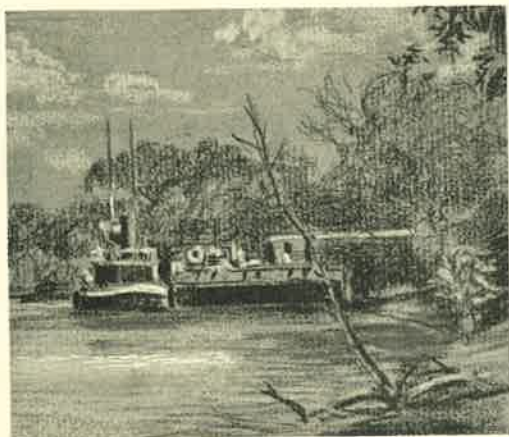


SEPT. 1954

*J. H. Omwake*  
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# THE ARCHEOLOG

PUBLICATION OF THE  
SUSSEX ARCHAEOLOGICAL ASSOCIATION



Above: Bend of the Mispillion River, Milford, Del. near the Phillips site and a view of the area of the first excavations.

Below: Mr. Omwake commenting on the first finds of the site at the meeting of July 15, 1954 held in St. Peter's Parish House, Lewes, Del.



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ARCHEOLOGICAL  
ASSOCIATION

T H E A R C H E O L O  
Bulletin of the Sussex Archeologica  
Association

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September, 1954

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J. B. Eggen  
Editor

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## DIGGING IN UTAH AT THE PARAGONAH SITE

- 1 -

H. H. Hutchinson

The writer had the privilege of attending the U.C.L.A. Field School of Archaeology this 1954 summer during their six weeks of work in excavating several Pre-historic Indian dwellings near Paragonah, Utah.

The Paragonah Site is the remains of a village which had been deserted many hundred years before the white man discovered that part of the country. Most of the houses had been built of adobe which in time have weathered away and formed small mounds of earth sometimes only a few inches high, sometimes a foot or two high, depending upon the original house or houses that had stood at that spot. Occasionally "pit-houses" which were partly underground, were found. Whether these "pit-houses" were earlier, later or contemporaneous with the above ground adobe houses remains to be definitely proven by detailed study of the artifacts and material found in the two types of houses, by careful analysis of the daily level reports and stratigraphic studies made by the investigators.

It was difficult, at first, to distinguish between the remains of a standing adobe wall and the surrounding soil which was composed of old adobe that had weathered and sluffed from the standing wall, but after having the difference in texture and stratification pointed out several times, together with the almost invisible wall line of the face of the wall, recognition was easy. These adobe walls were built of "puddled" adobe, that is, gobs of wet clay were laid down and let dry, then another layer of the same material was placed on top and allowed to dry. This continued until the desired wall height was obtained. Across the top of the

walls were placed beams or poles, on top of which were laid smaller branches, twigs and grasses. Over this was placed from two to four inches of adobe which was allowed to dry. A roughly round hole was left in the top or roof for entrance or exit. This was attained by the use of a notched pole or ladder.

The inhabitants of these adobe houses apparently lived most of the time outside their house as their fireplace, and by far the great majority of the potsherds and artifacts were found around the outside walls and relatively few were found within the walls of the houses.

Different were the "pit-houses". They were constructed by digging a pit in the ground rather rectangular in shape and two to three feet deep. Near the corners of this pit, but about two feet within the pit were erected posts which supported a flat roof structure consisting of wood beams and adobe-covered thatching. Poles were laid against this roof with the footing on the ground outside the excavated pit. These were covered with twig thatched adobe, and from the outside it would appear as a low truncated pyramid. Entrance to these houses is believed to have been from a hole in the roof which also served as a smoke hole. This was located over the fireplace that was approximately in the center of the dwelling.

We were fortunate in finding one pit-house that had been destroyed by fire so that the roof had collapsed and smothered the fire under it.. This caused many of the beams, a post, and many other perishable materials to become charred and carbonized into pure charcoal, very fragile, but still retaining their original shape and grain structure. A number of the beams, poles and posts were preserved by treatment

in situ, and will be studied for tree-ring dating in the University lab. Other perishable materials, that were also carbonized, were treated in situ with Alvar glue solution and then removed for laboratory study. Among these were corn on the cob, corn stalks, corn cobs, twigs and vegetative material as well as basketry and sandals. There was one piece of carbonized worked wood which we thought might have been the end of a bow.

Triangular projectile points were common but hafted and notched points were also present. Obsidian was the predominating material out of which points were made and

probably chert was next. Bone tool implements were so similar that they could have come from a Sussex County, Delaware shell refuse pit, with the exception of many bone gaming pieces.

The pottery was not entirely the same as is found in the East. It is quite different in that it is of a much higher quality, very hard and very fine grained. Often it is painted in semi-geometric designs prior to being fired. It appeared to be generally of coil construction. Quite often the coil would be pressed together with an angular tool or the finger-mail in which case it was a piece of pottery, referred to as corrugated.

\* \* \* \* \*

## THE TREASURES OF VIX

An article in the July 1954 issue of *Réalités* describes the discovery of perhaps one of the largest vases of antiquity. The Burgundian village of Vix near the town of Chatillon-sur-Seine in central France has been the site of this remarkable find.

Made of bronze and weighing 570 pounds, it required several days of digging to extricate it from the ground. On its cover stood a silver goblet with a motif in gold and two Attic goblets, one jet black, the other red, with black figures representing a battle between the Amazons and Greek warriors.

Determining the provenance of this vase is a real problem. The vase is 5 feet, 4 inches tall. The handles are embellished with the statues of gorgons and the neck bears a frieze of chariots and warriors. Each piece was moulded separately and fixed on with two rivets. An inscription inside the vase appears to be Etrurian, but the sculpture is Greek. Some Greek vases of the early Minoan period resemble this vase, but they were made out of terra cotta.

At present, it seems that the vase is the product of two tech-

niques. The body was probably executed by Etrurians. It consists of a sheet of bronze originally more than four yards long and worked down to about 4/100ths of an inch in thickness in some places. This points to the skill and tools of the Etrurians.

Still the vase shows evidence of another technique, namely, the ancient cire perdue process wherein the artist models in wax, then pours molten metal into his mould, forcing out the wax to replace it with bronze. The Gorgon serpents on the vase are exquisitely perfect specimens produced with this process and their style is Greek beyond a doubt. The vase was used to contain wine. Its cover is in the form of a sieve designed to strain the thick wine of antiquity.

In addition to this tremendous vase, a tomb has also been discovered in which the remains of an ancient queen have been found. Buried with this queen, or princess, have been excavated some breathtaking gold ornaments and dazzling jewels. A bronze pitcher found in the tomb has been identified as Etrurian and probably came out of Italia in the early years of the 5th century B.C.



A REPORT ON THE MILLER-TOMS SITE,  
LEWES, DELAWARE

- 3 -

H. G. OMWAKE

Directly behind the grounds of the Lewes school and the Fort Miles Station Hospital is a large plot of ground, bounded on the western side by Metcalfe's Branch of Canary Creek, which is now owned by Stanley Miller, of Lewes, and under development as a residential district. This land was formerly owned by Mrs. Roberta M. Dukes, and farmed by William Ritter.

The eastern part of this tract is adjacent to the Lewes High School football field. During extensive grading operations a number of small refuse pits and many post-molds were observed. From one of these pits sufficient pottery sherds of a single vessel were recovered to permit the restoration of this vessel. (1) Soon after the grading of the field was completed a map of the area and a full statement of the archeological evidence were published.

The land directly to the north of the Miller property, separated from it by a thick hedgerow, is owned by Mrs. Gladys Toms and family. The entire site, therefore, is designated as the Miller-Toms site.

On Oct. 9, 1949, while the Miller land was still owned by Mrs. Dukes, the writer investigated a shell refuse pit on the crest of a knoll at the western end of the tract. Subsequent cultivations of the whole area

revealed the presence nearby of a number of other pits but the opportunity to investigate them did not arise until the autumn of 1951. The work continued during the following winter and spring. A survey of the field belonging to Mrs. Toms showed the presence of many more pits.

MAPPING: Mr. Miller, in the course of preparing his land for division into building lots, had it surveyed and a topographical map was made. A copy of this map was obtained from him, and with the help of James A. Moore, of the Lewes school faculty the location of all of the pits was carefully recorded in relation to datum stake (iron pipe) established at the intersection of the baseline of the survey at the west end of the hedgerow above mentioned. The contour interval lines as shown on the map of the Miller land were extended roughly into the Toms tract, and refuse pits there were also recorded in relation to the same datum stake and an imaginary projection of the southeast to northwest baseline of the Miller survey, along the general course of Metcalfe's Branch.

PROCEDURE: To each of the pits was assigned a number recorded upon the map, beginning with the pit explored by the writer in October, 1949. As

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<sup>1</sup>For a report on the examination of material excavated from this site, cf. "Report From the Smithsonian Institution", The Archeologist, June, 1954, vol. vi, no. 1. The first vessel restored is shown on the cover illustration of that issue.

# PLATE I

Miller-Toms Site  
Lewes, Del.  
(1951 1952)

Contour interval  
one inch

Scale  
1" = 50'

TOMS LAND

Hedgerow

Hedgerow

MILLER LAND

Map by J.A. Moore &  
H.G. Onwake on  
plat by G. Drazen

← 30' West  
of RR

750' Approx.

OLD QUEEN ANNE R.R.

#13

#10

#9

208'

175'

#12

119'

#11

178'

14'

#5

54'

103'

72'

#8

#7

#6

40'

24'

78'

143'

130'

195'

#3

#2

7'

8'

9'

10'

11'

12'

13'

14'

15'

16'

17'

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267'



Top soil covering the refuse was only nine inches thick.

Except for a single conch shell, the refuse consisted entirely of clam shells. There was one small fragment of turtle shell and quite a lot of charcoal particles. There was no pottery or other cultural material found. This shell accumulation perhaps represented the remains of a single aboriginal clam-bake.

Pit Number 3 had an oval surface appearance with an east-west diameter of but 60 inches and a north-south diameter of 24 inches. The refuse, consisting of a mixture of clam, oyster, conch and mussel shells, achieved a thickness of 17 inches at the center and presented a cross-section profile which resembled a slightly distended half-moon.

During the removal of the refuse it was noted that the earth beneath was discolored, and it seemed to give evidence of having been previously disturbed. Investigation revealed that a human burial lay at a depth of twenty-five inches, eight inches below the bottom of the shell refuse.

The skeleton lay on its left side and was tightly flexed, with the head toward the northeast and the face toward the south. Prior to the removal of the skeleton for shipment to the United States National Museum for study, the burial was completely photographed. The report on this study is appended to this article.

The earth beneath the skeleton was discolored to a depth of 18 inches, and contained an occasional clam and oyster shell. The bottom of the pit was flat and generally oval, as was the surface appearance. The undisturbed side-walls were vertical.

From the evidence it would seem that the pit had been dug primarily for the interment of the deceased person, but that prior to emplacement of the body the lower portion of the pit had been refilled with disturbed soil into which a few clam

and oyster shells from the village floor had become mixed. The body was then interred and covered with soil to a depth of several inches, after which the remainder of the pit was filled with ordinary refuse.

Pit Number 4 presented an almost round surface appearance, having a north-south diameter of 34 inches and an east-west diameter of 37 inches. The top-soil was about 7 inches thick. The shell deposit was shallow, with maximum thickness of 7 inches at the center, and in cross-section profile showed a crescent shape. Under the shell deposit the earth was discolored to a depth of seven inches and the overall depth of the pit was 14 in. The bottom of the pit was round and flat, and the side walls were nearly vertical.

Refuse consisted of oyster, clam and conch shells, almost all badly burned some to the point of being pulverized. Animal bones recovered were also charred. Cultural evidence consisted of only a few potsherds.

The fifth pit excavated was of tremendous size. It was of a generally oval shape, having its longest axis 155 inches, running in the southeast to northwest direction, and its shorter axis, 115 in., in the northeast to southwest direction. Diameters in cardinal directions were: 130 in. north-south and 125 in. east-west. Top soil thickness was 7 to 8 in. Beneath the top soil a layer of discolored earth about 5 inches deep, distinct from the top soil, overlay the shell refuse.

Entrance to the pit was made from the south, and it soon became evident that beneath the upper refuse deposit was disturbed soil of unknown depth. The pit was so large that, when the mid-point of the upper refuse deposit had been reached, excavation of the disturbed earth which underlay it could be undertaken. It was apparent that under the disturbed earth lay a lining of clam and oyster shells.

The lining in the southern half of the pit was carefully exposed. In the process several fragments of pottery



were found and were left in situ in this area of the pit.

The technique of horizon-vertical excavation produced an excellent profile that revealed the perfectly flat bottom upon which the lining had been placed, a sloping deposit of disturbed earth upon all sides, nearly vertical undisturbed side-walls, and an upper level of shell refuse shaped somewhat like a wide-mouthed "V". The bottom of the refuse was slightly rounded rather than pointed, and extended so close to the lining as to be contiguous to it.

At this point the excavation was stopped, the peculiar features of the pit were photographed from many angles, and a sketch to scale was drawn by James A. Moore.

Completion of the excavation showed that the entire oval bottom was lined with oyster and clam shells, that the sloping disturbed soil was present around the entire perimeter, and that the undisturbed outer side-walls were almost vertical at all points.

The digging of such a large hole must have represented an extremely arduous undertaking to the Indian people who were equipped only with pointed sticks and clamshells for this purpose. One must suppose that it was done for some specific purpose such as the emplacement of the oyster and clam shell lining. What practical use the lining served or what its significance may otherwise have been can only be conjectured at this time.

The refuse yielded a great quantity of pottery, representing many vessels. It was possible, however, to effect the restoration of but one vessel. At present it is in the possession of James L. Parsons.

The sixth pit presented a fairly round appearance on the surface all but on the northeastern side where there was an asymmetrical bulge that made the north-east to south-west diameter 102 inches long whereas

the north to south diameter was only 90 inches and the east to west diameter 95 inches.

In the course of removing the 8 in top soil many fragments of pottery apparently deposited at the last minute as the pit was being filled were encountered. These were unavoidably damaged to some degree by shovel action but one large sherd was uncovered without injury and it was photographed in situ before its removal. Later it became evident that no other parts of this vessel had been cast into this pit.

Entry was made into the pit from the south southwestern section of the perimeter because of the sunlight prevailing at the time of the year. A bone awl was encountered almost immediately at a depth of three inches. A short time later another was found at a depth of six inches, and as the excavation was nearing completion a third was recovered at a depth of only three inches. All three awls were found near the outer edges of the pit. Perhaps it was only coincidence which placed them as they were.

As excavation was carried forward by the horizontal-vertical technique it became evident that the shell refuse burden was half-moon shape in cross-section profile and 16 inches in maximum depth. It was underlain by a quantity of discolored earth, separated from the refuse, except at the very center, by a band of sandy yellow clay an inch and a half thick. It was assumed, because of the even distribution and the tapering off at the center, that this clay band was the result of a rain wash while the pit was open just prior to the disposal of the refuse it contained. Investigation of the disturbed soil revealed that at a depth of 15 in. there was a well packed layer of oyster shells about 3 inches thick. Later it was found that these shells covered the entire flat bottom of the original pit and that almost every one of them had been broken prior to being discarded. In this lower layer which may be regarded as a lining



although it was thicker than most others, failed to produce pottery or any other cultural remains. One large deer antler was recovered.

The principal refuse deposit was replete with pottery. Two vessels were restored from the pottery sherds recovered. One was large and the other was small. The small one was complete except for two small fragments but the bottom was in such poor condition that it had a tendency to crumble at the touch of a trowel and some of it had to be replaced during the restoration. The walls of this vessel were very thin and the temper was a sand of a very fine texture. These facts could account for the crumbling tendency. The vessel contained 4 mending holes and was also unusual in that nearly all of the pieces were recovered. Both of these restored vessels are in the possession of the Museum of the University of Pennsylvania.

The refuse itself consisted of oyster, clam, a few conch shells, mussels, some charcoal particles, and numerous pieces of fire-cracked sandstone pebbles. Quantities of bones from deer and the usual smaller animals and birds were also found.

The completed excavation showed that the original pit was 34 inches deep, the bottom was flat, and the side walls were almost vertical. If the broken oyster shells may be considered as a lining, then why was the 15 inches of discolored earth put in place and then the pit used for refuse?

Pit number 7 was round in surface appearance, having cardinal diameters of 43 inches. In cross section profile it was conical and reached a depth of 20 inches. Top soil extended to a depth of 8 inches.

The refuse had shells of the oyster, clam, conch, and mussel. There were about the same number of oyster and clam shells. Firecracked sandstone was found but there was

very little evidence of charcoal. There was the usual deer small animal and bird bones to be found. Cultural evidence was limited to a small amount of pottery. No one vessel was sufficiently represented to permit restoration.

The eighth and final pit explored was round in surface appearance, with diameters of 50 and 52 in. in the cardinal directions. The top soil was about 8 in. thick. As excavations proceeded, it became evident that the refuse deposit was in the shape of a half-moon, achieving a maximum depth of 16 in. at the center and was underlain by a 12 in. deposit of stained and discolored soil, also half-moon in shape. The outer walls of the pit were rounded as was the bottom.

The refuse consisted of oyster and clam shells in about equal proportions. A few mussels were noted. Of unusual interest was the presence of many conch shells, all but one being of the canaliculatum variety. Except for one they were all small in size. There was a little charcoal and but 3 pieces of fire-cracked sandstone pebbles. There was not much faunal evidence except for pieces of deer antler and some deer bones.

Cultural traits were limited to a small amount of pottery, all found in the upper 8 in. of the refuse deposit. There were not enough sherds from any of the vessels represented to permit the restoration of a single vessel.

**SUMMARIZATION OF PIT FACTS:** Three of the pits presented an oval shape and five others were classed as generally round. The shortest cardinal diameter recorded was 21 in. and the longest, 130 in. Pit 5 because of its oval shape had the longest diameter - 155 in. In five pits the side walls were vertical. Of these five, four had bottoms that were flat. Only pit number 1 had a bottom that was slightly rounded. In all 5 pits the bottom generally corresponded in

the horizontal with the surface shape of the pit. In another pit the bottom was rounded like a half-moon. In pit 7 a distinctly conical shape was noted. In pit 8 the side walls and the bottom were rounded.

The minimum pit depth noted was seven inches in pit 2, and the maximum of 48 inches occurred in pit 1. Top soil depth varied from 7 to 9 inches.

The cross-section profile of the principal refuse deposit in the pits did not necessarily accord with the cross-section profile of the respective pits themselves. In three of the pits the general profile of the refuse resembled the outer perimeter of a half-moon and the one case it was more sharply rounded. In two pits the refuse deposit was shaped like the letter "V" having the arms set at an angle somewhat wider than usual and in one case the deposit was distinctly conical in profile. The minimum depth of refuse was 7 inches and the maximum depth 26 inches. It is to be observed that in pits 2 and 7 the general shape and depth of the refuse coincided exactly with the general shape and depth of the pits.

The peculiar phenomenon represented by the evidently intentionally emplaced shell lining was observed in two pits. In one case both oyster and clams were used at random for the lining while in the other only broken oyster shells were used. In both cases the lining was overlain by a deposit of discolored and disturbed soil. Clams were present in all pits and were exclusive, except for a single conch in pit number 2. Oyster shells were present in seven pits and the conch in varying quantities, were found in all pits. Mussels were found in 5 pits and marine snails in two. Land snails were found in all pits but were not recorded because of their assumed inedibility, and were considered to have been intrusive.

Among the faunal remains which were readily identifiable by the untrained, deer and turtle were most frequently noted. Deer bones occurred in abundance and this animal must have formed an important part of the aboriginal diet.

The two pits in which burials were found had obviously been dug for the purpose of making the interments. Both had been partially refilled with discolored and disturbed earth into which a few clam and oyster shells and charcoal particles from the village floor had become mixed before the bodies were interred. Only as a secondary measure were the pits used for the disposal of refuse. No conclusions as to the burial customs of these people can be drawn from the two widely differing types of burials encountered in pits 1 and 3.

If the two burial pits and the two pits having shell linings are not considered in the summarization, it may be said that five of the pits were dug for the express purpose of disposing of village household refuse. Perhaps even the two which had the linings should be included.

**FAUNAL EVIDENCE:** All faunal remains were sent to the United States National Museum for identification. Only those species which were readily recognizable have been included in the above report.

**CULTURAL EVIDENCE:** All pottery except the restored vessels from this site was transmitted to the United States National Museum for study and comparison with the pottery recovered from the Townsend site. The frequency and distribution of other cultural evidence is shown in Table I.

It is manifest from the following that the stone culture of the Miller-Toms village inhabitants, were represented by the meagre material that was obtained from the 8 pits, was poorly represented.

The bone culture, as evidenced by the small numbers and the lack of



variety of the items recovered in the 8 pits, was also poorly developed and of an order only slightly higher than that of the stone culture. The most noteworthy object recovered was the bone knife. It was made from the section of the leg bone of a deer, ground flat and thin on the end. One side was sharpened and polished. To the knowledge of this writer no other similar implement is recorded in the Lewes area. Except for the bone knife, the presence of a predominant number of awls stirs ones curiosity. Evidently they were not used as projectile points because, except for being sharply pointed and polished on one end, they reveal no other workings which might indicate some manner of hafting. A few, with but little modification could have been inserted into the end of a hollow reed, in which case they could have been used as projectile points. At the present writing of this reporter the Lewes area has not produced nor is there found any hollow reed of sufficient size and sinew to permit the use of it as a projectile shaft. Predicated on the assumption of suitable reeds in prehistoric times, use of these bone awls as projectile points is not indicated. Obviously, the Ulna awl was never intended for such use.

In direct contrast to the frequent occurrence of complete or nearly complete deer antlers in the refuse deposits are the two solitary examples of worked antler. One of these is a rejected section, the other is a tine which shows only that it had been worked.

**CONCLUSIONS:** The people inhabiting the Miller-Toms site depended for the most part on the sea for their food. They ate large quantities of oysters and clams and somewhat fewer numbers of conch and mussels. These mollusks could be gathered without the use of any weapons.

The Miller-Toms people ate deer in large numbers. The absence of stone projectile points would seem to indicate that deer and the smaller animals, including birds, were taken

by the use of snares.

The presence of a great many rim shards of pottery bearing incised and impressed decorative designs indicated that the Miller-Toms people made and used a large number of pottery vessels. These varied in capacity from a pint to more than a gallon (approximations).

If the bone awl can be considered a domestic implement and not in any sense as offensive weapon, since this was the only tool that was found with any frequency. These people evidently had little need for any other implement in carrying on their household activities. Their life was apparently so ordered that they were called upon to use little initiative and to expend little effort in order to survive.

In general it may be said that the cultural pattern disclosed in the refuse pit of the Miller-Toms site varied little, if at all, from that already revealed at other sites in the Lewes area.

The results of the excavation of the 8 pits on the Miller part of the Miller-Toms site may be regarded as indicative of the cultural pattern of the site but should not be regarded as conclusive. It is a possibility, yet not probable, that excavations of the pits known to exist on the Toms section of the site might reveal variant and/or additional cultural traits. More specific assessment of the site must wait further excavations.

It is equally true that the cultural traits of this site cannot be regarded as significant in and by themselves. The site is obviously only a small manifestation of a much larger pattern of which the two Ritter sites, the Russel site, the relatively unexplored Derrickson site the school house and the famous Townsend site are all components.

#### **APPENDIX:**

The following is a report of the examinations of the Miller-Toms site skeletons by Dr. T. Dale Stewart, United States National Museum.

"The first one (Pit No. 1), which bears our catalogue No. 380,489 is a large male around 35 years of age. The second (Pit No. 3), uncatalogued skeleton is a middle-aged female.

As calculated from the length of the femur in the male and the length of the humerus in the female, stature was approximately 5'10" in the former and 5'5" in the female. The male had his right humerus and ulna fused at an angle of 120-130°. This fusion was probably the result of an injury. He also had a separate neural arch in the fifth lumbar vertebra. All of the bones of the female were badly damaged. She was nearly edentulous."

The following observations were made:

	Male	Female
Skull length	188 mm	178 mm
Skull breadth	136	130
Skull height	146	---
Cranial index	72.3	73.0
Mean height index	90.1	---
Bizygomatic diam.	145	---
Upper face height	72	---
Nose length	51	---
Nose breadth	26	---
Nasal index	51.0	---
Upper facial index	49.6	---

TABLE I: Frequency and Distribution of Cultural Artifacts in Eight Pits of the Miller-Toms Site

Pit No.	Ulna awls	Split deer bone awls	Awl of wing bone of bird	Split deer bone knife	Cut Antler reject	Worked antler tine	Cut bird bone	Concave chipped scraper or knife	Broken arrow point
1								1	
2									
3									
4									
5		2				1	1		
6	1	2	1	1	1				1
7									
8									
Totals	1	4	1	1	1	1	1	1	1



## DETERMINING THE HARDNESS OF POTTERY

- 11 -

C. A. Bonine

Many of the articles and descriptive pamphlets concerning pottery vessels and pottery material, including sherds often refer to the hardness of the material from which the pottery is made. In order to give a more complete description of materials found it is important to determine the hardness of that particular artifact being described. The best known methods of recording this hardness is to follow the accepted scale used by geologists. This graded scale of hardness, which runs from one to ten, considers talc as the softest mineral and is given number one in the scale. The diamond, being the hardest mineral, has been given the number ten in the scale. The other eight minerals in the scale are listed in order of their hardness.

The hardness of a substance may be tested by comparing it with a standard series of substances of different grades of hardness. Among mineralogists the standard scale of hardness is known as Mohs' scale which consists of the following ten minerals arranged according to their increasing hardness.

- |             |             |
|-------------|-------------|
| 1. Talc     | 6. Feldspar |
| 2. Gypsum   | 7. Quartz   |
| 3. Calcite  | 8. Topaz    |
| 4. Fluorite | 9. Corundum |
| 5. Apatite  | 10. Diamond |

A mineral that will not scratch any given mineral in the scale of hardness nor will be scratched by it is said to have an equal hardness. If it scratches one of the scale minerals and is scratched by the next hardest one, its position with respect to hardness is between the two. Thus, a mineral that will scratch feldspar, which has been

given the number six in the scale of hardness, but is scratched by quartz, which is number seven in the scale is said to have a hardness of between 6 and 7.

It is not always convenient to have in one's possession samples of the minerals in the hardness scale and so for purposes of general comparison the following materials, which are always at hand, may be used.

A sherd that can be scratched by the thumbnail has a hardness of 2 or less. If the sherd has a hardness of less than 2.5 it will leave a mark if it is drawn across a piece of paper. If it can be scratched by glass then the sherd's hardness is less than 5.5. The blade of a pocket knife scratching a sherd will indicate that the hardness of the material is less than 6.5. Any material that can be scratched by quartz has a hardness of less than seven.

These hardness ratings are only approximations but are close enough for our purposes to be used without fear of misleading any reader. Again some degree of judgment must be used on the part of the person determining the hardness of a sherd especially when the scale should read between 3.5 and 5.5. This situation can arise when a sherd scratches a copper coin and yet is itself scratched by glass.

All material that is being tested should be done so on a clean fresh fracture. One that is coated with a tarnish or has been weathered should not be used since material in this condition does not give a true hardness test.

## NOTES ON PRESERVING CLAY ARTIFACTS

- 12 -

J. B. Eggen

In excavating pottery fragments it is found occasionally that the clay is soft and crumbly, and deteriorates at touch. This is a considerable handicap in the excavation process, and even more so in subsequent efforts to restore pottery vessels.

All archeologists whose work involves the unearthing of clay artifacts are faced with the common problem of proper precautions to be taken under such circumstances. A prominent feature in the archeology of the Near East, for example, is the recovery of inscribed clay tablets, made from sun-dried or baked clay. Owing to the delicate, friable nature of these tablets the archeologists working in that area have been compelled to develop special methods for handling them. Possibly some of these methods may be adaptable to the treatment of some of our clay artifacts of Indian origin.

The late Edward Chiera, former professor of Assyriology at the University of Chicago, commented that archeologists have different ideas on the technique of treating very fragile clay artifacts. After trying different systems, he said, he advised the following:

"As soon as found, the tablet must be cleaned of the surrounding dirt before being touched with the hand. When its condition is such that it can be handled, it should be picked up carefully, wrapped in thin paper, and wrapped again in heavier paper.

Then the little bundle--on which all indications as to provenience, date, and the like, have been promptly recorded--should be taken into a house and left to dry slowly in the shade for at least fifteen days. Since it will shrink during this process the package will become quite loose and cannot be handled at all. After fifteen days the tablet can be rewrapped in the final package, since by that time it has already shrunk to its original size. At no time should the tablet be exposed to the sun, either while being extricated or when in its package. It will dry too quickly and go to pieces. If these simple precautions are observed, every document will be saved, ready perhaps to be baked at a later time if this should be advisable." (Edward Chiera, "They Wrote on Clay", University of Chicago, 1938, p. 21)

It is sometimes found that clay fragments need to be strengthened before removal from the ground. Use of hard paraffin wax for this purpose is recommended in an article by P. Delougaz (Oriental Institute Studies, No. 7). The wax may be heated over any convenient source of heat in an ordinary container, and applied by a metal pipette or brush.

A practice commonly employed by Assyriologists is the baking of



clay tablets to render them more durable. Experiments with this procedure have been planned by local archeologists to determine its feasibility in connection with the treatment of Indian materials in this area where the crumbling is apparently due to insufficient original firing.

There are apparently no fixed rules on the technique of rebaking clay artifacts. An article that may be useful in this connection appeared in "Museum News", published by the American Association of Museums, for March 1, 1950, "The Preservation of Cuneiform Tablets by Heating to a High Temperature", by Eric Parkinson.

A method in use for many years, the article reports, requires a specially constructed electric furnace, in which the temperature is advanced to 1400 degrees by a graduated series of stages. This procedure can be modified with the use of simpler equipment, as for example, a small laboratory-type furnace.

Tablets are given a preliminary drying in an electric oven. They are placed in the oven in the morning at a temperature of 80° Centigrade, which is increased a few degrees at a time throughout the day. They are left in the oven all night at 105° degrees. Next morning they are transferred to the furnace, where the temperature is raised continuously to 800 until evening. Then the current is turned off and the tablets are allowed to cool overnight.

The author notes that this procedure is variable in detail, so long as the preliminary drying occurs slowly. This will prevent the "violent vaporization of residual moisture during the subsequent firing." After firing the clay has a stone-like appearance, and is usually altered slightly in color.

For mending broken clay surfaces the use of Vinyl Seal is recommended as a good adhesive. When a fragment is in a crumbly condition, its surface may be coated with the same adhesive, by brushing or spraying. It may also be soaked in a dilute solution of the adhesive material, which will consolidate the clay.

In a recent communication Dr. Parkinson advises:

"If deterioration has taken place while the objects have been buried, there is often little that can be done except to consolidate the object as found by impregnation with wax or with a solution of a synthetic resin such as Alvar or Vinyl Seal. With any of these agents the presents of moisture is a complicating factor, and it may be necessary to allow the object to dry out before impregnation is attempted."

\* \* \*

Every state in the Union but one is known to have a number of caves. Speleologists have informed us that the only one of the United States without a cave is Delaware.

## RECENT LOCAL FINDS

### CACHE BLADES FROM MARSHYHOPE CREEK

P. S. Flogel

the artifacts shown in Plate II are what might be considered as extraordinary and rather unusual especially in light of the conditions under which they were discovered.

They were found on the McAllister site on the Marshyhope Creek, 6 in. below the surface of a field that has been in cultivation for over fifty years. As far as is known, there have been no other such blades ever reported from this area. The material out of which they were made is not common to our region. No other projectile points, spalls or stone implements, made from the same material have been found here.

The McAllister site is located 1.3 miles south of Eldorado, Md. on Route 313. At this point there is a farm road at the northern edge of the McAllister property which runs in a westerly direction .6 of a mile to the Marshyhope Creek.

Along the creek at this point there has been recovered a number of projectile points, spalls, pottery shards (of both grit and shell temper), trade pipe stems and areas of concentrated oyster shell. Enough shards were found along the bank and just below the surface of the ground to reconstruct three vessels. One measuring 13 inches in diameter, another measuring 9 in. in diameter and a third nearly complete that has dimensions of  $2\frac{1}{2}$  in. in diameter and  $1\frac{1}{4}$  in. in depth. The larger one is shell tempered and a dark buff color. The other two seem to have no temper at all and are brick red

inside and buff outside in the case of the 9 in. vessel, and dark red inside and outside of the last one mentioned.

At least 4 refuse pits were present at one time, but at this writing, they either have been lost by erosion or continuous plowing.

From the material that has been found, as mentioned in the above paragraph, it is certain that there was an Indian camp-site at this spot at one time. Evidence does not prove that the encampment was for a very long time nor does it indicate that the number of people living there was very great at any time.

The soil is identified by USDA soil maps as Sassafras sand.

The cache was located 66 feet from the edge of the Creek in about the center of the cleared area. This open space, which is being planted to truck crops and grain, extends along the river bank for a distance of 340 yds. 60 feet south of the cache is to be seen the remains of a shell refuse pit. Another 70 feet, in the same direction, is a second pit. 60 feet north of the cache is the remains of a third pit, and others farther north of this pit have been located. All of the pits are about the same distance from the water as was the cache.

All blades were found in an area that could be easily covered by a bushel basket. No blade was found deeper than six inches in the soil and how they could have remained in this place and condition without



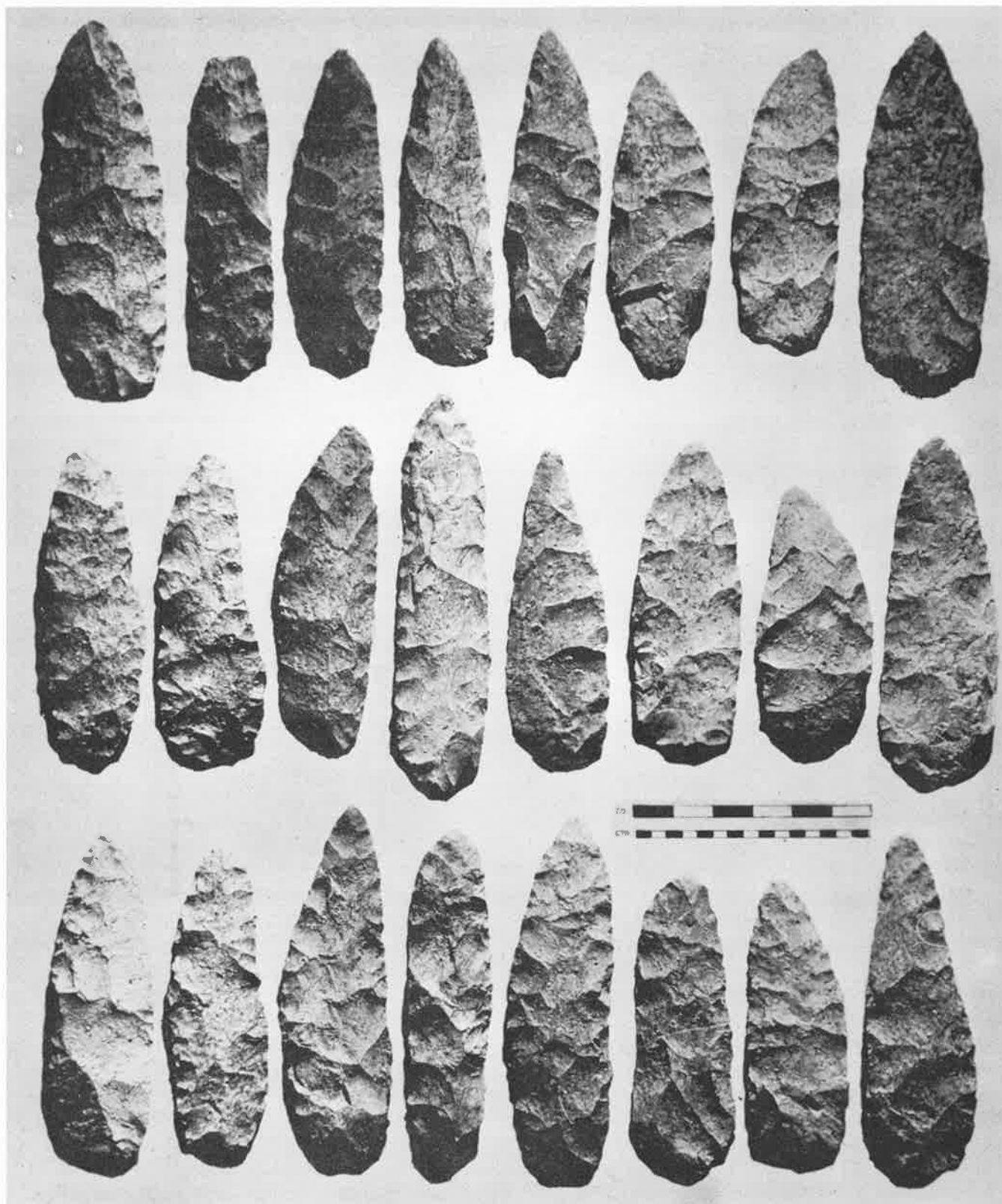


PLATE 2. The blades shown above were found recently by Mr. P. S. Flegel, president of the Sussex Archaeological Association along the bank of the Marshyhope Creek near Eldorado, Maryland. They were in a field that had been in cultivation for over half a century and were no more than six inches under the ground. The cache was small enough to be covered by a circle no more than 18 to 20 inches in diameter.