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October 16, 1972

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Dear Dr. Crabtree,

In 1971 and 1972, while I was employed at the Garvies Point Museum of Natural History, Glen Cove, Long Island, N.Y., I directed the excavation of the Old Marsh Site. I am now a graduate student here in Missouri and I am involved in writing the report on the Old Marsh Site. This letter concerns the functional interpretation of several "small, bi-polar, pebble hammers" included in the site material.

The site is located in the town of Glen Cove, N.Y. It lies on the north bank of Glen Cove Creek, a small tidal creek that drains into Hempstead Harbor on Long Island's North Shore. At this stage of the analysis it appears to represent a "work shop" area with cultural affiliations in the Archaic and Transitional Periods (Brewerton and Orient Fish-tail type points were present in the recovered material.) The stratigraphy of the site is such that there is a thin cultural zone above a subsoil of Cretaceous sand and clay intermixed with glacial till. Above the cultural zone is a layer of silt and sand, and finally a marsh mat.

A large portion of the artifact assemblage is comprised of hammerstones (a total of 43 were recovered.) The hammerstones varied in size and shape but of the 31 pebble sized hammers, 9 specimens are what I have been calling "small, bi-polar, pebble hammers." Specifically, they are "D" shaped in outline (one longitudinal side is bulging and the other side is straight) and roughly triangular in cross section. They have two distinct, separate, areas of pitting at opposing polar ends. One area of wear is concentrated and localized on one polar end (which is more bulbous than the other polar end.) The second area of wear is on the more tapered polar end; the wear starts on the polar end and extends back approximately 1/3 to half way along the bulging side. The first area of wear shows a higher degree of pitting than does its counterpart.

Photograph #1 shows six of these utilized pebbles. Their measurements (in centimeters) are as follows:

specimen	max. length	max. dia.	min. dia.
58-68-4	2.20	2.00	1.10
58-28-11	3.10	2.10	1.60
58-70-5	2.40	2.30	1.40

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Photograph #1

bottom row, left to right

specimen	max. length	max. dia.	min. dia
58-X-17	3.00	2.45	1.45
58-68-8	2.60	1.40	1.10
58-70-8	2.35	1.85	1.15

Photograph #2 is a close up of the bulbar polar end of specimen 58-X-17; Photograph #3 is a close up of the tapered polar end of the same specimen. Photograph #4 is a close up of the bulbar polar end of specimen 58-28-11; and Photograph #5 is a close up of the tapered polar end of specimen 58-28-11.

There is a total number of 9 bi-polar, pebble hammers from the Old Marsh Site. Their measurements are tabulated as follows:

s.d. = standard deviation
measurements in centimeters

	mean	s.d.	range
max. length	2.51	.57	3.40-1.75
max. diameter	1.90	.40	2.45-1.40
min. diameter	1.27	.27	1.70- .90

A microscopic examination of the pebble hammers has not been conclusive due to the coarseness of the material (8 specimens are silicious, fine grained quartz or similar material, and 1 is chert; all items are unmodified beach pebbles with their cortex intact except for the pitting on the utilized ends.) The only conclusion I can make about the wear patterns is that they are comparable to those found on larger, conventional hammerstones.

The question I want to pose to you is could these bi-polar, pebble hammers have been used as intermediaries in indirect percussion? I have tried two techniques using pebbles of this size and shape as intermediaries. The first method involved holding a biface in the palm of my left hand while holding the tapered end of the pebble against the biface edge (with the bulging side towards the biface) with the thumb, index and middle finger of the same hand. I struck the bulbar end of the pebble with a slightly larger hammerstone which was held in my right hand. The second method involved laying the biface on my thigh and steadying it with the heel of my left hand which held the bi-polar pebble hammer between thumb and index finger. The tapered end was placed on the edge of the biface and the bulbar end was struck with the hammerstone. Both methods proved extremely workable and gave excellent results. Very little force was required to remove a flake from the edge of the biface; control over flake removal was much better than that allowed by direct percussion. Method number one was slightly more awkward than method number two.

I used a chert biface so that I could study the removed flakes. the flakes ranged in length from 1/8 to 1/4 inch long and the same held true for flake width. The thickness of the flakes were less than 1/16 inch. The flakes have virtually no striking platform and barely distinct bulbs of percussion. A small number of similar flakes were recovered from the site. how-

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ever, due to their size many could have been lost through the $\frac{1}{4}$ inch mesh screen.

The wear pattern on the pebble intermediary is exactly the same as that found on the aboriginal bi-polar, pebble hammers. The bulbar polar end has a localized and concentrated wear pattern where it was struck by the hammerstone. The tapered end has a wear pattern that starts at the polar end and proceeds back along the edge of the bulging longitudinal side, as a result of the intermediary slipping down the edge of the biface. The bulbar end is more pitted than the tapered end as a result of taking up more force of the blow directly from the hammerstone.

I have not been able to locate any ethnographic evidence for the use of pebbles in this manner. The only report that mentions comparable aboriginal material is Dena Dincauze's article in American Antiquity (Vol. 36, No. 2) "An Archaic Sequence for Southern New England." In it she reports finding "small, bi-polar, pebble hammers" in the Archaic Neville Complex of the Neville Site. I have contacted her about these finds and she told me that as far as she can tell the Neville specimens and those from the Old Marsh Site are comparable except in size; the Old Marsh specimens being outside the smaller size range of the Neville artifacts. The Neville artifacts were associated with rhyolite and quartz debris; the Old Marsh specimens are associated with debitage that is 68% quartz, 16 % cryptocrystalline, and 9 % feldspar, the remainder being quartzite, basalt, and unidentifiable at present.

I have considered other possible explanations for these items but none seem satisfactory as a complete explanation. They are not large enough to use as hammers on cobbles that would require the removal of cortex or large flakes; they do not apply enough force due to their small mass. They may have been used for direct percussion retouch. However, this does not explain the different types of wear patterns on the polar ends of each individual specimen nor does it take into account the uniformity of the nine different specimens. (Besides the remaining 22 specimens of pebble size may have been used for this purpose or as the hammers with which the intermediaries were struck since they are of the size which proved most useful in the attempts at reconstructing the use of the bi-polar specimens.)

I would greatly appreciate your views on this subject. Also if you know of any references to similar material would you pass them on to me. If you like you may keep the enclosed photographs for your records.

Sincerely yours

Stephen A. Chomko

Stephen A. Chomko
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American Archaeology

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