

# THE BULLETIN

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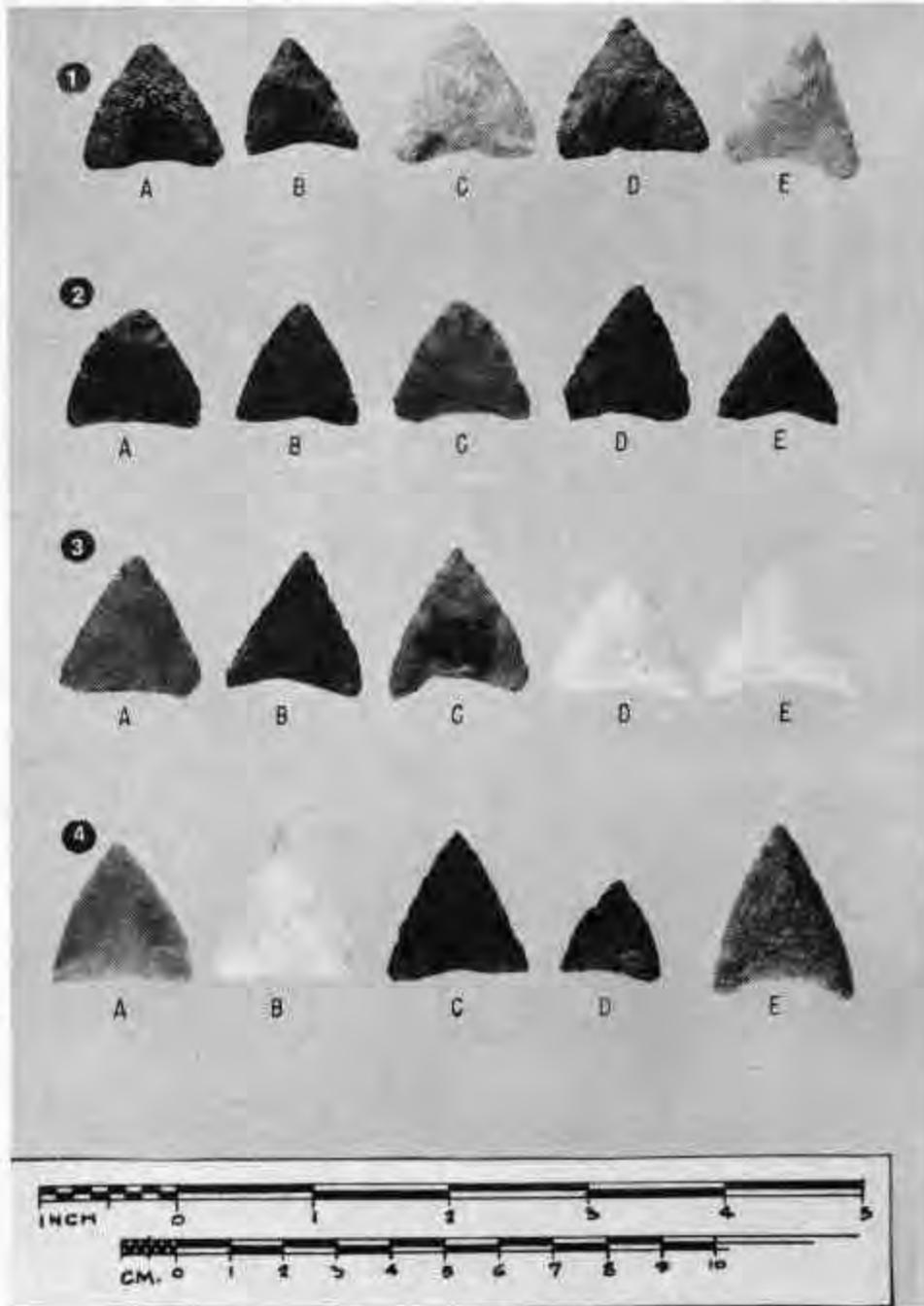


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The Hunterbrook Triangle Point Type

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## THE KAESER SITE: A STRATIFIED SHELL MIDDEN IN THE BRONX, NEW YORK

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The Kaeser site (FLG 1-1) is a shell midden (composed predominantly of hard-shell clam) located in Pelham Bay Park, Bronx County, New York, on the north shore of Eastchester Bay. The site lies south of City Island Road, and east of Pelham Bridge, close to the drainage of the Hutchinson River into the Bay (Fig. 1). It appears to have been sporadically occupied during Late Archaic, Early (or early Middle) and Late Woodland, and Historic periods.

The site was excavated over two seasons (24 May-6 June, 1973 and 14-29 June, 1975), initially as a salvage operation and later to test an hypothesis formulated during analysis of the first season's excavated material. This hypothesis relates to the way shell middens are deposited.

In a small-scale, seasonally occupied site, it is hypothesized that people using the site will occupy one area of the site for a period of time, returning there each year. As the shell debris gets deeper, seasonal migrants will move to occupy a new (perhaps adjacent) part of the site. Thus the accumulation of midden may occur not in layers but in heaps (cf. Salwen and Vetter 1974), more like the "basketload" phenomenon described in mound-building (Griffin, Flankers and Titterington 1970; Neumann and Fowler 1952). The test implication of this hypothesis is that one will find culturally and temporally distinct, spatially separate areas within the midden if the hypothesis is valid. If there is an even spread of artifacts from a given culture period, the hypothesis will be rejected.

Traditionally it has been virtually impossible to discern stratigraphy within shell middens. Our argument here is that on such sites, "stratigraphy" may often be visible in the spatial separation of chronologically distinct materials rather than in the superposition of such materials. The latter may occur on the peripheries of two spatially and chronologically discrete occupations, where artifacts of the later group will physically overlap those of the earlier one. Superposition may also occur when midden depositions are very thin.

As we shall demonstrate, the results of the Kaeser excavations show that not only can we see spatially separate areas which differ from each other in chronological placement but we can also correlate certain activities with these areas suggesting that the activities be seen as time-dependent.

#### Condition of the Site

The 1973 excavation was undertaken when shell debris was observed in a trench dug by Con Ed for a pipeline adjacent to the pedestrian path along City Island Road. Shell midden was visible all along the length of this trench, suggesting that the area covered by the site had once been quite extensive (perhaps 1-2 acres). Much of the area had been disturbed even before the Con Ed trench; the remains of shell midden overlay an old black-top road. Further, the territory directly north of the area that we excavated had a thick soil deposited on it; it also appeared to have been bulldozed, with a line of boulders representing the line where the dozing had stopped (Figure 2).

The more limited 1975 excavation was undertaken to test the hypothesis on midden deposition. Prior to excavation, auger testing determined the extent of the midden in the seemingly undisturbed area of the site. The site presently extends at least 150 ft. along the shore, at an approximate elevation of 10 ft. above sea level. An eroding embankment delineates the southern

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Cover illustration: This cover is a repeat of that which appeared in NYSAA Bulletin 68, November 1976, where specimens d, e, in line 3 and b in line 4 faded out in printing. The printer, Braun-Brumfield, Inc., has kindly consented to re-run the cover without cost. The point type description will be found on page 36.

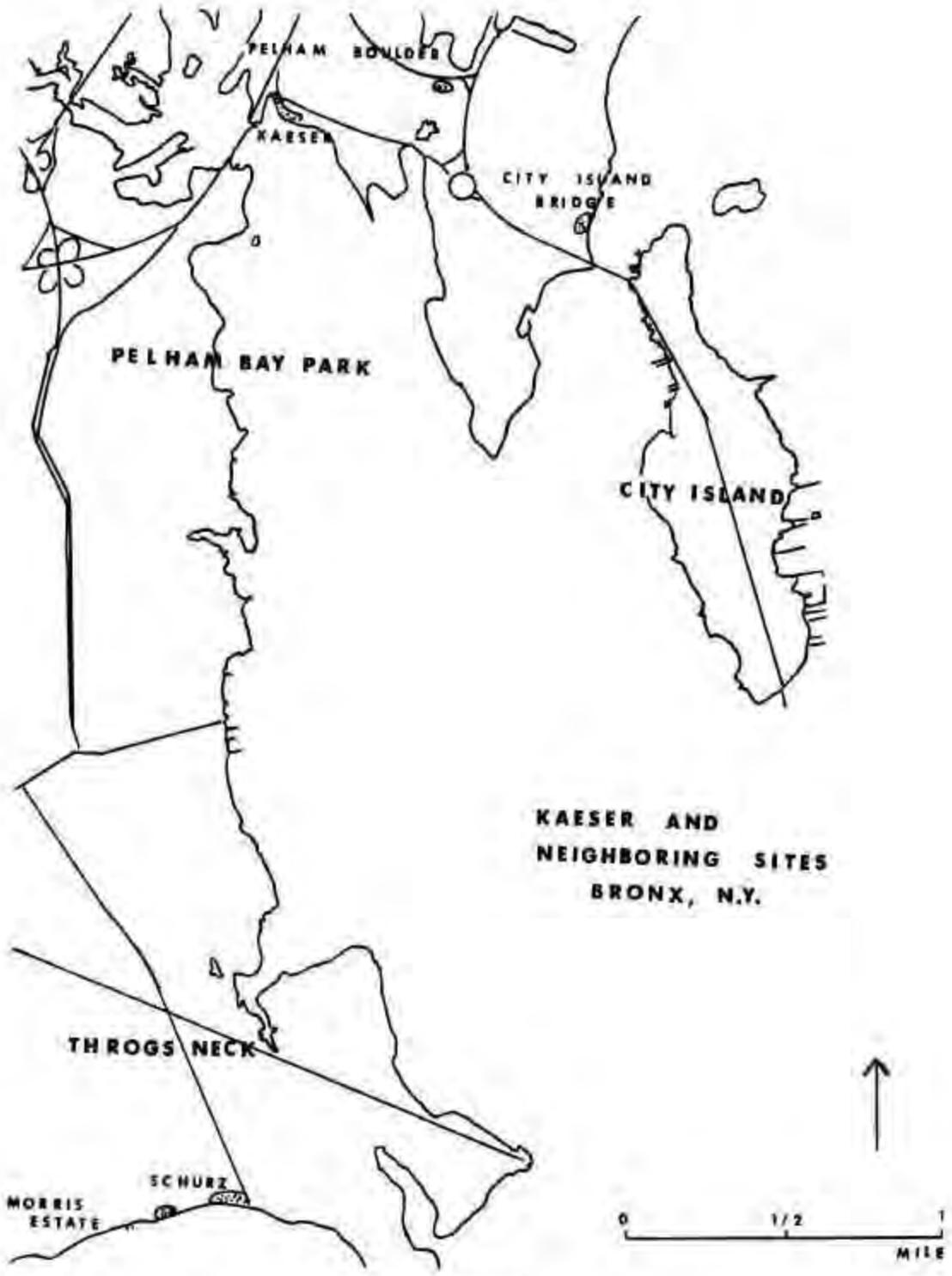


FIGURE 1.

FIGURE 1.

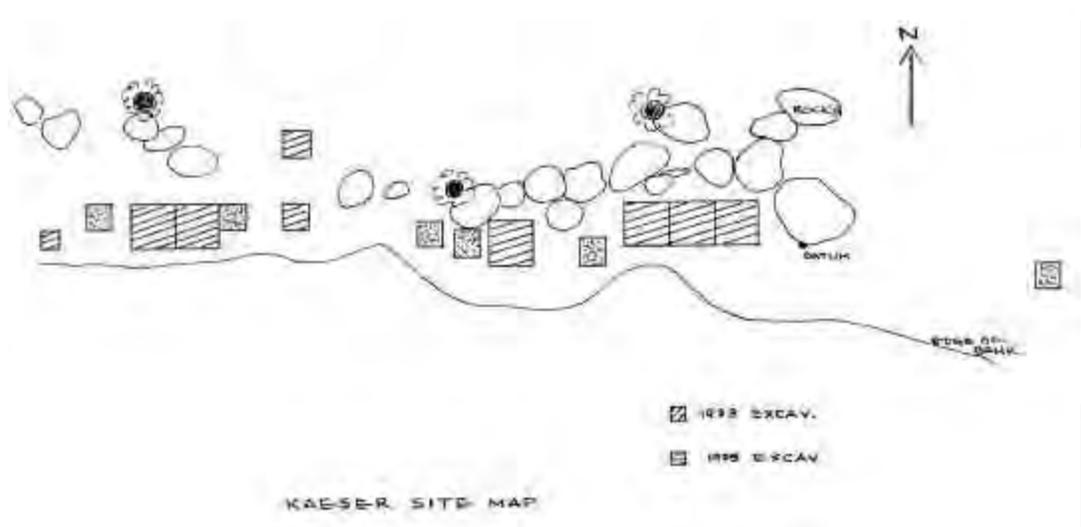


FIGURE 2. Kaeser Site map.

edge of the site, while the boulders noted above mark the northern edge of the undisturbed portion. Edward Kaeser, a member of the Metropolitan Chapter who first discovered the site, confirmed that it was originally larger, but erosion and local use of the park (fishermen and squatters) had destroyed some parts of it.

An east-west base line was established, and all squares were located in reference to the line. In 1973 ten squares were excavated, 6 of them were 5-ft. squares, and 4 were smaller 2 and 3-ft. squares. All material was screened through a 1/4 in. mesh screen. In 1975, 6 more 3-foot test squares were dug.

### I. Stratigraphy

3 strata were distinguished throughout the site. A top layer of dark brown humus contained a variety of historic materials, ranging from contemporary (beer cans, etc.), to one possibly 17th century red clay pipe-stem fragment (Lockhart, personal communication). The majority of the material was from the 19th and 20th centuries (stoneware, coins and glassware); the quantity present is consistent with sporadic use of the park. The humus layer also contained approximately 8% of the aboriginal material recovered at Kaeser (Figure 3). The mean pH of this level was 5.75.

The second layer was composed of shell midden. It contained some post-contact material (3% of that found at the site) and a variety of prehistoric artifacts spanning a number of cultural periods. Pottery, lithic material, bone and worked shell were recovered, with the majority of artifacts being lithic.

The midden ranged from a thickness of 6 in to almost nothing. Underlying the midden was a layer of yellow-orange sandy earth which contained almost half of the prehistoric artifacts recovered. The top 2 in. of this layer were mottled, and contained clam fragments, which suggests that this represents the base of the midden. The orange layer was excavated to a maximum depth of 12 in. below artifactual material but it was consistently sterile below 3 in. depth. In some squares a large number of cobbles and pebbles in the yellow-orange layer suggests the possibility of an earlier beach layer.

Only one feature was found, a roughly circular arrangement of stones found in the yellow orange layer of 5WON. Dark brown mottled earth was mixed with the orange between the stones

and a circular concentration of shell appeared above the feature. There was no cultural material, charcoal or fire-cracked rock within the circle. However, the largest collection of pottery at the site came from the same square (from both the orange and shell layers), and 3 narrow-stemmed (Wading River) points were found adjacent to the feature. The interpretation of this feature is a matter of conjecture. We can more readily say what it is not (i.e., it is probably not a hearth) than what it is.

## II. Pottery

53 sherds were recovered from the Kaeser site. 49 (92%) of them are undecorated and 4 (8%) are decorated. 39 (74%) of the sherds (including the 4 decorated sherds) were excavated from the shell layer, while the remaining 14 (26%) sherds were located in the first 2 in. of orange sand (Fig. 3). Both the undecorated and decorated sherds have been classified into categories according to the Smith (1950) system of typology. Smith's typology was chosen because its use of the criteria of surface treatment, paste, decorative technique, and rim and vessel form allows the typologist to classify all non-eroded sherds within its system. However, as Salwen (1968:325), Byers and Rouse (1960:14), and even Smith (1950:189) himself point out, there is one problem with this system. The undecorated body sherds and decorated sherds from a single vessel may be placed within separate pottery types. For this reason, we decided that only sherd categories containing rim sherds could justifiably be assigned to types.

2 of our 7 categories meet this requirement. But since they include only one rim sherd each (and therefore only 1 vessel) and bear little resemblance to any previously published types, they may be idiosyncrasies rather than the product of a "mental template". Consequently, the categories can only be classified as "sherd groups", in which the members of each group all share a combination of ceramic attributes distinct from those of other groups. These "sherd group" categories should in no way be regarded as pottery "types".

The number of sherds within each group and their stratigraphic position within the site are summarized in Fig. 3. Each category is briefly described below:

### *Undecorated Sherds*

Smoothed exterior/cord-marked interior (30 sherds).

This is a very crumbly, sandy-granular ware tempered with medium to coarse quartzite and sodium feldspar grit 1 to 5 mm. in size. (The size of the temper particles has been classified as follows: fine--below 1 mm. in length; medium-1 to 3 mm in. length; coarse-over 3 mm in. length.) It is quite thick; the sherds range from 9-12mm in. thickness, the majority being about 10 mm. thick. They have a hardness of 2.1-3.0 on the Mohs Scale. Exterior surfaces are smoothed. Interior surfaces are covered with either cord-wrapped paddle or cord-wrapped stick impressions, some of which have been partially smoothed over. Exteriors range in color from buff to orange, with a few gray mottles; interiors and sherd cores exhibit some orange coloring, but they are mostly gray. Coil breaks are present.

With two exceptions, the sherds in this category were recovered from the eastern end of the excavated area. 19 sherds were associated with the shell stratum, while 11 sherds were found 1 to 2 in. into the orange sand. At least 2 vessels are represented. The interior surface of 1 vessel (28 sherds) bears cord-wrapped paddle impressions; several of these impressions have been partially smoothed over. The interior surface of the second vessel (2 sherds) bears cord-wrapped stick impressions and wiped marks, as though it had been smoothed with blades of grass prior to its being impressed. The paste and surface treatment of both these vessels are characteristic of the earliest Windsor pottery; no other Northeastern pottery types bear cord-marked impressions on their interior surfaces, and so it is most probable that they are the body sherds of either Modified Vinette Interior (Salwen 1968:326) or Matinecock Point Stamped vessels (Smith 1950:196).

Cord-marked exterior/eroded interior (4 sherds).

The paste of these sherds is granular and tempered with a few medium coarse particles

FIGURE 3  
Distribution of Specimens

	Humus	Shell	Orange	Total
<b>1. Post-Contact Material</b>				
Ceramic	94	13		107
Glass	573	4		577
Metal	53			53
Coal	72	5		77
Miscellaneous	18			18
Total Post-Contact	810	22		832
<b>2. Aboriginal Material</b>				
Ceramic				
Smoothed ext./cord-marked int.		19	11	30
Cord-marked ext./eroded int.		4		4
Smoothed ext. and int./ grit temp.		10	2	12
Smoothed ext. and int./shell temp.		3		3
Decorated		4		4
Total ceramics		40	13	53
Chipped stone				
Projectile points				
Rossville/Adena		2		2
Levanna		2		2
Wading River		4		4
Normanskill		1		1
Brewerton		1	1	2
Unclassified		1		1
Unidentifiable point frag.		6	2	8
Knives and preforms	2	4	6	12
Scrapers				
Endscrapers	1		1	2
Flake sidescrapers	4	3	2	9
Flake endscrapers		6	2	8
Gouges	1	3		4
Gravers		2	2	4
Drills		2		2
Denticulate		1		1
Cores	1	5	1	7
Unutilized flakes	44	361	146	551
Ground stone				
Manos	1	2	2	5
Hammerstones		6	5	11
Paintstones		2		2
Adze		1		1
Abrader		1		1
Total stone	54	416	170	640
Worked bone				
Cut shell segments		9	7	16
Total bone and shell		11	7	18
Total Aboriginal	54	467	190	711

Continued

FIGURE 3 Cont'd.  
Distribution of Specimens

	Humus	Shell	Orange	Total
<b>3. Faunal Remains</b>				
<b>Bone</b>				
Mammal long bone frag.	1	20	5	26
Beaver humerus		1		1
Small mammal rib	1			1
Deer vertebra		1		1
Muskrat canine		1		1
<b>Shell</b>				
Busycon	1	12	1	14
<b>Total Faunal Remains</b>	<b>3</b>	<b>35</b>	<b>6</b>	<b>44</b>
<b>Total Specimens</b>	<b>867</b>	<b>524</b>	<b>196</b>	<b>1587</b>

of quartz grit (ca. 3 mm. in length). The sherds range in thickness from 5.5-6.5 mm., but all have eroded surfaces, which indicates that they were originally at least 1-2 mm. thicker than they are now. Exterior surfaces are covered with cord-wrapped paddle impressions; interior surfaces are eroded. Exteriors are buff-colored, while both the interiors and sherd core are gray.

The sherds probably represent a single vessel, as they were all found in the shell stratum at the eastern edge of the excavation.

Smoothed exterior/smoothed interior grit-tempered (12 sherds, including 1 rim sherd).

The paste of these sherds has a somewhat sandy-granular texture and is tempered with medium to coarse quartzite and sodium feldspar grit. Both exterior and interior surfaces are smoothed; the exterior of one sherd exhibits wiped marks. Exteriors range in color from buff and light brown to orange. Interiors and sherd cores range from buff and light brown to gray. Coil breaks are present.

All but one of the sherds in this category were recovered from the eastern and east-central portion of the excavation 10 were from the shell stratum while 2 were found in the first 3 in. of orange sand. At least 2 vessels are represented. Two conjoined body sherds and the single rim sherd from our collection indicate that one was a straight-walled vessel with a flattened out-sloping lip but no neck (Fig. 4). It had a rim thickness of 6 mm., a body thickness of 8-9 mm., and was tempered with dark gray shale. The interiors of the body sherds exhibit very faint markings which may be smoothed over cord marks, but the evidence is inconclusive. Unfortunately, this vessel fits none of the available descriptions of smoothed-surface undecorated pottery from this region, typed or untyped (i.e., Ritchie and MacNeish 1949:103, 110; Byers and Rouse 1960:19; Keener 1965:25; Salwen 1968:328-29). Because the vessel has no similar counterparts, either within the literature or at Kaeser itself, it may be anomalous and we have refrained from classifying the category as a new type.

Smoothed exterior/smoothed interior shell-tempered (3 sherds).

This pottery has a somewhat soapy texture, probably because it is tempered with a few medium-sized (1-2 mm.) particles of crushed shell. Both exterior and interior surfaces are smoothed. They range in color from buff to gray; sherd cores are gray.

One vessel is represented. It was located in the shell stratum at the easternmost edge of the excavated area.

#### *Decorated Sherds*

Stab and drag fabric-marked/smoothed interior grit-tempered (one rim sherd, Fig. 4a).

This sherd has a granular texture, as it is tempered with medium-coarse quartzite and sodium feldspar grit. The exterior surface is fabric-marked, while the interior surface is smoothed. Both surfaces are buff with dark gray mottling; the sherd core is brown and gray.

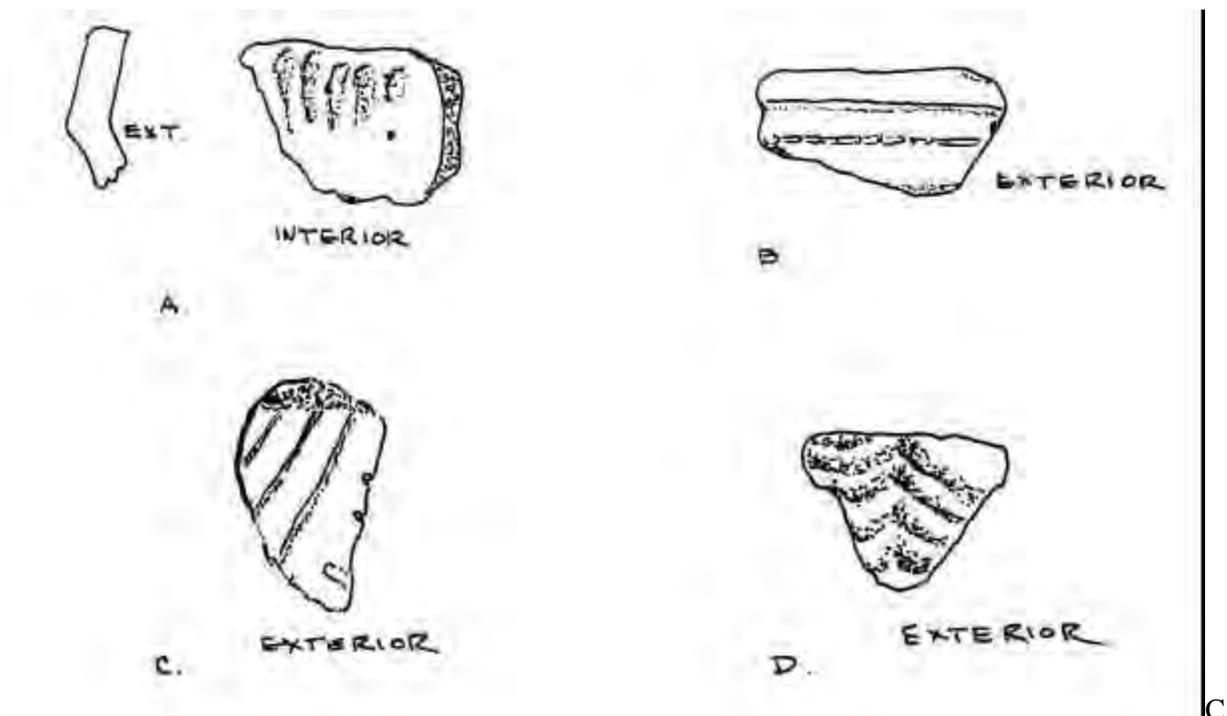


FIGURE 4.

The sherd represents a small vessel with a mouth diameter of 3 in. The vessel had a flattened lip and sharply constricted neck. Both the top of the lip and interior rim are encircled by a single row of stab and drag incision. It was found in the shell stratum within the central portion of the excavation.

The vessel does not fit any of the known pottery types, nor does it match any of the un-typed sherd descriptions found in the literature. Consequently, it may have been the product of an idiosyncratic rather than a cultural technique, and so we do not feel justified in presenting it as a new taxonomic category.

Cord-wrapped stick smoothed interior grit-tempered (1 sherd Fig. 4b).

This sherd has a granular paste tempered with medium-fine quartz grit. Exterior surface finish is unknown, but beneath the decoration it is smoothed. The interior surface is also smoothed. Both surfaces and the sherd core range in color from light brown to dark gray. Coiling is indicated. Decoration consists of 2 horizontal rows of cord-wrapped stick impressions.

The sherd was found at the easternmost edge of the excavation at the top of the shell, somewhere between 0-1 in. into the stratum. The sherd's superior position within the same square as a siltstone Wading River point (found near the base of the midden, 3-1/2 in. into the shell) suggests chronological placement. Wyatt (1976), however, notes that the use of such points continues from Late Archaic through at least Early Woodland times.

Incised smoothed interior grit-tempered (2 sherds).

Due to its grit tempering, the paste of both sherds has a granular texture. The type of exterior surface treatment is unknown, although it is smoothed under the decoration. Interior surfaces are smoothed. Exteriors range in color from orange to buff and light brown. The interior surface of sherd #1 is buff with dark gray mottling; the interior of sherd #2 is orange. The sherd cores range from light brown to gray. Coil breaks are present.

2 vessels are represented. Vessel 1 (sherd #1) is tempered with fine-sized quartz grit. Its exterior surface exhibits wide (2.5-3.0 mm.) but shallow parallel incisions. These appear to be framed on one side by shallow elongate punctates, possibly outlining a triangle motif (see Fig. 4d). Vessel 2 (sherd #2) is tempered with medium-coarse dark gray shale (Fig. 4c). On

its exterior are 3 parallel rows of horizontal incisions, below (or above) which is a line of parallel diagonal incisions. The incisions are narrower and deeper than those of vessel 1; they measure less than 1 mm. wide. Both vessels were found on top of the shell stratum. Vessel 1 was excavated from the central portion of the site, Vessel 2 from the eastern end.

Because they are represented only by body sherds, these vessels cannot be assigned to a specific type. But, since the combination of incising and smoothed interiors is attributed to the East River Aspect in this area, it seems fairly safe to assume that they are a Late Windsor (and therefore most probably a Late Woodland ware). That they post-date the Early Woodland is indicated by the stratigraphic position of sherd #2. It was found in the same square as 2 Early Woodland lobate-base points, but the latter were located at the base of several inches of shell while the former was recovered from the very top of the midden. One point was located only 19 in. north of the sherd.

The color attributes of the sherds provide us with some clues to the coastal Woodland method of pottery manufacture. The buff and orange exteriors and gray interiors indicate that the vessels were fired upside down in an oxidizing atmosphere, such as an open fire. Yet the presence of a few randomly occurring gray mottles on the exterior surfaces suggests that the pots were covered with brush during the firing, which created a reducing atmosphere near some parts of the vessels.

### III. Lithic Artifacts

640 stone artifacts were recovered from the Kaeser site. 551 (86%) are non-utilized flakes and 7 (1.1%) are cores; only 87 (13.6%) can be classified as tools. After careful examination under a binocular microscope (7 x 30 magnification), these artifacts were classified into functional categories according to their differential wear patterns (Semenov 1970; Winters 1969, 1976 - personal communication).

In the case of biface fragments, however, not all could be classified in functional categories on the basis of wear. It occurred to us that since knives and points perform different functions, they might be distinguished by the size of their edge angles. We hypothesized that, because they are used for piercing and not cutting, points should have smaller distal and lateral angles than knives. Fisher Exact tests (Siegel 1956) were performed on angle ranges of the site's *known* (i.e., already categorized by wear patterning) (1) quartz knives and points, (2) jasper-chert knives and points, and (3) knives and points regardless of lithic composition. (See Appendix for contingency matrices.) A probability value of .05 was chosen as significant for rejection of the null hypothesis. We considered any phi value of .5 or greater as indicative of strong association. The following tests were significant, and so their null hypotheses were rejected; no tests on lateral angles were significant:

1. H0: There is no difference in the distal angles of quartz points and knives.

H1: Quartz knives have greater distal angles.

The test was significant beyond the .05 level (one-tailed), and has the highest degree of predictive power (1.00).

2. H0: There is no difference in the distal angles of points and knives.

H1: Knives have greater distal angles.

The test was significant beyond the .02 level (one-tailed); it has a high degree of predictive power (.83).

All other tests involving the above paired artifact categories and angle ranges were insignificant. But in the test concerning the angles at the point or distal of jasper-chert projectile points and knives, this was apparently due to the very small sample size, as the association has the highest degree of predictive power (1.00). The clear dichotomy of point tip angle ranges presented by the contingency matrix of the latter test (Appendix A, 2) strongly suggests that there is a significant difference in the angles of jasper-chert knives and points as well as those of quartz points and knives and points and knives in general. In the comparison of jasper-chert points and knives, the points have point tip angles between 19° and 25°, as opposed to the

36°-37° angle of the chert knife. In the comparison of the point tip angles of quartz points and knives, all of the knives had angles between 41-50° while all of the projectile points had angles between 26-39°. The comparison of the angles of the total number of knives and points suggests that the two functional tool types can be distinguished by the size of their point tip angles regardless of their respective lithic compositions. The point tip angles of all the knives fall between 36°-50°, while those of all but one of the points fall between 19°-35°; the atypical point had a distal angle of 39°.

We also hypothesized that the mid-section of the knife blades would be thicker than those of points, since the former tools are used for cutting and so more pressure is applied to this area. The greater the pressure, the thicker the area must be to withstand it. All of the knives had a maximum thickness between 9.25 and 17.0 mm. All but two of the points had a maximum thickness of 4.74-9.0 mm.; the atypical points (both composed of quartz) have a maximum thickness of 10.25 and 10.50 mm. A Fisher Exact test was performed on the relevant variables; it was significant beyond the .05 level (one-tailed) and the association has a high degree of predictive power ( $\phi = .78$ ).

Because a point-knife dichotomy in both the size of the distal angle and the thickness of the mid-section seems quite apparent in our collection, the remaining biface fragments were classified into functional categories based upon these measurements. We realize, of course, that the classification, based as it is upon such small sample sizes, must be considered tentative. The number of artifacts within each functional category and their stratigraphic position within the size are summarized in Fig. 3. They are briefly described below:

#### a. General utility tools

This category includes tool types that may have been used in a number of activities but present methods of evaluating wear patterns do not permit us to differentiate between these various functions.

*Hammerstones.* 11 natural pebble hammerstones were recovered from excavation at Kaeser; most were made of sandstone, and some of quartzite. 6 of these were found in the shell midden and 5 in the orange layer below. Of these found in the shell, 2 were from the western portion of the site and 6 from the east; in the orange sand, 3 hammerstones were found in the western half of the site and 2 in the east. The majority of these were used fairly lightly, and only at one end; only 2 were used at both ends.

#### b. Cutting Tools

*Backed knife.* A backed knife is one in which the edge opposite the cutting edge has been left unthinned and is frequently blunted by crushing, which provides an effective gripping surface for its use as a hand tool (Winters 1969:35). A single quartz example was recovered from the west end of the excavation. Because it is only the tip, the knife's form and complete dimensions are unknown. It has a maximum thickness of 10.50 mm. In cross-section, it is convex-irregular. The point tip angle measures 49°-50°; the lateral angle ranges from 60-70°.

*Triangular knife* (Fig. 7b). 1 dark green and white chert specimen was recovered from the west end of the excavation. The sides and base of the knife are convex. It has a maximum thickness of 6.30-9.30 mm. Its cross-section appears plano-slightly convex. The point tip angle is 36-37°, while the lateral angle is 38-40°. A large flake has been removed on both sides of the base, indicating thinning for hafting purposes. The knife has only one working edge; this exhibits use polish as well as wear marks, strongly suggesting that the knife was used for cutting fairly soft materials, and not in woodworking activities.

*"Blank" knife.* A single example of an artifact blank used as a knife was recovered from Kaeser. It was of gray chalcedony. Microanalysis suggests possible crushing at one edge, providing a gripping surface. It has a maximum thickness of 17.0 mm. The point tip angle is 49°-50°, and the lateral angle is 60-70°. In cross-section the knife is plano-convex. Its provenience is unknown.

*Flake knives.* Flake knives are those formed from free flakes, one (or more) sides of which is used as a cutting edge. 4 specimens were recovered from Kaeser, 3 of brown or gray chert and 1 of white chert with gold speckles. The wear marks on 2 of the chert knives indicate a cutting and twisting motion. One of these knives had been heat-treated. The gray and brown chert knives were all excavated from the west end of the excavation, while the gold speckled chert knife came from the east-central area. The (working) edge angles on the knives range between 20-28°.

*Unclassifiable knife fragments.* 6 knife fragments were recovered: 1 dark gray chert base and 5 white quartz blade fragments. The chert base (Fig. 7a) was the only knife excavated from the east end of the excavation. 1 quartz fragment was excavated from the east-central area and 1 was excavated from the west-central area, while the remaining 3 fragments were found in the west end.

### c. Weapons and Hunting Implements

*Levanna points* (Figure 6b,e). 1 complete triangular point and 1 base were recovered, both of the same dark gray chert. The point was found at the junction of humus and shell in the east central portion of the excavation; the base was excavated from the shell at the west end. The sides of the point are slightly incurvate, while those of the basal fragment are straight. Both have concave bases and exhibit retouch along base and sides. Due to a heavy medial ridge running the entire length of the point blade, its maximum thickness is 9.0 mm. The ridge creates a triangular cross-section. The point has a tip angle of 19.5°, and a lateral angle of 40-45°. The basal fragment has a maximum basal thickness of 4.75 mm. The blade is lenticular in cross-section. There is no medial ridge. Its lateral angle ranges from 30-40°. The formal and dimensional attributes of these two specimens fit the Late Woodland Levanna point type (Ritchie 1971:31).

*Rossville/Adena points* (Figure 5c;6f). 2 stemmed lobate-base points were found within several inches of each other at the very base of the shell midden in the eastern portion of the excavation. One is an exotic tan-gold jasper, while the second is of white quartz. Both points have fairly narrow symmetrical isosceles triangular blades. Blade edges are excurvate; shoulders are weakly angled. The junction of blade and stem forms an obtuse angle. The sides of the stem converge to form a convex base. The points have a maximum thickness of 6.50-10.25 mm. The tan point is much more finely flaked than the quartz point. Its shallow flake scars and relatively greater control over flake placement indicate indirect percussion, probably the baton technique. The point is plano-convex in cross-section. Its quartz counterpart is lenticular. The quartz point also exhibits lateral grinding along its stem.

The formal and dimensional attributes of these points fit both the New York Adena point type as described by Ritchie (1971:12, 61) and the shouldered, lobate-base variety of the Rossville type illustrated by Kinsey (1972: Figs. 53A, 120B). In any case, both types have been assigned to the Early and early Middle Woodland periods.

*Wading River points* (Fig. 5b, f; 6c). 4 crudely-chipped stemmed points were recovered from the shell layer at the eastern edge of the excavation. 3 are of quartz and one of siltstone. All 4 belong to the Northeastern Narrow Point Tradition, a late Archaic manifestation that appears to have continued into early ceramic times or later in the coastal area (Ritchie 1969: 143-44; Fowler 1971:5; Swigart 1973:43-44; Wyatt 1976). They have triangular blades and parallel-sided stems. The junction of blade with stem forms an obtuse angle. The single siltstone point has an asymmetrical blade with slightly excurvate edges. Both shoulders are rounded. Blade tip and base are missing. It is plano-convex in cross-section. The quartz points have lenticular cross-sections. 2 of the quartz points are approximately equilateral triangles with asymmetrical blades. In each one shoulder is rounded, the other sharply angled. The points also share straight blade edges and straight bases, one of which exhibits basal thinning on both its sides. The remaining quartz point has a slightly asymmetrical blade in the form of an isosceles triangle. Although angled, neither of its shoulders are really sharply defined. Its base still has the cortex attached, which forms a convex bevelled edge. The points range in

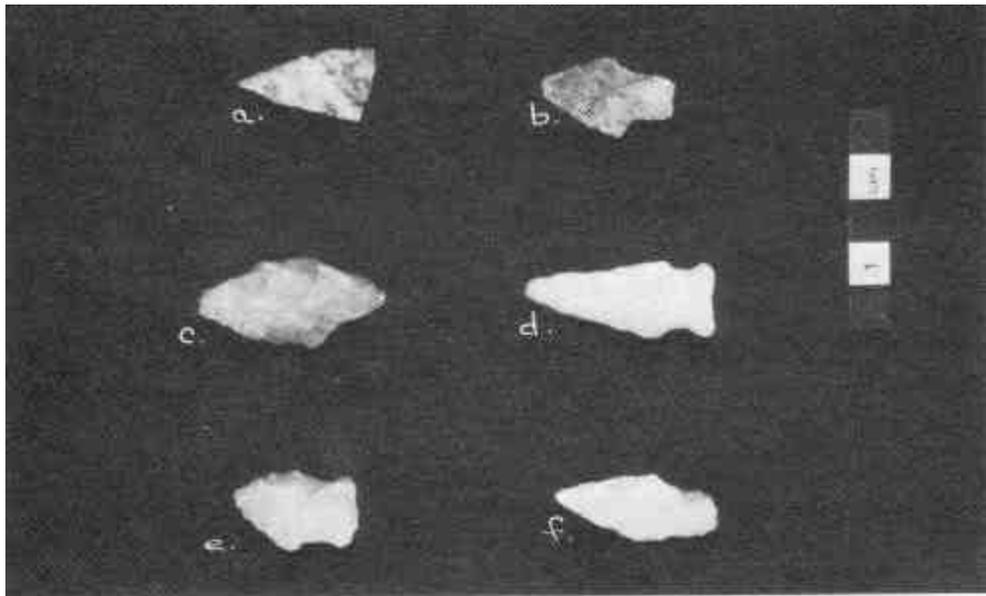


FIGURE 5. Quartz projectile points and knives. a. knife tip; b. Wading River point; c. Rossville point; d. Normanskill point; e. possible Brewerton side-notched point; f. Wading River point.

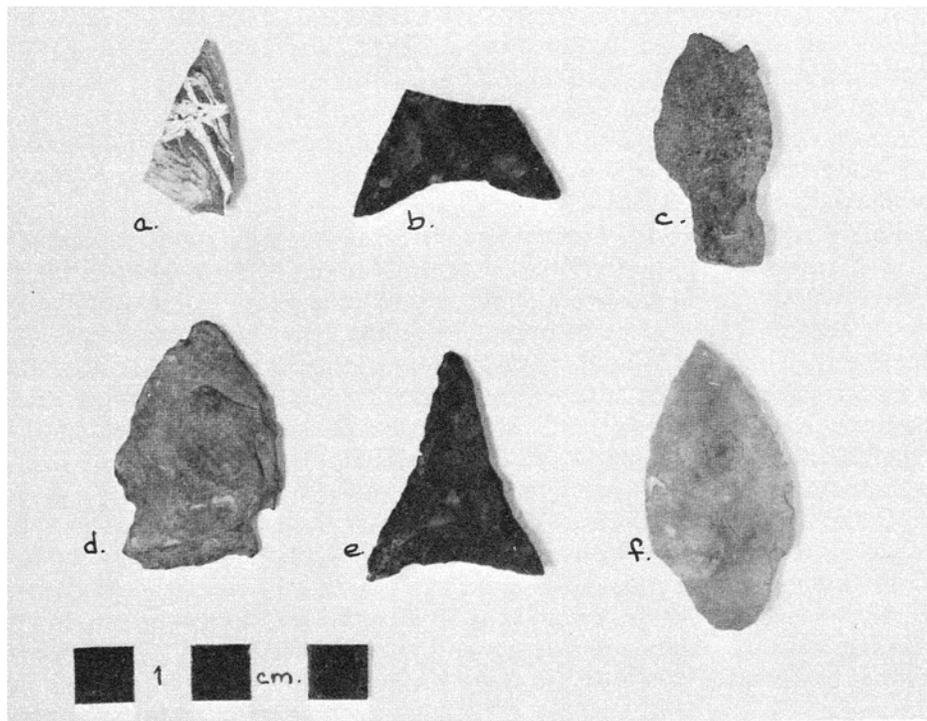


FIGURE 6. Chert and siltstone points and knives. a. chert knife tip; b. Levanna base, chert; c. Wading River point, siltstone; d. unidentified corner-notched point, chert; e. Levanna point, chert; f. Rossville point, chert.



FIGURE 7. Cutting and other tools. a. knife base, chert; b. triangular knife, chert; c. unidentified object, siltstone; d. stemmed denticulate, siltstone.

maximum thickness from 5.75-8.75 mm. Lateral angles range from 31-65°. Point angles range from 34-39°. The formal and dimensional attributes of these points fit the Wading River point type as described by Ritchie (1971:131-32).

*Normanskill point* (Figure 5d). A single quartz side-notched point belonging to the Narrow Point Tradition was recovered from the shell layer in the eastern end of the excavation. It was found at the same level as, but 21 in. away, from one Wading River point, and 1.5 in. above and 18 in. away from a second Wading River point. The blade is in the form of an isosceles triangle; its edges are straight. The base is very slightly concave, and has been slightly thinned on both sides. In cross-section the point is convex-triangular in shape. Its maximum thickness is 10.50 mm. The lateral angle is 60-65°. The formal and dimensional attributes of this point fit well the Normanskill point type described by Ritchie (1971:37).

*Possible Brewerton Eared-Triangle Point*. The base of a quartz triangular point was recovered from the shell layer in the east-central area of the excavation. The side of its blade is slightly excurvate. A flake had been removed from its lower side, producing an eared base. The base had been thinned on one side and appears to be slightly concave. Neither it nor the ear appears to have been ground. The fragment is 6.50 mm. thick. Its lateral angle ranges from 35-45. In cross-section it is plano-convex. Since the other end of the base was not recovered, and it is impossible to discover whether the flake producing the eared effect was purposely struck off by its maker or accidentally struck off during use, we very tentatively classify the point as a Brewerton Eared-Triangle (Ritchie 1971:18).

*Possible Brewerton Side-Notched point* (Fig. 5e). A single quartz side-notched point was recovered from 1-1.5 in. of orange sand at the west end of the excavation. Its blade is an equilateral triangle. One edge is straight while the other is slightly excurvate. The side notches are broad and shallow, forming thick basal ears. The notched edges exhibit grinding. The base of the point is slightly convex and has been thinned on both sides. In cross-section the point is triangular-convex. The point is quite thick, measuring 10.25 mm. Its formal and dimensional attributes most closely fit the Brewerton Side-notched point type (Ritchie 1971:19-20, 72).

*Unidentifiable Corner-notched point* (Figure 6d). A rudely-chipped shaley gray chert point was recovered from the shell at the eastern end of the excavation. The somewhat asymmetrical blade is in the form of an equilateral triangle; its edges are excurvate. They have been corner-notched, but because the barbs have been broken off, it is not known to what extent.

The expanding base has been thinned on one side. It has been broken in several places, making it impossible to discern whether it had a straight or concave edge. There is no basal grinding. The point is plano-convex in cross-section. It has a maximum thickness of 5.50 mm. The tip angle is  $21^\circ$ ; the lateral angle ranges from  $22-29^\circ$ . Because the barb ends and parts of the base have been broken off, we were unable to type this specimen.

*Unclassifiable point fragments.* 6 point tips, 3 blade fragments, and 1 preform fragment were recovered. 3 of the tip fragments were composed of brown or gray chert, 1 of quartz, 1 of argillite, and 1 of white and red mottled chert (apparently fire-reddened (Fig. 6a)). The chert tips were excavated from the humus-shell junction in the east-central section of the site, the shell layer at the east end, and the first 3 in. or orange sand at the west end. The quartz tip was excavated from the shell layer at the east end. The argillite tip was recovered from the shell at the west end of the excavation. 2 of the 3 blade fragments were composed of quartz; 1 was of unknown provenience and the other was found in the first 3 in. of orange sand at the west end of the excavation. The third blade fragment, which was composed of the gold speckled chert, was found in the shell stratum in the east-central section of the excavation. The single stemmed preform fragment was composed of dark gray chert and excavated from the east end of the shell layer.

#### d. Hideworking Tools

*Flake denticulate and sidescrapers* (Figure 8e). A flake-scraper is an irregular flake whose side (sides) bears the characteristic wear pattern of a scraping tool. A flake denticulate has the same characteristics plus small points or "teeth" along the working edge. 9 flake side scrapers were recovered from Kaeser: 4 were composed of dark gray chert, 1 of light gray chert, 1 of brown chert, 1 of coarse siltstone, 1 of argillite, and 1 of jasper. The light gray chert specimen is a multiple-function tool; one of its sides was used as a sidescraper while the other side bears the wear marks and teeth of a denticulate. Both it and the jasper scraper had been heat-treated (turning the originally yellow jasper to red). 2 of the dark gray chert scrapers, the argillite scraper, and the siltstone scraper were found in humus directly above the shell at the east end of the excavation. The jasper sidescraper was found in the shell layer of the same square. The heat-treated chert scraper was found in the shell layer in the east-central portion of the site, while the remaining brown and gray chert scrapers were located in the shell and first three inches of orange strata at its western edge.

*Flake endscrapers* (Figure 8a, c). Like the flake sidescrapers, these are irregular flakes whose end (or ends) have been used for scraping. 8 such scrapers were recovered. Except for 1 of quartz, all were manufactured from chert. The quartz scraper was excavated from the first 3 in. of orange sand at the west end of the excavation. The 2 dark gray chert endscrapers were found in the shell layer at the western end of the excavation. The 2 brown chert scrapers were also recovered from this area, 1 from the shell and 1 from the 3 in. of orange sand. The red and white speckled scraper (manufactured from heat-treated gold and white chert) was excavated from the shell in the central portion of the excavated area. The remaining light gray heat-treated scrapers were excavated from the shell layer in the eastern and east-central regions of the excavation.

#### e. Wood-working Tools

##### *Endscrapers*

*Pebble endscraper.* A single dark gray and white mottled chert pebble with 1 edge utilized as a scraping tool was recovered from the humus at the east end of the excavation. The pebble scraper retains its cortex. Its working edge has an angle of  $65-70^\circ$ . Such a steep working edge, along with the absence of use polish, strongly suggests a wood-working function (Winters 1975, personal communication).

Miscellaneous endscraper. A plano-convex artifact was recovered from the first 3 in. of orange sand at the east end of the excavation. Microscopic analysis indicates its possible use as an endscraper. The artifact, manufactured from a heavy quartz flake and still retaining its cortex, has an edge angle of 70-75°. Like the pebble endscraper described above, the steep working edge suggests a wood-working function.

#### *Gouges (chipped stone).*

Stemmed gouge. A single quartz specimen was recovered from the shell layer at the eastern edge of the excavation.

Unstemmed gouge (Figure 8b). A single dark gray chert plano-convex gouge was recovered from the shell layer in the eastern end of the excavation. Its proximal dorsal half still retains the cortex. One of its sides appears to have been blunted by crushing, probably for use as a hand tool. (The crushing would allow pressure to be applied without cutting the palm of the hand.) Miscellaneous gouges. 2 gouges with broken proximal ends were also recovered. 1, a slightly concave-convex yellow jasper specimen, was found in the humus layer in the west-central area of the excavation. Like the unstemmed gouge described above, its sides have been blunted by crushing. The other gouge, a plano-convex quartz specimen, was located in the shell layer at the east end of the excavation.

All of the artifacts described above display the steeply bevelled ventral edge characteristic of a gouge tool. The absence of smooth wear and heavy use polish argue against a hide-working function. Instead, the battered and spalled edges strongly suggest woodworking.

*Ground adz* (Figure 8f). The bit half of a ground stone tool was recovered from the shell stratum at the western edge of the excavation. Its steeply bevelled dorsal edge, combined with a plano- and heavily spalled ventral edge, identify it as an adz. It was manufactured from dark gray slate. On one side, several deep striations indicate that the adz was used to sharpen the tip of another tool, perhaps a bone awl.

#### f. Perforating Tools

##### *Drills.*

Wing-based drill (Figure 8d). A single dark gray chert drill was recovered from the base of the shell in the east end of the excavation. It has a concave expanding base. Heavy grinding is evident along both the base and sides of the bit, which had been broken at the tip.

Unclassifiable drill tip. One dark gray chert drill tip was recovered from the shell stratum in the eastern part of the excavation. The fragment exhibited use polish all along its sides and distal end.

#### g. Gravers

The base of these artifacts is an unmodified free flake from which protrudes a pointed triangular "beak". The distal end of this beak bears a wear pattern suggestive of a graving tool. 4 such tools were recovered. 1 quartz and 1 dark gray chert graver were found in the first 3 in. of orange sand in the west and west-central portions of the excavation; a dark gray chert and a gray limestone graver were excavated from the shell layer in the east and east-central portions.

#### h. Knapping Artifacts

*Cores.* 7 irregularly-shaped cores were recovered; 5 were composed of quartz and 2 of chert. 4 of the quartz cores were found at the eastern end of the excavation, 3 in the shell layer and 1 in the humus. 1 quartz core and 1 gold and white speckled chert core were found in the central part of the excavation in the orange and shell strata, respectively. A dark gray chert core was found in the shell strata at the western edge of the excavation.

*Non-utilized chips and flakes.* 551 unmodified chips, from every stratigraphic level, and flakes, were recovered. Out of this total 425 (77.1%) were chert, 92 (16.7%) were quartz, 17 (3.1%) were jasper, 14 (2.5%) were silt-stone, and 3 (0.6%) were quartzite. The chert fragments ranged in color from brown and various shades of gray to grays mottled with white, dark gray chert containing glass specks, and white chert with gold speckles. 5 of the gray chert, 2 of the

gold speckled chert, and 8 of the jasper flakes had been heat-treated (turning the gold in the latter 2 materials a bright red).

The ratio of jasper-chert debitage to jasper-chert tools is 10.8:1. The ratio of quartz debitage to quartz tools is even smaller-4.4:1, which suggests that knapping was only a minor activity at the site (Wilmsen 1968:984).

#### i. Domestic Equipment

These artifacts are those used in the processing of food. The pottery described in section II is, of course, included.

*Manos.* We have adopted Winters' (1969) criteria for the identification of manos, namely: "1) battered ends or edges; 2) uniform breaking or erosion of the patina over the entirety of flat or slightly convex surface; 3) erosion of the edges of minute, natural pits on the same surfaces, so that the edges become square rather than rounded as they are in the natural state; 4) occasionally striations developed in the mano surface from abrasion against a metate or other lower grinding element." (1969:61).

5 manos were found, 1 in the humus layer, and 2 each from the shell and orange levels. 4 were from the eastern end of the site and 1 from the west. 2 were made of rough sandstone, 2 of a finer-grained sandstone, and 1 of igneous rock. 3 of the 5 are rectangular in shape; the amount of use varies considerably among the manos.

#### j. Miscellaneous Artifacts

*Paintstones.* 2 paintstones were recovered. 1, a graphite fragment with artificial striations, was recovered from the shell layer at the eastern end of the excavated area. Its striations are 0.50-0.60 mm. wide, and even more shallow; they were probably formed by an abrader used to scratch off the powder for use as paint.

The second paintstone is a triangular-shaped fragment of limonite recovered from the shell layer at the western end of the excavation. Both surfaces and ends exhibit signs of use; they were apparently ground against a hard surface in order to produce a reddish powder.

*Stemmed denticulate* (Figure 7d). A heavy, crudely-chipped coarse siltstone denticulate was recovered from the shell layer in the east end of the excavation. It has 4 rounded "teeth".

*Possible Core sidescraper.* This quartz artifact was recovered from the humus level in the west-central portion of the excavation. Microscopic analysis suggests possible use as a sidescraper.

*Unclassifiable worked stone.* A pinkish beige chert fragment was recovered from the humus layer in the west-central area of the excavation. It had a broken proximal end and an ovoid distal end. A gray quartz flake was found in the first 3 in. of orange sand at the west end of the excavation, and a coarse gray siltstone object (Fig. 7c) was excavated from the shell layer at the eastern end. Although all 3 artifacts were worked along 1 or more of their edges, we were unable to place them into any of our general functional categories.

*Abrader.* One possible abrader was found in the shell midden at the eastern end of the site. It was smooth and ungrooved and made of very fine grained sandstone.

#### Summary

In summary, 9 functional artifact categories (and 1 miscellaneous category) are represented at Kaeser: general utility tools, cutting tools, weapons and hunting implements, hide-working tools, woodworking tools, gravers, perforating tools, knapping artifacts, and domestic equipment (i.e., the manos and the pottery described in Section II). Brown and gray cherts and white quartz are the major lithic materials utilized by the Kaeser occupants. Of the total 641 artifacts, 460 (71.9%) are chert, 119 (18.6%) are quartz, 20 (3.1%) are jasper, and 41 (6.4%) are manufactured from miscellaneous materials.

#### IV. Bone and Shell Artifacts

Only 2 pieces of worked bone were recovered during excavation. Both were too fragmentary to be able to discern tool type or species of animal bone. Both showed a light use polish and could have come from a type of awl. Both were found in the shell at the eastern end of the site.

13 squares of hard clam shell (*Venus mercenaria*) showing evidence of cutting were found during excavation; it is probable that these are rejects from one of the early stages of bead manufacture. 8 were found at the eastern end of the site and 5 at the western end; all but one were in the shell layer (the exception is from the top of the orange layer). These artifacts were included in the category of bead-making equipment in the analysis below.

#### V. Faunal Material

##### *Bone*

30 pieces of unworked bone were recovered from excavation. Most were too fragmentary to identify. The majority (18 pieces) were of unidentifiable mammal long bone. 23 pieces (77%) were recovered from the shell level, perhaps because of better bone preservation due to alkalinity (see below). 5 pieces (17%) were from the orange layer, and 2 larger, more recent, bone sections were found in the humus layer (these and some fish remains were thought to be the remains of contemporary fishing and picknicking activities in the park). Of the bone segments found in the shell layer, 15 (including a porcupine canine) were from the eastern half of the site, while 8 (including a deer vertebra) were from the west. Of those in the orange sand, 3 were from the east and 2 from the west. The 2 pieces in the humus were from the western half of the site. In addition to the mammal long bone pieces, there was 1 section of small mammal rib from the humus layer in the western part of the site, 1 segment of deer vertebra (*Odocoileus virginianus*), 1 porcupine (*Erethizon dorsatum*) canine, and 1 probable beaver humerus (*Castor canadensis*) in the shell at the eastern end of the site.

##### *Shell*

In addition to the shell midden analysis reported below, we found 2 large pieces and 16 columellae of *Busycon carica* (?), 9 of which came from the eastern end of the site and 7 from the west. These show no evidence of having been cut; apparently the conch was used for food and not for bead manufacture. We also recovered 1 *Janthina globosa* shell (from the humus level at the eastern end of the site), and 1 *Eupleura caudata* from the shell layer in the western portion. Neither shell was cut and neither represents a known major food source.

##### *Midden Analysis*

Column samples measuring 6 by 6 in. were taken from each of the 9 squares excavated in 1973. They were taken in natural stratigraphic levels and were analyzed according to the method described by Meighan (1958). Since the shell midden represents the remains of a major resource base for the prehistoric inhabitants of the Kaeser site, we were interested in several aspects of the composition of the midden, as manifest in the column samples.

- 1) What molluscs were represented ?
- 2) In what proportion were they each represented ?
- 3) How did the composition of the midden vary over the site ?
- 4) How does the composition of the Kaeser midden compare with that of other middens in the area?
- 5) If the midden composition varies, does it vary in a manner which confirms the hypothesis ? (In other words, does its variation relate to the dimension of horizontal location within the midden, and does it correlate with the distribution of time-sensitive artifacts, as described in the analysis below ?)
- 6) If the midden composition varies, does it vary in a manner which suggests the differential use of shellfish resources over time (or space) ?

The results of the midden analysis are summarized in Fig. 9.

The most interesting aspects of this table relate to the distribution of hard shell clam and oyster through the midden. As is clear from inspection, this distribution varies widely from square to square. A 2-tailed chi square test on the amounts of clam and oyster in each square is significant at less than .001, which validates the impression received on inspection. Further, chi square one-sample tests on the amount of clam in each square and the amount of oyster in each square are both significant at less than .01, demonstrating that neither of these resources is distributed evenly over the site.

The ratio of clam to oyster is also quite variable; clam ranges from 1-1/2 times as common to 13 times as common as oyster. This variability is not significant when tested by a

t-test. When the mean and standard deviation is expressed as a percent of the mean, this figure is .90 for clam and 1.26 for oyster. While these figures will not differ from each other significantly (using the Coefficient of Dispersion described by Thomas, 1975) they lend support to Salwen's (1970) statement that the use of a boat to collect oysters may account for the greater variation in that mollusc's distribution.

VI -pH Tests

The acidity of the soil of different levels was examined by means of a pH test done on the column samples using a Beckman pH meter. The results are described in Fig. 10. T-tests done to compare the mean pH for humus, shell and orange sand layers show significantly different (two-tailed tests with an alpha level of .05) acidity levels for humus vs. shell and humus vs. orange stratum. The shell midden has the most alkaline soil, as is expectable. The orange sand has a pH which is fairly close to that of the shell, which may be explained by the visual evidence of the shell midden leaching down into the orange. If we had separated the top 3 in. of the orange sand from the rest of the level, the results might have been quite different.

FIGURE 9  
Shell Midden Composition

Sample	Vol. cc.	Wt. gms.	Composition							Shellfish		Ratio Clam to Oyst.
			Rock wt.	Clam		Oyster		Unident. wt.	Meat/sq.			
				wt.	%	wt.	%		Clam (x/4.23) gms.	Oyst. (x/5) gms.		
0W2N*	690	800	177.0	40.2	5.03	4.5	.56	<.5	<.06	950.4	90.0	8.90
5W0N	840	1000	106.1	81.7	8.17	13.2	1.32	3.8	.38	1931.4	264.0	6.19
10W0N	795	1000	114.4	353.3	35.33	66.8	6.68	13.3	1.33	8352.0	1336.0	5.29
15W0N	860	1000	103.2	231.0	23.10	149.0	14.90	17.6	1.76	5460.9	2980.0	1.55
30W25	920	1000	85.9	33.3	3.33	2.9	.29	.9	.09	787.2	58.0	11.48
53W2N*	800	1000	45.4	426.5	42.65	79.5	7.95	28.0	2.80	10082.7	1590.0	5.36
53W10N*	940	1000	85.3	98.5	9.85	9.0	.90	10.2	1.02	2328.6	180.0	10.94
65W0N	790	1000	155.15	34.6	3.46	5.0	.50	6.1	.61	451.5	72.0	6.87
70W0N	845	1000	-	77.1	7.71	5.9	.59	3.3	.33	1822.7	118.0	13.07

FIGURE 10  
PH. Tests

Humus		Shell		Yellow-Orange	
Sample No.	PH.	Sample No.	PH.	Sample No.	PH.
9	6.7	1	7.1	3	6.6
10	5.8	4	5.9	5	6.9
12	4.9	6	7.1	17	6.7
13	5.4	8	6.4	23	5.9
14	6.1	11	6.5	28	6.6
18	5.3	15	6.5	29	6.1
19	6.1	16	6.4	30	6.5
25	5.7	22	7.1	31	6.1
		27	6.7	32	6.3
Mean	5.75		6.63		6.41
S.D.	.56		.41		.33

## Discussion

The preceding ceramic and lithic analyses demonstrate that Kaeser is a multi-component site that was probably occupied by Early or early Middle Woodland, Late Woodland and Middle or Late Archaic, aboriginal groups. 30 (56.6%) of the 53 sherds recovered from the site are from vessels diagnostic of the early Windsor North Beach focus, which has been placed within the Early or early Middle Woodland (Ritchie 1969:xxx-xxxi; Kaeser 1974:20). Similar pottery can be seen at the Morris Estate Club site (Kaeser 1963), Pelham Boulder (Lopez 1956), and the Schurz Site (Lopez 1955), all of which are located in the Bronx. 5 of the 11 identifiable projectile points belong to the Narrow Point Tradition, which in southern New York and New England extends from Late Archaic into early ceramic times (Ritchie 1969:143-44; Stivigart 1973:43-44; Fowler 1974:5). In point of fact, their spatial and stratigraphic positions within the site indicate that the points were coeval with the North Beach ware. 3 of the points were found in the same 5-foot square as were all but 3 of the early Windsor sherds; the points were found well into the shell, while the sherds were found in both the shell and first 1-2 in. of orange sand. Both were adjacent to Feature One, which suggests that the feature may date to this period, too.

Of the remaining identifiable points, 2 of them closely resemble the Adena and Rossville lobate-base points, both of which have been identified as Early to early Middle Woodland types (Ritchie 1971:12, 61; Kinsey 1972:192, Figures 53A, 120B). 2 other points fit most closely the Brewerton Eared-Triangle and Brewerton Side-notched types, which suggests a probable Middle or Late Archaic occupation of the site. The last 2 identifiable points represent the Levanna point type, a Late Woodland manifestation, as are the 2 Incised/Smoothed sherds. At another site in Pelham Bay Park, Milo Rock, a point which looks like a Levanna point was excavated (Lopez 1956:130).

In our analysis of the ceramic and lithic materials, we noticed that the early Windsor pottery and Narrow-stemmed points were concentrated at the eastern end of the excavation, while the Incised/Smoothed sherds and Levanna points were recovered from its west and central portions (the western 50 ft.). A Fisher Exact test was performed to test the possibility that the spatial associations may be due to chance alone. A probability level of .05 was chosen as significant for rejection of the null hypothesis. The association was significant beyond the .005 level (one-tailed test), and has predictive power ( $\emptyset = .63$ ). Consequently, the null hypothesis is rejected and we may infer that the spatial distributions of the Early (or early Middle) Woodland and Late Woodland occupations were non-randomly localized at the east end and central-west portions of the excavation, respectively.

We noticed that the two Archaic points also appeared to be localized in the west and central part of the excavation. A Fisher Exact test was performed to test the possibility that, like the Late Woodland artifacts, they were also spatially differentiated from the Early Woodland materials. The test was significant beyond the .001 level (one-tailed test), and it has very high predictive value ( $\emptyset = .97$ ). Consequently, the null hypothesis is rejected and we may infer that the Early Woodland and Archaic occupations at Kaeser were non-randomly localized in the eastern and west-central areas of the excavation, respectively.

The stratigraphic location of its diagnostic artifacts clearly demonstrate that the Early Woodland component was associated with the shell midden. 26 (70.1%) such artifacts were recovered from the shell, while the remaining 11 (29.7%) were recovered from the first 1-2 in. of orange sand. Because the latter was heavily mottled with brown stains containing shell fragments in this area, it seems safe to assume that this was the base of the midden, and artifacts excavated from it were probably associated with the midden occupation.

As for the Late Woodland occupation, 1 Levanna point was found well within the shell midden. But the two incised sherds were found on top of the shell midden immediately below the humus; the remaining Levanna point was also recovered from the junction of the humus and shell zones. Interestingly enough, the 3 artifacts recovered from the top of the shell were located in the central portion of the excavation at the periphery of the Early Woodland occupation, while the Levanna point found within the midden was located at its western end. A Fisher Exact test was performed to test the possibility that the stratigraphic associations may be due to chance.

A probability level of .05 was again chosen as significant for rejection of the null hypothesis. The test was significant beyond the .0005 level (one-tailed test), and has a high degree of predictive power ( $\emptyset = .85$ ).

Consequently, we may reject the null hypothesis and infer that the Late Woodland occupation was associated with the west and central portions of the midden. The western shell seems to be the exclusive remains of a Late Woodland shellfish-collecting party, while the central shell-composed of lower and upper sections-represents a combination of Early and Late Woodland collecting activities, respectively.

But the association of a Middle to Late Archaic occupation with the shell midden is far from clear. Firstly, the occupation is represented by only 2 points, whose classification is not without some doubt (See Section III). Secondly, the Brewerton side-notched point was found below the midden, in 1.5 in. of orange sand. Lastly, although the Brewerton Eared-Triangle was labeled as coming from the shell layer, in that particular square the midden is less than 1 in. thick and there is virtually no shell at all in the portion from which the point came. So there is a good chance that the points may actually have been associated with the orange sand zone.

Because the two major occupations at Kaeser were spatially differentiated, we hypothesized that the distribution of the various artifact categories might correlate with their spatial dichotomy. Chi square (Siegel 1956) or Fisher Exact tests were performed (1) on pairs of artifact categories and (2) on the east and central-west spatial dichotomy of the two Woodland occupations. The former test was used if the number of artifacts involved was sufficiently large. The following tests were significant, and so their null hypotheses are rejected:

- (1)  $H_0$ : There is no difference in the spatial distribution of domestic equipment and cutting tools.  $H_1$ : There is a difference in the spatial distribution of domestic equipment and cutting tools.

A Chi square test was significant beyond the .000005 level (two-tailed test), and the association has predictive value ( $\emptyset = .62$ ).

- (2)  $H_0$ : There is no difference in the spatial distribution of cutting and woodworking tools.  
 $H_1$ : There is a difference in the spatial distribution of cutting and woodworking tools.

The Fisher Exact test was significant beyond the .01 level (two-tailed test); the association has a fairly high degree of predictive power ( $\emptyset = .69$ ).

- (3)  $H_0$ : There is no difference in the spatial distribution of cutting and beadworking (drills, cut clam squares) equipment.

$H_1$ : There is a difference in the spatial distribution of cutting and beadworking equipment. The Fisher Exact test was significant beyond the .01 level (two-tailed test); the association has predictive strength ( $\emptyset = .59$ ).

- (4)  $H_0$ : There is no difference in the spatial distribution of domestic equipment and hideworking tools.  
 $H_1$ : There is a difference in the spatial distribution of domestic equipment and hideworking tools.

A Chi square test was significant at better than the .01 level (two-tailed test); the association has predictive power ( $\emptyset = .47$ ).

- (5)  $H_0$ : There is no difference in the spatial distribution of hideworking and woodworking tools.

$H_1$ : Preceding tests have demonstrated that (a) both hideworking and cutting tools are spatially differentiated from domestic equipment, the latter being concentrated at the east end of the excavation and the former in the west and central areas, and that (b) the cutting tools are also spatially differentiated from the woodworking tools in like manner. Consequently, it is logical to hypothesize that the hideworking and woodworking tools will demonstrate similar differentiation. The hideworking tools should be concentrated in the central and west region of the excavation, while the woodworking tools should be concentrated at its eastern end.

The Fisher Exact test was significant beyond the .05 level (one-tailed test); the association has predictive power ( $\emptyset = .43$ ).

All other tests involving paired artifact categories and spatial locations were insignificant. Tests involving paired categories and vertical distribution (i.e., strata) were also insignificant, indicating that all of the categories were associated with the midden and top of the orange sand.

(The lower humus, which also contained artifacts, appears to be associated with the upper midden.) The combined test results—both significant and insignificant—suggest that food processing, woodworking, and beadworking activities were carried out at the eastern end of the excavation, whereas cutting and hideworking activities were carried out in the western and central portions. In fact, a Chi square test performed on these two sets of functional categories and the east and central-and-west spatial dichotomy was significant beyond the .01 level (two-tailed test); although the association has limited predictive power ( $\phi = .39$ ). The spatial conjunction of the hideworking tools and the knives suggests that the knives functioned in the initial part of the hideworking process as tools for skinning and dismembering the kill.

Because the spatial dichotomy of functional categories coincides with the spatial dichotomy of Early and Late Woodland artifacts, we very tentatively suggest that the food processing, wood-working, and beadworking activities were associated with the Early Woodland occupation of the site, and the hideworking activities with its Late Woodland occupation.

A Chi square test was also performed on the possibility that the spatial distributions of chert and quartz artifacts, the two major lithic materials at the site, might concur with those of the two Woodland occupations. The test was significant beyond the .01 level (two-tailed test), but the index of predictive power was low ( $\phi = .15$ ). The results suggest that chert and quartz were the major materials for both the Early and Late Woodland chipped stone technologies at Kaeser, but that chert was utilized to a greater extent than quartz by the Late Woodland occupation, while the opposite was true for the Early Woodland.

The distribution of clam and oyster were examined in reference to the division of the site into eastern and central-western halves. While the distribution of clam and oyster varies over the site as a whole, when each is examined by means of t-tests comparing the mean amount of clam (or oyster) in each half, there are no significant differences in the site. Therefore, we cannot correlate a differential use of resources with different chronological periods. There is no evidence that the resource base changed over time in a significant way.

The several functional artifact categories represented at the site indicate that Kaeser was not just an overnight campsite, but that its occupants had spent some time there. Yet the small number of artifacts and the absence of postmolds and many other functional categories such as sewing, weaving, ceremonial, recreational, and domestic equipment (aside from manos and pottery) such as metates, nutstones, and pits, indicate that the stay was not a lengthy one. The absence at Kaeser of postmolds, and therefore of any definable house structures, also suggests a fair-weather occupation. For the Late Woodland occupation, at least, hideworking activities suggest an early fall occupation, as the poor condition of animal skins in spring and summer discourage hideworking activities during that time of year.

These characteristics (limited number of tools and functional categories, absence of house structures) are exhibited by other northeastern shell midden sites.

Two other sites in Pelham Bay Park, the Archery Range site (Kaeser 1962), and Pelham Boulder (Lopez 1956) show a similar pattern. Few tools are found, the majority of artifacts recovered being pot sherds.

At Archery Range 1120 sherds and 29 stone tools (almost all projectile points and hammerstones) were recovered. Quantitative data are lacking at Pelham Boulder. At Muskeeta Cove (Salwen 1968) in Glen Cove, Long Island, about 11 pots and 241 stone artifacts were recovered, 201 of which were non-utilized chips. Only 5 functional categories were represented: general utility cutting and chopping tools, weapons, perforating and woodworking tools, domestic equipment (pottery), and a miscellaneous category containing paintstones. At Oakland Lake in Bayside, Long Island (Kaeser 1974), the double component shell midden contained 106 stone and bone artifacts and 880 pot sherds. 30 artifacts and 85 sherds belong to an Early Woodland occupation, while 76 artifacts and 795 sherds represent a Middle Woodland occupation. Only 5 functional categories were represented: general utility chopping and scraping tools, weapons, perforating tools, fishing equipment, domestic equipment (pottery), and a miscellaneous category containing hematite paintstones. At Croton Point, a midden excavated by Brennan, located on the Hudson River in Westchester County, excavations recovered only 15 artifacts—a single point tip, 2 hammerstones, and general utility cutting and scraping tools (Salwen 1970:34). Although post-

molds were present at one of the sites (Muskeeta Cove), they were randomly placed and did not form any structural outlines; they may simply have been poles for holding and smoking shellfish (Salwen 1968:324).

The composition of the Kaeser midden was compared with that of Croton Point (Salwen 1970) and Muskeeta Cove 2 (Salwen 1968). All three sites varied in the presence of particular species of shellfish. At Croton Point, oyster made up more than 99% of the shell (Salwen 1970:2), while at Muskeeta Cove, soft shell clam was the dominant mollusc (66%), with 12%o hard shell clam and 20% oyster (Salwen 1970:3). The sites were similar to each other in one aspect of the midden composition-each had one dominant species. At Kaeser, the overall composition of the midden was 76.6% hard shell clam, 18.7%o oyster and 4.6% unidentified. Also, Kaeser and Muskeeta Cove had approximately the same amount of oyster and clam, although there was no softshell clam at Kaeser.

Salwen (1965) notes that molluscs are important indicators of coastal environment. With hard shell clam as the dominant species, salt water-covered mudflats is the most likely local environment.

The distribution of shell over the site was compared for Kaeser and Muskeeta Cove 2. At both sites, the mean amount and standard deviation of each species was calculated. When the standard deviation was expressed as a percent of the mean, for Muskeeta Cove the figures are: 45.5%o for soft-shell clam, 44.7% for hard shelled clam and 151.1% for oyster. For Kaeser, the figures are 90% for hard-shelled clam and 126% for oyster. While the unevenness of distribution is much greater at Muskeeta Cove, the same tendency is present, namely for clam to be more evenly dispersed through the midden while the presence of oyster is more erratic.

Two other sites in the Bronx had middens which resembled Kaeser in the types of mollusc present. Both Milo Rock (Lopez 1958) and the Morris Estate Club site (Kaeser 1963) have middens composed of oyster and hard shell clam in total or in almost total dominance, although quantitative data on proportion are not provided.

In addition, midden analyses from the samples of Muskeeta Cove and Croton Point (Salwen 1970:2-3) concur with those from Kaeser; i.e., that virtually all of the meat from the midden can be attributed to shellfish. Early seventeenth century ethnohistories (Mourt 1963:65; Wood 1865:39, 107) describe similar encampments at which small groups of coastal Algonkians would congregate for several days or weeks during the spring and summer to collect and dry fish and shellfish, which they later carried back to their main camp.

These data support Salwen's (1970:4) hypothesis that the Northeastern shell middens represent temporarily-occupied special purpose sites for the collection and processing of shellfish. As such, they were only one of several types in the subsistence-settlement system of the Northeast coastal groups from at least Early Woodland times until European contact.

### Conclusions

Kaeser has been used to demonstrate statistically significant differences in the distribution of both time-sensitive and functionally distinct artifact categories.

We have shown that in the case of Kaeser the midden was apparently accumulated by the occupation of different areas of the site at different time periods, rather than a uniform occupation which might result in a more typical layer-cake stratigraphy. Another possible model for midden accumulation is suggested by Brennan in a recent paper; he believes that artifacts found in shell middens are not contemporary with the shell in those middens but are from a later period when the shell has partially decomposed. Whichever of these interpretations is correct, several cautionary notes must be appended. First, we recognize that we have no clear picture of small-scale variations in activity patterns. We cannot say what the reuse of the site from year to year is like, but we can suggest that the Archaic and Early to early Middle Woodland peoples used a different area of the site than later groups. Second, we cannot assume that if this midden is formed this way that all other shell middens have been similarly formed. The confirmation of this hypothesis from these data will, we hope, lead to its re-evaluation by other archeologists who excavate shell midden sites.

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APPENDIX A  
Fisher Exact Tests

1. Distal angles of quartz points and knives.

		distal angles		
		25-40 <sup>o</sup>	41-50 <sup>o</sup>	
points	5	0	5	
knives	0	3	3	
		5	3	8
$p = .018$ (1-tailed)				$\phi = 1.00$

2. Distal angles of chert and jasper points and knives.

		distal angles		
		19-25 <sup>o</sup>	36-37 <sup>o</sup>	
points	3	0	3	
knives	0	1	1	
		3	1	4
$p = .25$ (1-tailed)				$\phi = 1.00$

3. Distal angles of all points and knives.

		distal angles		
		19-35 <sup>o</sup>	36-50 <sup>o</sup>	
points	6	1	7	
knives	0	4	4	
		6	5	11
$p = .015$ (1-tailed)				$\phi = .83$

4. Maximum thickness of points and knives.

	max. thickness		
	.475-.90	.925-1.70 cm.	
knives	0	5	5
points	11	2	13
	11	7	18
	p = .04 (1-tailed)		Ø = .78

5. Spatial distribution of Early and Late Woodland artifacts

	Central-		
	East	West	
E. Wldd.	35	2	37
L. Wldd.	1	3	4
	36	5	41
	p = .007 (2-tailed)		Ø = .63

6. Spatial distribution of Early Woodland and Archaic artifacts.

	Central-		
	East	West	
E. Wldd.	31	2	33
Arch.	0	2	2
	31	4	35
	p = <.002 (2-tailed)		Ø = .97

7. Chi Square  
Spatial distribution of domestic equipment and cutting tools.

	Central-		
	East	West	
Domestic	47	11	58
Cutting	1	12	13
	48	23	71
	p = <.001 (2-tailed)		Ø = .61

## 8. Spatial distribution of cutting and woodworking tools. Central-East West

	Central-		
	East	West	
Cutting	1	12	12
Woodwk.	6	2	8
	7	14	21
p = < .01 (2-tailed)		Ø = .69	

## 9. Spatial distribution of cutting and beadworking equipment.

	Central-		
	East	West	
Cutting	1	12	13
Beadwk.	9	5	14
	10	17	27
p = < 0.006 (2-tailed)		Ø = .59	

## 10. Spatial distribution of hideworking and food-processing artifacts.

	Central-		
	East	West	
Hidewk.	5	12	17
Food pr.	47	11	58
	52	23	75
p = < .002 (2-tailed)		Ø = .47	

## 11. Spatial distribution of hideworking and woodworking artifacts.

	Central-		
	East	West	
Hidewk.	5	12	17
Woodwk.	6	2	8
	11	14	25
p = .10 (2-tailed)		Ø = .42	

12. Chi Square  
Food processing, woodworking and beadworking vs. hideworking and cutting tools.

	Central-		
	East	West	
FP, WW, BW	62	18	80
HW, Cutting	5	12	17
	67	30	97
p = <.001 (2-tailed)		Ø = .39	

13. Chi Square

	Central-		
	East	West	
Chert	163	282	445
Quartz	61	51	112
	224	333	557
p = <.002 (2-tailed)		Ø = .15	

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## TWO MIDDLE HUDSON VALLEY SITES

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### The Hamburg Site (CTL 29)

In the fall of 1973, we discovered a small Late Woodland campsite 20 yds. south of the Corlear Kill creek, approximately 1 mi. north of the Rip Van Winkle bridge and 1/3 mi. north of the hamlet of Hamburg, Greene Co., N.Y. The site lay in a small, flat circular area 12 ft. west and 4 ft. above the Hudson River high tide mark. Its eastern periphery was 6 ft. from the shore's edge. To the north of the creek and directly abutting, west of the site, was a high, steep incline of Upper Normanskill shale. A narrow strip of flat land, generally 8 to 12 ft. above the high tide level, leads to Hamburg and is again backed by the shale plateau.

Local residents remarked that the heavy wave action of large tankers has eroded up to 15 lateral feet of shoreline. However, possibly because the site is in a small cove of the creek, little of its river frontage was said to have been destroyed. Immediately adjacent to the south, a large area of higher land had been reportedly washed away, diminishing the cove area. Numerous stemmed projectile points were said to have been picked up from the beach where this bank had been. We did discover 2 small, stemmed points on the southern periphery of the Hamburg site. These may have been associated with the possible Sylvan Lake component immediately adjacent.

The Hamburg Site was very small, being an east-west oval shape that was contained within only 15 excavated 5 ft. squares. Testing in immediate areas revealed scanty to negative aboriginal debris.

The Stratum I overburden of the prehistoric level was a clayey brown sand, 8 in. thick at the western edge and 13 in. thick at the riverside. Although the modern land was relatively even before excavation, vertical profiles of Stratum II showed a slight eastward-dip. Recent downward movement of soil must have leveled the surface. The occurrence of several cut nails and kaolin pipe fragments with this aboriginally occupied zone might be accounted for by this disturbance. Stratum II was easily identified by its dark brown-to-black color. At the western, north-western, and north-eastern areas this was from 1 to 4 in. thick, whereas toward the River it thickened to as much as 11 in. However, at its thickest (and darkest) edge, the zone abruptly narrowed upward to show the brown, clayey sand that lay beneath the entire site. Where tested, this Stratum III was sterile of artifacts to 3 ft. beneath the surface.

Stratum I produced no prehistoric objects other than several flint chips near the junction of the next level. Some 18th, 19th, and 20th century objects, such as glass, bottle caps, nails, and crockery were present.

Historical objects found in Stratum II were a Rose-head nail, 4 cut nails, 4 kaolin pipe stems and 4 Kaolin pipe bowls (one marked with TD - Tom Dexter). Two unidentifiable historical objects are a hemisphere of oxidized pyrite with a 16 mm circumference and 9 mm thickness and a thin rectangular brass piece 6 mm in width and 14 mm in length. One end of the latter is folded over by 3 mm. Whether or not these were of Indian use is not possible to determine.

The stone artifacts recovered include:

- a. 3 Levanna points (1 well-worn by water-probably picked from the River's shore), and a triangular point blank.
- b. 1 Wading River point.
- c. 1 small, untyped stemmed point with down-sloping shoulders.
- d. 1 typical, finely-made Iroquoian ovate knife.
- e. 3 point fragments.
- f. 3 point-like blanks.
- g. 8 knife or blade fragments.
- h. 2 endscrapers and 1 end-side scraper.
- i. 1 unique 76 mm long tool with a triangular tip and parallel 22 mm wide sides that quickly flare out to a 47 mm wide, flat-bottomed base. The base is 18 mm thick, while the tip section was thinned to 4-5 mm. Both sides (20 mm long) of the tip are worn. We suspect that the base was held in the hand while the tip edges were used to open clam shells.

Most of the above were made from local Normanskill flint, with a few of local Eastern Onondaga flint. One knife was fashioned from Pennsylvania jasper. Except for 6 quartzite netsinkers and 2 quartzite hammerstones, the following are made from Normanskill grit:

- a. 1 broken (rectangular in cross-section) muller which was carefully chipped into form and was much worn on one side; 145 mm long, 70 mm wide, and 35 mm thick.
- b. 2 mauls, each encircled by a pecked groove with both ends showing batter scars.
- c. 26 netsinkers (including the 6 of quartzite. These ranged from 57 mm to 80 mm long and from roughly notched grit fragments to symmetrical, well-notched, water-worn pebbles.
- d. 2 netsinker-like pieces (discoidal and rectangular) which were bilaterally chipped to thin the entire circumference.
- e. 1 bilaterally chipped disc, such as found on some Chance Horizon sites, but of unknown use.

Bone tools include 2 awls, 1 of deer, 1 of turkey wing. A third tool is of deer bone ground on 2 sides of the point to form a 5.5 mm wide sharp end. This may have been used to open clams. The marked ceramic remains from Stratum II appear to represent 12 separate pots:

- a. 9 pieces of an untyped pot with 4 horizontal incisions beneath a row of short, oblique nicks along a flat rim with short oblique interior nicks. Beneath the 4 incised lines is a row of short, nearly horizontal incisions based on 3 more rows of horizontal incised lines. The lowest row is slightly broken by deep vertical punctations around the base of the applied collar. Not noted on other Late Woodland Hudson River sites, this is also dissimilar to Iroquois types and thus, may be a purely Hudson Valley Algonkian type.
- b. 1 untypable collar in 5 pieces which show a flattened rim, plain on the interior with short vertical nicks on the exterior above 3 horizontal incised lines. These are directly above triangular incised lined plats. The base of the collar is missing. One moderate castellation is apparent.
- c. 1 small, flat-topped rim piece with external oblique nicks above 4 horizontal incised lines.
- d. 1 small, flattened rim fragment with 3 horizontal incised lines beneath oblique, external rim nicks. Touching these is an open section of an incised, triangular plat.
- e. 2 pieces of a rim with a slightly extruded, flattened (on top and outside) rim lip with tiny internal rim nicks and external vertically linear indentations. Below the lip is a line of vertical indentations at a short, oblique angle.
- f. 3 collar base sections with crude, slightly curved vertical incised lines abutted by oblique vertical lines. Deep notches are stamped at the collar base angle.
- g. 2 Cayadutta Incised (?) collar base fragments. These show a strongly everted collar with notches below triangular plats of incised lines.
- h. 2 basal fragments of a Cayadutta Incised collar with plats of triangular, incised lines. The rim is missing.
- i. 2 Deowongo Incised collar base fragments. These show a strongly everted collar with light indentations beneath triangular plats of incised lines. The rim is lost.

j. 1 Deowongo Incised rim with long, thin basal notches under incised, triangular plats, under 2 parallel horizontal incised lines. The flattened rim is vertically nicked. A portion of a slight castellation is apparent.

k. 1 small flattened rim castellation with 5 parallel incised horizontal lines.

The other rim pieces exhibit: 1, notches on a collar base, 2, incised lines, 3, interior nicks on a split, flattened rim. 7 shoulder fragments have parallel punctations. 1 sherd has 2 parallel, horizontal incisions above and below the punctations. The 146 body fragments were smoothed, well-tempered, and averaged 5 mm in thickness.

The only ceramic pipe (a stem end) was a well-made straight piece with a 5 mm hole diameter.

Food refuse remains are deer, turkey, and duck bones. Fresh water clam shells, sturgeon plates, and a dog or wolf canine complete the list, suggesting a fall or spring occupancy of the site. The paucity of charcoal scraps and fire-cracked rocks attest to a brief period of stay.

Although some temporal admixture of pottery fragments may exist, we believe the Hamburg Site to have been visited for a short period at approximately 1450 AD to 1500 AD, that is during the late Chance Horizon period (Ritchie, 65).

The lack of any cord-marking and complete predominance of incising on the pottery would place the Hamburg Site closer to Iroquoian times than nearby sites such as the Kingston (Ritchie, 52), the second level of the Rip Van Winkle I (Weinman and Weinman, 71), and Rip Van Winkle II (Weinman and Weinman, ms) of earlier Chance Horizon times. The presence of several Chance Incised sherds and the apparent lack of early Historic Indian objects of European manufacture would put the Hamburg Site somewhat earlier than the Historic riverine upper level at the Rip Van Winkle I site.

Undoubtedly, many historic and near historic riverine Indian (Algonkian) sites have been destroyed by cities, highways, dredging, industry, etc. However, there appears to be little evidence of large village sites along the middle and upper Hudson River such as those found of inland Iroquoian and late pre-Iroquoian sites throughout the rest of the State. It is well-known that corn, beans, and squash were grown in great quantities by these inland groups. Perhaps the vast food resources of the Hudson River lessened the Riverine Indian's dependence on agriculture. This might have given less reason to have large working forces and large village communities. If true, this would most likely have led to differing ways of certain life patterns between the late Riverine Indians and the inland Iroquois.

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n.d. The Rip Van Winkle II Site.

## Cedar Terrace (Cox 40)

The vast resource of Normanskill flint at Flint Mine Hill and other nearby outcrops prompted numerous groups of Indians to occupy the surrounding land in Greene Co., New York. The visitations of these range in time period from the Paleo-Indians through Historic Natives. In addition to the high quality and quantity of flint, the region, composed of flatlands and low hills, undoubtedly provided an excellent meat and vegetable producing environment. Easy access to and exit from the area could be made through the north-south lowlands, adjacent Hudson River, and more distant (but geographically confluent) Mohawk River from the west.

Except for the large West Athens Hill Paleo-Indian site (Ritchie and Funk, 1973), which was excavated at an outcrop of flint exposed on the summit of a steep, high hill, the numerous excavated sites and plowed-up artifacts existed on the flatlands, slight rises, along the Hudson River and smaller tributary creeks, and in rockshelters that abut the lowlands at the west. Except for the rockshelters and most sites along the Hudson River, other sites have shown no soil stratification that separates cultural debris. This seemed to be especially the case on hummocks of land where cause for soil accumulation would seem negligible.

However, at the Cedar Terrace site, beneath a surface scattered with flint chips and artifacts, we found evidence of at least 4 cultural groups in 2 distinct strata that, in places, extended to the depth of 11 in. Some debitage has even been imposed to 14 in., within a third stratum which was apparently of early post glacial origin.

Cedar Terrace (named by us from the abundance of young red cedar trees) is a narrow, oval-shaped, north-south uplift of Normanskill shale that is bordered on the west by Rte. 9W. The occupied section was 20-25 ft. east of a 25 ft. high Normanskill shale cliff which had been formed by blasting for the highway construction. The site is situated at the highest and widest section of the uplift, which is approximately 70 ft. wide east-west and 1/4 mi. long north-south. The Flint Mine Hill quarry is 1.5 miles north-north-east, the Scott Farm flint quarry 1 mi. south-south-west, while the Hudson River is 3.5 mi. east.

With the gracious permission of the property owner, Mr. Lloyd Zimmerman, we excavated 32 five-by-five foot squares in 1975. Three distinct strata were discovered beneath the surface:

Stratum I - a dark brown clayey loam 2 to 6 in. thick.

Stratum II - a yellow-brown, slightly sandy, clayey loam which was 1.5 to 4.5 in. thick.

Stratum III - an orangish-yellow clayey sand, interspersed with shale fragments. This was tested to 20 in.

Fortunately, the artifacts clustered in the north-south oval center of the excavation where the strata were thickest. The reason for the creation of these soils is not understood at present. Perhaps windblown sand, fallen vegetation, and the residue of human activity were the causes. The fact that most of the cultural remains were found where the strata were the thickest might give support to the suggestion that the inhabitants created the soil and resulting stratigraphy through their daily activities.

However, because the occupied strata were so thin and were not consistently of the same thickness, we cannot place the vertical separations of artifacts solely by their depth below the datum level. Although we kept careful record of this--and found it to be somewhat consistent (see plate 2)--we discovered it helpful also to measure and judge vertical position in relation to the upper, middle, and lower levels of the individual stratum. In some instances, the junction lines between strata were very important in assigning artifacts to any of the at least 4 distinct occupations.

The artifacts that were found exposed on the surface or just beneath moss and other vegetation appear to represent an occupation by Middle Woodland folk as evidenced by a Levanna projectile point (all types are from Ritchie, 1971) and a probable Greene projectile point base similar to those described by Funk (in Ritchie 1971). A somewhat aberrant (but probable) Petalas blade 128 mm long, 49 mm wide, 7 mm thick (fig.1) would also contribute to a Middle Woodland assignment to the surface level (Funk, nd.).

A single Lamoka point was also found on the surface, but must be considered displaced through human action. As will be noted, points of this style were found in situ in Strata I and II.

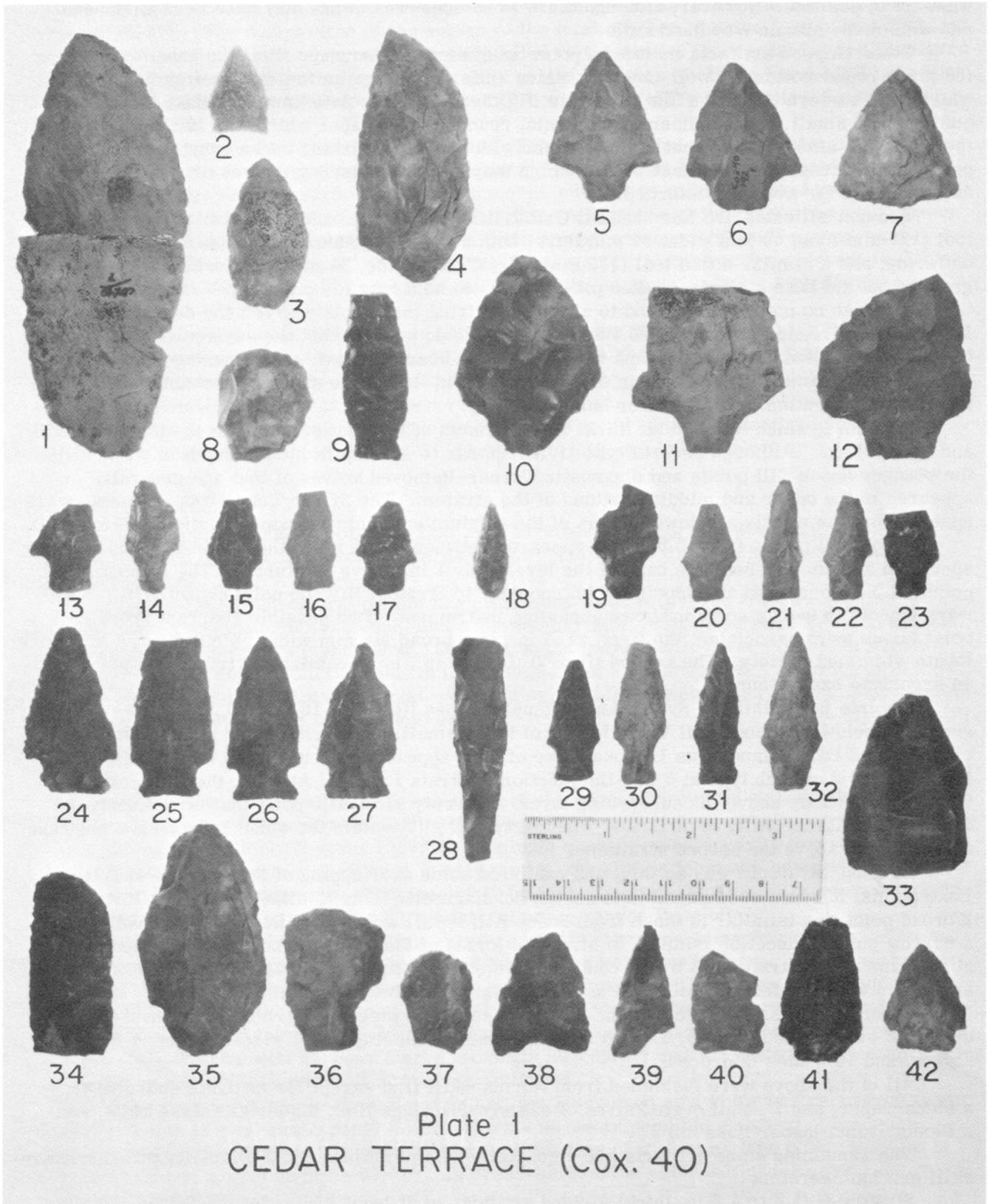


Plate 1  
CEDAR TERRACE (Cox. 40)

In addition, a possible aberrant Adena point (fig. 10) of Early Woodland times would seem somewhat out of position. However, although there is no edge-wear, this may have been an unusual and well-made Middle Woodland knife.

Other chipped artifacts include: a point tip of eastern Onondaga flint; the base of a large (68 mm), round-bottomed, well-chipped, biface knife; 9 point or knife preform fragments (1 of which is of eastern Onondaga flint); an ovate (fig. 3) and 2 lanceolate knives; 4 flake knives (1 of quartzite); 3 small, crude endscrapers; 1 thin, rounded endscraper which was finely chipped along the broad (64 mm) working end; a sidescraper with opposing working edges created from opposite poles; and 10 fragments of biface blades which may have been used as knives or were rejected as inadequate for what was intended.

The non-silicates are Normanskill Grit artifacts: a pecked and a grooved pulverizing (?) tool (121 mm long, 69 mm wide, 34 mm thick) with a roughly fashioned bit edge that shows some battering; and a similar bitted tool (130 mm long, 67 mm wide, 34 mm thick) which was not grooved but did have a single, pecked pit-possibly to hold nuts for cracking.

Although no pottery was found to aid in identifying the people who left the debris, the Levanna and Greene (?) points, and Petalas (?) blade do suggest that the surface artifacts belong to Middle Woodland times of perhaps 600-800 AD. A quartzite Jack's Reef pentagonal point (fig. 2) of this same time period was discovered at 1 in. below the surface, probably having been intruded into Stratum I by natural or human activity.

Stratum I, which was 2-6 in. thick, held artifacts of two distinct complexes-the Snook Kill and Sylvan Lake. Although several type styles appear to overlap in metric depth in a few instances, the younger Snook Kill points and diagnostic Corner-Removed knives of that age generally appeared in the upper and middle portions of the stratum. The Sylvan Lake Complex points were spaced from the middle and lower levels of the stratum even into the upper portion of Stratum II.

Snook Kill points (figs. 5,6,11,12) appeared between 2 to 4 in. in the initial stratum. The specimen at 4 in. was near the base of the level, only 1 in. above Stratum II. The 3 Snook Kill points at 3 in. occurred at midpoint, 3 in. superior to Stratum II. The point shown as fig. 5 was worn smooth in use as some unknown abrading instrument. Two possible aberrant Snook Kill point forms were associated: the first, at .5 in., is a broad (44 mm wide, 59 mm long, 9 mm thick) lobate-stemmed variety. The second (fig. 7), from 3 in., is an equilateral triangular point with an excurvate base-stem.

5 points fall within the Sylvan Lake Complex types (figs. 14, 16, 19, 20, 21) and were generally below the Snook Kill Varieties. 2 of these small, narrow stemmed points can be classified as Bare Island, 3 as Lamoka. One of each appeared at 3 in. in the 4.5 in. thick soil layer, as did 2 of each type at 5 in.-the junction of Strata I and II. At 5 in., the fifth point (Lamoka) was 1 in. above the succeeding layer. The only projectile point that is definitely out of place stratigraphically is an Orient Fishtail type (fig. 9) within the older Sylvan Lake position at 5 in., 1 in. above the second stratum.

Because Stratum I was so thin, and exhibited some overlapping of Snook Kill and Sylvan Lake points, it would be impossible to assign nondiagnostic tools to either complex. However, 2 broad point tips (similar to those from Snook Kill types) were found in the upper level, while a narrow point midsection (similar to stemmed forms of the Sylvan Lake Complex) occurred at the base of the stratum. 5 broad contracting stemmed (fig. 4) and corner-removed knives, similar to those typical of Snook Kill assemblages, lay midway within the soil layer.

Other silicious tools are: 6 thin, square-based knife pieces; 35 triangular to ovate knife pieces; 2 ovate-ended (figs. 8, 37) and 2 square-ended endscrapers; 4 sidescrapers; 6 flake knives; and 18 blades in process.

All of the above were fashioned from Normanskill flint except for an ovate endscraper, a sidescraper, and 2 small ovate knives of eastern Onondaga flint, a quartzite flake knife, and a Pennsylvania jasper flake knife.

The remaining stone artifacts are 4 quartzite hammerstones and a bifacially pitted Normanskill grit hammerstone.

Stratum II (1.5 to 4.5 in. thick) yielded artifacts of at least 2 complexes-Sylvan Lake projectile points from the upper section, and Laurentian Tradition-like points in the bottom level as well as at the junction with Stratum III.

## VERTICAL DISTRIBUTION OF PROJECTILE POINTS

Depth in Inches	0	1	2	3	4	5	6	7	8	9	10	11	12
Levanna	1												
Greene (?)	1												
Jack's Reef													
Pentagonal		1											
Orient Fishtail						1							
Lobate-Stemmed													
Snook Kill (?)		1											
Snook Kill			3	3	1								
Bare Island	1					2	1	2					
Lamoka				1		1	2	4					
Squibnocket													
Stemmed							1						
Laurentian-Like						1	1		1		1		
Brewerton													
Side-Notched													1
Brewerton													
Eared-Triangle							1				1		
Beekman Triangle										2			

PLATE 2

5 Bare Island (figs. 15, 22, 29, 30, 31), 4 Lamoka (figs. 13, 17, 23, 32), and 1 Squibnocket Stemmed (fig. 18) projectile points were recovered from .5 in. to 2 in. into Stratum II. Of these 10 Sylvan Lake Complex types, only 1 was deeper than a 1 in. into the stratum, this was at 2 in. Although found in the second stratum, these points are related in type (and possibly are from the same encampment) as those found at the lower levels of Stratum I. All points are of Normanskill flint except for a Lamoka and the Squibnocket Stemmed points of local Onondaga flint.

Below the Sylvan Lake points at the base of Stratum II were 4 Laurentian-like points (figs. 24-27) which have affinities with Vosburg, Brewerton Corner-Notched and Brewerton Side-Notched varieties, but all are somewhat longer in proportion to width than the holotypes. According to Ritchie (1971), these types are generally 1.25 to 1.5 times as long as wide, whereas the 4 somewhat similar points at Cedar Terrace are 2 to 2.3 times as long as broad. Two of these have slightly ground bases.

At the junction of Strata II and III, there were 2 typical Laurentian Beckman Triangle points (fig. 38), a squat Brewerton Corner-Notched point (fig. 42), and 2 Brewerton Eared-Triangles (figs. 39, 40). A sixth, untyped, point (fig. 41) had a broad, Laurentian-like blade which terminated in an unshouldered, inward-slanting stem with a straight base. This last artifact may have been a well-made knife, but there is no evidence of wear. Three unidentifiable point pieces fill out this artifact category. All of these Laurentian points are of Normanskill flint except the Brewerton Corner-Notched point which is of western Onondaga flint.

As in Stratum I, the non-projectile point artifacts cannot be assigned validly either to the Sylvan Lake or to the metrically lower Laurentian occupation because of the thinness of the soil layer and the large total number (116) pieces of worked stone. However, some notable tools might be assigned to either complex. At the Sylvan Lake zone of the second stratum was a fragment of ground, grey slate knife or ulo, an artifact normally found with older Laurentian material of the Vergennes Phase. At the base of Stratum II and junction of II and III were: a straight drill (fig. 28); a trianguloid strike-a-light, and a possible bannerstone wing of purple Granville slate. These could be products of the Laurentian occupation.

Other stone tools were: a thumbnail scraper of eastern Onondaga flint; 3 trianguloid scrapers (fig. 36); 8 flake sidescrapers (1 of purple Pennsylvania jasper); 46 small knife pieces ranging in various shapes and quality of manufacture from oval, ovate (fig. 35), rectanguloid (fig. 34), (1 is of quartzite, 5 of Onondaga flint); 11 flake knives (1 of yellow jasper); 2 large choppers and/or knives (1 of quartzite); 21 large, crudely chipped blades or knives in process; 15 crude, rejected quarry blanks; 4 quartzite hammerstones (1 bifacially pitted, another with 7 small pecked-out linear indentations, possibly for secondary flint chipping work).

As discussed briefly, aborigines undoubtedly occupied Cedar Terrace for obtaining and working flint, for gathering food, and for easy access to other locations. Although only 9 hammerstones were found, the quantity of flint debitage, and various stages of tool manufacture suggest that flint working was of major concern. The points, knives, scrapers, drills, choppers, and bipitted stones (of nutcracking use?), indicate some domestic activity. Fire-cracked rocks were sparsely scattered throughout the occupied zone, but there was little charcoal. No pottery, fire features, bone, clam shells, pits, or postmolds were preserved-if they ever existed. From this, we can only surmise that the encampments were for brief, but active periods of time. The lack of features and postmolds is quite common at small, Archaic sites in this region. The stratigraphic succession of complexes from Middle Woodland (600-800 AD) over Snook Kill (1400-1500 BC) over Sylvan Lake (1900-2300 BC) over late Laurentian (2300-2600 BC) fits within the sequence set up by Funk (nd) from excavations of many sites within the Hudson Valley.

It is interesting to note that the Vosburg complex style of the Laurentian tradition were found below the 4 untypable style of Laurentian-like points which, in turn, were below the morphologically different Sylvan Lake Complex points. These 4 may represent a style change from the older, but incompletely known, Vosburg Phase types usually found in the Valley. It is also interesting, possibly because of the small number (5) of points, that no "good" Vosburg types occurred among the deepest Laurentian points of that Phase.

Adding to the validation of Funk's proposed cultural sequence in the Hudson Valley is certainly an important contribution of the Cedar Terrace site. In addition, that artifacts of at least 4 aboriginal complexes could be in correct stratigraphic position on a hill where we previously thought little to no soil deposition could be made is a breakthrough which hopefully will lead us to knoll-top sites where we never would have expected anything but mixed cultural remains.

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## THE PICKLE HILL II SITE-Glf 17

Paul L. Weinman  
Thomas P. Weinman

State Museum  
Morgan Chapter

Unlike the relatively important Pickle Hill Site (Weinman, Weinman, and Funk, 1967), our experience at the nearby and probably related Pickle Hill II Site was somewhat soured by the paucity of artifacts and absence of features that could have led to comparisons of more significance.

The second locus is situated on a small Knoll nearly 300 yd. NNE of the first, 2-1/2 mi. south of Dunhams Bay, Lake George, N.Y. We had recovered all but 3 of the artifacts while surface hunting after yearly plowings from 1967 to 1974. In 1975, we were notified by the owner, Mr. Henry Harris, that the field would be put into grass and not plowed in the foreseeable future. We then decided to excavate in search of features and postmolds, putting in three 25 ft. by 3 ft. trenches and twenty 2 ft. by 3 ft. gridded test pits. The rewards for our effort were 3 flake knives, 18 secondary chips of Fort Ann flint, and 3 fire-cracked rocks. Roasting platforms, (similar to those found across the Pickle Hill Road at the first site), pits, postmolds, and charcoal flecks were not encountered. The occupied area seems to have been 60 ft. long east-west and 30 ft. wide north-south along the northern rim of the low, sandy knoll that was elevated over a swampy lowland by approximately 20 ft.

Of the 8 points we found, 5 might fall within the range of Lamokoid Stemmed or Side-notched types; 2 could be classified as Normanskilloid; 1 is an untyped broad-bladed stemmed variety; the eighth is an untyped, very narrow, weakly shouldered stemmed point. The temporal and/or cultural period in which the makers occupied the knoll would not work within the basic framework of previous studies (Ritchie, 1969) if the points were used as markers. However, when compared to the Pickle Hill Site, (which was dated 1760 B.C.  $\pm$  100), the variety of points is very similar. The types would suggest an admixture of Sylvan Lake Complex forms of approximately 2100 B.C. (Funk, n.d.) and the River Phase Normanskill points dated at the Bent Site (Ritchie and Funk, 1973) between 1339 B.C.  $\pm$  200 and 1930 B.C.  $\pm$  100. However, as we noted in the Fred Young Site report (Weinman and Weinman, 1968), the admixture and percentage of admixture of certain stemmed and side-notched points may be evident of a morphological evolution from the Sylvan Lake Complex points to the River Phase points. This can also be seen from similar findings at the Cole Gravel Pit Site (Hayes and Bergs, 1969). Further justification for the differing forms existing together could be explained by the lack of sites excavated other than the type stations of Sylvan Lake-Lamoka and Normanskill typology. Pickle Hill, Pickle Hill II, Cole Gravel, Fred Young, and probably others, (some of which may have been disregarded as pure components because of this mixture of types), could represent the temporal stages within this Late Archaic framework.

In addition to the above mentioned points, we recovered: 1 narrow, stemmed point blank, 1 narrow point blade, 12 narrow point blank fragments, 7 ovate knives, 3 side scrapers, 4 flake knives, and 2 quarry blades.

The flint chips were all of Fort Ann flint, as were most artifacts, with the exception of 2 points, a blank, and 4 ovate knives of Normanskill flint; two points, 2 blanks, and an ovate knife of Little Falls flint; 1 blank tip of E. Onondaga flint; and 1 knife tip of W. Onondaga flint.

Though we found no food remains, (such as acorns at Pickle Hill), we suspect Pickle Hill II to have been a fall hunting camp as suggested by the number of points and point blanks. It may have been a one time stay area for the same people who used the Pickle Hill Site at other, more numerous, times. Nevertheless, the small size, point varieties, location, and relation in nearness and artifacts to the Pickle Hill Site, aid this small locus to add to the growing knowledge of these people's movements, activities, and change.

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## THE HUNTERBROOK TRIANGLE POINT

General Description: A medium sized, equilateral (80%) triangle with a concave base. The base is moderately to heavily ground with bifacial thinning about 1/3 the length of the point on all specimens.

Sample Size: 24

Size: 67% are 1" to 1 1/4" in length, 25% are 3/4" to 1", and 8% are 1 5/16" in length.

Material: All points are made of silicate in the following percent: Flint 55%, Quartz 33% and Quartzite 12%.

Age: At the Hunter Brook Rockshelter they were several inches below the level of points of a known age of some 5,000 years B.P. and in close stratigraphic association with a Palmer-like point. At the Piping Rock site in Ossining, New York, they were relatively dated by shell lying above them. Thus they are older than 5135± 155 C-14 years (GX-3238).

Distribution: Hunterbrook triangles are presently known from sites along the lower Hudson River and its immediate inland environs.

Remarks: Almost half of the specimens show a break in the curve of the concave base about 1/3 its length produced by the technique used in the bifacial thinning of the base. Examples: Front Cover; Row 1. B, C, D; Row 2. B, D, E; Row 3. B, C, D; Row 4. A, C. One specimen shows slight serration. Fig. 4, Row 3. D. Fig. 4 Hunterbrook Triangles. Row 1. A and B from the Hunter Brook Rockshelter; C, D and E dated at the Piping Rock Site at 5135±155 C-14 years. Row 2. A and B from the Chadeayne Farm collection; C, D and E from the Piping Rock site. Row 3. Piping Rock Site. Row 4. from the Hanotak Rockshelter.

## BOOK REVIEW

*Artifacts of Prehistoric America* by Louis A. Brennan. Stackpole Books. Harrisburg, 1975. 218 pp. \$14.95.

Brennan's stated objective in writing this book was to assemble for the serious student of archaeology visual and written descriptions of the customary tools, equipment, and material possessions of the prehistoric inhabitants of America. In addition to the illustrations of stone, bone, antler, vegetal fiber, wood, metallic and ceramic artifacts, Brennan includes short discussions of the classification of artifacts, of flaking technology, and of modern atlatl experiments by Richard Regensburg. Despite the minor shortcomings mentioned below, Brennan has succeeded admirably in fulfilling his stated goals.

The profuse artifact illustrations coupled with clear, concise descriptions are the book's strongest assets. Although there are the expected photographs of complete ceramic vessels, birdstones, projectile points, bannerstones, and gorgets, Brennan has depicted many categories of artifacts which are seldom seen in books of this nature: retouched flakes, graters, teshos, and pebble choppers. The quality of the photographs is good, when one considers the circumstances under which some pictures had to be taken. Certain artifacts had to be photographed in museum storage areas or in display cases rather than under optimum conditions. While a purist may find fault, the realist will accept the overall quality of the work.

One wishes that a bibliography, provenience information on the specimens, and the name of the repository for each specimen had been included. It is a shame that individuals who are excited by the book are not given this information to pursue their newly discovered interests. Although the excellent suggestion is made that Brennan's *Beginner's Guide to Archaeology* be used as a companion volume, the appeal and focus of that book is somewhat different. While there are some artifacts pictured from most areas of the United States, the primary emphasis is upon the specimens likely to be found in the Northeast. I was disappointed by the absence of photographs of nets (Ritchie 1965:187), of mussel shell openers (Kinsey 1972:247), of Adena effigy tablets (Dragoo 1963:179), and of whole ceramic vessels from the Northeast (Kinsey 1972:91, 155, 168).

As one might expect, the majority of the photographs depict fine specimens which are typical of certain functional categories or types. Notable exceptions are the Meadowood, Fox Creek- Cony-Selby Bay and Orient Fishtail projectile points, which do not compare favorably to those pictured elsewhere.

The written descriptions of the specimens are very clear and concise, but some may give the reader the wrong impressions by the absence of necessary qualifiers. In the description of the Orient Fishtail points, Brennan states that ". . . the Orient culture (is) characterized by the ceremonial burial, (and) seems localized on Long Island and the coast of Long Island Sound" (p. 60). The work of Kinsey, Kraft, and Werner in the Upper Delaware Valley shows that Orient is nearly 200 years older there and is not associated with ceremonial burials (p. 359-360). As a matter of fact, the primary feature is the massive hearth. Hearths have been excavated which are more than 20 feet in diameter, 18 inches deep and filled with firecracked rock. While the ceremonial aspects may be localized on Long Island, the Orient Fishtail point has a wider dispersal.

The Susquehanna (Broad Spear) point was not made most often from Pennsylvania jasper as Brennan states (p. 58). Witthoft (1953:8), Kinsey (1972:427) and Ritchie (1965:150) state that the lithic preference is rhyolite in Pennsylvania and New York. Ritchie also states that local flints occur.

A few minor typographical errors were noted: from for form (p. 80), prestone for prestone (p. 83), spalix for spalls (p. 90), Iroquoisian for Iroquoian (p. 194), punctuation for punctation (p. 202), and dribble for dibble on the inside flap of the dust jacket. The fossil crinoid bead pictured with the metallic artifacts is labeled "a fossil cinoid bead" (p. 185).

Given the audience to which this volume is directed, Brennan's discussion of the origin of ceramics and the Jomon-Valdivia similarities is too dogmatic. Other viewpoints questioning prehistoric Transpacific Contacts should have been presented. A recent Middle Atlantic Archaeology Conference symposium addressed this question, and a hot debate ensued. The impression that the issue of ceramic origins has been resolved should not be conveyed.

Despite the shortcomings mentioned above, I highly recommend this book not only to the archaeological neophyte who wishes to identify his specimens, and become acquainted with the variety of implements used by prehistoric inhabitants of the Americas, but also to anyone who must choose a single volume which will illustrate and explain the differences among these artifacts to non-archaeologists. This reviewer has used it extensively with great success with students of all ages and with museum visitors.

Washington  
Connecticut

Dr. Roger W. Moeller, Curator  
American Indian Archaeological Institute

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#### NYSAA AWARDS - 1977

##### The Achievement Award

To Robert E. Funk for his monumental publication *Recent Contributions to Hudson Valley Prehistory*, New York State Museum Memoir 22, a landmark in New York State archaeology.

##### The Fellowship Award

To Peter P. Pratt for his comprehensive investigations of and publications on the Oneida Iroquois.

##### The Certificate of Merit

To George Hamell for his organization of the Fall, 1976, Iroquois Symposium at Rochester. The

##### Meritorious Service Award

George Cottrall-Long Island Chapter  
Virginia Stiles -Auringer-Seelye Chapter  
Barney Chernoff-Orange County Chapter  
William D. Sternitzke-Orange County Chapter  
Lewis A. Dumont-Orange County Chapter  
Pamela Augustine-Upper Susquehanna Chapter  
Marion V. Lloyd-Upper Susquehanna Chapter  
Helen Gutierrez-Upper Susquehanna Chapter

## SOCIETY OF PROFESSIONAL ARCHEOLOGISTS

The Society of Professional Archeologists was incorporated on April 26, 1976. Its purpose is to further high standards in the profession of archeology. A Code of Ethics, Standards of Research Performance, and Requirements for Recognition as a Professional Archeologist have been formulated as standards of professional behavior, performance and competence respectively. A set of Institutional Standards has also been drafted as a standard for archeological support facilities provided by museums, universities, and other institutions.

Among its services, SOPA will maintain a List of Accredited Archeologists composed of SOPA members and others who meet the criteria of education and experience specified in the Standards, and who subscribe to the Code of Ethics. This list will be made available to Government agencies, State agencies, private firms, and individuals who are seeking the services of qualified archeologists. The list will be subdivided to identify different kinds of archeological specialists.

SOPA is an outgrowth of the 1974 Airlie House Seminar on Certification and Accreditation of Archeologists, sponsored by the Society for American Archaeology and the National Park Service, and of the 1976 Interim Committee on Professional Standards of the Society for American Archaeology. The Interim Committee included representatives of the Archeological Institute of America, Society for Historical Archeology, and American Society for Conservation Archeology. Applications for SOPA membership and accreditation are now being received. Application forms, the Code of Ethics, the Standards, and descriptive material about SOPA's purposes and organization will be furnished upon request. Address inquiries to: Dr. Charles E. Cleland, Jr., President SOPA, The Museum Michigan State University, East Lansing, Michigan 48823.

The New York State members of SOPA Listed on the 1977 roster are: Louis A. Brennan, Francis J. Clune, John R. Cole, William Engelbrecht, Shirley Gorenstein, Jonathan Haas, Charles F. Hayes III, Ellis McDowell-Loudan, Nan A. Rothschild, Bert Salwen, Robert Schuyler and Cynthia Weber.

## PETROGLYPH SEARCH

Edward J. Lenik, long recognized for his outstanding contributions in the search for Pre-Columbian Norse occupation is spear-heading a cultural documentation program on Indian petroglyphs or rock carvings in the northeastern United States.

The focus of the program will be to determine and compile for each state an inventory of its Amerind rock art. An interpretive and diagnostic analysis will be made for each petroglyph along with a record of its site location for cultural comparison and interaction of the Indians within the geographic framework of the northeastern states.

As you know, prehistoric and historic data cannot be protected and recorded unless it is first known to exist. It is of vital importance that you who have knowledge of these ancient prehistoric and historic designs in stone take action by contributing this data in order for your state to be properly represented.

Please advise Edward J. Lenik at: 100 Deerfield Road, Wayne, New Jersey 07470 of any prehistoric or historic petroglyph site you think ought to be investigated.

## HISTORICAL ARCHAEOLOGY

4-7 Jan. 1978: 11th Annual Conference of the Society for Historical Archaeology and 9th Advisory Council (formerly International Conference) on Underwater Archaeology at the St. Anthony Hotel, San Antonio, Texas. General Chairman: Kathleen Gilmore, North Texas State University, Institute of Applied Sciences, N.T. Box 5057, Denton, TX 76203; SHA Program Chairmen: Dan Scurlock, Texas Historical Commission, P.O. Box 12276, Austin, TX 78711; and Thomas Hester, Center for Archeological Research, University of Texas at San Antonio, San Antonio, TX 78285; ACUA Program Chairman: Barto Arnold, Texas Historical Commission, P.O. Box 12276, Austin, TX 78711.