

**BULLETIN**  
**OF THE**  
**ARCHEOLOGICAL SOCIETY**  
**OF CONNECTICUT**

NUMBER 29



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## KAOLIN PIPES FROM THE SCHURZ SITE

by H. G. Omwake

The following report covers the study of many fragments of white kaolin pipe bowls and stems taken from the Schurz site, Bronx County, New York.<sup>1</sup> These were excavated by Harry Trowbridge and William Younkheere from within and about some stone foundations where they have been working since 1953. The structure, part of a colonial homestead, lay in the central section of the present site, near what is now the foot of Calhoun Avenue in the Throgs Neck area. At the request and through the kindness of Julius Lopez, the evidence was made available for examination.

The collection consists of more or less complete bowls, marked and unmarked; plain stem fragments, unmarked and undecorated; and three small marked or ornamented stem sections. The report of this study has been divided into sections arranged in the order by which, it would seem, inferences as to the dating of the stone foundation may most easily be drawn.<sup>2</sup>

### PIPE BOWLS

#### The Evidence

Bowls, damaged to a greater or less degree, and bowl fragments comprised a considerable portion of the evidence. These may be classified according to their marking, or lack of it, their shape, or their decoration into the twelve categories described below:

1. One fragmented bowl having the letters RT impressed on the back, and on the right side,

in relief, a circle enclosing the word Tip-et in raised letters on two lines. It is presumed that the small section missing from the top of the circle originally bore on a third line the complete letter R, of which only the base of the main stalk is now perceptible (Pl. 1, a).

2. Five broken bowls with a raised circle on the right side of each; within this, on three lines, appears the name R. Tipp-et. The letters RT, stamped into the back, also appear on three of these bowls. Two are so fractured that it cannot be said whether they, likewise, bore the same impressed letters on the back (Pl. 1, c-g).

3. One fractured bowl bearing a circle on the right side in only the slightest relief. Within this, on three lines of faintly raised letters, the name R. Tip-pet. The initials RT do not appear stamped into the back of this bowl (Pl. 1, b).

4. Three almost complete bowls on the backs of each of which appear the impressed letters RT and from the right sides of which the relief circle enclosing a name is absent (Pl. 1, h, i); one tiny fragment having the letters RT impressed upon it; one small fragment, fractured vertically, having stamped upon it the letter T, presumably all that remains of the letters RT. Perhaps these two fragments may be sections of bowls, similar to those described in classes 1 and 2, but for all practical purposes they may be counted under class 4.

5. Two badly damaged bowl fragments, one of which bears the letters WW impressed into the back (Pl. 1, k). The other has a small heel on the bottom of which, although substantially damaged, is a circular heel stamp enclosing two letters which appear to have been WW.

6. One bowl fragment (back) having the letters TW impressed upon it (Pl. 1, l); one smaller bowl fragment having a T (damaged) and a short length of the left hand slanting arm of a W or of a V, presumably the former.

7. One damaged bowl on the back of which are the impressed letters TP (Pl. 1, m).

8. Seven plain, unmarked bowls, all damaged in some degree, three of which had small, unmarked heels.

<sup>1</sup> Lopez, 1955.

<sup>2</sup> Although specific references have not been cited, much of the general information set forth in this report has been derived from numerous communications from Dr. Adrian Oswald to the author. Some of the citations to pipemakers who might have been responsible for other marks than those of the Tippetts' were also taken from material made available by him.

Dr. Oswald, Keeper of the City Museum and Art Gallery, Birmingham, England, was formerly associated with the Guildhall Museum, London. He is the leading authority on the ancient white clay pipe industry in England and the author of numerous pertinent articles which have appeared in *The Archaeological Newsletter*, London.

9. Thirteen unmarked bowl fragments of various sizes.

10. One basal section of a bowl with a very slender oval heel. On one side of the latter, in the vertical position, appears the letter W in relief; on the opposite side is a badly worn and indecipherable letter which may have been a G or a C.

11. One basal bowl section beneath which depends a short, pointed spur.

12. One bowl fragment on which are molded, expanding panels of scallop shell-like flutings, and above these, various ornamental designs of indeterminable nature.

#### Bowl Shape 1690-1750<sup>3</sup>

About 1690 a somewhat radical form of bowl came into use by the pipemakers of both England and Holland. The pronounced convex curves of the barrel-shaped bowls of earlier years went out of style. They became elongated and thinner, with gently curving to almost straight sidewalls, which imparted a graceful and pleasing appearance. The effect was analogous to modern day stream-lining. In most examples the forward outline of the bowl almost completely lost all semblance of the earlier bulge. Instead it developed, in many instances, into a long, graceful, slightly convex arc sweeping downward from the lip and having an inverse kink just above the dependent heel. In the heel-less examples of this same shape the forward arc merged gently with the stem at the base of the bowl. From rim to stem, the rear outline of the bowl assumed an equally graceful arc. Sometimes it had a slight inverse kink at the joining of bowl and stem, but as often as not it flowed into the stem smoothly and in a continuous curve. In other examples of the elongated type of bowl, both front and rear outlines lost practically all curvature and proceeded from rim to stem in a nearly conical pattern.

Generally, the emergence of the elongated form of bowl has been attributed to the influence of the Dutch soldiers who accompanied William III to England. The form was adopted by the English

<sup>3</sup> Much of the following discussion of pipe shapes is based upon the text of a manuscript the author is preparing on kaolin trade pipes. In order to conserve space, the many and complicated references to an extensive bibliography will not be cited here. They will, however, be furnished upon request.

pipemakers and continued in use until about the middle of the eighteenth century.

These "Dutch" type bowls were usually somewhat more upright than their predecessors of the seventeenth century, and the plane of the lip had now become generally parallel to that of the stem. While pipemakers seemed to follow no uniform pattern in this, the angle between bowl and stem gradually grew less and less obtuse. With rare exceptions the lip of the bulbous bowls of the early seventeenth century, and later of the barrel-shaped forms in the mid-century, had been actually oblique to the line of the stem. Some of this angle carried on for perhaps another twenty-five years among the pipemakers of Bristol and other centers of the industry. With the radical change, however, to the elongated, so-called "Dutch" type of bowl at the turn of the century, the plane of the lip became parallel to that of the stem and remained so thereafter.

Dating based on shape. These changes in form are so distinctive that a bowl manufactured toward the turn of the eighteenth century can be easily recognized. All of the bowls and bowl fragments noted in classes 1 through 9 are of the elongated type. None exhibits the barrel-like shape commonly in vogue prior to c. 1690, and the plane of the lip in all examples sufficiently complete to permit analysis is parallel to that of the stem. On these bases, therefore, the pipes listed in classes 1 through 9 must be assigned to a period around 1700.

#### Marks on Bowls

The Tippet marks and Tippet history. The RT initial combination does not appear among the almost five hundred marks of the eighteenth century which were registered with the pipemakers' guild of Gouda, principal center of the industry in Holland. There can be little doubt that all the pipes exhibiting the RT mark and having in relief the name Tippet in its various spellings are products of the famous family of that name of Bristol, England. In this family there were three pipemakers named Robert, father, son and grandson. Were the pipes bearing only the RT of the barrel or bulbous shape, there might be a question about this attribution, since there had been earlier pipemakers whose initials were also RT. In the instance of the elongated pipes the Tippet attribution is a virtual certainty.

The first Robert Tippet, who was the husband



Pipemakers' stamps and marks in relief on kaolin pipes from the Schurz site. Scale about 1:1.

of Joane, a daughter of William Thomas, became a freeman of the city of Bristol on May 14, 1660; his son followed suit on November 4, 1678, his grandson on July 20, 1713. Among the baptismal records in the Registers of St. James Parish, Bristol, appear the following variations of the family name: Tipat, Tippitt, Tipet, Tippet, and Tippett. It is curious that the spelling which appears most frequently in the Registers is Tippett, whereas that which appears most frequently on pipes is Tippet. Pipes made by one or another member of this family have been found on Indian or colonial sites in almost every state of the Atlantic and Gulf coasts, but no single example bearing the double T has yet been observed.

Considerable doubt exists as to which of the three Robert Tippetts should be identified with the different styles of the family mark. However, the eldest may probably be ruled out on the grounds that he must have died about 1680, 10 years before the introduction of the elongated bowl form into England. It is recorded in the Bristol Burgess Books that on "April 3, 1687, Robert... Phillips of the city of Bristol, puts himself apprentice to Joane Tippet of the same late wife of Robert Tippet pipemaker deceased for 7 years" (underlining mine). On Feb. 20, 1689, another "apprentice of Joane Tippet" became a freeman.

That Joane had obviously continued to operate her late husband's pipemaking industry further confuses the attribution of pipes bearing the Tippet mark. Joane may have been responsible for at least one variation of it. A number of bowls recently found in New York City<sup>4</sup> bear on the right side a raised circle enclosing on three lines the letters in relief I R Tip-et, representing "Joane, widow of Robert Tippet." The length of the period of her activity is not clear, but it must have approximated two decades after her husband's death. A list of inhabitants prepared as a basis for a tax levy for the year 1696 in Lewin's Mead, St. James Parish, includes the following entry: "Robert Tipet, pipemaker, his wife, one child, one apprentice henry hole and widow Tipet." Three years later, on Oct. 28, 1699, the Bristol Burgess Rolls record that an "apprentice of Jane, widow of Robert Tippett" was made a burgess. Jane and Joane were one and the same person.

<sup>4</sup> Discovered by Martin Schreiner near the Francis Lewis House close to the approach to the Whitestone Bridge in the Borough of Queens.

The second Robert was probably baptized on Aug. 22, 1660, only three months after his father became a freeman of the city. He himself became a freeman, as previously noted, on Nov. 4, 1678. How long he followed his trade is unclear. The Bristol Burgess Books record on May 14, 1688 an apprenticeship "to Robert Tippet tobacco pipemaker and Sara his wife for 7 years." Again on July 22, 1699, an entry in the Rolls lists "Henry Hoar (e), tobacco pipemaker, apprentice of Robert Tippett." Since there is no record that a "henry hole", mentioned above, ever became a burgess, it is suspected that "henry hole" and "Henry Hoar (e)" may have been the same person. The second Robert, however, must have worked beyond the 1699 date at which Henry Hoar (e) received his freedom. His son was probably baptized on July 4, 1692; and it is recorded in the Bristol Burgess Rolls that "Robert Tippett, junior, tobacco pipemaker, son of Robert Tippett, (was) made a burgess July 20, 1713." The inference would seem to be that the latter, the second Robert, was then still living. Indeed, another entry proves that he was still working: "Richard Richards, apprentice of Robert Tippet, (was) made a burgess Aug. 6, 1713," less than a month after the third Robert received his freedom. The second of the Roberts, then, is known to have followed the trade for at least 35 years.

Less can be adduced about the third Robert's career. He may have started as an apprentice to his father, but only one entry bearing on the length of his activity has been found. It is recorded in the Bristol Burgess Rolls that "James Millsom, junior, apprentice of Robert Tippet, (was) made a burgess Oct. 5, 1724." It is probable that the reference is to the third of the Roberts because by 1724 the second Robert would have been an old man of more than sixty-four years. It seems unlikely at an age of fifty-seven, or thereabouts, that he would have taken on a young apprentice. There are no further references to apprentices taken by the third Robert; and it can only be said with reasonable certainty that he engaged in pipemaking for at least 11 years, from 1713 until 1724.

Development and significance of marks. In Bristol the custom of placing marks on bowls did not begin until about 1660; and it is suspected that the first such marks were simple letters impressed into the back of the bowl with a rudimentary wooden rocker type of tool, having raised letters protruding from its face. At a somewhat later date, it is thought, more complex stamps, probably of metal, were employed

(witness the carefully executed and complex interlocking letters of the WW mark in Plate 1, k). Cutting the maker's mark into the pipe mold in order to transfer it in relief to the side of the bowl was undoubtedly a relatively late technological improvement. Pipes bearing this type of mark have been identified with Bristol makers of c. 1690-1720. Changes in the types and styles of marks, however, were gradual rather than sudden; and this may account for the presence on some pipes of both the RT impressed into the back of the bowl and the relief circle containing one or another spelling of the name Tippet on the side (Pl. 1, j). True, it has been suggested that the former may be an export mark impressed into the bowl after its removal from the mold. There seems to be little difference, though, between the letters stamped on the back of plain bowls and those stamped on bowls which also have the relief circle on the side (cf. Pl. 1, h, i, and j). At the present time there is little evidence to support this view, and the initials appear more likely to have been a proper mark. A number of pipes having only an initial stamp impressed on the back of the bowl have been recovered in England. These were probably made for home consumption rather than for export.

Because the first Robert Tippet appears to be ruled out on the grounds that the Schurz pipe bowls are of the elongated type, which only achieved popular acceptance about 1700, it would seem that all of the pipes must be attributed to the second and, perhaps, the third Roberts. In the absence of sites of known chronological position, little can be said regarding the assignment to son or grandson of those pipes which bear the mark in relief on the side of the bowl. If complexity and refinement could be assumed to be valid measures of recency, we might postulate that the plainly superior craftsmanship exercised in cutting the mold for the R. Tipp-et mark pointed to the grandson as the maker. Admittedly, however, the assumption is a dubitable one; and specific assignment of the various marks to son or grandson must await more substantial information than we now possess. Further discussion of the problems of attributing the various kinds of Tippet pipes to members of the family may be found in the Addenda.

The marks WW, TW, TP. Pipes marked WW, TW, and TP have not been previously reported from archeological excavations or as the result of surface collection. Since none of these marks appears in the 18th century Gouda registry and because Bristol is the origin of the Tippet pipes

which comprise so large a part of the Schurz site evidence, a Bristol origin for these, as well, is suspected. All bowls on which these marks occur are of the elongated type and, therefore, must date c. 1700. Among the lists of Bristol pipemakers of the late seventeenth and early eighteenth centuries to whom these pipes might be attributed may be found the following possibilities:

a. *William Wyatt*, freeman in 1674.

*William Williams*, apprentice of Susannah, widow of Roger Williams, made a burgess February 23, 1707.

*William West*, apprentice of Thomas Watts, made a burgess March 22, 1726.

b. *Thomas Watts*, freeman in 1675.

*Thomas Wadham*, freeman in 1739.

c. *Thomas Poicke*, freeman in 1656.

*Thomas Poyte*, freeman in 1754.

Obviously, the possibilities listed for TP under c above are somewhat remote.

On the chance that some or all of the pipes bearing the WW, TW, and TP marks may have had other than a Bristol origin, the lists of pipemakers of other English cities have been searched. The following possibilities exist:

a. *William Wilkinson*, pipemaker, as noted in the parish records of Broseley, died in 1733.

b. *Thomas Ward*, pipemaker, as noted in the parish records of Broseley, had children by different wives in 1645 and 1654.

*Thomas Ward*, another pipemaker, may have been born in Benthall in 1668.

*Thomas Woodward*, apprentice of James Marshall, was granted his freedom in Exeter in 1710.

c. *Thomas Pate* became a freeman of Hull in 1661.

The shape of one of the bowls marked with the large and coarse letters TW appears to have been slightly different from that of the others. In finishing the rim, the pipemaker seems intentionally to have effected a mediocre and incipient bevel on the inside of the lip. The pressure applied to the finishing tool to produce the bevel also produced a slight eversion of the rim. The bevel and resulting eversion are unusual and give to the sweeping curves of the elongated form a profile reminiscent of the somewhat earlier barrel-shaped forms. That the elongated form was actually intended, however, is made clear by the smaller fragment, similarly marked, which does not have the illusion-producing bevel and so reveals the graceful, sweeping curves which characterize the "Dutch" type bowls.

#### Heels, Spurs, and Ornamentation

After 1670 heels generally became smaller in the round but longer and of increasing prominence. Some took on the appearance of spurs, not actually pointed but having a flattened apex. Since the flat area of the apex was too small to receive a stamp of initials, makers began to place them, in relief, on opposite sides of the heel. It is thought that the technique of cutting marks or makers' initials into the mold in order to reproduce them in relief on the bowl or heel was not developed until about the turn of the eighteenth century. The practice remained in active vogue until about the middle of the eighteenth century. The custom was later revived and pipes of fairly recent origin may be found having initials or numerals in relief on opposite sides of their very thin heels or spurs.

While the fragment classified as No. 10 in the evidence cannot be identified because one of the letters on the spur-like heel is so badly obliterated, two of its features lead to the belief that it is out of context with the other evidence from the Schurz site. First, the stem is exceptionally thin at the point of its juncture with the bowl. Such was not usually the case among the older pipes. Second, a sufficiently large portion of the bowl remains to indicate that it was attached to the stem at a practically vertical angle, a feature which did not appear in kaolin pipes until the latter part of the eighteenth century and which became common among those of the nineteenth.

In the specimen classed as No. 11, the angle of attachment of the bowl to the stem is very obtuse, and the remaining basal section of the bowl

suggests that it had originally a rather pronounced barrel shape. The spur is pointed and sharp; the texture of the clay is refined, and the pipe has been carefully finished. In combination these features indicate that the pipe may belong to the mid-eighteenth century when some pipemakers reverted temporarily to the older shapes popular during the second and third quarters (especially the third) of the seventeenth. The fragment does not appear consonant with the great bulk of the bowl evidence and is believed to have been intrusive at the site at a later date.

The small fragment of bowl classed as No. 12 which has a scallop shell-like molded ornamentation is representative of types of pipes commonly produced during the latter part of the eighteenth century and all through the nineteenth. It is certainly of much later date than the pipes listed in classes 1 to 9, but could easily have been contemporary with No. 10.

#### PLAIN STEMS

Two hundred and fifteen fragments of plain, unmarked kaolin pipe stems constituted a large part of the evidence from the Schurz site. There are obviously not many details of such stem fragments from which conclusions in respect to their age or date of manufacture may be drawn. Early stems were generally thicker, of coarser texture, and less carefully finished than later stems; but some late stems were heavy, coarse, and crude. Frequently the bore through the stem of early pipes was notably off-center; but such boring also occurred, less frequently to be sure, in pipes of relatively late manufacture. None of these features, therefore, can be considered a completely reliable index of the age of a pipe stem fragment.

J. C. Harrington, faced with the problem of dating thousands of unmarked stem fragments recovered during the Jamestown excavations, suspected that measurements of the diameter of their bores might offer clues to the approximate periods of their manufacture.<sup>5</sup> Accordingly from the Jamestown, Williamsburg, and Fort Frederica collections he selected adequate samples of datable pipe bowls, to each of which a length of stem was attached. Each sample represented an arbitrarily determined time span. He then measured the diameters of the bores of all the stems in increments of sixty-fourths of an inch,

<sup>5</sup>Harrington, 1954.



tabulated the results, and converted them into percentages of the total number of specimens belonging to each time span. Harrington was able to show that throughout the history of the manufacture of white clay pipes of the seventeenth and eighteenth centuries there was a persistent tendency on the part of pipemakers to reduce the size of the bore through the stems. He found that the generally accepted belief that "the larger the bore the older the pipe" is valid, and that clues to the approximate age of pipe stems may be derived from measurements of their bores. Harrington was careful to point out the experimental nature of his percentages and to caution against their indiscriminate application.

The Harrington conclusions were caustically denounced by a London resident<sup>6</sup> who attempted to show by an apparently "rigged" experiment that no reliance could be placed in measurements of the bore as indicators of approximate dates of origin.

The present author, somewhat cognizant of the problems created by unmarked stems, conducted an independent experiment. In it he measured the bores of stem fragments recovered from seven sites for which the approximate dates of occupation had been determined through studies of ceramics, glass, and non-perishable household goods found in association with the pipe stem fragments.<sup>7</sup> These studies had been made by an expert from whom all knowledge of the pipe stem fragments from each of the sites had been withheld. While percentage tabulations of the various bore sizes represented among the stem fragments from each of the dated sites were not in precise agreement with those determined by Harrington, they were found generally to support his evidence and corroborate his conclusions. I feel, therefore, that when cautiously applied to any statistically large sample of unmarked kaolin pipe fragments, the percentages advanced by Harrington will yield data of real significance for determining the periods of occupation of the site from which the fragments were recovered.

For convenience in making comparisons, the Harrington percentages have been arranged in a different form from the bar graph which he employed and are set forth in Table 1.

A number of features of the distribution may be pointed out together with several conclusions

Table 1. Distribution of Pipe Stem Bore Diameters During Arbitrarily Determined Time Spans<sup>8</sup>

Time Span	Percentage of each diameter (in inches) represented					
	9/64	8/64	7/64	6/64	5/64	4/64
1620-1650	20	59	21			
1650-1680		25	57	18		
1680-1710			16	72	12	
1710-1750				15	72	13
1750-1780				3	20	77

which may be derived from it. First, we may note the lumping of bore sizes for each time span in groups of three consecutive sizes, each demonstrating a maximum of popularity for the central figure, but with a successive downward shift through time of the bore sizes characterizing each group. In other words, the bores of pipe stems were being made steadily smaller; but the pattern of this change was one of increasing and then waning popularity for each new and smaller size in turn. For obvious reasons, though, the pattern cannot be demonstrated at the two ends of the scale.

The larger stem bore diameters during the initial years of kaolin pipe manufacture are apparent. Their steadily diminishing size as time went on was doubtless the result of improved tools and techniques; and of changing tastes, or maybe a constant search for something better, until the 4/64-inch size was reached. It might be thought that this was found eventually to be about the ideal size since it became, for all practical purposes, the standard bore.

A pipe stem having a given bore diameter has a certain number of chances in a hundred of having been made during one of the selected time spans. For example, a stem whose bore diameter measures 6/64 inch has 18 chances in a hundred of having been made during the 1650-1680 span, 72 chances in a hundred of having been made during the 1680-1710 span, 15 chances in a hundred of having been made during the 1710-1750 span and 3 chances in a hundred of having been made after 1750.

<sup>8</sup>Based upon measurements of the bores of lengths of stem attached to datable bowls in the Jamestown, Williamsburg, and Fort Frederica collections. (Adapted from Harrington, 1954.)

<sup>6</sup>Chalkley, 1955, a,b.

<sup>7</sup>Omwake, 1956.

By applying the latter interpretation carefully and cautiously to white clay pipe stems recovered from archeological excavations, one may make a reasonable estimate of the chronological position of the site from which they were reclaimed. This dating technique, however, ought not to be applied to single specimens; nor should it be relied upon when the sample is small. It should be remembered, as well, that the percentages given in the table were derived from datable specimens specific to Jamestown, Williamsburg, and Fort Frederica and that the durations of the time spans were arbitrarily determined. Percentages derived from measurements of the bores of kaolin pipe stems recovered from other sites do not correspond precisely with those determined by Harrington. This may be principally due, I believe, to the virtual impossibility of finding sites whose dates of occupation duplicate the various time spans selected by him.

The distribution of the white clay pipe stem fragments from the Schurz site, by bore diameter sizes, is indicated in Table 2.

Table 2. Distribution of Bore Diameters of Kaolin Pipe Stem Fragments from the Schurz Site

	Stem bore diameters (inches)						Total
	9/64	8/64	7/64	6/64	5/64	4/64	
Number of specimens		<sup>a</sup>	33	79	92	10	215
Percent of total sample			15	37	43	5	100

<sup>a</sup>One specimen omitted as statistically meaningless. See Addenda.

It is quickly noted that 80% of all stem fragments in the collection have bore diameters of 6/64 and 5/64 inch, while the remaining 20% are divided between the 7/64- and 4/64-inch sizes. It may also be seen that the frequency of stems having the 7/64-inch bore diameter is three times that of those with one of 4/64 inch. This indicates, therefore, that occupation of the site probably began during the waning years of the period in which the 7/64-inch bore diameter was popular, continued during the periods at which the 6/64- and 5/64-inch sizes occurred with greatest frequency, and ceased at a time not long after pipemakers began to use the 4/64-inch bore

size. Reference to Table 1 recalls that during the period from 1680 to 1710 pipe stems having a bore diameter of 7/64 inch constituted 16% of the datable specimens. The 15% frequency of the 7/64-inch size among the Schurz site specimens seems remarkably close to Harrington's figure.

At the Schurz site the 6/64- and 5/64-inch sizes occur with comparatively equal frequency, when it is remembered that in any study of pipe stem fragments the number of pieces into which a stem may have been broken is purely a matter of chance. A difference of only 6%, therefore, whether or not attempts to match fragments have been made as they were in this case, should not be given undue statistical weight. Reference to Table 1 indicates that the 6/64- and 5/64-inch bore sizes achieved maximum frequency during the 1680-1710 and 1710-1750 spans respectively. Among the datable Harrington specimens these bore diameters occurred with equal frequency in successive time spans. The almost equal frequency of these two sizes among the Schurz site specimens, then, would seem to indicate an occupation of the site during the two time spans from 1680 to 1750.

The ten examples having the 4/64-inch bore diameter at the Schurz site constitute slightly less than one twentieth of the total number of specimens. It may be inferred, consequently, that during the time at which the site was occupied pipemakers were just beginning to manufacture pipes of which the stems had this extremely small bore. Reference to Table 1 indicates that stems of the 4/64-inch bore diameter were not present among specimens of the 1680-1710 period and began to occur only rather infrequently among specimens of the next period, 1710-1750. The fact that at the Schurz site this size occurred with only about one third of its least frequency among the datable specimens of Table 1 would seem to indicate that occupation of the structure we are here trying to date did not continue long after the manufacture of stems of 4/64-inch bore diameter began.

It seems a logical assumption from the percentages indicated in the distribution of datable specimens (Table 1) that the frequency of occurrence of each bore size increased gradually over the years following its inception, achieved a maximum, and then decreased gradually as the next smaller bore size was increasing. If this be granted, then it may be concluded, on the basis of the evidence derived from the plain, unmarked kaolin pipe stems, that occupation of the Schurz

site began approximately during the latter third of the 1680-1710 time span, or about 1700, and ended during the last quarter of the 1710-1750 span, or about 1740.

#### MARKED STEMS

Fleur-de-lis (Fig. 1, a). Of three marked stem fragments among the Schurz site evidence, one was found on the adjacent beach. This specimen has three small diamonds impressed upon it in imperfect alignment; from the background of each stands out in relief a well executed fleur-de-lis. Each flowered diamond has been individually impressed on the top of the stem by the application of a small hand stamp. The long axes of two of the diamonds are connected. The third impression, while an exact copy of the other two, is out of line to the left, probably accidental testimony to the hand-stamp nature of the tool used and to the inaccuracy, haste, or carelessness of the pipemaker who decorated it.

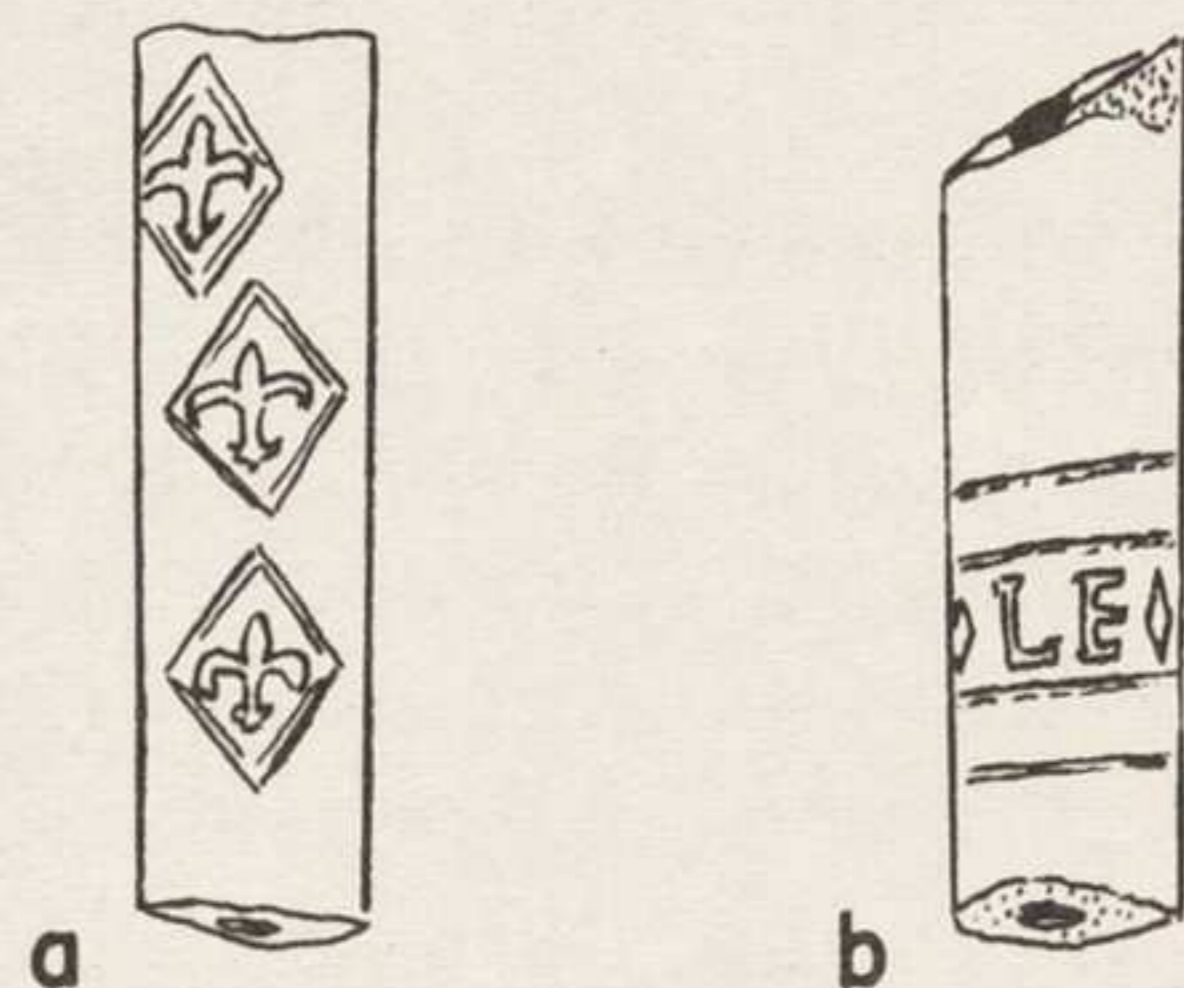


Fig. 1. Stem fragments with fleur-de-lis, and LE stamps.

The presence of only three diamonds is not thought significant, for the number of diamond-fleur-de-lis designs on a pipestem appears to have been solely the result of the pipemaker's fancy. It is quite possible that on the full length of the original stem there were others, although the blank spaces at each end of the fragment give the distinct impression that there were no more. Based upon present knowledge, it appears impossible to ascribe a pipestem having three such impressions to any one maker or stems having different numbers or patterns of impressions to others.

A discussion which would run to many pages could be written about the diamond-fleur-de-lis ornamentation, and research for such a paper has been in progress. The data will be included

in the text of a manuscript which the author hopes to be able to publish at a later date.

Suffice it here to say that the fleur-de-lis does not, as many persons think, indicate a French origin for pipes which are so decorated. The figure was essentially a standardized symbol in the ancient system of heraldry. It appeared on tiles manufactured in England prior to the beginning there of the pipemaking industry, and it has been noted on a few early kaolin pipes discovered there. Careful research, however, fails to reveal that it was employed by English pipemakers either as a stem ornamentation or as a mark. Instead, at least during the early periods of the industry, they seem to have preferred to produce pipes with plain stems, and bowls which were undecorated except for a milled line around the rim. There is no evidence that the fleur-de-lis was used as a heel-mark by any English pipe-maker. There is, on the other hand, abundant evidence that the fleur-de-lis within a diamond was extensively employed as a stem decoration by Dutch pipemakers, especially those of Gouda, from very early times. According to a Dutch authority, only the stem was ornamented at first (about 1630) with the lily. This took the form of a consecutive row of squares or diamonds with a little fleur-de-lis on the top of each. At that time there was no mark on the heel; but when they started using this stamp on the heel, the idea spread very rapidly. Later a special mark was developed for the heel alone, without the diamond.<sup>9</sup> The fleur-de-lis was registered as a mark in the records of the pipemakers' guild of Gouda in 1667.

The long history of Dutch activity and settlement in the New Amsterdam area prior to the English ascendancy to control in 1664 appears to account for the fleur-de-lis-decorated stem found on the beach adjacent to the Schurz site. It must be a relic of earlier days before the building in question came into existence, and doubtless had its origin in Holland, probably at Gouda.

LE (Fig. 1, b). One of the stem fragments found near the foundation bears the letters LE midway in a band of contiguous diamonds which, along with two parallel "rouletted" lines above and two below the band, encircle the stem in a

<sup>9</sup>Personal communication, G. C. Helbers. Mr. Helbers, presently Director of the Provincial Museum of Drenthe, lives in Assen, Holland. He was formerly Conservator of the Municipal Museum at Gouda, Holland, and is the co-author of the authoritative *Pipes De Gouda*, published in 1942 by the Pypenmuseum De Moriaan, Gouda.

slightly spiral manner, probably more accidental than intended. All elements of the decoration are impressed. No tools by which such encircling marks or ornamentations could have been imparted to the stems are known from museum collections of implements used in the pipemaking industry. Probably they were wheeled tools, perhaps analogous to the "mushrooms" by which milling was effected around the rims of pipe bowls, but having a wide tread suggestive of the knurls and chasing tools now employed in various crafts.

Similarly marked stem fragments were recovered in the course of excavations at "Geneser" on the eastern shore of Maryland below Ocean City, at the Salisbury, New Jersey, site, and at the Townsend site, Lewes, Delaware. Others like them came from refuse in a rock shelter on Langford Run, Delaware County, Pennsylvania, and from the surface of the Konzik Farm site, Gloucester County, New Jersey. When recovered during excavations, LE-marked stems have usually been in association with bowls and stems attributable to Bristol makers of the third quarter of the seventeenth century who may have worked fairly late into the last quarter.

On May 31, 1661, Luellin Evans, pipemaker, became a freeman of Bristol. In the Parish Register of St. James and in the Bristol Burgess and Apprentice Books the given name appears as Llewellyn, Llewellen, and Lluellin; elsewhere it appears as Luellin. Evans served his apprenticeship under James Fox; and it is interesting that stems were found at the Salisbury and Geneser sites with encircling decoration identical to that of the LE stems described, but with the letters IF in place of the LE on some of them. Although the date of his death is not known to the author, it is recorded that Evans continued the manufacture of pipes into the closing years of the seventeenth century. In 1688 and in 1691 William Taylor and Devereaux Jones, respectively, completed their apprenticeship under his tutelage and became freemen, burgesses of Bristol.

Nowhere in the available lists of pipemakers of other cities of England does there appear the name of any other pipemaker whose initials were LE, nor were these letters registered with the pipemakers' guild of Gouda, Holland. Thus, by the combined processes of association, documentation and elimination, stems marked LE are shown to be attributable only to Luellin Evans of Bristol and must date between 1661 and about 1691.

Literature on kaolin pipes and their English makers does not make reference to stem marking at any particular period of time. However, pipes having names and ornamentation *around* the stems, all attributable to makers active during the late seventeenth and early eighteenth centuries, have been found at Broseley; while others, the products of one William Massie, who worked from 1688 to 1715, have been discovered at Chester. These data confirm the general dating of the LE stems and suggest that the custom of marking and decorating pipestems in the encircling or slightly spiraling manner was in vogue during the final quarter of the seventeenth century and perhaps during the first quarter of the eighteenth.

The fact that only one LE-marked stem was recovered from the Schurz site area suggests, indeed, that at the time of occupation the custom of placing encircling marks on the stems may already have begun to wane.

W. White - Glasgow (?). A second marked stem fragment recovered from the area of the stone foundation bears on its opposite sides and parallel to its axis the names of its maker and, probably, the city of its origin. The specimen has been so badly battered and worn that it is impossible to decipher the name of the city, and only vaguely is the name of the maker suggested. The traces of the letters which remain seem to suggest the name White. If this is correct, then the stem is totally inconsonant with all the other evidence from the Schurz site and must have been intrusive at a time long after the end of the occupation which produced the remaining evidence.

The firm of W. (William) White was founded in Glasgow in 1806 and remained in operation until 1955. Fragments of pipestems marked W. White - Glasgow, usually in relief letters rising from depressed background panels on opposite sides of the stem, have been found in almost countless numbers in the fields of the Atlantic coastal states. Even should attribution of the Schurz fragment to the White firm be incorrect, the presence of the markings in the parallel position still assigns it to the nineteenth century, a period completely out of context with that of the remaining white clay pipe evidence.

#### ADDENDA

Age/bore size correlations. While isolated specimens are insufficient evidence on which to

establish dates based on Harrington's percentages, the bore sizes of a number of the pipes and stems described, when considered with other evidence, lend weight to the findings already reached.

1. The bore diameter of the fleur-de-lis and the LE fragments is 6/64 inch, while that of the probable White fragment is 4/64. The date (before 1664) ascribed to the first of these would place it well within Harrington's 1650-1680 period, even though the Dutch were generally a little ahead of their English competition. This marked the beginning of the span of use of this bore size, which was to continue for roughly 100 years. Likewise the date for the LE stem (1661-1691) corresponds to the 1680-1710 period when this size was most popular. Finally, the White (?) fragment (after 1806) falls in the last period of Harrington's table where we see the 4/64-inch size gaining its maximum popularity; and we know that this was the standard bore from then on.

2. Just as the fleur-de-lis fragment suggests that some kaolin pipes had reached the area before the stone foundation was laid, so does the 8/64-inch bore size of the fragment omitted from Table 2 fall within the two periods covering 1620-1680 in Table 1, both before the time assigned to the construction of the building we are trying to date. Since other Dutch pipe fragments were lacking in the collection, both of these specimens may be regarded as accidental intrusions into this part of the site and connected with the disturbance attendant on the construction or the later occupation or history of the site. The second and closing period for the 8/64-inch size (1650-1680) corresponds to the time when the fleur-de-lis mark was extensively used in Holland.

3. Eight of the bowls assigned to the Tippet pipemakers had sufficient stem to permit measuring the bores. They are listed with the bore size and the identifying marks for each in Table 3.

As previously indicated, the significance of these figures in terms of Harrington's findings cannot be considered as anything more than suggestive or perhaps capable of reinforcing other lines of reasoning. In this light it may be noted that the largest bores, 6/64 inch, are those on pipes with only a stamped marking, an RT on the back, and none in relief on the side. All pipes but one with the more complicated relief marking on the side have 5/64-inch bores, that one being

Table 3. Bore Sizes of Tippet Pipes

Bore (inches)	Class	Markings	
		Back	Right side
6/64	4	RT	None
6/64	4	RT	None
6/64	4	RT	None
5/64	1	RT	(R?) Tip-et
5/64	2	RT	R Tipp-et
5/64	2	RT	R Tipp-et
5/64	2	RT	R Tipp-et
4/64	3	None	R Tip-pet

4/64. As far as it goes, then, this evidence is at least uniform in suggesting that simple stamped initials preceded the more complicated raised marks, and that they constitute a proper mark in themselves rather than merely an export stamp used in conjunction with the others.

Since all the findings to date appear to support Harrington's conclusion that bore sizes diminished steadily through time, a number of speculations are prompted by a study of the table with regard to the identity of the two Tippet pipemakers in question. Might the pipes with the large stem bore and only the RT impressed on the back of the bowl represent the early products of the second Robert Tippet? Might those of the smaller 5/64-inch size combining the RT on the back and more complicated relief markings on the side represent his later products? Finally, might the bowl with only a very faint relief mark on the side and the 4/64-inch stem bore be attributable to the third Tippet? In passing, it might be remarked that this last pipe has a thinner and far more delicate stem than any of the others and a bowl approximately two thirds as long. These questions cannot yet be answered, but it may be that the study of further evidence will provide answers in keeping with the undeniable associations presented here.

#### CONCLUSIONS

The makers' marks which appear on the bowls and bowl fragments of this study cannot be identified with eighteenth century Dutch pipemakers, nor, in the absence of adequate records, with those of the seventeenth century. They may, however, be attributed to pipemakers known to have worked in Bristol and other cities of England. Hence it is concluded that, with the

exception of one beach-found stem fragment, one stem fragment which appears to have been a relic of an earlier day, two partial bowls, and one bowl fragment, all the pipe evidence from the Schurz site is probably of English origin.

All of the bowls and bowl fragments, with three exceptions thought to have been intrusive, exhibit a particular shape known to have been introduced into England by the Dutch soldiers of William III c. 1690.

Comparison of the percentages of different bore diameters among the unmarked stem fragments from the Schurz site with the distribution of similar percentages obtained from datable specimens by J. C. Harrington suggests that the

Schurz site stem fragments were manufactured at some time between 1680 and 1750, the period most probable being that from c. 1700 to c. 1740.

The LE-marked stem fragment could not have been made prior to 1661 and probably was not made much later than 1691.

Other than the stem fragments, the amount of evidence which suggests terminal dates for the existence of the Schurz site building is meagre. Viewed in its entirety, however, it points to a period beginning shortly before the turn of the eighteenth century and continuing through at least part of the pipemaking activity of the third Robert Tippet, who became a freeman in 1713.

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## DISCOVERY OF A POSSIBLE CEREMONIAL DOG BURIAL IN THE CITY OF GREATER NEW YORK

by Julius Lopez and Stanley Wisniewski

### Introduction

On Flushing Bay, across from the La Guardia Airport, there is a sandy bluff in College Point, within the confines of Greater New York, which rises some fourteen feet above the shore. The terrain behind the bluff is fairly flat except for a knoll which dominates the immediate landscape.

Arthur C. Parker<sup>1</sup> spoke of the place as a village and burial site on the E. Platt Straton estate, and said that "skeletons were found in 1861, when excavating for the foundation of Knickerbocker Hall." What is left of the site today (1954) can best be described in terms of the city blocks which, from north to south, run from 25th Avenue, past the knoll which is on Graham Court, and on to 28th Avenue. This stretch is bounded by the Bay and the College Point Causeway.

There is little that is known about the site since it was never extensively worked. There are no published reports but during the early 1930's, Ralph Solecki and Stanley Wisniewski unearthed a human burial. Subsequently, Solecki found a Van Cortlandt Stamped vessel<sup>2</sup> of the Clasons Point focus, East River aspect, and a cylindrical stone tube while exploring a shell midden near the edge of the sandy bluff. According to Martin Schreiner, who lives nearby, the site also produced a steatite fragment with a lug which he found many years ago.

The only other information available is that additional skeletons were exposed during a bulldozing operation when earth was removed and carted away as fill for the marshy area which later was to be the grounds for the 1939 New York World's Fair.

To this meager data we can now add an interesting dog burial found by the authors in one of four shell pits.

<sup>1</sup>1922, p. 672.

<sup>2</sup>Vessel illustrated by Smith, 1950 (Pl. 8, 9).

### Discovery

The four pits were located after probing the walls and floor of a cellar excavation, 45 by 60 feet, and about 4 feet deep. This had been cut out of the highest portion of the knoll by a bulldozer the day before for a private dwelling which was to be built there. Two of the pits were found hidden a foot or so behind the eastern wall of the excavation.

The first pit (No. 1), 3 feet wide and close to 2 feet in depth, yielded a solitary exterior cord-malleated body sherd; the second (Pit No. 2), a few similar body sherds, a netsinker, and some deer and turtle bones which were mixed in with the shells. This latter pit looked much more promising; but, unfortunately, it was under a huge tree with a web of massive roots. Consequently it could not be entirely emptied.

Pit No. 3, a few inches beneath the bulldozed floor, turned out to be a saucer-shaped deposit 4 feet in diameter with a maximum depth of 10 inches. Here the shells were tightly interwedged with one another in a compact mass. From this pit we retrieved a light tan sherd with primarily grit tempering, though there were some shell particles present. An incised platt design adorned the sherd, which we believe to be a variant of Bowmans Brook Incised. A few crumbly body sherds, brick red in color, and malleated on the exterior with a cord-wrapped paddle, were also harvested. These belonged to a second pot which contained grit as an aplastic.

Pit No. 4 had a fill of black earth and ash, and oyster, clam, and some scallop shells, with discernible stratification. From top to bottom, there was a three-inch layer of red stained soil with some broken shells and shell ash. This then blurred downward into a three-inch mixture of shell ash, followed by a zone of wood ash, with a final layer, about two inches thick, of charcoal-impregnated soil laced with thermally reddened earth. It was under this layer that the dog burial (Fig. 1) was found. What made it especially interesting was the presence of features suggesting a degree of ritualism.

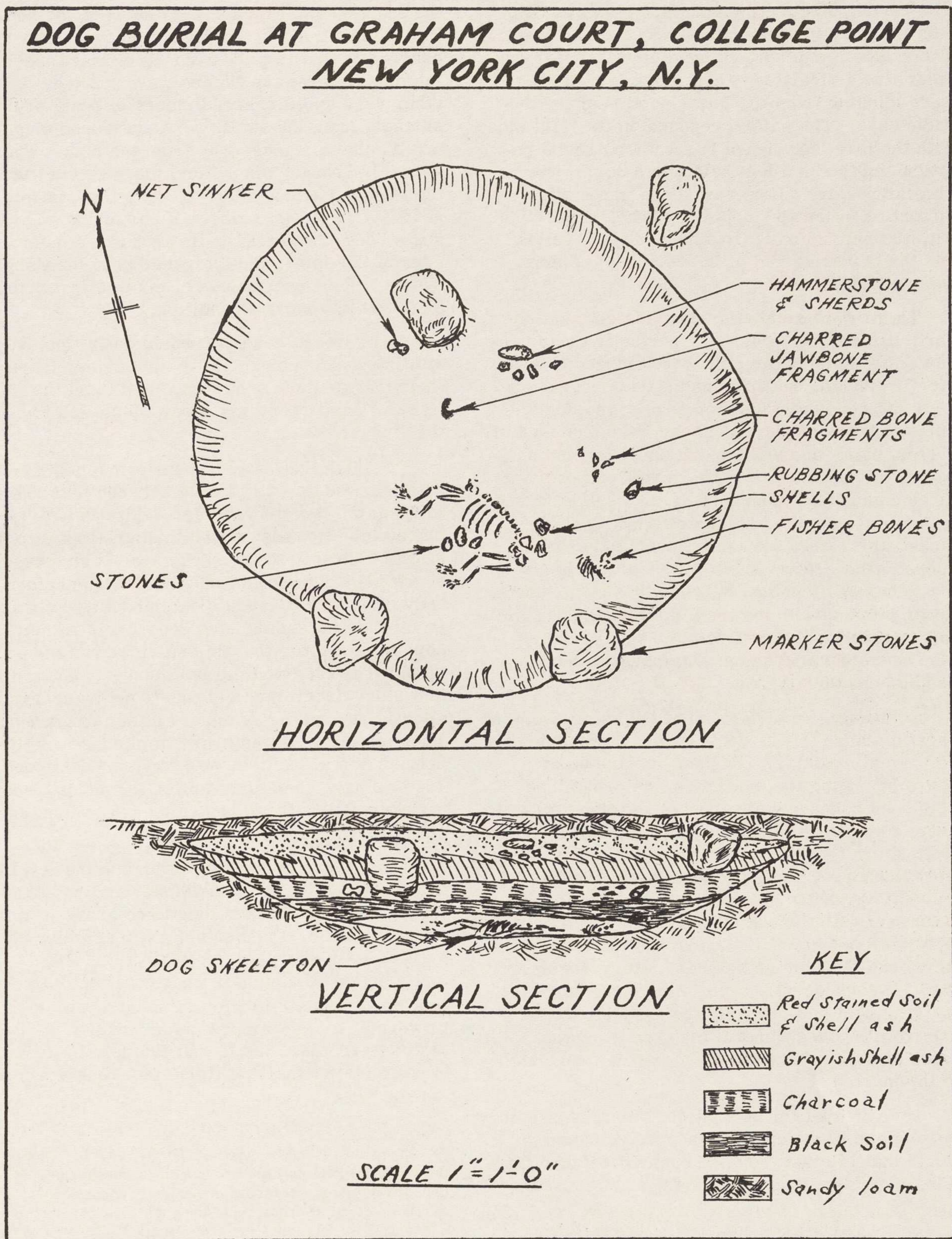


Fig. 1.



The dog discovered under the ashes at Graham Court had been apparently of a small breed. The skeleton was without head or tail, but it was otherwise articulated except for a few ribs which were missing from the lower portion of the thoracic cage. The animal reposed on its right side with the fore legs flexed in a rather natural position and the hind legs, also, in a somewhat similar posture. However, there was a slight distortion in that the upper leg bones connecting with the pelvic girdle, together with the pelvis and the posterior end of the vertebral column, were slightly raised.

There were no shells under the dog, and the earth between the bones was perfectly clean. Indeed, the skeletal remains were embedded in sterile subsoil, but three unhinged shell valves were noticed near the outer edge of the dog's spine at the same level. These were one each of oyster, clam, and scallop, all unbroken and unburnt. Lying in a row between the legs, were three unmodified stones. It is impossible to say if they were unpitted hammerstones since they lacked abrasions, but each conveniently fits a cupped hand. Near where the head would normally be, was found a charred piece of the dog's lower jawbone with the teeth split by fire. This was in marked contrast with the rest of the skeleton which bore no signs whatsoever of having been touched by fire.

Curiously, we also found at the same depth, a short distance off the dog's rump, a grouping of very small, partially crushed, rib and other bones belonging to a second animal which had also been beheaded. Nearby we did find, however, a small fragment of its jawbone with one tooth set in its socket. These bones, all of which were uncharred and embedded in clean subsoil without any shells in immediate association, were sent with the dog's broken jaw piece to Mr. George Goodwin, of the Department of Mammals, American Museum of Natural History, for analysis. He subsequently reported that "the smaller jaw fragment and probably the associated ribs are from a young fisher," also known by the name of pekan — a weasel-like carnivore related to the marten.<sup>3</sup>

The fact that the decapitated remains of both the dog and its companion escaped scorching would indicate that they had been covered with a thin, protective mantle of earth, as disclosed by

<sup>3</sup>Goodwin's comments contained in personal letter from Dr. Junius Bird, American Museum of Natural History, dated May 3, 1954.

the sterile sand which settled between the bones. The explanation for the dog's jawbone being charred is that it evidently fell, or was tossed, into the pit after the flames were started. A few other very small charred pieces of bone, presumably from the skull, were also found clustered some distance away from the body. They were also burned since they, too, were beyond the shielded area. In short, everything underneath the protective circle of earth, like the dog's body, the three shells around the outer edge of the spine, and the remains of the fisher, escaped the consequences of the fire; everything else was in a burned condition.

The severed heads, it would seem, had been mutilated beforehand, as we may gather from their fragmentary occurrence and from the fisher's unscorched jaw piece which was found in the subsoil.

To finish that aspect of the grave common to both animals, it was located between four rather large unworked stones which evidently had been placed intentionally around the burial as if to define it. Three were properly spaced as corners of the plot. The fourth may have been accidentally dislodged because it was about a foot away from where it should have been. It is rather certain, however, that this particular stone was intended as the fourth grave marker. It was the last stone excavated, and was found by searching slightly beyond the periphery of our excavation when the layout of the grave implied the likely presence of a fourth stone nearby. The stones seem to have been placed after the ashes began to accumulate: three rested on ash and one on subsoil.

There were no artifacts found on the level of the burial. However, a netsinker and rubbing stone, both fire-stained, occurred above it in the charcoal layer. Further up, a few exterior cord-marked body sherds were found in the ash matter; and still higher, almost on top of the entire mass, a plain hammerstone and two small Bowmans Brook Stamped<sup>4</sup> rim sherds from two distinct vessels. One is grit tempered, while the other contains shell particles including scallop.

<sup>4</sup>Type described by Smith, 1950, pp. 191-92. One of the cord-marked body sherds combines sturdy paste with a brushed interior. Brushing is generally associated with earlier pottery in this area of the coast, but we have found Clasons Point and Van Cortlandt Stamped pottery with interior brushing. These might represent an early, formative stage of the East River tradition.

### Other Dog Burials in New York City

The aboriginal interment of various types of animals is not uncommon. Skinner<sup>5</sup> reported finding the entire skeleton of a 4-foot sturgeon "neatly curled around its inner edge" in a pit at the Clasons Point site, Bronx County. He thought it might have been an offering. Complete snake skeletons were also found in two shell pits in New York City.<sup>6</sup> At Frontenac Island, Cayuga County, N. Y., Ritchie<sup>7</sup> reports finding a buried eagle. He also describes<sup>8</sup> skeletal remains (incomplete) showing probable instances of bear ritualism among the Owasco, and among the Iroquois, who, it is believed, ate the bear ceremonially. Canine burials, however, predominate everywhere. As is commonly known, they have been exposed from one end of the continent to the other. In the Southwest dogs have been found as burial accompaniments in Basketmaker caves.

Dog burials are frequent in New York State, and the Greater New York metropolis has produced a goodly share. About ten, some of puppies, were found at the northern end of Manhattan Island. All were discovered in shell deposits. The first was found in 1895 by Calver on the summit of a 12-foot high ridge of soft earth. Within 50 yards another was found.<sup>9</sup> In the Borough of Richmond, some were found at Tottenham and at the Bowmans Brook site.<sup>10</sup> At the latter place, one was located at a considerable depth with a layer of shells and charcoal a few inches above it.

The Bronx, which is another borough, also contributes to the list. In Pelham Bay Park one of twenty shell pits explored by W. R. Blackie contained a dog.<sup>11</sup> Near the Throgs Neck site M. R. Harrington opened several pits on the upland, and from the bottom of one he exhumed "two dog burials in a stone cist," which seemed to belong to a "later period."<sup>12</sup> At the same site Skinner<sup>13</sup> found, in a densely packed shell pit, "the skeleton of an old dog, headed westward, lying on the left side" with a netsinker nearby. Theodore Kazimiroff, of the Bronx, stated that in 1936 he unearthed at Ferris Point a burial with

human and dog remains, which it appears had been enclosed by postmolds. Recently, Harry Trowbridge and Julius Lopez uncovered a flexed human skeleton with a dog beside it at the Schurz site.

The burial found at College Point is the first and only one recovered from Queens County. None are reported from Brooklyn but the scarcity of canine interments in both Brooklyn and Queens can be attributed to the rapid development of these regions, and the lack of intensive archeological work decades ago when there was more of an opportunity to investigate aboriginal sites.

Outside New York City, but close enough to be included in this recapitulation, is the Port Washington site, Nassau County, where Harrington<sup>14</sup> found a human skeleton buried just above a large dog. The strained position of the animal suggested burial alive. Another human skeleton was found on a bed of shells, and underneath, the bones of a young dog with an arrow among the ribs. Harrington surmised that the poor creature had been shot to accompany its master into the hereafter. A fire had been kindled over the grave leaving a small ash bed near the surface.

### Discussion

Certain it is that since time immemorial the dog has enjoyed the affection and regard of man, even to the extent of being brought into the next world with him, possibly to serve as a pet, a companion, or a helper in the hunt. Indeed, the idea of sacrificing a dog, and rarely other animals, with human burials persisted in New York State from archaic to post-contact Iroquois days, even while concepts of how to bury a human being differed. Thus dogs have been found associated with human remains which were flexed, extended, or wrapped in bundles connected with previous tree or scaffold disposals.<sup>15</sup> The latter practice involves a preliminary disposal of the corpse by wrapping it in skins and placing it out of reach of dogs and other animals until it has become skeletonized. Later the bones are gathered and buried. Variations of the grave itself include, to judge from postmolds, one which had been enclosed by a ring of posts.

To further demonstrate the importance of the

<sup>5</sup>1919, p. 87.

<sup>6</sup>Finch, 1909, p. 71.

<sup>7</sup>1945, p. 8.

<sup>8</sup>1950, pp. 247-49; 1947, p. 69.

<sup>9</sup>For dog burials in Manhattan, see Finch, pp. 70-71; Bolton, 1909, pp. 87-88.

<sup>10</sup>Skinner, 1909a, pp. 7, 51.

<sup>11</sup>Bolton, 1934, p. 141.

<sup>12</sup>Skinner, 1919, p. 72.

<sup>13</sup>*Ibid.*, p. 56.

<sup>14</sup>1909, p. 176.

<sup>15</sup>Ritchie, 1944, pp. 188-89; the site was on the McComb farm, near Vine Valley, N. Y.

dog in the mind of the aborigine, the animals were sometimes interred in much the same fashion as human corpses. We have already seen that in the region of the coast, where shellfish were so commonly eaten, dogs have been found independently buried in shell pits the same as their masters, and on occasions, with evidence of a fire kindled over the grave. Also in Ledyard, Connecticut, in 1950, there was found a bundle burial of a dog.<sup>16</sup>

The presence of ashes over some dog burials is interesting when we recall that it may have been a human mortuary custom, to quote Skinner,<sup>17</sup> "to hold a 'Feast of the Dead' at the time of interment, as in almost all instances the earth above and about the skeleton contains particles of charcoal, fire-cracked stones, split and charred animal bones, potsherds, bivalve shells and the like. Sometimes a foot or more above the body will be a pit containing great quantities of oyster shells, etc., as though, when the departed was out of sight of the living beneath a thin layer of earth, a feast was held and the refuse cast into the still open grave."

Among many primitive peoples (and some not so primitive) the dog was often a subject of myth. At times it was even thought to occupy a position bordering on kinship, as with one of the Mohegan clans which had the dog for its totem.<sup>18</sup> It would not be surprising, therefore, if a Feast of the Dead were sometimes accorded certain dogs after a natural death; or if others, during a communal feast, were victimized for ritualistic sacrifices possibly connected with totemic ideas. It is known that the dog was also involved in other ceremonies. The Iroquois had "White Dog Feasts" when the poor creatures were entirely cremated.<sup>19</sup> Another type of ceremony was practiced by the Sioux and Dakota, who were observed eating raw dog liver "to make the heart strong" during a dance when several dogs were slain on the spot for this ritual.<sup>20</sup> Obviously, this "Dog Feast," as it was called, ties in with the widespread concept among aborigines that eating the

vital organ of a beast, or at times of a man, will confer certain admired attributes of the "donor."

Precisely what took place at Graham Court is not clear. Our burial is unique, for nothing like it has been reported before. The removal of the head and tail, the careful disposition of the dog's remains, and the presence of a companion sans head, imply some sort of ceremony though its nature is not apparent. The dog was evidently the main sacrifice with the fisher cast in a minor supporting role. The four grave markers also suggest more than just a casual burial, as do the leftovers from a communal feast. The reason for the mutilation of the heads is not known. Perhaps they were eaten ceremonially together with an organ removed from the dog. The missing ribs may point to the partial disemboweling of the animal.<sup>21</sup> As for the three stones aligned between the legs and the three shells near the spine, these might have been just a coincidence. On the other hand, might they not have been placed there for a symbolic purpose?

#### Dating of the Graham Court Burial

Lamentably, the clues for dating are far too slim. They consist only of a few body sherds and the three decorated pieces, which are not much to go by. Two of the latter, which came from above the grave, are *Bowmans Brook Stamped*; the other, from Pit No. 3, is believed to be related to, if not a variant of, *Bowmans Brook Incised*. Both pottery types are characteristic of the *Bowmans Brook* focus. However, according to Smith,<sup>22</sup> they lingered into the following *Clasons Point* focus. The burial, therefore, could belong to either period, both of which form part of the *East River* aspect. All that we can add is that the event took place sometime after the year 700 A. D.,<sup>23</sup> the approximate date, according to present beliefs, of the first appearance of this cultural tradition.

<sup>16</sup>Butler, 1954.

<sup>17</sup>1909a, p. 50.

<sup>18</sup>Speck, 1909, p. 193.

<sup>19</sup>Skinner, 1909b, p. 233.

<sup>20</sup>Glazier, 1894, pp. 219, 220.

<sup>21</sup>Could their removal have provided the easiest way of reaching the heart? ed.

<sup>22</sup>1950, pp. 191-92.

<sup>23</sup>Smith, 1955, pp. 4-5.

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Flushing, L. I., N. Y.  
December, 1956

*In Memory of*

ROBERT MACY BARNES

*Blessed are the pure in heart, for they shall see God.*

Matt.5:8

# THE MANAKAWAY SITE, GREENWICH, CONNECTICUT<sup>1</sup>

by Robert Carl Suggs

## ACKNOWLEDGMENTS

I should like to acknowledge my indebtedness to all those who, directly or indirectly, assisted in the undertaking described in the following paper. The Greenwich Board of Selectmen very generously gave their permission to work on Town property, a rare privilege. Donald D. Hartle, of Hunter College, rendered assistance and advice throughout the entire summer in all technical aspects of the dig. Dr. Leonard Jacob and Peter Salter, of Columbia University; Bert Cutler and Jack Green, of Greenwich; Les Horten, of Portchester; William Suggs, of Roanoke, Virginia; and the students of Hunter College did fine work in the actual excavations. Prof. Richard B. Woodbury, of Columbia University, gave painstaking assistance in the preparation of this report. Dr. W. J. Robbins, of the New York Botanical Gardens, and Mrs. Gordon Stanley, of Greenwich, aided in the seed identification. Mr. T. Donald Carter, Assistant Curator of Mammals, American Museum of Natural History, identified animal remains. Ralph and Rose Solecki, of Columbia University, and Ken Young, of Greenwich, made a fine photographic record of the dig and the artifacts. Dr. Irving Rouse, of Yale University, and Frank Glynn, then secretary of the Archeological Society of Connecticut, kindly gave assistance and lent their interest throughout the dig. Finally, numerous other individuals whose listing would require too much space gave their assistance in an infinite variety of ways.

## INTRODUCTION

### Archeology in the Long Island Sound Area

Aboriginal remains in the Long Island Sound area drew attention at an early date; but their investigation, unfortunately, was antiquarian in nature, with emphasis on the specimen and no attention to stratigraphy, associations, or context.

<sup>1</sup>Submitted in partial fulfillment of the requirements for the degree of Master of Arts in the Faculty of Political Science, Columbia University.

Within the past century, many sites have been discovered, looted, and obliterated through the rapid urban development of the metropolitan area; but not a word about them has been printed. The large and varied collections assembled by collectors of antiquities may be seen in most of the local museums and historical societies. The artifacts are often spectacular; but, with little or no site data attached to them, the value of the collections is hardly more than aesthetic.

Some of the earliest attempts at good scientific digging were made by Skinner and Harrington in their work for the American Museum of Natural History around the turn of the century. They did a tremendous amount of digging in the metropolitan area, on Staten Island, and in Westchester County and located many sites for future excavation; but their most important contribution lay in the series of publications resulting from this work. Although the reports suffer occasionally from an approach that is more descriptive than interpretive and techniques at times would make a modern archeologist blanch,<sup>2</sup> much of the data is still extremely valuable. Skinner tried some interpretive work and established a dichotomy between "Algonkian" and "Iroquoian" pottery; for he recognized the distinction between the earlier conoidal-bottom, wide-mouth vessels and the later globular, constricted-neck, collared vessels with incised and cord-wrapped stick decorations. However, no attempts were made to split off types or regional variations. Material from all sites was thrown into one category or another; and when sherds refused to fit in either, resort was made to a third division, "Sub-Iroquois."

Parker carried out extensive field work in upper New York State between 1906 and 1924; and he was joined at Rochester in 1925 by Ritchie, who conducted a series of excavations over the next 15 years and worked out a chronological sequence fitting their data into the McKern system. After the initial work of Harrington and Skinner along the coast, however, little digging was undertaken in this area which chiefly occupies the attention of this paper.

<sup>2</sup>Harrington, 1909a, Finch Rock House.

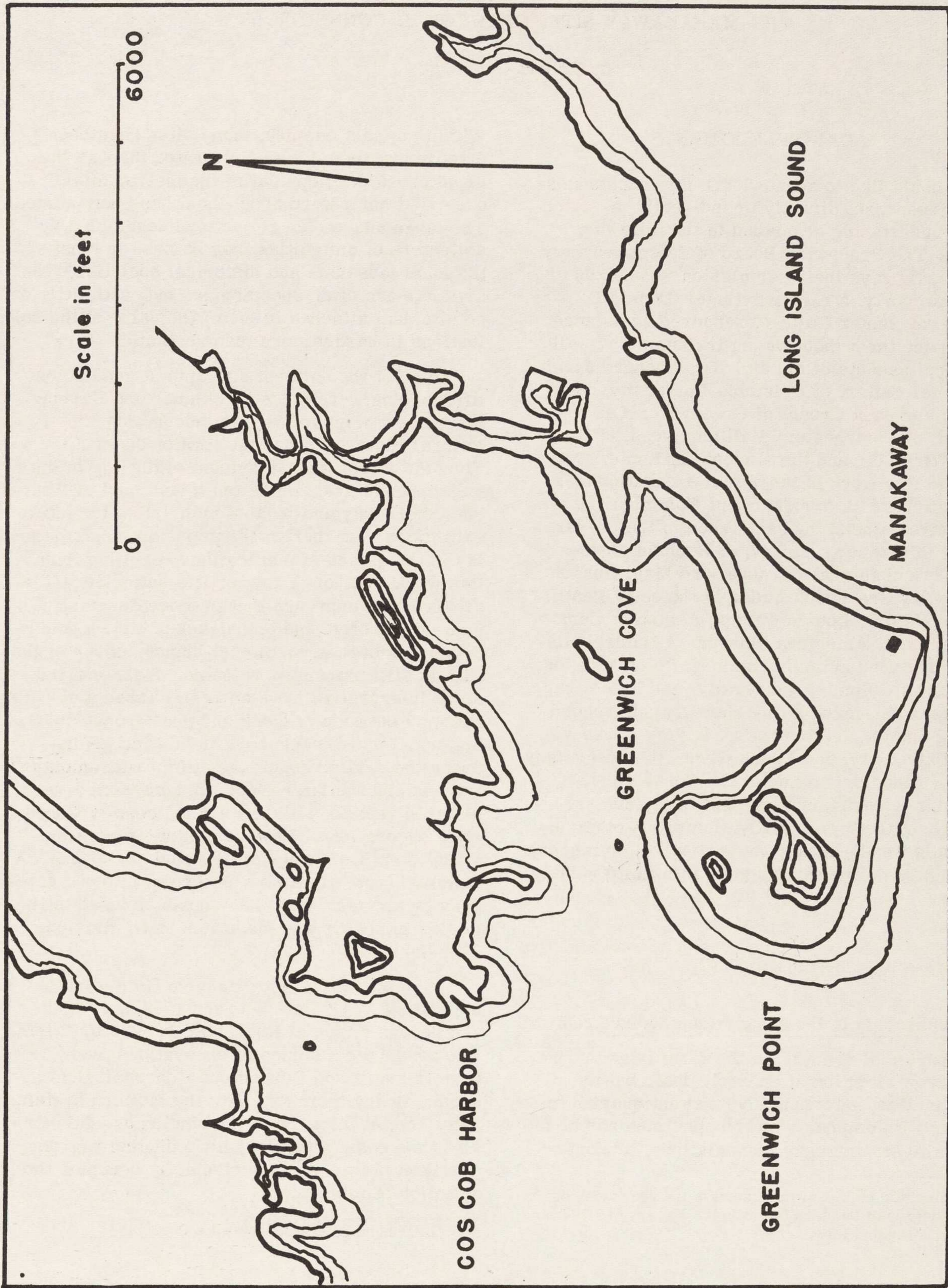


Fig. 1. Greenwich Point and the Manakaway site.

Both the Archeological Society of Connecticut and the various societies in the metropolitan area have been carrying on work about Long Island Sound for the past 20 years or more. Digging mainly on weekends, their members have obtained much valuable material; but no attempts were made to tie in these findings with time levels elsewhere until the work of Smith and Rouse in the 1940's. Rouse worked mainly in Connecticut, while Smith concentrated chiefly on Long Island and the region about New York, though he also made use of materials from Connecticut sites. His publication on this research<sup>3</sup> identified traditions, separated them into time levels, and established their relationships. Types were isolated and tied down to time level, and relationships to actual tribes of the contact period were often formulated. In this valuable publication Smith drew on the large store of collections produced by amateur digging as well as those of the earlier professional workers. However, many parts of the Sound region are not even represented in this material;<sup>4</sup> and they have been untouched except by the ubiquitous collectors. Work in these sections could substantiate or alter some of Smith's conclusions and would probably result in the isolation of certain regional variations, traditions, and foci. This is especially true in Connecticut, which is not at all well covered.

The preponderance of work has been done in the metropolitan area, lower Westchester County, and along the Sound shore of western Long Island to Northport. The eastern tip of Long Island and also the Connecticut mainland across from it have been fairly well covered. Otherwise, apart from some activity at the mouth of the Housatonic, the remainder of the area is relatively untouched. This includes western and northwestern Connecticut as well as a large part of the central portion, and central Long Island and southeastern New York along the Connecticut border.

The excavation now being considered was the first in the western portion Connecticut. It was undertaken with a view to ascertaining the eastward spread of the East River aspect, which has been associated with the Wappinger Confederacy<sup>5</sup> as well as with other groups. Since the Siwanoy of the Greenwich area were members of this confederacy, they, too, might be expected to represent East River culture. The general locale of Greenwich and its environs has many interesting

sites; and further excavation is planned to deepen the time perspective, which should show a continuous occupation from Archaic (Finch Rock House) to historical times.

This should also be a prime area for examining the relationship between the Windsor and East River aspects and for establishing the exact nature of the latter. This problem has been illuminated somewhat by research undertaken by the author in preparation of this paper, and an hypothesis will be presented in more detail later in the paper.

#### The Manakaway Site

Greenwich Point (Fig. 1) juts from the mainland into Long Island Sound toward the south for a distance of approximately 5000 feet and then hooks abruptly westward for about 4000 feet. It is a glacial deposit resting on a bed of gneissic rock, and the topography is generally subdued. The entire point is sinking slowly and wave action has been working steadily away at the banks on the beach near the site.

Although the point was for years a private estate, it was not cultivated and was only cleared occasionally for sheep grazing and once for a crude golf course.<sup>6</sup> Today, although development is proceeding extremely rapidly, only about one eighth or less of the total area is cleared in any way; most of the clearing done is confined to the shore line, along the roads that traverse about half of the shore of the point. The rest of the area is covered by a fairly dense second growth of trees and thick underbrush penetrated only by occasional bridle paths. Conditions for preservation of archeological remains seem to have been as good as could possibly be desired, although one small site was destroyed by construction this spring. There appear, also, to be traces of other aboriginal sites and possibly a late Colonial occupation. "Manakaway," the Algonkian aboriginal name of the point, was the name chosen for this site to distinguish it from others on the point. This would prevent confusion, since plans were being made to survey the entire area and excavate any and all aboriginal and Colonial habitation traces.

The area is renowned for its excellent fishing and shellfish beds, especially hard-shelled clams. Fresh water was once obtainable on the premises from a spring which now appears to

<sup>3</sup>Smith, 1950.

<sup>4</sup>See map in Smith, 1950, p. 102.

<sup>5</sup>Smith, 1950, p. 155.

<sup>6</sup>Personal communication, Arnie Larsen, former superintendent of the Todd estate.



have gone dry. Berries and nuts are still plentiful in some variety despite repeated clearing. Small game, especially rabbits, squirrels, skunk, and mink, were present until quite recently in large numbers. Stone (particularly quartz and granite) may be obtained all along the beach where the glacial deposit has weathered, and potter's clay is still dug by local hobbyists.

In aboriginal times, and up to about 50 years ago, the point was actually two islands connected to the mainland by a thin bar which was submerged even at low tide. A causeway built over this bar has now produced a silting up of the cove which lies in the curve of the point toward the mainland. The islands, formerly separated from each other by a channel, are now connected by roads which cut off the channel at both ends and thus form a large lagoon (Fig. 1).

The point is the site of the landing of the first white settlers in the area, a party led by Daniel Patrick and Robert Feacks of the New Haven Colony; and both it and the adjacent mainland were purchased on July 18, 1640, from the local Indians. These aboriginal inhabitants were members of small local units of the Siwanoy, who belonged to the Wappinger or Mattebesec Confederacy. This included the Wappinger themselves, Wecquaesgeek, Sintgink, Kitchawank, Tankiteke, Nochpeem, and Manhattan.<sup>7</sup> Ritchie<sup>8</sup> also adds the Pachami to this roster.

No mention is made in historical documents of any aboriginal camp site on Greenwich Point in contact times, and tradition fixes the only local settlement about one mile away on the mainland. That the area was still frequented by the Indians at contact is certain, for the deed prohibits any Indian trespass. Evidence of a late and ephemeral occupation will be discussed later.

The site (Fig. 1) is a strip of midden about 40 feet wide and of indeterminate length. It lies close to the beach in a depression parallel with the eastern edge of the point near the southeast corner. The brush is particularly thick here, sumac, poison ivy, and brambles abounding. A brackish marsh lies south of the site, separated by a high bar from the Sound. Investigation of this area was prompted by the discovery in 1953 of a large earthwork 140 feet long and varying in height between 2 and 5 feet which ran in an east-west direction across the depression later found to contain the midden strip. Alongside the earthwork on the north was a borrow ditch with a

sandy bottom, very shallow and about 30 feet wide. The western end of the earthwork was curved abruptly northward in a bastion-like structure. Trowel tests in the borrow ditch near the center of the wall proved the sand to be approximately 10 inches deep, overlying a well packed stratum of midden material which consisted of shells, small animal bones and stained earth. Sherds were found at a depth of about 2 inches; and further week-end excavation resulted in a pit measuring some 3 by 7 feet. This produced about 30 more sherds, a triangular point, shop chips, and a quantity of fish, reptile, and mammal remains. Excavations were then stopped until a full-scale job could be undertaken. It was felt at this time that the earthwork and borrow ditch were portions of an aboriginal fortification. This was later proved untrue. Construction of the earthwork had utilized the overburden of the midden which, in the areas outside of the mound and borrow ditch, was buried by approximately 20 inches of topsoil. The midden, luckily almost undisturbed, ran right beneath all these surface features (Fig. 3, a, b). Information volunteered by Arnie Larsen, the Todd estate superintendent, who has spent about 40 of his 60-odd years on the point, brought out the fact that the earthwork was constructed by military personnel who were allowed to use the premises for training in 1915-16.

## THE 1955 EXCAVATIONS

### Methods

In the spring of 1955 a full excavation was planned. On May 20 we mapped the site and laid out a system of 5-foot squares from north-south and east-west base lines (Fig. 2). Excavation proceeded in arbitrary levels in these squares, and was continued down through the shell midden into the sterile glacial till beneath. Two of the pits we carried down well into the till to check for any intrusions from above, but they were unproductive. The total of pits completed in this way was 17, of which 2 were dug in 3-inch levels with all artifacts, shellfish, and animal remains sacked separately according to levels. We dug four trenches, three of them through the earthwork and one through the low north bank of the borrow ditch, following the midden material out to the north. This trench was continued 23 feet 3 inches, but the shell midden persisted all the way without alteration in either thickness or composition. These trenches were the means by which we discovered the non-aboriginal nature of

<sup>7</sup>Smith, 1950, p. 103.

<sup>8</sup>1944, p. 13.

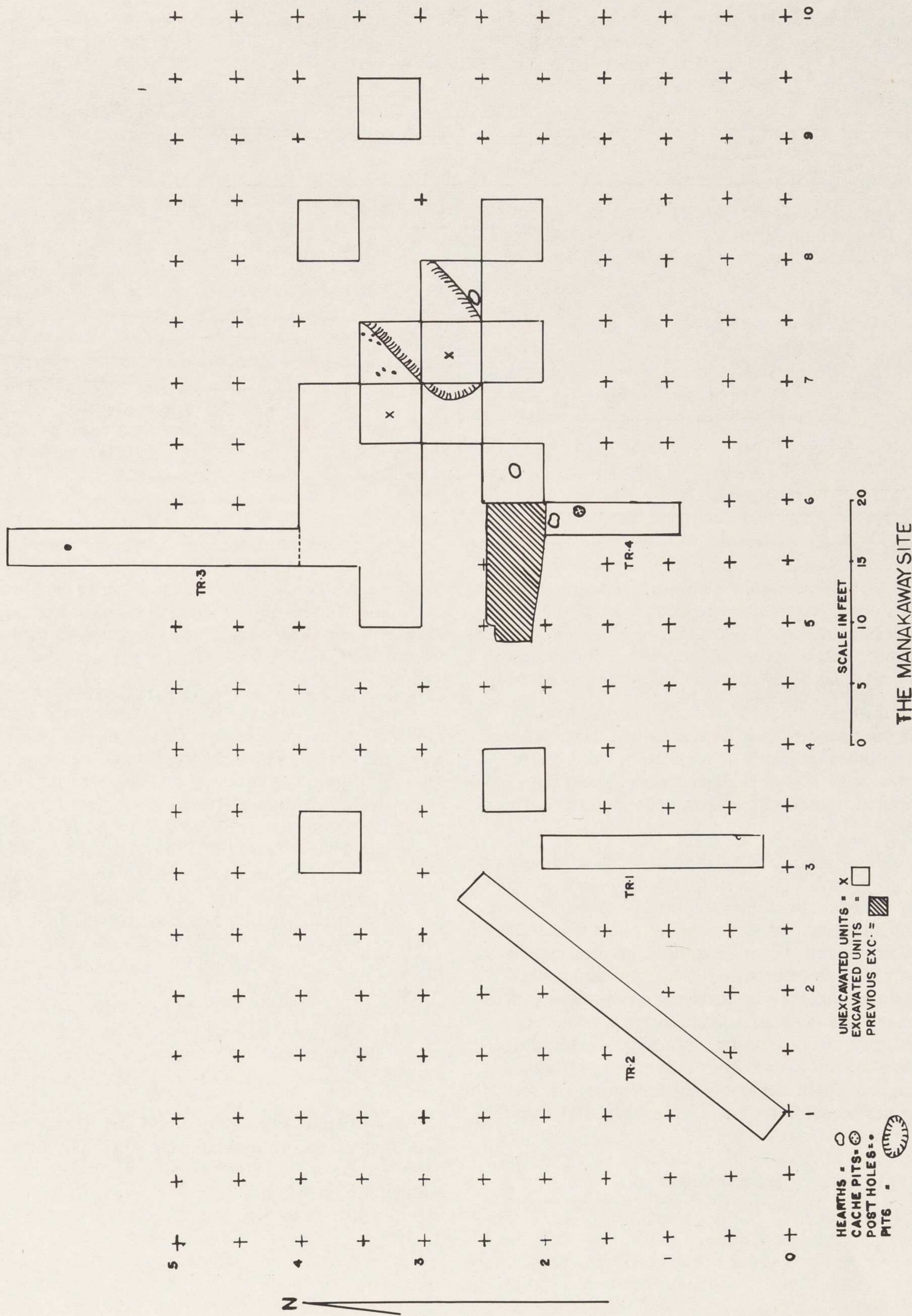


Fig. 2. Plan of Manakaway excavation.

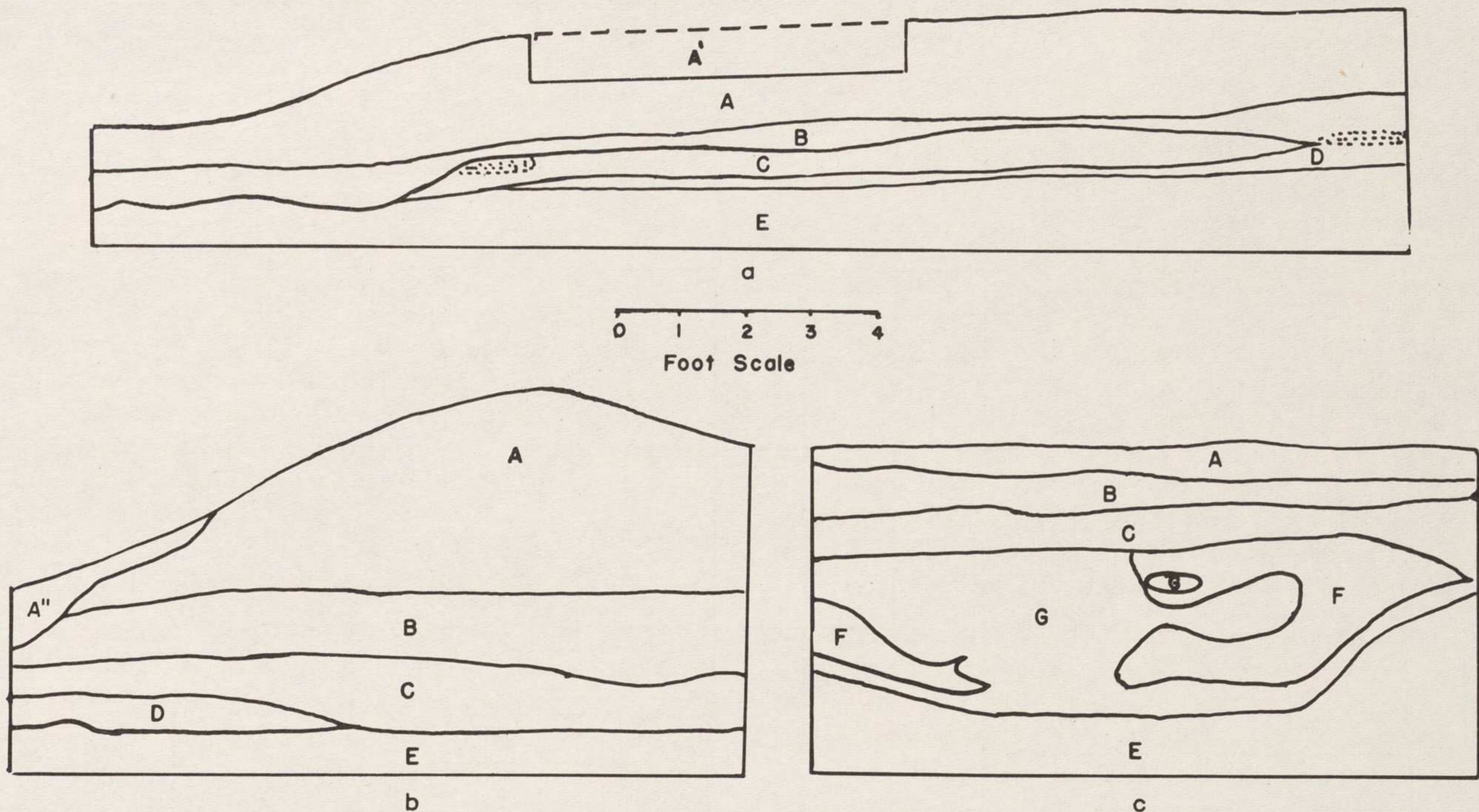


Fig. 3. Profiles from the Manakaway site: a, west face of Trench 3; b, east face of Trench 4; c, composite of north face of N25/E75 and south face of N30/E70 cutting diagonally through Pit 1.

A= topsoil; A'= test pit in overburden; A''= disturbance from 1953 excavation; B= stained earth and shell chips; C= shell midden; D= stained earth; E= glacial till; F= shell fill in Pit 1; G= stained and baked earth fill in Pit 1; stippling= ash beds.

the earthwork and borrow ditch (Fig. 3,a,b). A 5-foot square put down to sterile till about 40 feet south of the earthwork again struck what appeared to be the edge of the midden material; so it is evident that the midden exceeds at least 110 feet in length.

We drew profiles of the four sides of every pit, and also plans of the bottoms in cases where post holes, hearths, or subfloor pits appeared. Only one side of the trenches was profiled, that being chosen which presented the most distinctive features — if any at all were present. All large and unusual sherds and other artifacts were plotted as to provenience, and unusual animal remains were recorded in similar fashion. Work continued daily, with breaks only for bad weather, until August 18, after which Park Superintendent Castiglione lent the use of his bulldozer to move the back dirt into the excavations.

#### Stratigraphy

It may be expected, that much churning of deposits has occurred in a midden of any size and span of habitation, thus greatly complicating the stratigraphy. Quite often these changes are of a nature not detectable by the digger. In other cases, the disturbances present some bewildering complications.

In the excavations, as previously stated, all sides of every pit were profiled; but the results were not always what we might have expected. The high humidity, the dampness of the site (evidently from its proximity to ground water level), and a heavy morning dew combined to make the task of detecting strata very difficult. Drying of pit faces was very uneven, and some received no sun at all throughout the entire day. For this reason if the profile of a particular face was drawn once, and then a second time at a later date, the two profiles might differ from each other by the presence or absence of a stratum. This usually involved the topsoil deposits, which fortunately bore no cultural material; but occasionally the outlines of buried small heaps of shell in the deeper midden would be visible on some days but not at all on others.

The deeper pits never dried and beside being a breeding place for mosquitoes, sprouted a coat of green slime on the floors and walls which also obscured strata. In addition to these difficulties, nocturnal visits from the local fauna were occasionally disastrous. Rabbits were constantly falling into the open blocks and tearing away entire corners and large portions of faces in their efforts to escape. Skunks and large rats, too, were encountered but less frequently.

The deposits, starting with the uppermost, were as follows (Fig. 3a).

1. *Topsoil.* A 19- to 20-inch layer (outside the borrow ditch area) of loose, fine soil with some pebbles and boulders. In the borrow ditch the topsoil was very sandy and its depth, though varying, was mostly around 7 - 10 inches. The lower portion of this soil, not consolidated by roots as well as the upper, was extremely loose. It would flow at the slightest touch and leave the upper, more consolidated part hanging. This loose lower sand was particularly difficult to follow and would change color at the mere suggestion of moisture. Profiles showing it on one face often did not show it at all on the one adjacent. In the borrow ditch the sand was clearly distinct from the underlying layers, but outside of it the topsoil shaded gradually into the upper portion of the midden.

2. *Black dirt.* This was a layer of well packed earth deeply stained by decomposition of organic material. It contained a fairly high concentration of shells, mostly chips and fragments, and small pebbles and gravel.

3. *Concentrated shell.* A concentrated layer of shells, mostly whole, appeared in all pits, thinning occasionally both in thickness and in concentration and wedging out at the eastern and western edges of the midden. It was interrupted in spots by the appearance of very heavy shell deposits, obviously buried piles of shells, which were discontinuous and had a different texture. Extremely tightly packed, and with no earth to speak of in the interstices, they were just shell fragments. These deposits were also distinguished by the presence of a heavy, hard, gray and orange mineral deposit on the interior of the shells and on any small pebbles that appeared within them.

4. *Glacial till.* The lowermost deposit was a solid, well packed, and clayey till with occasional small, water-rounded pebbles and boulders. The portion in direct contact with the midden material was stained, often to a depth of several inches. Beneath this the till was yellow.

The interpretation of these strata seems to the author to be relatively simple. The midden is the product of a single occupation, no significant breaks occurring in the deposition.

The piles usually seemed to be a product of one deposition and were often extremely poor in cultural material. All indications suggested that they had soon been covered by more shell refuse, which allowed them to keep their form and outlines fairly well. This later deposit of concentrated shell contained abundant artifacts. After it had been laid down the site became less frequented, and the

"black dirt" layer began to accumulate from the decomposition of organic material at the surface of the midden in conjunction with the natural deposition on that surface. The mixing in of shells, mostly broken, was a result of human use churning up the surface of the midden and leveling off any inequalities in it.

After the final exodus of the aborigines deposition seems to have occurred pretty rapidly, and 19 - 20 inches of topsoil accumulated above this deposit. The process in this locality was probably more rapid than elsewhere in the area owing to the position of the midden in a slight depression. The latter would make a good catch basin for erosion from the high ground to the west and for dust and sand carried in from the beach by northeast winds.

#### Architectural Features

Post holes. Seven irregular post holes were found associated with the north side of Pit 1 in the glacial till beneath the midden. These holes were light, in contrast to the surrounding dark soil; and their texture, somewhat looser and softer, was completely different. Discussions with Solecki, Rouse, and Glynn reveal that light colored post holes are frequently found in this area and seem to be especially common in deeply stained soils like the surface till. The uneven shapes of these holes may be due to the use of split posts, of clusters of smaller poles set in the earth together, or, as is most likely, round posts with bracing wedges driven into the earth at their bases. Seven of the holes were elongated and about 7 inches by 4 inches; while four were ovoid and measured some  $4\frac{1}{2}$  inches in greatest dimension (Fig. 4). The structure represented by these post holes may have been some sort of drying or smoking rack. The association with Pit 1, in which signs of intense and prolonged heating occurred, seems to point to some explanation of this type.

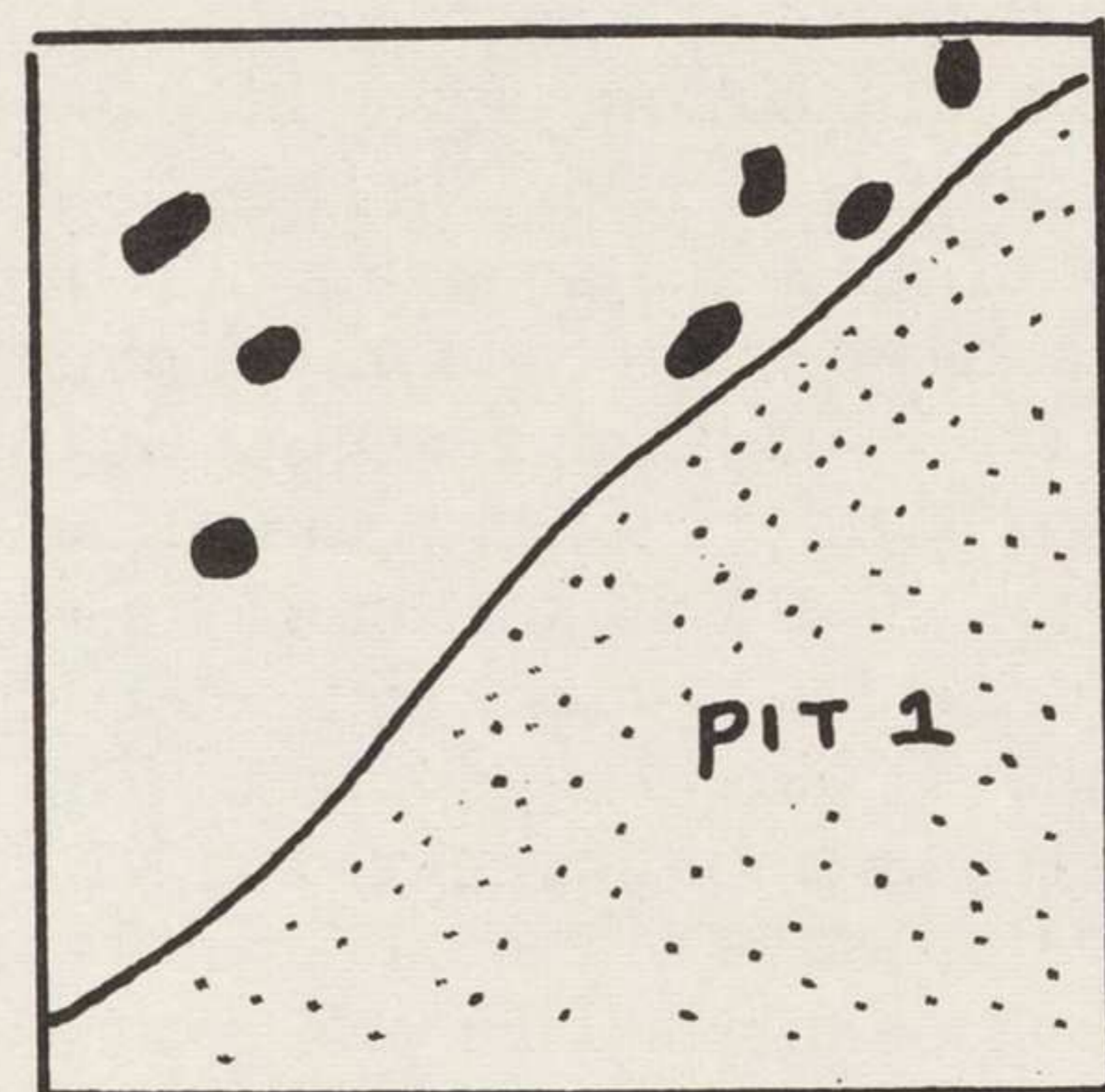


Fig. 4. Post holes associated with Pit 1.

A large post hole appeared in Trench 3, 17 feet 3 inches northward from its mouth. This feature was 21 inches deep, and the diameter varied from  $7\frac{1}{2}$  to 8 inches. It tapered slightly toward the bottom, which was somewhat pointed, and contained a darkly stained midden material and a number of land snail shells (white-lipped *Polygyra*). Two small holes lay in an east-west line about 14 inches north of this feature. They were very shallow (2 - 3 inches) and filled with shells; the eastern one was  $4\frac{1}{2}$  inches in diameter, the western,  $2\frac{1}{2}$  inches. They were about 10 inches apart. These may possibly have been holes left by braces for the larger post. No attempts were made to pick up any more post holes by cutting east or west at this point since we were pressed for time. This area will be checked next season; and if more post holes appear, a more complete excavation can be undertaken to determine the extent of any structures.

Pits. Pit 1 appeared first in the southeast corner of N30/E70. Cutting down through the midden, we noticed a sudden change in its appearance; a yellow-gray, calcareous deposit now covered the shells and stone fragments. When this was gone through and the deposit could be viewed in profile and in its horizontal extent on the floor of N30/E70, we saw that we had cut through a pile of shells covered by later midden growth. This pile was built over a pit the edge of which could be discerned in the floor. The contents of this segment of the pit were removed later; and the pit was found to consist of alternating layers of shell and earth, all heavily stained. Sherds of fine dentate stamped ware, a bone awl, and numerous animal remains were found in the pit. The alternating shell and earth layers, however, did not extend completely through the fill. The southeast side of the pit, cut by the north side of N25/E75, was filled with earth that showed signs of intense heat. No shells were found in this earth, but a thin lining of shells along the bottom of the pit was exposed in the north profile of N25/E75 (Fig. 3c). In the west profile of the same square a thin line of dark earth marked the bottom of the pit, even the basal layer of shells being absent at that point. Several large boulders were in the fill and along the edge of the pit at this section of its rim, and a small clay-lined hearth lay just south of it. The pile above the pit here was of earth. The western edge of the same pit appeared in N25/E65 along the eastern face of the square. There again the profiles displayed a pile of shells built up over the pit. Within and beneath the pile edge were sherds of crude dentate-stamped ware and

fabric-impressed limestone-tempered ware. The southern and northern extent of the pit could not be determined. It had not been filled gradually, however, since four sherds of fine dentate-stamped ware from a single vessel were found at all levels throughout the fill.<sup>9</sup>

In Trench 4 a small cache pit was associated with a clay-lined hearth and burned area. It was  $7\frac{1}{2}$  to 8 inches in diameter by about 7 inches deep, and was slightly undercut to the south. This contained snail shells and other midden material. It may have been a post hole dug into the till through the midden but naturally no trace of it could be found in the midden.

Hearths. Two lenses of orange, strongly burned soil containing burned shells were exposed in profile along the west face and in the northeast corner of Trench 3. The first of these was 13 inches long and 2 inches thick (Fig. 3a). In the south face of N35/E65 we exposed a charcoal lens about 13 inches long by  $4\frac{1}{2}$  inches thick at the deepest part. It contained no large pieces of charcoal, just tiny crumbling fragments. No signs of any construction (stone or clay linings, post holes, etc.) were associated with these lenses.

Hearth 1 was uncovered lying on the glacial till in the floor of N20/E60. It was surrounded with cobbles and was slightly dug in. The underlying earth gave no evidence of prolonged firing. Slightly above and to the north of the hearth lay a side-notched chert point, and beside it on the southwest side was a schist spade broken into three pieces and piled together; two other fragments of this implement were found on the western rim of the hearth. The hearth contents were dug out carefully, sacked, and later screened. Examination of the material proved it to contain soft shell clams and oysters in almost equal amounts, a few hard shell clams, and a snail (*Littorina saxatilis*). Small bone fragments (unidentified) and pieces of turtle carapace were also present. The surrounding area appeared to have been some type of habitation but no post holes were observed. More boulders and cobbles were exposed in the north face of the pit. To the southwest a short distance was the clay-lined hearth uncovered in Trench 4.

Hearth 2 was found in N25/E75 at the south edge of Pit 1, and Hearth 3 in Trench 4 (Fig. 2). The former was a basin with clay-covered interior containing fragments of well burned bone,

<sup>9</sup>See East River aberrant types.

shells, and charcoal and was quite well fired all over its interior. A groove along the east side seemed as though it had contained a piece of wood that had since burned out. The hearth was 5 inches deep and approximately 2 feet long in its east-west dimension.

The hearth in Trench 4 was of a slightly different nature, or there may have been two hearths. Ridges of light clay similar to that in Hearth 2 and about 3 inches high had been built on the glacial till. One ridge came west out of the trench face and hooked sharply back east again almost completely inclosing a scorched area which contained fire-cracked stones. The other jutted out of the east face approximately toward the southwest, and bounded a scorched and discolored area on its south side. The 50-inch depth of overburden here (this was beneath the earthwork) prevented following these intriguing leads, but it seems probable that the section covered by Trench 4 and by N20/E60 and N25/E75 was the locus of some of the first habitation of the site. Thus some house traces might be found, although a careful search in the area excavated has revealed none yet to the writer.

## THE ARTIFACTS

### Chipped Stone

Projectile points. Projectile points were not frequent and they display little unusual workmanship. Of 14 recovered the predominant form is triangular, unstemmed. Six of these have a flat base; while the bases of three more, otherwise similar, are concave (Pl. 1, M). Only two of this particular type are made of chert; the rest are of quartz. On the finished specimens (three are apparent rejects) basal thinning appears three times. Size varies from  $\frac{3}{4}$  to 2 inches in length and  $\frac{3}{4}$  to  $1\frac{1}{4}$  inches in width.

The next in numerical order is a flat-based, leaf-shape type which appears twice. Both of these may possibly be unfinished blanks. One in particular was chipped into shape and then highly abraded until the edges were rounded and the shallower flaking scars were almost obliterated. Both are 2 inches long and between 1 and  $1\frac{1}{4}$  inches wide.

One rather large quartz point with a straight stem appears to have been used as a knife. The stem is thinned at the base on both sides and the barb on one side is undeveloped. This point, broken at the tip, is at present 2 inches long and

fairly heavy. It was probably at least  $2\frac{1}{2}$  inches long when complete.

The finest point found was that associated with Hearth 1 in N20/E60. It is a complete point of poor quality greenish chert, but is very well pressure-flaked and retouched. It is corner-notched with basal thinning on both sides of the stem, and its total length is  $2\frac{1}{16}$  inches.

A small fragment of a point blade was also turned up. It had been burned and appears to be from the lower central part of a point, just above the barb or shoulders. It is biconvex in cross section.

In general the material used seems to have controlled the quality of the specimens produced. Quartz was used in 11 of the 14 cases. The three chert points are all well made and show very fine pressure flaking, in distinct contrast to the rough, asymmetrical appearance of the finished quartz points. The quality of local quartz is far from desirable. It occurs in dykes and veinlets in the metamorphic bed rock of the area and in cobbles in the glacial till, but both forms are very difficult to work owing to their tendency to fracture incorrectly. Both kinds of material have a great many internal planes of weakness and an irregular crystal formation. This accounts for the heavy character of most of the points, some of which look almost Archaic.

The triangular non-stemmed form predominates in late prehistoric time levels in this area, although found in small percentages all the way through from the Archaic.<sup>10</sup> In very late prehistoric times, however, bone points appeared and were more commonly used. No bone points were found.

Stone working. An examination of the chipped stone projectile points reveals some interesting facts about aboriginal stone working techniques, especially those involving quartz and applying in particular to the triangular and leaf-shaped, flat-bottomed points. The most common method of point production was evidently to strike a fairly large flake from a quartz boulder and rough it into the shape desired, but in much larger size, by removing flakes predominantly from one side. These flakes were struck off mostly from the edge inward, resulting in a high central ridge on this side with the other side generally flat. The point could now be blocked out more sharply and the ridge worked down by directing blows across

<sup>10</sup>Fowler, 1951, pp. 21-22; Pope, 1952, p. 24, Tables 1 and 2.

it toward the edges of the point. Two of the points recovered seem to have been broken at this stage. The dexterity of the workmanship on quartz is striking since that material is well known for its stubborn qualities. The resulting finished points are usually quite thin and once the stock was thin enough, were probably finished off by pressure flaking. The facet for basal thinning was begun rather early and usually appears on the ridged side only, bifurcating that feature at the base of the point.

In the final stages chert appears to have been pressure flaked. The available material is somewhat metamorphosed and weakened; but despite its poor quality, the artifacts made from it display good workmanship. The procedure outlined above which involves first the production of a plano-convex blank does not seem always to have been utilized when chert was being worked. If it was, the evidence was completely obliterated by secondary flaking.

Scrapers. Four chert scrapers were recovered varying in length from  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches. These are all point-shaped flakes from a core, curving slightly in the long axis. (Pl. 1, O). Also of chert are a rectanguloid  $1\frac{1}{4}$ -inch flake showing use flaking along one edge (Pl. 1, O), and a small fragment of a blade or some larger tool with one edge rubbed down smooth and rounded. A  $2\frac{3}{4}$ -inch flake from a quartzite pebble was also used for scraping purposes. The exterior of the pebble shows on one surface; and all surfaces, especially the edges, show considerable patination.

Spades. The artifacts subsumed under this title are very difficult to define in terms of aboriginal usage. The writer does not wish to imply that their function has been in any way definitely established, but makes use of the term only because it is common in the literature. Fowler<sup>11</sup> reports on artifacts of this nature; they are not common but evidently widely spread. In an illustration<sup>12</sup> he shows one quite similar to our second specimen.

Two spades, both fragmentary, were recovered. One was associated with Hearth 1 and although broken was restorable since most of the fragments were recovered. It is made of a  $\frac{7}{8}$ -inch plate of schist,  $7\frac{1}{2}$  inches long, and  $4\frac{3}{4}$  inches wide, with a "U"-shaped beveled blade, and hafting notches on either side. The other spade is of "U"-shape with a beveled blade edge also but had no notches. It is only fragmentary, representing slightly over half of the finished artifact, and is  $7\frac{1}{2}$  inches long by 3 inches wide.

<sup>11</sup> 1954, p. 44.

<sup>12</sup> *Ibid.*, Fig. 16.

Turtlebacks. Only two turtlebacks are represented. One occurred at the juncture of the overburden and the midden material in Trench 3 and the other in N25/E75 in the 3 to 6-inch level. The Trench 3 specimen is plano-convex, the flat surface being the exterior surface of the pebble from which it was removed. It is  $2\frac{3}{4}$  inches long,  $2\frac{1}{2}$  inches wide at the widest spot, and trianguloid in shape. The N25/E75 specimen is made of quartz from a pegmatite or coarse granitic rock since some feldspar crystals still clung to it. It had evidently been broken in production and discarded in the debris above Pit 1, where it appears to have been badly burned. This turtleback is in two pieces; a third intermediate fragment is missing. It is biconvex with ridges running down the median line of both surfaces. The intent was probably to produce a large knife blade of about 5 inches length.

Blades. Fragments of two blades of sandstone and quartzite appeared. Both appear to have been broken in manufacture.

Shop chips. Quartz shop debris was far predominant with 268 chips of varying size, as opposed to 51 chert chips and 6 of quartzite. No significant horizontal distribution was found, although depth control tests indicate the main concentration fell between 3 inches and 9 inches below the surface. A small number of chips of fairly compact slate were recovered; but no definite slate artifacts appeared besides the whetstones, whose only modification seems to have been by use. The use of slate in the area in aboriginal times seems to have been fairly common, and there is some evidence of a trade in the red slate from the Triassic lowlands of New Jersey or the Connecticut River Valley deposits of similar age. A local collection given to the writer for study contains slate points of a peculiar broad-based "fishtail" or "eared" variety; and slate was used in surrounding areas from Archaic to historic times for gorgets, bannerstones, points, blades, etc.

#### Ground or Pecked Stone

Abrading stones. Two small pumice fragments, a piece of vesicular basalt, and a fairly large and angular fine-grained sandstone fragment were probably used for grinding or abrading. Pumice is by no means native to the area but might possibly have been in the glacial till. All of these artifacts show signs of attrition. Two small, spherical granite pebbles and a loaf-shaped pebble may possibly have been used for rubbing or polishing. They appear especially



Stone, shell, bone, and pottery from the Manakaway site.



smooth and symmetrical, more so than the ordinary beach pebble, and differ strikingly from the other debris in the midden. Small stone balls of this type have been recovered by Bullen<sup>13</sup> at the Hofmann Site and by Russell<sup>14</sup> at Graniss Island.

These artifacts, if they are such, might be more frequently found were it not for their unprepossessing appearance, which makes them easily overlooked. During the course of a generation, an aborigine inhabiting or visiting a site such as this might have many occasions to pick up a pebble, a flake of quartz, a boulder, etc., for some specific job which would require only a moment's use. Many such tools were probably retained for periods longer than the passing moment, and these were consequently subjected to more modification than others. The stone balls and the loaf-shaped pebble are artifacts of the latter type. They may have been used for any one of an infinite number of purposes, but an attempt to put a tag on them implying function would be the purest guesswork. Nevertheless, their use for some purpose seems very probable, and for the sake of accuracy and inclusiveness they are here described.

Whetstones. The function of these artifacts is not altogether certain, but they seem to have been used for the sharpening of edged instruments since they all have narrow striations of varying depth on their surfaces. All are of slate, but that is probably mere coincidence since three distinct types of slate are represented that would doubtless not be associated in the aboriginal mind. No attempt has been made to shape the outlines of these slate fragments, attention being paid only to the flat surfaces where the striae are visible.

The largest of these is a flat fragment of laminated red slate,  $2\frac{3}{4}$  inches by  $3\frac{1}{2}$  inches, with a small quartz veinlet running through it. The striations appear on one surface alone (Pl. 1, J). A heavily burned pebble of compact slate,  $\frac{1}{2}$  by 3 inches, shows striations all over its rounded surface, except at one spot where fresh flakes have been removed. In other areas old flake scars were smoothed over by the striating and rubbing operations to which this pebble was subjected. A small fragment of a soft, blue-green slate pebble is  $\frac{3}{4}$  by  $1\frac{1}{2}$  inches. It has striations on the flat broken surface across the short dimension of the pebble.

Small red slate fragments were found widely

scattered through the debris. They appear to have had some general rubbing or abrading use, if they were not intended, possibly, to supply red paint. Fragments of red slate also appear in the Dosoris Pond and Port Washington collections of the American Museum of Natural History. They appear to have been used for general abrading purposes.

Shaft smoother. A flat, irregular-shaped plate of schist has a notch in one edge worn smooth by the passage of objects back and forth through it. The rest of the plate is unworked (Pl. 1, L).

Blades (?). Forty-seven thin, flat blade-shaped objects are in the collection. Forty-four are schist, two are gneiss and one is granite. Two broad categories are distinguishable on the basis of shape: leaf-shaped (Pl. 1, K) and six-sided, the former being the most numerous. Edges show attrition and size averages about 3 inches by 4 inches. The finding of such forms in appreciable numbers seems to rule out natural occurrence. Artifacts of this type are found throughout Connecticut<sup>15</sup> and in New Jersey also.<sup>16</sup> They are usually overlooked by collectors and hence have not frequently found their way into exhibits or the public eye in general. The predominance of schist here in Greenwich is due to the metamorphic character of the bed rock. Not too much rock of other types is available, and granite is mostly extremely coarse. In other areas similar artifacts are present but are manufactured of different types of stone. At the Powder Hollow site<sup>17</sup> local outcrops of compact slate furnished material for similar blades. At the South Woodstock site<sup>18</sup> a gneiss artifact of similar nature appeared as well as a number of nondescript blades of other types of stone.<sup>19</sup> Fowler<sup>20</sup> describes such blades as does Byers<sup>21</sup> from Martha's Vineyard sites, where he calls them hoes and choppers.

The friability of stones was evidently no deterrent to the aborigines since Fowler,<sup>22</sup> on the basis of petrographic analysis of such artifacts, states that aboriginal preference for agricultural tools and other generalized implements of this

<sup>15</sup> Fowler, 1951; Russell, Rouse and Glynn, personal communication.

<sup>16</sup> Hartle, personal communication.

<sup>17</sup> Thompson, 1945, pp. 5-6; Pl. 1, 8, 12-24.

<sup>18</sup> Praus, 1945, p. 23.

<sup>19</sup> *Ibid.*, p. 19; Pl. 2, 45, 49, 50, 51, 56, 57, 62.

<sup>20</sup> 1949, p. 73.

<sup>21</sup> 1940, p. 51; Pl. 5, 3, 4, 7.

<sup>22</sup> 1954, p. 43.

<sup>13</sup> 1949, p. 20.

<sup>14</sup> Personal communication.

nature was definitely toward shales, granites, schists, and sandstone. Rainey<sup>23</sup> describes the occurrence of similar artifacts on the upper Copper and the upper Tanana Rivers in central Alaska. These artifacts occur in both archeological and ethnological contexts and are called *tcí-tho* in the Tanano Athabaskan dialect. Rainey's description<sup>24</sup> of the manufacture of such an implement is interesting, for it shows just how little actual modification is necessary to make a serviceable tool. A pebble was selected, evidently of friable stone, and a thin flake or plate knocked from it. This flake was then struck against other stones to dull and round the edge and thus produced a skin scraper capable of performing all the tasks which the Athabaskans demanded of it. While it can by no means be certain, the 47 blades in question were probably used for skinning and scraping implements.

#### Miscellaneous.

*Hammerstones.* Several stones were recovered which had probably been used for hammerstones. Most of them are of granite.

*Green gneiss implements (?)*. On and below the surface of the glacial till in N35/E65 were 95 fragments of green gneiss, flat and thin, mostly with no discernible shape pattern. Certain fragments, however, do show some similarities. Several are triangular and lozenge-shaped, and a number semi-lunar with wedge-shaped cross sections as though they might have been used for scrapers, choppers, or wedges. Those beneath the surface of the till had worked in from above; they were not lying flat but were generally vertical or near vertical on a thin edge. A few fragments of this material were found in the surrounding blocks, but chiefly they were concentrated on the floor of N35/E65.

*Feldspar crystals.* The collection contains a total of 97 feldspar crystals, most of them showing fresh, relatively unweathered cleavage faces. Some show indications of being burned. The use of these objects, if they were used at all, is not possible to determine. They may be debris from rock crushing operations aimed at producing tempering material for ceramics. Some surfaces show signs of wear, but whether this is artificial or natural is impossible to say. They occurred below 3 inches in the depth control tests, but no significant horizontal distribution was noted.

<sup>23</sup> 1939, p. 359, Fig. 2; pp. 360-61, 365, 366, Fig. 4; p. 369.

<sup>24</sup> *Ibid.*, p. 360.

*Concretions.* In and above Pit 1 and throughout the midden occurred small, irregular lumps of a reddish brittle substance, containing granitic materials and often small water-washed pebbles and gravel. They were identified by Dr. Leonard Jacob and Ralph Solecki independently as concretions formed when sandy soil with a concentration of limonitic material is heated to a high temperature. This interpretation is borne out by the fact that they occurred in the greatest numbers in the pile of earth over the southeastern corner of Pit 1, where charred bones and discolored earth gave abundant evidence of fire. At spots in this pile they covered the floor exposed in digging almost end to end, as a kind of pavement.

*Cracked rocks.* The midden was filled with stones of different types, cracked and broken by fire or strong heating. Most of these are of granite, others of quartzite and gneiss. A number of smaller quartz fragments and large crystals, looking in some cases as though they too had been subjected to firing, were also present. A small nest of baked stones was associated with Hearth 3, and the pile over Pit 1 in N25/E75 held a disproportionately large number at depths from 3 inches down to 18 inches. These are undoubtedly evidence of stone boiling and baking.

#### Shell

With so much shell available, it might be expected that the Manakaway inhabitants would use it in operations for which more inland groups would employ completely different raw materials. The present flakey, soft nature of most of the shells almost excludes the possibility of detecting signs of use; and only in the cases of unusual alteration listed below is there any certainty as to aboriginal modification.

*Perforated shells.* Two hundred and eighty perforated oyster shells (Pl. 1, R) are in the collection, one hundred and seventy-nine of these being the top valve of the animal, one hundred and one the lower valve. Most of the perforations in the top valves are at a point where the valve is very thin, just above the umbo. Others are scattered all over the body of the shell, usually near the edges. Holes are slightly larger in the top valves, averaging about  $\frac{5}{16}$  as against  $\frac{1}{4}$  inch in the bottom valves. In two thirds of the cases where perforated edges are preserved and the direction of drilling is consequently detectable, the holes were drilled from the exterior of the shell; the remaining one-third were drilled

from the interior. Two examples have two perforations in each, and two have grooved anterior edges.

In addition to the drilled oyster shells, a number of hard- and soft-shell clams are also perforated, although the hard-shells have all been punched instead of having been drilled. Thirty-one punched hard-shell clams (Pl. 1, Q) complete and fragmentary, are present in the collection. All are punched in the umbonal area, the majority of perforations being on the side of the umbo which is convex, the others being just above the umbo on the slope to the highest portion of the shell. These punched holes are highly irregular and are surrounded by a crater where the outer layers of the shell have stripped off owing to the force of the blow. Since this effect always occurs on the outer surface, it would seem that the perforations had been done from the inside. They measure anywhere from  $\frac{5}{16}$  to 1 inch in their longest dimension. Several of these specimens, whole and fragmentary, show attrition along their edges. On a few whole specimens the anterior lips of the shells seem to be beveled by rubbing or scraping. One of the punched holes shows wear on the inside, as though it had been strung on a cord of some material.

A total of 16 perforated soft-shell clams are present, and again the area of perforation (in this instance probably drilled) is fairly well localized just on the start of the down slope from the highest point of the shell to the lip. The perforations are variable in size ( $\frac{3}{16}$  to  $\frac{7}{8}$  inch), but in general the larger ones are found on the larger specimens. Again, one specimen shows wear inside the hole. Perforated shells like this are easily overlooked and it is very probable that many of the workers passed them up or considered them unimportant. Harrington<sup>25</sup> states: "a few shells have been found that show signs of use as scrapers, others have had large round holes made in them for some unknown reason. Among the shells so perforated are those of the oyster, soft clam and periwinkle." Coffin<sup>26</sup> obtained a perforated soft clam and a perforated scallop from the Eagle Hill site. The Port Washington (L.I.) collection at the American Museum of Natural History contain three perforated oyster shells and one hard clam with punching in the same spot as the Manakaway specimens. Skinner<sup>27</sup> illustrates oysters and

soft-shell clams with perforations from Staten Island.

These artifacts are particularly hard to tie down as to function, and the only suggestion which the writer can offer is that they were net weights or fishing lures of some type. The total absence of the usual double-notched pebble net weights from a site like this is somewhat suspicious; perhaps these were substituted.

Scrapers (?). Whole and fragmentary clam and oyster shells appear to have been used in many instances as scrapers. Twenty-two hard-shell clam and three oyster valves (all bottoms) show signs of wear along the edges. The hard-shell clams are most often broken across the shell from both sides of the umbo. This forms a trianguloid fragment, and the wearing is found along these broken edges. Of the 3 oyster shells, 2 have the anterior lips worn straight across, truncating the specimen; the other is worn along both sides, which narrows it down to a thick rib about  $1\frac{1}{4}$  inches wide. The surfaces on each side of the latter are almost perpendicular, and do not possess the natural tapering of thickness to the edge shown by unmodified specimens.

Harrington's allusion to a possible use of shells as scrapers has been cited above, and other sources supplement his suggestions. Fowler<sup>28</sup> describes the use of a hard-shell clam as a hoe and illustrates a method of hafting such an implement. Shell hoes are recorded by Flannery<sup>29</sup> as a Coastal Algonquian trait, although there is no documentary evidence for it at contact time on the New York coast. Leechman<sup>30</sup> cites archeological material from digs in Ontario and the testimony of an early contact period European source to show that shells were used in some locales for scraping operations; and Ritchie<sup>31</sup> quotes De Laet's description of the skinning of a dog with shells used as skinning knives.

Sinew frayers (?). Whole and fragmentary oyster shells display grooves in 11 instances, all grooves being in the anterior lip of the shell. Most of these specimens are bottom valves of a fragmentary nature, only 2 being top valves.

Wampum. A characteristic of late sites<sup>32</sup> is the abundance of wampum cuttings and whelk debris. Such was not the case here at Manakaway. All whelk shells and shell fragments were saved,

<sup>25</sup> 1909b, p. 173.

<sup>26</sup> 1951, Pl. 16, 19, 20.

<sup>27</sup> 1909b, Pl. 12.

<sup>28</sup> 1948, pp. 87, 88.

<sup>29</sup> 1939, p. 12.

<sup>30</sup> 1949, p. 56.

<sup>31</sup> 1944, p. 18.

<sup>32</sup> Solecki, 1950, p. 28.

Table 1. Analysis of Ceramic Traits

Category	Sherds	%	Category	Sherds	%
Rim	53		Rims		
Body	935		Straight	18	
Shell temper	219	22.1	Flaring	4	
Grit temper	769	77.9	Collared		
Surface Treatment			Incipient	1	
Plain	665	67.3	Common	1	
Cord-marked	182	18.4	Lips		
Fabric-marked	38	3.8	Flat	7	
Brushed	16	1.7	Round	17	
Stippled	26	2.6	Lip Decoration		
Unclassified	61	6.2	Notched	5	
Decoration			Undulant	2	
Incised	6	0.6	Cord-wrapped stick-stamped	1	
Cord-wrapped stick-stamped	9	0.9	Dentate stamped	1	
Dentate stamped	58	5.8			
Rocker stamped	1	0.01			

numerous small shell-tempered sherds which seem to be mostly from one coil-constructed pot. The high proportion of this type of surface treatment compares quite well with a similar analysis carried out by Smith on the Finch Rock House collection, and thus might seem to indicate for the Manakaway site a position in one of the later foci of the East River aspect. An examination of the material from the two sites, however, would prove immediately that there is no real similarity since the plain ware at Finch is thinner, mostly shell-tempered, and associated with a completely different and much later decoration technique than is that at Manakaway.

The sherds listed under surface treatment as "unclassified" are mostly very small; and one surface, or sometimes a large portion of both, is missing. For accuracy's sake it was thought best to distinguish these instead of trying to assign them to other categories on what would often be a rather subjective basis.

The decoration techniques, even when taken all together, make up but a small percentage of the total assemblage of sherds. Dentate stamping, the most abundant of all, appears on sherds which represent three different vessels. Cord-wrapped stick stamping appears on sherds from two more. This seems to show that ceramic decoration was of minor importance at this site since the eight decorated vessels must have been only a small proportion of the total number represented.

It is possible, however, that the sample from the 1955 work is not a completely representative one. Therefore it is hoped that the field work may continue and provide more information on the relative incidence of these various ceramic traits. This would either corroborate or revise

the present data and possibly expand the range of traits present at the site, thus giving an expanded base from which to postulate spatiotemporal connections and establish the site's position.

#### East River tradition

**East River Cord Marked.** (Pl. 1, B). Sherds  $\frac{1}{4}$  to  $\frac{3}{8}$  inch thick. Grit temper of medium size. Cord marking varying in depth, in spots nearly obliterated; impressions slanting from rim. Interiors wiped and smoothed. Rim straight with a rounded lip. No basal sherds recovered.

**Van Cortlandt Stamped.** (Pl. 1, D). (All sherds of this type from a single vessel.) Well fired, hard paste,  $\frac{3}{8}$  inch thick. Temper fine to medium with some large inclusions. Interior and exterior plain and smoothed. Body globular with constricted neck and common collar; decorations of cord-wrapped stick stamping on collar and neck. Lip bears a line of impressions along the top and a series of short slanting notches on its outer edge. Well-spaced on collar exterior, four horizontal lines of stamping; below these, at junction of collar and neck, another horizontal line of short slanting impressions. Castellations are evident; a break in the horizontal design band occurs beneath that on the one sherd showing this feature, and a herringbone plat is substituted at this point. Double lines of short horizontal impressions made with the side and end of the stick run vertically down the neck from the collar and presumably end below the shoulder.

This type of decoration combining horizontal lines around the collar, slanting impressions on the upper and lower boundaries of the collar, and breaks filled with herringbone patterns beneath the castellations is a very common one on East River ware. The same basic pattern is found in the Pelham Bay, Van Cortlandt, Armonk, and Finch Rock House collections of the American Museum of Natural History and is described and illustrated by Skinner as occurring in sites on

Table 2. Pottery Represented

Types	Sherds	Types	Sherds
East River Tradition		Miscellaneous	418
East River Cord Marked	162	Windsor Tradition	
Van Cortlandt Stamped	40	Vinette 1	20
Bowmans Brook Incised	3	Modified Vinette 1	185
East River Aberrant		Foreign	
Dentate-stamped (circular motif)	53	Owascoid	1
Dentate-stamped	42	European	1
Fabric-impressed	38		
Stippled	27		

from the smallest most immature specimen to the largest, which included fragments of the exterior portions of the shell. The total for the entire site was 55 pieces, 9 of which were exterior fragments and virtually whole specimens. The majority of these appear to have been broken with intent to extract the animal rather than for bead production. The top and, more frequently, the bottom exterior portions are left intact; and the coil in which the animal resided is broken back from its opening completely around the shell one circuit or more.

Only 6 of the columellar fragments have all of the exterior shell removed; and 4 of these seem to show some signs of cutting at one end or another, but not at both ends. These specimens are not very like the wampum cuttings from Corchaug and Massapeag, which the writer examined. They are much larger and do not show the smoothing that the specimens from those sites show. No bead blanks were found. In short, wampum making, if it was practiced at all, was not a strong point of the Manakaway aborigines.

Problematical. Two oyster bottom valves have been modified into a drill-like form with projecting points. One hook-shaped object about  $4\frac{1}{2}$  inches long has been cut from the rim of an oyster top valve.

The preference for oyster bottom valves for all except the perforated specimens may be due to their more uniform thickness since the top valves have a thin area just above the umbo. Also the flatness of the bottom valves makes them more desirable for scraping than the spoon-shaped top valves.

#### Bone

The bone industry, like wampum making, is most highly developed in the later prehistoric sites; but, if the sample is in any way representative, it appears to have been very poorly developed here. One bone awl was recovered in the segment of Pit 1 cut by the southeast corner of N30/E70 along the side of the pit just below its rim. This is a  $5\frac{1}{2}$ -inch splinter of long bone, probably deer, with the point polished down fairly smooth. It was broken in three pieces, which were within an inch of each other (Pl. 1, P). Two other small bone fragments seem to represent pieces of the points of similar awls. They are ground to a smooth taper. Four bone fragments show knife marks, but this may be the result of butchering or of splitting a bone for marrow. An

antler socket (deer) shows a knife cut around its circumference, probably a result of attempts to remove the antler from the skull.

#### Remarks on stone, shell, and bone

The description of stone tools above may seem to be overburdened with problematical artifacts and those whose functions are uncertain. These have all been described because the author feels a definite need for detailed reporting of this type in the area being dealt with. It should be remembered that artifacts cover a vast range, from the pebble, for example, which is casually picked up, used without modification to crush a shellfish, and immediately discarded, to, say, the pot sherd, which represents a highly complex technological process. Between these two poles of complexity are ranged the countless other artifacts, some easily discernible, some much less so. The easily recognized objects are those most dwelt upon, but those whose function is less readily perceived will add substantially to the reconstruction of a culture, especially one of the type under examination which presents a rather generalized, conservative, and unimaginative assemblage. In order to obtain the fullest picture possible and add what we could to this assemblage, great pains were taken during excavation to scrutinize all material which might possibly have been worked by human hand. Much of it was even brought home to be washed and then examined more closely. The results presented here are the end product of numerous weedings-out in which material was gone over and over and discarded if there seemed to be too much doubt of its having been an artifact.

Search of the literature has already illumined the possibilities of function for the blades and has at least raised the perforated and attrited shells to a fairly certain status as artifacts worth more attention. The feldspar crystals are still problematical, as are the peculiar green gneiss fragments; but data can still be hoped for on these.

#### Pottery

Excavation yielded some 988 sherds of pottery which were analyzed as shown in Table 1.

A few qualifying remarks are necessary to correct the somewhat false impression conveyed by this analysis. In the first place the high percentage of sherds with plain surface treatment is due to heavy weighting of the sample by sherds from two particular grit-tempered vessels, plus

Manhattan Island,<sup>33</sup> the Snakapins site,<sup>34</sup> and the Throgs Neck site.<sup>35</sup> Volk<sup>36</sup> and Heye and Pepper<sup>37</sup> illustrate similar material for the Delaware Valley.

The occurrence of the vertical lines of impressions down the neck, however, is not so frequent, although slanting incisions and impressions on the neck are found frequently in Owasco of New York.<sup>38</sup> This particular decoration appears on material from Snakapins,<sup>39</sup> in surface collections from the Armonk vicinity, and on a vessel from Cold Springs, Manhattan, both in the American Museum of Natural History.

Bowmans Brook Incised. (Pl. 1, C). The three small sherds representing this type are not enough to generalize on. All are grit-tempered. Thickness varies from  $\frac{1}{4}$  to  $\frac{5}{16}$  inch. Rims are straight and flaring. The incisions in all cases seem to be neat and fairly controlled, although varying in depth.

Aberrant and miscellaneous.

Dentate-stamped (circular motif). (Pl. 1, E). The most interesting and problematical specimen found at this site. Associated with Windsor types, Van Cortlandt Stamped, and stippled and fabric-impressed wares of the East River tradition. Paste is well fired,  $\frac{1}{4}$  inch thick, tempered with medium grit with fairly large inclusions. Construction was probably coiled. Body sherds cord-marked; neck and rim sherds plain. Body probably elongate globular; slight neck constriction and flaring rim with lip rounded and everted. Interior is wiped and smooth. Decoration consists of slanting, sharp-edged impressions on outer lip and six horizontal rows of dentate stamping beneath, arranged in three groups of two rows of stamping with a ridge in the center separating them.

The stamping instrument was held with the edge pointing down to make the top row of impressions for each of these groups and was held with the edge slanting upward to make the bottom impressions. The individual stamps are large and of irregular shape, and the use of the technique is somewhat clumsy. Below the horizontal

band are circular elements composed of four concentric circles of stamping. Slanting double lines of stamping starting between the upper corner of each of these circular elements and the horizontal band seem to indicate the possibility of pendant triangles alternating with the circular motifs below the horizontal band.

The general over-all characteristics of this vessel as described above (paste, thickness, surface treatment, rim treatment, and body shape) place it in the East River tradition. The unusual feature is the circular motif, which is certainly uncommon on this coast. Other occurrences of curvilinear motifs in this area are in Early Woodland at the Matinecoc Point site, a component of the North Beach focus of the Windsor aspect;<sup>40</sup> in Late Woodland at the Van Cortlandt site of the East River aspect<sup>41</sup> and at the rather imperfectly known Washington Heights site,<sup>42</sup> which does not permit chronological placement. In Massachusetts and Rhode Island Fowler<sup>43</sup> also records the presence of curvilinear motifs.

Recently, additional examples of curvilinear motifs have been described from a site in Pelham Bay Park;<sup>44</sup> and other scattered occurrences in the coastal area have been listed by the same source in an attempt to show that such manifestations are the result of Hopewellian influence on the coast, mediated through the Middle Woodland culture of the Abbott Farm site. There are several points on which the paper may be criticized and Lopez' entire argument vitiated. This criticism will be taken up later in a separate section of this paper.

Dentate-stamped. (Pl. 1, G). All sherds are from one vessel. Medium coarse grit-tempered ware,  $\frac{5}{16}$  inch thick, red-brown, not as compact as the other types mentioned. Outer surface plain and smooth, as is the interior. Neck constricted, rim flaring with a flat lip. No inferences possible as to body shape. Decoration consists of a triple horizontal line of neat uniform dentate stamping around the neck, with series of pendant parallel groups of stamped lines extending from this band down onto the body of the vessel, meeting obliquely. Stamps are oblong with rounded corners. This is a variation of Bowmans Brook Stamped. Similar specimens occur in other East River site collections of the American Museum of Natural History (Dosoris Pond, Pelham Bay, Van Cortlandt) and in

<sup>33</sup> Skinner, 1909, Fig. 16, d, e, q.

<sup>34</sup> Skinner, 1919, Figs. 8a, 9b, c, e, f, g.

<sup>35</sup> *Ibid.*, Pls. 3A, B, Figs. 2, 3.

<sup>36</sup> 1911, Pls. 110, 1; 114.

<sup>37</sup> 1915, Pls. 25, 27.

<sup>38</sup> Mac Neish, 1952, Fig. 17 and text: Owasco Corded Collar; Owasco Oblique; Bainbridge Linear; Bainbridge Incised Neck; Castle Creek Punctate, Castle Creek Beaded, and Castle Creek Incised. Also Ritchie and Mac Neish, 1949.

<sup>39</sup> Skinner, 1919, Figs. 9a, 12.

<sup>40</sup> Smith, 1950, pp. 185, 196.

<sup>41</sup> Skinner, 1909a, p. 118.

<sup>42</sup> Bolton, 1909, p. 90, Fig. 9b.

<sup>43</sup> 1946; 1956, p. 18.

<sup>44</sup> Lopez, 1958.

collections from New Jersey. Skinner<sup>45</sup> records the presence of dentate stamping at Throgs Neck as does Volk<sup>46</sup> for the Delaware Valley. Most of the illustrated examples have everted rims, and some have lip notching on the outer edge. These sherds appeared in Pit 1, associated with East River Cord Marked. This material is almost an exact likeness of dentate stamped sherds in the American Museum collection from the Sebonac site<sup>47</sup> placed by Smith in an indeterminate category. The resemblance is so close that if the Sebonac material were mixed with the Manakaway collection, it would be impossible, without prior knowledge, to reparate the materials again into the two original groups.

*Fabric-impressed.* (Pl. 1, F). Black-green, poorly fired paste, limestone temper of varying size, crumbly,  $\frac{1}{4}$  inch thick. Rim is very slightly everted, lip almost flat and transversely impressed with a sharp edge. Related to the community of eastern fabric-impressed pottery. Associated with circular motif dentate stamped.

*Stippled.* (Pl. 1, H). Sherds all from a single vessel. Thick ( $\frac{1}{4}$  to  $\frac{7}{16}$  inch), poorly consolidated paste, tempered with a very small amount of micaceous material in microscopic particles. "Temper" may actually be a natural inclusion in the clay. Coil-constructed. Surface stippled, shows small patches of cord marking in places; interior plain but very uneven — finger marks in some spots and some traces of wiping. Rim straight and round. Sherds of this type have been found only on the Schurz site. Smith<sup>48</sup> records no stippled sherds in any East River site and lists only two occurrences in Windsor, one in the North Beach focus, the other in Sebonac. The type is probably a variant of East River Cord Marked, but the coarser treatment of the interior shows some Windsor influence. Found on surface and at base of midden in area of concentration, associated with circular motif dentate.

*Non-fired.* One sherd of non-fired pottery was recovered. It shows extremely clear cord-wrapped stick impressions and is, on this basis, assigned to the East River tradition. The type is probably Bowmans Brook Stamped. It was tempered with leaves or other vegetable fiber, and the paste is extremely granular. This sherd is not included in the analysis.

*Miniature vessel.* Four sherds were recovered from what was apparently a miniature vessel of about 4-inch diameter. The paste is fairly solid and well fired, shell-tempered  $\frac{1}{8}$  inch thick. Leaching holes are frequent on both surfaces. The sherds indicate a slight neck constriction and a common collar with round lip. The exterior surface is plain and uneven, with hints of obliterated cord marking; the interior is plain and even. This is an unstamped version of Van Cortlandt Stamped. Skinner<sup>49</sup> obtained miniatures at Snakapins; and one small vessel, though of a completely different shape, appeared at the Schurz site.

*Plain sherds.* Finally, there are a large number of sherds that display East River paste characteristics but cannot be assigned with certainty to any particular type. Shell-tempered sherds comprise about half of this category. The shell-tempered East River sherds (Pl. 1, I) are about  $\frac{7}{16}$  inch thick; interiors and exteriors are smooth but show shell leaching holes, and there is a suggestion of obliterated cord marking on the outer surface. All are probably from one vessel, though a second may be represented, and show definite signs of coiled construction. Many of the sherds are fragments of single coils that have separated along planes of weakness in the original coil union. Fairbanks<sup>50</sup> feels that this is due to a water film on the coils which evaporates at firing and leaves an internal weakness in the coil bonding. These particular sherds have a singular appearance. They are long and narrow, and their cross-section reveals that the coil was set on at a slant with the interior surface much higher than the exterior surface. The lower surface of such a sherd is usually smooth and concave, while the upper is smooth and convex.

Sherds at the American Museum of Natural History from Helicker's Cave are identical to this in paste characteristics and fracture pattern; but the interiors are lightly brushed, an interior finish appearing in only a few Manakaway sherds. These sherds do not conform to the characteristics of the later shell-tempered pottery from Shantok, Corchaug, and Pantigo.<sup>51</sup> The latter is thinner and has much smoother surfaces; it is also better fired and better constructed, with the plates of shell tempering arranged parallel to the body surface.

<sup>45</sup>1919.

<sup>46</sup>1911, Pls. 110, 114, 115.

<sup>47</sup>Smith, 1950, pp. 180-81.

<sup>48</sup>1950, Table 4.

<sup>49</sup>1919, p. 104.

<sup>50</sup>1937, pp. 178-79.

<sup>51</sup>Smith, 1950; Rouse, 1947; Solecki, 1950.

eastern edge of the midden, and also because blocks adjacent to it had produced sherds of Windsor ware; the hope was to get some good associations with East River material.

Although N25/E75 did not, as expected, hit Pit 1 squarely in the center, it still provided a good chance to check the possibility of any time lag in the filling of this pit. We discovered that sherds of the same vessel, the Bowmans Brook Stamped variation, appeared in the 3 to 6-inch level and persisted throughout, down to the very bottom of Pit 1. Excavation of the entire block was carried down only 21 inches; below this Pit 1 was excavated as well as was possible, but disturbance and dampness made the outline disappear in the center of the block. Therefore we took a vertical slice along the east face to pick up the lines of the pit bottom and sides in the profile. The actual depth of the pit was about 48 inches from the present surface. Shell tempering, also, was present from the surface to the lowest levels.

In N30/E50 the association of Windsor with East River sherds is made more interesting by the types involved. The former are Windsor "Modified" Vinette, but the only East River type identifiable is Van Cortlandt Stamped, which is characteristic of early Clasons Point, a much later time level.

## ENVIRONMENTAL FACTORS

### Foods

#### Molluscs

During the excavation, samples of every type of molluscan shell which appeared were kept for identification, and the species are noted in Table 4.

In addition, two blocks, N25/E75 and N30/E50, were dug in 3-inch levels; and all the shells from the entire block were retained and bagged by the levels from which they originated. These were to be analyzed to see if any change in preference was evident from bottom to top of the midden.

The analysis was carried out in the following manner: Since it was physically impossible to count every chip from each layer, only shell fragments larger than two fingers' width were counted. In the case of small species such as the various snails, mussels, and soft shell clams,

Table 4. Molluscan Species Represented<sup>53</sup>

#### Marine Species

<i>Ostrea virginica</i> . . . . .	common oyster
<i>Venus mercenaria</i> . . . . .	hard shell clam
<i>Mya arenaria</i> . . . . .	soft shell clam
<i>Pecten irradians</i> . . . . .	scallop
<i>Arca transversa</i> . . . . .	transverse ark
<i>Mytilus edulis</i> . . . . .	mussel
<i>Ensis directus</i> . . . . .	razor clam
<i>Crepidula fornicata</i> . . . . .	boat shell
<i>Busycon carica</i> . . . . .	} whelk, winkle
<i>Busycon canaliculatum</i> . . . . .	
<i>Urosalpinx cinereas</i> . . . . .	oyster drill
<i>Polinices heros</i> . . . . .	sand collar snail
<i>Clinocardium ciliatum</i> . . . . .	Iceland cockle
<i>Littorina littorea</i> . . . . .	periwinkle
<i>Nassarius obsoleta</i>	

#### Terrestrial Species

<i>Polygyra albolabris</i> . . . . .	white lipped snail
<i>Anguispira alternata</i>	
<i>Helisoma trivolvis</i>	

where the entire animal may not be two fingers in any dimension, a fragment of half or more than half of the whole shell was counted. In graphing, certain species were not represented individually since this would have involved the use of a larger scale. Since these species (mussels, scallops, winkles and all snail types) were numerically too unimportant to warrant separate treatment, they were combined on the graph under the heading "Miscellaneous" (Fig. 5).

First, N30/E50 was analyzed in this way since, as the shallower of the two blocks (slightly deeper than 15 inches), it represented a less formidable obstacle than N25/E75. The results of the analysis can be seen in Figure 5. It will be noted that except in the upper and the two lower levels the oyster-clam ratio held constant at 200 clams per 1000 oysters. These three levels were obviously not in the main concentration; the lower two especially, since no sherds appeared in either, had all signs of being completely out of the occupation horizon. Probably the shells worked down into these levels from above.

When the N25/E75 material was attacked with this data in mind, it was seen immediately that the ratio of oysters to clams was completely different since the two types were very close to equal in the 0 - 3-inch, and 3 - 6-inch levels. This was not entirely unexpected; it would certainly be odd if every gathering of shellfish

<sup>53</sup>Sources: P. G. Howes, Curator, Bruce Museum, Greenwich, Conn., personal communications; P. G. Howes, 1936, pp. 185-215; Morris, 1951, pp. 10-17, 40.



## Windsor tradition

Vinette Interior Cord Marked. (Pl. 1, A). Sherds  $\frac{3}{8}$  inch thick; well fired paste with numerous large inclusions of quartz, feldspar, mica, and hematite. Exterior red-brown with shallow cord marking perpendicular and near perpendicular. Interior has horizontal cord marking with vertical paddle-edge impressions. Rim is slightly everted, lip round. This is quite similar to the Vinette 1 ware of upper New York. The sherds of this vessel were scattered in a small area in Trench 4 on the surface of the concentrated shell midden material (Fig. 3b).

Modified Vinette. One hundred eighty-five sherds of a large interior-cord-marked vessel, probably a bowl, were recovered in the excavations of N30/E50, N30/E55, N30/E60, N35/E55, N35/E60, N35/E65. The paste is compact and well fired, and the tempering is medium coarse grit with infrequent larger inclusions. Some sand appears to be present. Thickness is  $\frac{3}{8}$  to  $\frac{7}{16}$  inch; and the exterior is yellow-tan, plain, and smooth, with very infrequent, almost obliterated, traces of cord marking. Coil construction is indicated, but the exterior seems to have been rubbed with clay obliterating coiling and cord marks. This is not a frequent practice; but Howes<sup>52</sup> mentions the trait, although neglecting to record any site or collection in which it occurs. The rim is straight and undulates slightly. The interior cord marking is almost obliterated in spots. This vessel seems to be a rather unusual combination of early and late traits but seems, nevertheless, to be a variation of Vinette 1. In N30/E55, one of the stratigraphic test pits, sherds of this vessel were associated with East River types at depths between 3 and 12 inches and at the 9 - 12-inch level held numerical advantage over the East River material by only one sherd. No sherds appeared below 12 inches. This seems to indicate approximate contemporaneity even though a midden heap, with the continued churning up that takes place during occupation, cannot be relied upon to give good stratigraphy over a depth of 12 inches. Six sherds of another vessel recovered in the same locale seem to be of the same type, but the entire interior surface has been stripped away, and no positive identification can be made.

## Foreign wares

Owascoid. One small rim sherd with an

everted rim and flat lip and dentate stamping diagonally across the lip is an Owasco trade sherd.

European. One small sherd of brown glazed pottery appeared in the mound, Trench 1, about 6 inches below the surface on the south side of the crest. Only the exterior surface is preserved. This sherd may have been in the earth removed from the layer above the midden when the mound was built, or it may have been intruded after the World War I occupation. Numerous traces of a children's hut were discovered, and this may be from it.

## Pottery making

The possibility of a pottery industry having been carried on at the Manakaway site is indicated by small lumps of fired, untempered clay found in association with Pit 1 in N25/E75. It will be remembered that evidences of fire were particularly abundant in the segment of the pit touched by this excavation. The combination of this fact with the fired clay lumps, the unfired vegetable-tempered sherd in close proximity, and the evidences of rock crushing in the numerous freshly cleaved feldspar crystals seems to point to some, rather limited, pottery making.

## Stratigraphic tests

Table 3, below, shows the results of the stratigraphic tests as far as ceramics are concerned. Little comment on it is necessary, since it shows clearly that the portion of the site excavated this year was indubitably East River. The blocks were selected for several reasons. N25/E75 was picked principally because it was sure to be fairly deep, and a sample of shell from a deep spot in the midden was desirable. N30/E50 was chosen because it was at the

Table 3. Distribution by Depth and Tradition of Sherds Recovered in Test Squares N30/E50 and N25/E75

Depth (inches)	Windsor tradition		East River tradition	
	Square		Square	
	N30/E50	N25/E75	N30/E50	N25/E75
0 - 3			1	7
3 - 6	2		15	12
6 - 9	3		5	10
9 - 12	7		6	8
12 - 15				1
15 - 18				2
18 - 21				
21 -				4

<sup>52</sup>1954, p. 31 and figure.

Depth (inches)	Oysters	Clams	Soft clams	Miscel.
0 - 3	■	■	■	■
3 - 6	■	■	■	■
6 - 9	■	■	■	■
9 - 12	■	■	■	■
12 - 15	■	■	■	■
15 -	■	■	■	■
Totals	4850	2100	400	230

Fig. 5. Percentage distribution of shellfish according to depth in test square N30/E50.

through the years yielded the same species approximately in the same ratio. Undoubtedly preferences and needs varied through time, contingent on such qualifying factors as personal taste, ease of procurement, ease of preparation and transportation, and qualities affecting the feasibility of storage. Naturally none of these details can be deduced at present.

The analysis of N25/E75 material was not carried further because there was too little time to tabulate the contents of some 160 sacks of shells. A complete analysis, however, is planned for publication at a later date. The sampling of the top two levels was sufficient to show a very marked difference from the N30/E50 material. Since the object of the testing was in part to detect homogeneity of deposits and provide data on preference changes which might be revealed through the fine stratigraphic control, this difference was all that was desired for the present.

Taken as a whole, the results of the tests seem to indicate the following: The shellfish gathered were primarily clams and oysters, and their relative abundance varied throughout the midden, owing to variations in harvests, which

resulted from several unknowable factors. Other types of shellfish were available but were gathered in insignificant amounts; this, too, depended on unknowable factors, possibly including that of relative abundance. Many of the smaller gastropods seem to have been boiled or used as soup ingredients since their shells are in the large majority undamaged.<sup>54</sup> All larger varieties were fractured to remove the animals.

#### Plants

Quite early in the dig, seeds were noticed in the midden material in concentrations beneath shells. These were bright yellow and looked like gravel, but they stained immediately on contact with the earth. A closer examination revealed the presence of many carbonized seed coats, complete and fragmentary, associated with these seeds. The seeds were collected and recorded as to provenience, and shells beneath which particular concentrations occurred were removed and their contents gone through at home.

A sample of these seeds with pertinent information was forwarded to the New York Botanical Gardens for identification by Mrs. Clarence Stanley, Greenwich, Conn. After some difficulty, they were there identified as seeds of *Rhus glabra*, an edible variety of sumac, the fruit of which has a "pleasantly acid flavor."<sup>55</sup>

The New York Botanical Gardens in turn sent the seeds to the Boyce Thompson Institute for Plant Research, Yonkers, New York, for germination tests. The method used there by Dr. Lela V. Barton and her staff is as follows: "The coats of all of the seeds were filed by holding them individually between the fingers. They were then mixed with moist granulated peat moss and placed at 5 degrees C. for 1 month, after which they were transferred to a daily alternating temperature of 20 degrees C. to 31 degrees C. for germination. Eighteen seeds of MA 36 yielded 13 seedlings, and 24 seeds of MA 229 produced 12 seedlings. These were all planted in soil in the greenhouse. Three seedlings of MA 36 and 10 seedlings of MA 229 have survived."<sup>56</sup>

The seeds were all recovered from about 8 inches below the midden-topsoil contact, although occurrences were frequent at all levels below that in the area of N30/E70 and N30/E60. After

<sup>54</sup>Rainey, 1937, p. 18, cites the use of shellfish and snails in a kind of "mulligan" which he believes to have been the Indians' main food preparation.

<sup>55</sup>Robbins, personal communication.

<sup>56</sup>Barton, personal communication.

the initial appearance and the collection of what was felt to be a suitable number of specimens, the seeds were disregarded, since their removal constituted such a painstaking and time-consuming job. The fact that all specimens were from the same level does not imply that this was the only point at which this material occurred, but merely that this was the point at which collection was made.

That any seeds could survive so long in the earth, especially with the dampness of the site's particular location, seems very improbable. Therefore several possible means of intrusion into the midden deposit from above were explored, with the following results: Dr. Libby Hyman, invertebrate zoologist of the American Museum of Natural History, states that earthworms are incapable of carrying seeds, especially of the size of these specimens. Not only have they no mechanism for carrying, but the seeds are too large for consumption and therefore of no food value to them and quite outside the usual worm diet. Evidences of worm action were found but not in association with seeds. Dr. T. C. Schneirla of the Department of Animal Behavior, American Museum of Natural History, states very emphatically that ants do not carry such material into their burrows. He doubts if the local varieties are capable of carrying objects of that size.

Messrs. Hyman and Schneirla, as well as Junius Bird of the Department of Anthropology, American Museum of Natural History, feel that rodent action may be indicated. The remains of chipmunks and of *Peromyscus*, the white-footed mouse, support this hypothesis; but the circumstances of the finds seem to contradict it. There were no traces of burrows in the profiles or in the general areas where the seeds were obtained, although evidence of a few burrows was present elsewhere. In all cases the burrows were clearly distinguishable. There is a possibility that burrows close to the surface may collapse without a trace if used only for a short time by a very small rodent such as *Peromyscus*. This, however, does not explain the presence of a few seeds under nearly every shell in the N30/E70 - N30/E60 area and elsewhere in smaller quantities. This would require a most extensive system of burrows.

The possibility of insect intrusion is a difficult one to explore without extensive research, and the time for that is not available. It now appears highly probable, however, that some of the burrowing beetles may be held accountable for

the intrusion of the seeds into the midden from above. A more rigorous technique in future excavations will also help to establish the possibility of insect action. This will involve microscopic examination of the earth matrix of the seeds for exoskeletal fragments or other insect traces.

#### Vertebrate animals

Mr. T. Donald Carter, Assistant Curator of Mammals, American Museum of Natural History kindly identified the following species from among the animal skeletal material recovered:

Table 5. Vertebrate Animals Identified

<i>Odocoileus virginianus</i> . . . . .	deer
<i>Procyon lotor</i> . . . . .	raccoon
<i>Felis concolor</i> . . . . .	puma
<i>Lynx rufus</i> . . . . .	wildcat
<i>Euarctos americanus</i> . . . . .	bear (immature individual)
<i>Castor</i> sp. . . . .	beaver
<i>Sciurus</i> sp. . . . .	squirrel
<i>Tamias</i> or <i>Eutamias</i> sp. . . . .	chipmunk
<i>Mephitis</i> sp. . . . .	skunk
<i>Vulpes</i> or <i>Urocyon</i> sp. . . . .	fox (?)
<i>Canis</i> sp. . . . .	dog
<i>Peromyscus</i> sp. . . . .	white-footed mouse
<i>Bovidae</i> . . . . .	bison or cow (immature)
<i>Tautoga onitis</i> . . . . .	blackfish

Deer, raccoon, and dog in that order were the three types most frequently represented. The dog was "slightly smaller than a coyote, with a shorter nose."<sup>57</sup> Flannery<sup>58</sup> labels the use of dogs as food an Iroquoian trait, and cites evidence of it in this area at contact times. The occurrence of this practice at the Manakaway time level may be another indication of a connection, in general cultural terms, between the Owasco and Iroquois aspects.

Probably the species on the above list most embarrassing and difficult to explain is the bison or cow represented by the socket of an immature horn. Carter feels that this fragment is quite definitely bovine and not deer. It was found in the southeast corner of N35/E65, just above the glacial till. If it is bison, as Carter's one alternative suggests, it is probably a trade item or the relic of a stray from the Hudson River Valley. Garretson<sup>59</sup> describes the annual north and south migrations of large herds of bison in western New York, New Jersey, and Pennsylvania

<sup>57</sup> Carter, personal communication.

<sup>58</sup> 1939, p. 180.

<sup>59</sup> 1938, Chap. VI.

during historic times; and these migrations probably occurred in prehistoric times as well. The occurrence of bison remains on the coast, therefore, is a little unusual but not completely implausible. If it is cow, then the absence of European trade goods in the midden is quite out of the ordinary, since they should be present in some quantity. No villages were located on the point during the contact period, however; and after contact the land was settled immediately and Indian trespass forbidden. Thus the possibility of there being a late site here is rather slight although a seasonal trespass might conceivably have been permitted and missed recording in the historical documents. If such is the case and this is a contact site, then the whole coastal chronology with its established ceramic sequence stands in need of considerable revision.

Bird bones were present in small quantity but unidentifiable. Most of the bone was greatly broken up for the extraction of marrow, and the result is innumerable small angular fragments of shafts and a scattering of articulatory ends. Carter states that many of the bones show signs of boiling and burning.

#### Climate

The climate, judging from the assemblage of animal and shellfish remains produced, must have been about the same as today. The coastline seems at present to be receding,<sup>60</sup> and the situation of the site during its aboriginal occupation may have been considerably different from what it is now; but aside from this, the environmental complex has not been greatly altered. The inclusion of ark and scallop shells in the midden when neither animal is now to be found in the immediate locale is undoubtedly a function of a bacteria and silt increase or other environmental change in the waters of the Sound in the past fifty years. Local residents testify that scallops were present at the turn of the century. The arks are still present in New England waters, although not in overwhelming numbers; and their distribution on the whole seems to be more in the southern middle and southern Atlantic regions.<sup>61</sup>

<sup>60</sup> Richards, 1941.

<sup>61</sup> Morris, 1951, pp. 10-18.

## INTERPRETATIONS and CONCLUSIONS

### Curvilinear Motifs

The central point of criticism of Lopez' paper is as follows: the material from the Manakaway site demonstrates approximately the same complex of traits that Lopez claims to be characteristic of an Hopewellian influence and therefore of a Middle Woodland date, namely, collarless, everted lips, exterior lip notching, and dentate stamping. There is even an association with not only Vinette 1 interior cordmarked but with a modified Vinette in which the interior cordmarking has been wiped over, quite like that which Lopez describes.<sup>62</sup> These traits, which for Lopez so surely indicate an early position, are shown at Manakaway to be no more than 750 years of age; and the position is reinforced by cross-dating on the basis of sherds found in other sites (see above, Dentate Stamped). A comparison between these dates and those considered as truly representing the Ohio Hopewellian culture<sup>63</sup> indicates a range of difference of about 1000 years at a minimum and 1800 at a maximum, a time gap which is too great to allow any hypothesis of connection even if transmitted through another source.

It is my opinion that these curvilinear manifestations are not the result of outside contact but indigenous to the area. Neither are they limited to any one time level or locality but occur sporadically throughout the Woodland period in the southern New England-New York-New Jersey region. This opinion is based on the following facts:

1. On the evidence above presented we see that the curvilinear designs appear in the coastal New York-New England area from early Woodland up to contact time.

2. The appearance throughout the same area of examples of curvilinear motifs in non-ceramic media, such as shell disks, effigies, etc.<sup>64</sup> In the consideration of an art form it is impossible to limit its manifestations to one medium alone, as Lopez has done. The curvilinear motifs in pottery cannot be separated from similar motifs on gorgets, etc.

3. Evidence from the earliest contact period<sup>65</sup>

<sup>62</sup> 1958, p. 6.

<sup>63</sup> Ford and Webb, 1956, p. 122.

<sup>64</sup> A few articles displaying such traits are provided in Griffin, 1952, Figs. 23, E-F; 24, M; 25, N-P; 26, G-J.

<sup>65</sup> Verrazano, 1524, p. 45, speaks of damask patterns on skins.

demonstrates that the use of curvilinear motifs on clothing was common, the designs seeming to resemble those collected by Speck from the Penobscot.<sup>66</sup> In the consideration of archeological material it is always necessary to remember that what survives is only a small percentage of the cultural complex. Failure to consider what historic sources can tell us about the perishable items of a cultural inventory can often lead to error in over-emphasizing the non-perishable materials. In reality, therefore, non-ceramic curvilinear motifs were quite common. It is not surprising that these motifs appear from time to time in the ceramic medium.

On unbiased consideration of the totality of the present evidence, it does not seem possible, or necessary, to hypothecate an exotic source for curvilinear designs in this area.

#### The East River Aspect

I have elsewhere stated my views on the nature of the East River aspect, its relation to the Windsor aspect, and the common origin of the Late Woodland manifestations of both in the Owasco of New York.<sup>67</sup> There is no need to restate the whole matter here. There are several new points bearing on the same subject that should be raised, partially in support of my own argument and partially in answer to Smith's views on the matter.<sup>68</sup>

The derivation of the East River aspect from the prehistoric cultures of New Jersey does not seem to be supported by the recently published material on the Abbott site.<sup>69</sup> This material seems to show a certain very definite resemblance, but nothing indicating a genetic relationship such as Smith has postulated. The presence of definite Owasco influence in New Jersey most certainly plays a role in heightening the similarities.

Smith states that the contemporaneous occurrence of Windsor and East River pottery in the Manakaway site results from the position of the site "near the boundary" of the two aspects.<sup>70</sup> The majority of the sites utilized by Smith in his report are really far more peripheral than Manakaway,<sup>71</sup> being much closer to the alien influences from New Jersey. One is also prompted to

ask if, in an area as small as that in which the East River aspect supposedly holds sway, one can legitimately expect that any sites will be free from exotic influences.

#### Conclusions

The site is a single component site, occupied intermittently over a fairly short period of time, and the cultural materials contained therein are all contemporary. There is no evidence whatsoever of an earlier occupation. The occurrence of East River ceramics in association with Windsor ceramics shows that this occupation group was using both types simultaneously. Windsor sherds were found both in the midden and above it, in both cases in association with East River material and with absolutely no evidence of intrusion or extrusion in the strata.

The site is assigned to the Bowmans Brook focus of the East River aspect on the basis of the East River material present. The associated Windsor types have such temporal persistence as to make them unsuitable for dating purposes.

The following points provide the basis for the chronological placement of the site:

1. The predominance of Bowmans Brook sherd types and variants as against a single vessel represented by sherds of the early Clasons Point focus. This vessel, however, is far superior in workmanship to the rest of the material in the site and to much of the other Van Cortlandt Stamped material in the American Museum of Natural History collections. It may be a trade vessel from upper New York; it may also be a harbinger of the Clasons Point period.
2. The rim and neck types are those which would be expected in the early focus of East River,<sup>72</sup> with, again, the exception of the Van Cortlandt Stamped sherds.

The lack of incising, relative to other methods of decoration, and the preponderance of grit temper over shell temper are not in themselves indicative of a position in the Bowmans Brook focus;<sup>73</sup> but when we consider that the material is East River, these particular traits reinforce the conclusion that it is from the early focus, East River aspect, rather than the later foci. Sherds linking this site with the unclassified material of the Sebonac site are further evidence that it is correctly placed in time.

<sup>66</sup> Speck, 1927.

<sup>67</sup> Suggs, 1957, p. 420.

<sup>68</sup> Smith, 1957, p. 170.

<sup>69</sup> Cross, 1957.

<sup>70</sup> Smith, 1957, p. 170.

<sup>71</sup> Smith, 1950, Fig. 1, p. 102.

<sup>72</sup> Smith, 1950, pp. 191-92.

<sup>73</sup> *Ibid.*, Fig. 2, p. 125.

The chronological position based on ceramic evidence is strengthened to a certain extent by the evidence of the projectile points, although this evidence does no more than place the site within the major cultural unit of the East River aspect. Smith states that there is a predominance of triangular non-stemmed points in this focus<sup>74</sup> and this form of point is predominant at the Manakaway site.

The lack of wampum cuttings, although negative evidence, indicates that the site lies probably in the early portion of the aspect since wampum appears in the Clasons Point focus<sup>75</sup> and is a good time marker.

Radiocarbon dates on two samples from this site give us an excellent idea of its temporal position and also allow extension of this date for cross-dating purposes to other sites with related material.<sup>76</sup> The samples were carefully selected in order to show the length of occupation as well as the date. Sample L339A, charcoal from Hearth 1 beneath the midden in the subsoil, gives an age of 650 ±100 years; and Sample L339B, oyster shells from the middle of the midden, gives an age of 610 ±100 years. These dates, internally consistent as they are, should be considered as of high reliability.

In the original of this site report, written some two and one-half years ago, I inclined to the belief that the site was early in the Bowmans Brook focus; after further study, it appears that the site is actually somewhat later and falls toward the middle of the focus. This opinion was formulated on a reconsideration of the Van Cortlandt Stamped sherds and those from the miniature vessel. These seem to indicate that the changes that distinguish Clasons Point from the Bowmans Brook focus were already beginning to take place in a small degree. This may not have occurred first in the immediate area, but in upper New York, with the changes reaching the coast by this time.

The small amount of mammalian remains, when viewed against the overwhelming abundance of shellfish remains, indicates that this site was occupied by groups engaged almost solely in shellfish gathering rather than hunting. In addition, the paucity of stone artifacts, projectile points in particular, suggests that the site was not occupied all year round. The few hearths uncovered contained comparatively small amounts

of ash and do not bespeak any prolonged occupation. Dr. Nelson Marshall of Alfred University has examined the scallops from the midden and states that they were probably gathered in the fall, the time of year when shellfishing is still the best.<sup>77</sup>

Smith<sup>78</sup> feels that shellfish gathering was the mainstay of existence in this area, but I disagree. Clams, oysters, and scallops are 82 per cent water and give respectively 82, 82, and 72 calories per pound.<sup>79</sup> If shellfish gathering was the main mode of subsistence, the number of shellfish needed to support a band of twenty persons would run into astronomical figures in a very short period of time. Smith's hypothesis for the subsistence of the coastal groups referred to above was probably derived from the fact that a disproportionately large number of seaside sites have been excavated. In these sites the maritime aspects of the aboriginal life loom largest.

There is evidence of a well-developed seasonal cycle of economic activities involving some mobility. Ritchie cites colonial sources that speak of the migratory existence of the aborigines at contact time,<sup>80</sup> despite an evidently productive agriculture which should have allowed some measure of sedentary existence.

Flannery,<sup>81</sup> in her analysis of coastal Algonquian culture, sees a reliance on fishing, hunting, and agriculture, with equal dependence on each in season; this appears to be much closer to the actual aboriginal conditions. It is certain that gathering also played a large part, and it seems very likely that agriculture and hunting supplied a much larger part of the total caloric intake of these groups than did fishing and shellfishing.

#### Summary

The Manakaway site is a component of the Bowmans Brook focus of the East River aspect, dating about 1200 A.D. The group inhabiting the site made use of pottery of the Windsor tradition as well as that of the East River, and may have been receiving cultural items diffused from upstate New York. The site was occasionally occupied by shellfish gathering groups over a period of about a century and was then abandoned.

<sup>74</sup> *Ibid.*, p. 123.

<sup>75</sup> *Ibid.*, p. 122.

<sup>76</sup> Suggs, 1958, p. 432.

<sup>77</sup> Marshall, personal communication.

<sup>78</sup> 1950, pp. 106, 117.

<sup>79</sup> Cooper et al, 1947, p. 503.

<sup>80</sup> Ritchie, 1944, pp. 17, 19.

<sup>81</sup> 1939, p. 7.

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