THE BULLETIN

March 1964 Number 30

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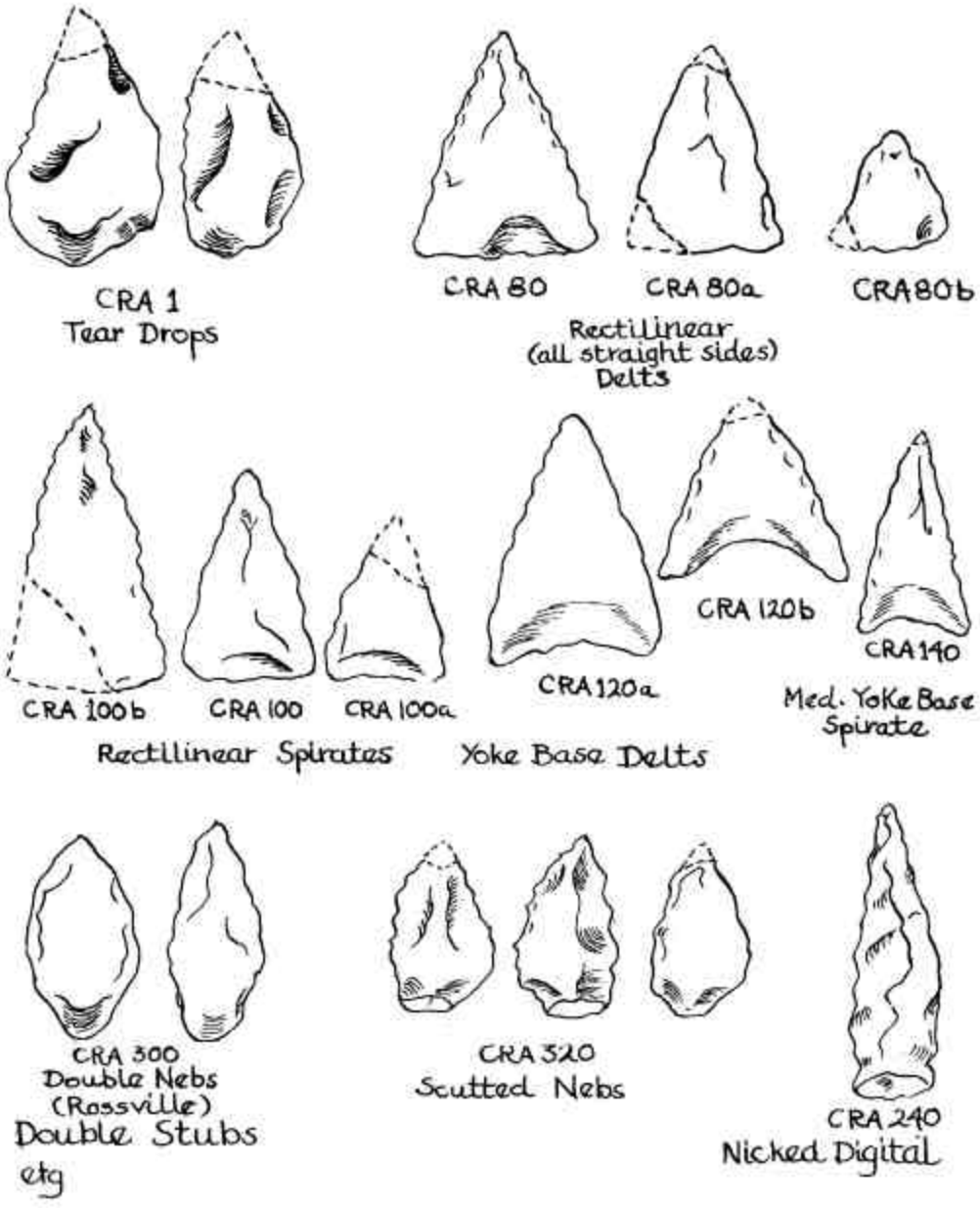
WINTERICH SITE PROJECTILE POINTS



PROJECTILE POINT VARIETIES PRESENT IN A PRE-CERAMIC, NON-SHELL-MIDDEN SITE IN THE LOWER HUDSON VALLEY

Louis A. Brennan Metropolitan Chapter

The Winterich site, reported by this writer in a paper delivered before the annual meeting of the NYSAA in April, 1956, under the title "Two Possible Coeval Lamokoid Sites near Ossining, N.Y." (Brennan, 1956), is the only non-shell midden site investigated by the writer and his colleague, Mauck Bramme r, (joined later by Sigfus Olafson) dur ing their decade and a half of excavation in the vicinity of the mouth of the Croton River.

It is on a hilltop about 180 ft. above present Hudson River water level, and is about 500 yds. from the present shore, at the head of a draw that descends rapidly to the river. Probably once an extensive site, the major part of which was destroyed by a New York City water supply aqueduct from Croton Reservoir, it is now a little flat about 25' by 25' in area, buttressed by an outcrop of bedrock against destruction by erosion. It has been used as a garden for the past four decades.

Once an orchard and since many times disturbed by annual spading and cultivation, its principal value lies in the yield of about 150 projectile points and parts in an indubitable preceramic context. In the light of the recent apparent corroboration of the Fairbridge scheme of sea level fluctuation (Brennan, 1962a) by the C14 dating of the GO (giant oyster) horizon (Brennan, 1962b) midden at Croton Point at 5863 plus or minus 200 B.P., it becomes possible to begin an elucidation of the Winterich projectile point inventory,

The facts that argue that the Winterich site was a hunting camp site are these:
(1) though it overlooks the Hudson, it is to all intents and purposes quite remote from it because of its elevation; (2) the concentration and the profusion of varieties of points, with a near absence of non-hunting tools, indicates that hunters of widely differing cultures frequented the site; (3) shell of the oyster which was a subsistence staple in the Haverstraw Bay-Tappan Zee vicinity when climate and sea level were right for them is absent; (4) the position of the site is at the head of a steep-sided draw which would have been the natural route of a trail for game descending from the hills to the Hudson shore; and, finally, (5) the Winterich site is inexplicable as anything but a hunting camp.

The one argument against the site as a hunting camp and station is that, under present environmental conditions, there would be very little reason for game to des-

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Ed. Note: This paper should be read in close conjunction with the two following, Agro on South Cruger Island, and Funk and Johnson on Fish Club Cave, for a developing outline of the correlation of cultural passage along the Hudson with climate and sea level changes. The first occupation of Fish Club Cave must have been during the warm, fairly dry phase, possibly as early as GO midden times at 5800 B.P. but, more probably, considering other Laurentian evidence in the Hudson Valley, at 4500 B, P.

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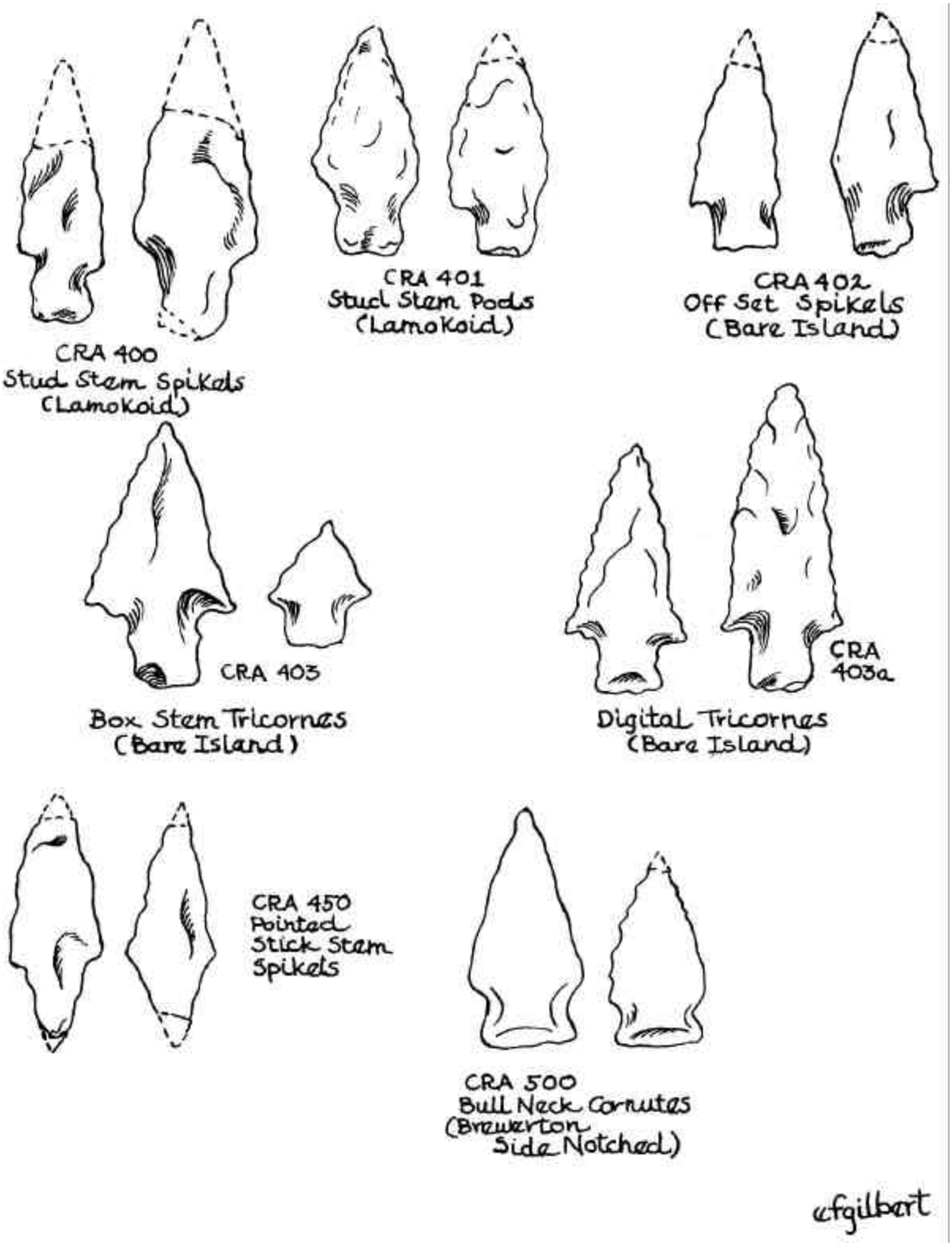
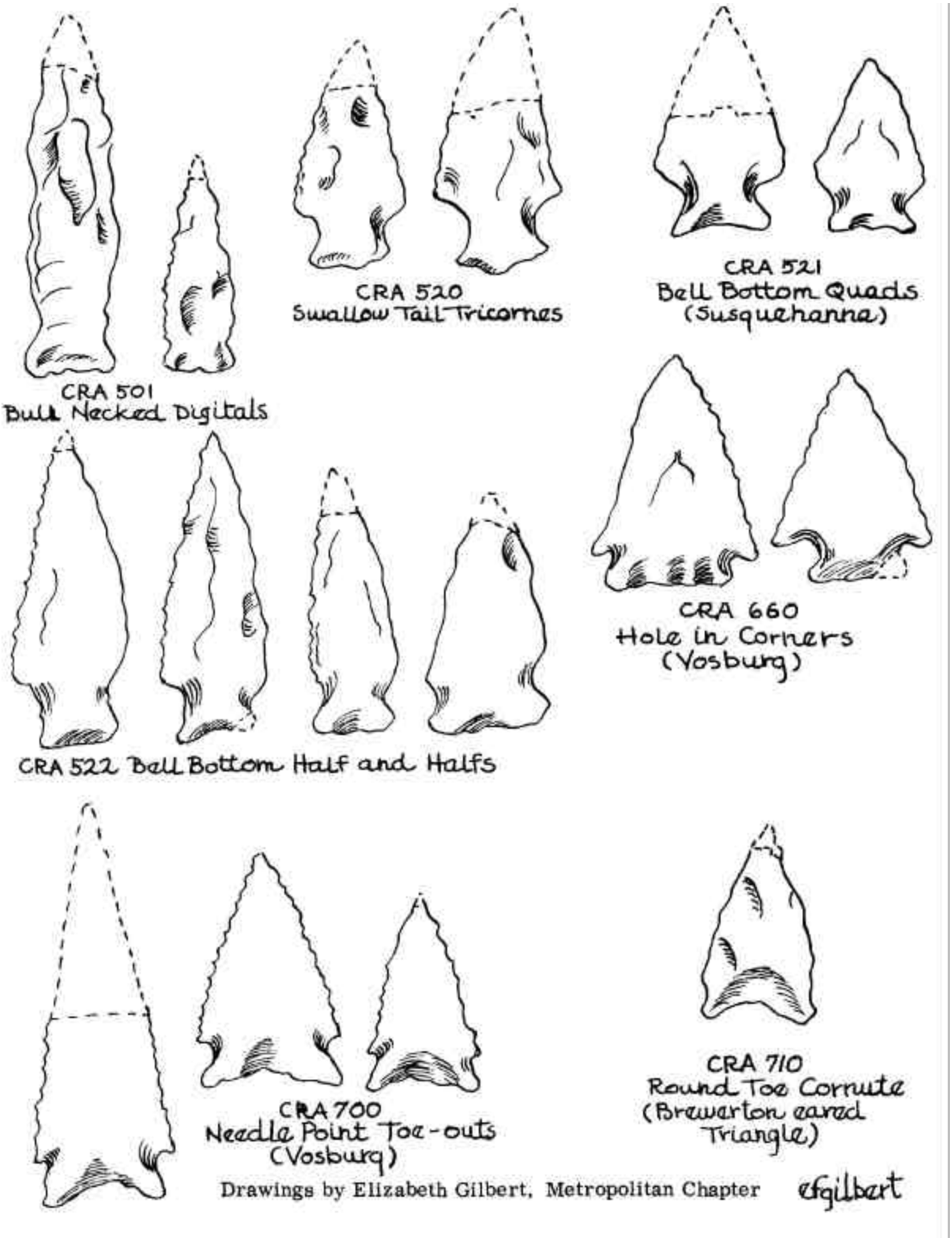

CRA 400
Stud Stem Spikels
(Lamokoid)
CRA 401
Stud Stem Pods
(Lamokoid)
CRA 402
Off Set Spikels
(Bare Island)
CRA 403
Box Stem Tricornes
(Bare Island)
CRA 403a
Digital Tricornes
(Bare Island)
CRA 450
Pointed
Stick Stem
Spikels
CRA 500
Bull Neck Cornutes
(Brewerton
Side Notched)
cfgilbert


CRA 501
Bull Necked Digitals
CRA 520
Swallow Tail Tricornes
CRA 521
Bell Bottom Quads
(Susquehanna)
CRA 660
Hole in Corners
(Vosburg)
CRA 522 Bell Bottom Half and Halfs
CRA 700
Needle Point Toe-outs
(Vosburg)
CRA 710
Round Toe Corrute
(Brewerton eared
Triangle)
Drawings by Elizabeth Gilbert, Metropolitan Chapter
efgilbert

cend to the Hudson shore. The water is too brackish to drink, and there is practically no river bottom land to support forage for herbivores.

But if the 5863 B.P. date (Brennan, 1963) recently released for the G O horizon shell at Croton Point corroborates not only the Fairbridge chronology of climatic change and the fluctuation of sea level by as much as 12 ft. both above and below present, then this objection can be answered, and the Winterich site stands forth as a location along a probable route of travel between the hills and the Hudson River bottoms.

So shallow is the Hudson at the end of the Winterich draw that a drop of two feet would create about 1000 ft. of tidal flat beyond the present shore. A drop of five feet would set the shore out from its present line by about 7000 ft. A 10-12 ft. drop would return the Hudson almost to its entrenchment and reduce it to less than half its present width. Any appreciable lowering of present water level would, therefore, expose more or less of river bottom land which would be covered in a few years with a rich pasturage. As soon as a food producing plain comes into being along the shores of the Hudson, to which the draw beside the Winterich site gives convenient access, the draw becomes probable as a game trail, and the concentration and variety of projectile points on the Winterich site explains itself.

Neither pottery nor steatite was recovered from Winterich, though it is a truncated site, having been cut through by an aqueduct of the New York City water system. The entire absence of ceramics and steatite from what remained is convincing in the light of the varieties of projectile points, almost all of which are accepted as typologically Archaic in New York State. Assuming, then, that the Winterich site was a hunting camp, of use only when the waters of the Hudson were below present level, and that the 5863 plus or minus 200 year C 14 date recently reported on the basal midden at Croton Point corroborates not only the sea-level fluctuation chronology of Fairbridge but the fact that sea level did fluctuate between 10-12 ft. above and below present level, the task to be undertaken is to fit the Winterich projectile point varieties satisfactorily into the low water periods of the Fairbridge scale.

Classification

In order to facilitate the taxonomic assembling and correlation of projectile points at the Winterich and the several other sites investigated in this area, the writer has constructed a classification system based on physical description which he has used in designating the points illustrating this paper. It is called the CRA (Croton River Area) system and will be explained in full; it is hoped, at the NYSAA annual meeting. But, for the purposes of this paper, the designations used in "A Typology and Nomenclature for New York Projectile Points" (Ritchie, 1961) will be used where possible, for the convenience of the reader.

Point varieties (called types in the "Typology") present at Winterich and recognized in the "Typology" with their CRA designations are as follows:

Lamokas (circa 5500 B.P.) equals CRA 400, "stud-stemmed spikel." (Stud equals knobby, protuberance, describing the stem; spikel, short for spikelet, as in a spikelet or head of wheat, describing the narrow, thick blade).

Vosburg (circa 4500 B.P.) equals CRA 660, "hole-in-corner," describing the kind of corner notch.

Vosburg, with indented base (circa 4500 B.P.) equals CRA 700, "needle point toe-out, 11 describing the kind of spur created by the side-notching and basal indentation.

Brewerton eared triangle (circa 4500 B, P.) equals CRA 710, "round toed cornute," cornute (meaning horn-shaped) describing the sometimes triangular, sometimes ovoid blade, and round-toed describing the basal ear.

Brewerton side-notched (circa 4500 B.P.) equals CRA 500, "bull neck cornutes," bull neck describing the wide neck left by the slight side-notching.

Bare Island (late Archaic) equals CRA 402, "offset spikels," offset describing the fact that the stem is off-set from the blade, that is, one shoulder is more distinct and sharper than the other.

Lamoka-like (early Archaic) equals CRA 401, "blunt stem pods," pod describing the round, shouldered, lenticular sectioned blade and blunt-stem describing a stem that has not been chipped to a sharp or bit (as in ax-bit) base.

Bare Island (late Archaic) equals CRA 403, "box-stemmed tricornes," tricorne describing the three sharp points of the blade, at the tip and at the two shoulders. Bare Island (late Archaic) equals CRA 520, "swallow-tail tricornes," swallow tail describing the slight expansion of the stem.

Susquehanna (transitional) equals CRA 521, "bell-bottom quads," quad describing the quadrangular blade and bell-bottom the flare-out of the stem.

Fish-tail (transitional, early ceramic) equals CRA 522," bell-bottom half-and-half," the half-and-half describing the fact that one edge of the blade is straight and forms a sharp, distinct shoulder, and the other is excurvate and rounds into the stem.

Rossville (late Archaic) equals CRA 300, double nebs, this phrase being used because the shank repeats the blade in form. There are only two possible specimens of this variety at Winterich, though they occur in the area.

Varieties of points present at Winterich which are not recognized in the "Typology" are these:

The triangulars, both rectilinear and yoke or indented base. The "Typology" recognizes the Madison and Levanna triangulars, but places the Levanna in Middle Wood-land times and the Madison in late prehistoric to historic times. The triangulars at Winterich are all in a pre-ceramic context. The Winterich triangulars are classified as CRA 80 rectilinear (all straight side) "delts" (broad triangular); CRA 80a, "macro (large) delts;" CRA 100 "rectilinear spirates" (narrow triangular); CRA 120, "yoke (concave) based delts;" CRA 120, "hollow base (deep concave) delts;" and CRA 140, "yoke base spirates."

The possibly 5 ovoids CRA 1, at Winterich seem to conform to the description of Winnipeg ovoids (MacNeish, 1958) in that they are tear-drop in general shape.

The "scutted nebs," CRA 320, are so-called because they have short, stubby blades, like pen nebs or points and have a "scut" stem, that is, the stem is very short and is very close to the body like a rabbit's scut or tail. They are really only demi-stemmed. The best authenticated instance of the occurrence of this variety elsewhere is at Ventana Cave, Arizona (Haury, 1958), where it is well illustrated and described.

The "nicked digital" is a long, thick, roughly made point that apparently falls into a shank less category, that is, it has no true stem neck formed by notching.

The "bull-neck digital" is a digital point probably related to the nicked digital, but genuinely though slightly notched, leaving a thick neck.

Chronology

Most of these varieties of points at Winterich might conceivably be cramped into one low period on the Fairbridge scale, that approximately 300 years between about 4200-3900 B.P., on an assumption that some varieties of points, such as the Lamokoids, lingered in this area longer than elsewhere, while other varieties, like the Susquehanna and fishtail, appeared here earlier than elsewhere. But this is too strained an explanation, requiring the establishment of some special set of conditions that there is no reason to believe existed. The Hudson is the most direct and deep penetrating inland south-north travelways between the coast and the interior in the northeast, as well as being of itself a well-stocked food pantry, especially during oyster producing times. The local populations would certainly have been in direct and immediate contact with migrants using this travelways, or with populations moving either northward or southward and would thus have had a chance to observe first-hand any new and desirable or attractive traits being carried in one direction or the other. Actual invasion, with the intent to take over new food producing loci such as oyster beds, would have fallen first upon the Hudson's riparian dwellers. And these, finally, would have been in lively and recurrent contact with each other because of visiting the river during oyster gathering and fish-run seasons.

There is every reason to believe that multifarious projectile point inventory at Winterich reflects the chronological succession of projectile point varieties elsewhere, separated by similar intervals of time. When the accepted order of succession of New York projectile points is adjusted to the low sea-level periods of the Fairbridge scale, the following correlation results:

Pre-6000 low (before sea level attained present level after being as low as 350 ft. below present level during the Wisconsin glaciation) --Lamokoid points.

5400 B.P. low (a very brief low, with sea level dropping to, or only slightly below, present level)--ovoids, and scutted nebs.

4400-4000 B.P. low (a deep low, with water level dropping 10-12 ft. below present the Laurentianistic and Bare Island series, along with the triangulars.

3400-2600 B.P. low (as deep as the preceding low and twice as long, but separated into two lows by a brief rise at 3000 B.P. that may have reached present level or just above and permitted the return of oysters to the area) -- Susquehannas, swallow-tail tricornes and fish tails (which are not the usual Hudson River variant) in the earlier half. There is slight evidence that this variant of the fish tail, which resembles the Orient, accompanies steatite, while the more usual Hudson River variant accompanies ceramics. Since the second half of the 3400-2600 low occurs after 3000 B.P., which marks the appearance of Vinette I pottery, and no pottery was found at Winterich, this segment of the low does not appear to be represented at Winterich.

The foregoing correlation of projectile point varieties is not merely mechanical. It has been made also with consideration being given to certain archaeological evidence from the many shell midden sites excavated in the Croton River area and an assumption derived from the Fairbridge scheme of sea-level fluctuation that highs, being periods of warmth, promoting oyster growth, would see new populations moving upriver, and low, cold periods would see the lingering on of the populations that had entered into the area during the previous high.

The Lamokoids, a strong series at Winterich, comprising varieties CRA 240, 400,

401, and possibly 501, totaling about 60 specimens are assigned to the pre-5863 plus or minus 200 low because they do not seem to appear in any of the shell midden horizons. All the Lamokoid, that is, narrow-bladed, stemmed points found in shell midden context appear to fall into the Bare Island catch-all category. At least they have been so typed by a taxonomist familiar with the "Typology." The most persuasive conclusion, then, is that the makers of the Lamokoids moved on, or were pushed, up river with the onset of the 5863 plus or minus 200 high that brought the first oysters in at least 30, 000 years to this Tappan Zee - Haverstraw Bay vicinity.

The G O (giant oyster) shell midden at Croton Point, from which the C14 date of 5863 plus or minus 200 was obtained, yielded no projectile points and very little lithic material at all. What it did yield was two inch-long, ovoid-triangular spalls which would be just the kind of blanks out of which the scutted nebs (CRA 320) could be made. Scutted nebs, with ovoids (CRA 1) also appear in the lower midden at Parham Ridge (Brennan, 1962b), about two miles north of Winterich, which we now, in hind-sight, believe to have been of late G O horizon time, probably at 5500 B. P. One scutted neb has also been found in an isolated shell dump at Croton Point.

This succession leads to the tentative conclusion that the makers of the scutted nebs and ovoids (they are placed together because they approach each other in form in certain specimens and were found together at Parham Ridge) replaced the Lamokoid makers in this area by about 5500 B.P. and were still here during the brief, mild, low at about 5400 B.P. The CRA 1 and 320 series is weak but unmistakable, and this weakness accords with the general impression of a culture lithically indifferent in all phases of tool making, as well as with the impression that the 5400 B.P. low was as brief as 50 years or less, but that either the water did fall by at least two feet below present level, or the crustal elevation of the river bottom was that much higher than it is now. This scutted neb or demi-stemmed ovoid and ovoid tradition continued somehow in the area, since the two varieties are found at the Crawbuckie Beach sites which, on cultural evidence, are late steatite-early ceramic.

The low that the Fairbridge scale places at 4400-4000 B.P. is both long enough and deep enough to have seen the last of the Laurentianistics (CRA 700, 710, 610, 500) and a strong occupation by Bare Island point makers. The strongest series of these is the thorn-like barbed shouldered, sharply outlined tricorne, CRA 403 and 403a, which, with the pods (CRA 402) and the off-set spikels (CRA 401) bring the Bare Island total to about 60. A Laurentian campfire at Bannerman's Island, 20 miles or so upriver from the Croton River area (Ritchie, 1958) has been dated at 4460 plus or minus 300, indicating that the point varieties associated with the Laurentian as manifested at Brewerton were in the vicinity possibly as early as 4800 B.P., during an oyster-thriving high. The persistence of the Laurentianistics into the following low, at 4400, is to be expected, and the assignment of the Winterich Laurentianistics to this low should cause no comment.

The Laurentianistics, however, probably faded from the area during the low that began at 4400 and were replaced, toward the latter part; it is believed by this writer, by the makers of the Bare Island series, herein designated CRA 402, 403, 403a, and 520 (?) The line of argument here runs that variants of the Winterich Bare Island varieties are found in the steatite-early ceramics, shell midden Crawbuckie Beach loci. Also among the CRA 403 specimens are some quartzite points; quartzite is a very

rare material in this area before about 4000 B.P. The plentiful ness of Bare Island types at beach and shell midden sites is evidence that the makers of these points took over and lived in this area for several hundred years; they were no mere passers through.

Passers-through is what the makers of the 2 or 3 Susquehannahs at Winterich probably were. This variety has been almost absent from sites in this area so far, but the variety designated CRA 520, swallow tail cornutes, has the look of having been influenced by or of being imitative of Susquehannas by makers who did not quite know how to achieve the classic form. Perhaps the variety is Susquehanna-related since it, too, seems not to occur elsewhere. Also assignable to this period are the triangulars. The placement of these varieties, and the three fish tail specimens, in the low of about 3500 B.P. will not, in all probability, be challenged. They are everywhere of this order of age.

Emerging from the foregoing correlation are the bare bones of a hypothesis that the movement of the people who made the succession of points is in some sort of synchronization with sea-level fluctuation, that is, with the climatic fluctuations that accompanied sea-level fluctuation. It seems more than idle speculation that new populations moved upriver and occupied the Croton River area with its valuable oyster beds with the warming, higher sea-level phases that made possible the flourishing of oysters, and it seems more than a guess that these populations petered out during the next cold, low-level, oyster less period. There are, in the shell midden, riparian sites, many more varieties of projectile points than occur at Winterich, indicating that there were more groups in the area during oyster producing periods than in non-oyster producing periods. Very probably, as the high, warm periods sloped off to cold, low periods, the shift of population was down-river, just as on the up-slope side, when the climate was warming, the trend was upriver. Undoubtedly some populations stayed on, while others drifted through, looking for unoccupied territory, for somebody to join up with, or for somebody to overcome. What the Winterich site presents is only the bold, generalized situation, not the detail.

The contrary to this hypothesis is the view that the Winterich site has no specific correlation with lows or highs and is merely a hunting camp occupied by a succession of different style point makers over some 3000 years. No evidence or argument now exists by which this view can be flatly contradicted. But the fluctuation in the size of oysters supports the fluctuation of sea level, that is, the existence of highs and lows, and during the oyster less highs, the proper location for a site is on or near the beach. During a high Winterich is neither on the beach nor at any significant distance inland. During lows it was a distinctly inland site, well-placed for taking game and, probably, exploiting vegetal resources.

To sum up, the succession of occupations in this area, as determined by the Winterich projectile point inventory, would seem to be this:

6500-6000 B.P. - low water and cool weather, but water is rising and climate moderating; the Lamokoids.

5800 - peak of a high; the demi-stemmed and ovoids arrive.

5400 - low water and cool; the lithically weak ovoid and demi-stemmed makers persist.

5000 - peak of a high; Laurentianistics arrive.

4400 - beginning of a long low; Laurentianistics linger until about 4100 when the Bare Islands arrive, during a warming, rising trend.

3800 - Bare Islands persist; Susquehannas, and other forms, including the triangulars, conventionally assigned to the transitional-early ceramic period, arrive in area. Vinette I pottery must have arrived here not much later than 3500 B.P., for it is found in middens of small shell, apparently with the Hudson River variant of the fish tail.

This chronology is a trial arrangement only, resting as it does on argument from the Fairbridge climate-sea level fluctuation scheme, itself disputed by investigators of Atlantic coast line geology, but corroborated for this area by one C14 date for a level where, unfortunately, no diagnostic artifactual material has been found. Consulted as a reference, however, it should evoke information which may prove or disprove it.

Brennan, Louis A. 1956. "Two Possible Coeval Lamokoid Sites Near Ossining, N.Y." The Bulletin, NYSAA, No. 8, Nov. 1956, Rochester,

1962a. "Fairbridge's Sea-Level Fluctuations." The Bulletin, NYSAA, No. 25, July, Rochester.

1962b. "The Q Tradition and the GO Horizon," The Bulletin, NYSAA, No. 24, March, Rochester.

1963 "A 6000 Year-Old Midden of Virginia Oyster Shell at Croton Point, Lower Mid-Hudson," The Bulletin, NYSAA, No. 24, Nov., Rochester.

Ritchie, Wm. A. 1961 "A Typology and Nomenclature of New York Projectile Points," New York State Museum and Science Service, Bulletin No. 384, Albany.

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PRELIMINARY REPORT ON TEST EXCAVATION OF SOUTH CRUGER ISLAND

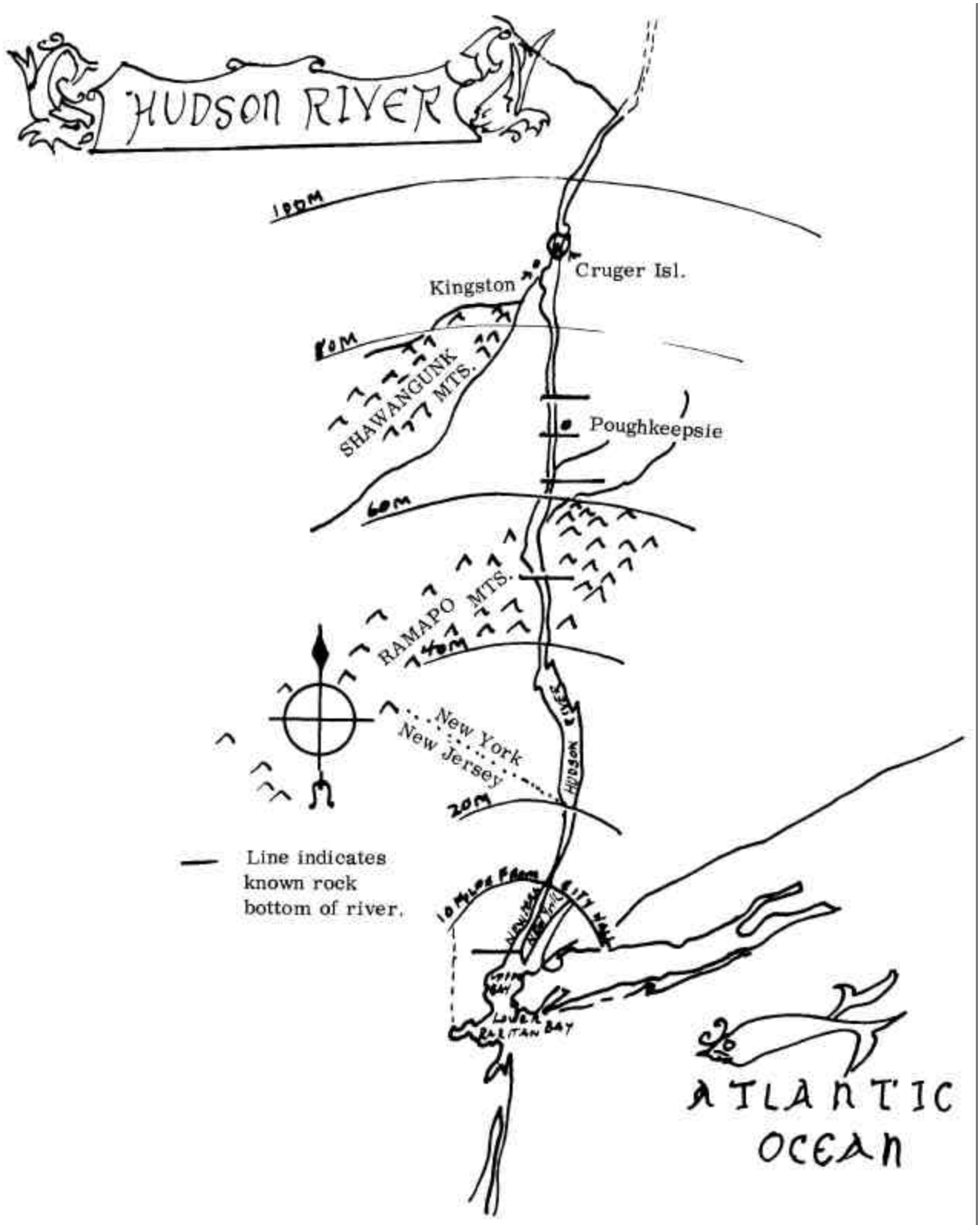
Robert J. Agro Columbia University

ABSTRACT

This is a brief site report from a test excavation done on Cruger Island in the summer and fall of 1962. It includes a suggestion as to the significance of the geological implications and their relation to the dating and history of the area. The site itself produced, at the earliest recognizable levels, Lamoka artifacts. It is therefore considered to date contemporaneously with the Bannerman site at around 2500 B.C. (Ritchie, 1958). Beneath this level was uncovered debitage. This may represent an earlier cultural horizon depending upon the geological interpretations, or simply downwash from the cultural levels above.

One specific problem encountered in this excavation was the nature of the strata. The matrix in which the artifacts were uncovered was not soil but rather river-laid sediment. Due to the very uniform nature of the sediment, there was no stratigraphy

(Editorial Note: Excisions have been made in the full-length manuscript as submitted by Agro to (1) reduce the manuscript to publishable size, and (2) emphasize the important geologic sections of the report. The archaeology of the dig was meager and confirms in Argo's view, the Lamoka-Laurentian sequence. It is much the less important aspect of Agro's work and has, therefore, been kept to bare essentials.)


HUDSON RIVER
100M
Kingston
Cruger Isl.
80M
SHAWANGUNK MTS.
Poughkeepsie
60M
RAMAPO MTS.
40M
New York
New Jersey
20M
Line indicates known rock bottom of river.
10 MILES FROM CITY HALL
LOWER RARITAN BAY
ATLANTIC OCEAN

as is normally common in soils. I do believe there is a cultural stratigraphy which appears to be supported by geological evidence.

LOCATION AND HISTORY

Cruger Island is located one-half mile from the eastern shore of the Hudson River and ninety miles north of New York City. It is in the Red Hook section of Duchess County. In 1688, the island was purchased from an unspecified Indian group by Col. P. Schyler. Subsequently, in 1835, John Church Cruger bought it and attached the rocky island to the mainland by a stone causeway. Today the island is owned by the Central Hudson Gas and Electric Corporation.

The north end of Cruger Island was partially explored and excavated by Dr. Mary Butler during the Vassar College Hudson Valley Archaeological Survey, 1939-1940. In March of 1947, James Shafer directed the Mid-Hudson Chapter of the New York State Archaeological Association in an excavation of the southern tip of South Cruger Island. (Ritchie, 1958)

Although there have been two excavations done on the island, an aerial photograph revealed soil marks in the same areas where a surface survey had uncovered a considerable number of artifacts. These areas, along beaches and in hollows, had already been considered as likely primitive campsites on the basis of the natural suitability. One of the many such sites lies north northeast of and right and one-half feet below er's Shafer's site Ctl 11-3. (Ritchie, 1958).

On June 6, 1962, we began a test excavation of this area. It consisted of one five-foot-square test pit, 1N1E, the base line of which ran 20 degrees east of north along the eastern side of the Western outcropping. This outcrop separates Ctl 11-3 from the June site. The southwestern corner of 1N1E is located twenty-seven paces (95 meters to the pace) and 20 degrees west of north from the eastern corner of the southern cave. This corner is bordered by a rock outcropping which begins at the flood tide mark. A trench three feet wide (Trench I) was extended from 1N1E twenty feet in a direction of 70 degrees east of north. Trench I was divided into four sections; each section was five foot in length. They are designated as follows: Trench number one, section one (Tr I, 1); section two (Tr II, 2); section three (Tr III, 3); and section four (Tr I, 4). The maximum depth of the excavation, from the surface, was four and one-half feet.

GEOLOGY AND CULTURAL AFFINITIES

South Cruger Island consists of two large shale outcroppings, the Western and Eastern, covered with a mantle of post-glacial sand and gravel deposits, which are capped by a layer of recent humus. Within the upper eighteen inches of the mantle are found angular pieces of fragmented shale which range from one-half an inch to more than two feet in length. These are the result of frost action on the rocky slopes of the island and of solifluction. The strata of the Middle Ordovician shale dips in ridges of about 75 degrees to the east with a strike a little east of north. (Ritchie, 1958). Between the two shale outcrops lies a relatively flat sandy area six inches above flood tide and covered with light forest vegetation. The June 1962 site occupies this low-lying region.

Cruger Island is a non-intensive (Kroeber, 1939:p. 222) occupation site which represents part of a generalized lithic or stone tool using, tradition of the northeast. Stratum I represents the archaic or pioneer phase, the Lamoka, in New York (Ritchie, 1932: p. 79-134). This dates from about 2500 B.C, in the central New York State (Willey and Phillips, 1958: p. 11.7). Beneath this, however, was excavated a semi lunar knife of rubbed slate. This Laurentian element is intrusive into New York State from the St. Lawrence Valley Ritchie, 1951:p. 130-136) and may date from 3640-600 B.C. (Libby, 1954:p. 733-742). The Laurentian horizon is immediately preceded by scattered and unidentifiable debitage. Above the indications of a Lamoka horizon is what may be an Orient horizon and finally, in the topsoil, indications of European contact.

If the ulo knife represents a Laurentian intrusion before the Lamoka horizon in this area, the two being distinct horizons and unmixed, then habitation of the island can go back as far as 6000 B.C. (Libby, 1954). In view of the geologic evidence, I do not think such an early date as this is possible.

The stratigraphy of the June 1962 test excavation is similar to that of Ctl 11-3. There are, however, notable variations. Among these, the lack of shell material and actual depth of the strata are especially outstanding.

Stratum III, which varies in depth from zero to minus three and one-half inches from the surface, consists of slightly sandy black topsoil. This is the result of humus accumulation from the surrounding flora. Available evidence indicates that this stratum represents a Late Woodland and contact horizon.

At minus three inches from surface, intermixed with chert waste flakes and chips, a small copper bell complete with clapper was excavated. Although it was uncovered crushed and partly corroded, it is in a good state of preservation. Four fine lines circumnavigate the bell. Its association with the flakes leads me to believe it may have been used as a trade item. The bell is not of aboriginal origin. The ring on top of the bell is a separate piece and not part of the bell itself as in specimens of Indian origin.

All of the pottery was found at the base of Stratum I. Unfortunately, all of it was too fragmentary to give any positive clues to the makers. The sherds are Cayadutta Incised and are grit-tempered (MacNeish, 1952).

THE STRATUM II SEQUENCE

Stratum II is reddish tan alluvial sediment. This sandy stratum extends downward to a depth of minus fifty inches from the surface in 1N1E and minus thirty-four inches in section four of trench one TR 1-4. Three subdivisions in the stratum can be seen. The first extends from the bottom of Stratum III to minus eighteen inches. In this zone, due to the leaching of organic material from the topsoil, the presence of decomposing rock and greater oxidation than in the lower portions of the stratum, the sediments are a dark reddish brown. This can most clearly be seen in 1N1E where there are a great number of rocks which have been eroded and moved through solifluction from the slopes of the western outcrop into their location in Stratum II. These rocks only extend a short distance into Tr. 1. This subdivision is designated as Stratum II-C. From the bottom of Stratum II-C through minus forty inches in 1N1E

and minus twenty-four inches in Tr. I-4, the sediment is a dry reddish tan. This zone is called Stratum II-B. Finally, from the base of Stratum II-B, minus forty inches in ME, to Stratum I, the sediment becomes darker and tightly packed, due to water absorption. This is Stratum II-A. When sediment samples are dried they are a uniform reddish tan color. The distribution of artifacts throughout Stratum II and the varying degrees of oxidation indicate that the stratum is the result of successive sediment deposition. The unconformity within the stratum prevents drawing any clear zones that would help in organizing the cultural sequences which can be found reflected in the artifacts of the stratum. There are, however, indications of a cultural stratigraphy within Stratum II.

In 1NiE was found the only feature of the test excavation. It was a fire pit, identified as such by the presence of charred wood, intrusive into Stratum II C. The uppermost rocks were at minus three inches, and they extended downward to minus twelve inches. The pit was located in the southwestern corner of 1N1E. In addition to charcoal, it contained acorns, a few waste flakes, and two pointed chert tools, which may be drills. These appear to be pressure-flaked and have rounded and worn points. In association with the pit were excavated a base of an Orient Fishtail point of brownish red chert.

The occurrence of rocks moved through solifluction brings up the question as to whether or not the artifacts described above were actually found in situ. I believe that their association with the fire pit establishes the fact that they were found in situ and not moved through solifluction from another location.

At sixteen inches, toward the bottom of Stratum II-C, was excavated a broad based, side notched gray chert Lamoka-like point fragment. It is a pebble derived tool, percussion flaked on both sides. The fragment is not waterworn.

Possible indications of food material found in Stratum II-C were acorns, a butternut, small charred bone material, and the shell of a pelecypoda. An ovoviparous egg case found at minus sixteen inches from the surface in 1N1E point to a possible sea-level change.

In Stratum II-B, at eighteen inches, was uncovered a sharp, ovate blade or point. It is percussion flaked on both sides. The material is black chert.

At twenty-five inches another typical Lamoka-like point was excavated. It is narrow stemmed and pressure flaked on both sides and on each blade and is of gray chert. A gray and white blank and a gray chert, triangular point, were found. Less than one per cent of the total six hundred and fifty-three flakes found were of quartzite. One large adze-like chopping tool of quartzite was discovered, however.

Also excavated in Stratum II-B were some charcoal and bone (charred) fragments and a portion of another ovoviparous egg case. This was found at minus twenty twenty-seven inches in 1N1E and again represents the possibility of another water level change. At minus twenty-six inches in 1N1E a mineralized birch tree, three inches in diameter, was discovered. It was lying in a horizontal position and may represent part of the original ground cover.

At minus forty inches in Stratum II-A in ME and also in Tr. I-1 were uncovered the only core materials found in the excavation. At the same level, minus forty inches, three pebble hammerstones were excavated. A gray slate ulo knife was found with the hammerstones. Also discovered was a dark gray waste flake that has been retouched on the edges and made into a chopping or cutting tool.

A pressure flaked burin made on a gray chert wasteflake was taken from Stratum II-A.

NOTES ON STRATUM II

The artifacts and flakes, except for a few, are sharp and not waterworn. It appears that they were left behind by their makers and, as the water rose, became covered with sediment. Whether the same people returned after each successive water rise, I cannot tell. Changes were taking place as is noticeable in the tool types. These changes may have been brought about by contact among river peoples or by an influx of culturally different people. It is also notable that at precise places where we find Lamoka-like points, there also occur signs of water level change -- the ovoviparous egg cases.

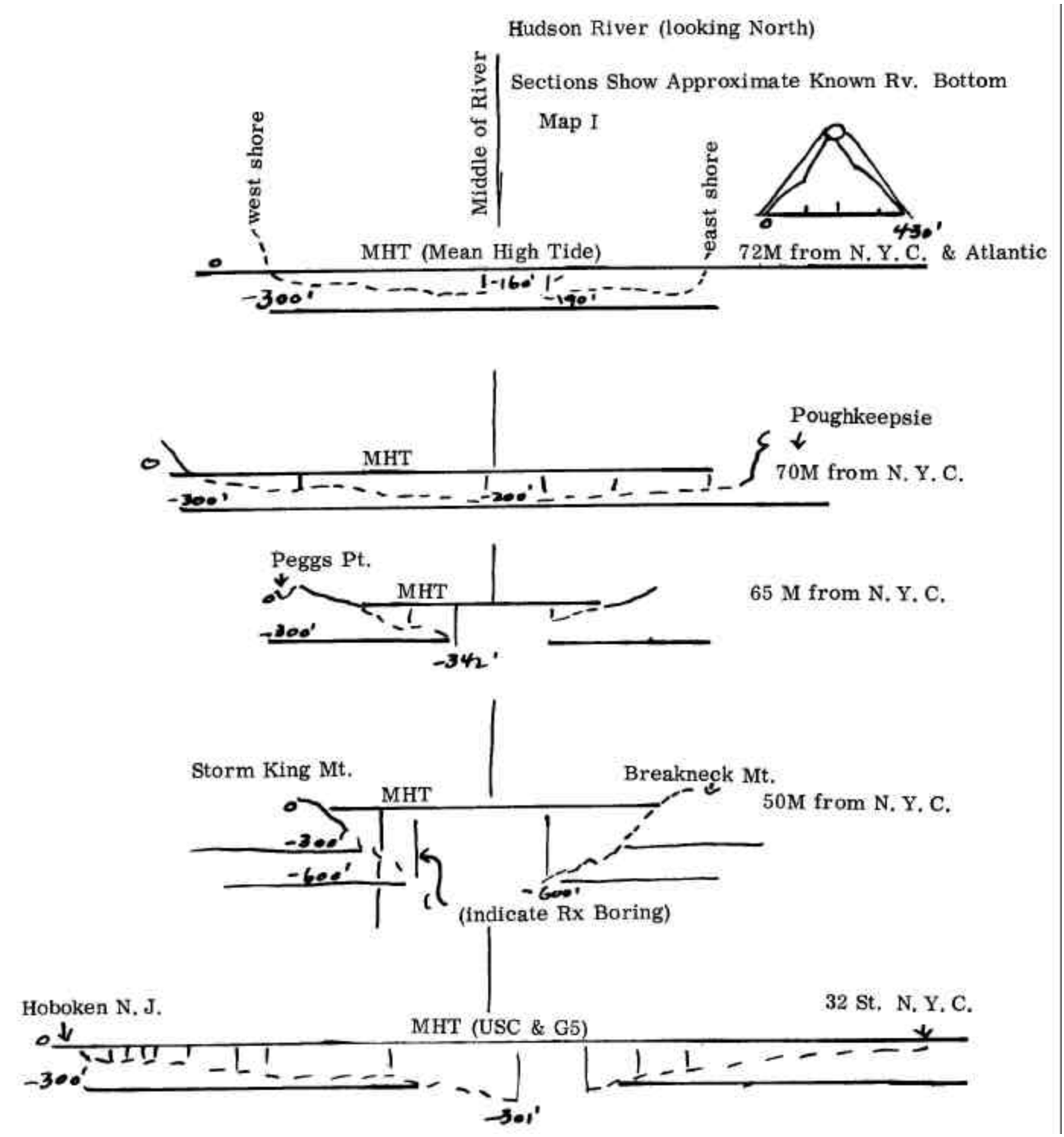
Ovoviparous egg cases are found on the island today. They are washed up onto the beaches from the river. It is possible that they could be carried onto the land by animals, but their uselessness as food makes this doubtful. Two fragments of such egg cases were excavated at minus sixteen and minus twenty-seven inches from the surface in test pit 1N1E. From minus sixteen through minus twenty-seven inches from the surface, was found projectile points of the Lamoka type. This is also the approximate area of Stratum II-B. I would propose that the egg case fragments were washed into the position where we excavated them and represent the floor of earlier beaches. The amount of oxidation of the sediments and presence of artifacts of Lamoka type help to support this idea. Until more work is done on the island, these observations can only be considered interesting and not conclusive indications of cultural stratification. They may provide an artificial means of determining the actual stratigraphy of Stratum II.

As was noted above, at minus forty inches from the surface, three hammerstones and an ulo knife were found. They were all uncovered and grouped together exactly at this depth. This probably represents another and earlier beach floor.

STRATUM I

The designation of the gray alluvial sediments found beneath Stratum II, as Stratum I, is based merely on the color of the sediment. In actuality, there is no break in the type of sediment either in physical character or method of deposition. Unlike Stratum I, Stratum II has been exposed to atmospheric conditions that have resulted in their distinctive color. The time involved in this process varies. If my assumption for the possible date of Stratum II is correct, it took about 4500 years to oxidize the first thirty inches of sediment. The lack of oxidation of Stratum I give us a hint to the possible antiquity of this zone. Stratum I begins at a point of saturation that is approximately level with that of the mean tide. Although the sediment is gray, lenses of localized oxidation can be observed. The sands of the sediment extend downward to an unknown depth. No diagnostic artifacts were excavated from the stratum.

On and in Stratum I were uncovered six chert waste flakes. One orange chip was excavated at minus fifty-five inches in 1N1E. Two gray chert flakes came from a depth of minus forty-three inches in Tr. I-1. In Tr. 1-4 three gray chert flakes were excavated from minus forty and one-half inches --three-and-a-half inches into the gray sediment.


Hudson River (looking North)
Sections Show Approximate Known Rv. Bottom
Map I
Middle of River
west shore
east shore
MHT (Mean High Tide)
72M from N. Y. C. & Atlantic
-300'
-160'
-190'
430'
Poughkeepsie
MHT
70M from N. Y. C.
-300'
-200'
Peggs Pt.
MHT
65 M from N. Y. C.
-300'
-342'
Storm King Mt.
Breakneck Mt.
MHT
50M from N. Y. C.
-300'
-600'
-600'
(indicate Rx Boring)
Hoboken N. J.
32 St. N. Y. C.
MHT (USC & G5)
-300'
-301'

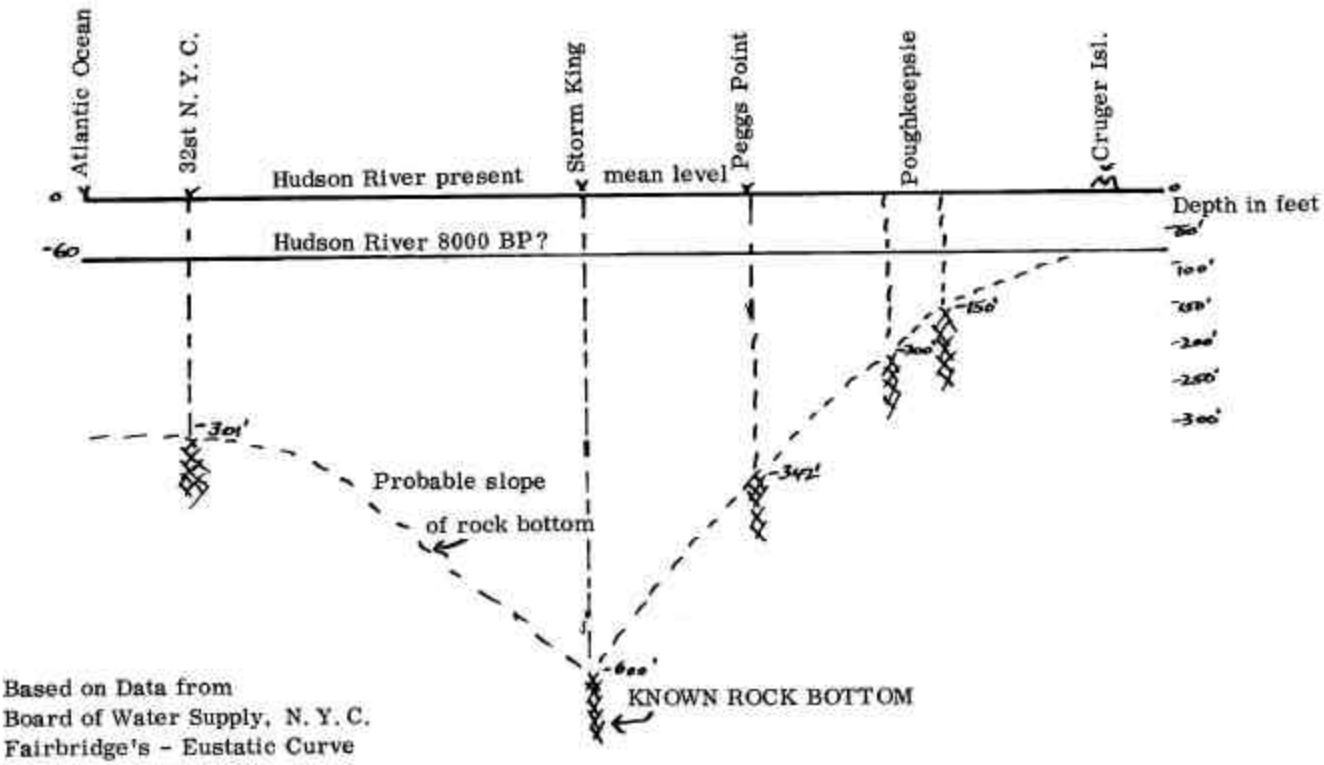
One problem encountered in the investigation on South Cruger Island was obtaining a date for Stratum I, the earliest cultural horizon. This problem was complicated not only by the nature of the stratum but also that of the early hunter. The oldest absolute date for a cultural site on the lower Hudson River is from the Bannerman Island radio-carbon sample (Ritchie, 1958). This date of 2524 B.C. is attributed, on the basis of stratum and artifact typology, to geological Stratum II of the June 1962 South Cruger Island site. Of course, the basic assumption here is that the Bannerman date is correct. What then, is a possible date for Stratum I? (Ed: Croton Point is 3900 B.C.)

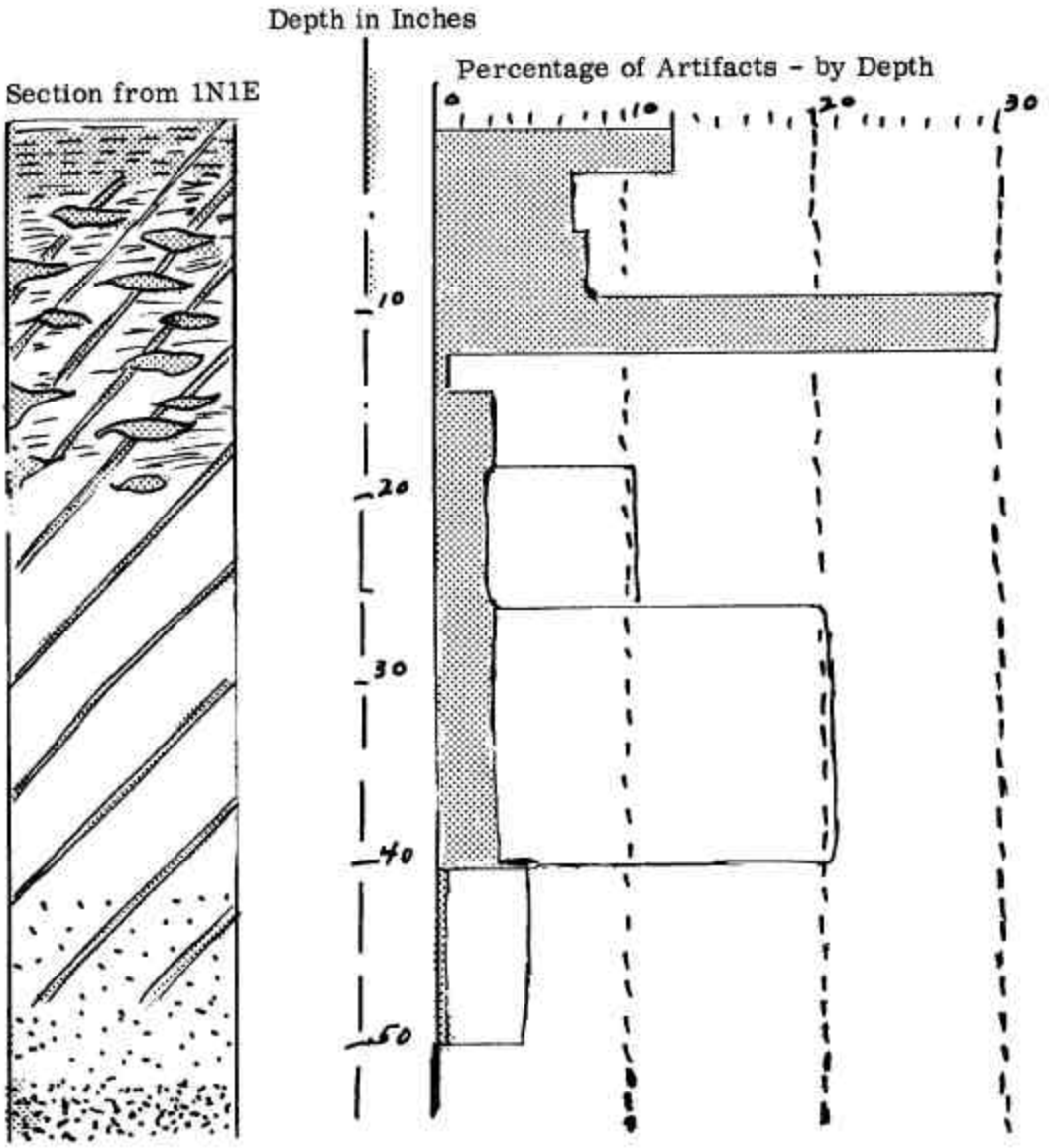
The answer lies in the river itself, and our story begins during Cretaceous times when the Hudson River region stood moderately above sea level. All the streams on this peneplain reached the sea at about the Upper Bay and drained into the Atlantic (Berkey, 1911). At the close of this era the area was subjected to great erosion. Just before the advent of the Pleistocene and glacial occupation, the continent was elevated and renewed stream erosion began. Such master streams as the Hudson kept to their original courses and began to cut deep narrow gorges. The river was widened during the Pleistocene, when glacial ice was funneled between converging mountain fronts. The ice tongue moved in direct line with the already existing river and caused more than an average amount of glacial erosion. This is what accounts for the excessive depth of more than 600 feet near the river gorge at Storm King Mountain (Berkey and Healy, 1911). The retreating glacier removed loose soil and silt from the river bed and gouged it down to rock bottom (Gilluly, Waters, and Woodford, 1958). The ocean had already begun, by the end of the Pleistocene, to enter the river valley and deposit new sediments on the rock bed. Land level had sunk below that of the sea, and the free egress and ingress of tidal waters was made possible (Berkey, 1921). With the glacial retreat and the rise of world sea level, the Atlantic's waters moved further and further up the Hudson River Valley. The valley slopes gently upward for a vertical height of more than one hundred and fifty feet in its ninety mile course between the Upper Bay and Cruger Island (see river slope maps). The river itself is in no way normal. For one hundred and fifty miles inland its currents are under strong tidal influence. The river's water is supplied in part by runoff from the surrounding mountains. From Albany to the sea, however, the river is an estuary of the Atlantic and is modified by ocean waters. It is, therefore, a semi-tidal waterway. As far north as Albany, the ocean causes a three-foot tidal change!

Stratum I, a sandy alluvial sediment, is at the river's mean level. There are only three possible ways this sediment could have reached its present position. Since it is post-glacial, the sands were either lifted to their present position through postglacial rebound, or they were deposited when the river reached its mean, or they could have been deposited by spring floods.

In regards to post-glacial isostatic rebound in this area, there is little evidence that significant glacial rebound was in effect as late as five or six thousand years ago (Personal communications with William Farrand and Walter Newman). Somewhat related to this problem is that of subsidence caused by compaction. In this case it would be the result of the thickness of Strata III and II forcing Stratum I to its present level. I am of the opinion that if there had been any subsidence caused by the thickness of the above strata; it would have only been negligible. This was further confirmed in an informal conversation with Walter Newman from the Department of Geology and Geography of Queens College.

RIVER SLOPE MAP II





Key
Stratum III
Stratum II-C
Stratum II-B
Stratum II-A
Stratum I

Black indicates % Artifacts by Depth

Between 18' and 40' the white boxes indicate actual excavation depth and artifacts uncovered. However, black space is an adjusted estimate to show graphically the decline in artifact numbers.
Based on 600 artifacts of flakes.

I do not think the sediments are the product of spring floods or erosion from the hilly slopes on the eastern shore of the river. The island itself is one-half mile from this shore line. Before eroded material could begin to build up on the island, it would have to fill in the channel between the island and the shore. This is not the case. Spring flood waters, on the other hand,, would normally move down stream. South Cruger Island is protected on the north by the larger Cruger Island. This prevents any water flowing south that has suspended soil particles, from depositing them on the southern island. If the sediments were a product of the local topography, they could contain organic material. This, once again, is not the case.

The only explanation that seems logical to me is that the sediments were carried by the river from the sea during the river's rise and deposited upon the southern shore of the island.

The mean of the river estuary's waters directly reflects that of the sea and could only have been reached when the sea attained its present mean. By 6000 B.P. (Years Before Present) sea level reached its present mean (Fairbridge, 1961; Newman and Fairbridge, 1962). Six thousand years ago the sediments of Stratum I were probably deposited. If this is so, the few flakes excavated from the gray alluvial sediments can be as old as the date that sea level rose--4000 B.C. At the same time, they can be younger than 2524 B.C., the proposed date for Stratum II. Is there any way that we can further limit this time span?

It has already been noted that geological Stratum II is an alluvial sediment similar to Stratum I. There are three possible ways that Stratum II could have been deposited. The first is that the river level has not changed since it reached its present mean, and that the land has risen. This matter can be discounted on the basis that there has been no significant glacial rebound. The other two possibilities are that the sediments were deposited through local flooding after the river reached its present mean. These last two are the more credible. Even today, the area is subject to periodic spring floods, which cause a considerable rise in the river's level. As. explained above, however, I do not think this is the case. The next consideration is that of the sea level change since 6000 B.P. Although there is great controversy about fluctuations after today's mean had been reached, it is well to note that such changes can be observed today. (Johnson, 1929b and 1930; Fairbridge, 1961b).

Radiocarbon dates obtained from Point Peron, Western Australia, indicate that 5000 years ago sea level stood ten to twelve feet above the present mean (Fairbridge, 1950; Ferguson and Rafter, 1954; Rubin and Suess, 1955). Paleobotanical evidence further supports this date for sea level rise. It indicates that the temperature of northern Europe in 5000 was 2.5 degrees centigrade higher than it is today. (Fairbridge, 1961) Pollen analysts note a general renewed warming of the atmosphere accompanied by a rise in sea level. This rise, the Boreal-Atlantic Transition, is fixed by radio-carbon dates at 7500 BP (Godwin, 1957). It is assumed that water level rose for the next 2500 years, as no evidence for any important negative oscillations have yet been recorded (Fairbridge, 1958 and 1961). A river rise certainly resulted in geological Stratum II. If there had been a rise that could be connected with the postulated world sea level rise in 5000 BP, the Older Peron Terrace, then we could isolate the date for the few flakes of Stratum I between 3000 B.C. and 4000 B.C. Since the river is an estuary, any rise in the ocean's level would have affected that of the Hudson.

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EXCAVATIONS OF FISH CLUB CAVE (COX 6), ALBANY CO., NEW YORK

Robert E. Funk and R. Arthur Johnson Van Epps-Hartley Chapter

Fish Club Cave is located in the township of Coeymans, Albany County, N. Y., three miles west of Ravena, in the valley of Hannecrois Creek. Discovered by Johnson in January, 1962, as part of a continuing survey, in cooperation with the State Museum, of aboriginally occupied caves and rock-shelters in eastern New York, the site is on the north side of Feura Bush Road, almost directly opposite the Ravena Fishing Club.

The limestone hill in which the cave was formed is an outcrop of the Schoharie formation, of Devonian origin. The cave entrance faces to the southwest and is situated about 15 feet above stream level. The aperture is triangular in form and previous to excavation was 63 inches above ground level at the apex. Its breadth is 113 inches. Inside, the walls assume a more cylindrical form, and a six-foot man can walk erect for a space of about twenty feet. Toward the rear, the walls, floor, and ceiling converge, until at a distance of 73 feet from the mouth, a narrow slit prevents further progress. This fissure, from which issues a slight cool draft, apparently extends through to the north side of the hill, where a small, partially buried opening is visible. This built-in "air-conditioner" was undoubtedly a disadvantage from the aboriginal point of view, especially in winter. The cave at present is fairly damp in spring and summer.

The floor of the cave consists of black leaf mold, rubble, and considerable modern debris in the form of tin cans, broken glass, tree branches, and boards. At one time, local farmers stored cabbages in the chamber. In the walls are small veins of flint, and considerable quantities of this flint turned up as debitage in the excavations.

The authors visited the cave together on April 24, 1962 and sank a 4' by 4' test pit, after setting up a small grid of stakes inside the entrance. Just outside the opening is a fall of very large rocks protruding above ground level. As excavation proceeded, it became evident that the rocks had fallen before the Indian occupation, and that the principal living area was just inside the cave. The Indians were restricted to this spot not only because of the rock falls, but also because smoke from their fires could escape only at the entrance.

The test square was enlarged during later visits by the writers, so that an area of over 120 square feet was eventually dug. Stratigraphy was as follows:

The upper zone (zone A) in the test area was 5 to 8 inches thick, black in color, consisting of leaves, humus, flint spalls and flakes, and modern trash. No whole or diagnostic artifacts occurred in this layer.

Underlying zone A was zone B, gray-brown to black in color and 15 inches thick, composed of granular clay, grit, flint debris, and rubble, comprising the "Indian dirt" of the site charcoal-stained and containing much refuse bone. Nearly all the recovered artifacts pertained to this layer, which thinned out several feet into the cave from the datum line. Zone C consisted of a thin (6 inches) layer of tan clayey silt and rubble, which seemed to dip toward the cave margins. Into the resulting space the Indians of zone B threw the remains of many meals. Zone C petered out within 10 feet of the cave entrance.

The subsoil (zone D) was a culturally sterile deposit of fine yellow clayey silt in which occasional angular fragments of stone occurred. It was at least 54 inches thick, as determined by probing with a soil sampler, and probably overlay either bedrock or some intermediary deposit of Pleistocene origin.

The lowermost artifacts in zone B, at depths of 17-23 inches, were four projectile points of Otter Creek type, two ovate knives, and an adze. At the base of this level a number of flat stone slabs, apparently carried in from outside, appeared to have been deliberately placed to form a floor or platform of unknown function. This paving was confined to the main area of occupation.

At an intermediate level (10-16 inches) in zone B an end scraper, an ovate knife, a pestle, a single-pitted hammerstone, and a Vosburg-type projectile point were found. The pestle, an unusually large specimen 23 inches long, was found in a crevice between one side of the entrance and a large fallen rock.

At the 8-9 inch level, a Normanskill point and an ovate knife turned up. At the very top of zone B, a Madison point, a Levanna point, a rim sherd, and several body sherds were unearthed. The rim sherd was of Middle Woodland form. One body sherd was decorated with narrow oblique corded lines on a smooth surface; the other sherds displayed cord-marked or smoothed-over cord surface treatment.

Preliminary study of the midden bone indicates a heavy reliance on venison throughout the period of occupation. At least three specimens of red fox are also represented. [1] A fragment of sturgeon plate was found.

We conclude with a brief history of the site. The cave was formed by the action of subterranean waters at a time remote from the present. Later, downcutting by Hannecrois Creek and concomitant erosion of the surrounding formation in the area exposed the cave and resulted in its present external appearance. The subterranean stream ceased to flow because the water table had dropped considerably. Deposition of the fine yellow silt of zone D probably occurred long after this time, when slow-moving or eddying water filled the chamber during a climatic episode moister than present. This moist interval may have coincided with the close of the last (Wisconsin) glaciation, some 10,000 years ago. In all probability, water entered the cave mouth during a swollen proglacial stage of Hannecrois Creek.[2] Some time thereafter, heavy

1 We are indebted to Dr. Edgar J. Reilly, state curator of zoology, New York State Museum, for this identification.

2 We are grateful for the assistance of Mr. James F. Davis, Economic Geologist New York State Museum, and Dr. Ernest H. Muller, Department of Geology Syracuse University, in interpreting the geologic aspects of the site.

rock falls occurred, partially blocking the cave mouth. These rest directly on zone D.

The status of zone C is something of a mystery. Its rocky content and limited extent argues for its separation from zone D. Barren of cultural remains, it may represent a period of weathering, humic action, and deposition by wind, water, and minor rock falls at and just within the cave mouth. Alternatively, it may be the upper portion of zone D, its color resulting from (1) a period of humic deposition and/or weathering or (2) organic stains from the overlying zone B.

Whatever the case, the first aboriginal occupation either followed or interrupted the formation of zone C. The stone platform was laid directly upon the zone.

The first occupation was by a group bearing the culture of the Vergennes Phase of the Laurentian tradition. The time of this occupation can only be guessed at. The Vergennes Phase has not yet been radiocarbon dated on any "pure" component. There are some grounds for believing it to be a very ancient expression of the Laurentian. The evident weathering of the Otter Creek points, and their position at the bottom of zone B, argues for considerable antiquity. The apparently later stratigraphic occurrence of the Vosburg and Normanskill points cannot be relied upon in the absence of more data. We are safe only in saying that groups of Laurentian affiliation were first to sojourn at the site, beginning perhaps at about 3000 B.C. or even earlier.

The meager evidence of the potsherds and triangular points indicates later occupations by Middle and Late Woodland peoples.

Our investigations at Fish Club Cave, then, demonstrate that the site was primarily a hunting station, occupied intermittently by small groups from Middle Archaic to hate Woodland times.

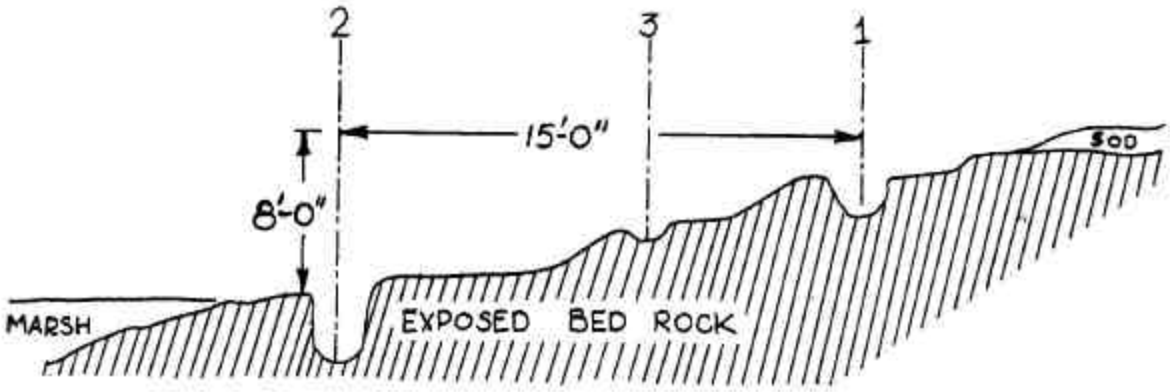
INVESTIGATION OF A POT-HOLED KNOLL IN PELHAM BAY PARK BRONX COUNTY, NEW YORK

Edward J. Kaeser Metropolitan Chapter

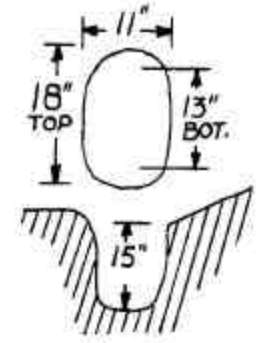
Within view of the two massive glacial boulders marking the Pelham Boulder site (Lopez, 1956, p. 15), a series of five rocky knolls rise out of the salt marsh oriented in an east-west direction. A cluster of six pot-holes, situated on the eastern slope of one of these knolls and the contiguous area was first examined by the author in the autumn of 1956, during a circumjacent survey of Glovers Rock (Abbott, 1901). The six pot holes noted (Fig. 1) are those that are exposed on the rock slope. Sod and shrubs mantle many hollows in the bed rock, possibly hiding several others, which might be found with the use of a probe. The existence of the pot-holes has been recorded and conjecture forwarded as to their possible use as corn grinding mortars by the Indian (Jenkins, 1912, pp. 312, 313).

The search for recorded observations of cultural material recovered from the knolls which, if available, would help determine the extent of aboriginal activity and possibly contribute some clue relevant to the use of the holes, has so far been unsuccessful.

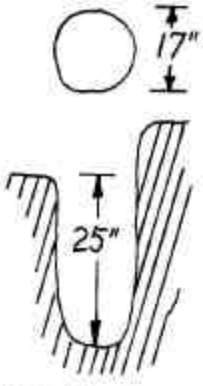
Surface evidence of Indian occupancy is meager on the knoll under investigation. Some scattered clam and oyster shell fragments appear on rain-scoured slopes, and a few quartz and chert flakes have been found, revealing the manufacture or dressing



Rock slope profile, showing pot-hole location. East, west axis.

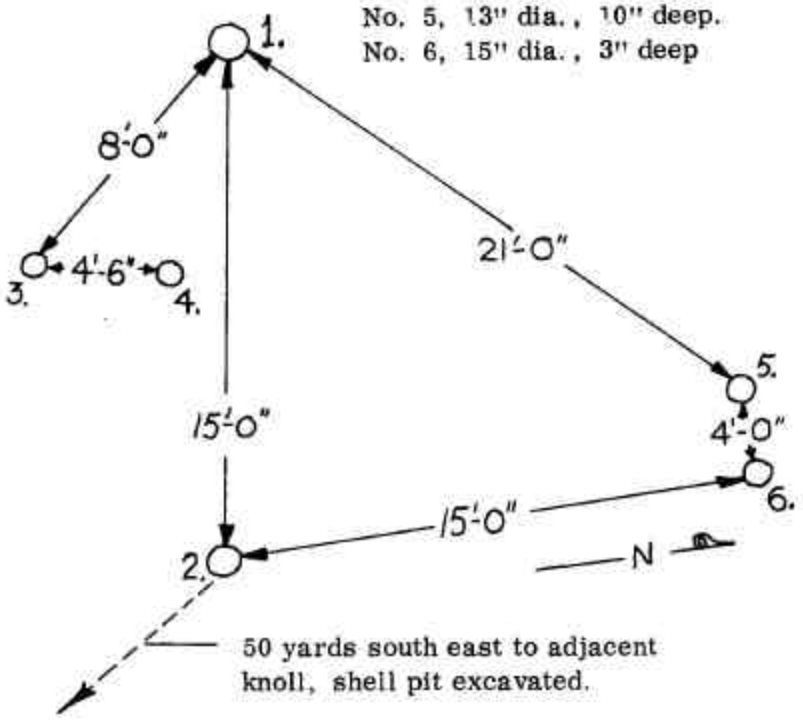


No. 1



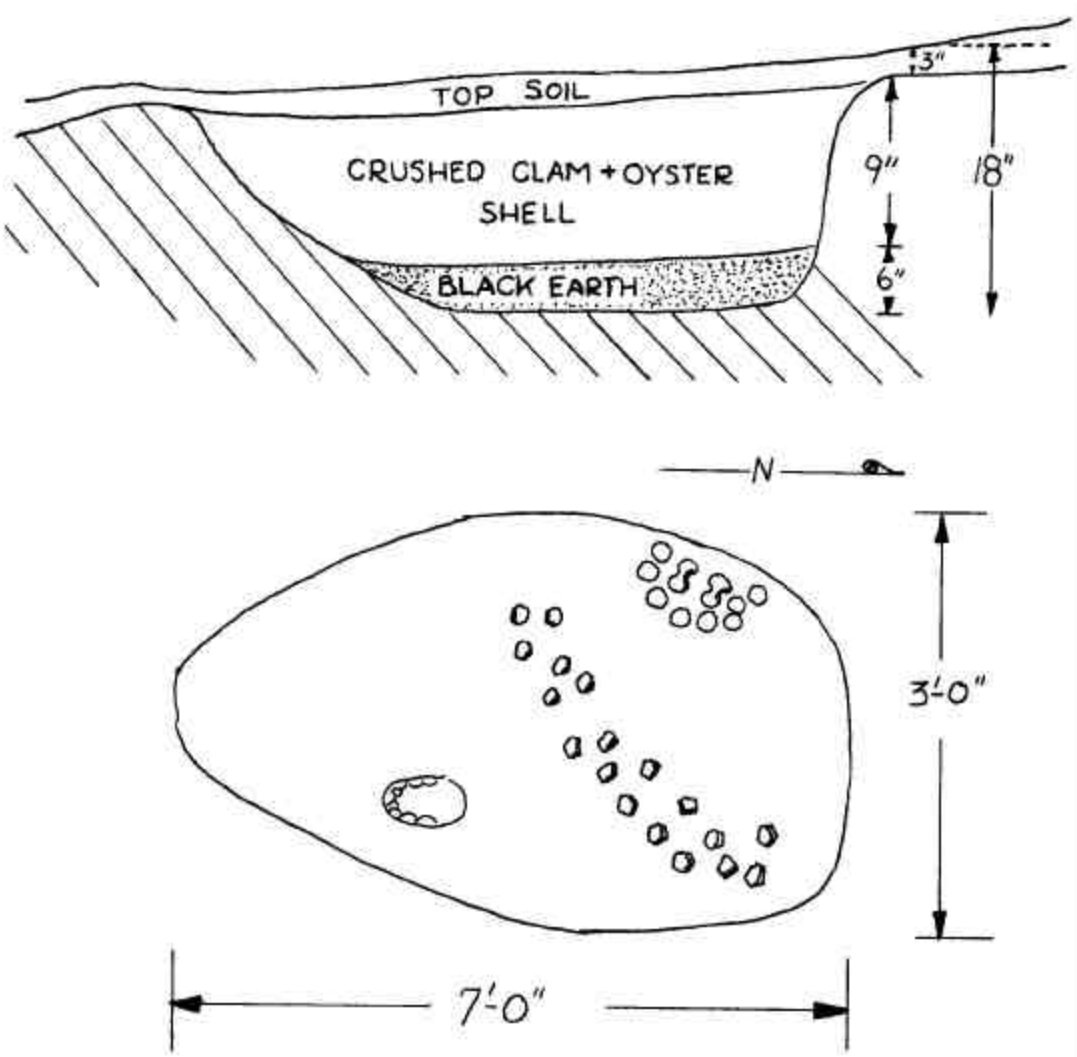
No. 2

No. 3, 10" dia., 2" deep.
No. 4, 10" dia., 2" deep.
No. 5, 13" dia., 10" deep.
No. 6, 15" dia., 3" deep



50 yards south east to adjacent knoll, shell pit excavated.

FIG. 1



Cross section and plan of refuse deposit in bowl shaped depression of bed rock.

FIG. 2

of stone tools in the immediate area. Two 12-inch diameter, double-pitted cobble mortars were found, their weathered surfaces partially exposed through the sod, near the wooded apex of the knoll. These finds represent the writer's sole artifactual recoveries to date.

As yet, no definite shell midden has been discovered on the knoll bearing the potholes. The writer, however, during the summer of 1957, located a small shell deposit on a nearby knoll 50 yards southeast across the marsh, lying in a shallow, bowl-shaped depression in the bed rock at an approximate 5-foot elevation above the salt meadow. The circumjacent area was closely examined and the pit excavated to its limits. The refuse deposit was found to be oval in outline. The greatest dimension in length, at the orifice, measured 7 feet. Breadth measured 3 feet and maximum depth 15 inches from the top soil junction to the flat bottom of bed rock. Below a 3-inch mantle of dark brown top soil, a 9-inch compact stratum of crushed clam and oyster valves was found. The remaining 6-inch layer was composed of greasy, black carbonaceous earth containing several small, whole whelks and unmodified columella fragments (Fig. 2). Two notched quartzite pebble net sinkers were recovered from the tightly compacted shell, 9 inches from the surface. These objects were found lying amidst a group of 8 round beach pebbles, often referred to as pot or boiling stones, measuring one-and-a half to two-and-a-half inches in diameter. A crudely chipped, ovoid hand chopper of argillaceous stone was recovered from the base of the deposit, lying on bed rock in association with a quantity of broken and split bone and several deer teeth. The chopper, if it was utilized as such, is presumed to have been used in the butchering process and in cracking marrow bones.

A total of 17 pottery sherds were recovered from the 9 to 12-inch level measured from the cavity orifice. The fragments, all non-contacting body sherds but thought to represent a single vessel, did not exceed one-and-a-half inch in diameter. The exterior surfaces of all sherds bear cord-wrapped paddle impressions. Interior surfaces show a haphazard, shallow, brush marking as if smoothed with a grass bundle. Paste structure is moderately coarse; the aplastic is angular quartz particles; the sherds are tan-colored throughout the one-quarter to five-sixteenths inch thickness. They most closely resemble the type Windsor cord marked (Smith, 1950, p. 194), typical of eastern Long Island and Connecticut's prehistoric Sebonac and possibly historic Niantic foci. Both foci are tentatively accepted as late surviving manifestations of the Windsor tradition of long temporal span and contemporaneous with coastal New York's Clasons Point focus of the East River aspect (Smith, 1950, pp. 151, 152). The sherd collection, though small in number, leaves little doubt of a cultural occupancy coeval with the nearby Pelham Boulder site which produced sherds exactly similar in paste and surface finish.

During the course of investigating the pot-holed knoll, no conclusive evidence was found to substantiate or disprove the pot-hole mortar theory. No calcined remains of corn or acorns, the raw vegetable foods normally ground to meal in-stone or wooden mortars, were found. No stone agricultural tool or pestle turned up. However, the latter implement could have been made of wood and perished along with the many other non-lithic objects of common domestic use which rarely survive archaeologically. Because of the exceptional depth of several of the holes, only a wooden pestle would have been practical. Considering the ingenuity displayed by the Indian, it would seem

strange that the pot-holes would not be put to some use either as mortars or as containers for storing dry food stuffs. I should like to submit this added possible use for the holes, as ready-made cooking vessels, particularly holes numbered 1, 2, and 5, using boiling stones heated in a nearby bed of embers, a cooking method commonly used in skin and bark vessels. Advancing conjecture further, this might account for the scarcity of ceramic cooking vessel sherds on the knoll.

Assuming the knolls could have afforded the Indian a comfortable warm weather dwelling place, it is extremely questionable that a habitation would be maintained throughout the winter, because of the exposed location. During early spring and particularly in the fall, the wind-driven tides all but inundate the area, as evidenced by the driftwood and swamp reeds that pile high up the slopes. During the hurricane of September, 1938, this entire area was under many feet of water; only the tall Oak trees crowning the knolls marked their sites.

Although several writers have alluded to the local Indian cultivation of vegetable foods, the absence of -unquestionable agricultural tools such as hoes and remains of maize and curcurbits is significant throughout the parklands. Large chopper-like artifacts, usually crudely made from slabs of micaceous rock, have been recovered at several sites in the area, but because of their location close to oven and refuse pits and graves, they more than likely were used as simple digging implements for the particular pit from which they were recovered. None of these objects show the smoothing and polish or hafting notches characteristic of known cultivating tools.

Until the entire knoll has been completely investigated and artifactual proof added to the scant evidence of Indian activity, it must be assumed the pot-holes, though probably not completely ignored, were not utilized by the Indian as local tradition suggests.

One question remains. Why, when ready-made mortars were available, were the two double-pitted mortars needed and because of their large size probably manufactured on the site?

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MORE NOTES ON THE STONE UTENSILS IN THE ORIENT BURIALS

Roy Latham Long Island Chapter

The old stone vessels of the Orient Mortuary Complex, when amassed in a culture, are extremely interesting and worthy of considerable study. Their abundance in the Orient culture is unique. The sum of 30 to 60 stone vessels in each burial plot indicates probably only a fraction of the total that was in service by the Orient people over 3000 years ago, around 1000 B. C., when this stone industry, imported to Long Island from north of the Sound, was at its height.

An assemblage of stone vessels, after restoration, exhibits an amazing diversity of forms and sizes. There are large, shallow rectangular vessels with variations, through deep rounded, oval, and triangular utensils, with, however, the trend toward oblong forms. The sizes vary from 6 to 18 inches in length and the weight from three-fourths of a pound to 24 pounds. The largest vessels have a capacity of 27 quarts. The lugs also manifest great variation in shapes, sizes, and their positions on the pots: A lug may be on the top on one end and halfway or lower on the opposite end; or in the center on one end and on a corner on the other end. The lugs are often dissimilar in shape and size on the same pot: One of the unbalanced corner ears in one instance is deeply scored, evidently in the process of being removed. Both rounded and bar lugs occur. A few of the smallest vessels are unlugged. Some of the larger lugs are incised for ornamentation. All vessels are smoothly finished throughout on exterior and interior. Ninety per cent have flat bottoms, the remainder showing varying degrees of convexity, no doubt due to the conformity of the blocking. Practically all vessels are transversally notched on the rims. One is especially prominent in this respect; probably all were when new. In most specimens the notches are nearly obliterated from handling; apparently the notches were never renewed. Only one vessel has any body decoration, a continuous band of Vs encircling the circumference of the vessel one inch below the rim. Many rims are incurvated from scraping in smoothing and finishing. The minimum thickness of a vessel is one-eighth inch and the maximum thickness two inches; both extremes may occur in the same vessel. The base is the thin and weakest portion of a vessel due to excessive scraping and wiping.

Steatite in the Orient culture is very irregular in quality. The crumbling of certain vessels is not due entirely to age but to the composition. Examples of the strongest and weakest vessels are intermixed on all four components of the Orient aspects. Certain vessels are as strong as when blocked; others have almost completely disintegrated; all stages of intergradation occur between the two extremes.

All large stone vessels are soot begrimed from contact with fires, showing that they had been utilized as cooking pots. This is further corroborated by the discovery of a stone vessel two feet down in a cutout from a major ceremonial pit. This pot is medium-sized, with a third of one end broken off, evidently "killed", and tilted to prevent contents from spilling off the fractured end. The pot was supported by three sizable stones, five to seven inches in diameter, in a small, apparently temporary, hearth. The propping by stones probably was a method of steadying the stone pots during the period of cooking.

Out of a total of approximately 180 stone vessels recovered from the four Orient

burial plots, only one was unbroken. This was near the surface, between grave shafts, and was, perhaps, covered when the graves were dug. This vessel is an important record on which our contentions are based that the stone vessels were transferred intact to the burial places and cracked or broken outside the pits during the rituals. Breaking the vessels in advance would have complicated movability and detracted from the final mortuary plans.

As previously mentioned, the small vessels set upright in a grave cache, with associated offerings spread around them, are considered individual offerings. Nothing has been found in these small vessels. A small hole has been punched through the base from the exterior, but the vessels have not been broken apart. These small holes are here classified as "kill holes". The large vessels that are shattered and broken into few or many sherds, and are distributed throughout on the floor of the major pits, between grave deposits or partially buried in ochre are considered communal pieces, which represented the whole group in that burial plot. When sections of stone vessels were buried in ochre, they were covered with rims exposed an inch or less above the paint and appeared as though they had been pushed down into the substance and not meant to be completely covered. When large sherds were laid independently of the ochre, they were invariably deposited outside up. All large vessels were inverted upside down, sometimes a large vessel over a smaller one.

In the single grave pits outside the margins of the big main pits, parts from one, two, or more broken stone vessels were spread to cover nearly the complete floor with the other goods all or mostly underneath them. These individual grave pits are now thought to be the results of a second or later visitation to the cemeteries. No fractured stone vessels in the single grave pits match broken vessels in the multiple grave pits.

One unusual stone specimen is a dipper-like article found, with five broken stone vessels, on the floor of a central pit. The specimen is seven inches in length, beveled down to an edge on one end, with a short pointed handle on the back rim; along the top of this handle is a groove to fit the thumb when it was manipulated--this is not a lug, and it is quite different in nature. The tool would have been useful for scooping ochre, sand, and similar material. There is a small kill hole from the exterior through the bottom. The pit from which this was taken is considered communal and not a grave.

Various uses were made of the large sherds from stone vessels. One sherd was inverted over the skull parts of a bundle burial superimposed below the floor of a major pit. Bones in this sub floor burial were the only interment material not cremated or completely decomposed on the four Orient sites. However, there was sufficient evidence in the graves on our site and the marginal pits on another to substantiate that there were fully decomposed burial remains. In the several grave pits of this nature, the discolorations were always on the east side between the grave goods and the east wall. The stains were in strong contrast with the light-colored sand with the natural subsoil adjoining them. The slab of steatite over the skulls was the means of associating that deep isolated feature with the 32 graves on the floor above it, by its matching sherds from a large vessel scattered among the grave caches.

No genuine stone mortars were with the Orient burials, and they would, not be expected if the sites were far from a habitation. It is plausible to assume that heavy stone dishes were utilized as mortars. Perhaps such service is the reason for the numerous perforations for mending and repairing breaks. Pestles are in the list of

tools in the Orient, and they may have been used to "kill" the vessels. Pestles were also broken, "killed," as a part of the burial ceremonies and deposited in the graves with other goods.

In one pit, sherds were associated with red sandstone slabs to form a wall around the grave goods. In another grave, a stone vessel had been broken into many small sherds of two to five inch pieces and neatly packed in tiers of four to six sherds high on the east side of the other offerings.

The majority of the steatite in the Orient conforms to samples from the prehistorically worked quarries in Connecticut. No soapstone is indigenous to Long Island, except a few unworked boulders far removed from the east end. Only four fragments of raw steatite were in the Orient burials and, except for two gorgets, only finished utensils manufactured from this material are recorded on these sites.

The opinion is here expressed that the so-called steatite (Amphibole talc rock, as determined for Dr. Ritchie) in the Orient hilltop burial plots is derived from the anciently worked quarries in Connecticut across the Sound.

Cohn's "The Fortifications of New York" will continue in the next issue.

This issue marks the end of the 10th year of publication of The Bulletin. For this anniversary year we have printed 81 pages of text, 90 per cent archaeological report, as against 43 pages of Vol. 1, with about 15 per cent archaeological report.

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David Baerreis — Society for American Archaeology

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(1) a quarterly journal, American Antiquity, containing over 600 pages of abundantly illustrated articles and reviews on all phases of New World prehistory;

(2) Abstracts of New World Archaeology, an annual publication listing and abstracting articles and books in all media pertaining to New World archaeology; and,

(3) occasional Memoirs issued intermittently (but our Editor, Dr. T. N. Campbell, has promised several for the coming year).