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Richard C. Quick — "H. Geiger Omwake's Archeological Writings: A Commemorative Bibliography, 1934 - 1972"

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Elwood S. Wilkins, Jr. — "A Selden Island Pottery Vessel From the Minguannan Site - 36Ch3"

Elwood Wilkins has served the ASD in many capacities including President and Curator of Collections. He has authored numerous articles for the Bulletin and is a recognized authority on aboriginal lithic materials.

Ronald A. Tirpak — "Activity Analysis: A Technique for the Possible Discrimination of Seasonal Occupation at the Mispillion Site"

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H. GEIGER OMWAKE'S ARCHEOLOGICAL WRITINGS: A COMMEMORATIVE BIBLIOGRAPHY, 1934-1972

by
Richard C. Quick

Geiger Omwake remarked once to a friend that his surname derived from the German *om weg*, "by the wayside." Those who knew Geiger best during his more than thirty years' affiliation with archeological interests in and beyond Delaware will agree that he was seldom found by the side of the road.

Most often, Omwake was right on center path as an articulate activist and mentor in the cause of archeological study, research, and preservation. He was an early advocate of popular participation in archeological recovery, and a founder in 1933 of the Archaeological Society of Delaware. His developed special competence in the study of clay smoking pipes and of their meaning in specific archeological contexts won him general respect among expert amateurs, and significant regard among professional archeologists and historians. Several of his later published pipe studies are enviable models of careful analytic and interpretive method. Together, Omwake's archeological writings - whether of purely local interest, or of wider relevance - form a durable legacy illustrating the extent to which an intensely interested amateur may contribute to the unraveling of history and prehistory.

Henri Geiger Omwake (1907-1967) was born in Mercersburg, Pennsylvania, where his father was head of the Latin Department at Mercersburg Academy. Later family relocations took young Geiger to Harrisburg, and to Lancaster, where the elder Omwake was Dean of Franklin and Marshall College.

Successively, Geiger attended Harrisburg Academy, Franklin and Marshall Academy, and Mercersburg Academy through high school. He studied briefly at the Universite de Poitiers in France, and completed college at Franklin and Marshall. He studied, in addition, at the University of Pennsylvania, Duke University, and at Catawba College during his father's presidency there.

Geiger served in Delaware as teacher, principal, and superintendent of schools in various localities. In 1934, when his first publication, "Agriculture Among the Indians," appeared in the *Bulletin* of the newly formed Archaeological Society of Delaware, he was school principal at Hockessin. Twenty years

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later, in 1955, when his first clay pipe article, "Concerning 'TD' Clay Pipes," was published in the Nassau Archeological Society's *Bulletin*, he was supervising principal of the Greenwood School District, Greenwood, Delaware.

By the mid-1950's Omwake could claim some twenty-five years' active interest in archeology. He had been founder of the Archaeological Society of Delaware, and had held most offices and responsibilities. He had helped to found the Sussex [County] Archeological Association in 1948, and had been an appointed member of the Delaware Archaeological Board from its initial organization in 1953.

Conditioned by a lifelong background in higher education and, as may be inferred, a tradition of scholarly pursuit, Omwake had been steadily making increasingly sophisticated contributions to archeological investigation and the literature of archeology.

Sometime in the early 1940's, with a developing interest in clay tobacco pipes as possible time markers for habitation sequences on Euro-American and Euro-Indian sites in North America, Omwake entered into a narrowed area of inquiry that happily combined contact with excavators and site excavation, and artifactual analysis and historical research, for which he had a marked inclination. It offered an opportunity for investigation in which he could - and did - make a skillful, lasting contribution.

While he was never to lose his zest for prehistoric inquiry, Omwake became very closely involved with the history and archeological significance of clay pipes. For pipes were mass produced items which, from their evolving physical differences, might be shown to fit into an historical - and, therefore - tighter time sequence than had seemed possible for some other kinds of artifacts. In combination with other indicators they might contribute meaningfully to the chronological placement of excavated sites. Too, in clay pipes, there was the advantage over many other wares that a date for the beginning of manufacture could be fixed at a documented point in the late 1500's, thus providing a moment in time for which to work forward. And, owing to the widespread, epidemic use of clay pipes over nearly four-hundred years, and because of their fragile nature and brief working life, pipe fragments were omnipresent, frequently in quantity, on most historic sites.

From adequate pipe samples it appeared that changes in dimension, capacity and design - though subtle - could be discerned as chronological trends. Molded decorative embossings on stems and bowls could be seen in sequence and might then possibly be related to known periods of ornamental innovation. Further, manufacturer's initials

or devices on bowl, stem, heel, or "spur" might be interpreted and dated from documentary sources in the form of European guild records and apprenticeship rolls, or from other European and American local records in which seventeenth and eighteenth century pipemakers were cited or could be inferred. Later, in the 1950's, J. C. Harrington's suggestion (Harrington, 1954) that a correlation might exist between the diameter of the pipestem bore and approximate period of manufacture seemed to offer a quantitative reinforcement for other observed characteristics in an apparent time sequence. Later still, in the 1960's, Binford's advanced work with bore dating seemed to provide an even more precise tool for pipe dating (Binford, 1961).

Omwake's earliest interest in clay tobacco pipes began in 1939, "... when - on a crabbing expedition - he stumbled upon several thousand broken pipestems and bowls, rolling around on the floor of a salt-water bay below Ocean City, Md. Many bore markings that roused his curiosity, but he could find little about them in print. So he began collecting data, and in doing so has written several thousand letters." (Omwake, 1955).

Omwake's first published article on clay pipes (Omwake, op. cit.) reflects both his growing correspondence in the 1940's, and the variety of original sources - such as the Bristol Burgess Rolls from whence he had a list of pipemakers extracted - which, together with the contemporary published reports, he had been collecting.

By 1956, Omwake felt secure enough in his specialization to enter actively into a controversy arising from Harrington's 1954 date-bore correlation proposal (Omwake, 1956), publishing his "Date-Bore Correlation in English White Kaolin Pipe Stems, Yes or No?" in the *Quarterly Bulletin* of the Archeological Society of Virginia where Harrington's article had appeared, and in which Chalkley's "A Critique and Rebuttal..." had followed (Chalkley, 1955). Omwake, through analysis of trade pipe specimens collected from six sites in Southern Delaware, supported Harrington's dating technique and refuted Chalkley's arguments.

By 1958, Omwake was in frequent correspondence concerning clay pipes and their history with a number of investigators, both at home and abroad, including Dr. Adrian Oswald, Keeper of the City Museum and Art Gallery, Birmingham, England - a leading authority on the white clay pipe industry in England. That their exchange of information was not onesided is indicated by the fact that once, at least, Oswald (Oswald, 1961) noted his indebtedness to Omwake for materials and help in preparation of a published study of the evolution and chronology of English clay tobacco pipes.

Also, in 1958, Omwake began to be sought out as a study consultant on excavated pipe fragments. His pipe analysis report, "Kaolin Pipes From the Schurz Site," (Omwake, 1958) made for the excavators of the Bronx County, N. Y. site, was the first in a series of published and unpublished evaluations of pipe materials from widely separated sites in the United States and Canada that would continue until his death a decade later.

In the post-1955 period, until a final posthumous publication in 1972, Omwake produced at least thirty published and unpublished clay pipe studies. In this he worked carefully with the dating formula developed by Harrington and revised to nearer accuracy by Binford and others. By 1964 he seems to have been experimenting with machine methods for pipe dating with even greater accuracy. His "Evaluation of an Assortment of White Kaolin Pipe Bowl and Stem Fragments Surface Collected From an Apparent Colonial Period Refuse Deposit Near Chestertown, Maryland" reported "a computer-determined version of the original Binford Formula," (Omwake, 1967). He referred there to a 1964 communication, noting that "Mrs. Audrey Noel Hume has found that the computer revision of the formula yielded mean dates consistently five to nine years higher than those which resulted from application of the Binford Formula to materials from five sites."

Although in chronic poor health during his last years, Omwake maintained a schedule of consultation, study, and reporting with something like characteristic vigor. He was honored as a Fellow of the Pennsylvania Institute of Anthropology and, as L. T. Alexander remarked, "it is noteworthy that he was the only amateur Fellow of the Society for Historical Archaeology," (Alexander, 1967).

Geiger Omwake's strengths as an investigator and practitioner in archeology were owing especially to a relentless tenacity, natural capacity for minute attention to detail, and a habit of highly critical approach. Whether dealing with a sequence of prehistoric ceramics, or analyzing a grouping of pipe fragments, he was frequently testing earlier methods, tenets and conclusions just as much as the materials in hand. This last is quite obvious in his later major publications, and is the mark of a skillful, accomplished scholar.

* * *

Many of Omwake's early published contributions were routine news and organizational writings incidental to his editoral work

with the *Bulletin* of the Archaeological Society of Delaware, and the *Archeolog* of the Sussex Archeological Society. Each article that is traceable to him has been included in the Commemorative Bibliography. There are doubtless others in both the early *Bulletin* and *Archeolog* which are his, although unsigned.

Feeling that his more recent contributions - especially those dealing with clay tobacco pipe analysis - are of first importance, I have chosen to list Omwake's known published writings in reversed chronological order. While I had not originally intended to include unpublished manuscripts, their number, diversity, and potential interest seem to warrant such listing.

For their assistance in tracking down some fugitive unpublished studies I am especially indebted to John L. Cotter, Regional Archeologist with the National Park Service, Philadelphia, and Iain C. Walker, formerly Head of Artefact Research, National Historic Parks and Sites Branch, Department of Indian and Northern Affairs, Ottawa. The first has readily assented to my listing Omwake's unpublished reports noted in his *Bibliography of Historical Sites Archeology* (University Microfilms, 1974), while the latter has graciously permitted me to cite those unpublished manuscripts listed in the bibliography appending to his 1973 doctoral dissertation, *Aspects of the Clay Tobacco-Pipe Industry From the Point of View of the Manufacturering Techniques and of the Changing Patterns of Trade and Smoking, and With Particular Reference to the Industry in Bristol*, (University of Bath, 1973). Both have acknowledged to me their appreciation of Omwake's scholarship, and respect for his competence.

I am grateful to Elwood S. Wilkins for his painstaking assistance in verifying bibliographic details for articles cited in early numbers of *The Archeolog* of the Sussex Society of Archeology and History, and the *Bulletin* of the Archaeological Society of Delaware. Additionally, he searched those Omwake papers deposited in Delaware's Division of Historical and Cultural Affairs (Dover) in an attempt to identify and/or verify both published and unpublished writings, and I am glad to acknowledge the help of the Division's Director, at that time, Dr. Ronald M. Finch, who made the Omwake Papers readily available for search. Dr. John M. Dawson, Director of Libraries at the University of Delaware, lent early assistance in a preliminary review of the University's holdings of *The Archeolog*. Charles F. Kier of Hammonton, N. J. supplied several important details. Donna L. Howe of Dansville, N. Y. typed the final manuscript.

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March 1978

H. GEIGER OMWAKE'S ARCHEOLOGICAL WRITINGS: A COMMEMORATIVE BIBLIOGRAPHY, 1934-1972

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A SELDEN ISLAND POTTERY VESSEL FROM THE MINGUANNAN SITE - 36Ch3

by
Elwood S. Wilkins, Jr.

Excavations conducted in the northern portion of the Minguannan Site by the Archaeological Society of Delaware between October 9, 1955 and October 12, 1958 yielded some very valuable information. One artifact is unique, the first restorable Selden Island pottery vessel ever recovered. Since this item was restored two others have been reported to have been restored by Thomas Mayr of Davidsonville, Maryland, however these vessels are more elongated with a conical base. Because of this basal form they are probably of a later date than the Minguannan specimen.

The greater part of the pottery vessel was found on July 10, 1957 in Square 9-R-2, Level 6 of the site (the first or upper layer of yellow soil). A few scattered sherds were found in other levels of this excavation unit - 9-R-2, Level 5 and 9-R-2, Pit 2 - as well as in Square 4-R-2, Level 7 and Square 10-R-2, Level 6. These nearby finds were in the same natural stratum. The sherds, when uncovered, were fanned-out and had the appearance of having been thrown into the area in a westerly direction.

The reconstruction of this vessel presented unusual difficulties due to its size and paste (poorly fired). Attempts to reconstruct the pot by butting the sherds and cementing with DUCO cement proved to be a frustrating experience as the sherds pulled away from the cement because of the weakness of the paste. Inquiries were made of a number of experienced persons and the problem was presented before the Pottery Symposium at the 36th Annual Meeting of the Eastern States Archeological Federation in 1970 at Natural Bridge, Virginia. Ivor Noël-Hume made the suggestion that the Colonial Williamsburg procedure be attempted. This involves the impregnation of the sherds with diluted"DUCO"cement and the wiping off on the excess from the surfaces.

The procedure used was based on this suggestion. Clear cellulose nitrate spray lacquer was diluted with acetone and ethyl acetate and the sherds were impregnated in this by immersion. The sherds were immersed until all air bubbles ceased to rise, usually overnight. The surfaces were wiped with a cloth saturated with acetone and then laid on waxed paper to dry for several hours. One rimsherd was left untreated and is so marked. This was done so that the original appearance would be visible. However, there is no noticeable difference in appearance due to the treatment.

Reconstruction of the pot was then begun and was most difficult for several reasons; the method of manufacture (see below), the large size, and the missing portions of the pot, among others. "DUCO"cement was used to join the sherds all made to conform to several templates which were made to shape the inside and outside of the bowl. In the final stages, acetone-soaked cloths were used to cautiously soften a joint or joints, to bend the restored areas in order to made then conform or to make a circle.

The restoration was commenced at the base of the vessel and completed at the rim. The voids were filled with a tinted casting - plaster mix made to match the original color. This mix was prepared by Wilfred Fletcher of the Hagley Museum in Wilmington, Delaware. The larger voids were bridged by a fiber-glass fabric and this was coated with the casting-plaster mix

Method of Manufacture

A wad of paste was formed into a shallow cup-like basin to form the base of the vessel and the edges were thinned on all sides to form, in cross section, a blunt inverted "U". The exterior was impressed with a paddle wrapped with a coarse, 2-strand cord with an "S" twist. The cording extended onto the upper edge. This basal section was then permitted to air dry and broad fillets were applied to it. The lower edge was paddled to the desired thickness and a thin edge was again formed on the top of the fillet. This process was continued by butting the fillet edge to edge to complete the circuit. After the circuit was finished with a cord-wrapped paddle as before, it was again dried before applying the next course. The complete vessel had 5 courses which were 50 to 60 mm. high (see Figure 1).

Description

Dimensions of restored vessel

Height	11 5/8"	(29.5 cm.)
Width at Rim	12 - 12½ "	(30.4 - 31.6 cm. O.D.)*
2" below rim	11½ - 11 7/8"	(29.2 - 30.3 cm. I.D.)**
5" " "	11½ "	(29.2 cm. I.D.)**
7" " "	11 - 11 1/4 "	(27.9 - 28.2 cm. I.D.)**
Rim Thickness	3/16 "	(5 mm.)
Body Thickness		
(9/16 " below rim)	3/8 "	(9 mm.)
(main body sherds)	3/8 - 7/16 "	(9 - 11 mm.)
Capacity	15.4 quarts	(14.6 liters)

* Outside Diameter ** Inside Diameter

Color

Near Rim - Munsell Notation 10 YR 7/3, very pale brown. A red color increases almost imperceptably toward the base of the vessel with the deepest color being Munsell Notation 7.5 YR 6/6, a reddish yellow.

Paste

A very gritty fell, due to silty inclusions of fine smokey quartz, reflecting the origin of the clay in a local ball clay derived from pegmatite.

Temper

Crushed schistose steatite up to 5 x 12 mm. in size, the steatite has the appearance of the material from the Harlan Mill Quarry (Wilkins 1962)

Finish

Exterior - horizontal cord-marked, wiped surface
Interior - finger smoothed with the marks of small fingers still visible

Shape

Bag-shaped with a rounded base, slightly everted rim.

Discussion

This vessel was fired at a temperature below 273° C. (523° F.), the transition temperature between limonite and hematite as shown by the color of the rim and interior of the pot. Also, the subtle color change from 10 YR 7/3 at the rim to 7.5 YR 6/6 at the base indicates that no great heat had been applied during use and that the pot may not have been in use very long.

The manufacturer used fillets, squeezing each succeeding one over a thinned edge formed on the next lower course. Each course had been air-dried, so the junctions formed planes of weakness due to poor bonding. Consequently, most of the breaks occured at these points. The thinned portion squeezed over the course below broke away in numerous instances, revealing the underlying cording which can be observed in Figures 2 and 3.

Significance

Seldon Island ceramics appear to have developed out of the Marcey Creek flat-bottomed ware. The amount of steatite temper became much less and instead of resembling a steatite pot-sherd it resembled a clay ceramic with lumps of steatite scattered throughout. Marcey Creek ware developed out of the steatite bowl and assumed the shapes of these stone bowls. They appear to be the first ceramics in this area and heralded the beginning of the Early Woodland Period of around 1600 to 1400 B.C. The Selden Island pottery probably developed between 1400 and 1200 B.C.

The reconstruction of this pottery vessel represents the skill and patience of the entire Wilkins family over an extended period of time. The capacity was determined by filling the vessel with puffed wheat which was well contained in the rim voids. The standard material used for this purpose is millet seed.

Wilkins, Elwood S, Jr. "A Preliminary Report on the Harlan Mill Steatite Quarry (18Ce5)" Bulletin of the Archaeological Society of Delaware, Number 2, New Series

Figure 2

Figure 1

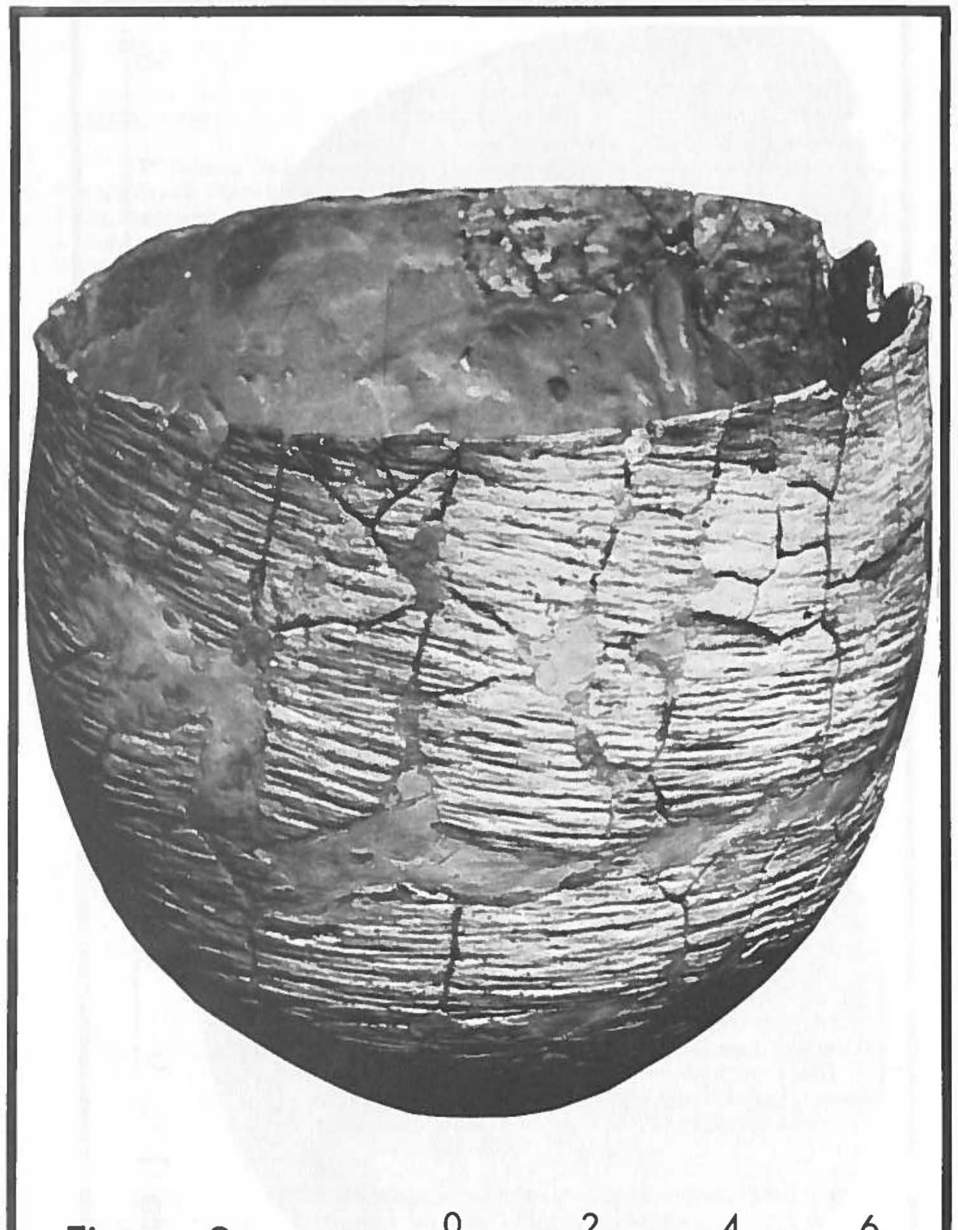

Figure 3

ACTIVITY ANALYSIS: A TECHNIQUE FOR THE POSSIBLE DISCRIMINATION OF SEASONAL OCCUPATION AT THE MISPILLION SITE

by

Ronald A. Tirpak

Preface

There are a number of people without whose help this project might never have been completed. Special acknowledgement must be given to Ronald A. Thomas, State Archaeologist of Delaware, and his staff, especially Daniel R. Griffith and Richard E. Artusy, for their generous cooperation, salient comments and recommendations. Dr. Thomas C. Patterson and Dr. Anthony J. Ranere of my graduate committee at Temple University have been of immense help and guidance all during the course of this study. I would also like to thank Georgia Colflesh for her valuable clerical and field help, and Antoinette Sciallo for the final typing of this paper. Last but not least, I would like to thank my wife, Linda, for her endless encouragement and support.

Introduction

Amateur archaeologists and private artifact collectors have drawn on the wealth of material to be found at the Mispillion Site (7S-A-1) for over half a century. The Sussex Society of Archaeology and History (SSAH), intrigued by the archaeological materials recovered by its members, sponsored a project of investigation and documentation of the area with an eye toward future excavation. The excavation of shellpits began in 1954 with extensive excavations continuing into 1955. The majority of the site was sampled during these two field seasons and thousands of artifacts were unearthed and stored in the private collections of the society's members. Five reports about the 1954-55 excavations were published from 1955 through 1962 (Hutchinson & Omwake, 1955; Hutchinson et al., 1957; Flegel, 1957; Lopez, 1961; and Omwake, 1962).

This type of investigation, consisting of the location of shellpits and their excavation with the subsequent publishing of a report on their contents, was the primary method of archaeological inquiry in Delaware until the state legislature established the Delaware Archaeological Board (now a part of the Division of Historical and Cultural Affairs) in 1965. The D.A.B. was charged with the mapping, plotting, and investigation of all archaeological sites within the boundaries of the State. The first site plotted in Sussex County was the Mispillion Site, and it was placed high on the list of sites for extensive investigation. Nothing more was done until April of 1970 when it became known that the site was in danger of destruction because of a proposed by-pass around the city of Milford. With the help of the Delaware State Highway Department and the highway contractors, an effort was made to glean as much information as possible from the site before it was covered by several feet of concrete. This study is a continuation of that effort.

Aims and Objectives of this Study

The Mispillion Site was the scene of extensive salvage excavations during the summer of 1970. Since that time, except for a preliminary report (Thomas & Warren, 1970), neither the data nor the artifacts from the site have been analyzed. Several thousand artifacts were contained within the thirty-seven features found at the site during the 1970 work. The artifacts were ceramic, faunal, floral, and lithic in nature; the focus of this project is the 11,411 artifacts of the lithic assemblage. The following study was undertaken with three goals in mind: (1) to conduct a microanalysis of the lithic assemblage found at the Mispillion Site paying special attention to wear patterns similar to those observed and reported by other investigators, working with analogous materials; (2) to define the concept of activity analysis and apply this technique to the interpretation of the Mispillion lithic collection; (3) to present a hypothesis concerning the use and occupation of the Mispillion Site as determined through activity analysis.

Methods of Analysis

Procedure

The successful fulfillment of this, or any other study, is determined by the techniques used. It is therefore prudent to take some time here to discuss the methods used to achieve the aforementioned goals. The most demanding and time consuming aspect of this project was the microanalysis of the Mispillion lithics. The analysis was in four steps.

During the first stage, all the lithic materials were documented. A feature by feature inventory was developed including such information as length, width, thickness, and weight of each artifact as well as the angles of worn edges. All of these measurements were recorded on a data sheet accompanied by a scale drawing of the artifact. This procedure was followed for all chipped, flake and ground artifacts.

The second stage of the lithic analysis was a tactile observation. The investigator examined the artifact for any sudden change in texture being especially mindful of pitted, and/or abraded areas. In many instances the "feel" of an artifact is the first indication of wear.

Next, a thorough visual examination of the artifact was made. Some of the areas located by touch are the result of natural rather than mechanical action and may so be identified visually. Other areas, although the result of human activity, may be accidental - whether or not material was heat-treated by design of chance requires a more detailed study than this preliminary unaided visual assessment.

Unlike the three previous macroanalystical stages of analysis, the fourth stage was microanalytical. The specimen was thoroughly washed in soapy water and examined under a binocular microscope (in this instance a Bosch & Lomb 30X stereoscopic microscope). The goal of this microscopic examination is the identification of wear patterns which in turn will suggest the functions of the elements of the Mispillion lithics.

Wear Patterns

Several different types of wear patterns are identifiable under magnification. The presence of these wear patterns are indicative of the functions to which the artifacts are put (Tringham et al, 1974; Willey, 1975). The four main categories into which the Mispillion lithics may be placed according to wear are:

1. Battering (see Figure 1)

   This type of wear results from the use of the artifact to deliver or receive repeated blows. The surface of such objects usually have a very rough and irregular appearance. This type of wear will generally appear on granular rocks composed of different mineral particles and with a high degree of joining (Semenov, 1964).

2. Polish (see Figure 2)

   This type of wear is a smooth or glossy finish resulting from the friction produced when the artifact is used in association with bone, flesh, hide, wood, or other materials. A scraping function is suggested if polish appears unifacially along the edge, and a cutting function is suggested if the polish appears bifacially. A griding function is indicated by polish on the plane of the artifact.

3. Flake Scars (see Figure 3)

   Tringham et al. (1974) considers this type of wear to be the most important function indicator. Flake scars result from the deliberate or accidental removal of a flake from an artifact. The location, orientation, and distribution of the flake scar

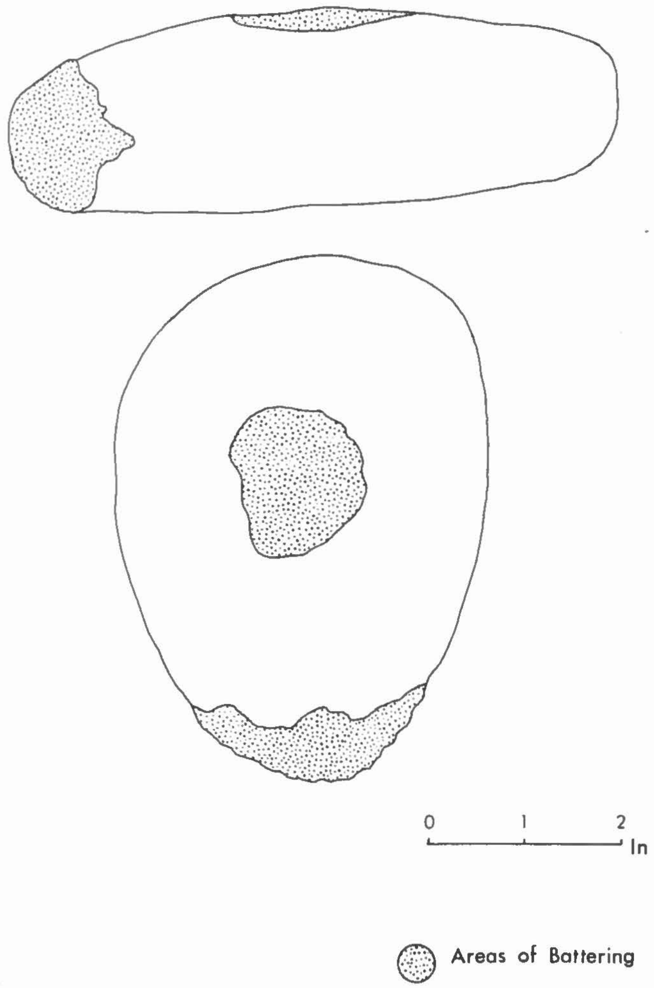

Figure 1

BATTERING WEAR PATTERNS

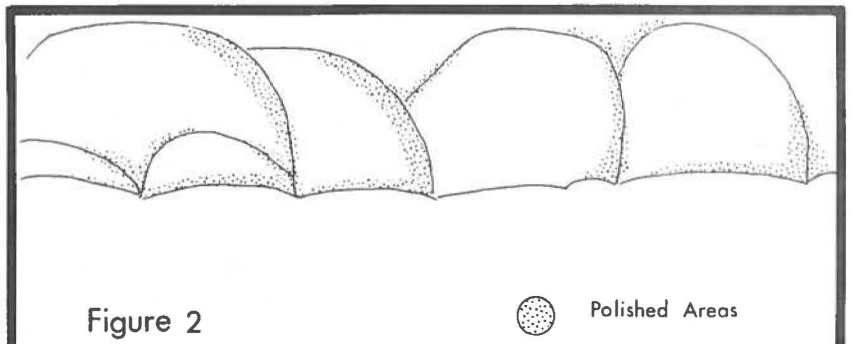

Figure 2

POLISH WEAR PATTERNS

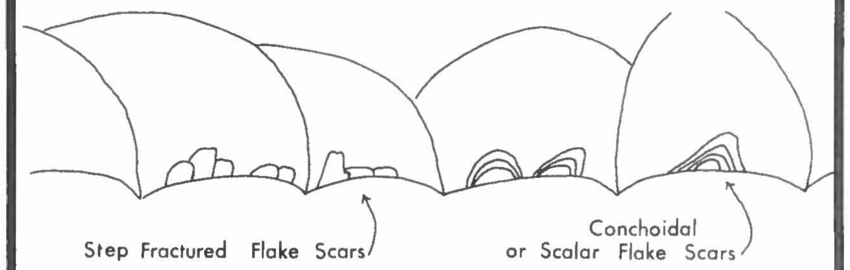

Figure 3

FLAKE SCAR WEAR PATTERNS

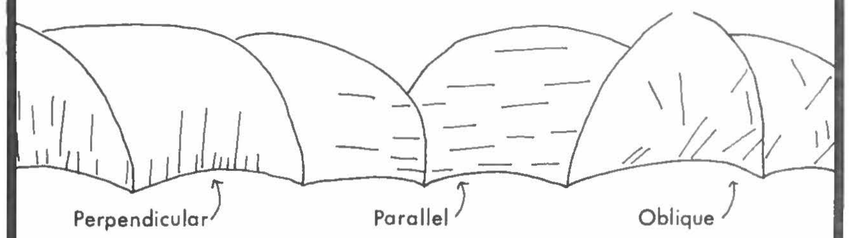

Figure 4

STRIATION WEAR PATTERNS

is suggestive of that artifact's utilization as well as the validity of its classification as an artifact. A random collection of flake scars distributed along the edges of a specimen without any particular orientation suggests damage and not wear. On the other hand, flake scars appearing on one side of an artifact aligned in a single direction with an uneven distribution along the edge indicates a cutting or scraping action.

There are two types of flake scars, step-fractures and concoidal. A step-fracture flake scar results when an object is used to scrape or chop a relatively hard material such as bone or wood; sawing the same material results in the production of concoidal flake scars.

4. Striations (see Figure 4)

Unlike Tringham, Semenov (1964) believes the orientation of striations on the artifact's surface to be the prime functional indicator. Striations are minute grooves or channels in an artifact's surface, caused by abrasive materials encountered while in the act of scraping, cutting, sawing, carving, chopping, penetratings, or drilling. The orientation of the striations to the working edge is the best indication of use (Semenov, 1964; Tringham et al., 1974; Wiley, 1975). If the striations are perpendicular to the edge, a scraping function is indicated. If the striations are parallel to the edge, a sawing or cutting function is suggested. Obliquely striated artifacts suggest a carving function and random striations on pointed artifacts suggest a penetrating function. Rotary striations on a pointed artifact suggest use as a drilling tool.

Organization of the Artifacts

For the purposes of this report, the contents of each feature were separated into four groups:

1. Large Artifacts - those measuring 80 mm. or more.
2. Medium Artifacts - those measuring between 20 mm. and 80 mm.
3. Small Artifacts - artifacts measuring less than 20 mm.

Flake artifacts measuring less than 20 mm. were divided into four classes; (a) unworked and unworn - these show no signs of retouch or secondary working of the edges and bear no evidence of wear, (b) unworked and worn - these flakes show no signs of retouch or secondary working of their edges but they do show evidence of some type of wear, (c) worked and unworn - these flakes, although they have been retouched or otherwise altered, show no evidence of any type of wear, (d) worked and

worn - these flakes are both altered and worn

4. Projectile Points and Projectile Point Fragments - this group includes arrowpoints, dart points, spearheads, etc.

Introduction to the Area

Location

Cedar Neck ($38^{o}55'00''N.$, $75^{o}22'30''W.$) is a topographical feature 4.5 miles long centered between the Mispillion River on the west and north, and the Cedar Creek on the south and east. Located 14 miles south of Dover, the capital of Delaware, and one mile east of the city of Milford (see Figure 5), Cedar Neck is situated within the Atlantic Coastal Plain and therefore experiences a continental climate. Temperatures vary from an average low of 24°F. in late January and early February to an average high of 89°F. in late July. The average rainfall follows a cycle similar to that of the temperature variation with the largest amount of rain in August and the least amount of rain falling in February. Droughts have periodically developed especially during the summer months. The frost free growing season averages two hundred days with an average of 46 inches of precipitation annually (Ireland and Matthews, 1974).

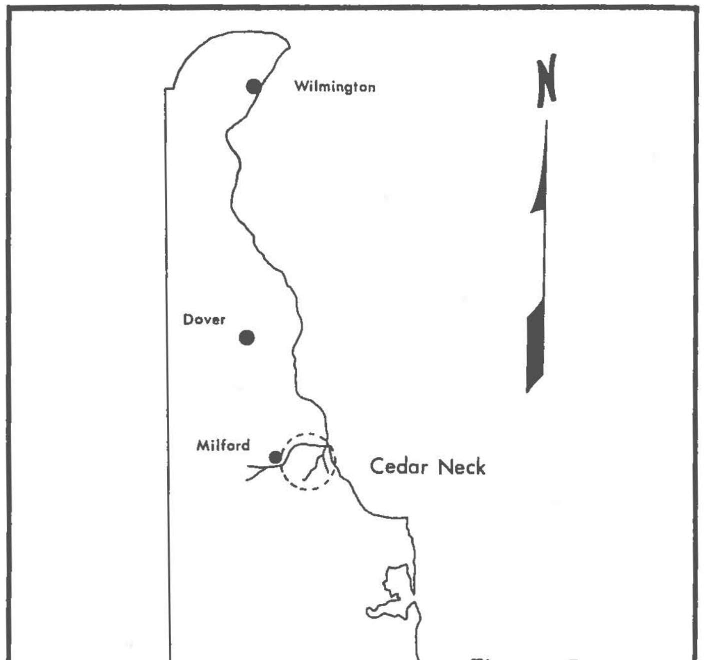

Figure 5

Terrain

The terrain of Cedar Neck is uniform throughout its 20 square mile area; it is a region of flat corn and soybean fields approximately 50 feet above sea level. Woodlands exist primarily around small streams that drain into the Cedar Branch and the Mispillion River. Before the advent of large-scale agriculture, the well-drained areas were forest regions with several swiftly flowing streams. A gradual rise in the sea level began about 8,000 years ago and resulted in the closing off of many of these streams. The speed of the streams was slowed by a rising water table leading to their subsequent development into swampy areas (Kraft, 1971). The soils of the Cedar Neck reflect the diversity of microenvironments located therein.

Soil Types

An extensive soil survey of the State of Delaware was conducted by the Soil Conservation Service of the United States Department of Agriculture (U.S.D.A./S.C.S.) and issued in May of 1974. The maps resulting from this survey are of great help in the reconstruction of past environmental conditions. The Soil Conservation Service classifies the soils into categories in accordance with the drainage capabilities of the soil, i.e., well-drained, moderately-drained, poorly-drained swamp, and marsh lands (see Figure 6).

The well-drained woodlands are areas having good to excellent drainage. In fact, some of the areas tend toward excessive drainage or droughty conditions. The soil types included in this classification are: Collington Series, Elsinboro Series, Evesboro Series, Lakeland Series, Matapeake Series, Norfolk Series, Rumford Series, Sassafras Series, and the Talleyville Series. The well-drained woodlands host a variety of economically important plants and animals. The usual floral suite includes dogwood, hazelnut, hickory, holly, huckelberry, oak, persimmon, sassafras, sumac, and wild cherry as well as herbacious upland plants. The faunal suite of this microenvironment consists of bear, deer, elk, fox, grouse, racoon, and turkey.

Although not as wet as the poorly-drained woodlands or as well-drained as the uplands, the moderately-drained woodlands are characterized by areas of water located near the surface during the Winter and early Spring. The soil types associated with the moderately-drained woodlands are: Butlertown Silt Loam, Delanco Series, Glenville Series, Keysport Series, Matapex Series, Mattawan Series, and Woodstown Series. The aforementioned soil types support a floral assemblage consisting of mixed oaks, scattered pine, weet gum, and red maple (the oaks are the dominant species). The faunal suite takes on a compound nature, because the moderately-drained woodland region is a transitional zone between the well-drained and the poorly-drained or swampy woodlands. This area is a feeding and mingling zone for the animals of both its bordering regions.

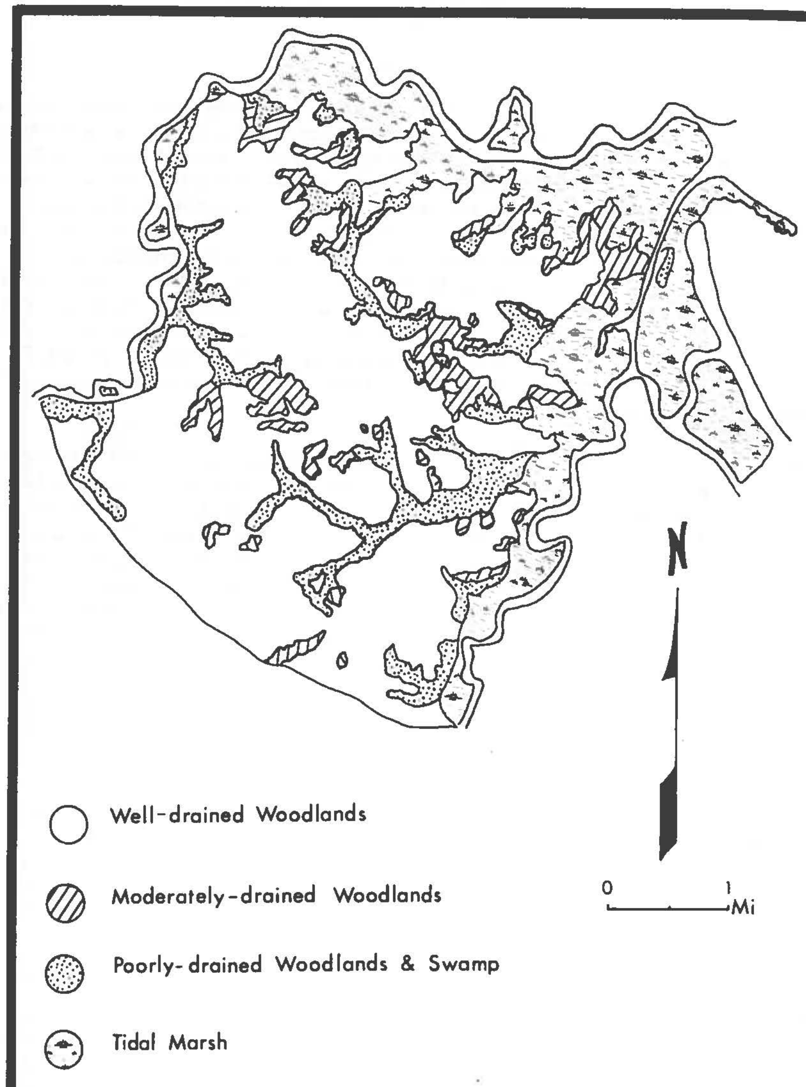

Figure 6

CEDAR NECK SOILS MAP

Areas listed as poorly-drained woodland and swamp are characterized by poor to extremely poor drainage leaving large amounts of water standing on or just below the surface during the entire year. Bayboro, Elkton Series, Johnson Series, Kinkora Series, mixed alluvial lands, muck, Othello Series, Plummer Series, Pocomoke Series, Portsmouth Series, Rutledge Series, St. Johns Series, and Swamp are the prevalent soil types of this category. This ecozone hosts a floral suite of highly water-tolerant plant species, such as alders, gum cypress, holly, oaks, pond pine, red maple, sweet bay, and willows. The accompanying faunal assemblage consists of bear, beaver, deer, duck, mink, muskrat, otter, squirrel, snake, and turkey. It should be remembered that this area is of particular importance during the Summer months when the other areas often experience water shortages.

The final soil-classification is that of tidal marsh and estuarine zones. This zone extends, in some areas, so far as eight miles inland as well as along the coast behind the beachfront. This microenvironment supports such important subsistence species as deer, mink, muskrat, opposum, otter, and racoon, as well as a large variety of grasses and reeds, and numerous seeds and roots. A wealth of marine resources are also contained within this zone. Clams, crabs, various species of fish, mussels, oysters, and whelks provide a plentiful and nutritious year-around resource.

The Mispillion Site and its Excavation

The Mispillion Site is located within the Cedar Neck region about eight miles upstream from the Delaware Bay on the southern shore of the Mispillion River (see Figure 7). The site extends east from Hering Branch for a distance of approximately 800 meters along a series of low ridges. The soil drainage is excellent because of a high sand content. A number of small salt marshes border the site. These marshes serve as rest and feeding stations for the various species of migratory waterfowl that periodically use the Atlantic Flyway.

The staff of the Delaware Section of Archaeology (S.O.A.), now a part of the Division of Historical and Cultural Affairs, moved quickly as soon as authorization was given for the salvage excavation of the Mispillion Site. The first obstacle to overcome was the initial clearing of the area to be excavated. The land on which the site was located had served several purposes for its owners prior to its acquisition by the State Department of Highways. The last use to which it was put was that of a trailor park. The area was strewn with a number of concrete trailer pads and sheds of various sizes and descriptions. These man-made encumbrances were removed by use of a road grader supplied by the Highway Department. The roadgrader had to be replaced by a tractor-drawn Gradeall following the initial clearing of the site. This change was necessitated by the unacceptable amount of subsoil disturbance caused by the roadgrader.

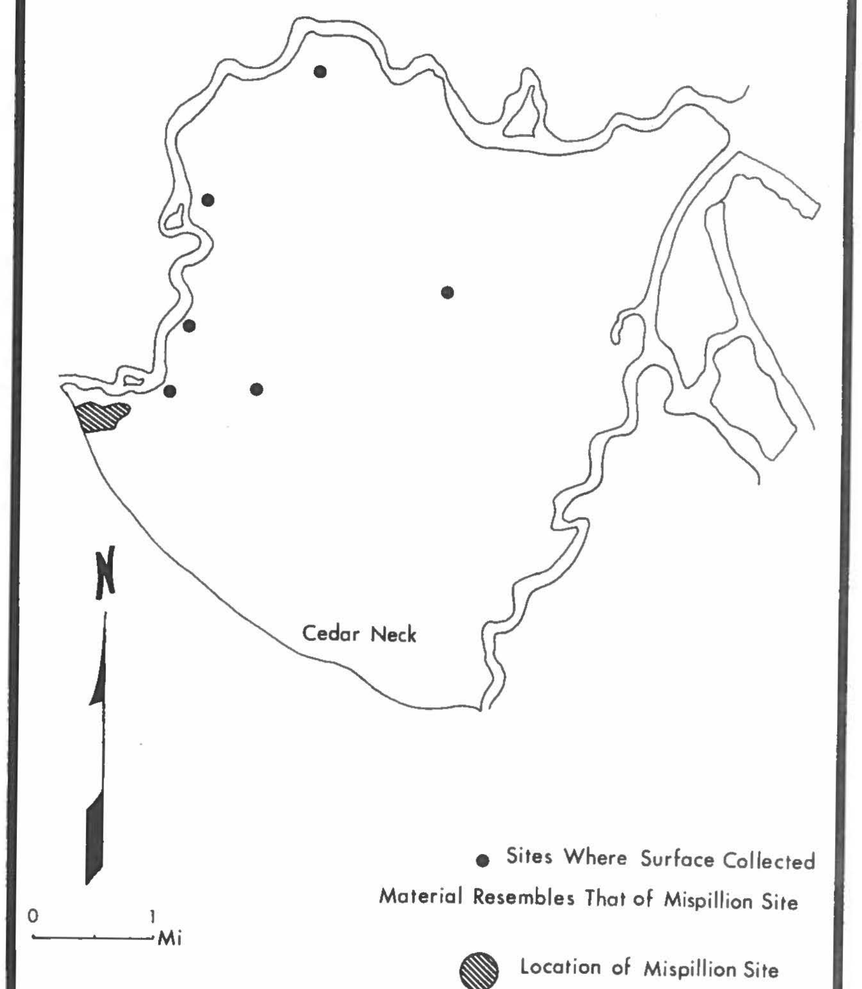

Figure 7

MISPILLION SITE LOCATION

The fieldcrew of the S.O.A. was assisted in the excavations by local volunteers, members of local archaeological societies, and private collectors. This group followed the gradeall with flat shovels to clear and identify areas of aboriginal disturbance. After marking suspected features, the area was overlaid with a grid of two-meter squares for the excavation of thirty-five aboriginal features (later construction uncovered additional features). The datum point for this grid was established to correspond, as closely as possible, to the datum point of the 1954-55 S.S.A.H. excavations. Excavation teams began to work the grid in late March of 1970. These crews were of the same composition as the fieldcrews which worked the initial clearing operation. One member of each crew working a grid section was made responsible for the final workup of their area. The excavation of the Mispillion Site was focused on the features. This study will deal with the lithic materials recovered from these features.

The Features of the Mispillion Site

The features of the Mispillion Site were the focus of the excavations conducted there (see Figure 8). The 1954-55 excavations of the S.S.A.H. concentrated on the location of shellpits and the extrication of their contents. The 1970 salvage excavations at Mispillion followed much the same direction. Pits were excavated by natural lenses when possible but not all features contained meaningful stratigraphic units. It is therefore necessary for this study to consider the feature as a basic unit of analysis.

Thomas and Warren (1970) arranged the aboriginal features of the Mispillion Site into three types according to size, shape, wall and bottom configuration.

Type I: (see Figure 9)

Type I is made up of the smallest features at the site having sloped walls, a rounded bottom; and an overall circular shape. These features had a mean diameter of 90 cm. and a mean depth, below the plow zone, of 70 cm. The surface area covered is about 1 m^2. Examples of Type I features are Features # 7,8,14,17,19,20,22,28,29, and 30.

Type II: (see Figure 10)

This type of feature is characterized by an irregular shape ranging from circular to oval. The characteristic mean diameter is about 193 cm. with a mean depth of 130 cm. and surface areas of 2 to 4 m^2. Some variety in the slope of the walls was noted (from incurvated to excurvated) as well as variation in the bottoms (from rounded to flat). Examples of Type II features are #s 6/13, 9,10, 11, 12, 18, 21, 23, 24, 25, 26, 31, 32, 33, 34, 35, and 37.

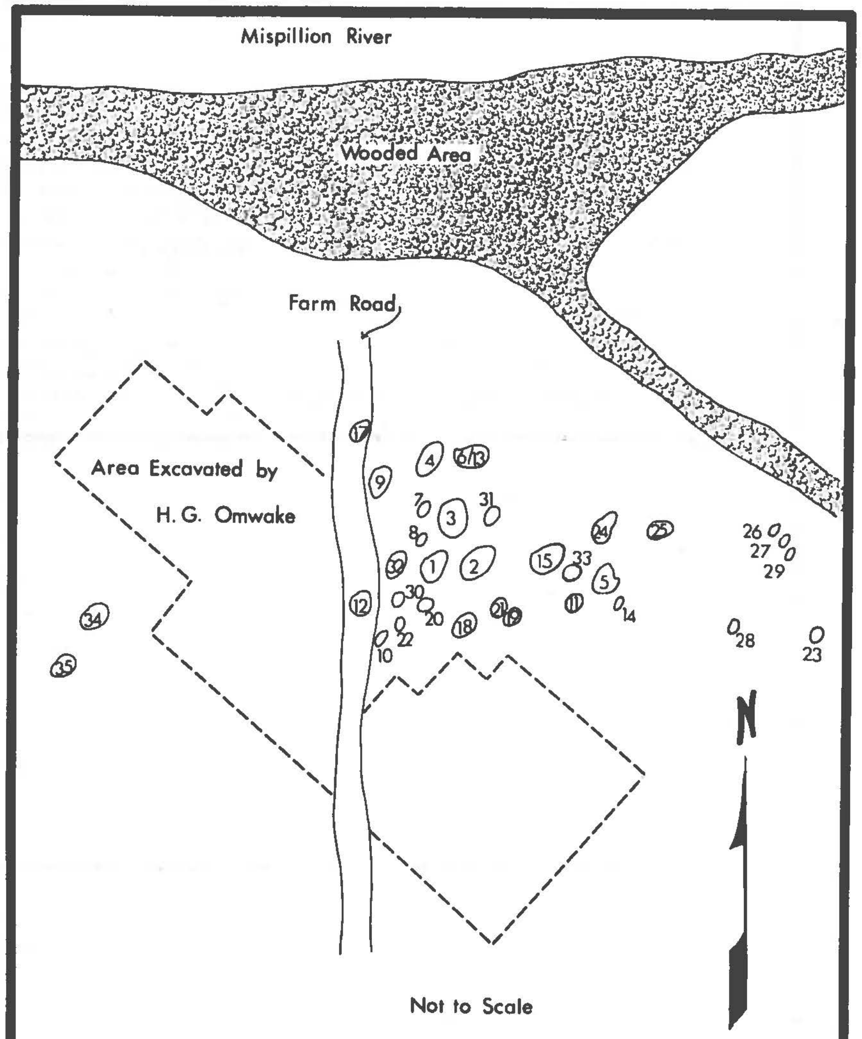

Figure 8

SKETCH MAP of MISPILLION SITE (7S-A-1) EXCAVATION

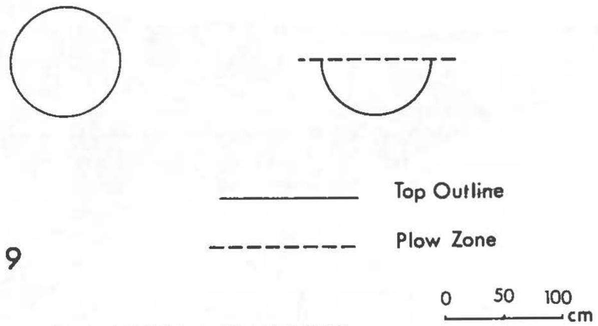

Figure 9

MISPILLION TYPE 1 FEATURE

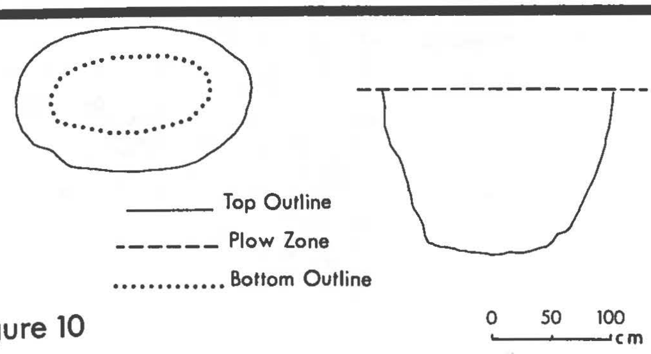

Figure 10

MISPILLION TYPE 2 FEATURE

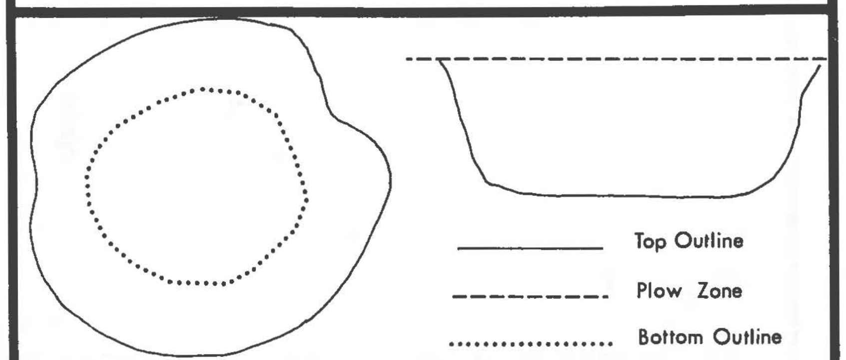

Figure 11 MISPILLION TYPE 3 FEATURE

Type III: (see Figure 11)

The Type III features are the largest of the Mispillion pits. Oval in shape, these features average 318 cm. in length, 280 cm. in width, and about 107 cm. in depth. They have surface areas of around 6 to 12 m^2. The walls vary from steeply sloped to straight with flat carefully prepared, bottoms. Examples of Type III features are #s 1,2,3,4,5, and 15. The refuse-filled shellpit, similar to that of Type III has long been a diagnostic element for the Late Woodland period of southern Delaware, however, their use remained speculative. They were not believed to be garbage pits because of the care taken in their preparation. It is also unlikely that they were used as cooking pits because of their size (there was evidence of fires built in features 1 and 3). The best interpretation of this category was suggested by Thomas and Warren (1970:17) and later expanded upon by Griffith and Artusy (1975). This interpretation suggests that the large pits were semi-subterranean houses.

Five burials were unearthed at the Mispillion Site in 1970. Features 7 and 17 contained canine burials while features 18 and 35 were single human burials (both flexed), and feature 37 held an undertermined number of human burials (discovered during construction of the highway, contents were scattered over a large area and further analysis was impossible).

Ceramics were recovered from Features 1, 2, 3, 5, 6/13, 7,8,9,10,11, 12,15, 18, 19, 22, 25, 32, and 36. The vast majority of these sherds were of the Townsend Series, however, some other influences were observed (Thomas & Warren 1970). The subsurface ceramic assemblage appears to be very similar to specimens collected on the surface and reported by Lopez (1961) and Blaker (1963).

Specimens of oyster, clam, mussel, and whelk shells were recovered in quantity from Features 1,2,12,15,23,25,31,34, and 36. There was a very small quantity of shell in Feature 3. The shells were never weighed or counted so more specific comparisons are not possible.

Bone was found in the fill of Features 1,2,3,6/13,7,9,12,15,17,19, 23, and 25. A total of 8,034 pieces of bone were recovered of which 7 were identified as tools (3 awls, 2 needles, 1 bead, and 1 antler tine flaker). Less than half of the bones could be identified, however, of 3,967 pieces that were identified 1,442 were of large mamals, 981 were of turtles, 679 were of small mammals, 594 were of birds, and 271 were of fish.

Charcoal was found in Features 1, 3, 22, 24 and 27; the only floral specimens recovered were nut shells from Feature 5.

The Nature of the Lithic Assemblage

The excavations of the Mispillion Site resulted in the acquisition of 11,470 lithic artifacts, the majority of which are discard flakes. Bifacially and unifacially flaked objects as well as hammer, anvil, and grind stones were among the 1,349 remaining tools. To simplify the description of the Mispillion lithics, they have been arranged into two major categories (miscellaneous stone artifacts and projectile points) and subdivided into ten groups. The classification parameters are purposely broad; the aim of this listing is to give the reader a general idea of the lithic collection - not to analyze it (an analysis of this material appears later in this paper). Jasper was the primary raw material used in all of the following categories (see Table 2).

Miscellaneous Stone Artifacts

1. Discard Flakes

The most abundant artifacts recovered from the Mispillion Site are unaltered discard flakes resulting from the manufacture of chipped stone objects. There were 10,121 of these flakes.

2. Used Flakes

One hundred fifty-eight flakes were recovered which revealed signs of having been used in a cutting or scraping manner on one or more edges (subsequent microanalysis increased this number by an addition 901 flakes).

3. Cores

Twelve irregularly flaked cores were recovered at Mispillion.

4. Bifacials

One hundred eight bifacially flaked tools were found. Lithic material included, in the order of their frequency, jasper, quartz, chert, flint, argillite, and ironstone (ferruginous quartzite).

5. Unifacials

Thirty-eight unifacially flaked tools were found at Mispillion. The majority were made of jasper with some quartz, chert, argillite & flint.

6. Pitted Stones

Two pitted stones were found within the features. One specimen exhibited the abrasion characteristic of a hammering function along its edges while the other single pitted stone had the flat polished smooth surface of a grindstone on three of its faces. These artifacts were 70 mm. and 88 mm. in diameter.

7. Hammerstones

Six hammerstones were found at the Mispillion Site (not counting the stone discussed in the section above). Like the pitted stones, they were made of a multi-mineral stone which would not flake on impact. They ranged in size from 32 mm. to 81 mm.

8. Grindstones

Two grindstones, other than the two pitted stones, were found. One stone was flattened and polished on three sides while the other stone had these characteristics on one side only. They measured 65 mm. and 106 mm. respectively.

9. Planforms

A planform is that stage in the construction of a projectile point when the blank is thinned and the tip and base are prepared for the next stages of manufacture. Only a base outline of the point can be seen at this time because the knapper has many options yet to excerise before the design is finalized. Three examples of planforms were found at Mispillion. All three were roughly triangular in shape, made out of jasper, and measured 35 mm. x 28 mm. x 10 mm.; 37 mm. x 31 mm. x 13 mm.; and 40 mm. x 33 mm. x 13 mm. with weights of 15.7 gms., 12.9 gms., and 15.2 gms. respectively.

Projectile Points

1. Class PP-T (Triangular)

Number of Specimens - 2
Form - Blade: triangular (one equilateral, one isosceles)
Shoulder: none
Notches: none
Stem: none
Base: straight with basal corners rounded
Flaking - well executed with some secondary flaking
Material - jasper
Dimensions - 26 mm. x 26 mm. x 5mm. (3 gms.)
26 mm. x 20 mm. x 5 mm. (3.7 gms.)

2. Class PP-O (Ovate)

Number of Specimens - 2
Form - Blade: triangular with a lenticular cross section
Shoulder: none
Notches: none
Stem: undefined
Base; ovoid to elliptical

Flaking - well executed
Material - quartz (1), jasper (1)
Dimensions - 37 mm. x 28 mm. x 10 mm. (7.3 gms.)
37 mm. x 23 mm. x 9 mm. (5 gms.)

3. Class PP-S (Stemmed)

Number of Specimens - 2
Form - <u>Blade</u>: triangular in outline
<u>Shoulder</u>: sloping inward
<u>Notches</u>: none
<u>Stem</u>: contracting
<u>Base</u>: curved
Flaking - crude to well executed
Material - argillite (1), jasper (1)
Dimensions - 36 mm. x 25 mm. x 7 mm. (6.8 gms.)
37 mm. x 16 mm. x 8 mm. (3.7 gms.)

4. Class PP-P (Pentagonal)

Number of Specimens - 1
Form - <u>Blade</u>: irregular pentagonal
<u>Shoulder</u>: none
<u>Notch</u>: none
<u>Stem</u>: none
<u>Base</u>: straight slightly concave
Flaking - crude
Material - jasper
Dimensions - 36 mm. x 22 mm. x 7 mm. (4.6 gms.)

5. Class PP-D (Diamond)

Number of Specimens - 1
Form - <u>Blade</u>: diamond-shaped in outline
<u>Shoulder</u>: rounded
<u>Notches</u>: none
<u>Stem</u>: undefined
<u>Base</u>: convex with rounded corners
Flaking - crude
Material - jasper
Dimensions - 43 mm. x 33 mm. x 15 mm. (16.2 gms.)

6. Class BPPF-T (Basal PP Fragment, triangular)

Number of Specimens - 20
Form - <u>Blade</u>: none present
<u>Shoulder</u>: none
<u>Notches</u>: none

<u>Stem</u>: straight to concave
<u>Base</u>: rounded to sharp corners
Flaking - fine to well executed
Material - jasper (15), chert (4), flint (1)
Dimensions - (average of fragments) 25 mm. x 27 mm. x 6 mm. (4.8 gms.)

7. Class BPPF-S (Basal PP Fragment, Stemmed)

Number of Specimens - 2
Form - <u>Blade</u>: none present
<u>Shoulder</u>: none
<u>Notching</u>: none
<u>Stem</u>: straight
<u>Base</u>: straight to slightly convergine, rounded corners
Flaking - fine
Material - argillite (1), quartz (1)
Dimensions - 15 mm. x 16 mm. x 8 mm. (1.2 gms.) <u>average</u>
37 mm. x 16 mm. x 8 mm. (3.7 gms.)

8. Class PPF-R (PP Fragment, rectangular)

Number of Specimens - 6
Form - <u>Blade</u>: parallel to slightly converging
<u>Shoulder</u>: none
<u>Notches</u>: none
<u>Stem</u>: none
<u>Base</u>: none
Flaking - fine to well executed
Material - jasper (4), chert (1), hornfels (1)
Dimensions - 25 mm. x 23 mm. x 7 mm. (4.7 gms.) <u>average</u>

9. Class TPPF (Tip PP Fragments)

Number of Specimens - 34
Form - <u>Blade</u>: undetermined
<u>Shoulder</u>: none
<u>Notches</u>: none
<u>Stem</u>: none
<u>Base</u>: none
Flaking - fine to well executed
Material - jasper (26), chert (4), quartz (3), argillite (1)
Dimensions - 24 mm. x 33 mm. x 7 mm. (3.7 gms.) <u>average</u>

Functional Groups and Classes

The wear patterns, previously discussed in this paper, help to identify the uses of the articles found at the Mispillion Site. The identification of the function of a single artifact, although important, is secondary to the understanding of the relationships between artifacts both within the feature itself and within the site as a whole. To understand the Mispillion Site from its lithic assemblage requires an identification of these intrafeature and interfeature association.

The examination of microscopic wear patterns is the first step toward the identification of the aforementioned relationships. All lithic artifacts found within the fill of a particular feature may be placed into one of four general functional groups.

1. Scraping

An artifact is placed into the scraping group when it bears step-fractured flake scars and/or edge-lip polish on the dorsal or trailing edge. Also characteristic of a scraping function, are striations perpendicular to the edge of an artifact.

2. Cutting

An artifact is placed into the cutting group when it bears bifacial striations either parallel or oblique to its edge. Concoidal flake scars, bifacial polish and edge spalling are also characteristic.

3. Percussion

An artifact is placed into the percussion group when it bears heavy step-fractured flake scars either bifacially or on the ventral edge. Impact striations, either bifacially or ventrally present are also characteristic of this group.

4. Penetration

An artifact is placed into the penetration group when it bears rotary striations on a tip, or light polish and striations perdendicular to an edge on a blade.

The assignment of more specific functions is possible by subdividing the major groups into smaller functional classes. The experimentation of several investigators (Semenov, 1964; Tringham et al, 1974; and Wiley, 1975) have enabled the following subdivisions of the aforementioned functional groups possible.

1. Scraping

This group is divided into two classes - hard and soft scraping. Hard scraping is distinguished by step-fractured flake scars and edge - lip polish both of which appear on the trailing edge of the artifacts. These types of wear are the result of the use of the artifact in contact with hard materials such as wood or bone. Soft scraping is identifiable by dorsally appearing edge-lip polish. Striations perpendicular to the working edge are also characteristic of this class. These types of wear patterns are the result of the use of the artifact in contact with soft materials such as hides.

2. Cutting

This group is divided into two classes - carving and sawing. Carving is identified by oblique striations appearing bifacially and in a single direction. These striations result from the use of the artifact in contact with soft materials such as skin or meat. The second class in this group, sawing, is identified by the bifacial presence of polish as well as bidirectional striations oriented parallel to the working edge. Concoidal flake scars and edge spalling may also occur. These wear patterns result from the use of the tool in association with hard materials such as wood and bone.

3. Percussion

This group also has two classes - chopping and adzing. Chopping can be identified by the heavy step-fractured flake scars which appear on both sides of the working edge as well as edge battering and impact striations. Wood and bone are typical of the kinds of materials which cause these types of wear patterns. Adzing produces wear patterns very similar to those of chopping. While both have heavy step-fractured flake scars and impact striations, on an artifact that has served an adzing function these wear patterns appear unifacially and only on the leading edge.

4. Penetration

The penetration group is divided into three functional classes - drills, awls, and projectile points. The first of these three classes, drills, is characterized by rotary striations at the tip of the artifact. This wear pattern results from use on hard materials. The second functional class in this group is awls. Since awling is done primarily on hides the main wear pattern which is evident is that of impact striations caused as the awl is thrust through the hide and into the soil on which it lay. Some polish may also appear on the tip. The third class within the penetration group, projectile points, have major wear patterns that form as a result of its use in contact with a variety of materials, these are impact striations and tip burination. Points are multi-purpose tools.

Activity Analysis

Activity analysis is a set of indices developed from the synthesis of information gained through the microanalysis of a ceramic, faunal, floral, or lithic assemblage. This technique seeks to identify and define the types of activities that occurred within a site through the assessment of both quantitative and spatial data.

The key to activity analysis is the application of microanalytical techniques to the assemblage under examination. Macroanalystical characteristics, such as size and shape, are not sufficient to clarify use. A flint blade, for example, may be used to carve meat, to clean hides, to shave wood, or any combination of the three. A projectile point may be used as an arrowhead, as a scraping tool, or as a knife depending on the situation and circumstances in which its owner finds himself. The only way the function of an artifact can be reasonably determined is through wear pattern identification; even then, only the dominant and perhaps a secondary use can be identified. Infrequent or occasional uses may not leave any functionally diagnostic evidence. Absolute certainty about the use of a particular artifact, or type of artifact, is impossible at this time; but absolute knowledge of all the uses to which an artifact has been put in not necessary for activity analysis. The ability to identify the primary use of an artifact is sufficient. Laboratory experiments have shown that such identification is within the parameters of microanalysis. The more an artifact is used to perform a task the more conspicuous will be the wear pattern characteristic of that task (Tringham et al., 1974). Therefore, if the majority of the artifacts found within a defined area (such as a grid square, set of grid squares, or feature) have similar wear patterns, it is likely that the major activity conducted within that area is the activity which produces the types of wear patterns found.

It is unusual to find a grid square or feature with artifacts bearing only one type of wear pattern. Generally a heirarchy of wear patterns can be developed within the defined area along quantitative lines. A quantitative analysis of each area (as determined by the investigator) of the site based on wear pattern information is the first step of activity analysis. Activity analysis is a technique which views the site as a tool of those who built it. Like a tool, a site is the result of preparation and design; it has a purpose or function. Like a tool, to discover its function and to understand its purpose, an investigator must examine those elements of which it is composed as well as examining it as a whole. There are three concepts at the disposal of the activity analyst, each one broader than its predecessor; they are (1) the activity profile, (2) the activity area, and (3) the activity contour.

Activity Profile

An activity profile is a mental construction formed by the synthesis of wear pattern information obtained by the microanalysis of materials recovered from the fill of a defined area. The activity profile is the plinth concept of activity analysis - the base or foundation on which the other concepts are developed. Quantitative in nature, an activity profile is a coded representation of the activities of a defined area as evidenced by the identified wear patterns of the artifacts from that area. This representation is graduated in descending order by the frequency of the appearance of sets of characteristics peculiar to the previously mentioned functional groups and classes relative to one another. The first element indicates the activity whose characteristic wear patterns were the second most numerous, and so forth. It is important to point out that the exact numbers of artifacts represented by each element is not important here, this is not a mathematical model. The real importance lies in the relationship between activities such as scraping, with some carving and chopping in that order of frequency. The possibility of finding areas with exact numerical or even proportional similarities in wear pattern frequency is unlikely. There are too many variables - tool materials, materials on which the tools are used, quality of workmanship, skill in using the tool, just to name a few. For the purposes of activity analysis, the presence of an activity is sufficient for its consideration. An example, of a lithic activity profile from the Mispillion Site may help to clarify the concept.

The preliminary site report of the 1970 salvage excavation of the Mispillion Site (Thomas & Warren, 1970:9) describes Feature 1 as:

> This shell and refuse-filled pit was circular in shape with dimensions of 222 x 218 x 116 cm. Straight, steeply sloping side walls extended to a flat sandy bottom. The pit fill consisted of dark brown soil mixed with oyster shell. Charcoal was concentrated in one area of the bottom while the shell was concentrated around the circumference and at the bottom of the pit. (paraphrased)

The following is a summary of the lithics found in the fill of Feature 1. Of the chipped tools there were; three large tools (one grindstone and two multipurpose tools), fifteen bifacially flaked artifacts and seven unifacially flaked specimens. Also found were ten projectile points or fragments thereof, the shapes of nine of these items were identifiable.

The process for developing an activity profile for the chipped artifacts begins with the microanalysis. After a microscopic examination of wear patterns, the frequency of the occurances of functional characteristics is recorded. A determination of group and class functional ranking is made in accordance with the number of times sets of characteristics - wear patterns - appear. As I have previously mentioned, an activity profile is a relative measure; the exact number of scrapers or hammerstones in not the important issue. The important issue in an activity profile is the density of cutting, penetrating, percussion or scraping tools relative to one another within a feature.

In the case of chipped tools from Feature 1, most of the items exhibited wear patterns characteristic of a scraping function. The majority of the scraping tools (86%) gave indications of use in connection with hard materials. Next in order of frequency are the cutting tools (71%) that revealed wear indicative of the sawing of hard materials such as bone or wood. The percussion and penetrating groups were equal in the frequency of their occurance. All of the artifacts assigned to the percussion group have wear indicative of a chopping function while all the artifacts assigned to the penetration group have wear indicative of an awling function.

By using the following abbreviations for the major functional groups (C = cutting, PN = penetration, PR = percussion, and S = scraping) along with the following abbreviations for the function classes (ha = hard, so = soft, ca = carving, sa = sawing, ch = chopping, ad = adzing, dr = drilling, aw = awling, and pp = projectile point) the lithic activity profile for Feature 1 of the Mispillion Site (1970 excavations) is written Sha, Csa, PRch/PNaw, Cca.

Microanalysis revealed 191 flakes in Feature 1 that bore evidence of use (flake scars, striations, etc.). The wear patterns of these flakes indicated their use in the scraping and sawing of hard materials. Some of the flakes with sawing indications are probably refuse flakes struck from chipped tools used as sawing implements. A full lithic activity profile is composed of wear pattern information for chipped tools, ground tools, flakes, any miscellaneous stone tools. In this case, the inclusion of the data from the flake analysis does not change the activity profile of the feature; the wear patterns of the flakes substantiate the lithic activity profile developed for Feature 1.

The activity profile is a technique to identify intra-feature relationships - the focus of an activity profile is within the feature. To identify inter-feature relationships the concept of an activity area is used.

Activity Area

The activity area is a spatial construct that defines a region in which a particular industry or activity occurred; it is composed of features or other defined areas having similar activity profiles. Activity areas are identified by the comparison of activity profiles. First the activity profiles are plotted on a site map. Lines of demarcation similar to isobars on a weather map are then drawn, however, instead of indicating areas of similar barometric pressure these lines indicate areas of similar

activity (see Figure 12). The interpretation of these areas is supplemented by data concerning the nature of the rest of the material found within the feature. Again, an example from the Mispillion Site may help to clarify the concept.

Eighteen of the thirty-seven features of the Mispillion Site held lithic materials. The following is a list of the features along with their respective lithic activity profiles:

Feature #		(Activity Profile)
1	Sha, Csa, PRch/PHaw, Cca	
2.	Sha, Sso, Csa, Cca	
3.	Sha, PNpp, PRch	
5.	Sha, PHpp, Csa, PRch	
6/13	Sha, Sso, PNpp	
7.	Sha	
9.	Sha, Sso	
10.	Sha, PNpp	
11.	Sha, PNpp	
12.	Sha, Sso	
15.	Sha, PNpp, PRch, Cca/Csa	
18.	Sha, Sso	
21.	PRch	
24.	Sha, Cca/Csa	
25.	Sha	
29.	Sha, PRch	
31.	Sha, PNpp, Csa	
33.	PNpp, Sha, Sso	

The following associations are noted when the aforementioned lithic activity profiles are examined. Features 3 and 5 have similar lithic activity profiles. The only difference is the presence of a sawing function (Csa) in Feature 5 which is absent in Feature 3. Features 7 and 25 have identical lithic activity profiles composed of artifacts used in the scraping of hard materials. Features 9, 12 and 18 also have identical lithic activity profiles composed of artifacts used in the scraping of hard and soft materials. The lithic activity profiles for Features 10, 11 and 31 are similar; they are composed of artifacts used in the scraping of hard materials and projectile points. In addition to these two wear patterns, Feature 31 had artifacts which bore evidence of a sawing function (Csa) on hard materials. Features 1, 2 and 15 are similar in the respect that all three have elements of all the major functional groups as well as artifacts that had been used with both hard and soft materials.

Under closer scrutingy a dichotomy was found to exist. The profiles of Features 3, 5, 7, 10,11,21,25,29, and 31 record the use of artifacts in association with hard materials, such as bone or wood, exclusively. The profiles of Features 1, 2, 15, 6/13,9,12,18,24 and 33, on the other

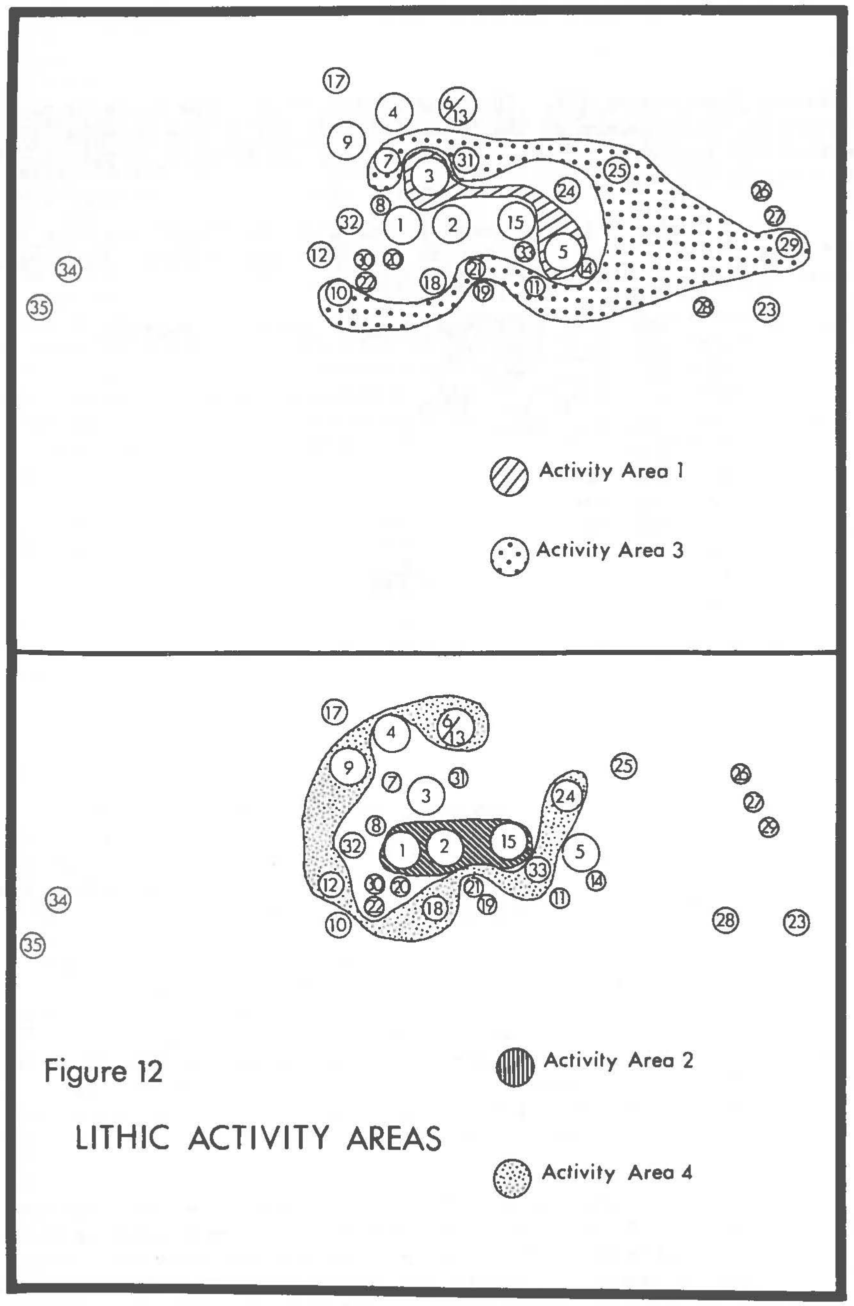

Figure 12

LITHIC ACTIVITY AREAS

hand, record the use of artifacts in association with hard and soft materials. The significance of this dichotomy will be discussed later in this paper in the section on the activity analysis of the Mispillion Site.

In the technique of activity analysis, activity profiles are used to examine intrafeature association while activity areas are used to examine interfeature associations. Both of these types of relationships are encompassed in the concept of an activity contour.

Activity Contour

The third element of an activity analysis is the concept of an activity contour. As the broadest of all the concepts of activity analysis, it encompasses both the activity profiles and the activity areas. An activity contour is, therefore, composed of both quantitative and spatial relationships which are used to define a site in terms of the industry conducted therein whether it be, ceramic, faunal, floral, or lithic.

A lithic activity contour is an outline of the use of the stone artifacts found within a site focusing on both the quantity as well as the location of this utilization. The quantitative aspects of the activity contour are to be found in the compilation of statistical information concerning the types of stone chosen for use as tools. The spatial aspects of an activity contour are to be found in the distribution of features within activity areas and in the locations of the activity areas themselves. An activity contour provides a schematic of the activities that occurred within a site. This schematic consists not only of the types of activities present but also their concentrations, orientation, and associations (i.e., what sets or groups of activities appear together). Again, an example from the Mispillion Site may be of some help in understanding this concept.

The lithic activity contour of the Mispillion Site is composed of two segments. Each segment consists of one activity area with Type III features (described earlier) flanked by another activity area with six Type II features. Only one Type I feature was found to contain lithic materials (Feature 29). The orientation and arrangement of the features within the site is rather interesting. In section "A" (see Figure13), the three Type III features (# 1,2,and 15) form an almost perfect east-west axis with three Type II features (# 6/13,9 and 24) to the north of the axis, and three Type II features (# 12,18 and 33) to the south. In section "B", the two Type III features (3 3 and 5) form a northwest-southeast axis with two Type II features (# 31 and 25) to the east, and four Type II features (3 7,10,11 and 21) located to the west. The single Type I feature is located to the northeast of the axis in this section. The greatest diversity of lithic activities occurs in the Type III features situated in the center of their respective cluster of features. The Type II features are situated on the periphery of their cluster of features and seem to be more specialized exhibiting usually only two types of activities. The possible significance of this alignment as well as the significance of their respective lithic collections is discussed in the next section of this paper.

The Activity Analysis of the Mispillion Site

The first step in the activity analysis of the Mispillion Site was the microanalysis of the lithics contained within the features of the site. The feature was chosen as the unit of reference or "defined area" for this analysis because of the type of excavation procedures used and the lack of any stratigraphic data. Eighteen of the thirty-seven features found at the site contained lithic materials. The most varied lithic activities evidently took place in the five Type III features (material from a sixth Type III feature was unavailable for analysis); their activity profiles contained a greater diversity than any other set of features at the site (# 1,2,3,5 and 15). The main activity in all five Type III features was that of scraping on hard materials. These features also contained wear patterning characteristic of sawing, carving, awling and chopping. Further analysis did reveal a factor that enabled the separation of the five Type III features into activity areas. The factor is the type of material on which the artifacts were used (hard or soft). The lithics of Features 3 and 5 revealed wear patterns distinctive of tools used on both hard and soft materials. The material factor was applied to the other lithic-bearing features and a similar division developed. Features 7,10,11,21,25,29 and 31 all contained artifacts used exclusively in association with hard materials, and Features 6/13,9,12, 18,24 and 33 all contained artifacts used on both hard and soft materials. These associations led to the recognition of the following activity areas with their accompanying characteristics:

Activity Area # 1 (Features 3 and 5)

1. Artifacts used on hard materials only
2. The primary activity is scraping
3. The secondary activity is sawing and/or chopping
4. These features fulfill the criteria outlined as characteristic of semi-subterranean houses (Griffith & Artusy,1975)

Activity Area # 2 (Features 1,2 and 15)

1. Artifacts were used on both hard and soft materials
2. The primary activity is the scraping of hard materials
3. The secondary activities are awling, carving and scraping on soft materials
4. These features fulfill the criteria established for semi-subterrean houses (Griffith & Artusy,1975

Activity Area # 3 (Features 7,10,11,21,25,29 and 31)

1. Artifacts were used on hard materials only
2. The primary activity is scraping hard materials
3. The secondary activity is chopping hard materials
4. These features do not fulfill the criteria for semi-subterranean houses

Activity Area # 4 (Features 6/13, 9,12,18,24 and 33)

1. The artifacts were used on hard and soft materials
2. The primary activity is the scraping of hard materials
3. The secondary activites are carving and scraping soft materials
4. These features do not fulfill the criteria established for semi-subterranean houses

By plotting the four activity areas mentioned above on a site map (see Figure 13) an interesting configuration or alignment appears. The pivotal features of the site are the centrally located areas 1 and 2. The five features are almost identical except that the features of activity area # 2 have artifacts which bear evidence of use on both hard and soft materials whereas the artifacts from activity area # 1 do not. Both sets of features appear to be semi-subterranean houses (Griffith & Artusy, 1975), and possess the most diverse lithic collections found at the site. The orientation of the features of activity area # 1 is along a northwest-southeast line with three of the features of activity area # 3 to the east of the axis and the other four to the west. The features of activity area # 2 are aligned along an east-west axis with three of the features of activity area # 4 to the north of the line and three to the south. The suggestion is that the features of activity area # 3 are auxiliary to the features of activity area # 1, and that the features of activity area # 4 are auxiliary to those of activity area # 2. These associations are based on the similarity of the materials on which the artifacts of these features were used as well as their alignment with the focal features.

Prior to this study, the Mispillion Site was believed to be a permanent or semi-permanet occupation of five or six households and their accompanying auxiliary features. However, the lithic activity contour of this site suggests two similar, possibly seasonal, occupations by a smaller group of two or three households (see Figure 14). The first occupation (Occupation I) is represented by activity areas # 1 and 3 and the second occupation (Occupation II) by activity areas # 2 and 4.

The results of the initial examinations of the bone, ceramic, floral and shell materials from the Mispillion Site were checked for possible confirmation of separate occupations. During this check it was

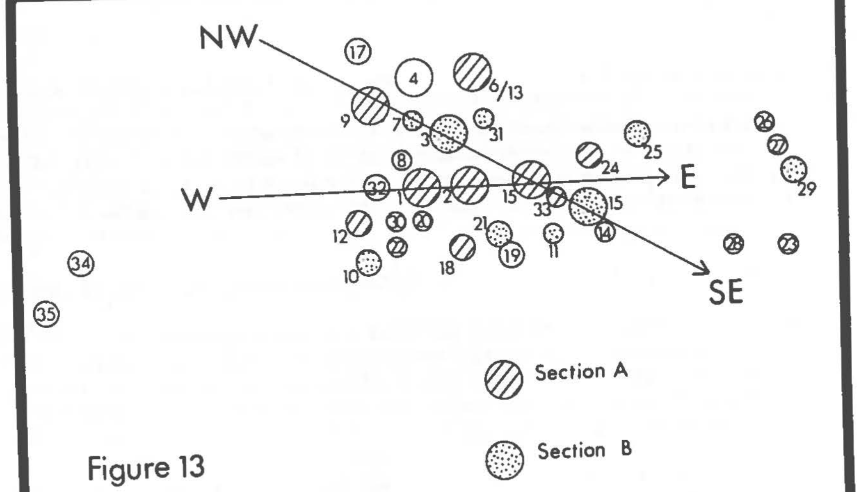

Figure 13
ORIENTATION
of LITHIC ACTIVITY CONTOUR

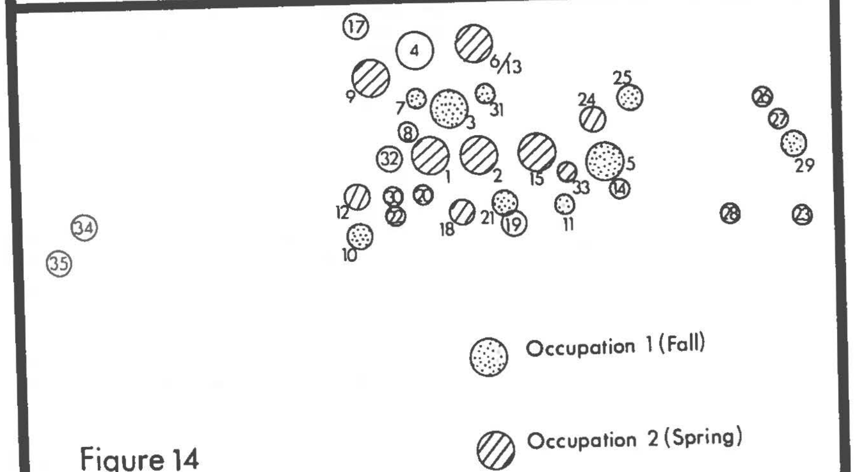

Figure 14
POSSIBLE SEASONAL
OCCUPATIONS of MISPILLION SITE

discovered that the features of Occupation I contained almost three times the amount of large mammal and turtle bones than did the features of Occupation II. However, the features of Occupation II contained almost all of the shell (Clam, mussel, oyster and whelk) and fish bones recovered at the site. The features of both occupations contained almost equal amounts of bird bone.

The concentration of large mammal bones (most identified as deer) might suggest a fall occupation since the best time of the year for the exploitation of this resource in this ecozone is the autumn (Thomas et al, 1975:29). Hickory nut shells were found in Feature # 5 of Occupation I (this also is a fall resource). The concentrations of shells and of fish bones in the features of Occupation II may suggest a spring occupation. Shellfish are best gathered in the late spring and anadromous fish are abundant throughout the spring and early summer. The site is located within the Atlantic Flyway and the equal distribution of bird bones also suggest that the Mispillion Site was occupied in the spring and the fall when the migrations of waterfowl were at their height. This discussion of seasonal use of the site is speculative - the data is by no means conclusive. A ceramic, faunal and floral investigation of the Mispillion Site data would provide a means of testing this hypothesis. Such an investigation is outside the realm of this lithic study.

Summary and Conclusions

This study was undertaken to increase the knowledge of the Mispillion Site (7S-A-1), a Late Woodland site in southern Delaware. The project began with the making of several decisions. It was decided that already excavated materials would be used. This decision was made based on two years of unfavorable weather conditions (one year of drought and one year of floods) which resulted in a hesitancy by landowners to give permission for excavation. Finances were also a factor. The total cost of the excavation would have been far in excess of the cost of using the existing collections from the site at the offices and laboratory of the Delaware Section of Archaeology at the Island Field Museum. The Mispillion Site was selected as the focus of this study because:

1. It is one of the longest known but least understood site on the Delmarva Peninsula
2. It is one of the two largest sites excavated in the peninsula
3. The Section of Archaeology (Delaware) expressed a willingness to have the Mispillion material examined
4. The artifactual assemblage of the Mispillion Site provided a sample large enough to make valid conclusions possible

The next decision made concerned the scope of the study. An attempt to investigate all aspects of the site would have required a team of investigators with a range of expertise as broad as the artifactual assemblage of the site. Lithics were chosen as the subject of the study because nothing had been done with the Mispillion Site lithics whereas two papers had been written on surface collected ceramics (Lopez, 1961; Blaker, 1963).

Once the choice of lithics had been made, some decisions had to be reached as to how the greatest amount of information could be gleaned by this area of investigation. As previously stated, the Mispillion excavation was a salvage project. The features of this site were chosen as the reference units for this study because of some subsurface disturbances and years of surface collecting (thus skewing the sample available on the surface). Microanalysis was chosen as the key tool or technique by which the most accurate identification of the artifact uses could be made.

Microanalysis, like any other method of investigation, has "pros" and "cons". From a "pro" viewpoint, 901 flakes were discovered to have wear patterns. That is to say that 901 tools would otherwise have been overlooked or approximately 8 % of the lithic assemblage would have been disregarded. A second positive aspect of microanalysis is that more specific functions could be assigned to some artifacts than would be possible using macroanalytical techniques. Microanalysis provides additional information to help clarify the overall view of the site as well as the individual feature and the artifact itself. From the "con" viewpoint microanalysis is a very time consuming technique. An average of three to five minutes of microscopic analysis per artifact is needed if the procedures previously discussed in this paper are followed. For the lithic assemblage of the Mispillion Site, this meant approximately 760 hours or about 95 workdays of eight hours each (this does not take into consideration the time required to prepare an artifact for examination.

The microanalysis of the Mispillion lithics revealed that the primary lithic activity at the site was scraping. Further analysis showed that this scraping was done on hard materials. Secondary activities were varied, but consisted mostly of carving and scraping soft materials, chopping hard materials, and penetration as indicated by projectile points or their fragments.

Activity analysis is an investigative technique developed to apply microanalytic data to the identification and definition of activites occurring within a site and the clarification of the relationships between them. Through the comparison of lithic activity profiles and lithic activity areas, the lithic activity contour of the Mispillion Site was divided into two sets of features according to the nature of the materials on which the artifacts were used. This division may indicate two seasonal occupations of the Mispillion Site instead of the one permanent or semi-permanent occupation as was believed prior to this study. When the lithic activity analysis is combined with the faunal and floral data from the fill of the features, the suggestion is that the Mispillion Site was occupied during the spring when migratory waterfowl were exploited

supplemented by the utilization of shellfish and anadromous fish resources. The site was again accupied in the fall when migratory waterfowl were again exploited this time supplemented by deer and small game hunting along with nut gathering. These results imply that activity analysis may be a means by which seasonal occupations within the same site may be identified, however, additional application of this technique to other sites must be made before a more definite conclusion concerning the validity of this implication can be made.

This study has sought to view the site as a tool of the people inhabiting it. Just as functional analysis seeks to identify the use of an artifact, activity analysis seeks to identify the activities occurring within a site. In that way, the individual characteristics of the featues are disclosed and may lead to better comparisons of contemporaneous sites located in similar ecozones. It is the hope of this student that further refinement and use of activity profiles, activity areas, and activity contours will enable a clarification of the aboriginal occupation of the Delmarva Peninsula.

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TABLE 1. FLAKE ARTIFACTS BY WORK, WEAR, AND FEATURE

	Unworked and Unworn	Unworked and Worn	Worked and Unworn	Worked and Worn
Feature 1	1444	138	19	34
Feature 2	856	126	6	25
Feature 3	657	26	3	7
Feature 5	718	115	4	2
Feature 6/13	353	36	0	0
Feature 7	90	28	0	0
Feature 9	689	62	2	16
Feature 10	60	17	0	1
Feature 11	166	14	0	3
Feature 12	48	7	0	0
Feature 15	2375	118	6	14
Feature 18	445	39	0	6
Feature 19	17	14	0	0
Feature 21	111	17	0	4
Feature 22	7	1	0	0
Feature 23	127	18	0	2
Feature 24	339	15	0	0
Feature 25	129	8	0	1
Feature 29	179	9	0	0
Feature 30	11	0	0	0
Feature 31	527	46	1	2
Feature 32	96	3	0	0
Feature 33	381	14	0	0
Feature 36	296	29	0	0
Feature 37	0	1	0	0
Totals	10,121	901	41	117
% of Total	90.5	8.1	.4	1

TABLE 2. USED AND DISCARDED FLAKE ARTIFACTS BY MATERIAL AND FEATURE

		Total Number	Jasper	Quartz	Chert	Argil-lite	Flint	Horn-fels	Sand-stone	Shale	Iron-stone	Mica
Feature 1	Discarded	1444	1274	77	74	9	10					
	Used	190	157	18	8	4	3					
Feature 2	Discarded	856	741	31	43	11	5	25				
	Used	159	147	3	6							
Feature 3	Discarded	657	565	83	9							
	Used	36	29	7								
Feature 5	Discarded	718	640	31	36	2	3	2	4			
	Used	121	107	3	10			1				
Feature 6/13	Discarded	353	342	5	5							
	Used	36	36									
Feature 7	Discarded	92	70	6	14	1	1					
	Used	28	23	1	4							
Feature 9	Discarded	689	538	40	25	5		8		73		
	Used	80	74	4	1			1				
Feature10	Discarded	60	47	5	4	2	1	1				
	Used	18	17	1								
Feature11	Discarded	166	129	29	3	3		1			1	
	Used	19	18		1							
Feature12	Discarded	48	46	1	1							
	Used	7	7									
Feature15	Discarded	2395	2196	105	56	2	9	6		1		
	Used	138	135	2	1							
Feature18	Discarded	445	402	31	8	1		3				
	Used	45	42		2	1						
Feature19	Discarded	17	12		1	2		2				
	Used	14	14									
Feature21	Discarded	111	90	7	5			2				1
	Used	21	20		1							
Feature22	Discarded	7	3	1	2						1	
	Used	1	1							1		
Feature23	Discarded	127	120	2	3	1	1					
	Used	20	19	1								

TABLE 2. (Continued)

		Total Number	Jasper	Quartz	Chert	Argil-lite	Flint	Horn-fels	Sand-stone	Shale	Iron-stone	Mica
Feature24	Discarded	339	285	28	12	4	3	5		2		
	Used	15	14	1								
Feature25	Discarded	129	111	8	6	1	1	2				
	Used	9	9									
Feature29	Discarded	179	168	4	2	1	4					
	Used	9	9									
Feature30	Discarded	11	4	6							1	
	Used											
Feature32	Discarded	96	84	9		1		2				
	Used	3	2	1								
Feature33	Discarded	381	325	29	22	4		1				
	Used	14	14									
Feature36	Discarded	296	267	12	9	8						
	Used	29	26		3							
Feature37	Discarded											
	Used	1	1									
Total	Discarded	10,123	8,943	580	354	59	39	61	4	79	3	1
	Used	1,060	965	42	42	6	3	2				
Total % of Total	Discard	90.516	79.969	5.186	3.165	.527	.348	.545	.035	.706	.026	.009
	Used	9.5	8.6	.4	.4	.05	.03	.02				

TABLE 3. SUMMARY OF GRINDSTONES AND HAMMERSTONES.

	Large Grindstones	Large Hammerstones	Medium Grindstones	Medium Hammerstones
Feature 1	3	3		
Feature 3	1			1
Feature 15			1	2
Feature 21				1
Feature 25			1	
Feature 29				1
Total	4	3	2	5

TABLE 4. SUMMARY OF CHIPPED ARTIFACTS BY MATERIAL AND FEATURE

		Total #	Jasper	Quartz	Chert	Agrillite	Horn-fels	Furruginous Quartzite	Flint
Feature 1	Bifacial	15	9	4	1	1			
	Unifacial	7	4	2	1				
Feature 2	Bifacial	21	9	4	5		3		
	Unifacial	4	2	1	1				
Feature 3	Bifacial	14	7	4	3				
	Unifacial	3	2		1				
Feature 5	Bifacial	10	5	2	1	1		1	
	Unifacial	9	8	1					
Feature 6	Bifacial	3	2	1					
6/13	Unifacial	4	3		1				
Feature 7	Bifacial	1	1						
	Unifacial	0							
Feature 9	Bifacial	8	4	3		1			
	Unifacial	2				1	1		
Feature 10	Bifacial	1		1					
	Unifacial	0							
Feature 11	Bifacial	1	1						
	Unifacial	1	1						
Feature 12	Bifacial	2	2						
	Unifacial	0							
Feature 15	Bifacial	9	5	1	1				
	Unifacial	3	1	1	1				
Feature 18	Bifacial	4	4						
	Unifacial	0							
Feature 24	Bifacial	5	4					1	
	Unifacial	1	1						
Feature 25	Bifacial	0							
	Unifacial	1	1						
Feature 29	Bifacial	3	2	1					
	Unifacial	0							
Feature 31	Bifacial	5	4	1					
	Unifacial	2		1	1				

TABLE 4. (Continued)

		Total #	Jasper	Quartz	Chert	Argillite	Hornfels	Ferruginous Quartzite	Flint
Feature 33	Bifacial	2	1	1					
	Unifacial	1	1						
Feature 35	Bifacial	1	1						
	Unifacial	0							
Feature 36	Bifacial	5	3	1				1	
	Unifacial	0							

TOTALS:

Bifacials	
Jasper	64
Quartz	24
Chert	11
Argillite	3
Hornfels	3
Flint	1
Ironstone	2
Total	108

Unifacials	
Jasper	24
Quartz	6
Chert	6
Argillite	1
Hornfels	1
Total	38

TABLE 5: SUMMARY OF PROJECTILE POINTS BY FEATURE

	Shape	Material	Length	Width	Thickness	Weight	Stem or base Thickness	Length Weight Ratio	Length/Neck Thickness Ratio
			mm	mm	mm	gr.	mm		
Feature 11	O	Q	37	28	10	7.3	7	2:1	4:1
	O	J	37	23	9	5	7.1	2:1	7:1
	S	A	38	25	7	6.8	6	2:1	6:1
Feature 15	T	J	26	26	5	3	4.8	9:1	6:1
	S	J	37	16	8	3.7	5	10:1	2:1
	D	J	43	33	15	16.2	1.6	8:1	4:1
Feature 31	T	J	26	20	5	3.7	4.6	7:1	6:1
	P	J	36	22		4.6	6.6	78:1	55:1

Legend:

A Argillite
D Diamond
J Jasper
O Ovate
P Pentagonal
Q Quartz
S Stemmed
T Triangular

TABLE 6. SUMMARY OF PROJECTILE POINT FRAGMENTS BY FEATURE

Feature #	Artifact #	Shape	Material	Length	Width	Thickness	Weight	Type
				mm	mm	mm	gr	
1	1	T	J	35	30	9	6	b
	2	T	J	26	40	8	10.2	b
	3	T	J	26	29	6	5.2	b
	4	T	J	26	29	6	5.3	b
	5	T	J	20	23	4	4.2	b
	6	T	J	10	28	5	3.9	b
	7	T	J	20	25	6	4.4	t
	8	R	J	31	23	7	5.3	b
	9	T	J	34	28	6	5.8	t
	10	T	J	29	33	10	6.7	b
2	1	T	J	27	34	5	3.9	b
	2	T	C	18	32	5	2.7	b
	3	T	J	28	22	6	2.2	t
	4	T	C	32	25	8	6	b
	5	T	J	16	17	4	.9	t
	6	T	J	19	22	5	1.5	t
	7	T	J	16	22	7	1.9	t
	8	T	C	13	14	3	.4	t
	9	R	J	26	31	6	4.4	b
3	1	R	J	25	18	5	2.4	b
	2	R	J	35	23	11	11	b
	3	R	J	19	29	7	4.2	b
	4	T	J	41	36	6	6.5	tm
	5	T	J	23	16	3	.8	b
	6	T	J	18	18	5	1.2	t
	7	T	J	20	15	5	1.4	t
	8	T	J	27	24	6	3.2	t
	9	T	J	41	22	6	4.6	t
	10	T	J	30	41	9	10.6	t
	11	T	C	16	18	10	3.1	t
	12	T	J	16	15	5	.8	t
	13	T	J	36	33	10	12.5	b

TABLE 6. (Continued)

Feature #	Artifact #	Shape	Material	Length	Width	Thickness	Weight	Type
5	1	T	C	37	21	7	5.1	b
	2	T	J	43	29	9	6.1	t
	3	T	J	40	23	7	5.3	t
	4	T	J	26	25	7	4.8	t
6/13	1	T	J	35	23	5	4	t
10	1	T	J	33	29	9	7.9	t
	2	T	J	30	31	6	5.3	b
	3	T	J	17	28	5	3	b
11	1	T	J	22	18	5	1.8	t
	2	S	Q	15	16	5	1.2	b
	3	T	J	19	29	6	3.5	b
15	1	T	J	20	27	6	3.1	t
	2	T	J	19	20	5	1.5	t
	3	T	J	19	22	5	1.5	t
	4	T	J	9	13	4	.5	t
	5	T	C	14	20	7	2	t
	6	T	C	17	16	4	1.2	t
	7	T	Q	29	24	12	7	t
	8	T	J	14	8	5	.3	b
24	1	T	J	28	22	5	2.4	t
	2	T	J	27	24	7	4.1	t
25	1	T	F	24	28	7	4.7	b
31	1	T	J	29	20	4	3.3	b
	2	T	C	21	23	6	3.5	b
	3	R	C	18	12	6	1.3	b
33	1	T	J	20	17	4	1.1	t
	2	T	J	26	27	8	3.6	t
	3	T	A	13	18	6	1.5	t
	4	T	Q	24	23	8	3.6	t

TABLE 6. (Continued)

Feature #	Artifact #	Shape	Material	Length	Width	Thickness	Weight	Type
33	5	S	A	33	20	8	4.7	b
36	1	T	J	35	21	6	4.1	t
	2	T	J	32	27	8	6.1	t
	3	T	Q	33	35	18	21.2	t

LEGEND:

A	Argillite
C	Chert
D	Diamond
F	Flint
J.	Jasper
O	Ovate
P	Pentagonal
Q	Quartz
R	Rectangular (tip and base missing)
S	Stemmed
T	Triangular
b	Basal
t	Tip
tm	Tip Missing

TABLE 7. SUMMARY OF FEATURE CHARACTERISTICS

	Size (cm.)	Walls	Bottom	Share	Type	Comments
Feature 1	222x218x116	St.	Pf.	O	III	
Feature 2	345x330x98	St.	Pf.	O	III	
Feature 3	332x260x110	St.	R.	O	III	
Feature 4	316x280x112	Con.	Pf.	O	III	
Feature 5	375x330x110	St.	Pf.	O	III	
Feature 6/13	280x170x70	St.	R.	O	II	
Feature 7	110x80	Gs.	R.	C	I	
Feature 8						Small depres-sion
Feature 9	400x230x130	Ss.	I.	O	II	Midden deposit
Feature 10	220x170x112	Ss.	R.	O.	II	
Feature 11	280x140x125	Ss.	R.	O	II	
Feature 12	180x182x40	Ss.	I.	C	II	
Feature 14	28x22x10	Gs.	B.	C	I	
Feature 15	320x260x100	St.	Pf.	O	III	
Feature 16						Non-aboriginal
Feature 17	60x38x21	Gs.	B.	I	I	
Feature 18	176x160x94	Ss.	F.	C	II	
Feature 19	110x90x50	Gs.	R.	C	I	
Feature 20	79x68x12	Gs.	R.	C	I	
Feature 21	154x120x70	St.	F.	O	II	
Feature 22	50x50x25	Ex.	R.	C	I	
Feature 23	176x152x106	Ex.	F	O	II	
Feature 24	238x180x100	Ss.	I.	O	II	
Feature 25	168x116x62	Ex.	R.	O	II	
Feature 26	196x34x66	Ss.	I.	O	II	
Feature 27	38x28x10	Gs.	R.	O	I	
Feature 28						Modern post hole
Feature 29	36x24x8	Gs.	R.	O	I	
Feature 30	100X90x58	Ss.	R.	O	I	
Feature 31	164x140x61	Ss.	F.	I.	II	
Feature 32	170x130x68	Ss.	F.	O	II	
Feature 33	240x156x74	Ss.	F.	O	II	
Feature 34	196x110x38	Gs.	R.	O	II	
Feature 35	168x132x64	Ss.	F.	O	II	
Feature 36	102x74x36	Gs.	R.	O	II	
Feature 37	105x77x42	Gs.	R.	O	II	

LEGEND:

St.	Straight	R	Rounded
Con.	Concave	I	Irregular
Gs.	Gentle Slope	B	Bowl-like
Ss.	Steep Slope	F	Flat
Ex	Excurvated	O	Oval
Pf.	Prepared floor	C	Circular

TABLE 8. SUMMARY OF ARTIFACTUAL MATERIAL BY FEATURE

	Charcoal	Shell	Bone	Lithics	Ceramics	Burials	Floral
Feature 1	X	X	X	X	X		
Feature 2		X	X	X	X		
Feature 3	X	vsm*	X	X	X		
Feature 5			X	X	X		nuts
Feature 6/13			X	X	X		
Feature 7			X	X	X	2 dogs	
Feature 8				X	X		
Feature 9			X	X	X		
Feature 10				X	X		
Feature 11				X	X		
Feature 12		X	X	X	X		
Feature 15		X	X	X	X		
Feature 17						1 dog	
Feature 18				X	X	1 human	
Feature 19			X	X	vsm*		
Feature 22	X			X	X		
Feature 23		X	X	X			
Feature 24	X						
Feature 25		X	X	X	X		
Feature 27	pfp**						
Feature 31		X					
Feature 32					X		
Feature 34		X					
Feature 35						1 human	
Feature 36		X		X	X		
Feature 37				X		uh***	

*vsm - very small amount
**pfp - possible fire pit
***uh - undetermined number of humans