses

Flotation Analysis
by William Sandy

The results of the flotation are interesting because of what was found and because of what was not found. The uncharred seeds of *Chenopodium* (also called pigweed, lambsquarter, and goosefoot) were found in two of the samples (Samples 1 and 3). Although *Chenopodium* is an annual herb that goes to seed from June to October, the seeds can persist on the plant into the winter. It grows in a variety of habitats including fields, meadows, clearings, and disturbed soils (Kavasch 1981:44; USDA 1971). The leaves were used by Native American tribes as a green and were parboiled. Seeds were ground into meal and baked into bread, sometimes being mixed with cornmeal. The root was brewed into tea, and used for kidney ailments (Kavisch 1981:44; Sandy 1985:135; Tantaquidgeaon 1972:128; Weiner 1980:177). The ash resulting from burning the plant was used as an antidiarrheal, as a salve for burns, as a stomach aid, and as a gynecological aid (Moerman 1986:114-115). *Chenopodium* seeds are present on a great many prehistoric sites throughout New York, New Jersey, Pennsylvania, and nearby states. Collectively, these sites span from the Archaic through the Woodland and into the Contact Period (Crowley and Sandy 1992; Sandy 1985, 1989, 1991, 1992; Thomas 1981).

A single common chickweed, *Stellaria media*, seed was found in Sample 3. This small annual weed is very hardy and has been known to flower year round. A cosmopolitan weed, chickweed grows in many habitats, from woodlands to thickets, meadows, and waste places. It is an excellent potherb when boiled (Hedrick 1972:557). Chickweed was used to make an eye wash by the Chippewa and was used by the Iroquois in a compound poultice for cuts and wounds (Moerman 1986:469). *Stellaria* seeds were found at a Woodland site in Monmouth County New Jersey (Sandy 1985:146).

Seven sclerotia (*Cenocuccum graniforme* or *Cenocuccum geophilum*) were found in Sample 3. These fungi live in a symbiotic relationship with a large variety of both deciduous and evergreen trees. They have been identified at a variety of prehistoric sites throughout the Northeast (Crowley and Sandy 1992; Sandy 1991, 1992; McWeeney 1989). The nature of their introduction into archaeological matrices is not clear, nor is any link to prehistoric behaviors. Their relative lack on this site may be linked to the paucity of trees at the site.

There are several things noticeably absent from the Cedar Creek flotation samples. No nut fragments have been identified,

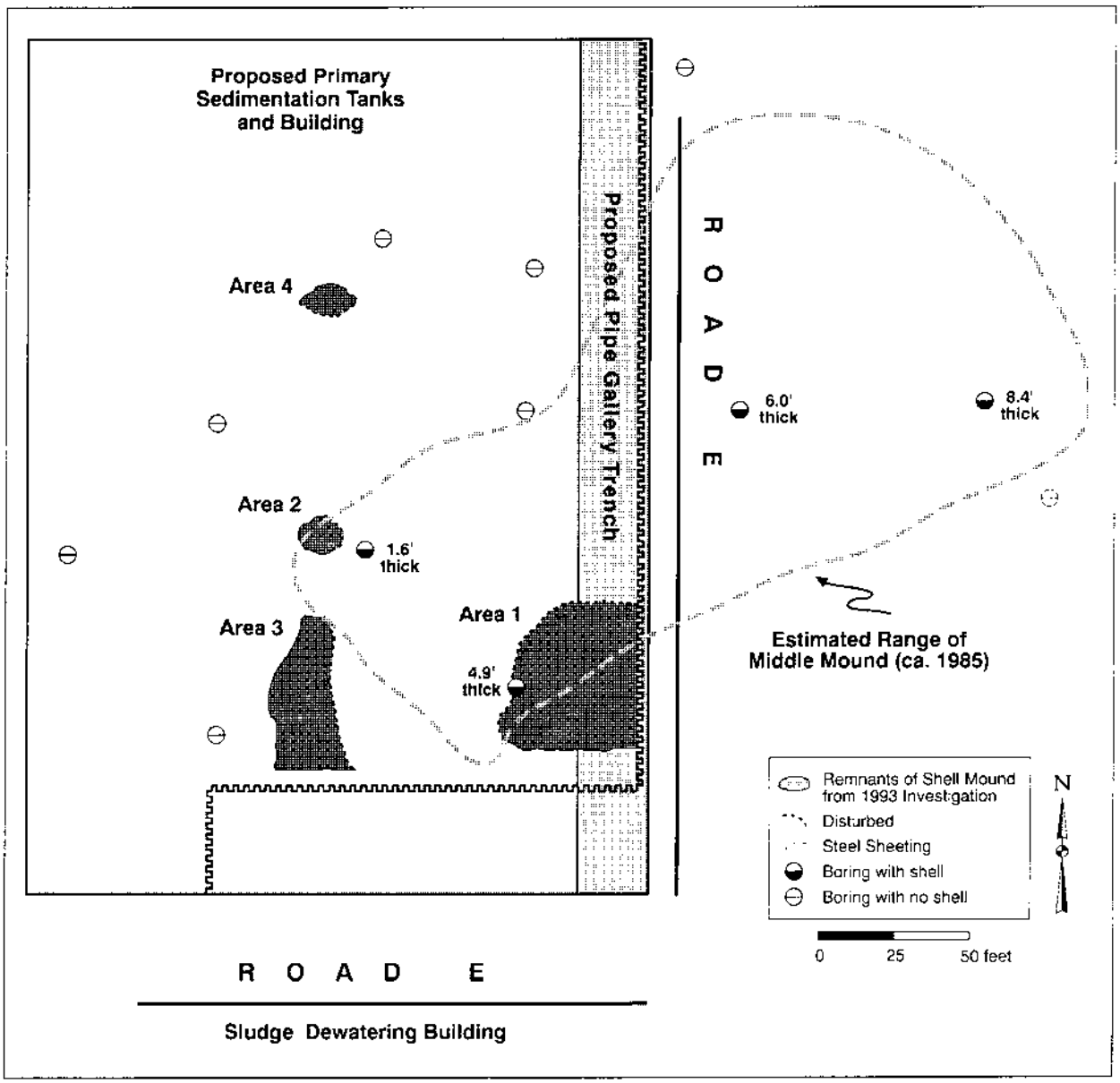

Figure 3. Map from HCI (Rutsch 1985: Figure 6) report showing project area and estimated range of Middle Mound based on borings. The dark grey areas show shell midden actually encountered by TRACKER Archaeology Services in 1993.

which is surprising because nutshells are present on many Northeast prehistoric sites that have been subjected to flotation (e.g., Crabtree 1983; Sandy 1985, 1989, 1992). This lack of nutshell could be related to the small sample, seasonality, or the task-specific nature of the site. Also missing from the flotation samples are any non-mollusc faunal remains. Bone, bone fragments, and fish scales are regularly found in flotation samples from Northeast prehistoric sites (e.g., Crabtree 1983; Sandy 1985). Also absent from the sample were any microflakes. This confirms the excavators' observance of a paucity of lithics from the site, and seems to indicate that tool manufacturing, and even maintenance and resharpening, are not evident at Cedar Creek.

Site seasonality is difficult to determine based on the flotation evidence alone. The identified seeds come from plants that carry seeds throughout much of the year. However, the relative paucity of seed varieties, combined with the apparent lack of nutshell, seems to suggest a winter or early spring occupation. Perhaps analysis of the tiny and microscopic shells recovered from flotation could add information about site seasonality.

Shell Analysis
by Cheryl Claassen

The shells to be interpreted came from two column samples in two areas of the site. Unfortunately, none of the 237 shells from the Area 3 column sample yielded an adequate number of readable shells. Of the 1268 shells from the Area 1 column sample, 561 were readable. Based on this, it appears that shellfishing at Cedar Creek began as early as February-March and ended in June. There is no indication of year round harvesting in this column sample. If year-round harvesting was practiced at Cedar Creek, shells from the other months of the year were deposited elsewhere and have yet to be analyzed. It must be stressed, however, that the control used to interpret these shells was assembled from southern New Jersey where waters may warm earlier than in the Cedar Creek vicinity. It is, however, the best control available for this work, having over 1200 shell collected in 33 consecutive months.

Radiocarbon Analysis

Radiocarbon samples taken from the three locations within test trench have revealed the following: Sample 1 (70-80 cm below surface) has an approximate date of A.D. 670±60 yr (Beta 62971). Sample 2 (140-150 cm below surface) has an approximate date of A.D. 530±50 yr (Beta 62972). Sample 3 (200-210 cm below surface) has an approximate date of A.D. 540±60 yr (Beta 62973).

Site Interpretation

The charcoal staining in sections of the middens would indicate that the clams were heated open, en masse, after they were tossed into hot coals. The clams closest to the hot coals would show the most charcoal staining and the clams furthest from the coals, on top of the pile, would show the least amount of staining. The discarded shells would then be thrown on the shell heap. The stratigraphy we identified at Middle Mound documents such degrees of charcoal staining. Heating the clams in this manner would make the shells more friable and easily fragmented. The highly fragmented and chalky nature of the shells was evident in our investigations (Cammisa et al. 1993:84). Previous investigations have described this same condition (Wyatt 1976:5, 9, 10; personal communication, 1993). Shells closest to the heat and subjected to charcoal staining would be even more disposed to fragmentation and decomposition. This is what we noticed during our field investigations. The highly charcoal-stained shell was more decomposed and fell through the 0.5-in screen at much higher levels (60%) than the white (unstained) shells (12%). The addition of hydraulic fill would, of course, aggravate the fragmented condition of the shells (Cammisa et al. 1993:84).

Fires for opening and roasting the clams were probably located as close as possible to the shell mounds. Area 4, which displayed the only heavy concentrations of charcoal, was located at what appeared to be the fringe area of Middle Mound. The possibility of finding any tools would be greatest around the hearth locations. Neither tools nor fire-cracked rock were found during these or previous field investigations (Cammisa et al. 1993:84-85).

The nature of the site can be explained in part by local geography.

> From Jamaica Bay to Islip the 20 foot contour line is from 1 to 2 miles back from the inner edge of the marsh... and meets the water at a very low angle. This constitutes a favorable zone for marsh growth and the distribution of Long Island's larger marginal marshes are thusly limited to this area... These marshes are almost entirely of the salt water type, although, some are bordered with fresh water vegetation [Fuller 1914:184].

The location of barrier islands to the south also aid in the development of the large marsh areas along the south shore of Long Island (Schuberth 1968:206).

Some of the largest shell mounds reported on Long Island come from this area.

> Though positive documentation is presently lacking, it is believed that numerous similar shellfish processing stations once existed on the South Shore (this phenomenon is unknown on the North Shore), but that many have been destroyed by mining or covered with fill to facilitate land development [Wyatt 1976:15].

The nearest dry ground would have been near present-day Merrick Road or on the necks of dry land that extend further south (e.g., Fort Neck and Hicks Neck) and are surrounded by marsh (Smith 1950:162; Wyatt 1976:13). Unfortunately, these areas were settled early, and the evidence of the original inhabitants has been buried or destroyed.

The Seaford Park Archaeological Site is located along the west bank of Cedar Creek. The location of prehistoric sites on the west banks of tidal creeks is a settlement pattern Ritchie (1980:169) noted for much of Long Island.

A typical southern New England marsh is a breeding ground "for over 250 species of plants and animals -50 species of plants, 100 species of birds, 30 species of insects, 25 species of fish, 20 species of mammals, 18 species of crustacea, and 10 species of amphibians" (Barke and Roberts in Lavin 1988:108).

O'Conner and Terry (in Lavin 1988:108) "estimate that about 53,000 metric tons of vegetation are produced annually in 8,790 hectares of marsh in eastern Long Island."

Many plants were probably utilized in and around marshes. Seeds of eelgrass were collected by Seri Indians of Sonora, Mexico, along the Gulf of Mexico (Fielger and Mosner in Lavin 1988:113). Jewelweed, cattail, and other plants have medicinal properties most likely known by Native Americans (Cammisa et al. 1993:86).

The marsh's evolution and subsequent rise in elevation at the Cedar Creek location probably contributed to the destruction of the shellfish habitat and the gradual abandonment of the site (Wyatt 1976:14). Although shellfish collecting at and near the Seaford Park Archaeological Site eventually diminished, other abundant marsh resources probably continued to attract Native Americans to this area (Cammisa et al. 1993:86).

Nine lithic flakes from the site were positively identified as cultural by preceding archaeologists (Rutsch 1985:13; Wyatt 1976:12). The gray chert, red jasper, and rhyolite material of the flakes are minerals exotic to Long Island. The gray chert probably came from a source in upstate New York and was traded down the Hudson River. The red jasper and rhyolite probably came from sources in western New Jersey and eastern Pennsylvania (Rutsch 1978).

Our analysis has shown that at least the portion of the Seaford Park Archaeological Site that made up the current project area was utilized from mid or late winter to late spring or early summer. This interpretation is based on our shell analysis and is supported by our soil flotation analysis (Cammisa et al. 1993:87). Previous seasonality studies indicated possible year-round use of the site as a whole. Samples of shell reported in the 1985 report came from the North Mound, South Mound, and from an unprovenienced area (Rutsch 1985:53-56). No samples were positively identified as collected from Middle Mound (Cammisa et al. 1993:87).

Possible discrepancies between the current and previous investigations may be related to the following:

1. Different portions of the site were utilized during different seasons. Shellfish collected from Middle Mound may have been collected only during mid or late winter to late spring or early summer period. The other mounds may have been produced from shellfish collected during summer and fall months or during all four seasons (Cammisa et al. 1993:87).

2. Differences in methodologies may have produced the different findings. For example, shell analysis for the current field investigations was based on over 500 shells taken from the project area (Cammisa et a1.1993:87). Shell analysis on the previous field investigations was based on 37 shells for the entire site. The shells were collected in 1967 and 1981 and analyzed in 1984 (Rutsch 1985:53-54, 58). There are other methodological differences between past and present means of shell analysis for seasonality; for example, it is typical among shell seasonality researchers in the Northeast to assign death time to individual shells rather than to sets of shells as was done in this project (Cammisa et al. 1993:80-81).

Radiocarbon analysis from the 1993 project area has shown a tight time period of 140 years (A.D. 530 to 670), which correlates with the Middle Woodland Period. Previous radio carbon analysis reported in 1985 had shown a longer span of time, ranging from what would have been the Middle though Late Woodland periods for the North and Middle mounds. The South Mound had, in previous studies, reflected a shorter span of time (230 years) solely during Middle Woodland times (Rutsch 1985:60, 62).

Two other points may also be relevant:

1. Different parts of the North and Middle mounds were built up over longer time spans, reflecting activity during both Middle and Late Woodland periods. The entire South Mound would then represent the most intensive build up of shellfish remains reflecting only one cultural time frame.

2. Different data-collecting strategies may have produced the different findings. Radiocarbon analysis for the current field investigations was performed on shell excavated in a column sample from the western portion of Middle Mound at three different elevations. Radiocarbon studies from the previous archaeological investigations were conducted on shell collected from 11 borings taken in 1978 and analyzed in 1984. The borings were taken with a gouge auger and covered the entire Seaford Park Archaeological Site (Rutsch 1985:60, 68). The value of engineering soil borings used as an archaeological research tool has been described by Rutsch (1985:91-92) as experimental.

That the Seaford Park Archaeological Site was a specialized food-processing station is suggested by several factors: (1) the low density of artifacts present; (2) the absence of any features indicating a habitation site (e.g., post molds, storage pits, hearths, etc.); (3) the low density of food remains other than shellfish; (4) the large size of the middens and apparent lack of soil therein (Wyatt 1976:12); and (5) the very specific species of shellfish comprising the site (i.e., hard clam) (Cammisa et al. 1993:89).

At first, the shellfish gathering zone was probably adjacent to the processing site, situated just south by the bay shore. Eventually, the shellfish adjacent to the processing site may have become depleted. The native inhabitants may then have expanded their

range of collecting east-west along the shore and into the bay itself. It would seem unlikely that the bay was ever over-harvested during the prehistoric period (Cammisa et al. 1993:89).

The main camp or village must have been located on the nearest high, dry ground, probably adjacent to a fresh water stream. A likely spot would have been near present-day Merrick Road near the south-flowing Cedar Creek, perhaps near the forest fringe (Cammisa et al. 1993:89; Wyatt 1976:3).

The size of the shell mounds were immense by any standard. The radiocarbon results on the 1993 area of focus reveal an incredible buildup of 8 ft of midden in 140 years. Previous radiocarbon determinations on samples from South Mound showed that about 16,000 cu yd of shell remains were produced in about 230 years (Rutsch 1985:62 133). Why were the mounds produced so quickly and to such an extent?

We can offer three possible explanations:

l. If the site or a portion of the site were utilized seasonally (e.g., late winter to early summer), then the shellfish would have been collected more intensively during a portion of the year. There would have been a period of inactivity on the mound for many months. In this case, food may have been consumed immediately or stored for later consumption.

2. If the site or a portion of the site were utilized year round, the shellfish would have been collected less intensively than described above, but more consistently over the year. There might have been no seasonal periods of inactivity. This would seem to imply immediate consumption only.

Explanations 1 and 2 are related to the diet of the inhabitants who were collecting and processing shellfish at Cedar Creek.

3. There is also the possibility that the mounds represent the result of shellfish collected for trade (Cammisa et al. 1993:90). We know from historic sources that pre-Contact Long Island native inhabitants paid tribute to the Iroquois (Mohawk) in the form of dried clam as well as wampum (Furman in Lopez and Wisniewski 1978:211). Although the mass production of wampum is thought to have been initiated with the introduction of the European metal awl, it is quite conceivable that a long-standing tradition of trade in dried clam existed during Woodland times (Cammisa et al. 1993:90).

Furman wrote:

> when the Dutch settled here, they persuaded the Canarsee to keep back the tribute. When the tribute was withheld the consequences were severe. In 1655 a large body of Northern Indians (Iroquois) made a descent on Long Island, and invested Gravesend (Brooklyn)... after leaving Gravesend ...they fell upon and destroyed the Canarsee tribe and afterward proceeded down through the Island with the terrible foray of murder the account of which have been preserve on tradition to this day; and to prevent a repetition of which the Consistory of the Dutch Church of Albany undertook to be agents to see that the required tribute was regularly paid by the Long Island Indians to the Five Nations [Furman in Lopez and Wisniewski 1978:211].

Immense shell heaps have also been reported at Canarsee (Parker in Lopez and Wisniewski 1978:208).

In none of these three explanations does it appear likely that the site had been abandoned for many years since there is virtually no soil stratigraphy within the shell midden. Explanations 1, 2, and 3 may have been independently or simultaneously valid (Cammisa et al. 1993:91).

Acknowledgments

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A Fresh Look at the Middle Woodland Period in Northeastern North America

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The purpose of this paper is to summarily describe the Middle Woodland Period in northeastern North America. Distributional patterns of Middle Woodland artifact types across the northeastern region are evaluated. Insights into hunter-gatherer lifestyles are derived from these patterns.

Northeastern North America is viewed here as the territory that encompasses the entire St. Lawrence Valley south to northern Pennsylvania and northern New Jersey.

Chronology and Distribution of Artifacts

The addition of decorated ceramics made available a new and exciting class of artifacts in the archaeological record. Important innovations such as the bow and arrow occurred during the Middle Woodland Period as well. Knowledge and use of horticulture, including tropical cultigens, is likely, although evidence for its practice remains enigmatic.

Among the earliest decorated pottery types are pseudo-scallop shell and dentate stamped. These types appear to have originated in the northern reaches of the Northeast where they were first applied to conoidal vessels (Speiss and Hedden 1983:185). Linear and rocker techniques were used to apply these decorations. These early ceramic styles have been named Vinette 2 by Ritchie (1944:164; 1969a:206, 213). The term is an obvious reflection of continuity and evolution from earlier Vinette 1 ceramics.

There is a limited number of early radiocarbon dates for Vinette 2 ceramics. All of them are from sites located in the northern portion of the region. Pseudo-scallop shell and dentate-stamped pottery have been associated with a radiocarbon date of 690±50 B.C. at the Oxbow Site in New Brunswick, Canada (Allen 1980:144). This site is located along the Miramichi River, which drains into the Gulf of St. Lawrence. At Site 41.40 on Kidder Point in Maine, charcoal within Feature 3 yielded a date of 650±220 B.C. (Speiss and Hedden 1983:52). The feature did not produce any artifacts but was clearly related to the rest of the site, which did produce numerous sherds of pseudo-scallop shell and dentate-stamped ceramics.

Near the southeastern shore of Lake Huron, the lowest level of the Burley Site produced a radiocarbon date of 669±220 B.C. (Wright and Anderson 1963:50). The Donaldson Site (Wright and Anderson 1963), located 2 mi inland from the eastern shore of Lake Huron along the Saugeen River, produced the radiocarbon dates of 585±150 B.C. and 530±60 B.C. (Stothers 1975:39). Both sites are representative of the Saugeen culture. Pseudo-scallop shell and dentate-stamped ceramics were prevalent.

Further south these pottery types occur at decidedly later dates. Some of the earliest dates associated with these motifs in the southerly portion of the Northeast are A.D.115 and A. D. 185 from the Roaring Brook Site (Juli and McBride 1984:91), A.D.135±125 from the Tuthill Site (Lavin 1984:19), and A.D. 140±100 from the Cottage Site (Ritchie and Funk 1973:118). Funk (1993:146-147), however, has estimated the age of the Cottage Site between 300 B.C. and A.D. 150.

Netmarked is another important early Middle Woodland ceramic type. It appears first on vessels of conoidal shape. The type has a mid-Atlantic or southern origin. In North Carolina, it appears with steatite-tempered and coarse cordmarked pottery types in the Deep Creek I Phase. The type increases in popularity in the Deep Creek II Phase, for which an antiquity of 800 B.C. has been postulated (Phelps 1983:30-31).

In the state of Delaware, netmarked pottery also occurs with coarse cordmarked pottery in the Wolfe Neck complex. The earliest radiocarbon determination available for this complex is 505±60 B.C. (Custer 1984:182).

In the middle Delaware River Valley, Vinette 1, Exterior Corded/Interior Smoothed, and Broadhead Netmarked pottery have been assigned a minimal date range of 590 B.C. to A.D. 330 on evidence from the Lower Black's Eddy Site (Robertson and Kingsley 1994:101). This range is in agreement with information from the nearby Williamson Site, where Marcy Creek, Vinette 1, Corded, Flat-bottom Corded, and Flat-bottom Plain ceramics occurred (Hummer 1994:146). Netmarked ceramics were not found in this Early Woodland assemblage. Five radiocarbon dates from the Early Woodland level at the Williamson Site range from 1283 B.C. to 790 B.C. (Hummer 1994:146).

In the upper Delaware River Valley, netmarked pottery occurs with Vinette 1 at a horizon dated 480±80 B.C. at the Miller Field Site (Kinsey et al. 1972:38). At the Faucett Site, also in the upper Delaware River Valley, netmarked pottery

occurs together with dentate stamped at the same stratigraphic level. The radiocarbon dates associated with this level are 400±95 B.C. and 100±135 B.C. (Kinsey 1975:96-97). From the above data, it would appear that netmarked pottery arrived in the upper Delaware River Valley slightly earlier than dentate stamped or that both arrived at approximately the same time c. 500-400 B.C. It is likely that there already was a long period of culture contact between the groups responsible for introducing the dentate-stamped and netmarked wares. The two pottery types simply diffused in northern and southern directions.

Netmarked and dentate-stamped pottery are part of the Bushkill Phase as defined by Kinsey et al. (1972:364-369) in the upper Delaware River Valley. In a discussion of the Bushkill complex, Kinsey et al. (1972:369) astutely stated: "It is felt that it is likely that too many projectile point and pottery types have been identified as traits for this complex to represent the original ethnological conditions." Indeed, the blending of influences created a complicated collection of artifact types. The Bushkill Phase is clearly a mixture of traits from the north and south. The dispersion patterns of these northern and southern ceramic traits has generally gone unnoticed.

In the lower section of the Delaware River Valley near Trenton, netmarked pottery is heavily represented at the extensive Abbott Farm Site (Cross 1956). Dentate-stamped pottery, however, comprises a very small percentage which probably reflects the lower range of dentate-stamped type in this valley. Some of the netmarked vessels at this site also bear dentate-stamped impressions, usually confined on or near the rim. An excellent discussion of the Abbott Farm pottery is in Cross (1956:131-159).

The Delaware River Valley is not the only area to reflect this mixture of northern and southern pottery types. At occupation (A) of the Musketta Cove 2 Site on western Long Island, a netmarked, a dentate-stamped and two cordmarked pots were found at the same stratigraphic level. The netmarked pot found here is particularly interesting in that its interior contains dentate-stamped impressions (Salwen 1968:326).

Netmarked pottery also extends well up the Hudson River Valley and is prevalent in the Fox Creek Phase (Funk 1976:287-293). The type also extends east along the coast and is found on Martha's Vineyard (Ritchie 1969b). It is not well known in the Connecticut River Valley, where dentate-stamped pottery dominates the Middle Woodland (Juli and McBride 1984; Lavin 1987). There is a general dearth of netmarked ceramics on New England sites, extending from the coast inland. Dentate stamped is the major Middle Woodland ceramic type in New England (Barber 1982; Bernstein 1993; Childs 1984a, 1984b; Hamilton and Yesner 1985; Petersen and Power 1985).

Netmarked and dentate-stamped ceramics were found in Funk's (1993) major survey of the upper Susquehanna River Valley. Netmarked ware, however, was not particularly well represented, a situation that is clearly reversed where the Susquehanna River meets the Chesapeake Bay. The major Middle Woodland ceramic type in the Chesapeake Bay area is netmarked (Egloff and Potter 1982; Wright 1978).

The intermediate portion of the Middle Woodland Period is a post-A.D. phenomenon in all areas of the Northeast. The Kipp Island Phase in the Upper Susquehanna River Valley is the most securely dated. It has a date range of c. A.D. 300-700 (Funk 1993:147). Other areas in the Northeast have similar time spans.

Pottery vessels became larger and more rounded through time. Some areas, however, retain the conoidal form until the Late Woodland Period. Temper particles became smaller, shell tempering achieved some popularity, and incising and cord decoration developed.

Intricate zoned designs on ceramic vessels became popular in some areas of the Northeast and are separable into two main groups. The first is broadly classified under the name Hopewell. Circular motifs define this group of ceramics. In his discussion of Hopewell pottery types, Griffin 1952:114-120) defined three different Hopewell Zoned types, including Hopewell Zoned Stamped with its intricate depictions of birds, most often raptors. Six non-zoned types belonging to the Hopewell culture have also been defined. These classifications have remained largely intact.

Hopewell ceramics occur infrequently in the Northeast, even in western New York and Pennsylvania (Ritchie 1969a:218; Seeman 1979:378). These states were not ad dressed at the 1978 Chillicothe Conference on Hopewell Archaeology (Brose and Greber 1979). Seeman (1979:263-266), however, did include western New York in the Hopewell Interaction Sphere based on specific trade items and burial mound traits which will be discussed later in this report.

The second kind of zoned pottery is broadly categorized under the name Abbott Zoned. It has elaborate geometric patterns, principally triangles, rectangles, and parallelo grams. Three types of Abbott Zoned pottery have been defined by Cross (1956:144-147). The types are most prevalent in the southern section of the Northeast and appear to have developed in the mid-Atlantic area.

The range of the Abbott Zoned ceramic group is not extensive. It is known principally in the Delaware River Valley and coastal New York. It has been recovered at the Westheimer Site in eastern New York (Ritchie and Funk 1973:130, 133).

In the terminal Middle Woodland Period, there was an increase in ceramic designs and varieties. Many of these new designs and varieties were the progenitors of Late Woodland

ceramic types. These new types are particular to individual river valleys and certain sections of the coast.

Increased sedentism could have been the reason for the rise in the number of local ceramic varieties. Less interaction would have translated into more localized ceramic types and slower rates of diffusion. Greater interaction would have resulted in more homogeneous ceramic types across broad areas with faster rates of diffusion. It is also obvious that there was an increased importance assigned to pottery through time. These points will be discussed in greater depth in later sections of this paper.

Projectile points are another important artifact class with great significance for the Middle Woodland Period. Ritchie's (1971) remarkable treatment of the subject gives an excellent discussion of Middle Woodland types.

There seems to be a persistence of earlier point types into the incipient Middle Woodland Period, particularly narrow stemmed varieties. However, new point types, such as Long Bay and Port Maitland (Ritchie 1971:125), are present in the Canoe Point Phase of central New York. Another new type is the Greene point, which is known in the Hudson River Valley and along the coast to Martha's Vineyard (Ritchie 1971:122).

The well-known Fox Creek Stemmed and Fox Creek Lanceolate point varieties are represented in coastal New York, the Hudson River Valley, the upper Susquehanna River Valley, and southern New England. Consistent radiocarbon dates ranging from A.D. 360±100 to A.D. 480±200 are associated with these points (see Funk 1976; Funk 1993; Ritchie 1969b; Ritchie and Funk 1973; Swigart 1978).

Custer (1984) has defined the Carey complex in the state of Delaware. The ceramic types within this complex are cord- and netmarked. Associated projectile points include the Fox Creek Stemmed and Lanceolate types. There are 11 radiocarbon dates for this complex ranging from A.D. 65 through A.D. 455 (Custer 1984:131, 181-182). The Fox Creek point styles apparently spread north through eastern Pennsylvania and New Jersey into New York and east to Martha's Vineyard via Long Island Sound.

The dissemination of the bow and arrow across North America has been outlined by Blitz (1988). He places the bow in Alaska around 3000 B.C. However, it was introduced into the western United States around A.D. 200 and reached the Northeast according to Blitz, at around A.D. 600.

Jack's Reef points (Ritchie 1971:26-28) are representative of this new type of hunting apparatus. They fit the classic definition of arrowheads provided by Thomas (1978) and mark the first appearance of the bow and arrow in the Northeast.

The movement of Jack's Reef points across New England has been outlined by Straus (1992). His provenience for these points also lies within the late Middle Woodland Period. The earliest Radiocarbon dates associated with these points in New England are A.D. 665±120, A.D. 685±130 (Borstel 1984a:253, 256; McManamon 1984:355), A.D. 710±70 (Barber 1982:14), and A.D. 750±130 (Power et al. 1980:54).

Jack's Reef points were heavily represented at the Davis Site, which has an associated radiocarbon date of A.D. 755±130 (Funk 1993:206). These points are part of the late Middle Woodland Kipp Island Phase, which has a date range of A.D. 475±90 to A.D. 830±90 in the upper Susquehanna Valley (Funk 1993:206). This date range of c. A.D. 500-800 is similar to those of other areas of the Northeast such as central New York, the Delaware River Valley, and western Vermont (Funk 1993:206).

Seeman (1992) and Straus (1992:345) have reasoned that Jack's Reef points were introduced into the Northeast from the Ohio area. This technology was apparently disseminated from groups that were part of an intrusive mound culture. The introduction of the bow and arrow represents a pronounced change in projectile point evolution in the state of Ohio. The greatest change in morphology occurred between A.D. 600 and A.D. 800 (Seeman 1992:42).

The adoption of the bow and arrow is placed between A.D. 700 and A.D. 900 in Ohio (Seeman 1992:42). The data from the Northeast suggest a slightly earlier time frame. Seeman's (1992:42) practice of only accepting radiocarbon dates from sites that have at least three overlapping deviations or dates that are stratigraphically sealed below later contexts may be too conservative.

The Levanna point is present in late Middle Woodland contexts and is the dominate type in the Late Woodland Period (Ritchie 1971:31-32). This point type was adopted very quickly in all areas of the Northeast, and its origin or distributional pattern cannot be ascertained at this writing.

Exchange Patterns

Interregional trade during the Middle Woodland Period is represented by artifacts of the Hopewell culture. One of the most distinctive items of this culture found in the Northeast is the platform pipe. The right-angle bowl is a radical form in comparison to local obtuse-angle varieties. Other Hopewellian artifacts found in the Northeast are crescent and reel-shaped gorgets, panpipes, and beads made of Olivella or Marginella shell (see Seeman 1979:311-385 for complete list).

Post-Hopewellian trade in platform pipes has been proposed by Seeman (1981). The Oaklawn Quarry in Rhode Island may have provided raw materials and finished platform pipes that were traded on an interregional basis. The timespan of A.D. 700-900 has been proposed.

The movement of lithic materials either in finished artifacts or raw form across vast territories of the Northeast is evidenced on many Middle Woodland sites. The lithic mate-

rials used to manufacture Fox Creek bifaces in coastal New York have been studied by Rutsch (1970) and Venuto (1982). Both studies have identified eastern Pennsylvania as the source for many of the exotic lithics present in this area,

An Abbott Interaction Sphere has been proposed for coastal New York based primarily on Fox Creek point styles made of lithic materials originating in eastern Pennsylvania, the occurrence of ceramics similar to the Abbott Zoned types, and the presence of mica (Silver 1991:215-216). Evidence of symbolic or ritual behavior has not been associated with any of the artifacts. Therefore, Silver (1991:249) has proposed that these were domestic and utilitarian items and the purpose of the exchange was economic in nature. The pottery, however, is not particularly well made and not likely to have done well in transit. I propose that this pottery diffused northward from the New Jersey area and was not a trade item. My model on the nature of this diffusion is in the following section.

In contrast, Seeman's (1979) concept of an interaction sphere emphasizes trade as a basis for maintaining communication and relationships on an interregional level. On Cape Cod the lithic material that is clearly recognized as exotic is chert. Ratios of chert in comparison to other lithics is highest on sites of Middle Woodland affiliation, particularly in the latter portion of this stage (Borstel 1984b: 326, 332; McManamon 1984:395). The most likely sources for this material in Cape Cod are Rhode Island and the mid-Atlantic area (Borstel 1984b:320).

Luedtke (1987:43) found jasper to be an important material on sites of the late Middle Woodland Period. Eastern Pennsylvania is suggested as being the source for much of this material. The survey by Straus (1992), however, found that jasper did not make up a significant portion of Jack's Reef points throughout most of New England. Local lithic materials clearly dominated. Only in Connecticut was there a major use of jasper presumably derived from sources to the west (Straus 1992:341).

The type of trading pattern that is evident in the Northeast is broad based, non-focal, and not highly structured. This type of exchange system has already been proposed for the Middle Atlantic region (Stewart 1989).

Discussion

The movement of ceramic types through time and space in the Northeast was clearly accomplished by diffusion. A pattern emerges of a trait or traits being adopted from neigh boring groups of people that were probably related by blood and marriage. Since women are generally credited with making pottery, manufacturing techniques were no doubt handed down to adolescent females and children in the group. When these adolescents matured and married into neighboring groups, the new decorative techniques spread to adjacent areas. It is also likely that the new decorative techniques were adopted by relatives and friends of the newly married women as well as by upcoming generations.

Diffusion in lithic artifacts is also evident. Jack's Reef points show low frequencies of being manufactured from exotic lithic materials over most of New England. This indicates the point style and likely bow-and-arrow technology were passed from person to person or group to group across the region. The fact that there are minor morphological differences among Jack's Reef points in the state of Maine may be due to its distance from the point's apparent heartland or to limitations of local lithic material (Straus 1992:345).

The presence of Hopewellian artifacts in the Northeast has already been noted above. These are proposed as representing trade on an interregional basis.

Burial mounds of Hopewell affiliation are likely to have been constructed by people who migrated into the Northeast from areas in which they were participants in this culture. Straus (1992:347) has also found it likely that Hopewell cultural traits such as burials are likely to have been the result of actual movements of people into the Northeast.

The lack of Hopewell pottery in the Northeast has already been mentioned. Even in Hopewell centers, pottery is not regarded as a trade item (Seeman 1979:378, 379). This brings us to an interesting situation. If Hopewellian cultural traits occur in the Northeast and the pottery does not, would this be a result of males with Hopewell affiliation traveling into the Northeast without female colleagues? While down-the-line trade is likely responsible for most of the Hopewellian artifacts in the Northeast, it seems likely that trading parties traveled into the Northeast and resided with local groups as well. These trading parties may have stayed a season or more and possibly overwintered in the Northeast. If a member of a trading party died, he would have likely been afforded mound internment possibly with the assistance of local residents.

The practice of mound burial may have been introduced into the Northeast in this manner. It was not particularly widespread and never achieved the dimensions of its Ohio expression. The absence of Hopewell habitation sites and pottery is notable (Ritchie 1969a:215, 218).

Such a model would explain why habitation sites of the Hopewell culture have never been found in the Northeast even in areas near burial mounds. This view is also in agreement with and gives additional support to Ritchie's (1969a:214-217) framework of providing a separate Squawkie Hill Phase from the Point Peninsula sequence. Seeman (1979:263-266), on the other hand, has argued that Hopewell traits in New York belong within the Point Peninsula Tradition and has called for a reorganization of the data. The present model does not support these changes.

Another major topic of concern is whether the native inhabitants in the Northeast practiced agriculture during the Middle Woodland Period. Direct evidence for the propagation of indigenous and tropical cultigens is lacking.

The presence of obtuse-angle elbow pipes on Middle Woodland sites could be an indication that tobacco was grown in the Northeast. It is, of course, possible that tobacco was traded but not cultivated. Identification of a Middle Woodland phase associated with obtuse-angle pipes and not involved in some form of intraregional or interregional trade would support the idea of tobacco cultivation at this time. There are, however, very few Middle Woodland sites that do not have evidence in some form of trade. Even the remotely located island of Martha's Vineyard contained a fragment of a platform based pipe at the Vincent Site (Ritchie 1969a:152).

Current evidence suggests that agriculture was not practiced in the Northeast during the Middle Woodland Period. The only agricultural center adjacent to the Northeast is to the west.

In Ohio and other states of the Midwest, a number of indigenous and tropical species were cultivated. Around A.D. 800, maize was dominant in all agriculture of this region (Asch and Asch 1985; Johannessen 1984; Smith 1989; Wymer 1992). If agriculture was practiced by women during the Middle Woodland Period the current model suggests that its diffusion into the Northeast would have been severely attenuated. However, the cultivation of native plant species began in the middle Mississippi River Valley region around 2000 B.C. (Smith 1989). It seems extremely unlikely that the practice of agriculture would not have reached the Northeast in some form by Middle Woodland times.

The present model does suggest that maize would arrive later, perhaps by late Middle Woodland times. Maize in Ohio is questionable for Adena contexts and is a minor constituent on sites dated between A.D. 400 and A.D. 800 (Wymer 1987:212; 1992:67). The earliest securely dated context for maize in eastern North America is A.D. 175±100 from the Icehouse Bottom Site in Tennessee (Chapman and Crites 1987:353).

I expect that maize will be found in Middle Woodland contexts in the Northeast. There seems little doubt that it was brought into the Northeast for personal consumption by trading parties. We must be extremely careful in how we interpret Middle Woodland sites in which maize is found. We need to differentiate between a site in which maize is merely present and one in which maize was cultivated.

The division of labor based upon gender is almost universal. In addition to this division, societies of the Middle Woodland Period were likely to have followed a patrilocal orientation. The reason for proposing this structure has been summarized by Elman R. Service:

> To hunt ...requires close collaboration of several men, just as does warfare. The women's gathering activities, whatever their economic significance to the society, ordinarily do not require the delicate coordination of several people. Thus women could be lost to their own band when they marry, and others gained, without weakening it so much as it would be by breaking up the teams of brothers and male cousins who grew up together [Service 1979:38].

Mention has already been made of the increasing number of ceramic types in the late Middle Woodland Period. Increased sedentism through time has been proposed for the entire Woodland sequence by a number of scholars. This could account for the increase in local ceramic types during latter part of the Middle Woodland Period. The dependence on fixed base camps may have been established in the Northeast at this time. Specialized procurement activities with field camps and foray activities lasting days and weeks at a time would have been dispatched from these locations. These fixed base settlements would have allowed considerable mobility for trading and procurement parties.

The adoption of agriculture is likely to have been a consequence of increased sedentism. A group must be sedentary for agriculture to be adopted. This idea is not new, but it is often overlooked. The scale of agriculture was minor in comparison to other subsistence activities when it was initially practiced. Groups did not become sedentary in order to practice plant propagation.

It has also been hypothesized that agriculture was adopted due to factors of stress, such as increasing population and exhaustion of subsistence resources. Griffin (1984:259) has succinctly stated: "Necessity is not the mother of agriculture".

It is obvious that the Northeast was not an entity unto itself. This region was subject at various times to a number of influences. To completely summarize each major river valley in the Northeast along with interpretations of surrounding areas during the Middle Woodland Period would easily fill a volume. Interpretations in this paper could only be broadly illuminated.

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Book Review

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Lewis H. Morgan on Iroquois Material Culture, by Elisabeth Tooker (1994). Tucson: University of Arizona Press, xxii + 325 p., illustrations (black and white plus color plates). $65.00 (library binding), $40.00 (paper).

Lewis H. Morgan (1818-1881) is generally acknowledged to be the "father" of American anthropology. His importance in the history of this discipline appears to grow every year, particularly as more of his unpublished efforts are transformed into volumes such as this extraordinary and important work by Elisabeth Tooker.

Nearly 50 years ago, George Peter Murdock (1949:91), in a classic contribution to the study of social organization, stated, "[T]he scientific significance of kinship systems was first appreciated by Morgan in what is perhaps the most original and brilliant single achievement in the history of anthropology. That many of Morgan's particular interpretations are no longer acceptable does not diminish the luster of his work." Others have noted that Morgan's insights and publications in the field of anthropology are parallel, in many ways, to those of Freud in psychiatry. Both of these scholars hold important places in the histories of their disciplines, having contributed considerable data and lasting theoretical ideas. The recent collapse of the Soviet Union, with its ideological base founded on the theoretical structure of society rooted in ideas of sociocultural evolution proposed by Morgan, erased the last bastion of support for those of Morgan's "interpretations" of social evolution that had long ago been discarded in the Western world. A more lasting and important of Morgan's contributions to the science of anthropology has only recently come to the fore, and Tooker's book serves as an important showcase for these studies of material culture.

Morgan's insights and brilliance can be noted in many aspects of his several works. Archaeologists will be impressed by the extent to which Morgan was involved in early surveying and collecting. While Morgan's contributions to archaeology are overshadowed by his work in other areas, such as the material culture studies that are the focus of this volume, the prehistoric artifact collections made by Morgan for the State of New York were important in the history of archaeology in that region.

Tooker wisely quotes one of Morgan's more brilliant observations to point out his prescience. Morgan's statement "that these objects `speak a language, which is silent, but yet more eloquent that the written page'" (Morgan 1851:351, in Tooker p. xiii) has become the theoretical basis for recent studies in several disciplines. Numbers of publications now provide interpretations of the "language" of clothing, decorative designs, and other elements of material culture from peoples in all parts of the world (e.g., Anawalt 1990; Weiner and Schneider 1989). These studies demonstrate Morgan's clear understanding, some 150 years ago, of the meaning of these cultural products and confirm his wisdom in collecting these artifacts.

A long decline in material-culture studies as an important area of research within anthropology has only recently been reversed, for many reasons still being debated. Among the reasons may be the disappearance of many cultures throughout the world, leaving behind only their material remains. Also important in reawakening interest in material-culture studies is the renewed archaeological interest in ethnohistory as a means of supplementing the limited record of material that survives in the ground. In general, this reversal has done much to focus attention on museum collections that have been ignored for decades. In the context of the growing interest in the "language" of cultural products, the efforts of Morgan to collect and preserve the material culture of the Iroquoian-speaking peoples of New York takes on great significance.

Tooker's book will certainly be bought by every scholar as well as by most individuals concerned with the peoples called Iroquois. If you do not now own this volume, or believe that your interests do not require you to purchase a copy, let me summarize what is available in this work. A brief preface provides an overview of what has been produced by the author. Following these introductory remarks, Tooker offers a section entitled "Editorial Method," which attempts to provide some understanding of the New York State Senate document numbers, a numerical series that did not appear in chronological order. This section also includes the citations of the Regents reports and their content and other data needed to understand the materials that are the focus of Tooker's work. The placement of this section as a separate entity after the preface but before Part I, Chapter 1, may seem a unnecessarily confusing structuring, but it is nothing compared to the bureaucratic publications tangle that is decoded by Tooker.

The five chapters of Part I ("Morgan's Research") begin with a description of Iroquois material culture in 1850. Cultural distinctions among the Six Nations are nowhere noted. The second chapter purports to deal with Morgan and his study of material culture, but half of this short section deals with his other studies and suggestions relating to how Morgan eventually came to make the collections that are the subject of this volume.

Morgan's early Iroquois work is the subject of Chapter 3. This chapter also continues the story of Morgan's intellectual development, begun in Chapter 2. Tooker indicates the impor-

tance of the archaeological and historical context in which Morgan grew up. Chapter 4 covers the early days of archaeology in New York, beginning at a point long before Morgan's arrival on the scene. This chapter covers his important contributions to these studies and ends with the initiation of his collecting for the State of New York. The fifth and final chapter of Part I examines the specific pattern and scope of Morgan's collecting specifically for the State. This long chapter reviews the significance of Morgan's relationship with the Parker family. These educated and cultured Christians were prototypic ethnographic informants, and Morgan viewed the Tonawanda Seneca and the "Iroquois" in general through their eyes.

The three chapters of Part II of Tooker's volume, collectively called "The Morgan Collection," actually have their primary focus on the written records relating to those artifacts. Chapter 6 ("Classification of Articles in the Collection") begins by listing the three types of written sources that provide the documentation of the approximately 500 objects that Morgan sent to the State between 1848 and 1850. These three types of sources include the actual lists of articles sent to Albany "that were published in the several Regents reports" (p. 87), the long published reports themselves describing the items in Morgan's three major shipments, and the extraordinarily important parts of Morgan's field notes from the three trips taken during 1849 and 1850 to gather these materials. Chapter 6 also provides a summary Classification List of these items plus a discussion of the use of illustrations found in various Regents reports that also appear in other works by Morgan. The summary list is followed by a more detailed description, with Seneca name (as originally given and also in an accurate transcription) plus the English translation, where possible (cf. Becker 1994).

Chapter 7, "Morgan's Field Notes," derives from his bound journals now among the Morgan Papers that remain in the University of Rochester Library (see also Trautmann and Kabelac 1994). This chapter includes extracts from Morgan's 1849 and 1850 field notes recorded at Tonawanda and from his 1850 Grand River field notes. These data are incredibly important in putting the artifacts into their true cultural contexts.

Chapter 8 provides reproductions of the actual texts and illustrations of the three Regents reports (Second, Third, and Fifth). The brief Second Report includes no illustrations, but the longer Third Report has numerous black and white illustrations in the text followed by 17 plates that are beautifully reproduced. The even longer Fifth Regents Report provides coordinating numbers for the many black and white drawings, and plate references where appropriate. The 20 plates following this report are, of course, reproduced to the same high standards that make this volume an excellent value as well as providing an essential resource.

Two appendixes, also reproduced from actual texts, follow the second set of plates. Appendix 1 reproduces five lists: the three lists of "Articles Donated to the State" in 1848 and 1849 plus the two lists of "Articles Sent to the State" in 1849 and 1850. Appendix 2 reproduces the three-page publication of Ely S. Parker's article, "The Cornplanter Tomahawk in the State Collection." This is taken from the Fourth Regents Report (Tooker, p. xix). The notes and bibliography, as well as the index, provide the reader of this volume with important information needed to expand on all aspects of this valuable scholarly work.

Tooker is quite clear about what she does not include in this volume. Three other major collections of Five Nations artifacts collected in the middle of the nineteenth century are not addressed by Tooker, nor are the specific items cited since there is every expectation that future scholars will put all this information together. These three collections are located in the Rochester Museum & Science Center, the New York State Museum, and The National Museum of Denmark in Copenhagen (see Becker 1994). The objects collected by Morgan and sent to the New York State Museum that survived the disastrous fire of 1911 are estimated at only 10 to 15% of the original total. The survival rate of the pieces gathered for the Danish collection is much better, but a few pieces on the original list of items sent to Copenhagen are now missing. I believe the missing items may have been discarded due to insect damage (Becker 1994). The principal surviving collection, therefore, remains in Rochester. The limited information now available on these collections points out the importance of Tooker's publication of this important work on the Morgan collection.

While Tooker states that the collection in Denmark was sent to what was then the Royal Danish Museum "through Morgan's offices" (p. xvi), I have been unable to document any direct evidence of any involvement on the part of Morgan (see Becker 1994). While I do not doubt that Morgan may have been, in some way, instrumental in aiding Raaslpff in making this collection, positive proof has not been revealed. Many of these pieces are identified as having been purchased by Raaslpff from a "Mr. Parker," but Morgan's name has yet to be associated with these objects.

Most interesting in the history of anthropology and of museum collections in general is the interest shown by c.1850 the director of the Royal Danish Museum in making collections that provided a wide range of artifacts from each culture, including ordinary or utilitarian items as well as decorative pieces, as well as the raw materials (e.g., fiber, bast, splines) from which the artifacts had been fashioned. Also involved in this charge to the people making these collections for the Royal Danish Museum was the recording of native names for these items and the notation of the functions of these pieces (see Becker 1994:5-6). Thus, the Danish collecting technique parallels that used to gather the Morgan collections in New York, particularly in providing the details that enable these examples of material culture to be seen and understood in their appropriate position within the culture from which they came.

An extremely interesting question regarding the similarity in the methods and goals of collecting relates to the possibility that both techniques may derive from a single source. Perhaps there was a remarkable parallelism in the "evolution" of ethnographic techniques on both sides of the Atlantic. Closer study of this aspect of the history of ethnography appears warranted.

In addition to allowing other scholars to pursue the study of the surviving Iroquois collections, Tooker makes note of yet another "group" of artifacts. In her preface, Dr. Tooker suggests that Morgan intended that the materials sent to the State "would form the nucleus of a larger collection" (Tooker p. xv). Tooker states that, indeed, "a number of objects of Iroquois manufacture were added to the state's collection, especially in the closing decade of the nineteenth century and the first decade of the twentieth" (Tooker pp. xv-xvi). Who collected these, how they were transmitted to the museum, how many (if any) were lost in the fire of 1911, and how these are now distinguished from the surviving pieces are questions not noted. Possibly these later arrivals are considered by Tooker simply as a part of the New York State holdings that are termed the "Morgan" collections.

Note should be made that Morgan's concern with providing the Seneca names for the objects he collected may mask or distort the specific cultural context from which they derive. There is no consideration in this volume of the degree of homogeneity, if any, among the Five Nations from which these artifacts were obtained. If there is a "language" spoken by items of material culture, what are the "dialectical" differences that existed among similar products that were made by the various members of the League of the Iroquois? Can we determine the specific culture that produced any of these objects? Were there elements of design or decoration that provided an indication of cultural origins of individual pieces in the past, but that were no longer evident by 1850? All the items sent collectively by Morgan to the State are noted as coming from "the Mohawks, Onondagas, Cayugas, Senecas and Tuscaroras" resident on the Grand River reserve in Canada, as well as "from the Senecas in the western part of the State" (from Morgan's list of "Articles Sent to the State in 1850" in Tooker, p. 283). Were there differences among the decorative types, or among utilitarian categories, produced by each of the Six Nations at that time? Does the "language spoken" by these artifacts differ from that "spoken" by the Cayuga or Onondaga, or by the later arriving Tuscarora? Are there comparable collections of Oneida artifacts from this time period in midwestern American museums? In describing the dress of these peoples c. 1850, Tooker treats the Iroquois as if they were one, completely homogeneous people. If this is the case, the story of this amalgamation would be enlightening. The answers to these various questions may be the subjects of future doctoral dissertations.

The value of Tooker's contribution soon will be demonstrated by the considerable use to which it will be put by scholars, as well as by the enjoyment that it will bring to a wide range of individuals. This is a volume that is more than simply to be recommended; it is one that is a "must buy" for everyone in any way interested or involved in Iroquois studies.

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