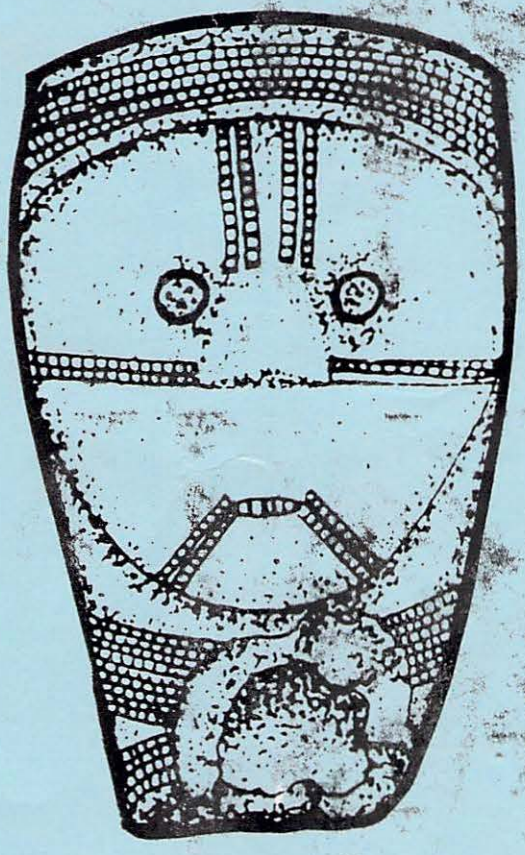
Stewart

MIDDLE ATLANTIC ARCHAEOLOGICAL CONFERENCE 1989

PROGRAM AND ABSTRACTS



Rehobeth Beach, Delaware
March 31 to April 2, 1989

MIDDLE ATLANTIC ARCHAEOLOGICAL CONFERENCE
Rehoboth Beach, Delaware
March 31 - April 2, 1989

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Special Thanks: Susan D. Hanna, Archaeologist, Historic St. Mary's City, for Program Preparation and Registration.

Cover Illustration: A circa 1645 clay tobacco pipe found at Pope's Fort in St. Mary's City, Maryland.

1989 MIDDLE ATLANTIC ARCHAEOLOGICAL CONFERENCE PROGRAM

Friday, 31 March 1989

The Middle Woodland To Late Woodland Transition in the Middle Atlantic

Jay F. Custer, University of Delaware, Organizer and Chairperson

1:00 - 1:10	Introduction -- *Jay F. Custer (University of Delaware)*
1:10 - 1:35	MIDDLE WOODLAND TYPOLOGY AND CHRONOLOGY IN THE LOWER JAMES RIVER VALLEY, VIRGINIA -- *Douglas C. McLearen, and L. Daniel Mouer (Virginia Commonwealth University)*
1:35 - 2:00	MOCKLEY DISTRIBUTION IN THE INTERIOR: AN EXCEPTION TO OYSTER DETERMINISM -- *Michael Johnson (Fairfax County)*
2:00 - 2:25	EVIDENCE FOR CULTURAL CHANGE IN THE LATER MIDDLE WOODLAND PERIOD OF THE LOWER CHESAPEAKE BAY -- *Paul Green (U.S. Army)*
2:25 - 2:50	THE MIDDLE TO LATE WOODLAND TRANSITION IN MARYLAND -- *Dennis Curry and Maureen Kavanagh (Maryland Geological Survey, Division of Archaeology)*
2:50 - 3:05	Break
3:05 - 3:30	THE MIDDLE WOODLAND TO LATE WOODLAND TRANSITION IN THE UPPER DELAWARE VALLEY -- *Ben Fischler and Jean French (National Park Service)*
3:30 - 3:55	THE MIDDLE TO LATE WOODLAND TRANSITION IN THE MIDDLE DELAWARE VALLEY -- *R. Michael Stewart (Louis Berger and Associates, Inc.)*
3:55 - 4:20	THE WOODLAND I - WOODLAND II TRANSITION IN THE DELMARVA PENINSULA AND SOUTHEAST PENNSYLVANIA -- *Jay F. Custer (University of Delaware)*
4:20 - 7:30	Dinner

Topics in the Middle/Late Woodland Transition: A Discussion Session

7:30 - 7:45	Introduction -- *Jay F. Custer (University of Delaware)*
7:45 - 8:30	REGIONAL INTERACTION: CERAMICS AND PROJECTILE POINTS -- *Jack Cresson and Cara Wise (Delaware Division of Parks and Recreation)*
8:30 - 9:15	SUBSISTENCE AND SETTLEMENT -- *R. Michael Stewart (Louis Berger and Associates, Inc.)*
9:15 - 10:00	POPULATION MOVEMENTS AND MIGRATIONS -- *Kurt Kalb (New Jersey Department of Transporation)*

Saturday, 1 April 1989

Current Prehistoric Research in the Middle Atlantic Region

Laurie Cameron Steponaitis, University of North Carolina, Chairperson

8:00 - 8:20	ENVIRONMENTAL SITE PREDICTORS AND PREHISTORIC SETTLEMENT SYSTEMS IN THE CENTRAL PIEDMONT OF VIRGINIA – *J. Sanderson Stevens (John Milner Associates)*
8:20 - 8:40	ANALYSIS AND INTERPRETATION OF LITHIC REDUCTION STRATEGIES AND SITE FUNCTION: A METHODOLOGICAL APPROACH – *Randolph K. Taylor (EBASCO Services) and Pamela S. Stephenson (Office of New Jersey Heritage)*
8:40 - 9:00	ARCHAIC AND PALEOINDIAN OCCUPATIONS AT THE HIGGINS SITE – *Carol Ebright (Division of Archaeology, Maryland Geological Survey)*
9:00 - 9:20	POSSIBLE EVIDENCE FOR INTER-GROUP COMPETITION IN THE NEW JERSEY LATE ARCHAIC – *John Cavallo (Rutgers University)*
9:20 - 9:40	INVESTIGATIONS AT A LACKAWAXEN GENERALIZED HUNTING SETTLEMENT ON THE MIDDLE DELAWARE RIVER DRAINAGE – *Ted M. Payne (MAAR Associates, Inc.)*
9:40 - 10:00	Coffee Break
10:00 - 10:20	WHAT DO WE DO WITH THE REST? THE ANALYSIS OF "NON-DIAGNOSTIC" ARTIFACTS FROM A LATE ARCHAIC SITE IN COLLEGE PARK, MARYLAND – *Joseph W. Hopkins, III and Katherine Dinnel (Greenhorne & O'Mara, Inc.)*
10:20 - 10:40	FORTY MILES TO LEESBURG: THE MEANDERS OF MODERN HIGHWAY PLANNING THROUGH PREHISTORIC SETTLEMENT PATTERNS – *John H. Haynes, Jr. (WAPORA, Inc.)*
10:40 - 11:00	TIMES OF CHANGE: NEW DATA FOR THE SOUTHERN MARYLAND PREHISTORIC CULTURAL SEQUENCE – *Stuart Reeve (Jefferson Patterson Park and Museum)*
11:00 - 11:20	SHIFTING SANDS: AEOLIAN SITE BURIAL IN SOUTHERN DELAWARE – *Cara L. Wise, Cherie Clark and Meril Dunn (Delaware Division of Parks and Recreation)*
11:20 - 11:40	ANALYSIS OF CORDAGE IMPRESSIONS ON LATE WOODLAND CERAMICS FROM THE PATAWOMEKE SITE AND THREE MONTGOMERY COMPLEX SITES FROM THE POTOMAC RIVER PIEDMONT OR A NEW TWIST TO AN OLD TALE – *William C. Johnson (University of Pittsburg)*
11:40 - 12:00	PITS, POTS, FLORA, AND FAUNA: THE SEASONALITY OF OCCUPATION AND ABANDONMENT OF A LATE WOODLAND PERIOD VILLAGE SITE ON THE UPPER JAMES RIVER, VIRGINIA – *Thomas R. Whyte (James Madison University)*
12:00 - 1:30	Lunch

Saturday, 1 April 1989

Current Historic Sites Research in the Middle Atlantic

Julia King, Jefferson Patterson Park and Museum, Chairperson

1:30 - 1:50	ARCHAEOLOGICAL PRESERVATION OF THE URBAN WATERFRONT: AN EXAMPLE FROM WILMINGTON, DELAWARE -- *Francine Weiss Bromberg (Engineering Science, Inc.)*
1:50 - 2:10	CHASES WHARF: EXCAVATIONS OF A MERCHANT'S HOUSEHOLD IN EARLY 19TH CENTURY BALTIMORE -- *Ethel R. Eaton (Maryland Historical Trust)*
2:10 - 2:30	THE WILLIAM DICKSON STOREHOUSE AT CHRISTIANA BRIDGE: AN EXAMPLE OF "SUPPLY SIDE" ARCHAEOLOGY -- *Wade P. Catts (University of Delaware)*
2:30 - 2:50	AN ARCHAEOLOGICAL/ARCHITECTURAL STUDY OF 17TH THROUGH 20TH CENTURY PLANTATIONS AND FARMSTEADS IN BURLINGTON COUNTY, NEW JERSEY -- *Mary Anna Ralph and Ted M. Payne (MAAR Associates, Inc.)*
2:50 - 3:10	LEGISLATIVE TAKINGS -- HISTORIC PRESERVATION BY CONGRESSIONAL FIAT: THE MANASSAS EXPERIENCE -- *Jonathan A. Gerlach (Flinn & Beagan)*
3:10 - 3:30	Coffee Break
3:30 - 3:50	FIELD METHODS FOR THE RETRIEVAL OF EARLY GARDEN LANDSCAPES: MORVEN, PRINCETON NEW JERSEY--*Karen E. Bescherer, Conrad M. Goodwin, Judson M. Kratzer and Anne E. Yentsch (Historic Morven)*
3:50 - 4:10	THE REBEL AND THE RENAISSANCE: NATHANIEL BACON AT CURLES PLANTATION -- *L. Daniel Mouer (Virginia Commonwealth University)*
4:10 - 4:30	GOING FOR THE IDEOLOGY: CHAPEL SITE ARCHAEOLOGY IN ST. MARY'S CITY, MARYLAND -- *Henry M. Miller and Timothy B. Riordan (Historic St. Mary's City)*
4:30 - 4:50	EXCAVATIONS AT A 17TH CENTURY TOBACCO PLANTATION IN CALVERT COUNTY, MARYLAND -- *Alain C. Outlaw and Meta Janowitz (Louis Berger and Associates, Inc.)*
4:50 - 5:10	LITTLE MARSH CREEK: A PRELIMINARY REPORT -- *Larry Moore (Fairfax County)*
5:10 - 8:00	Dinner
8:00- 9:30	Annual Business Meeting. The Conference Room.
9:30 -	Reception in the Hospitality Suite

Sunday, 2 April 1989

(Note: Change to Daylight Savings Time Today, Move Watches One Hour Ahead)

Applications of the Biological Sciences in Middle Atlantic Archaeology

Joan Chase and Elizabeth Myler, American University, Chairpersons

9:30 - 9:35	Opening Remarks -- *Joan Chase and Elizabeth Myler, American University*
9:35 - 9:55	SIGNS OF STRESS IN PREHISTORIC POPULATIONS OF THE POTOMAC VALLEY -- *Joan W. Chase (American University)*
9:55 - 10:15	PALEONENVIRONMENTS AND PREHISTORIC ADAPTATIONS IN CENTRAL DELAWARE: MULTI-DISCIPLINARY RESEARCH IN ROUTE 13 CORRIDOR -- *Jay F.Custer (University of Delaware), Grace Brush (Johns Hopkins University), James Pizzuto and Elizabeth Whallon (University of Delaware), Robin Webb and Paige Newby (Brown University) and Kevin Cunningham (Delaware Department of Transportation)*
10:15 - 10:35	EXCAVATION AND SKELETAL ANALYSIS AT THE CARROLL TOMB, ST. ANNE'S CHURCH YARD, ANNAPOLIS, MARYLAND -- *Richard J. Dent (American University)*
10:35 - 11:00	Coffee Break
11:00 - 11:20	INFORMATION PRIVY TO A DOCTOR: THE FAUNAL ANALYSIS OF A THIRD QUARTER NINETEENTH CENTURY PRIVY IN ANNAPOLIS, MARYLAND -- *Justin S.E. Lev-Tov (University of Maryland)*
11:20 - 11:40	WHAT CAN BE SAID FROM THE CHARCOAL REMAINS? -- *Lucinda McWeeney (Yale University)*
11:40 - 12:00	ETHNOBOTANICAL ANALYSIS: CURRENT METHODS AND THEIR APPLICATIONS AT SMITHFIELD BEACH -- *Jean French (National Park Service)*

ABSTRACTS OF PAPERS

Bescherer, Karen E., Conrad M. Goodwin, Judson M. Kratzer and Anne E. Yentsch (Historic Morven)

FIELD METHODS FOR THE RETRIEVAL OF EARLY GARDEN LANDSCAPES: MORVEN, PRINCETON NEW JERSEY

The recovery of past garden landscapes is a primary element in the restoration and interpretation of Morven, one of New Jersey's most historic houses. This property, which is administered by the New Jersey State Museum under the auspices of the New Jersey Department of State, was home to Richard Stockton, a signer of the Declaration of Independence, and other illustrious Stockton family members, as well as to several other influential families as the site of the former Governor's Mansion. Since the 1750s, each generation has left its particular cultural imprint on the garden landscape in both a physical and symbolic sense. It is, in fact, the interaction with and the manipulation of the physical realm which provides one of the most dynamic aspects of Morven's past. The combination of areal excavation techniques, mapping and the use of Above Sea Level measurements, and an analysis of the material composition of garden features, including a botanical study, has been used to define three different episodes of garden evolution at Morven: an 18th-century ornamental garden, a mid 19th- century pleasure garden, and a turn-of-the-century Colonial Revival garden.

Bromberg, Francine Weiss (Engineering Science, Inc.)

ARCHAEOLOGICAL PRESERVATION OF THE URBAN WATERFRONT: AN EXAMPLE FROM WILMINGTON, DELAWARE

America's maritime heritage is inextricably linked to its history. Indeed, European exploration and colonization of the nation depended on the values and technology inherent in a maritime culture. With increasing waterfront development in our cities, the threats to our maritime heritage have increased over the past few decades. One approach to minimizing the loss of this heritage can be seen in an archaeological preservation plan for Wilmington, Delaware. Funded by the National Park Service as part of a general archaeological management plan for the core of the city, a block-by-block analysis of Wilmington's waterfront was undertaken. Through an examination of a series of maps and historic documents, the analysis focused on a determination of the potential for the recovery of archaeological resources on each block. The potential resources were discussed with regard to general themes and chronological periods in Wilmington's history and prehistory. Archaeological investigation of Wilmington's waterfront is likely to yield evidence relating to traditional maritime features and activities, such as wharves, ship-building and trade. In addition, the area has the potential to provide insight into prehistoric occupation, into changing residential patterns in the city, and into some of Wilmington's most important industrial concerns.

Organized according to city block number, this archaeological management plan serves as both a research tool and a preservation tool. It pinpoints those areas of the waterfront which have the potential to provide insight into various aspects of Wilmington's history as the city changed from a possible locus of prehistoric occupation to a colonial farming community and then to a merchant milling center, a manufacturing city, and finally, a corporate center. Researchers can use this information to focus on those blocks which best serve their research goals. Planners for the city can immediately tell if an area slated for development has the potential to yield significant archaeological resources. If necessary, the appropriate mitigation procedures can be instituted. The plan thus helps to minimize the loss of information relating to the maritime heritage so important to the growth and development of America.

Catts, Wade P. (University of Delaware)
THE WILLIAM DICKSON STOREHOUSE AT CHRISTIANA BRIDGE: AN EXAMPLE OF "SUPPLY SIDE" ARCHAEOLOGY

In recent years, historical archaeologists have been addressing the issues of consumerism and consumer choices as these are reflected in the archaeological record. The majority of these studies have focused on archaeological data collected from domestic sites or occupations. Sites of this type provide a view of what material goods were utilized or consumed by domestic households; ie. the "demand side" of consumerism. Generally lacking from these investigations, however, are the analyses of commercial sites, such as stores and storehouses, where glimpses of the broad range of material goods that were actually available to domestic households can be obtained. The excavation of the late 18th-to early 19th-century William Dickson Storehouse at Christiana Bridge, Delaware, has provided an opportunity to examine the "supply side" of the supply and demand economic equation. Contemporary storekeepers' inventories and account books are used to compare the archaeological assemblage with the historic record, and with other artifact assemblages from domestic sites, thus providing a view of early 19th-century consumerism in the Middle Atlantic.

Cavallo, John A. (Rutgers University)
POSSIBLE EVIDENCE FOR INTER-GROUP COMPETITION IN THE NEW JERSEY LATE ARCHAIC

Large Late Archaic residential sites in the central interior of the New Jersey Coastal Plain (circa 4300 to 3900 B.P.) have yielded enormous quantities of Savannah River-like points, shaft-smoothers, atlatl weights and heavy woodworking tools together with numerous human cremation burials replete with grave goods. Small Koens-Crispin procurement and processing sites are also ubiquitous in this area. Contemporaneous sites containing Bare Island and Poplar Island-like points are present, but none in these locations are comparable in extent and content to the Koens-Crispin settlements. Dense clusters of Koens-Crispin sites are situated adjacent to vast tracts of hardwood and Atlantic white cedar swamps. During the winter, the sheltered interiors of the cedar swamps prevent freezing of waterways and ponds and serve as refuges in which the cedars, edible terrestrial and aquatic plants and berries provided food for a host of large mammals and resident and migratory fowl. These unique habitats were, in fact, the most reliable and productive settings in the Coastal Plain during the months of lowest overall environmental productivity and were intensively exploited by the Koens-Crispin groups.

The Savannah River-like points, knobbed adzes and non-local raw materials from several Koens-Crispin sites raise the possibility that their human occupants were intrusive to the area from more southern portions of the Middle Atlantic region. The several thousand points, hundreds of shaft-smoothers, atlatl weights and heavy woodworking tools are viewed as evidence of intensive weapons production resulting from competitive interactions with indigenous Late Archaic groups for control of these productive resource corrals. The numerous human cremation burials are explained as the residual effects of increased social tensions effected by these competitive interactions.

Chase, Joan W. (American University)
SIGNS OF STRESS IN PREHISTORIC POPULATIONS OF THE POTOMAC VALLEY

The transition from less intensive to more intensive agriculture was examined in skeletal populations excavated from sites in the Potomac Piedmont and Coastal Plain. Sites in the Piedmont represent small villages located on naturally fertile silt loam where food-growing was practiced along with hunting and gathering. The same pattern is true of the Coastal Plain except that the villages were larger, more centralized, crowded and palisaded.

There is evidence that the transition from hunting and gathering to sedentism and agriculture was accompanied by a deterioration in health status. This study attempts to determine whether or not further signs of stress were apparent as agriculture intensified.

The results show that there was no sign of increased nutritional stress as the populations changed from less intensive to more intensive agriculture. Indeed, the Coastal Plain population seemed to fare somewhat better than did the Piedmont group. It appears that a natural environmental resource may offset the deleterious effects of a high carbohydrate diet.

Curry, Dennis and Maureen Kavanagh (Division of Archaeology, Maryland Geological Survey)

THE MIDDLE TO LATE WOODLAND TRANSITION IN MARYLAND

The Middle to Late Woodland transition in Maryland is examined geographically, from the Appalachians to the Chesapeake Bay. In far western Maryland, the Middle Woodland--though poorly known--is marked by mixed-temper ceramics with a probable Ohio Valley influence. The Late Woodland is marked by limestone- and shell-tempered wares, and appears directly related to expansion of groups (Monongahela?) in southwestern Pennsylvania. The Great Valley is also poorly known, but may represent a buffer area between coastal and western groups. In the Monocacy Valley, there appears to be no resident Middle Woodland population. Coastal Mockley ceramics are restricted to rockshelter sites, with open sites consisting solely of lithics. Clearly, the Middle Woodland in the Monocacy is related almost exclusively to rhyolite exploitation by Coastal groups. This is followed by an expansion of northern (Owasco-related?) groups, and is manifested in Late Woodland Shepard ware. The Piedmont appears to have been virtually uninhabited throughout the Middle and Late Woodland periods, being represented in the archaeological record by small, scattered hunting and/or campsites. On the Western Shore of the Coastal Plain, the Middle Woodland is represented by the Mockley-using Selby Bay focus, with an apparent concentration in the Patuxent drainage. The population appears fairly sedentary, and in situ development to Late Woodland Townsend groups is likely.

Custer, Jay F. (University of Delaware)

THE WOODLAND I - WOODLAND II TRANSITION IN THE DELMARVA PENINSULA AND SOUTHEAST PENNSYLVANIA

The transition from the Woodland I to the Woodland II period (ca. AD 800 - 1000) is one of the most pronounced cultural changes seen during the prehistoric occupation of the Delmarva Peninsula and southeastern Pennsylvania. Cultural changes manifested in the local archaeological record include changes in site distributions and settlement patterns, the abandonment of some sections of certain drainage basins, the demise of regional exchange systems, the demise of local complex socio-political systems, the appearance of new and diverse ceramic technologies and ceramic design systems, the appearance of corn agriculture in some areas, and the appearance of certain special exotic artifact forms and mortuary ceremonialism traits which are virtually identical to similarly dated archaeological complexes of the Eastern Great Lakes, central Pennsylvania, and western Virginia. The Woodland I/Woodland II cultural discontinuity is probably the result of a migration of Algonkian-speaking groups into the area.

Custer, Jay F. (University of Delaware), Grace Brush (Johns Hopkins University), James Pizzuto and Elizabeth Whallon (University of Delaware), Robin Webb and Paige Newby (Brown University) and Kevin Cunningham (Delaware Department of Transportation)

PALEONENVIRONMENTS AND PREHISTORIC ADAPTATIONS IN CENTRAL DELAWARE: MULTI-DISCIPLINARY RESEARCH IN ROUTE 13 CORRIDOR

Phase I and II archaeological testing in the Route 13 Corridor in central Delaware included research by a multidisciplinary team of palynologists, geologists, archaeologists, and pedologists. The basic goal of the multidisciplinary research was to document changes in hydrology, vegetation, sea level rise, and regional land forms for the past 12,000 years and to correlate these changes with prehistoric settlement patterns and adaptations. Data from a variety of sources indicate that major environmental changes took place ca. 9000 B.P., 5000 B.P., 3500

B.P., and 1400 B.P. Dating and expression of these changes are somewhat variable across three watersheds. However, consistent changes are present in terms of forest composition, plant succession events, reductions and increases in numbers of plant taxa over time and through succession events, changes of proportions of wet and dry woody and herbaceous taxa, fluctuations in availability of wild rice (Zinzania), changes in sedimentation and pollen influx rates, changes in local water tables and ground water recharge of interior bay/ basin features, frequency of aeolian deposition and erosion, development of riverine marshes with sea level rise, changes in stream energy regimes, and prehistoric settlement patterns. Overall, the data indicate that the Holocene was a time of dramatic environmental change in the study area.

Dent, Richard J. (American University)
EXCAVATION AND SKELETAL ANALYSIS AT THE CARROLL TOMB, ST. ANNE'S CHURCH YARD, ANNAPOLIS, MARYLAND

This paper reports on the excavation of the Carroll Family Tomb in St. Anne's Church Yard, Annapolis, Maryland. The tomb, an altar tomb, was originally constructed in 1817 to contain the remains of Margaret Tilghman Carroll. During a recent restoration of the tomb, archaeological excavations were undertaken at the request of the family in an effort to locate missing prominent 18th century members of the Carroll family. Through the archaeological excavation of the tomb, five other individuals were excavated and their remains analyzed. Some of these individuals could be identified. Included in this group were a number of the missing members of the Carroll family. All remains were reinterred.

Eaton, Ethel R. (Maryland Historical Trust)
CHASES WHARF: EXCAVATIONS OF A MERCHANT'S HOUSEHOLD IN EARLY 19TH CENTURY BALTIMORE

This paper is concerned with the analysis of an archaeological assemblage recorded from an urban waterfront site. A locus of maritime shipping activities from the last quarter of the 18th century until the 20th, the site takes its name from the middle class merchant, Thorndick Chase, who lived on the property from shortly after its acquisition in 1798 until his death in 1838. His firm, T. Chase & Co., conducted its shipping operations from this base until the death of his son and successor, the younger Thorndick Chase, in 1866. The archaeological sample combined with documentary evidence provides the opportunity to study the relationship of a material cultural assemblage to occupational status. In addition, study of different discard patterns at the site permits the interpretation of the way space was allocated to domestic vs. commercial activities on an early 19th-century urban site.

Ebright, Carol (Division of Archaeology, Maryland Geological Survey)
ARCHAIC AND PALEOINDIAN OCCUPATIONS AT THE HIGGINS SITE

The Higgins site is a large intact prehistoric archaeological site situated on an "upland" in the Coastal Plain in Anne Arundel County, Maryland. Phase II and III excavations in 1987 and 1988 revealed extensive intact subplowzone deposits buried to depths of 70 cm below the base of the plowzone. Both alluvial and aeolian processes are thought to have contributed to the deep burial of cultural remains, with alluvial deposition being dominant.

Intact deposits include an isolated Early Woodland hearth, extensive Late Archaic Bare Island and Middle Archaic Otter Creek occupations, and smaller Early Archaic and Paleoindian occupations. The Paleoindian component represents the first intact occupation of this period known in Maryland. For the most part, occupations of different periods are horizontally separated. Intact vertical stratification is apparent only with reference to the Paleoindian component which is overlain by an intense Late Archaic occupation.

Fischler, Ben and Jean French (National Park Service)
THE MIDDLE WOODLAND TO LATE WOODLAND TRANSITION IN THE UPPER DELAWARE VALLEY

This paper will provide a review of information from excavated sites within the Upper Delaware Valley dating to the period AD 500 - AD 1100. The local cultural sequence as known from published sources will be discussed. New information from excavations at Smithfield Beach (36MR5) will be presented.

French, Jean (National Park Service)
ETHNOBOTANICAL ANALYSIS: CURRENT METHODS AND THEIR APPLICATIONS AT SMITHFIELD BEACH

Research questions requiring ethnobotanical (Paleoethnobotanical) data are currently recognized as significant in the Middle Atlantic area. Collection of matrix for recovery of food remains and the processing by flotation is widely done. Some aspects of methodology should be carefully evaluated in planning the project to make comparable results possible.

Smithfield Beach is a multi-component, Late Archaic through Late Woodland site along the Delaware River in Monroe County, Pennsylvania. This paper discusses some aspects of flotation taken from this site emphasizing methodology questions.

Gerlach, Jonathan A. (Flinn & Beagan)
LEGISLATIVE TAKINGS -- HISTORIC PRESERVATION BY CONGRESSIONAL FIAT: THE MANASSAS EXPERIENCE

The "third" battle of Manassas, waged by a commercial real estate development corporation against preservation advocates, bred public fervor nationwide which culminated in Federal ownership of the 542 acre William Center property. The acquisition was accomplished by Congress under a rarely used procedure known as a legislative taking. This paper discussed the legislative takings mechanism from a legal, economic and human perspective in the context of the Manassas experience. Viewed as an expedient device for acquisition of imminently endangered historic property, this paper argues for enactment of legislative takings statues at the state government level to supplement existing condemnation procedures.

Green, Paul (U.S. Army)
EVIDENCE FOR CULTURAL CHANGE IN THE LATER MIDDLE WOODLAND PERIOD OF THE LOWER CHESAPEAKE BAY

We examine the evidence from settlements and other sites, ceramics, and subsistence from ca. A.D. 700-900 against the paleoenvironmental record to develop alternative models of cultural development in the lower Chesapeake. The Middle Woodland Mockley phase has fewer, larger settlements located in ecotonal and culturally strategic (i.e. for trade, defense) places. Its "classic" subsistence pattern shows broad spectrum reliance on game, wild plants, fish, and shellfish. Townsend/Colington ceramics appear in the A.D. 700-900 time frame; this development is considered against the backdrop of climatic change, the appearance of plant domestication, and population change.

Haynes, John H. Jr. (WAPORA, Inc.)
FORTY MILES TO LEESBURG: THE MEANDERS OF MODERN HIGHWAY PLANNING THROUGH PREHISTORIC SETTLEMENT PATTERNS

WAPORA, Inc. has conducted Phase I and Phase II cultural resource investigations on 40 miles of proposed alignments in Loudoun County, Virginia. Extensive, but channeled into a limited corridor, the survey has resulted in insights into settlement distribution in two periods. At

one end of the corridor, extensive swamps created a rich environment for hunter-gathers who intensively utilized an area far from the primary rivers in the area, often assumed to be a focus for Late Archaic/Early Woodland Period settlements. Several broad areal cultural resource planning and clearance surveys in the Middle Atlantic region have produced close correlations with wetland areas, certain soil types, and prehistoric settlement. Two of the sites, excavated at the Phase II level, give indications of intensive occupation and extensive travel to or trade with other areas. The importance of the environmental correlates for the inhabitation of the sites and the diversity of non-local lithic materials recovered will be discussed. The evidence from this survey suggests that certain resource areas enjoyed a central position in settlement/mobility systems, even when distant from major rivers and estuaries.

Hopkins, Joseph W. III and Katherine Dinnel (Greenhorne & O'Mara, Inc.)
WHAT DO WE DO WITH THE REST? THE ANALYSIS OF "NON-DIAGNOSTIC" ARTIFACTS FROM A LATE ARCHAIC SITE IN COLLEGE PARK, MARYLAND

Frequently lithic analysis of material from Mid-Atlantic prehistoric sites focuses on retouched and shaped tools, especially projectile points. These pieces often serve as chronological indicators, and, because of their more extensive modification, invite functional interpretation. However, the majority of the material from any site consists of retouched flakes or flakes that show edge damage ("utilization" or minor retouch on one or more edges. The analysis of these less impressive kinds of artifacts may provide important information that has been neglected in the past.

Material from a small Late Archaic Site (18PR355) in College Park, Maryland, is examined using a provisional typology developed for the diagnostic and "non-diagnostic" pieces collected. The site included at least one core, and a number of flakes and tools made from flakes apparently struck off this core. The typology is compared to other typologies used on similar collections from the region, and recommendations are made for future research directions.

Johnson, Michael (Fairfax County)
MOCKLEY DISTRIBUTION IN THE INTERIOR: AN EXCEPTION TO OYSTER DETERMINISM

Fairfax County has been subjected to ten years of intensive archaeological survey which has resulted in the recording of over 1,000 Native American archaeological sites. For years only two ceramic-producing sites had been recorded for interior parts of the county, which is bordered on two sides by the Potomac River and on a third by the Occoquan River. Mockley sites are common, especially along the Tidal Potomac. Revising phase II techniques to include laboratory water screening of dry screen residues has resulted in a dramatic rise in the numbers of pottery producing sites, including Mockley phase sites. Of particular interest is the Karell site (44FX944) which was salvaged in 1985 after having been found and tested by Karell Archaeological Services. This presence of shell tempered Mockley net impressed ceramics on an interior, Piedmont site is noteworthy in expanding the potential range of variation in Mockley settlement systems. The relationship between Mockley ceramic producing sites and sites from this period that produce only lithics is also crucial to understanding the Mockley phase at the Potomac Fall Line.

Johnson, William C. (University of Pittsburg)
ANALYSIS OF CORDAGE IMPRESSIONS ON LATE WOODLAND CERAMICS FROM THE PATAWOMEKE SITE AND THREE MONTGOMERY COMPLEX SITES FROM THE POTOMAC RIVER PIEDMONT OR A NEW TWIST TO AN OLD TALE

Researchers have postulated that the Potomac Creek complex represents a late intrusion of Montgomery complex people into the Potomac River Coastal Plain. Since the mid-1970s, archaeologists have been utilizing cordage twist direction as it is preserved on aboriginal ceramics in the Middle and Upper Ohio River Valley both to delineate cultural areas and to measure

continuity or replacement through time. Cordage impressions preserved on Potomac Creek Cord Impressed ceramics from the Patawomeke site (44St2) and on Shepard Cord Marked pottery from three Montgomery complex sites in the Potomac River Piedmont, Winslow (18Mo9), Gore (18Mo20), and Frye (44Ld4), are examined to determine the preferred twist direction exhibited on each. Both wares display impressions of predominantly final Z twist cordage indicating that the Montgomery complex could represent the ancestral population for the Potomac Creek complex.

Lev-Tov, Justin S.E. (University of Maryland)

INFORMATION PRIVY TO A DOCTOR: THE FAUNAL ANALYSIS OF A THIRD QUARTER NINETEENTH CENTURY PRIVY IN ANNAPOLIS, MARYLAND

The faunal remains excavated from the third quarter nineteenth century privy at 193 Main Street in Annapolis, Maryland, are examined and compared to the faunal remains excavated from the late eighteenth century hypocaust and well at the Calvert House in Annapolis, Maryand. Evidence for the increased urbanization of Annapolis over the one hundred year difference between the sites is looked at through the increased participation in a market economy. The increased urbanization of Annapolis is shown by the differences in the forms in which meat was purchased from the market in the eighteenth and nineteenth centuries.

McLearen, Douglas C. and Daniel Mouer (Virginia Commonwealth University)

MIDDLE WOODLAND TYPOLOGY AND CHRONOLOGY IN THE LOWER JAMES RIVER VALLEY, VIRGINIA

Archaeological research in the last ten years has revealed a significant amount of variety in ceramic wares produced during the "late" Middle Woodland period (ca. A.D. 200-800/900) in the James River drainage of central Virginia. Evaluations of the local artifact sequences and their sociocultural implications are derived from data gathered mainly from the Fall Line and Inner Coastal Plain, but also rely on reevaluations of additional work, including many earlier studies, in the Outer Coastal and Inner Piedmont of the greater James River drainage system. This paper presents a proposed local ceramic sequence for the James River-drained Fall Line and Inner Coastal Plain, including: description, proposed temporal placement, and key sites of newly defined wares and type varieties; reevaluation of the temporal placement, range of variation, and research utility of previously established wares/types; regional distribution of both previously and newly defined wares/types; and implications of the ceramic variety for both localized and greater regional interaction spheres, local developments, and "intrusive" elements in the region. Associated projectile point sequences are also presented. Implications of these phenomena with respect to trends characteristic of the Late Woodland period are discussed. The transition to Late Woodland is discussed, gaps in the data are presented, and the associated questions such gaps generate are offered as future regional research avenues.

McWeeney, Lucinda (Yale University)

WHAT CAN BE SAID FROM THE CHARCOAL REMAINS?

Charcoal and wood ecofacts can provide site specific indicators for use in paleoenvironmental reconstruction. Current investigations of these materials from the Mid-Atlantic region are also providing clues to selection processes and how choices for fuel changed through time.

Miller, Henry M. and Timothy B. Riordan (Historic St. Mary's City)
GOING FOR THE IDEOLOGY: CHAPEL SITE ARCHAEOLOGY IN ST. MARY'S CITY, MARYLAND

In 1988, archaeologists at St. Mary's City began a multi-year project exploring the "Chapel Field", birthplace of the American Catholic church. The site was known to contain the remains of a number of important buildings including the "Great Brick Chapel" (1667-1704) and a priest's rectory, along with the town cemetery. Surface evidence also suggested some earlier occupation at the site. In this paper, the results of these investigations are reported. Excavators revealed a portion of the brick chapel foundations and tested the yards of the rectory. In addition, stratified random sampling of the site area was begun. These efforts detected numerous features, including several graves, and yielded artifacts which have significantly changed the dating of the priest's house. Perhaps the most important discovery was the presence of a number of early 17th-century structures, including the first Catholic Chapel in English America. Available evidence suggests that the Jesuits constructed a previously unsuspected mission complex at the site during the period 1634-1645. Architectural and artifactual data pertaining to this early occupation are presented.

Moore, Larry (Fairfax County)
LITTLE MARSH CREEK: A PRELIMINARY REPORT

The Little Marsh Creek site (44FX1471) is located on Mason Neck, formerly known as "Dogue Island," in southeastern Fairfax County, Virginia. Heritage Resources Office personnel excavated forty-nine one meter units in November of 1988 as part of a National Fish and Wildlife Service erosion control project. Diagnostic artifacts recovered indicate that the location has been used, probably sporadically, since the late Archaic period; present are Savannah River and side-notched points, soapstone bowl fragments, and some Mockley sherds. However, the majority of the diagnostics date to the Contact Period; included are approximately 900 Potomac Creek Plain sherds representing 7-10 vessels, 4 crudely made triangle points, and 3 Native American made gunflints. The Taux (or Dogue) Indians are known to have lived on Mason Neck during the first half of the 17th century and the Contact Period component is ascribed to them. Further, it seems that this later component represents a single occupation of short duration or the remains of a larger site, of unknown character, that has eroded into the Occoquan Bay.

Mouer, L. Daniel (Virginia Commonwealth University)
THE REBEL AND THE RENAISSANCE: NATHANIEL BACON AT CURLES PLANTATION

The 1987 and 1988 seasons at Curles Plantation included the partial excavation of Nathaniel Bacon's brick house. The house was constructed 1674-5, and was destroyed before the turn of the 18th century. A detailed inventory made in May of 1677 expands our knowledge of Curles at this time. The archaeology and inventory together depict Curles as an attempt to reconcile the values, worldview, and social aspirations of a gentleman of Renaissance England with the realities of frontier life and developing Chesapeake traditions. Architectural design, the functions of rooms and outbuildings, and artifacts from the ground and inventory all suggest a role for material culture in resolving cognative dissonance or "culture shock" problems for a newly-arrived immigrant.

Outlaw, Alain C. and Meta Janowitz (Louis Berger and Associates, Inc.)
EXCAVATIONS AT A 17TH CENTURY TOBACCO PLANTATION IN CALVERT COUNTY, MARYLAND

The results of data recovery at a seventeenth century Maryland site, located on the north shore of the Patuxent River, provide important new information on the character of c. 1650-1680 sites in the Middle Chesapeake. Conducted during the summer of 1988, the project

was funded by a developer, CRJ Associates, Inc., Camp Springs, Maryland, as part of a larger cultural resource study required by Calvert County in an area being cleared for condominiums. The fieldwork at the Compton Site included the systematic screening of plow zone soils as well as the excavation of subsurface features, thus allowing an assessment the employment of these methodologies for addressing research questions. Another contribution of the research lies in the evidence discovered in the artifact assemblage for the role of Dutch trade in the Region.

Payne, Ted M. (MAAR Associates, Inc.)
INVESTIGATIONS AT A LACKAWAXEN GENERALIZED HUNTING SETTLEMENT ON THE MIDDLE DELAWARE RIVER DRAINAGE

Data recovery investigations at the Worrell Site (28Bu252) in Burlington County, New Jersey recorded a Delaware Archaic complex settlement on the middle part of the Assiscunk Creek. The approximately seven acre Lackawaxen settlement area was situated adjoining wetland and woodland ecozones at the juncture of the creek and a tributary. The settlement was utilized for the purposes of faunal and floral food procurement and general settlement processes. The seasonality of the settlement has not been defined, but it appears to have been in use from summer through fall.

The integrity of the cultural material patterns was preserved, which permitted a study of the site's infrastructure and tool assemblage. In addition to foodways activities, fabrication, processing, and general utility settlement practices were maintained with little change over time. The manufacture of flaked and groundstone tools also occurred at the site. Included in the assemblage were sherds from a Marcey Creek vessel, which raised the question of ceramic use by this Late Archaic culture. Recent radiocarbon dates from Lackawaxen components in the region, as well as thermoluminescence analysis of Marcey Creek ceramics in Burlington County, indicate a possible contemporaneity.

Ralph, Mary Anna and Ted M. Payne (MAAR Associates, Inc.)
AN ARCHAEOLOGICAL/ARCHITECTURAL STUDY OF 17TH THROUGH 20TH CENTURY PLANTATIONS AND FARMSTEADS IN BURLINGTON COUNTY, NEW JERSEY

During the period of 1985-1988, a series of archaeological and architectural investigations were conducted for the Burlington County Solid Waste Management Facility by MAAR Associates, Inc. of Newark, Delaware. Results from this study have provided information about the area's history, development, land use practices, architectural expressions, and residents' lifeways. The research has been from a historical/developmental perspective of transportation/communication avenues, land use patterns, stylistic architectural development, and socioeconomic practices. The multidisciplinary approach of this study has resulted in a knowledgeable understanding of the personal practices of the inhabitants of the area.

Initially, a settlement plan clustered along navigable waterways, led to the first patent subdivision. These late 17th and early 18th century stream-side homesteads and forthcoming plantations reflected English and Quaker lifeways. With the introduction of the early inland road networks, in the mid-18th century, land division was refocused and roadside plantations and homesteads following Anglo-American social and economic practices were being established. The late 18th century and early 19th century witnessed the rebuilding or remodeling of the early plantation homestead residences. These new dwellings frequently reflected an increased economic and social status. However, inheritance practices of land subdivision among siblings, resulted in the break-up of many original homesteads.

Encroachment of urban and suburban development out of the City of Burlington and other cities in the early 20th century brought about increased land division. This continued urban drift resulted in the break-up of many of the remaining large farm tracts, and by the middle of the 20th century, an increasing number of residential plots and small garden farms were established along the rural roadways. The earlier land use patterns of the area were quickly vanishing. Fortunately, some archaeological and architectural record of the 300 year history of this area has been been preserved by this study.

Reeve, Stuart (Jefferson Patterson Park and Museum)
TIMES OF CHANGE: NEW DATA FOR THE SOUTHERN MARYLAND PREHISTORIC CULTURAL SEQUENCE

Recent excavations along the lower Patuxent River have yielded a wealth of new C14 dates and diagnostic artifact associations from Middle and Late Woodland period sites. These data are examined in a regional framework of population dynamics within lower river esturine and fluvial environments, and the breakdown of inter- and intra-drainage material flow within southern Maryland. Several periods of population instability are noted as possible intervals for ethnic migrations, or major shifts ins subsistence strategies.

Stevens, J. Sanderson (John Milner Associates)
ENVIRONMENTAL SITE PREDICTORS AND PREHISTORIC SETTLEMENT SYSTEMS IN THE CENTRAL PIEDMONT OF VIRGINIA

A Phase I survey of the Charlottesville Route 29 Bypass Study for the Virginia Department of Transportation resulted in the survey of over 60 miles of proposed corridor alignments and the discovery of 54 archaeological sites, 41 of which contained a prehistoric component. Site location and environmental variables were recorded for each site in an attempt to isolate and quantify key environmental variables which may be used as site predictors in the central Piedmont region of Virginia. Environmental variables recorded and analyzed during the present survey follow the work of Hantman, Klatka, and others, and include soil type, distance to water, elevation above water and landscape position. These variables were recorded from the Charlottesville study and tested to determine their validity as site predictors within the project area. Data from the Charlottesville survey were also analyzed by cultural affiliation, site size, and site type. The results of the present study were compared to data generated for Albemarle, Buckingham, and Fluvanna counties by Hantman, Klatka, and others. The results of the comparative study not only provide information on environmental variables as site predictors, but also permit a discussion of changing settlement patterns in the central Piedmont region of Virginia.

Stewart, R. Michael (Louis Berger and Associates, Inc.)
THE MIDDLE TO LATE WOODLAND TRANSITION IN THE MIDDLE DELAWARE VALLEY

The most visible difference between archaeological cultures on either side of what is considered to be the local division between the Middle and Late Woodland periods (ca AD 700-900) is a change in lowland aspects of settlement patterns. Large group settlements of the Middle Woodland period, oriented around portions of fresh water tidal marshes, shift to broad floodplain settings during the Late Woodland period. In part, this shift may reflect alterations of subsistence patterns involving an increased focus on the cultivation of domesticated crops, and a shift in fishing practices and the role of this food source in the aboriginal diet. Seasonal exploitation of anadromous fish runs was an essential component of Middle Woodland subsistence practices as reflected in the location of lowland sites and associated material culture and upland aspects of settlement systems, and related subsistence foci, remain remarkably conservative through both periods. Further, the geographic extent of settlement territories is similar for the Middle and Late Woodland periods.

Lithic technologies are comparable for both periods. Moderate change is seen in the decrease in the use of argillite for tool manufacturing and the relative lack of cache blades in Late Woodland assemblages. These changes can be indirectly linked to the shift in the importance of anadromous fish in subsistence practices. Ceramic technologies and typological variability remains high during both periods but may decrease slightly during Late Woodland times. Influences on ceramic design reflect contacts with groups from a broader portion of the middle Atlantic coast during the Middle Woodland rather than Late Woodland period. However, evidence of trade and exchange is low for both periods. This paper provides greater detail on the noted changes and similarities at the Middle to Late Woodland transition. Hypotheses dealing with explanations for these changes are also explored.

Taylor, Randolph K. (EBASCO Services) and Pamela S. Stephenson (Office of New Jersey Heritage)

ANALYSIS AND INTERPRETATION OF LITHIC REDUCTION STRATEGIES AND SITE FUNCTION: A METHODOLOGICAL APPROACH

Lithic artifact assemblages from two prehistoric sites recently investigated near Waterford, New York were analyzed to identify lithic reduction strategies. The analyses include; 1. a technological classification of debitage, with postulated reduction sequences and; 2. a comparison of the flake size distributions using analytical techniques borrowed from petrographic studies of sediments. Flake size distributions were analyzed using a standard logarithmic transformation of the size data based on the phi scale. Interpretation of the combined results suggest that the two sites are typologically different. Lithic reduction at one site (site 1) consisted of bifacial reduction of flakes and reflects an expedient use of small, well-round cobbles available from a glacial till outcrop located at the site. In contrast, reduction strategies at the second site (site 2) emphasized the production of unifacially worked flake-tools. Materials selected include silicified slate and tabular cherts that were probably obtained from primary outcrop sources. Functional differences are postulated for the two sites. Both sites appear to be short term occupation sites, however, reduction strategies suggest that processing activities were a major emphasis at site 2 where there was a focus on flake tool production and use. At site 1, the activities were focused on bifacial tool production and rejuvenation. The results of the analysis demonstrate the utility in combining two complimentary approaches to the analysis of debitage: technological classification of reduction sequence and quantitative analysis of flake size distribution. The combined approach increases the understanding of reduction strategies at sites where lithic materials are the primary artifact type.

Whyte, Thomas R. (James Madison University)

PITS, POTS, FLORA, AND FAUNA: THE SEASONALITY OF OCCUPATION AND ABANDONMENT OF A LATE WOODLAND PERIOD VILLAGE SITE ON THE UPPER JAMES RIVER, VIRGINIA

Bessemer (44BO26) is a Late Woodland period village site on the upper James River in Botetourt County, Virginia which contains a Dan River component dating to ca. A.D. 1200 to 1300, and a Page component dating to ca. A.D. 1300 to 1400. With reference to knowledge of the seasonal availability of fauna and flora represented among the recovered remains, it is argued that the site was inhabited from early spring through autumn. Furthermore, through the identification of nonlocal tempering materials in much of the pottery recovered, and with reference to ethnohistorical observations of the functions of subterranean pits, it is argued that the site was abandoned in winter for temporary encampment downriver, east of the Blue Ridge Mountains.

Wise, Cara L., Cherie Clark and Merll Dunn (Delaware Division of Parks and Recreation)

SHIFTING SANDS: AEOLIAN SITE BURIAL IN SOUTHERN DELAWARE

Over the last two years, the Delaware Division of Parks and Recreation has conducted an intensive level survey of state part and nature preserve lands along James Branch and its tributaries in southwestern Sussex County, Delaware. The areas surveyed were parcels of wooded upland adjacent to stream valleys. None of these areas had been cultivated in the past and cultural material was recovered from depths of up to 90 cm. We have identified a consistent pattern of vertical distribution of temporally diagnostic Woodland I and Woodland II projectile point and ceramic styles throughout the study area. This indicates the presence of a cumulative soil profile which is most likely to be the result of aeolian deposition. Our results support previous studies in northern and central Delaware which associate an increase in aeolian deposition with the climatic conditions of the middle Holocene.

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Middle Woodland II Typology and Chronology in the Lower James River Valley of Virginia

by

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DRAFT COPY ONLY

This copy represents the original draft version of a much shorter, condensed paper written for oral presentation at MAAC on March 31, 1989. Figures are not included in the present paper. This paper is a working draft copy of a paper still in progress. Please excuse any errors and omissions. Please do not quote without permission of the authors.

INTRODUCTION

Virginia Commonwealth University has been involved in prehistoric archaeological research in the Inner Coastal Plain and Outer Piedmont of the James River Valley, Virginia for twenty years. For the past decade, much of this effort has involved the refinement of a Late Archaic through Contact period sequence. While sizeable gaps remain in our knowledge of this period in the region, we now have the outlines of such a sequence, including a considerable body of data concerning settlement and subsistence systems, and inter- and intra-regional boundaries and interactions in the late Middle Woodland and early Late Woodland periods.

In the present paper we present brief descriptions of the diagnostics sequence for the Middle Woodland II and early Late Woodland and the major sites which have contributed to our knowledge of this sequence. Major trends and events notable in the sequence are discussed and an attempt is made to interpret these in the light of broader trends and sequences of the Middle Atlantic as a whole. Implications for such regionally significant phenomena as major population movements and the development of agricultural communities are suggested.

THE LOWER JAMES VALLEY

The James is one of the principal tributaries to the Chesapeake Bay. It has its headwaters in Bath and Highland counties in the Ridge and Valley Province, near the Virginia/West Virginia border. The river has a run of approximately 150 miles through the Piedmont. At Richmond, the river falls to sea level as it crosses the Fall Line. From this point, the river is tidal and has aggraded a broad, flat bed through a series of marine, estuarine and fluvial terraces. Below the confluence of the James and Appomattox Rivers, near present Hopewell, Virginia, the James is essentially a freshwater stream, with salinities increasing eastward. Technically, the Oligohaline lies just below the mouth of the Chickahominy, near Jamestown. The James estuary lies at the mouth of Chesapeake Bay.

For the purposes of this paper, the "Lower James" means that stretch of the river that runs through the Outer Piedmont, below the confluence of the Rivanna, and through the Coastal Plain to the Bay. For the purposes of discussion, we have divided the Lower James into four zones--the *Outer Piedmont, Inner Coastal Plain, Middle Coastal Plain, and Estuary* (Figure 1). The Outer Piedmont, from the Rivanna east to the Falls, is characterized by stretches of broad floodplains, and includes Buckingham, Powhatan, and Goochland Counties, along with the westernmost portions of Chesterfield and Henrico Counties and those areas of the City of Richmond which lie west of the Falls. The Inner Coastal Plain includes the Falls and the abrupt meander loops east and south of present-day Richmond to the Appomattox

Bay. This zone includes most of Chesterfield, Henrico and Richmond. The Middle Coastal Plain includes the salt - freshwater transition and covers the stretch of the James from City Point to Hog Island in Charles City, James City, Prince George and Surry Counties. The Estuary includes the broad harbors and poquosons of Tidewater, proper; i.e. Isle of Wight County and the cities of Norfolk, Portsmouth, Suffolk, Virginia Beach, Newport News, and Hampton.

The works of Binford (1964), Turner (1976) and Smith (1971) have each presented detailed inventories and discussions of native plant and animal resources of the Virginia Coastal Plain. The Piedmont contains, essentially, a subset of these same food resources, although unique auxiliary resources (jasper, rhyolite, soapstone, pucoon root, etc.) are to be found in the latter province. The James forms the boundary between northern and southern forest types in the Coastal Plain (Braun 1950). Large numbers of coastal plants and animals have their northernmost or southernmost distributions near the James in eastern Virginia. Likewise, the Fall Line forms a natural boundary between physiographic provinces which differ somewhat in edaphic, climatic and hydrologic regimes. The Fall Line divides two distinct cultural regions as well: the Piedmont and the Coastal Plain. The James differs from most major Middle Atlantic streams in that it drains large areas of both the Piedmont and Coastal Plain physiographic provinces and, because of this, some prehistoric periods exhibit evidence that each of these regions was further subdivided culturally.

The north-south boundary of major biotic communities is also reflected in the cultural evidence. Ethnohistorically, the James exhibited the mingling of cultures and cultural characteristics of both the greater Southeast, Middle Atlantic and the Northeast culture areas. For the prehistoric periods in question, this boundary or interaction zone phenomenon is also quite evident in the material culture.

THE SEQUENCE

Summary of Data Sources

The data for temporal associations of ceramics and other major diagnostic artifacts has been synthesized from stratigraphic information and other contextual data, detailed survey information, and C-14 dates. The sequence presented here is based on data from major sites in the above-named study area, but also relies to a lesser extent on review of data from the upper James and lower York River drainages. Two major projects which have contributed a great bulk of information, particularly with respect to newly named and dated ceramic types, are the James River Survey, conducted mainly in the Piedmont between 1978 and 1981, under a grant from the Virginia Research Center for Archaeology, and the Henrico Project, conducted for the County of

Henrico at various times between 1978 and 1984. While the James River Survey has provided data that pertains mainly although not exclusively to the Late Archaic through Early Woodland period and Late Woodland periods, the majority of the Henrico Project data is most relevant to the later part of the Middle Woodland period, ca. A.D. 200 - A.D. 800/900.

Sites excavated by VCU which have provided some of the C-14 dates and sequence data include the Pony Pasture and Alvis Sites on the south bank of the Chickahominy River (a major tributary of the James), and the Bailey Creek, Dorey Park, Ray Moon, and Aignor #3 and #9 Sites, on minor tributaries of the James in eastern Henrico County (Mouer 1986, Gleach 1986, McLearen 1987). All such sites lie within the Inner Coastal Plain. Relevant C-14 dates for the Outer Piedmont come from the Point of Fork Site in Fluvanna County (Mouer 1985b).

Additional VCU projects as well as previous surveys and excavations by others have been used for synthetic purposes, and are too numerous to list here. Of special note with respect to Piedmont early Late Woodland data is the Partridge Creek Site, excavated by Claudia Chang and Perry Turtolotte, partially under funding by Virginia Division of Historic Landmarks. This site is crucial as it lies just outside the study area boundaries and provides some comparative data from the Inner Piedmont James. Also of special note is the important Maycocks Site, located on the south bank of the James in the eastern part of the Inner Coastal Plain. This site was excavated by the College of William and Mary in 1970-71. A ceramic study focusing on Mockley ware by Opperman (1980) is of special importance as are the numerous collections from the general area of the site. Some of these artifacts are professionally curated, while others have been surface collected by local persons and are in private collections, some of which have been made available to us. This site, and similar sites in the same general area, have produced exotic materials and unusual ceramics, and may be major macroband encampments/settlements. An important site from the lower York River drainage is the stratified Croaker Landing Site, excavated by the Virginia Research Center for Archaeology and reported by Egloff et al (1988).

Time Frame

For purposes of clarity within this particular discussion, the terminology used here is generally consistent in with a scheme previously proposed by Gardner (1982: 53-86), although beginning and end dates have been modified to a minor extent.

Middle Woodland I, ca. 500 B.C. - A.D. 200

Middle Woodland II, ca. A.D. 200 - A.D. 800

Late Woodland I, ca. A.D. 800 - 1000

Late Woodland II, ca. A.D. 1000 - 1400

Late Woodland III, ca. A.D. 1400 +

As with any such scheme, the temporal brackets are somewhat arbitrary and are generally marked by beginning and end dates for ceramic wares and types; however, as is the case with most of the Middle Atlantic area, some differences in intensity of site use, distributions of artifacts, and inferred settlement types among the periods tend to support the divisions. This discussion deals mainly with Middle Woodland II through Late Woodland I, although references to other periods are briefly made for comparative purposes.

Ceramics

The local ceramic sequence includes both previously and newly established regional ceramic wares. Previously established Middle through Late Woodland I wares applicable to the the study area include: Pope's Creek (Holmes 1903: 153-155; Stephenson 1963: 92-96), Prince George (Evans 1955: 61-64), Mockley (Stephenson 1963: 105-109), Vincent (Coe 1964: 101-102), Townsend (Blaker 1952 1963: 14-22) and variants of Branchville (Binford 1964: 287-303) Wares. Newly established types include: Chesterfield, a late variant of Pope's Creek; Varina closely related to Chesterfield and Prince George; and the later Shockoe and Ettrick Wares. All of these wares are associated with radiocarbon dates and good contextual association, and all are relatively common either over the entire study area or, in some cases, only in either Coastal Plain or Piedmont areas. Accordingly, these are viewed as valid local types. Proposed types with some contextual associations but no C-14 dates at present are City Point and Bailey's Creek for the Coastal Plain and James River for the Piedmont.

The ceramic types and wares used here are, in some cases, further refinements of descriptions, definitions, and temporal placement of wares originally established by Evans (1955). These refinements build upon and augment previous revisions, such as those of Egloff and Potter (1982). For example, recent C-14 dates, contextual associations and analysis of basic vessel decorations and methods of manufacture have indicated that Prince George, once thought to be Early Woodland, and later revised to Middle Woodland I, is clearly contemporaneous with Mockley within at least the first few centuries of Middle Woodland II, even though it may have originated at a slightly earlier date.

Figures * and ** illustrate the wares and types for the study area by temporal placement and regional divisions.

Ceramic Descriptions

Pope's Creek Ware

The sand-tempered Pope's Creek Ware, originally described by Holmes (1903: 153-155) and later formally expanded on by Stephenson (1963: 92-96), is the primary diagnostic ceramic type for the earlier part of the Middle Woodland period in central Virginia. Although both net and cord-marked varieties are known, net-marking is far more common. Egloff and Potter (1982: 99) have provisionally dated Pope's Creek pottery to 500 B.C. to A.D. 200. This dating appears correct in light of regional C-14 dates. Dates of 545 B.C. +/- 95 (Gardner and McNett 1971: 43, 45) and 490+/- 95 B.C. (Handsman and McNett 1974: 4) obtained for Pope's Creek pottery from the Potomac drainage mark nicely the earlier end of the time range, while considerably later dates of A.D. 80 +/- 125 (Wright 1973: 24) and A.D. 190+/- 100 (McLearen 1986: 148) from the Potomac and James drainages respectively, fit the end date originally estimated for the ware.

Egloff and Potter (1982: 99) note that "southernmost variants" (those south of the Potomac drainage) are thinner and less sandy. This observation holds true to some extent in the study area, although a great range in thickness among vessels appears to be common. Within the central Virginia area, the temper is almost always very fine sand, fine sand, or less often, medium sand, with only rare large particles which always appear to be incidental inclusions rather than intentional tempering. Coarse and very coarse sand have not been noted as tempering agents within the study area. The ware is almost always weathered and friable. Although the interior scoring noted by Stephenson (1963: 95) appears on only a minority of Pope's Creek vessels in the study area, it is relatively abundant at some sites. The simple decoration reported by Stephenson (Ibid: 96) for a minority of the vessels has not been found on Pope's Creek ceramics in the James drainage.

Pope's Creek Ware is found throughout the entire study area, although it appears to be most common in the near-Fall Line areas of the Outer Piedmont as well as both the Inner and Middle Coastal Plains. While its southern limit of distribution is undetermined, it does not appear to extend far south of the James. Its northern distribution appears to extend at least as far as the Piedmont and Coastal Plain areas of Maryland, where it is common along the Potomac drainage. Older archaeological reports for most Virginia sites may have lumped Pope's Creek pottery under "Stony Creek" (Evans 1955: 69-73), a type which appears to represent every sand-tempered ware known from Early through Late Woodland times in Virginia's Coastal Plain, and in our opinion, needs considerable refinement.

Prince George Ware

Prince George Ware, defined by Clifford Evans (1955: 60-64), has a distinctive temper consisting of small to large water-worn pebbles, often but not always mixed with small amounts of coarse sand. Paste is generally very firm and hard rather than brittle or friable, and fine clays often appear to have been selected for its manufacture. The surfaces are usually oxidized on both the interior and exteriors of vessels. Surface treatment includes net-marked, net-roughened, cord-marked, and coarse fabric-impressed. Net roughened and cord-marked appear to be the most common types. Evans also notes plain surfaces, some of which appear to be smoothed over fabric impressions. Simple stamped and scraped surface treatments, also included in Evans original definition, were always noted in small quantities, particularly the stamped sherds. Egloff and potter do not consider these to be valid types within the series. In our opinion, the stamped category represents examples of much later and very distinct ceramics which are either derivative of - or more likely - unrelated to the ware as a whole.

Simple decorative motifs are known for net, cord, and fabric-marked examples. These consist of single or (less often) multiple rows of either finger or stick/cane punctations which sometimes pierce the body walls just below the rim, or more typically, leave rounded nubs protruding on the inside of the vessel. Vessels with scalloped, folded or flanged rims are not uncommon. Rare examples also have crude finger swipings running vertically or diagonally down the sides of the pot. All of these decorations are sometimes found on Mockley ceramics. The punctations below the rim are the most common Prince George decorations, however, and most vessels are undecorated.

Vessel forms are medium to large, elongated jars or globular pots with rounded bases. Recent evidence has also shown that relatively small, thin vessels also occur, although they appear to be far less common than the larger ones. These smaller vessels are identical in every other way to more typical

Prince George ceramics, except that body walls are thinner and the pebble temper is correspondingly smaller.

As Evans and Potter (1982: 103) note, Evans argued that Prince George was an Early Woodland type, although this is simply not supported by the raw data presented in his tabulations. In addition, the revision of Prince George as a temporal equivalent of Pope's Creek, ca. 500 B.C. - A.D. 200 (Ibid), also needs rethinking. While the full time range of Prince George is undetermined, more recent data indicates that Prince George pottery was used at least through the 4th century A.D., and overlaps well with the earlier half of the time range in which shell-tempered Mockley ware was also being used.

At Aignor #3 in eastern Henrico County, Prince George ceramics have been found in features which also contained Mockley ceramics in very small numbers. Dates were A.D. 250 +/- 60, A.D. 340 +/- 60, A.D. 450 +/- 60, and A.D. 480 +/- 60 (McLearen 1987: 48). In addition, two dates are known for features containing Prince George vessels without Mockley ceramics in association. A radiocarbon date of A.D. 335 +/-85 was associated with large fragments of a single Prince George Cord-marked vessel recovered from a pit feature at 44He470, the Alvis Site, on the upper Chickahominy River in Henrico County, Virginia (Gleach 1986: 94). The early A.D. placement fits well with the small amount of stratigraphic and other contextual evidence that exists. A similar date was received from a pit feature at 44He38, on Four Mile Creek, also in Henrico County, Virginia. While this last date's error factor was great, the pit contained large sections of a single Prince George net-marked vessel. This pit was a shallow hearth which clearly intruded into and originated at a higher level than a deeper pit containing Pope's Creek ceramics. Additional excavation level data from Aignor #3 also supports the temporal priority of Prince George over Pope's Creek. The most likely scenario is that Prince George was locally developed sometime during the last few centuries that Pope's Creek ceramics were still in existence and overlapped considerably with the time at which Mockley ceramics were being used.

Prince George appears to be a highly localized ceramic type, and surely has its origins in the Inner Coastal Plain of central Virginia, probably along those areas drained by the James and lower Appomattox Rivers where it is more common than anywhere else in the study area. Although highly concentrated in the latter area, its full distribution along the James includes the near Fall Line areas of the Piedmont, heavy concentration in the Inner Coastal Plain, the Middle Coastal Plain, and less commonly, in the estuary. It is also found to a lesser extent in more northerly areas of the York River drainage and (rarely) as far as the Northern Neck; however, as Egloff and Potter (1982: 103) note, it is always found less frequently with increasing distance north of the James. This ware does not appear to occur outside of Virginia.

Mockley Ware

The shell-tempered Mockley Ware, defined by Stephenson (1963) contains cord-marked, net-impressed, net-roughened and plain/smoothed surfaces. Although an unusual, very coarse-weave fabric-impressed variety has also been recognized (Opperman 1980), this surface treatment appears to be very rare and possibly localized in Virginia. The majority of the plain smoothed surfaces on vessels found in the study area appear to have first been either cord or net-marked and then subsequently smoothed over, although this is not always the case. Interior scraping, and less often, more formalized scoring, is occasionally noted, but this is very rare. Decoration is not common but when present consists of broad line incising along the body, as well as designs restricted to areas just below the rim. These latter consist of broad line chevrons, diamonds, cross hatches, parallel lines, and punctations. Also found on a few sites within the project area are vessels with Mockley paste which show more elaborately incised and punctated motifs, usually separated or zoned, on a single vessel. These unusually decorated vessels appear to be identical to some examples of Cross's (1956) "Abbott Zone Incised" and Pollack's (1968) Abbott Zone Punctate". Mockley rim treatment consists of rare nicking, finger impressions, scalloping, and less commonly, paddle edge impressions and punctations.

Mockley vessels are medium to large jars or bowls with rounded to subconical bases. Rare flat-bottomed jars which are otherwise identical to Mockley Cord and Net-marked have been found in the Virginia Beach area and dated to A.D. 260 +/- 60 (Egloff et al 1988: 30).

Mockley dates range from ca. A.D. 200-900. Although dates within the ca. A.D. 300-450 time range are the most common in the study area, the Maycocks Site contains a sequence which includes one 9th century date as well.

Egloff and Potter (1982: 103-104) note that Mockley is found throughout Coastal Plain Virginia, with the exception of four counties lying south of the James. None of these four counties front the Chesapeake Bay, and with one exception, all contain sizeable portions of areas drained by the Albemarle Sounds drainage basin. To our knowledge, Mockley has been found in only one instance in those portions of the study area which lie west of the Fall Line. In addition, its occurrence in the Coastal Plain generally becomes more rare with increasing distance toward the Fall Line. Within the near-Fall Line Inner Coastal Plain, it is found sporadically on the Chickahominy and James Rivers and their tributaries, but only appears to be abundant on sites where other Middle Woodland occupations, both earlier, and overlapping or contemporaneous, are also fairly well represented. Within the Inner Coastal Plain as a whole, it appears to drop off fairly quickly south of the James and the Appomatox Rivers, and especially, with increasing distance away from the immediate riverfront areas.

Outside of the study area, Mockley has a northern distribution range which extends throughout most of the Delmarva peninsula and well into eastern New Jersey. Its is also reported from the Maryland Piedmont (Stewart 1982: 75), although less frequently than in Coastal Plain contexts where it is relatively abundant. It may extend in rare instances as far as Coastal North Carolina.

Varina and Chesterfield Wares

Two newly defined non-shell tempered wares, "Varina" and "Chesterfield" (Mouer, Gleach and McLearen 1986: 127, 128, 145-148) , are associated with 3rd century radiocarbon dates in the greater James River drainage of the Inner Coastal Plain of central Virginia. While the full date range of these wares is undetermined, the available radiocarbon dates are significant in that they extend the date range of sand and crushed rock-tempered Coastal Plain Middle Woodland ceramics into the time at which Mockley ceramics were also being used, and often in the same areas.

Varina ware is tempered with finely crushed rock or, more typically, a combination of medium to very coarse sand and crushed rock, usually quartz. Occasionally, small pebbles and large, angular crushed pebble fragments are present as very minor inclusions, and temper size and distribution can vary significantly within a single vessel. Paste is generally hard and varies in texture according to amount and coarseness of temper and the type of clay used. Generally, however, fine ferruginuous clays appear to have been selected. Sherds are not friable, but may be somewhat brittle when derived from thinner vessels and then heavily weathered. There is a great range in variation among thickness of recovered sherds both among and within most sites where this ware has been found.

Varina Ware has net-impressed, and less frequently, net-roughened exterior surfaces, with either rough or smoothed/plain interiors lacking any further surface treatment. Similar ceramics with cord-marked surfaces have been found in Middle Woodland contexts, but these remain undated by absolute means. In addition, there is some confusion between these cord-marked ceramics and a somewhat similar although more refined type of coarse sand and crushed pebble-tempered ware in the Inner Coastal Plain. Most likely, typological lumping of two distinct wares may have obscured accurate assessments of their distributions as well as any temporal differences between them (see below under "Bailey Creek Ware").

Varina vessels appear to be deep, open bowls with rounded to subconical bases. Known rim treatments consist of rare scalloping or fluting, and on one vessel, an outwardly folded or flanged rim. The rim scalloping is identical to that which is occasionally found on Mockley and Prince George ceramics. To date, no further decoration has been found on Varina.

Although usually cruder in appearance, Varina ceramics are somewhat similar to Prince George ceramics. Small, weathered sherds of the two wares may sometimes be indistinguishable in the absence of mendable fragments of two or more different vessels. The main differences between the two wares are: 1) the diagnostic pebble temper in Prince George ware only appears occasionally in Varina ware and even then as only sparse and probably incidental inclusions; 2) Prince George ware includes plain, cord-marked and coarse fabric-marked surfaces as well as a high incidence of net-roughening in addition to simple net impressions, while Varina has net-impressed (and possibly cord-marked) surfaces and is rarely net-roughened; 3) the distinctive punctate decorations found on Prince George have not been found on Varina.

Varina Ware is most similar to the newly defined type Chesterfield and has been found in the same dated features. Dates for features containing both Varina and Chesterfield ceramics, with Varina as the dominant type are A.D. 275 +/- 85 from 44He470, the Alvis Site, on the upper Chickahominy River in Henrico County, Virginia (Gleach 1986: 177-178), and A.D. 230 +/- 100 from the Aignor #9 Site, on a low order tributary of the James River (McLearen 1987: 187). Both are located in the Inner Coastal Plain.

The most notable difference between Varina and Chesterfield is that the latter ware is always tempered with fine to very fine sand and in some cases, appears almost untempered. Chesterfield paste is generally very hard and relatively smooth. Interiors are sometimes floated, and interior scoring is known from a single vessel. Surface treatment includes both net impressions and cord-marking. Surfaces are thoroughly oxidized, and are generally deep orange to orange-tan in contrast to the more variable colors on Varina vessels. Chesterfield vessels are medium-sized to large, deep open bowls with subconical bases and thin to medium vessel walls. Although nicked rims similar to those found occasionally on Mockley vessels are known, no other decorative techniques have been reported.

A date of A.D. 270 +/-70 was obtained for a feature containing Chesterfield cord-marked ceramics, with no other associated diagnostic artifacts. The feature was located on the Aignor #3 site (McLearen 1987: 148), situated on a small James River tributary and just downstream from Aignor #9, one of the two sites where Varina ceramics were dated. As mentioned above, the 3rd century features from which Varina dates were derived, also contained small numbers of Chesterfield sherds. While these latter sherds could easily have been incidental inclusions, the similarity of the two wares suggests the possibility that they may be contemporaneous.

Varina is one of the most common Middle Woodland ceramic wares found from the Fall Line to the salt-fresh transition zones on the James and its tributaries. Its distribution outside of these zones is unknown. Sites containing Varina ceramics have been found in both riverine and small

tributary stream locations. Varina is most commonly found on Middle Woodland sites containing both Chesterfield and Prince George ceramics. Chesterfield ceramics have a distribution similar to that of Varina, although Chesterfield is less common and may be restricted mainly to areas closer to the Fall Line than the salt-fresh transition. Both Varina and Chesterfield appear most common on small to medium-sized stream side camps, although this may be a product of survey coverage.

Chesterfield appears to be a direct regional outgrowth of Pope's Creek and as such represents the late end of and a continuum of the earlier Middle Woodland wares. The fine temper and presence of interior scoring (although only found on one Chesterfield example to date) are the most notable characteristics that Chesterfield ware has in common with examples of Pope's Creek ware found in the James River drainage. The differences are mainly in terms of paste: Pope's Creek is sandy and very friable, while Chesterfield is relatively hard, durable, and well fired.

Given the above, the more common Varina ceramics can be viewed as having some traits in common with both Chesterfield, a locally "evolved" or late variant of Pope's Creek, and the slightly later and/or temporally overlapping Prince George ware. This is an interesting combination, as Pope's Creek, in its typical cruder, earlier form, is more common to the north in Piedmont through Outer Coastal Plain contexts, while Prince George appears to be a locally restricted ware with its origin in the Inner Coastal Plain of central Virginia. This situation suggests a highly regionalized overlay on an earlier and more widespread theme.

As is the case for Pope's Creek ceramics, older archaeological reports on sites in the study area may contain ceramic descriptions and tabulations in which Chesterfield and some examples of Varina have been classified under "Stony Creek Cord and Net". In similar fashion, some sherds of the coarser tempered Varina ware may have also been erroneously lumped under or at least compared to Evans' (1955) "Albemarle Net", a type which we believe needs considerable refinement, and in addition, may be an inappropriate type to use when classifying Coastal Plain ceramics.

Uncommon Shell-tempered Ceramics--"Zoned-decorated" pottery

Several major Middle Woodland sites located in the Inner Coastal Plain have produced highly decorated ceramics, most of which fit the descriptions of Cross's (1956) "Zoned Incised" and Pollock's (1968) "Zoned Punctate" pottery types defined for the Abbott Farm complex of southeastern New Jersey. All examples from the lower James study area are shell-tempered, and those found in good context are in association with Mockley components. In contrast to most examples of Mockley, the majority, although not all, of the zoned sherds have an extremely compact and comparatively hard paste.

The most common motif on the Zoned Incised sherds that have been found in the study area is fine cross-hatching bordered by broader incised lines. The punctate sherds contain rows of single or multiple punctates enclosed by incised lines running at diagonals to the orientation of the rim. The Zoned Incised sherds have been found at the Maycocks Site, [redacted] and at the nearby Hatch Site. Zoned Punctate has been found outside of this immediate area at the Aignor #3 Site, but has not been reported elsewhere in the greater study area. To our knowledge, no similarly Zoned-decorated ceramics have been reported east of the salt-fresh transition.

City Point Net-Marked

Little is known of this well-made net-roughened, finely crushed rock-tempered ware other than the fact that it appears to have a distribution more or less limited to the Appomattox drainage between the falls and the confluence of the Appomattox and James, with a few sporadic finds on the Inner Coastal Plain portions of the James and Chickahominy. The pottery resembles Mockley in form, surface treatment and technological characteristics and is presumed to be of approximately the same date range. It differs from Varina in that it is more commonly fired in a reducing environment, is always very hard and durable, and is tempered with very finely crushed quartz, without the addition of coarse sand. Interiors are generally floated. It may be a localized equivalent of Varina, although a later variant seems a more likely possibility.

Bailey Creek Cord-Impressed

This type was named for a major tributary to Four Mile Creek and the James River in eastern Henrico County. Survey of the Four Mile Creek Valley led to identification of this ware which is surface impressed with fine cord-marking - often cross-corded (Mouer, Gleach and McLearen 1986: 125-126). The pottery may be a development from Prince George cord-marked which, except for its lack of decorations, larger percentage of thinner sherds, and fine grit temper, it resembles. It further resembles the cord-marked variety of Nomini Ware, defined by Waselkov (1982: 286, 291-293) for the lower Potomac. At the White Oak Point Site in Westmoreland County, Nomini was associated with components also containing Mockley ceramics, with dates of A.D. 860 +/- 60 and A.D. 880 +/- 60. At the Ray Moon Site in eastern Henrico County, Bailey Creek was statistically above Varina Net-Impressed and below Townsend.

In typing sherds for the Henrico Project analysis we feel we were too general in applying the Bailey Creek type name. Some materials from the Aignor #3 site, for instance, were typed Bailey Creek but probably represent instead a cord-marked variant of Varina. If a terminal Middle Woodland dating and typological consistency between Bailey Creek and Nomini can be demonstrated, the latter nomen should be given precedence and the Bailey Creek usage dropped. At any rate, Bailey Creek/Nomini appears to be

somewhat localized in the Inner Coastal Plain and probably dates to the late Middle Woodland II period.

Ettrick Simple Stamped/Vincent Cord Marked

A common "indigenous" Late Woodland I assemblage of the Outer Piedmont and the area just east of the Fall Line is typified by a plain cord-marked, fine sand-tempered ceramic, fitting Coe's description of Vincent Cord-marked (Coe 1964), usually in association with a very similar minority ware we call Ettrick Simple Stamped (Mouer, Gleach and McLearen 1986). Vincent and Ettrick are rarely decorated, although some paddle-platting on the rim has been observed in some sherds. That Vincent and Ettrick belong together and are not simply found together as an accident of sampling is demonstrated by the rim of a vessel from excavations at the Stoneman site in Goochland County. Here the fine-cord paddle platting is found on a rim sherd of Ettrick Simple Stamped ceramic. Vincent ceramics were dated by Coe at the Gaston Site to A. D. 910 +/- 200 (Coe 1964: 118).

In the James Valley, we have dated Vincent and Ettrick sherds at the Alvis Site in Henrico County and at the Point of Fork Site in Fluvanna County. At the former site, Vincent and Ettrick were found as inclusions in a large pit feature that also contained Branchville ceramics. The date from this feature was A.D 920 +/- 75. This feature also included hickory, acorn and walnut fragments, seeds of Acalypha, wild mustard, cultigen beans and gourd or squash (Gleach 1986: 187). At Point of Fork, a pit containing Vincent and Ettrick pottery and dated A. D. 1030 +/- 75 was excavated in the floor of what appeared to be a semi-subterranean pit house. The dated feature also produced seeds of Chenopodium, hickory nut shells, deer and turkey bone, and a carbonized fragment of maize cob (Mouer 1985: 29).

Vincent pottery is distributed throughout the Piedmont, in the Inner Coastal Plain and, presumably, in the Fall Line Region of southeastern Virginia and northeastern North Carolina. Ettrick has only been reported in the James Valley, but given the generally "southern" origins of simple-stamp decoration, it seems likely that Ettrick will eventually be recognized in the Roanoke basin as well. Nothing like Vincent or Ettrick has been reported from areas north of the James Valley.

Shockoe Fabric Impressed

Shockoe Fabric Impressed (Mouer, Gleach and McLearen 1986) ceramics appear in the James River Piedmont and Inner Coastal Plain perhaps as early as ca. A.D 800 and persist into the 11th century in the Piedmont. The pottery type is named for a small village and cemetery site in Richmond salvaged in 1974 by Mark Druss of VCU.

The characteristic deeply fabric-impressed pottery which has no decoration other than occasional small flange lugs just below the lip is tempered with coarsely crushed quartz, granite, or other rock. A rare variant of the pottery is surface impressed with thick thong or root type simple stamping.

In one of the Shockoe Slip Site burials there were caches of finely made large quartzite triangular and antler tine points accompanying the single internment of an adult male. Grave fill and midden flotation led to identification of squash or pumpkin seeds. Other Shockoe-associated traits, known largely from Piedmont sites, include clay elbow pipes, large and medium Yadkin/Levanna points, Jack's Reef points, and a moderately common occurrence on some sites of bifaces, points and debitage made on a non-local dark grey-green chert; some have suggested this material is Onondaga chert, but this remains to be demonstrated.

Shockoe pottery has been found in association with Shepard Cord-Marked pottery in pit features at the Partridge Creek Site, located on the James River in Amherst County and excavated by Perry Tourtelotte and Claudia Chang. Here large vessel sections or nearly complete vessels of both types suggest that makers of each deposited trash in the same pits. A series of C-14 determinations showed a tight cluster of dates around the 11th century A.D.

Similar ceramics have been labelled Hercules ware by Smith (1971), and characterize the earlier phases of the Hand Site in Southampton County. David Phelps has named identical pottery Cashie Fabric Impressed and Cashie Simple Stamped from the Inner Coastal Plain of Northern North Carolina (Phelps 1982). In this latter area, the Cashie complex dates from as early as 800 A.D. to Protohistoric times. Although Phelps' definition of Cashie includes considerably more variation than is included within our usage of Shockoe, it is clear that the early-dated materials from North Carolina are identical to Shockoe on the James. Shockoe can be viewed as "ancestral" to a number of later Late Woodland ceramics including Cashie, Branchville (Binford 1964) and Sturgeon Head (Smith 1971) in the Inner Coastal Plain of southeastern Virginia and northeastern North Carolina.

The pottery and typically associated points are found throughout the James Valley from at least as far west as Lynchburg to as far east as Williamsburg, although Coastal Plain components are relatively rare. Possibly related wares are found at the Middle to Late Woodland transition in the Shenandoah Valley as well. At Linville Mound, Fowke recovered coarse fabric impressed and thong stamped pottery of the characteristic bowl shape associated with Shockoe Ware (Schmitt 1952). A pit feature containing five sherds of "Albemarle Fabric Impressed" pottery from the Cement Plant Site in Augusta County was dated to the sixth century A.D. (Valliere and Harter 1986). This feature lay beneath an accretional burial mound, but the vast majority of ceramics from all contexts on the site were crush rock tempered and fabric-

impressed. This suggests a possible association of Shockoe-like pottery with early phases of the Lewis Creek Mound Culture (MacCord 1986). Most later-dated mound and related habitation components contain primarily Shepard/Page ceramics, underscoring again the association of Shockoe with this technologically and formally distinct ware. Probable Shockoe ceramics - identified as Albemarle Fabric Impressed - are also present at the Accokeek Creek Site below the Fall Line on the Potomac. Further north, there may be some relationship between Shockoe and Hell Island (Griffith 1982, Artusy 1976, Thomas 1966) on the Delmarva peninsula.

While it's possible to see Vincent and Ettrick ceramics derived from the Middle Woodland traditions of the Piedmont, the same cannot be said of Shockoe. The Shockoe complex appears to be intrusive. In the Outer Piedmont and Coastal Plain sections of the James Valley, it is also short-lived. Ceramics possibly derived from Shockoe continue to dominate some later assemblages in the Inner Piedmont and from the Inner Coastal Plain area south of the James, but Townsend soon replaces Shockoe in the James Coastal Plain as does Shepard in the Outer Piedmont.

Attempting to identify the source of Shockoe assemblages is a challenge. Bill Johnson (personal communication) feels that there is a strong resemblance between Shockoe and some late Middle Woodland wares from the eastern Great Lakes region. Certainly Phelps and Binford have demonstrated that the closely-related later Cashie and Branchville ceramics (including Smith's varieties, such as Sturgeon Head) are the protohistoric ceramics of the Iroquoian-speaking Meherrin, Nottoway and Tuscarora peoples.

Simple-stamped ceramics become considerably more common in the late protohistoric and historic period (Coe 1964; Phelps, personal communication). These are typologically distinguishable from earlier Shockoe or Hercules simple-stamped wares in that they appear to be stamped with a carved paddle. This latter pottery - tempered either with small pebbles or crushed quartz - has been defined by Coe (1964: 105-106) as the Gaston Simple Stamped type. Gaston, Branchville Simple Stamped, and Cashie Simple Stamped are all essentially identical wares.

Townsend Ware

Shell-tempered, fabric-impressed Townsend Ware is the most abundant of the Late Woodland wares following Mockley in the sequence, and is also the most regionally widespread of such wares, particularly on the greater regional level. Townsend is ubiquitous in the Coastal Plain in the Late Woodland, and the variety of decorative motifs more or less parallels that from other Mid-Atlantic areas. Townsend includes type varieties Rappahannock fabric-impressed (undecorated), Rappahannock Incised, Townsend Incised, Townsend Corded, and Townsend Herringbone (Griffith 1980). The incised motifs are by far the most common of the decorations found within the study

area, while those of the Herringbone type are the rarest (Egloff and Potter 1982: 109).

Within the James and Chickahominy River basins of the Inner Coastal Plain, shortly east of the Fall Line, both typical Townsend and an apparent localized variant co-occur. The latter vessels are identical to Townsend, including the details of some Incised decorations, but are either tempered with small quantities of very fine sand or an apparent mixture of very fine sand and a small amount of very finely crushed shell. Some vessels appear untempered, and all are extremely hard, compact and very well made. Most are rather small, thin vessels whose shapes are like those of typical Townsend vessels. It is our opinion that these vessels were made in areas where shell is generally unavailable, as they do not appear to be widespread in their distribution. Accordingly, it is probably most appropriate to treat this pottery as a highly local variant of Townsend and not as a separate ware. In addition, available evidence suggests that this variation in the ware may be a very late phenomenon.

Townsend dates from ca. 800/900 A.D. and into the early 1500s. It is possible that early Townsend and late Mockley may co-occur and/or blend. At the Irwin site on the Appomattox River, a pit feature dated to the 9th century contained both Townsend and a net-marked vessel in large sections, very strongly suggesting that the Mockley sherds were not incidental backfill inclusions. In addition, hard, well-made and often thin cord-marked shell-tempered vessels which are otherwise identical to Townsend are occasionally found on Late Woodland sites with Townsend components.

While numerous Late Woodland I (800-1000) ceramic types sometimes appear to be found together or in adjacent sites, Townsend dominates the Coastal Plain in the Late Woodland II (1000 - 1400). It is not until Late Woodland III (1400+) that competing pottery wares (Potomac Creek and, especially, Gaston) are found in the James Coastal Plain. Townsend is absent from the Piedmont except as "trade" sherds on a few "James River Phase" components (see below).

Within the study area, Townsend is found throughout the entire Coastal Plain from the Fall Line to the Bay. On the greater regional level, Townsend occurs in Coastal Plain contexts from Delaware and Maryland to Tidewater North Carolina. In the latter area, Townsend ware is part of the "Colington" Series (Phelps 1982).

James River Ware

The proposed James River Phase appears to be a highly localized, short-lived intrusion of "Townsend" groups into the Outer Piedmont. A number of village sites at the Virginia State Farm and on or near Sabot Island make up the known distribution of James River Phase components. James River

pottery is identical in firing, form and design to Townsend, including the Townsend Incised type. The only difference is in the temper. James River is tempered with very scant amounts of crushed quartz. This pottery is quite distinct from the above-mentioned Inner Coastal Plain variant of Townsend which often contains at least some finely crushed shell and never contains crushed rock or other coarse temper.

James River "trade sherds" occur on the Chickahominy River with Townsend pottery at the Upham Brook and Posnick Sites, while highly decorated Townsend "trade" sherds have been recovered from James River sites in Goochland County. Possibly indicative of the Coastal Plain origin of the Phase is the predominant use of quartzite for making triangular points. Most Late Woodland Piedmont groups used quartz or jasper.

Dan River Ware

The most common Late Woodland ware in Piedmont sections of the Roanoke River system is the Dan River Series (Coe and Lewis 1952; Holland 1970). Evans (1955: 49-54) defined the Clarksville type based on data from several localized assemblages excavated by Carl Miller on the Roanoke. This nomen is rarely used at present, however, as that series appears to represent a number of ceramic types. Early Dan River pottery has been dated as early as the 12th century (Clarke 1978), although most varieties are later , ca. 1300 - ca. 1700. This pottery is not found at all in the James Coastal Plain, and only rarely in the James Piedmont. One small component was collected on Elk Island in Goochland County (44Go45), while another was excavated stratigraphically above the possible filled pithouse feature described earlier. Dan River pottery appears to be the typical protohistoric ware of the Siouan-speaking groups resident along the Roanoke, including the predecessors of the Saponi, Tutelo and Occaneechee. Late 17th and 18th century historic sites of these groups contain Dan River and, more frequently, check-stamped and complicated stamped ceramics.

Projectile Point Types

The following projectile point descriptions are for types known for the Middle Woodland period when a number of forms were in use, and the change from notched and stemmed to triangular forms occurred. During the Late Woodland period, the triangular form is the dominant type, with the major changes being in size becoming smaller through time, and use of quartzite gradually decreasing.

Potts Corner and Side-notched types

The highly distinctive Potts Corner-notched type was first described although not named by Ben McCary (1953), after recovering numerous examples in his excavation at the Potts Site on the Chickahominy River in New Kent County, Virginia. More recently published descriptions or references to the point as a type include MacCord and Hranicky (1979), Gleach (1986, 1987) and Egloff et al (1988). When found in good context, the Potts type is always associated with Middle Woodland components. An estimate for the time range of the type is ca. 100 B.C. - A.D. 400 or 500, although its full span may extend slightly earlier or later. Within the Coastal Plain of Virginia, Potts points have been found in association with Pope's Creek, Varina, and Mockley pottery. The Potts Corner-notched point appears most common in the Coastal Plain and near-Fall Line Piedmont of Virginia, although it is reported as far west as the Shenandoah Valley and less frequently, in the Ridge-and-Valley and Blue Ridge of southwestern Virginia.

A side-notched variant has recently been defined (Gleach 1987, Egloff et al 1988). Its status as a variant is evident from the manner in which examples of the side and corner-notched types overlap in morphological characteristics and the association of the two types at several sites, most notably the stratified Croaker Landing Site on the York River (Egloff et al 1988).

Yadkin Triangular and Yadkin Eared types

In the central Virginia area, at least in the James River drainage, large to medium-sized triangular points with concave bases appear to be the most common late Middle Woodland forms of projectile points. A suggested sequence is that Eared points such as Potts were most common at the beginning of Middle Woodland II, and were gradually replaced with triangular forms by the Late Woodland. The gradual change to smaller triangular forms began during the Middle Woodland, although the very small, delicate forms were not used until the more recent centuries of the Late Woodland. Most, although not all of the triangular points of the Middle Woodland II period are identical to the Yadkin points described by Coe (1964: 45-49) for the North Carolina Piedmont.

The Yadkin triangular projectile point is common in both Middle Woodland II and Late Woodland contexts. A shallowly notched or "eared" variety, typed by Coe as "Yadkin Eared", is a variation on the Yadkin large triangular point. Yadkin Eared is similar to Potts, although the notches are generally shallower on the Yadkin points.

Coe's Yadkin triangular type can be compared to the Levanna type of the northeast (Ritchie 1971) as well as Roanoke (Coe 1964) and other large triangular projectile points found in North Carolina and the greater

southeast. While these types of points may not come into use until the 8th century A.D. in the northeast, large triangular points are found in far earlier contexts in the southeast. Within the study area, Yadkin-like large and medium-sized triangular points are found in late Middle Woodland contexts, ca. A.D. 200 - 800/900 at numerous sites. At the Croaker Landing Site on the York River (Egloff et al 1988), large triangular points were associated with Mockley ceramics. At the Alvis Site, five medium-sized to large triangular points and an eared variety were found together in a pit feature also containing an argillite stemmed point and a Prince George vessel dated to A.D. 335 (Gleach 1986). A nearby pit contained fragments of the same Prince George vessel and two additional large triangular points.

Fox Creek/Selby Bay types

Stemmed, lanceolate, and less often, shallowly notched points identical to the Fox Creek (Ritchie 1971) and Selby Bay points of the northeast are found on major Middle Woodland sites and less often on smaller, ephemeral sites in Coastal Plain Virginia. Although argillite examples are occasionally found, the vast majority are made on rhyolite which is macroscopically identical to that of the Blue Ridge of Maryland and Pennsylvania. Rare examples are made on local quartzite.

The most common contexts in which the Fox Creek points are found are large shell middens containing major Mockley components. At Aignor #9, where no Mockley ceramics were present, a Fox Creek lanceolate point of local quartzite was found in an undated stratum containing Prince George and unclassified plain ceramics (McLearen 1987: 180, 181); however, all other good contexts show Fox Creek in association with Mockley.

Fox Creek points appear to be found in small numbers throughout the Coastal Plain of the James drainage, particularly from the Inner and Middle Coastal Plains to the salt-fresh transition zone. Unlike Potts and triangular types, the Fox Creek points are rarely if ever abundant at any single site location. Both lanceolate and stemmed forms are found.

Other lanceolate projectile points, many of which are more properly midway between elongated triangular and lanceolate in form, are abundant on sites containing Middle Woodland II and Late Woodland components on the Chickahominy River in the Inner Coastal Plain. These are usually made on quartzite and quartz. Although none have been recovered from good contexts, their triangular to lanceolate form as well as their abundance on sites with Middle Woodland II components suggests an association with that time period.

Jack's Reef Corner-Notched and Pentagonal

These points are not common, but when found, are almost always on either jasper or nonlocal cherts. These are found statewide, but in the study area, appear most common in the outer Piedmont of the James. They are often found on sites containing notable quantities of Shockoe pottery. Other associations of these probable components include debitage and occasionally points of dark green chert similar to Onandaga flint.

Rossville and Miscellaneous Stemmed Types

The Middle Woodland I Rossville point (Ritchie 1971), a crudely made contracting stem to diamond-shaped form, may be used as late as the earlier centuries of Middle Woodland II, although there are no good contextual associations within the study area. Within the James drainage, Rossville points are more common in the Piedmont, and appear to be found in small numbers in most areas of Virginia. It is possible that some similar contracting stem forms, some of which give the impression of cruder and smaller Adena points, also have Middle Woodland associations. An argillite stemmed point found in association with Prince George ceramics and Yadkin points may or may not have been an inclusion of an earlier artifact in the pit fill at Alvis.

"Petalas" and Similar Bifacial Blades

Maycocks Point has produced a number of well made medium-sized to large bifacial blades, many of which are on exotic chert. The chert is of a dark gray-green color with notable and often differential oxidation of the surface. While this chert has been casually identified as Ohio Flint, we would disagree with this classification. Instead, the chert is extremely similar to New York State cherts such as Onandaga flint. Similar dark green to gray green chert appears in very small quantities in many Middle Woodland sites in the study area, including the Outer Piedmont. Although unquestionably exotic, whether or not this chert is really Onandaga Flint is still open to question.

These blades are in all respects identical to similar medium to large cache blades described by Funk and Ritchie for Middle Woodland components in upper New York state and named "Petalas Blades" (Funk 1976; Ritchie and Funk 1973). At Westheimer, the type site for Fox Creek, these blades were associated with stratum 3 which contained a single Middle Woodland component with Fox Creek and Greene Points, plus Zoned Incised as well as local Middle Woodland pottery. This stratum was dated to the 5th century A.D. (Ritchie and Funk 1973). At the Tufano Site (Funk 1976), Petalas Blades appear to have been associated with a Middle Woodland component dated to A.D. 600-800. Similar blades found in Middle Woodland context at the Abbott Farm National Landmark are generally made of argillite, although some are of yellow brown chert or jasper (LBA 1983).

Additional smaller and thinner chert blades have also been found on Eppes Island lying upstream. These blades are on dark brown to gray brown chert of a different type than that of the larger specimens. In general size and form, the latter blades are like only slightly longer and wider Fox Creek lanceolate points, but with rounded distal ends.

One finely made rhyolite blade was found in the fill of Middle Woodland pit at the Alvis Site on the Chickahominy River. While no ceramics were in association, the pit did yield a C-14 date of A.D. 505 +/- 70 (Gleach 1986: 181, 191).

Large, extremely well made quartzite bifaces have also been found on nearby Eppes Island; however, these have all been recovered from surface contexts on a heavily multicomponent site (Lyle Browning, personal communication). Consequently, it is possible that these latter blades may relate to far earlier Savannah River components. Moreover, none are on exotic materials.

DISCUSSION

Pope's Creek ceramics and Rossville points appear to be the primary diagnostic artifact types for Middle Woodland I, ca. 500 B.C. - A.D. 200 in the Lower James River drainage in the Inner Coastal Plain and the Outer Piedmont. Toward the end of this period in the Inner Coastal Plain, Potts Corner and/or Side-notched points appeared, and the formerly friable sand-tempered net and cord-marked ceramics were now being manufactured with a more durable, compact paste, and the interior scoring was less frequent. Perhaps as early as ca. A.D. 200-250, shell-tempered Mockley ceramics were being used in the Outer Coastal Plain and in the Middle Coastal Plain well past the salt-fresh transition zone. They became the dominant type by ca. A.D. 400 in major parts of this area. Ca. A. D. 200-300, local coarse grit-tempered and well-made pebble-tempered ceramics contemporaneous with early Mockley were being used in the Inner and Middle Coastal Plain portions of the James.

The earlier centuries of the Middle Woodland II period in the James Piedmont are not well understood. At this time, however, it is probably safe to say that a relatively stable situation existed, and that this was dominated by Yadkin, Vincent or similar pottery with Potts and Yadkin points as the dominant projectile point types. In terms of ceramic traditions, influences appear to be derived from the south until the final centuries of the period.

At the same time, two very distinct phenomena appear to be happening in the Middle Woodland II period within the Inner and Middle Coastal Plain: 1) intraregional diversity; and 2) evidence of an interaction sphere that is

centered along the Middle Coastal Plain and characterizes the most notable of the Middle Woodland complexes of the Middle Atlantic.

The period ca. A.D. 200-400 was one in which a great diversity of ceramics were in use. This diversity appears to reflect localization - that is, the development of local styles or types within smaller areas than in previous times.

Mockley pottery in this area is associated with a complex of traits common to the Middle Atlantic: Fox Creek Points, some exchange in rhyolite and, perhaps, argillite, and select sites displaying the exceptional zoned decorated vessels and large "trade" bifaces of exotic chert. On the other hand, Mockley is also found with local Potts Corner Notched and Side-Notched points and large triangular points. More to the point, Mockley coexists, at least for a time, alongside a series of highly localized wares.

Within the Inner Coastal Plain, Mockley ceramics are less common than Varina and Prince George ceramics and are never the dominant type on any of the interior stream camps in this area. In addition, the non-shell-tempered ceramics seem to be made consistently on clays excavated at the site of deposition (cf Mouer 1985b). In contrast, Mockley ceramics on these sites are not at all different from typical Mockley ceramics found in the Middle Coastal Plain. Those few sites in the Inner Coastal Plain which contain significant numbers of Mockley ceramics are the larger and/or more intensively occupied Middle Woodland sites. The occasional rhyolite blades and Fox Creek points tend to occur in the same contexts. Numbers of artifacts, together with a large number of Middle Woodland features on such sites, indicates possible microband base camps at least for some components.

During this time, networks through which exotic lithics and possibly ceramics moved were in operation as shown by the zoned pottery, exotic chert, argillite, and more frequently, rhyolite. The larger Mockley sites in which these "regional" traits are most common are centered in the Middle Coastal Plain, especially where both large marshes and shellfish-gathering areas were present and where distance to the Fall Line was not great. One interpretation then, is that this area is the location of macroband sites which act as focal points in a fusion-fission cycle that included the Outer Coastal Plain and Inner Coastal Plain exploitation. Shellfish and marsh resources would have been exploited in the Middle and Outer Coastal Plain areas, with anadromous fish runs, freshwater swamps and deciduous forests exploited in the interior. This explanation fails to explain the sporadic occurrence of Mockley ceramics on the intensively used camps on some very small interior Inner Coastal Plain streams, however.

Similar phenomena can be seen from the data extracted from Berger's recent Abbott Farm explorations as well as re-examination of earlier work there, and its relationship to regional trends of that particular study area and those

immediately outside of it (Stewart 1985). Stewart (Ibid: 45) suggests that the large floodplain/marsh sites of the Abbott Farm may have involved group fusion, in that case, involving seasonal fish runs. In that model, the special Zoned ceramics would have been low level status symbols used in a Big Man type of society, with the seasonal macroband aggregations being where inter-group alliances and distributions of materials were maintained.

Another interpretation for the largest sites of the Middle Coastal Plain James is that they were more or less permanently inhabited, with forays up and down river and into interior streams continuing, but with a breakdown of the fusion-fission cycle, ie., a shift from fusion-fission to more permanent settlements from the first few centuries of Middle Woodland II until ca. A.D. 800. The faunal assemblage from the Mockley shell midden of Maycocks Point suggests the possibility of year-round habitation (Barber 1981).

In either case, the Mockley ceramics are seen primarily as the dominant ceramics of the Outer Coastal Plain groups, with the non-shell-tempered wares, those of the Inner Coastal Plain. The Middle Coastal Plain may reflect a combination of both, possibly with Mockley dominating in later centuries. Either a fusion-fission or a more sedentary model may be useful with respect to the ceramic variation shown, although a gradual shift to greater sedentism best explains the extreme variety within the first few centuries A.D. as well as the ceramic distribution patterns on interior sites of the Inner Coastal Plain.

Clearly, traditions are very localized, and the impression is one of relative stability with respect to intergroup friction. Since the Inner Coastal Plain, as we are using the term here, is restricted to a near-fall line area, different groups may have reduced intergroup friction involved in overlap of territories through the use of the typical Middle Woodland exchange networks alone or by that in combination with macroband congregations.

The regional diversity shown in the ceramics of the Middle Woodland II period appears to be on a local level, in contrast to the diversity of the Late Woodland period. A sharp contrast with the Late Woodland is that the different ceramics of the latter period are often a mix of very distinct types reflecting probable ethnic affiliations and possible movements of people over long distances rather than mainly local innovations. At the same time, the trade and exchange networks that brought some of the exotic artifacts to the large base camps appear to have broken down. There appears to be more movement by different groups as well as competition for territory, suggesting that any system of large macroband aggregations and/or other common use of large exploitative territories has also broken down.

The relative stability of the Middle Woodland II was disrupted by the appearance of new material culture forms at the dawn of the Late Woodland Period. Sometime around A.D. 800, a complex characterized by Shockoe Pottery and the use of cultivated plants - including beans and squash - spread

throughout the Lower James drainage from at least as far west as Lynchburg to the Inner Coastal Plain. The Shockoe groups maintained long-distance relationships to the north through an as-yet-unexplained exchanged network which included Jack's Reef points and, probably, Onondaga and other northern cherts. In the James Valley, Shockoe groups appear to have interacted in a variety of ways with local groups.

The long-established Carolina Piedmont Woodland tradition of the Piedmont James, in its early Late Woodland form is associated with cultigens, including maize, by ca. 1000 A.D. In Coe's sequence, the Vincent-Clements continuum, which is common in the James Piedmont, is replaced by the Dan River Complex. Only sporadic finds of Dan River ceramics in the James Valley mark the presence of what most certainly were the late prehistoric ancestors of the Siouan speaking Saponi, Tutelo and Occaneechee. Dan River is, on the other hand, the dominant late ceramic in the Roanoke Valley to the South.

Attempting to identify the source of Shockoe assemblages is a challenge. William Johnson (personal communication) feels that there is a strong resemblance between Shockoe and some late Middle Woodland wares from the eastern Great Lakes region. Certainly Phelps and Binford have demonstrated that the closely-related later Cashie and Branchville ceramics (including Smith's varieties, such as Sturgeon Head) are the protohistoric ceramics of the Iroquoian-speaking Meherrin, Nottoway and Tuscarora peoples.

While Shockoe material is fairly common and widespread, it is not the only complex in the James Piedmont at that time. By ca. 900 A.D. Shepard Cord-marked ceramics are found sometimes - as at Partridge Creek - in the same occupation deposits with Shockoe. In the Coastal Plain, the situation is quite different. Shockoe sites disappear with the rise to dominance of the Townsend Complex.

Shepard ceramics - including similarly shaped and decorated fabric-impressed vessels - become the dominant wares of the Outer Piedmont. The Protohistoric version of Shepard in the James Outer Piedmont (and in the Potomac Coastal Plain) is Potomac Creek (Manson and MacCord 1985). In the Shenandoah Valley, it is the Mason Island Complex (McNett 1975) characterized by Page Cord-marked pottery. Shepard/Potomac Creek in the James Valley finds an historical identity in the Monacan /Mannahoac Confederacy, a coalition of groups speaking unknown, mutually unintelligible, languages (Mouer 1984) . At least one writer (MacCord 1986: 31) has suggested that the Shepard-Potomac Creek - Page complex represents the material culture of Shawnee - related Central Algonkians in Virginia. It is not difficult to find possible stylistic antecedents of Shepard ceramics in Late Middle Woodland assemblages of the Midwest and Northeast.

Perhaps the most instructive apect of the transition to the Late Woodland throughout the region is the rise of persistent stylistic diversity, and intense ceramic decoration. Using the premise of Wobst (1977) and Braun and Plog (1982), this increased stylistic behavior almost certainly represents an intensification of interactions between disparate groups - and the extension, not contraction, of social networks. The rise and fall of Shockoe pottery in the James Valley, the expansion and contraction of the Townsend-related James River phase into the Piedmont, the rapid appearance of Shepard and related wares, the differentiation of the James Valley from the Carolina Piedmont tradition to the South, the breaking of the long-established regional exchange in rhyolite, the appearance of accretional burial mounds to the West and ossuaries to the East, and the appearance of cultigens and village settlements are all part of a pattern. This pattern can best be viewed as one of intensive competition.

Competition for, and defense of established territories are typical of tribal cultivators, of course. The primary questions that remain to be answered are: why were domesticates introduced at this time? were the introductions of Shockoe and Shepard the results of population incursions from the outside? and was maize, beans and squash horticulture introduced with new populations or simply adopted by local groups? Is Townsend the in situ development from Mockley that some assume, or part of this pattern of inter-regional instability? Clearly, the origins of the Late Woodland in the James Valley will not be understood without reference to similar phenomena taking place throughout Eastern North America.

In summary, it is possible to say that the James River late Middle Woodland shared a number of features with the Middle Woodland throughout the Eastern Woodlands: the apparent coexistance of a "regional" culture alongside various "local" cultures; subsistence based on hunting, gathering, and intensive foraging - or even cultivating - of indigenous seed and starchy tuber plants; and the integration of overlapping teritories or ranges through widespread exchange networks and other mechanisms. Unlike Middle Woodland groups of the Midwest and Southeast, however, there is no evidence for use of maize, beans or squash. It is with the introduction of these, at least partly along with major population movements - perhaps of Iroquoian and Central Algonkian speakers from the North and West - that the relative tranquility of the Middle Woodland comes to an end, and a new set of as-yet-unexplored cultural dynamics comes to dominate the James Valley.

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B. Fischler

The Middle Woodland to Late Woodland Transition in the Upper Delaware Valley

Introduction

For this symposium, we were asked to look at the cultural changes in the period from AD 500 to AD 1100 within the Upper Delaware Valley. For the purposes of this paper the "Upper Delaware Valley" will be defined as the 35 mile long portion of the Delaware River drainage from the confluence of the Delaware and Neversink Rivers downstream to the Delaware Water Gap.

In the Upper Delaware Valley this time period is marked by a paucity of Middle Woodland remains prior to AD 900, in contrast with more substantial remains of the Pahaquarra phase after AD 900. Given the change evident at about AD 900, we will first discuss the AD 500-900 period (the "terminal Middle Woodland"), then the AD 900-1100 period (the early Pahaquarra phase), and then summarize what can be said about the transition.

Our original plans for this paper were to examine and compare all collections from relevant sites. Unfortunately, due to changes in our fieldwork plans beyond our control, this has proved impossible. Instead this paper is a review of published information and a description of new information from Smithfield Beach.

There is also a problem with the available data. Due to the threat of the Tocks Island Reservoir in the 1960s and 1970s and park development in the 1980s, the focus of archeological research has been the river terraces (up to 400 feet AMSL), leaving many site settings unsurveyed. We are fortunate that dedicated individuals such as Done Kline and Dayton Staats have investigated some of these settings and provided important information. However, it must be remembered that the site inventory we are about to utilize may not be a representative sample.

Prior to AD 900: Terminal Middle Woodland

Middle Woodland: Chronology

The local cultural sequence of the Upper Delaware Valley for the time between AD 500 and AD 900 is poorly known. This time span falls within the later half of the Middle Woodland, a period best described in the Upper Delaware Valley as between the end of the Bushkill complex (about AD 100) and the beginning of the Pahaquarra phase (about AD 900). A variety of point and ceramic types are known to have been in use during the Middle Woodland; however, definition of phases covering limited periods of time is still at a very rudimentary stage. This situation is due to the lack of Middle Woodland sites with clearly stratified sequences and to the scarcity of radiocarbon dates associated with components of this sub-period.

This situation is typified by the component associated with the only radiocarbon date from the AD 500-900 time span in the Upper Delaware Valley: the Kipp Island component at the Faucett site (Kinsey 1975a:28). This date of AD 790 ± 120 years (or AD 670-910) is on "wood charcoal from a living floor" with a Rossville point in the same 10 foot square and a "Jack's Reef Corner-Notched point of jasper" in "an adjacent square". As Kinsey notes, these are the remains of "a light and transient occupation".

Without radiocarbon dates, it is not possible to be certain about which Middle Woodland sites within the Upper Delaware Valley (other than Faucett) were occupied during the "terminal" period of AD 500 and AD 900. For present purposes we will simply assume that any Middle Woodland component without radiocarbon dates prior to AD 500 is "terminal Middle Woodland".

Two Middle Woodland components have yielded dates prior to AD 500, and will thus be exempted from this consideration. Kraft (1975) has defined a Tocks Island phase from a component of the Harry's Farm site which dates to the beginning of the Middle Woodland, ca. AD 200-400 (actual date = AD 290±95). Probable Middle Woodland ceramics from the Shawnee Minisink site may be associated with two dates within the AD 110-510 range (McNett 1985:117).

This leaves eleven sites in the Valley to be considered "terminal Middle Woodland": Faucett, Upper Shawnee Island, Walters Rockshelter, Lenape Lake Rockshelter, Smithfield Beach, Michaels #4, Zimmermann, Peters-Albrecht-21, Bell-Browning, Manna, and Minisink Island.

Middle Woodland: Ceramics

No one ceramic type is found in all eleven components. Types reported include Exterior Corded/Interior Smoothed, Brodhead Net-Marked, Cord Marked/Shell Tempered and late Point Peninsula types. The only radiocarbon dated component from the terminal Middle Woodland in the Valley (at the Faucett site) does not include ceramics.

There appears to be an upstream/downstream division within the terminal Middle Woodland of the Upper Delaware Valley. The sites in the downstream third of the Valley contain shell-tempered, cord-marked ceramics. In contrast, the sites situated further upstream do not contain shell-tempered ceramics. Late Point Peninsula ceramic types have only been found in the upstream portion of the Valley.

The ceramics from four Middle Woodland components are predominantly shell-tempered. These shell-tempered sherds are identical to Ware I ceramics at the Abbott Farm (Stewart et al 1988:10-11), which were produced there from AD 200 to AD 800. All of the sherds from three of these components are shell-tempered: Lenape Lake Rockshelter (Kline and Staats 1974), Upper Shawnee Island (Stewart et al 1988), and Smithfield Beach. The Walters Rockshelter (Kline and Staats 1983) contained both shell- and grit-tempered vessels; most are cord-marked and one (grit-tempered) is net-impressed. Several rim sherds from the two rockshelter sites have cord-wrapped (stick or paddle edge) impressions, suggesting a terminal Middle Woodland age. The Walters Rockshelter and Smithfield Beach sherds are cord-marked only on the exterior, with the interior smoothed; two radiocarbon dates on this variant (Ware Ib) at Abbott Farm provide a range of AD 640-900 (Stewart 1985:22).

The other site within the downstream group is Michaels #4. One shell-tempered sherd with dentate-stamping was found at the Michaels #4 site along with a predominance of Exterior Corded/Interior Smoothed and some Brodhead Net-Marked sherds.

Late Point Peninsula ceramics have been found only in the portion of the Valley upstream of Wallpack Bend. However, late Point Peninsula ceramics are not abundant even in the upstream portion of the Valley (Kinsey 1972:372). Two of the six Middle Woodland sites in the upstream portion of the Valley do not contain ceramics: Faucett (Kinsey 1975a:28) and Minsink Island (Kinsey 1972:372). The remaining four sites (Zimmermann, Peters-Albrecht-21, Bell-Browning, and Manna) have yielded several Point Peninsula types: Point Peninsula Corded, Point Peninsula Rocker Stamped, Wickham Punctate, and Jack's Reef Corded.

At the Zimmermann site the late Point Peninsula (Jack's Reef Corded) sherds were mixed with Sackett Corded and Clemson Island sherds in a component situated above a Middle Woodland component (Werner 1972:90-102). The Middle Woodland component contained Exterior Corded/Interior Smoothed and Dentate-Stamped sherds.

Finally, the absence of Mockley ceramics from the Upper Delaware Valley is notable, given its abundance in the Middle Delaware.

Middle Woodland: Lithics

In the Middle Atlantic and New York, Fox Creek and Jack's Reef points are expected diagnostics of terminal Middle Woodland occupations. These biface types have been reported as surface finds and from excavations in the Upper Delaware Valley, however thay are not very common (Kinsey 1972:372; 1975a:91).

Large triangular points of the Levanna type are also associated with terminal Middle Woodland occupations in the Middle Atlantic and New York. Large triangular points are very common in the Upper Delaware Valley, but they have been classified as Late Woodland there. Various "generalized side-notched" points were probably also in use.

Non-local lithic raw materials have been found in terminal Middle Woodland sites of the Upper Delaware Valley. Argillite and jasper are most often noted, while rhyolite occurs occasionally. All excavated Fox Creek bifaces (including those from the Michaels #4 and Walters Rockshelter sites) are argillite. The Middle Woodland component at the Zimmermann site yielded an argillite Rossville point. Argillite debitage is present at all three of these sites.

Middle Woodland: Site Types and Settlement Patterns

The reported sites for the terminal Middle Woodland are of two types: small, open-air camps and small camps in rockshelters. All of these sites appear to have been occupied over brief periods, as judged from their low feature density and their restricted size.

The open-air camps all seem to be under 1000 square feet in area and have few or no features associated. One site that may not fit this description is Manna, but very little information has been published on that site.

Three areas of Middle Woodland occupation have been found within a three acre portion of Smithfield Beach. Each of these areas appears to be small (under 1000 square feet), although the broad exposures needed to confirm this have not been done. Features have been found in two of these areas. A thin, diffuse dark stain over 4 feet wide with a scatter of charcoal was found in EU 110, with a postmold adjacent to it. A small basin-shaped pit (1 foot diameter and 0.5' deep) was found in EU 83.

There were two areas of Middle Woodland occupation at Michaels #4, each about 750-800 square feet; these areas were located 138 feet apart within an excavated area of 2,900 square feet (Goldman 1975:67-68). It is not clear whether these areas are discrete activity areas within one component or separate components (Kinsey 1975b:82). The only feature noted was a 0.5 foot diameter light stain.

The rockshelters provided 126-168 square feet of living space. The only feature within the Lenape Lake rockshelter was a hearth area. Kline and Staats (1983:15) concluded that the rockshelters were used during visits of "short duration" by "small family bands".

Middle Woodland: Subsistence Base

Almost nothing is known of subsistence patterns during the terminal Middle Woodland in the Upper Delaware Valley. All we do know from published reports is that the remains of a single whitetailed deer were recovered from the Lenape Lake rockshelter.

To a large extent this is because methods for the recovery of small-scale subsistence remains have not been applied. Flotation samples have been collected from the Middle Woodland deposits at Smithfield Beach, but time has not yet been available for analysis.

Middle Woodland: Summary

The impression is of transient use of the Valley between AD 500 and AD 900. The terminal Middle Woodland appears to have been a period without resident communities within the Upper Delaware Valley. The upstream/downstream variation in ceramics suggests that communities from both north and south were making forays into the Valley. It appears that a boundary between exploitative territories exisited at Wallpack Bend. The sites with shell-tempered ceramics ("Ware I") are all along the 10 mile stretch of the Delaware between Wallpack Bend and the Water Gap. This predominance of Ware I ceramics downstream of Wallpack Bend indicates that this area was used by communities resident in the Middle Delaware Valley. The presence of Late Point Peninsula ceramics in the territory upstream of Wallpack Bend indicates that this area was used by communities resident to the north. Corresponding variation in lithics is not as clear. Jack's Reef points are found throughout Valley, as are artifacts and debitage of jasper and argillite. Apparently some exchange was taking place between these groups, but ceramics were not involved.

After AD 900: Pahaquarra Phase

Pahaquarra Phase: Chronology

The Late Woodland cultural sequence of the Upper Delaware Valley is well known. This sequence is based on what Kraft and Staats (1975:120-122) have described as "an orderly evolution of form and design in the ceramics of the Upper Delaware Valley" after AD 900. This ceramic sequence has yielded a three-phase subdivision of the Late Woodland. The time span of interest here (AD 900-1100) is included within the Pahaquarra phase, which continued until about AD 1250.

The Pahaquarra phase is characterized by the co-occurance of Sackett Corded and other uncollared Owasco types with Overpeck Incised, Bowman's Brook Incised, and Clemson Island types. Owasco is a very distinctive ceramic tradition to the north, developing out of the Point Peninsula types. Clemson Island ceramics are most common in the Susquehanna basin.. Overpeck Incised is a type common in the Middle Delaware Valley, while Bowmans Brook Incised is common in throughout New Jersey and Long Island (Staats 1974); these types appear to have developed out of a different ceramic tradition from Owasco. Such a mixture is expectable in the early Late Woodland of the Middle Atlantic--as Hatch (1988) and Stewart (1989:6) have pointed out, "suites of distinguishable types appear to have been made and used contemporaneously by the same group".

The Pahaquarra phase is differentiated from the following Intermediate phase by the absence of collared vessels. Within the Upper Delaware Valley there are fifteen excavated sites with possible Pahaquarra phase components. Five sites have both uncollared and collared Owasco types in most features and are either Intermediate phase or mixed Pahaquarra and

Intermediate phase. The remaining ten sites that were considered here are: Miller Field, Zimmermann, Faucett, Harry's Farm, Minisink, Bell-Browning, Zipser Lower Field, Beisler, Shawnee Minisink, and Smithfield Beach.

Two sites have components which appear to date to the earliest portion of the Pahaquarra phase. Level 1A at the Zimmermann site contained Owasco types with late Point Peninsula types (Jack's Reef Corded and Corded Punctate), Clemson Island Punctate; unfortunately there is not a radiocarbon date on this component. At the Smithfield Beach site a radiocarbon date of AD 930 ± 80 (Feature 13E) was associated with Bowman's Brook sherds and cord-marked body sherds (Overpeck or Owasco); a nearby intact living floor contains only Bowman's Brook ceramics.

Pahaquarra Phase: Site Types and Settlement Patterns

Known Pahaquarra phase sites are small "hamlets" adjacent to the river with evidence of structures (postmold patterns) and a variety of pit features. These pit features seem to have functioned as storage facilities early in their use-life; most ended their use-life filled with household refuse. The combination of structural remains, storage facilities, and significant accumulations of household refuse indicates that Pahaquarra phase sites were occupied for periods of long duration (multi-season if not multi-year).

Determining the size and internal structure of Pahaquarra phase settlements is a difficult task. Most Late Woodland sites in the Upper Delaware Valley are intensively occupied, multi-component localities. In this situation it is difficult to map out each separate component. The Smithfield Beach site is unusual in this regard, as the later Intermediate

and Minisink phase components are several hundred feet upstream from the Pahaquarra phase component. At Smithfield Beach, the Pahaquarra phase component covers between 1 and 2 acres, but excavation has not exposed enough of the component to describe its internal structure.

Pahaquarra Phase: Subsistence Base

There is clear evidence of the Late Woodland exploitation of wild food resources. Charred nutshells (from oak, hickory, and walnut/butternut trees) are the most commonly reported wild plant food remains. Where Late Woodland deposits have been subjected to flotation, the seeds of a wide variety of fruits, herbaceous plants, and weedy plants have been recovered along with the bones of an equally wide variety of animals and fish.

A major change in subsistence remains is found in the archeological record of the Late Woodland: domesticated plants are present along with wild foods. The earliest documented cultigen in the Upper Delaware Valley is *Cucurbita pepo* (squash or pumpkin) at AD 1060 ± 60. This date is from wood charcoal associated with a *Cucurbita pepo* seed fragment and Clemson Island Punctate ceramics from Feature 10 in the Pahaquarra phase component at Smithfield Beach. The presence of cucurbit remains clearly indicates that the Pahaquarra phase inhabitants of Smithfield Beach were involved in gardening to some extent. Cucurbits have never been important food plants. Initially, cucurbits may have been grown for use as containers; early varieties probably had a thin, inedible fruit and edible seeds with a high amount of oil (King 1985).

No other cultigen has been reported from a Pahaquarra phase context. In the Midwest, evidence has been found for the cultivation and, in some cases domestication, of locally available plants during the Woodland (Ford

1985). Whether the cucurbit found at Smithfield Beach was grown in gardens with a broader variety of cultivated plants is a question for further evaluation.

The earliest reported occurrence of corn and beans in the Upper Delaware Valley is after AD 1250, in the Intermediate phase component at the Minisink site (Kraft 1978:43). Corn is also present in the Intermediate phase component of the Smithfield Beach site. Corn and bean remains are commonly reported from post-AD 1350 contexts (Werner 1972:125; Kraft 1978:45; Puniello 1978c:156; French 1988).

The presently-available artifact data has also been used to sketch the basic trends of Late Woodland subsistence change. By looking at formal/functional tool types from five Late Woodland sites, Kinsey (1975a:24-27) has suggested that through the Late Woodland the importance of hunting decreased while the role of plant foods increased. Puniello (1978c) has described a similar shift between the Intermediate and Minisink phase components at the Bell-Browning site.

Taken together, all of this information indicates that corn-based horticulture became important within the Upper Delaware Valley after AD 1250. Corn cobs, recovered from the Miller Field site, have been described as probably of the eight-row, Northern Flint variety (Kraft 1972:42; 1975:158; Winter 1971). Such eight-row corn had evolved by ca. AD 800 in the Upper Ohio Valley (Watson 1988:44), and was grown by Owasco communities in New York (Winter 1971). Corn was thus known and available during the Pahaquarra phase, but somehow not attractive in the Upper Delaware Valley. How corn-based horticulture came to be a part of local subsistence is not yet clear, but it is clear that the processes that led to its acceptance must have started in the Pahaquarra phase.

A problem with the presently available subsistence data is that few excavations in the Upper Delaware Valley have utilized recovery techniques (such as flotation/water-separation and phytolith sampling) adequate to recover a full range of subsistence remains. Full consideration of the changing subsistence of the Late Woodland awaits the collection of more controlled floral and faunal samples from future excavations and the careful comparison of these with previously collected samples.

Pahaquarra Phase: Summary

The Pahaquarra phase provides quite a contrast to the terminal Middle Woodland. Site size shows a dramatic increase, with Pahaquarra phase open-air sites 40 or more times larger than those of the terminal Middle Woodland. The degree of residential stability increases just as dramatically, with structures, facilities, and refuse accumulations indicating habitations of long duration. The inhabitants of these settlements were involved to some degree in gardening and intensive gathering. It seems clear that the Pahaquarra phase settlements were home to a group of permanent residents of the Upper Delaware Valley.

The suite of ceramic types used by Pahaquarra phase communities show that these people had ties with groups on all sides of the Valley: Lower Delaware/Coastal communities to the south and east (Bowman's Brook and Overpeck vessels), Owasco communities to the north, and Clemson Island communities to the west. What these ties were is not clear. Answers to such questions must await technical studies of clay composition and detailed studies of design grammars.

Summary

The available data indicate that between AD 900 and AD 1000 a shift occurred in the utilization of the Upper Delaware Valley: after several centuries of transient use, communities established permanent residence within the Valley. This shift began an 800-year development leading to the historic Minisink communities.

Rather than continue here with various appealing speculations, we will leave you with this brief summary and look forward to hearing your ideas this evening.

Ben Fischler and Jean French
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Mockley Distribution in the Interior:

An Exception to Oyster Determinism

By

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INTRODUCTION

The title of this paper was written in a fit of Gardnerian humor (Gardner 1981, 1983a, 1983b) and probably should more accurately be titled Middle and Late Woodland Adaptations in Fairfax County: Not a Live Oyster in Sight. The idea for the paper originated with the Fairfax County archeology program's discovery of numerous Mockley potsherds at the Karell Site (44FX944), originally tested by Karell Archeological Services (Koski-Karell 1982, 1983 , 1983). This site was considered important because not only were Mockley, Potomac Creek and Rappahannock complex incised ceramics recovered but also the site was located in an upland hollow. The hollow is in the headwaters of a low order stream in the Piedmont Uplands approximately 6.4 miles southwest of the closest river and 11.4 miles upstream from the mouth of Holmes Run which empties into the tidal Potomac River at Hunting Creek in Alexandria.

Another stimulant was the results of excavations at the Taft Site (44FX544) which was a rescue project on an eroding midden with shell on the edge of a tidal bay at the mouth of the Occoquan River. This site produced stratified associations between Mockley ceramics and oyster shell, Potomac Creek ceramics and fresh water mussel and clam shells, and Popes Creek ceramics and no shell.

These two sites and the county's large inventory of Native American sites led me to believe that this paper might be of value as a preliminary discussion of Middle and Late Woodland settlement patterns, including interior (non-riverine) and upland environments.

CONTEXT

Fairfax County occupies 399 square miles on the inside of a large bend in the Potomac River. The county sits astride three physiographic provinces, the Inner Coastal Plain, Piedmont Uplands, and Triassic or Culpeper Basin (Figure 1). Furthermore, the Potomac River Fall Line is located on the large bend at Little Falls. This means that the river on the eastern border of the county is tidal and brackish, while the northern border is free flowing and fresh. The Occoquan River and Bull Run form the southern border and serve as significant riverine paths into the interior Piedmont and Triassic Basin of Northern Virginia.

The Occoquan River has been dammed up for decades which has resulted in its terrace system being inundated during all but the driest years. In the mid and late 1970s and 1988 significant droughts have resulted in those terraces being exposed. Surveys conducted on those exposed terraces have produced a significant pattern of ceramic producing sites. These data are also important to the subject matter of this paper.

The Fairfax County archeology program is over ten years old and has been predicated on the assumption that in order to understand and manage a resource one must know, or at least comprehend, its quantity and quality. Therefore, although site testing and excavation have been important parts of the county archeology program, reconnaissance and survey have been the driving forces throughout the program's history. The result is an ever growing inventory of over 1550 archeological sites of which over 1000 are Native American. The inventory is the foundation for the Fairfax County Heritage Resource Management Plan (Chittenden et al 1987), which guides preservation actions and research objectives in the county. This paper contributes to the research foundation of the county's planning process.

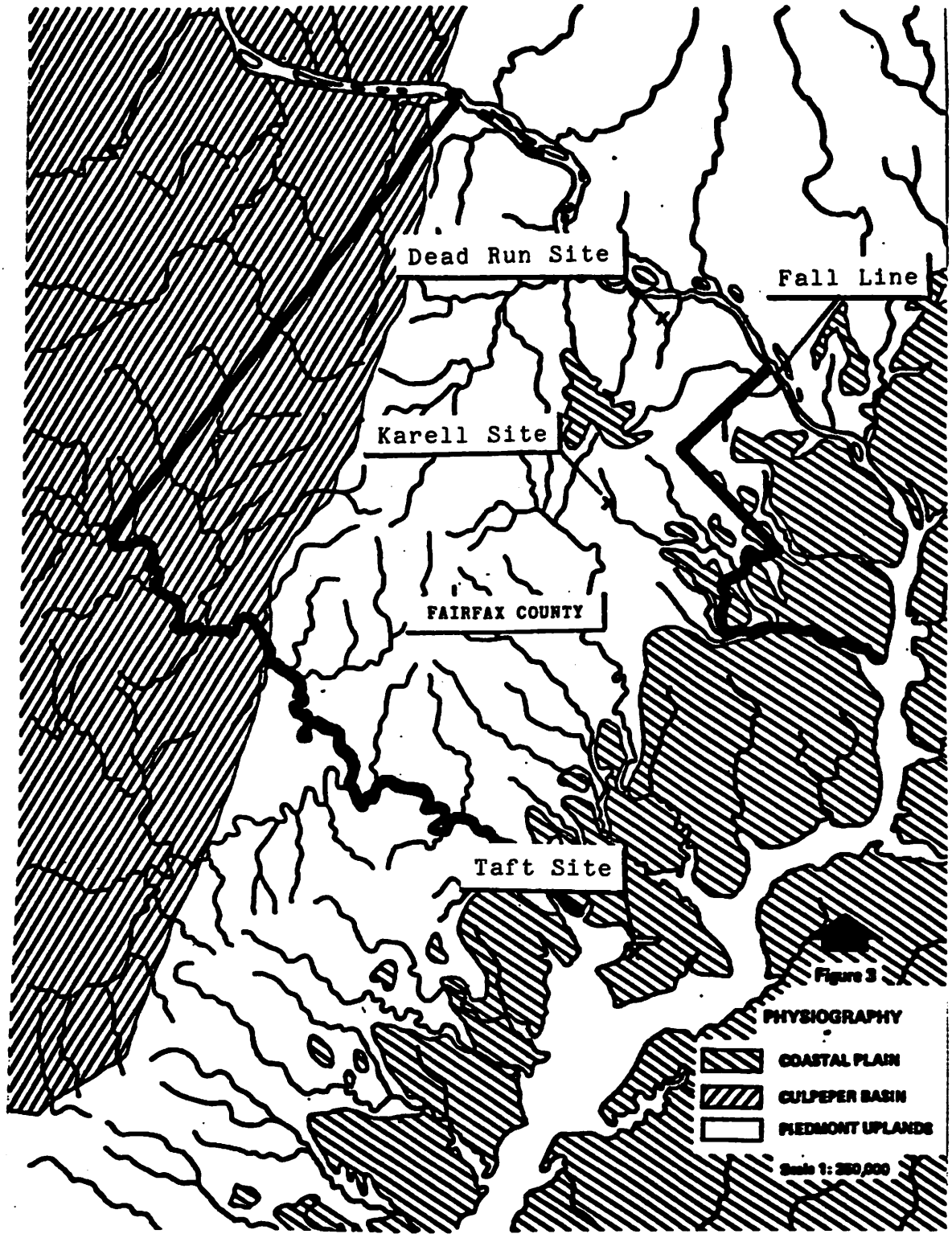


Figure 1. A physiographic map of Fairfax County, Virginia, showing the Karell and Taft sites.

CULTURAL OVERVIEW

Table 1 shows the temporal ranges for artifacts which are diagnostic of the Middle and Late Woodland Periods in Fairfax County. Although this paper is primarily concerned with the Middle to Late Woodland transition, earlier data on Popes Creek ceramics and Rossville/Piscataway and Fox Creek points are included for context and comparison.

An important relationship to be discussed here is that between Middle and Late Woodland cultural patterns and oysters. The question is, what was the role of oysters at the Fall Line where oysters were not naturally available. Since oyster habitats are confined to waters with a certain salinity range, they are limited in their extension up the Potomac to a maximum estimated prehistoric up-river extent of __ miles below the Fall Line (need reference and no. of miles). During the Middle and Late Woodland the maximum hypothesized extent was __ miles below the Fall Line (reference?). Therefore, the presence of oyster shell in a Popes Creek, Mockley, Townsend, or Potomac Creek context would be significant in understanding the transport of shellfish resources.

In the discussion here I also will provide data on the non-riverine distribution of Middle and Late Woodland artifact producing sites in Fairfax County. There is little question that there was a significant non-riverine component to the Late Archaic through Late Woodland settlement patterns in the Middle Atlantic (Gardner 1982:Figures 1-9). Distribution maps of both diagnostic ceramic and point producing sites in Fairfax County support that position.

DATA

Taft Site (44FX544) - This site is located near the southern tip of

Table 1. Temporal ranges for artifacts diagnostic of the Middle and Late Woodland in Fairfax County, Virginia.

Diagnostic artifact type	Date range	References
Popes Creek ceramics	545 B.C.-80 A.D. (500 B.C.-200 A.D.)	Gleach 1985:187 (Egloff and Potter 1982:99)
Rossville/Piscataway points	520 B.C.-375 A.D.	Gleach 1985:196
Mockley ceramics	200-880 A.D.	Gleach 1985:186
Fox Creek points	270-450 A.D.	Gleach 1985:192
Selby Bay points	400-700 A.D.	Kavanagh 1982:66
Triangular points	815-1750 A.D.	Gleach 1985:198*
Townsend ware ceramics	840-1590 A.D.	Gleach 1985:187-188
Potomac Creek ceramics**	1310-1650 A.D.	Egloff and Potter 1982:112

* Only one date recorded by Gleach for triangular ("Yadkin") points south of New York was before 815 A.D. That was a 335 A.D. date from HE470 by VCU.

** Includes Moayone (Potter 1987:personal communication)

Fairfax County on Mason Neck (Figure 1). It was partially excavated in 1987 for the purpose of recovering the parts of the site most seriously threatened by shoreline erosion (Johnson 1988a). Although not initially recognized as such, the Taft site was a stratified upland site containing at least Popes Creek, Mockley, and Potomac Creek components. The most significant aspect of this site was the relatively large amounts of shell in the Mockley and Potomac Creek levels. Potter (1983:personal communication) called it a <u>midden with shell</u> rather than a shell midden. With the undisturbed tops of features occurring within five centimeters of the surface, it was clear that the site was one of those rare ones that had never been plowed.

Numerous trash pits were recovered from the Potomac Creek level. They were conspicuously full of fresh water mussel shell which preserved significant amounts of organic refuse. One sub-feature within feature 2 was lined with thin walled clam shells. The Mockley level was conspicuous by its lack of mussel or clam shells. However, oyster shells were present. The Popes Creek level had no shells, despite the presence of a hearth.

Detailed analysis of the Taft site data is still underway. Over forty features were excavated, with all trash pit matrix having been saved. Although a sample of each pit will have been floated by the time this paper is in print, any reports on the analysis are at least a year away. Significant amounts of mammal, bird, reptile, and fish bones, as well as seed remains, including squash, have been tentatively identified.

<u>Dead Run Site (44FX193)</u> - This site was tested in the early 1980s and was found to have an inverted stratigraphy. It is located on an alluvial fan

adjacent to a large upland hollow, 900 yards south of the Potomac River gorge above the Fall Line. The site is significant here only because of the presence of Mockley ceramics.

Karell Site (44FX944) - This site is noteworthy because, as stated at the beginning of this paper, it is approximately 6.4 miles, as the crow flies, from the nearest part of the Potomac River, and approximately 11.4 miles upstream from the tidal Potomac River (Figure 1). It is part of a complex of ceramic producing sites adjacent to a large upland hollow in the headwaters of Holmes Run. This site and others in the complex have also produced Townsend (Rappahannock complex incised) and Potomac Creek ceramics.

The Karell site was destroyed by construction of a road. Its recovery involved an emergency salvage project which was able to recover only one small component. The loss of this site complex is the most significant failure of the Fairfax County preservation program. Although the sites appear to have been shallow, there had been only minor plow disturbance, leaving excellent horizontal integrity and ceramic preservation.

Other Interior Mockley Sites - McDaniel (1989:personal communication) has identified a Mockley component on and upland site in Maryland across the Potomac River from Lowes Island. This site is on a small all-weather stream approximately 400 meters from the Piedmont Potomac River floodplain. The site also produced Selby Bay sidenotched points. No shellfish remains were noted.

Virginia Commonwealth University (VCU) reported a Mockley ceramics component at the Aignor #3 site (44HE596) 600 yards inland from the tidal

James River floodplain near Richmond (McLearen 1987:129). The site also produced Popes Creek and numerous other wares local to the James River watershed. No shellfish remains were reported although both floral and faunal remains were recovered.

Kavanagh (1982:68) reported that

> Mockley ceramics, which are associated with Selby Bay lithics in the Coastal Plain, occur rarely in the Monocacy Valley. Mockley sherds were most numerous in two rockshelters, one on the Monocacy (18FR2, 70 sherds), and another on Linganore Creek in the Piedmont uplands (18FR6, 18 sherds). Altogether, Mockley ceramics were noted from seven sites: three rockshelters, one rhyolite processing station, and three open riverine sites.

Middle-Late Woodland Site Distribution in Fairfax County - The above sites are only the tip of the iceberg. Figure 2 shows the distribution of unidentified ceramic producing sites. Figures 3-6 show the distribution of Popes Creek, Mockley, Townsend, and Potomac Creek ceramic producing sites. Figures 7-10 show the distribution maps for Rossville/Piscataway, Fox Creek, Selby Bay, and triangular point producing sites.

The numbers of ceramic sites in the interior parts of the county has increased dramatically since this office shifted to water-screening the residue from dry screening. For example, in the case of one 1/2 meter shovel test pit from the Newgate site (44FX1118) only two quartz debitage were recovered from the dry screen. However, when the screen residue was water screened at the lab, nine small potsherds were recovered.

ANALYSIS

Taft Site (44FX544) - The associations of diagnostic ceramics and faunal remains are excellent. They show distinct changes in shellfish exploitation over time at the site. I hesitate to make a leap from this site's data to a grand scheme for shellfish exploitation in the entire

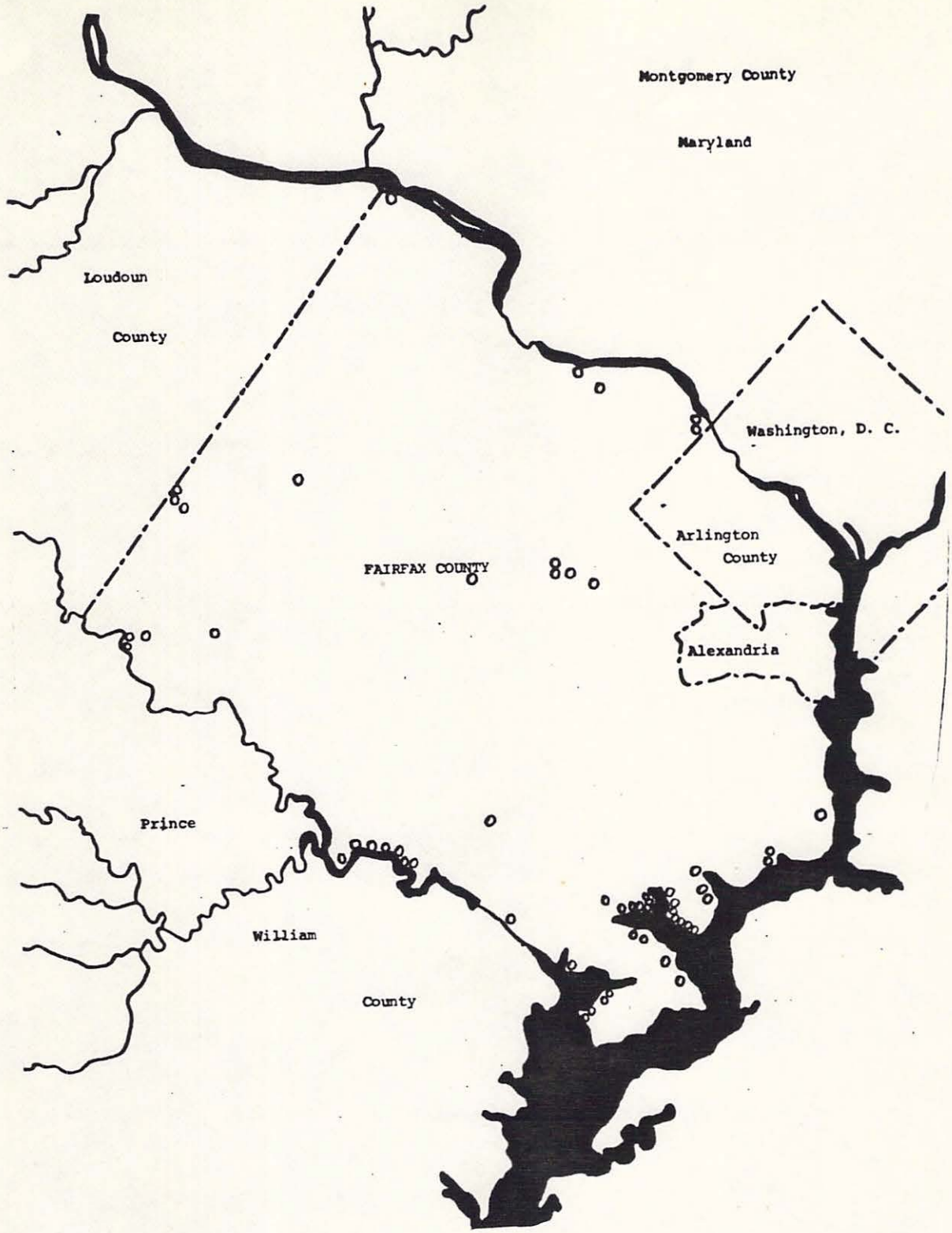


Figure 2. Distribution map for sites producing ceramics that have not been typed. The map includes 56 sites.

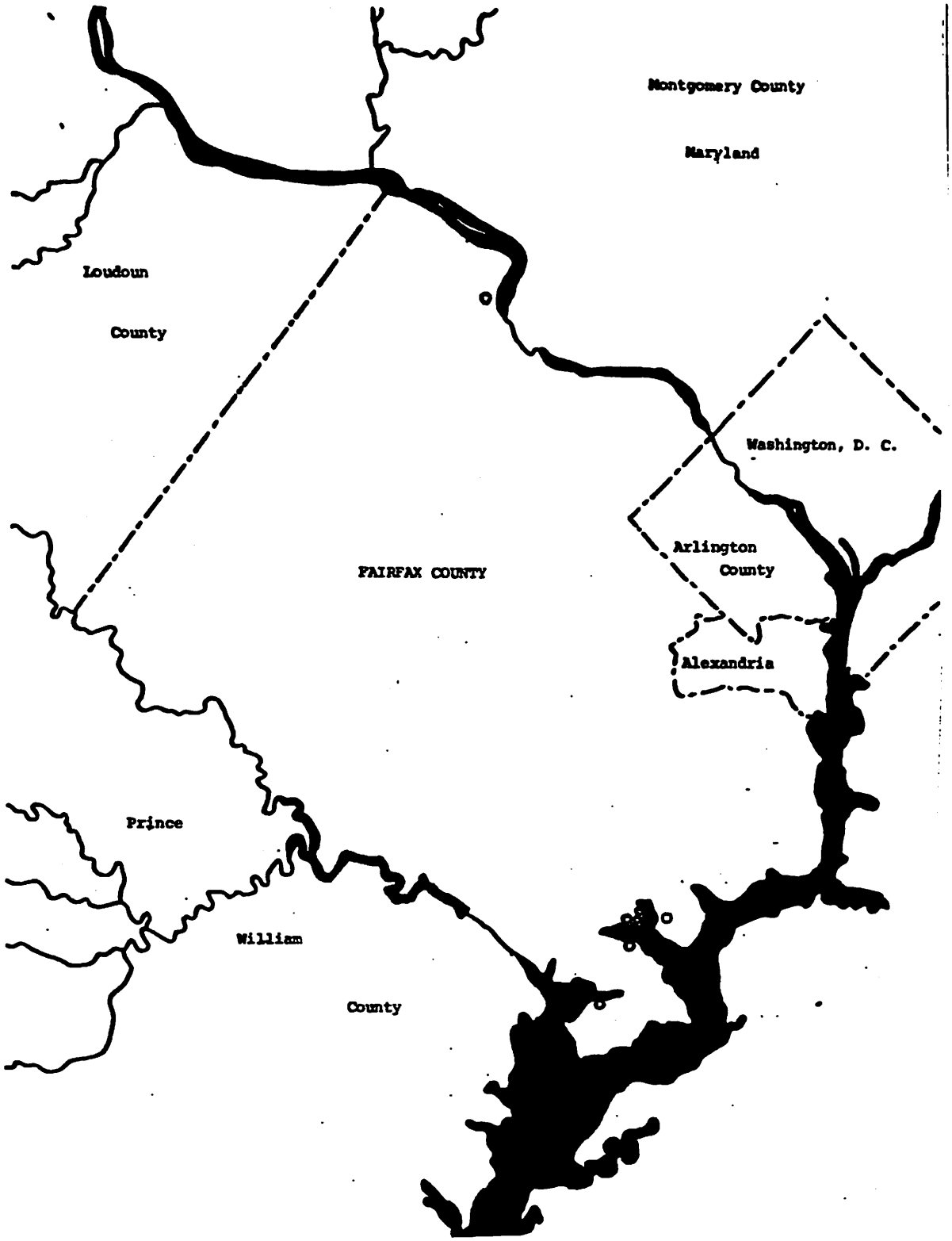


Figure 3. Distribution map for sites producing Popes Creek ceramics. The map includes eight sites.

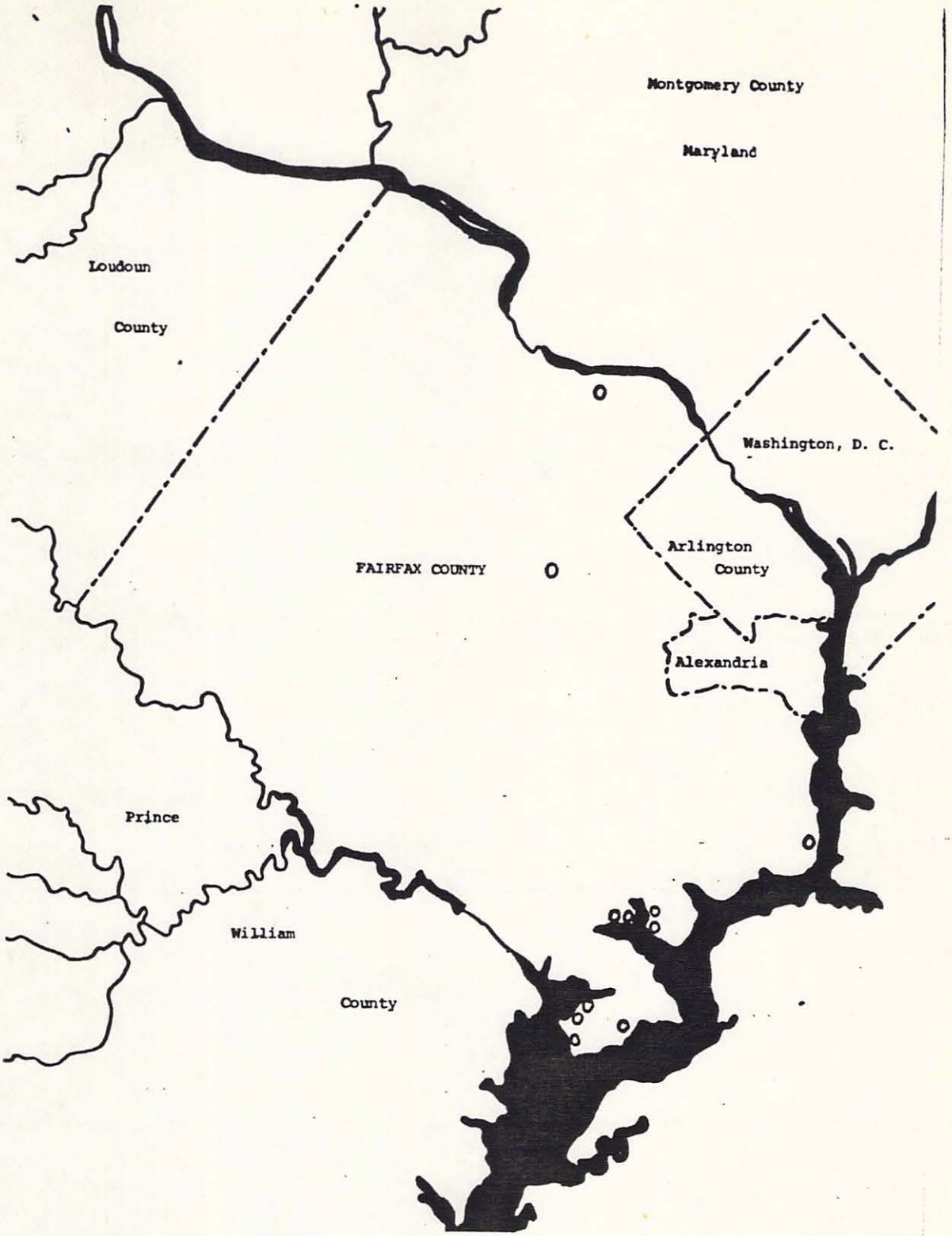


Figure 4. Distribution map for sites producing Mockley ceramics. The map includes 11 sites.

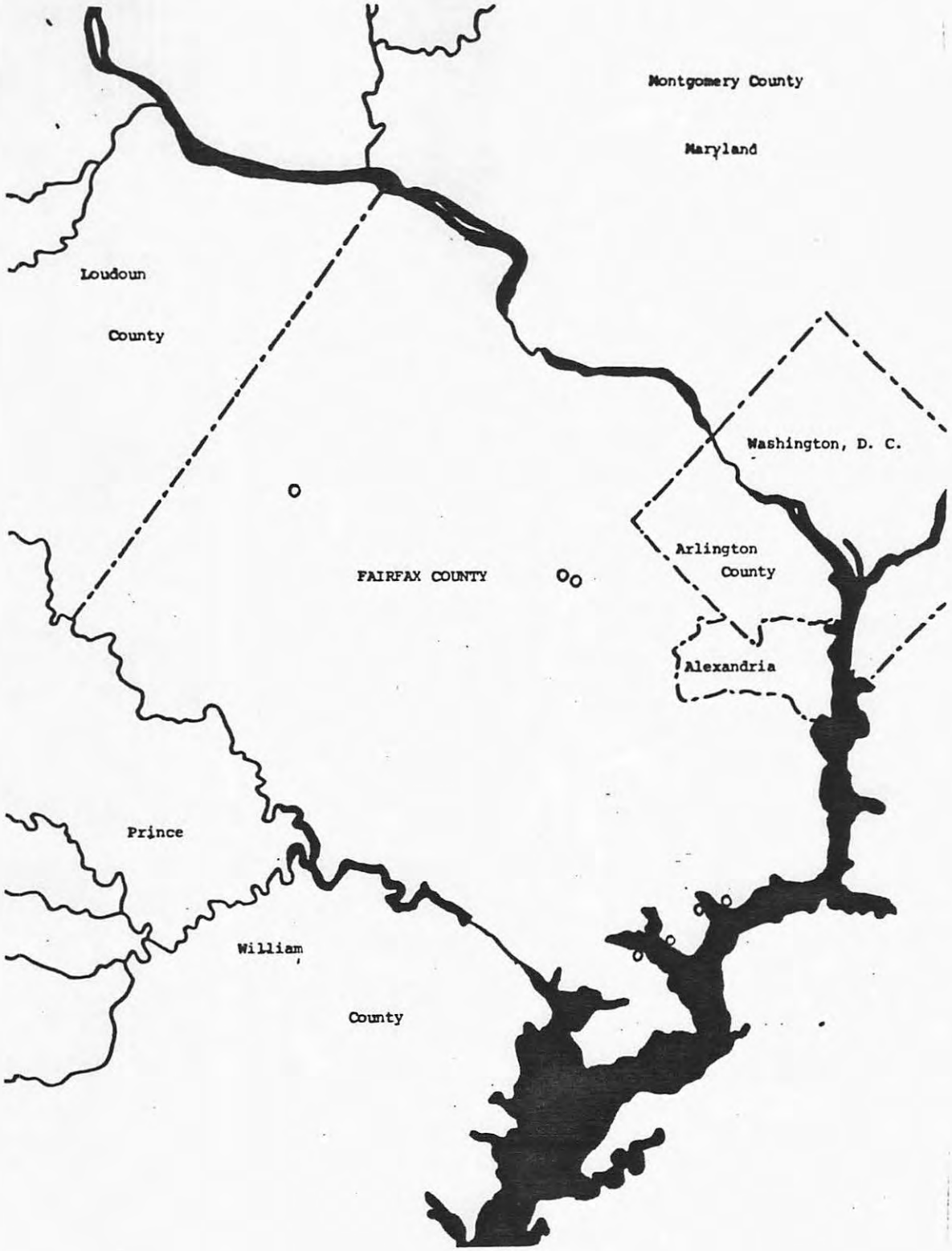


Figure 5. Distribution map for sites producing Townsend ceramics. The map includes seven sites.

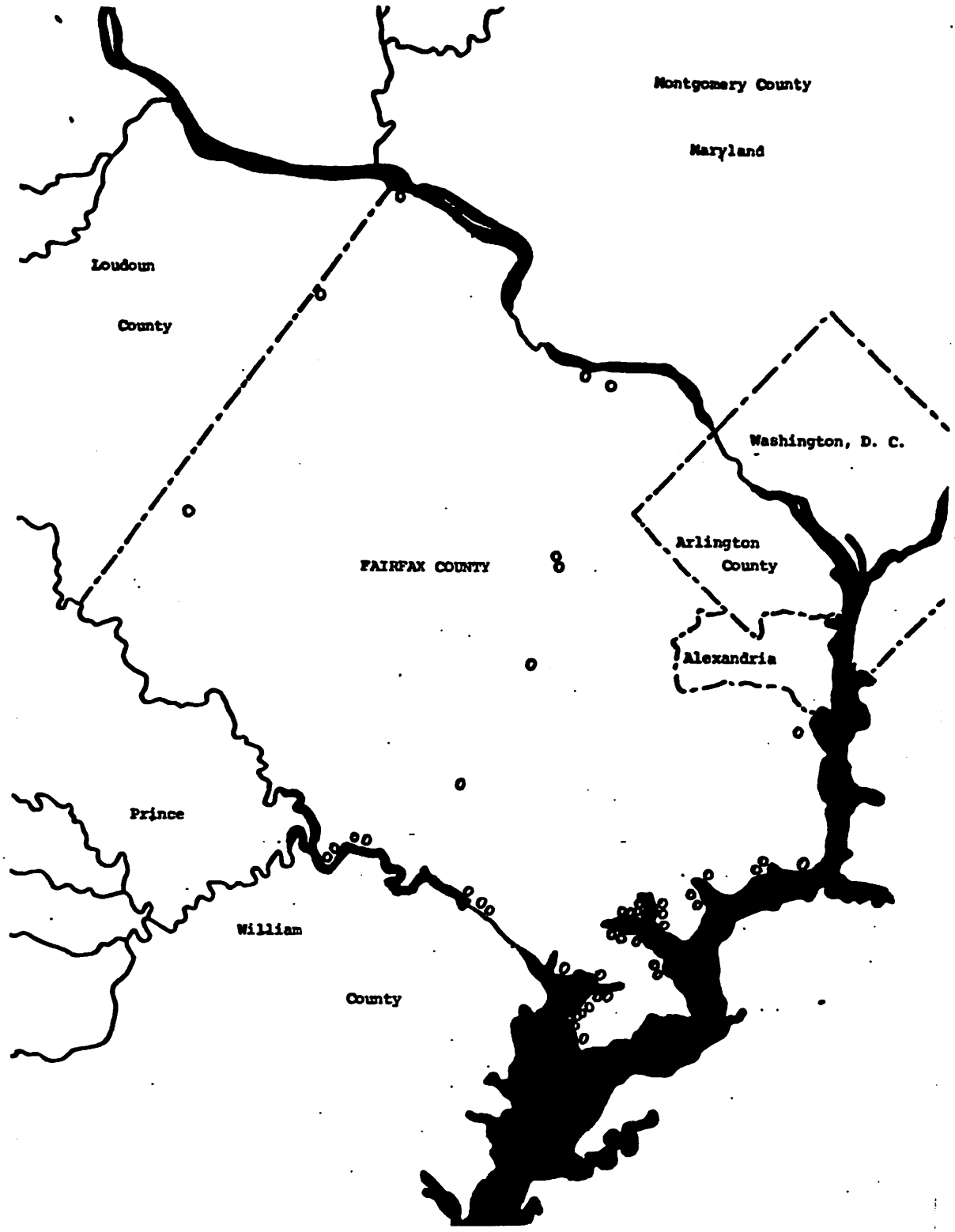


Figure 6. Distribution map for sites producing Potomac Creek ceramics. The map includes 42 sites.

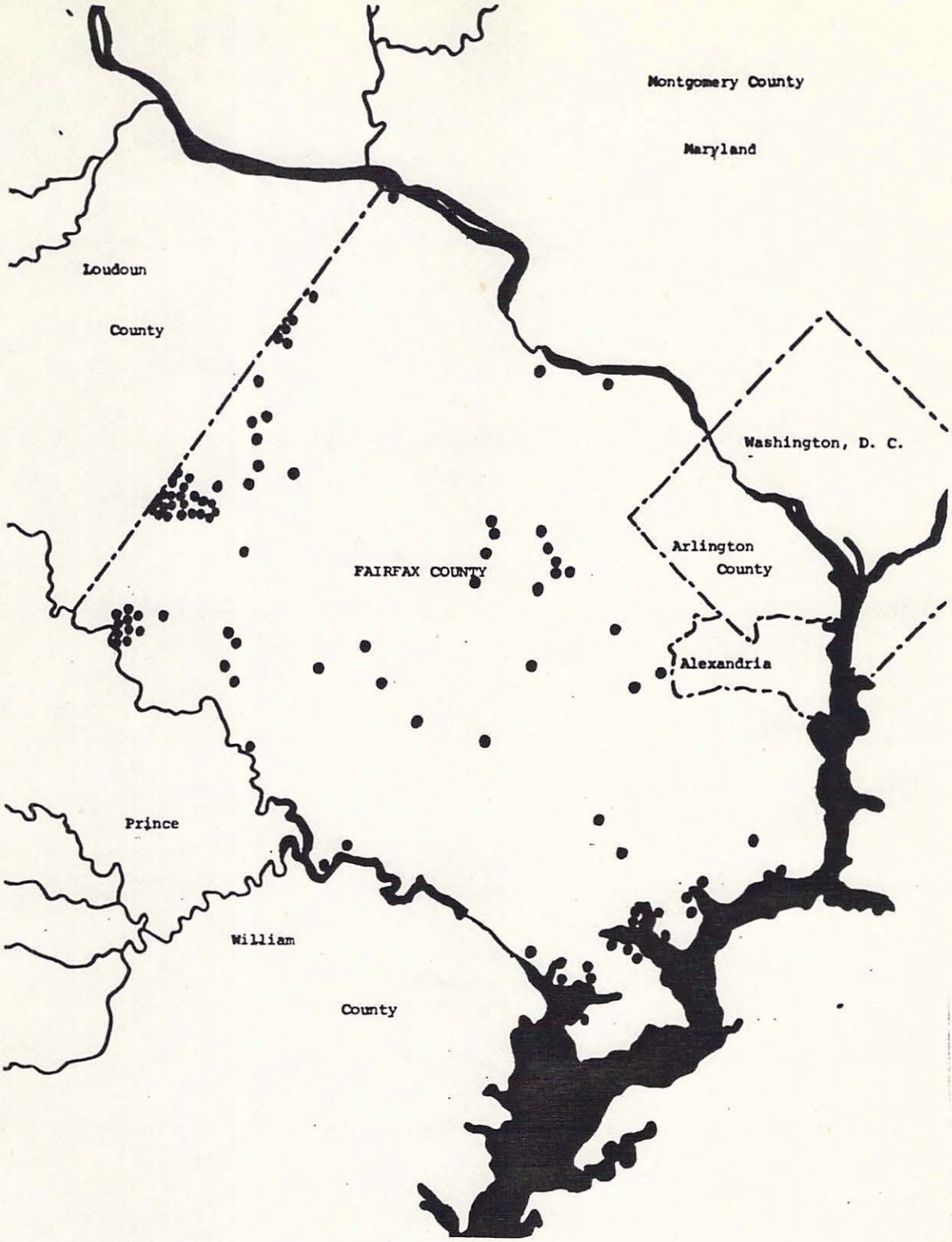


Figure 7. Distribution map for sites producing Rossville/Piscataway points. The Map includes 96 sites.

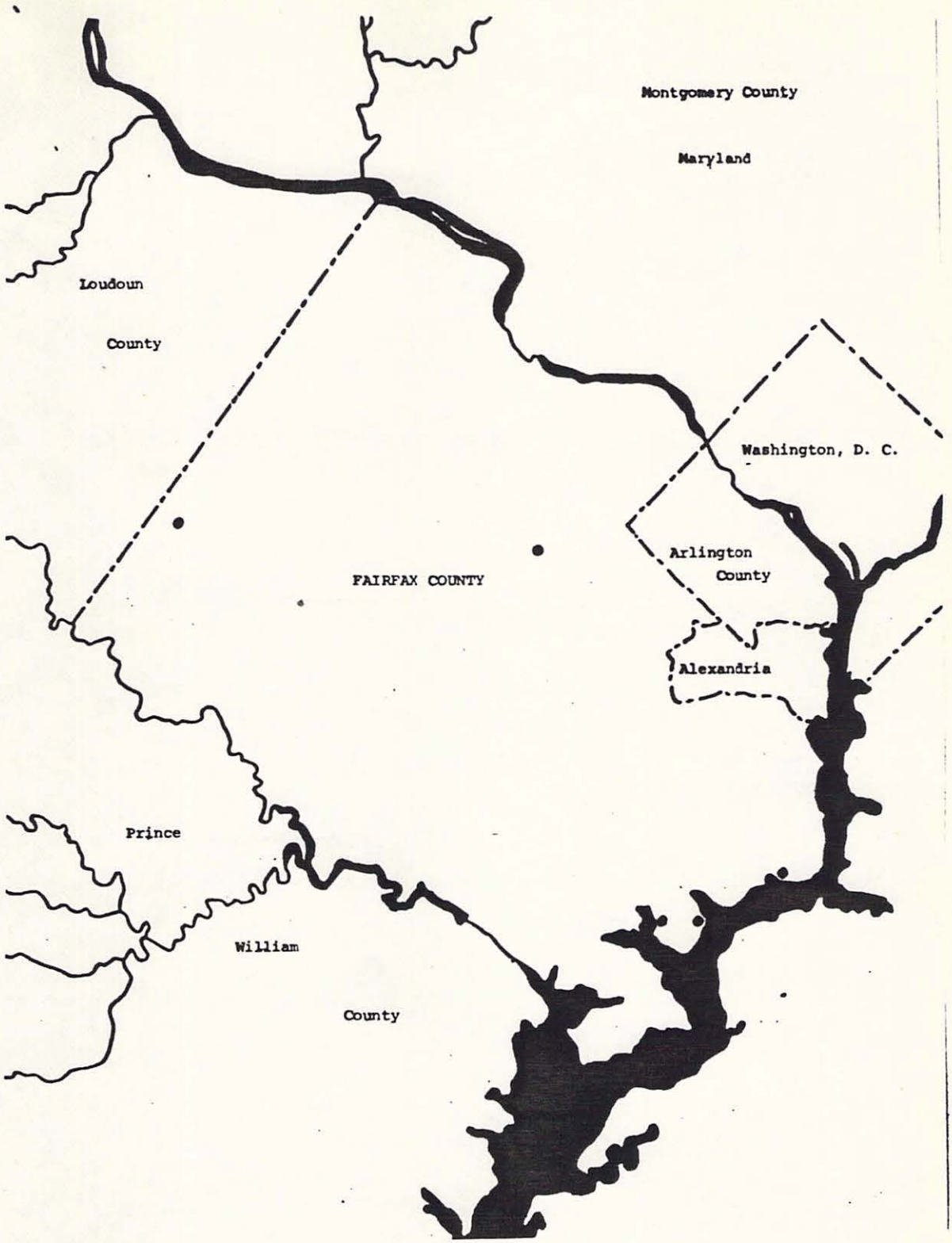


Figure 8. Distribution map for sites producing Fox Creek points. The map includes five sites.

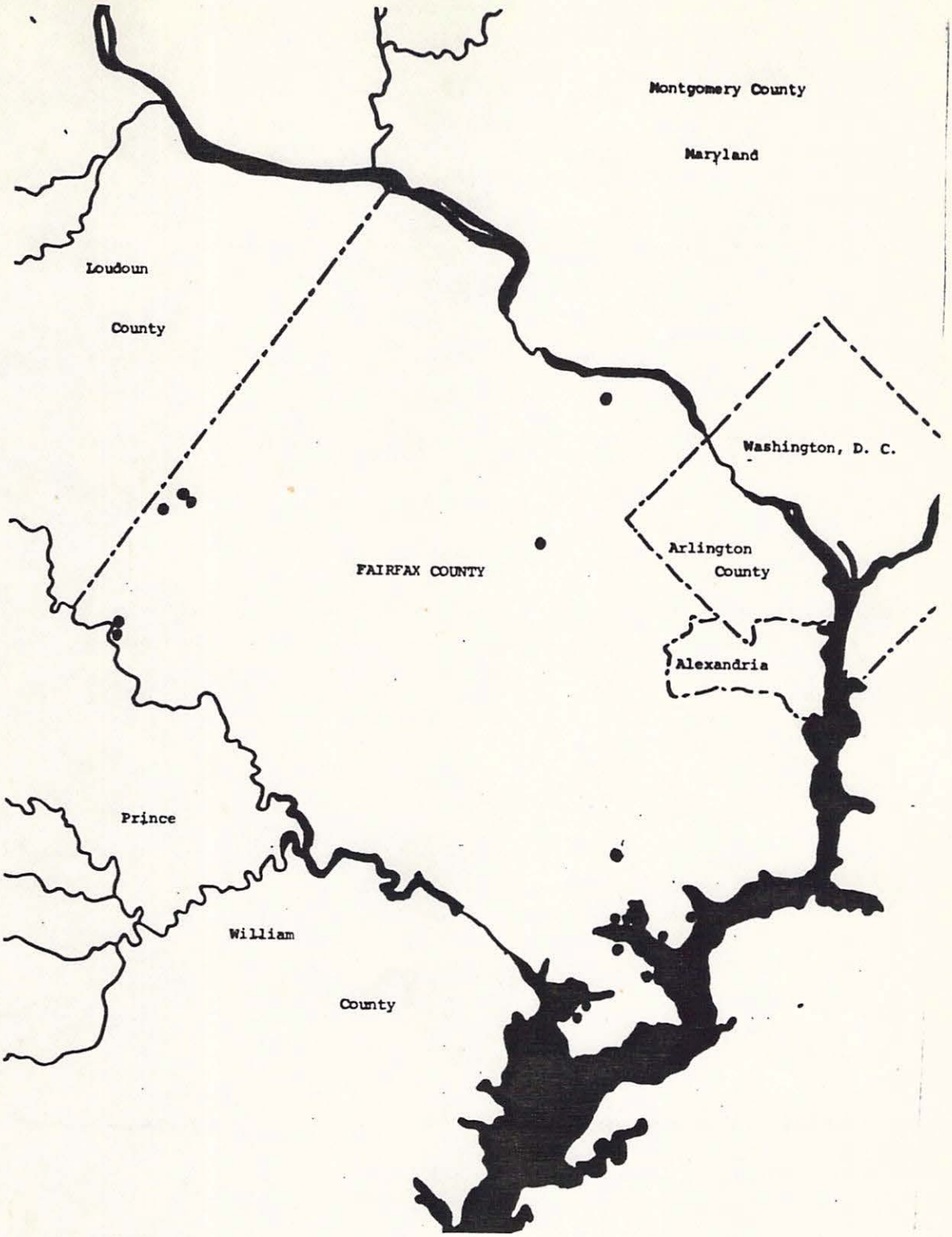


Figure 9. Distribution map for sites producing Selby Bay points. The map includes 17 sites.

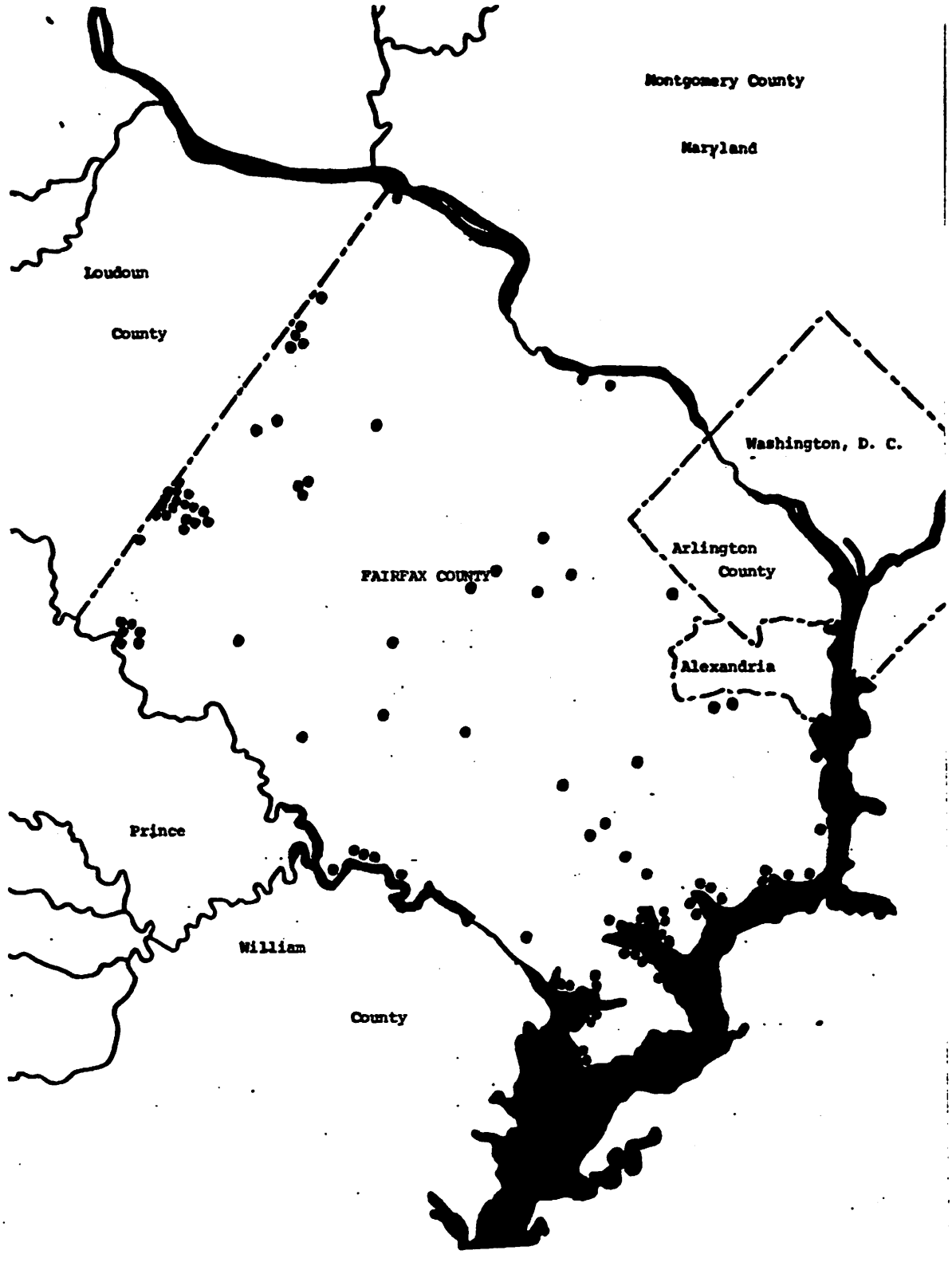


Figure 10. Distribution map for sites producing triangular points. The map includes 92 sites.

tidal headwaters of the Potomac Estuary. However, I think that the discussion of several alternative hypotheses is warranted.

(A) Popes Creek occupation:

1. Shellfish were not being gathered in (fresh water mussels) or transported into (oysters) the tidal headwaters. There are insufficient data to support or negate this hypothesis. The lack of a Popes Creek/shellfish association at the Taft site does not preclude such an association at another site adjacent to the tidal headwaters.

2. The Popes Creek occupation at the Taft site was not during the shellfish gathering season, which for the Powhatan was primarily in late spring and early summer (Waselkov 1982:38). See the following discussion for hypothesis #3 which indicate that, although the available data do suggest no shellfish association, preservation factors may have biased the data.

3. Popes Creek shellfish remains are no longer present on the site because the core of the occupation was along and earlier shoreline and has been destroyed by erosion. This hypothesis has some merit. Potomac Creek ceramics extend well inland beyond the maximum distribution of shell producing features. In time, at current erosion rates, all that will remain of the Potomac Creek occupation will be ceramics and lithics. The reason there are shell features left on this site is because it is in the unique position of being partially protected from wave action. Every other site located along the tidal boundary of the county has been severely reduced in size by encroaching sea levels. In some areas the damage has been over 100 feet during recorded history.

(B) Mockley occupation:

1. Oysters were being transported (traded or gathered and brought by

the site's occupants) into the tidal headwaters. This is a pretty good hypothesis if the estimated maximum up-river extent of oyster habitats is accurate.

2. The maximum estimated up-river extent of oyster habitats is wrong and oysters were locally available during the Mockley occupation of the site. Here the definition of "local" is significant. The re-analysis of prehistoric oyster bed distribution is beyond the scope of this paper.

3. Oyster beds producing oysters of the size found on the site were within a one day foray of the site. Such a trip would have to include paddling to and from the oyster beds and the time necessary to gather them. Detailed analysis of such an hypothesis is beyond the scope of this paper but will be addressed in the excavation report.

(C) Potomac Creek occupation:

1. Oysters were not exploited by the Potomac Creek occupants of the Taft site. The virtual lack of oyster shells in the Potomac Creek trash pits indicate that oysters were not available. Since fresh water mussel shells were present in great numbers, it is clear that shellfish were an important part of the diet on the site. Furthermore, since the presence of a single lens of an exotic shell (clam) was present in one feature, it is likely that other than locally available shellfish were being transported to the site. If the clams were locally available like mussels they should occur throughout the trash rather than in a single deposit.

2. Oysters were not available. If, for example, the maximum up-river extent of oyster habitats had receded down-river after the Mockley occupation then their use may have been precluded by distance and/or hostile neighbors, such as the Potomacs.

3. The site was not occupied during the ideal oyster gathering

season. This hypothesis is contingent on oysters not being locally available and other shellfish being available and gathered during the season of occupation. Seasonality studies on all three types of shell are planned.

(D) General:

The Mockley and Potomac Creek features and levels produced significant quantities of mammal, bird, reptile, and fish remains, as well as at least one squash seed (Potomac Creek context). Therefore, although shellfish were being exploited, they were, by no means the only or possibly even the dominant subsistence resource exploited at the site.

Dead Run Site (44FX193) - This site is significant here because it contained Mockley as well as Potomac Creek and other ceramics, and is located near the fresh water Potomac River. It is also important because it is in an upland context. Since the site is disturbed the following general hypothesis is proposed:

The lack of shell on the site indicates that the Mockley component was not associated with shellfish gathering. With no organic preservation and no integrity it is difficult to determine what was happening on the site. The lack of shell of any kind does tend to support the hypothesis. Since there may be undiscovered sites with shellfish remains in a similar context, all that this site indicates is that there are Mockley ceramics producing sites without shell.

Karell Site (44FX944) - The Karell site, like the Dead Run site, only provides data of sufficient quality to help with Middle and Late Woodland macro-settlement patterns. However, the site's location, deep in the

interior Piedmont Uplands, does offer important hypotheses about the movement of ceramics:

1. Mockley ceramics were carried significant distances away from major sources of the preferred shell temper. Unless there were locally available sources of both potting clay and shellfish the Mockley ceramics on the site were transported there. No shell was recovered during the salvaging of the Mockley component of the site. Kavanagh's (1982:68) discovery of Mockley ceramics in upland rockshelter and Piedmont contexts in the Monocacy Valley of Western Maryland (discussed below) strongly supports this hypothesis.

2. Shellfish were locally available and used in ceramic manufacture on the site. The re-cataloging of the Koski-Karell phase I and II material has produced one unidentified shell fragment from an area producing shell tempered Rappahannock incised ceramics (Townsend ware). Since the temper in all of the shell tempered ceramics has leached out, it is possible that the highly acid soil of the site destroyed any trace of shell, used for either temper or subsistence.

<u>Other Interior Mockley Sites</u> - These sites are presented here only as additional evidence for the use of Mockley ceramics in a variety of settings. The Monocacy distribution (Figure 11) shows that three of the seven Mockley ceramic producing sites were well up in the headwaters of small streams which are in mountain foothills (Kavanagh 1982:19). Hypothetically, the Mockley presence in the Monocacy Valley is related to rhyolite procurement, since both Selby Bay and Fox Creek points are often made of rhyolite.

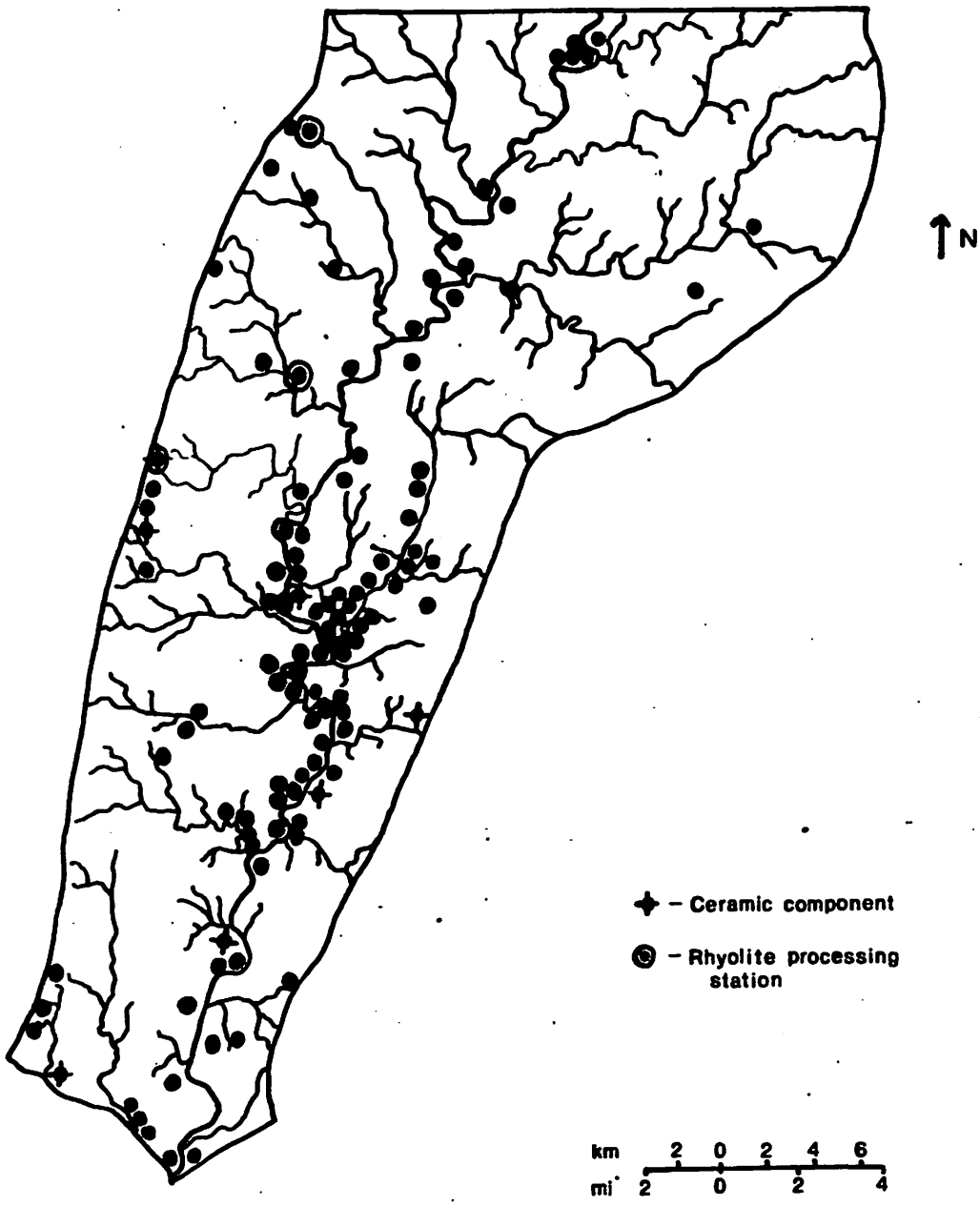


Figure 11. Middle Woodland (Selby Bay points and knives, Jack's Reef points and Mockley ceramics) sites from Kavanagh's (1982:67) survey of the Monocacy Valley in Western Maryland.

Middle-Late Woodland Site Distribution in Fairfax County - The distribution maps for the Middle and Late Woodland sub-periods suggest several hypotheses:

1. The dramatic increase in the number of Potomac Creek ceramic producing sites (Figure 6) over other sites producing earlier ceramics (Figures 3-5) indicates that Popes Creek, Mockley, and Townsend ceramics were not used in the interior and elsewhere in Fairfax County to the extent that Potomac Creek ceramics was used. The data do seem to support this hypothesis. However, there is the problem of survivability for the less well made Popes Creek and Mockley ceramics. Popes Creek ceramics is sandy and friable and therefore erodes much faster than Potomac Creek. Mockley and Townsend ceramics are tempered with shell which leaches out in acid soil, thereby weakening the sherds. All three types of ceramics should be more easily destroyed by natural and cultural forces.

One also would expect Popes Creek, Mockley, and Townsend components to be stratigraphically deeper and, therefore, less visible than Potomac Creek components. The greater age of the earlier ceramics also means that the elements have had more tome to work on them.

2. Popes Creek, Mockley, Townsend, and Potomac Creek ceramics producing sites represent only a portion of the sites exploited by Native Americans during the the times when those ceramics were used. The Rossville/Piscataway, Fox Creek, Selby Bay, and triangular point distributions (Figures 7-10), which correspond roughly with the ceramic chronology for the county (Table 1), dramatically expand the settlement ranges and alter the distribution intensities toward upland and interior locations.

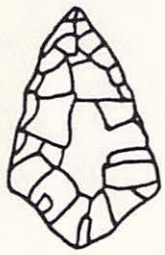
3. There was a hiatus of cultural activity in Fairfax County during

the time when Mockley ceramics and Fox Creek and Selby Bay points were being used. A comparison of the total number of sites between Popes Creek-Rossville/Piscataway (104), Mockley-Fox Creek/Selby Bay (33), and Townsend/Potomac Creek-triangles (141) shows a drop of 71 sites from Popes Creek-Rossville/Piscataway to Mockley-Fox Creek/Selby Bay and then an increase of 108 sites in the Late Woodland. However, the number of pottery producing sites increases steadily from Popes Creek (8) to Mockley (11) to Townsend/Potomac Creek (49).

A significant problem with the typing of points also is pertinent. Rossville/Piscataway and triangular points are distinctive in shape when when compared to other points found in the county. Fox Creek and, to a significantly greater degree, Selby Bay points are not distinctive, at least when found out of context. Figure 12 shows examples of all four point types. Such examples are misleading because there is significant variation within each type. With the cataloguing policy of the Fairfax County archeology program being to type points only when distinctive attributes are present, it is likely that Selby Bay and, to a lesser degree, Fox Creek points would be catalogued as "unidentified."

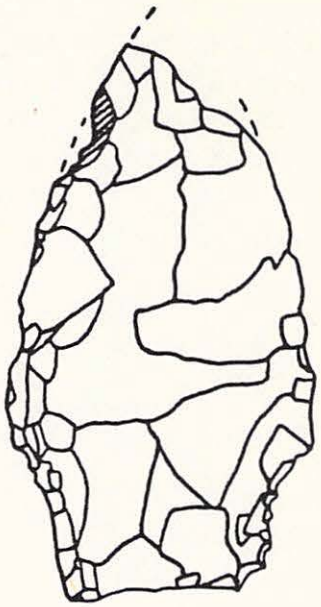
The distinctive attributes of Selby Bay points are shape, shallow side notches, irregular flaking, penchant for rhyolite, and an unworked, "snapped" base. The only one of these attributes that is uniquely Selby Bay is the "snapped" base. Not all Selby Bay points have "snapped" bases (Potter 1987:personal communication), which means that in a disturbed context many Selby Bay points are not distinctive. Hypothetically, therefore the Late Middle Woodland data are biased because of typological problems on plowzone and mixed sites.

4. The inclusion of points in the equation indicates a dramatic



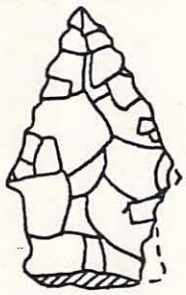
(a)

Quartz
(Reworked)



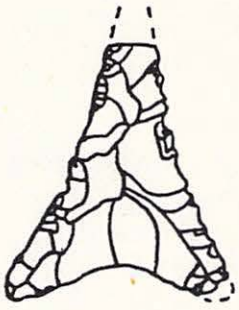
(b)

Rhyolite



(c)

Rhyolite



(d)

Black chert

Figure 12. Sketched examples of Rossville/Piscataway (a), Fox Creek (b), Selby Bay (c), and triangular points (d) from the Fairfax County area.

(except for Mockley-Fox Creek/Selby Bay) upland aspect to Middle and Late Woodland settlement patterns. Figures 13-15 are the combined ceramic and point maps for the three main sub-periods discussed here. The upland and interior aspects of the settlement patterns are 76% for Popes Creek-Possville/Piscataway, 35% for Mockley-Fox Creek/Selby Bay, and 55% for Townsend/Potomac Creek-triangles.

5. The data show clusters of sites that may represent past isolated adaptive strategies. The two large site clusters on the county's western border (Figures 2, 7, 9, 10, and 13-15) are functions of survey bias. The northernmost cluster is the Upper Cub Run Complex which was the product of ten years of systematic controlled surface collections on plowed fields (Engquist 1985; Johnson 1983; Johnson 1988c). The southernmost cluster is the result of an informant who also was systematically collecting plowed fields. The cluster of sites lining the tidal Potomac in the southeastern part of the county is a result of systematic shoreline surveys (Adey 1983; Inashima 1985; Johnson 1979, 1988b; Whitmore 1974). Most of these surveys did not include equally intensive surveys in the adjacent uplands and interior parts of the Coastal Plain.

There is, however, one pattern that appears not to be the result of survey bias. That is the line of Rossville/Piscataway point producing sites (Figures 7 and 13), which corresponds with the approximate western side of the Triassic Basin-Piedmont Uplands boundary (Figure 1). The other diagnostic points used here had the same chance of being found on those sites, but showed no similar pattern. This pattern, though less pronounced, is present on distribution maps for Late Archaic Savannah River and Holmes/Bare Island points and soapstone bowl fragments.

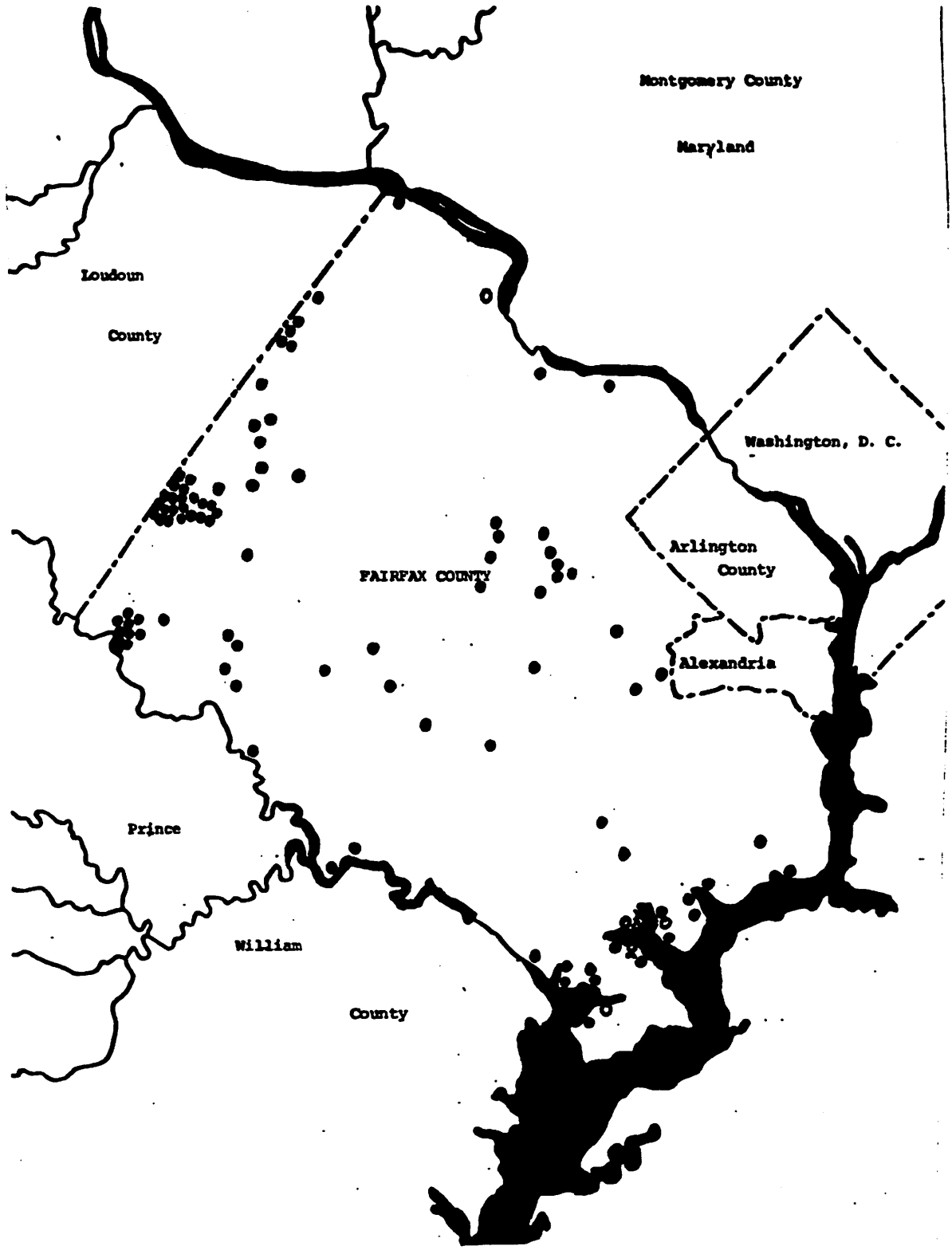


Figure 13. Combined Popes Creek-Rossville/Piscataway distribution map for Fairfax County.

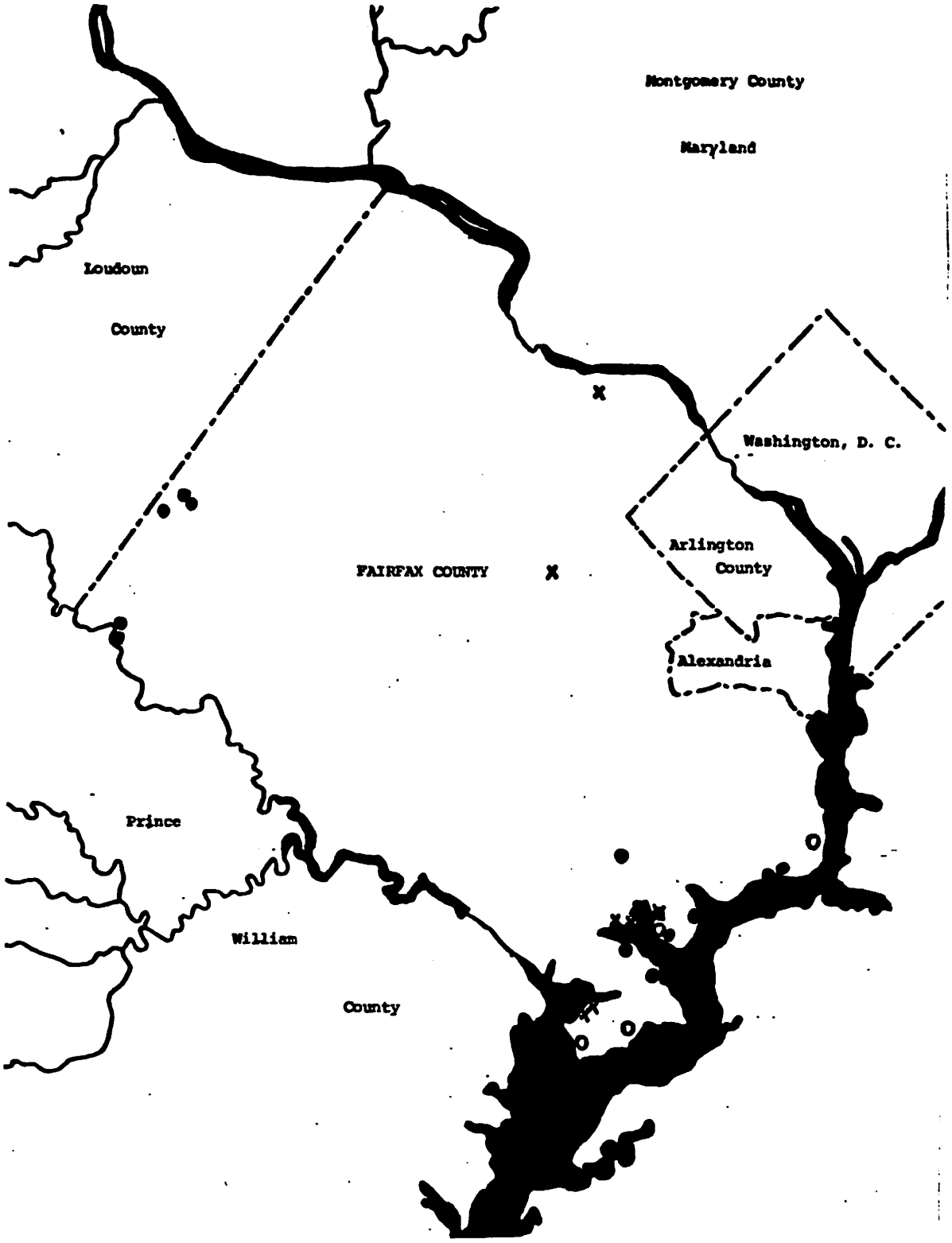


Figure 14. Combined Mockley-Fox Creek/Selby Bay (Late Middle Woodland) distribution map for Fairfax County.

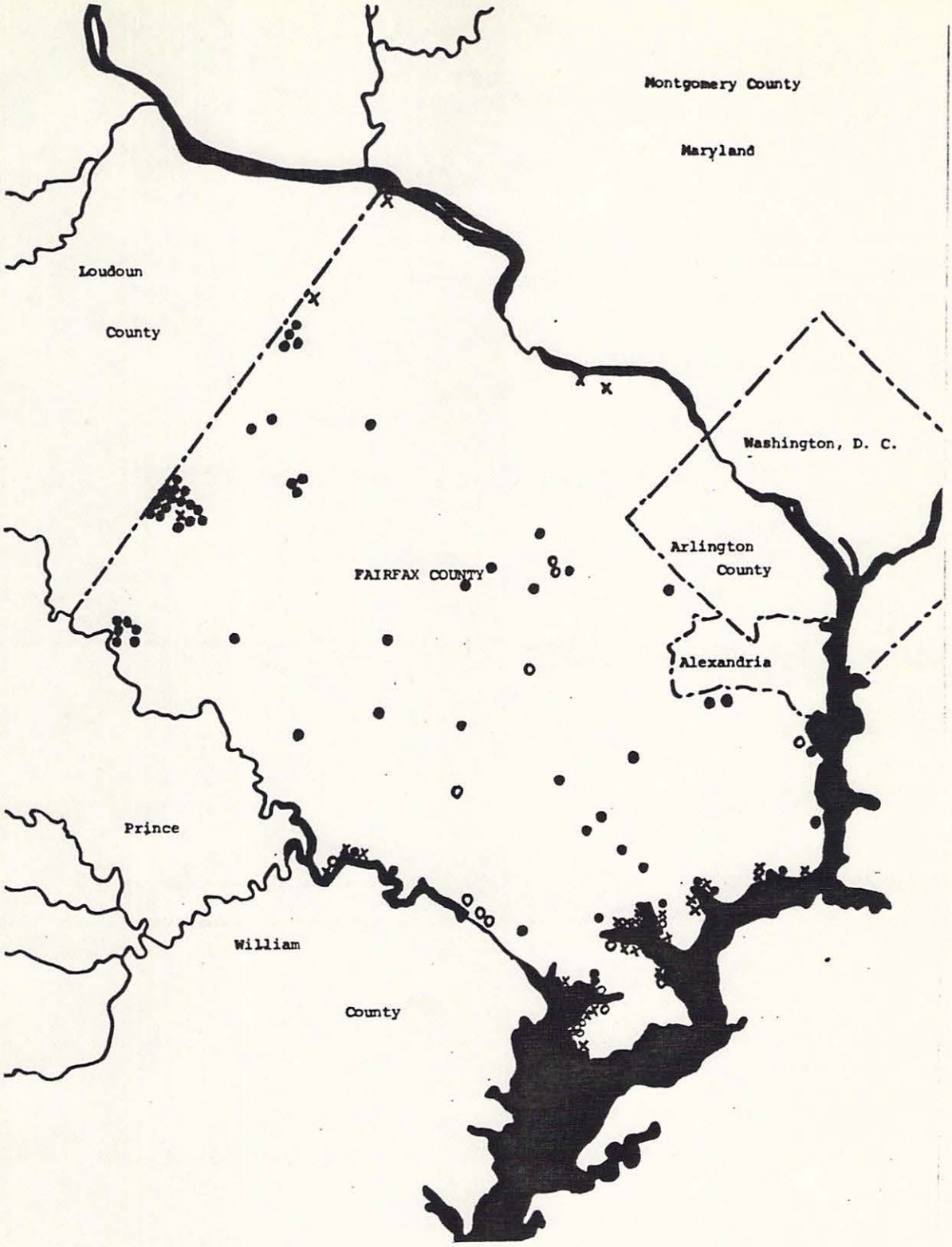


Figure 15. Combined Townsend/Potomac Creek-triangle (Late Woodland) distribution map for Fairfax County.

CONCLUSIONS

Popes Creek-Rossville/Piscataway - This analysis of data from Fairfax County sites suggests that, for the Popes Creek-Rossville/Piscataway pattern, Gardner's (1982:Figure 2) alternative 1 for the fresh water zone (A) (Figure 16) probably applies to the tidal headwaters (brackish) parts of the Potomac Estuary. This assumption is predicated on the lack of a Popes Creek and shellfish association. Should such an association be discovered or have been overlooked in this paper, then the salt water alternative (B) would apply to the Fairfax County situation.

The significantly large numbers of interior Piedmont and Culpeper Basin sites producing Rossville/Piscataway points supports his fusion-fission model for interior streams and the estuary, rather than the seasonal shift model (alternative 2) between salt and fresh water estuaries, i.e. up and down the river.

The line of sites along the Triassic Basin-Piedmont Uplands boundary indicates that hydrology and lithic resource locations (hornfels is the only unique lithic resource along the boundary) are not the only two variables influencing the interior part of the Popes Creek-Rossville/Piscataway settlement pattern. The physiographic edge apparently produced some kind of conditions that were desirable at that time. The apparent disappearance of this cultural pattern in Late Middle Woodland and Late Woodland times provides an interesting point for comparison.

Mockley-Fox Creek/Selby Bay - If the Mockley-Fox Creek/Selby Bay data are taken literally they support a model for Fairfax County that is a combination of alternatives 1 and 2 for Popes Creek-Rossville/Piscataway

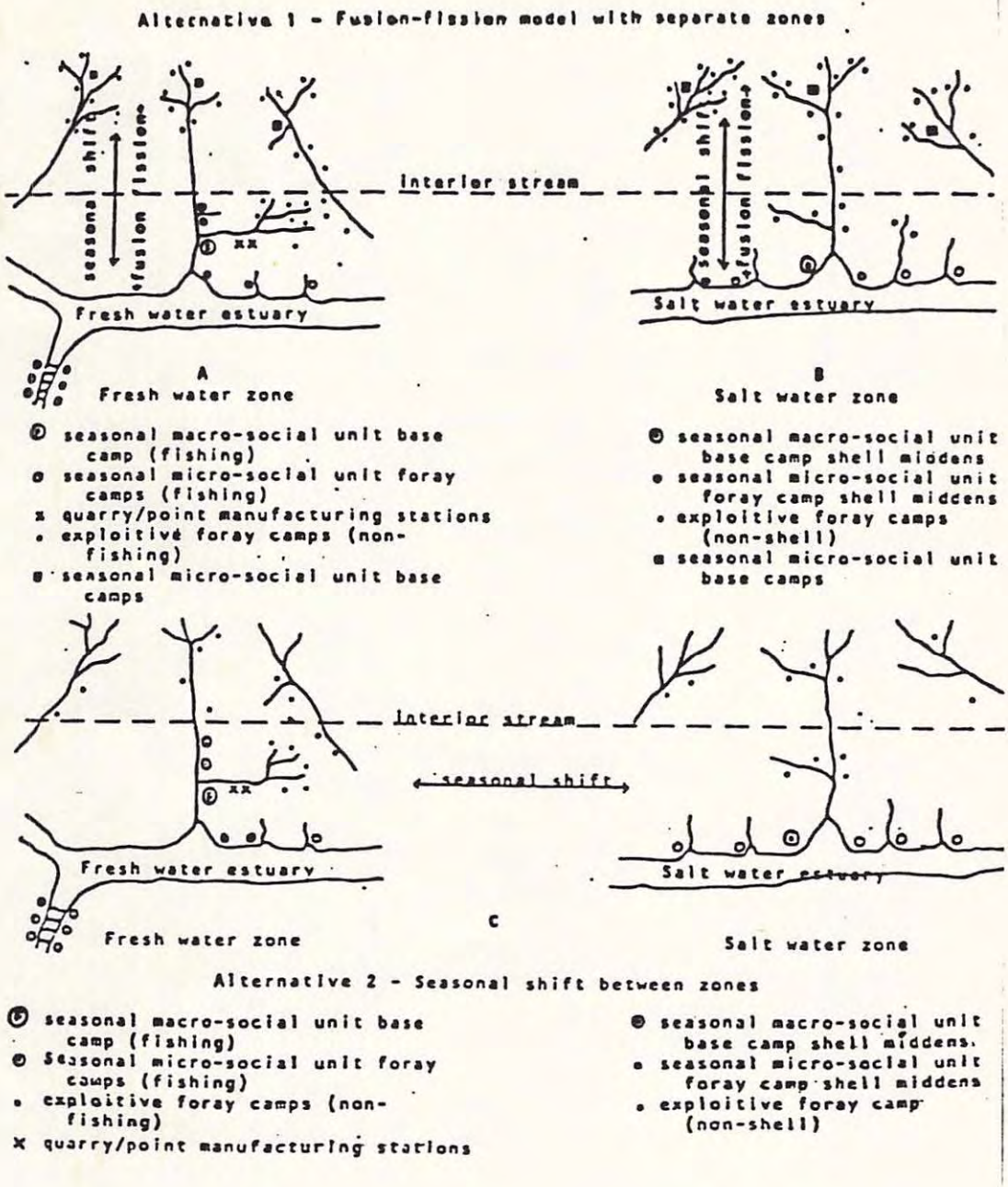


Figure 16. Gardner's (1982:Figure 2) Inner Coastal Plain (Popes reek-Rossville/Piscataway) settlement pattern model.

(Figure 16). The sparse (35%) occupation in the interior compared with the estuarine occupation (65%) indicates a stronger reliance on estuarine habitats and resources. The presence of only oyster shell in the Mockley context at the Taft site offers some support for a greater reliance on or preference for them and, therefore, a greater cultural interaction between the salt and fresh(er) parts of the Potomac Estuary. I stress again, though, the problems with the data: only one stratified site and the typology problem with points.

A modification I would make to the fresh water zone of Gardner's alternative 2 if it is applied to Late Middle Woodland is that seasonal micro-social unit base camps should be added to the interior stream zone. The particular habitat for these would be upland hollows with broad floodplains. The site examples are the Dead Run and Karell sites mentioned above.

The data from Kavanagh's (1982) Monocacy study (Figure 11) indicate that the Mockley pattern probably involved extended trips out of the Coastal Plain. In this case the trips seem to have been to the Monocacy Valley to procure rhyolite. The distribution of points and ceramics throughout the Valley indicates that the stays may have been extended or seasonal. As a result, the seasonal rhyolite trips as well as the foray trips down river for oysters have been included in the new model (Figure 17). The oyster transport is more tentative because its data source is two features on one site. The rhyolite and Mockley/Selby Bay connection appears to be more solid.

<u>Townsend/Potomac Creek-Triangle</u> - Regarding Gardner's (1982:Figure 9) Late Woodland Coastal Plain settlement pattern model shown in Figure 18A, the

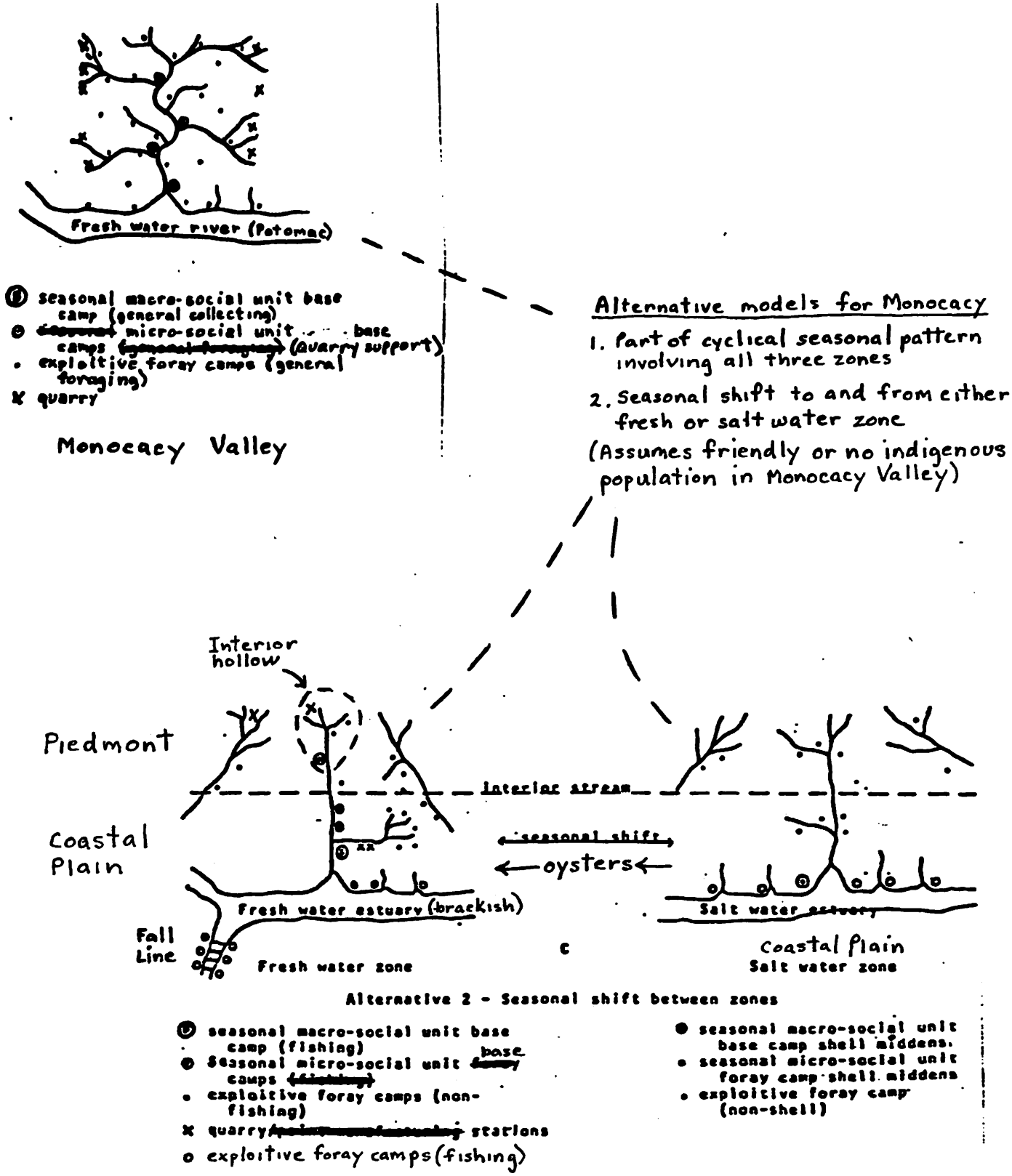
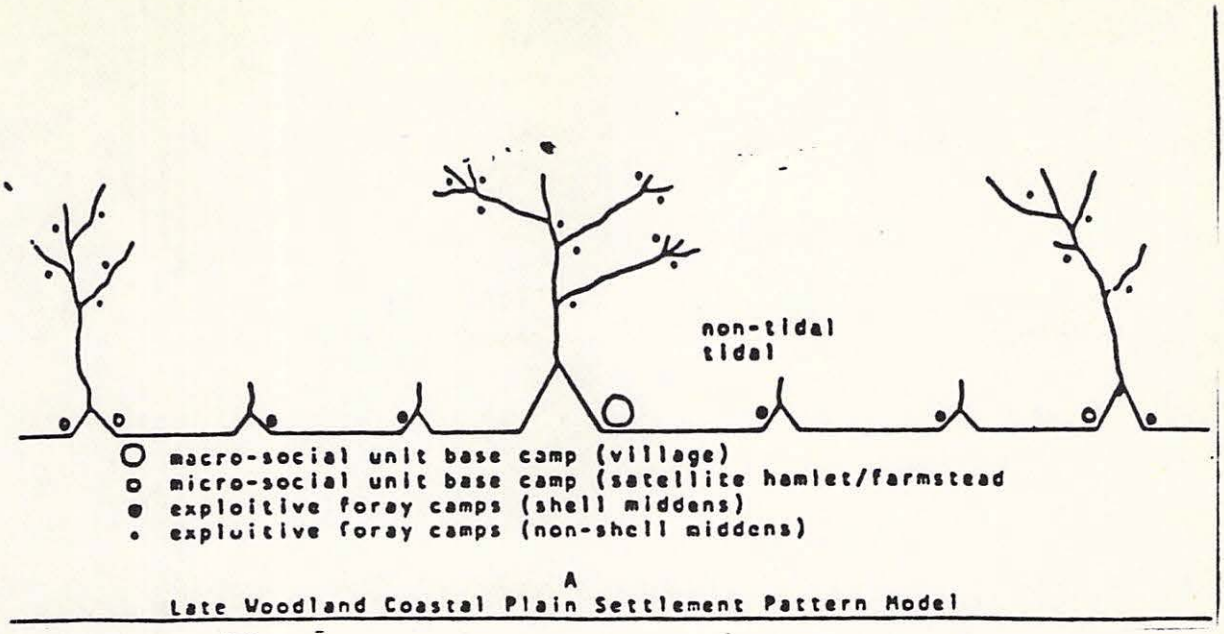


Figure 17. An adaptation of Gardner's (1982:Figure 2) alternative 2 model for Popes Creek-Rossville/Piscataway to Mockley-Fox Creek/Selby Bay for the Potomac River.



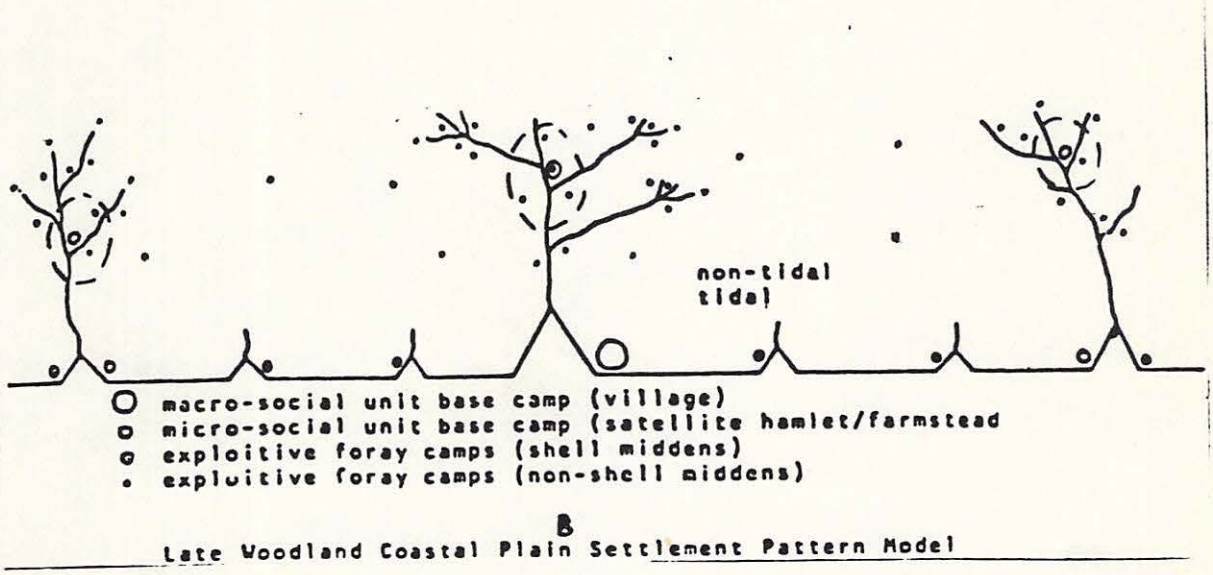


Figure 18. Gardner's (1982:Figure 9) Late Woodland Coastal Plain settlement pattern model (A) and an updated version (B) that applies to the tidal headwaters of the salt water Potomac estuary and Fairfax County.

Fairfax County data indicate a more intensive interior and upland aspect to the distribution of sites. This pattern should include micro-social unit base camps with either seasonal (residential) or logistical functions which are not directly related to agriculture. The updated model (Figure 18B) reflects this change. Model A probably remains valid for the lower Potomac estuary where the interior is environmentally more uniform (Potter 1982:347-353). The lack of oyster shells in the Potomac Creek levels at the Taft site suggests that the interaction between the cultures of the upper and lower estuary was different from that during the Late Middle Woodland.

General - Tentatively (!), the Mockley-Fox Creek/Selby Bay data can be interpreted to indicate that the settlement pattern at 200-880 A.D. in the Fairfax County area was significantly different from that which immediately preceded it. Although not discussed above, the Townsend data which could relate to the early part (900-1350 A. D.) of the Late Woodland do not show a significant change. However, the Potomac Creek data do show a dramatic increase in sites in general.

Regarding the distributional data, the presence of ceramic producing sites in the interior and uplands increases after Popes Creek. This is reflected in the addition of micro-social unit base camps to the Late Middle Woodland and Late Woodland models.

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Stewart

ARCHAIC AND PALEOINDIAN OCCUPATIONS AT THE HIGGINS SITE

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ABSTRACT

The Higgins site is a large prehistoric archeological site situated on an "upland" in the Coastal Plain in Anne Arundel County, Maryland. Phase II and III excavations in 1987 and 1988 revealed extensive intact subplowzone deposits buried to depths of up to 70 cm below the base of the plowzone. Both alluvial and aeolian processes are thought to have contributed to the deep burial of cultural remains, with alluvial deposition being dominant. Intact deposits include extensive Late Archaic Bare Island and Middle Archaic Otter Creek components, along with smaller Early Woodland, Early Archaic LeCroy, and Paleoindian Clovis components. The Paleoindian component is the first intact occupation of this time period known in Maryland. Occupations of different periods are generally horizontally separated. Intact vertical stratification is apparent only with reference to the Paleoindian component that is overlain by an intense Late Archaic occupation.

Paper presented at the 1989 Middle Atlantic Archaeological Conference, Rehoboth Beach, Delaware.

INTRODUCTION

The Higgins Site is located in the Maryland Coastal Plain on a ridgetop above the confluence of Stony Run and Kitten Branch in Anne Arundel County. Portions of Stony Run are presently quite swampy, a situation which has cyclically reccurred throughout the Holocene. The site was discovered by Talbot D. Jones around the turn of the century when it was still in agricultural use. By the time it was first tested by professionals in 1976 as a result of endangerment by construction, the area had reverted to woods. Although the majority of the site was avoided in this first episode of development, subsequent construction again threatened the site in 1987.

Phase II testing in 1987 and 1988 included excavation of 176 systematically placed shovel tests over the entire ridgetop, and 24 sq m of test excavations in 7 small blocks. This resulted in the identification of intact Early Archaic through Late Archaic components in subplowzone context. No vertical stratification of cultural material was identified; however, the components exhibited good horizontal separation. Phase II excavations uncovered several features consisting of small clusters of fire-cracked rock, and one massive concentration of limonite slabs of uncertain origin. Due to the leached, acidic nature of the sandy soils, no preservation of visible organic remains was documented.

Based on test excavation results, Phase III mitigation efforts were undertaken on a small portion of the site within and near the specific project area in the summer and fall of 1988. Two hundred twenty-one square meters were excavated in three large blocks. These larger excavations revealed the existence of intact Early Woodland and Paleoindian components in addition to the Archaic occupations identified previously. Furthermore, the Paleoindian component was vertically stratified below Archaic deposits in one area of the site. No other instance of vertical stratification was uncovered. Other components, although overlapping, were horizontally restricted. Analysis of remains from the site is presently ongoing.

EXCAVATION RESULTS

Block 1

Block 1, the largest contiguous area opened, totalled 151 square meters. Located entirely in the project area, this block was initiated near a Phase II shovel test with a moderate density of artifacts. Exploratory trenches were dug towards shovel tests containing both high and low sub-plowzone prehistoric artifact counts, and cut across a dirt fire road at two locations. Intact deposits including

features and activity areas were discovered in all locations. The northern expansion of the excavations yielded an intense concentration of features and artifact scatters largely dating to the Late Archaic period. The southern portion of the block contained more typical small clusters of fire-cracked rock, and an unusual concentration of small pieces of limonite. The latter feature also contained several large chunks of rhyolite, a limonite abrader, and a rhyolite chopper. Fiber analyses of the chopper revealed legume and compositae plant remains. Unfortunately, no diagnostic artifacts were associated directly with this feature. Other non-diagnostic Archaic period tools recovered from this block include a 34 cm long pestle, a mano and metate, and numerous hammerstone and biface fragments.

Stratified under the Late Archaic deposits in the northern portion of the block were the remains of a small Paleoindian occupation. This was identified by the recovery of two quartz Clovis point bases, and several unifacial scrapers manufactured from exotic, high quality chert. The occupation was spatially defined by the distribution of chert tools and debitage, since this lithic material was only very rarely employed by later occupants of the site. In addition to the diagnostic projectile points and scrapers, several large retouched flakes and piece esquillees made of chert were also recovered. The Clovis component appears to have been small in size, and was completely excavated.

A single feature was recorded in the same levels as the Paleoindian remains. It consisted of a small fire-cracked rock cluster similar to those of later time periods. Analysis of pollen samples from the feature indicated high amounts of oak pollen, in addition to pollen from species preferring wetter conditions such as willow, hickory, maple, and hemlock (typical of Cretaceous pollen assemblages). The feature also contained fibers identified as turkey feather fragments. Examination of the point itself revealed the highest concentration of hickory phytoliths found on any of the artifacts submitted for analysis (Seward 1989).

Block 2

Block 2 excavations expanded a Phase II six square meter test excavation which produced an Early Archaic bifurcated base point, some untyped but probably Early Archaic broad-bladed weakly side-notched points, four small clusters of fire-cracked rock, and an undefined concentration of large limonite slabs. At the close of Phase II investigations, the distribution of tools on the inside of the rock concentration and the debitage on the outside of the limonite suggested that the rocks might form part of the outline of a structure location.

Phase III excavations in Block 2 were limited to an additional 18 square meters because this area was located outside the project area. Further expansion uncovered several more small clusters of fire-cracked rock, two additional bifurcated base rhyolite points, and considerably more limonite. A small concentration of Otter Creek and other side-notched points was located in the western portion of the block. Unfortunately, the expansion of excavations was unable to resolve the origin of the limonite concentration, although boundaries were found on the north and east. The lack of open space within the concentration makes a structural function unlikely. When the fire-cracked rock clusters are mapped in relation to the limonite concentration, however, the features appear to form a semi-circle on the outside edge of the slabs, which may indicate that the rocks had some other cultural function. Geologists visiting the site have been unable to agree if the concentration was the result of natural processes or cultural activities. Geomorphological consultant Frank Vento believes the rocks to be manuports based on their position in the soil profiles.

This block also produced two pestle fragments, one from the plowzone, and one from intact subsoil. This is a previously unidentified artifact in an Early Archaic assemblage.

Block 3

Phase II excavations in the vicinity of Block 3 produced a small fire-cracked cluster closely associated with a rhyolite Otter Creek point, a debitage concentration, and scattering of fire-cracked rock and other tools. Phase III Block 3 expanded the excavations in this area by 66 square meters. Although few other features and relatively little debitage was encountered, these excavations produced a number of additional Otter Creek projectile points and other tools.

The northern portion of this block also contained the only Early Woodland artifacts in intact context found on the site. Two large mendable fragments of Marcey Creek pottery were found in isolated context; while a large feature consisting of fire-cracked rock and limonite produced mendable fragments of a Selden Island pot. Despite the presence of these large sherds, other pottery was conspicuously absent from the plow zone and matrix in this, and other, areas of the site.

COMPONENT DATA AND PROBLEMS

Excavations of large blocks during Phase III mitigation uncovered exceedingly rich archeological remains. Interestingly, the quantity of artifacts found in Phase II

shovel tests was **not** necessarily a good predictor of areas containing intense concentrations of features or living floors, although it probably reflects very well the locations of knapping activities.

Despite the potentially devastating effects of tree roots, features have remained remarkably intact. This is apparently due in large part to the friable sandy soils which make it easier for roots grow around a rock concentration rather than penetrate through it. A substantial amount of historic material in the plowzone also provides a control on the vertical movement of artifacts on the site at least through the 19th and 20th centuries. Although large quantities of coal, cinders, shell, and other historic artifacts were recovered from the plowzone, these later artifacts were virtually absent from subplowzone contexts. An occasional fragment of coal was rarely recovered from the first level below the plowzone, and can be attributed to material trapped in plowscars.

Although features and other cultural remains were plentiful, organic preservation was virtually nil, eliminating the possibility of absolute dating of the site through carbon. Occasional charcoal flecks that did occur in sub-plowzone soils, lacked adequate cultural contexts, were very fresh appearing, and are almost certainly derived from recent forest fires and root burns.

The clear presence of iron in the deposits and association of reddened earth with artifacts in several of the test excavations, led us to explore the possibilities of archeomagnetic dating. Unfortunately, no master magnetic data needed for interpretation was available for the East, nor did available western data extend far enough back in time to be usable. Expanded excavations also revealed that reddened soils were probably caused by natural concentrations of hematite, and not culturally derived. No reddened areas were unambiguously associated with features.

A wide range of pollen samples were taken during excavation and may provide some clues in dating, when taken in conjunction with other artifact and feature distributional data. Stratigraphic columns were taken from all three excavation blocks to provide baseline environmental data, and from features, artifact pedestals, and artifacts themselves. Phytoliths, and other micro-residue analyses were done as well. Analyses by Seward (1989) clearly demonstrated the abundance of this type of data on the site.

In the final analysis, dating of components, and association of diagnostic artifacts with other cultural deposits will have to be done primarily by means of analysis of spatial relationships, and by typological similarities to diagnostic artifacts from other sites. Fortunately, at least partial

horizontal separation of components could be detected at the site. Based on diagnostic artifacts, the Clovis and Bare Island components dominate Block 1, the LeCroy component is restricted to Block 2 where a small Otter Creek component also occurs, and Block 3 contains a substantial Otter Creek component, as well as Early Woodland remains. Most of these components have been firmly dated at other sites in the Eastern Woodlands.

The actual dating of the Otter Creek component, along with the other broad-bladed side-notched points, presents the thorniest problem. Large side-notched points such as Big Sandy I points date to the early Archaic in many contexts in the southeast and mid-continent areas. Notably, at the Stanfield-Worley rockshelter in Alabama, these points were heavily represented in the Dalton levels at the site, occurring below the corner-notched Early Archaic points.

Gardner (1974) named, but never formally described, Warren points from the Thunderbird complex of sites in Virginia. Based on published photographs, this type is similar, if not identical, to the Otter Creek point type described by Ritchie (1961). Gardner places Warren points between Kirk and bifurcated base points in time; however, these side-notched, concave base points have been firmly carbon-dated to about 2000 B.C. at the Vermont Late Archaic Otter Creek type site.

Recently, Funk (1988) has reassessed the dating of the Otter Creek points in New York to an earlier Middle Archaic position. The age of Brewerton points has also been reassessed to an earlier period in Pennsylvania (George and Davis 1986).

Selection of raw materials may prove to be useful in separating out deposits relating to particular components. Probably 98 percent of all flaked stone artifacts recovered from the site consist of quartz tools or debitage. Rhyolite is the next most frequent material, followed by quartzite, chert, and indigenous limonite cemented sands. Although the proportion of quartz drops significantly when only diagnostic artifacts are considered, this lithic material still makes up 75% of the assemblage. Rhyolite accounts for another 20%.

The Paleoindian component, in particular, is marked by the use of chert which is virtually absent in other components. Some of the chert, furthermore, is high quality apple green material most likely from the Normanskill formation in New York. The Early Archaic LeCroy component is characterized by a preference for rhyolite over quartz among the small sample of diagnostic artifacts. The Middle Archaic Otter Creek and Brewerton components show an increased use of

quartz over rhyolite among diagnostic artifacts. By Late Archaic times, stemmed points such as Bare Island are manufactured almost exclusively from quartz.

Systematic two-gallon flotation samples were taken from features and from every level of every 1 x 1 m unit and are still being processed. Although the rationale in their collection and large size was primarily for the recovery of a valid sample of small flakes, preliminary sorting of the light fraction from selected samples have yielded small quantities of seeds and charcoal. These have not yet been analyzed.

DEPOSITION AND STRATIFICATION

The means by which the Higgins cultural deposits were buried has been a subject of some controversy. What is clear is that subplowzone contexts have produced numerous features and activity areas with unquestionable integrity, and that cultural deposits extend to depths of up to 70 cm below the base of the plowzone.

Curry (1980) postulated that the Higgins site, among others on ridgetops in the Coastal Plain in Anne Arundel County, were buried primarily by aeolian deposition, probably occurring most prominently in the dry period between 6000 and 2000 years B.P. More detailed studies at the Higgins site since that time have produced different results. Two sets of soil studies at the Higgins site by Wagner (1988) and Vento (in progress) both resulted in the conclusion that the grain size of site sediments is too large to be consistent with wind borne transport. Vento also notes that the upward fining sequence in the profiles, and the distinctive heavy mineral suite, more likely to support an alluvial origin for the sediments. Wagner attributed the site burial primarily to colluvial slope wash. Vento believes that the bulk of the sands are derived from alluvial overbank deposition. Review of the sites in Curry's study along with recently completed climatic studies of Holocene precipitation, stream dynamics and wind patterns have resulted in the recognition of a number of means for site burial of ridgetop sites in the Middle Atlantic Coastal Plain including alluvial, aeolian, and colluvial processes, and combinations thereof (Curry and Ebright 1989).

The "ridgetop" setting on which the Higgins site is located is a relatively recent phenomenon caused by the rapid Pleistocene and Holocene dissection of the unconsolidated Coastal Plain sediments that were laid down during the Cretaceous period. This fluvial process was simultaneously responsible for the bulk of the medium to coarse-grained sediments deposited on top of the Cretaceous Potomac Group clays. Vento believes the sands now enclosing the cultural deposits were dropped primarily by Kitten Branch rather

than Stony Run due to the lower gradient, and more gently sloping floodplain of the former. Later in the cultural sequence, aeolian and colluvial processes may have functioned to bury cultural deposits in portions of the site. The channels of Stony Run and Kitten Branch are presently too deeply incised for overbank flooding of the site area to occur.

Despite the apparent flat, slightly sloping topography presently on the site, indications of prehistoric small stream channels on the ridgetop were uncovered during Phase III excavations. One of these gullies is apparently responsible for the deeper burial of Paleoindian remains.

Other stratification of the site has apparently been obliterated by plowing in historic times. Examination of surface collections from the site area made by T. D. Jones, Edward Higgins and earlier collections by the Maryland Geological Survey, indicates a strong bias toward larger, stemmed quartz projectile points typical of the Late Archaic and possibly the Early Woodland periods. Almost no points dating to the Middle Archaic or earlier periods are included in the surface collection.

The sample of projectile points produced during Phase III excavations confirmed this apparent plow-destroyed stratification (Figure 1). Woodland period points occurred only in the plowzone, along with approximately one third of the Late Archaic stemmed points, and only a single side-notched Middle Archaic point. Two-thirds of the Late Archaic points, 97 percent of the Middle Archaic points, and all the Paleoindian points were in intact subplowzone settings. This distribution of diagnostic artifacts, while documenting previous vertical stratification, also tends to diminish the probability that aeolian deposition/deflation played a major role in site burial.

CONCLUSIONS

Field results and analyses completed to date indicate that the Higgins Site was seasonally reoccupied from Paleoindian through Early Woodland times. The attraction to the area was no doubt a combination of factors including exploitation of the water sources of Stony Run, Kitten Branch, and the marshy area at their confluence. Both these streams also cut down through Cretaceous gravel beds which provided an important lithic resource that was actively exploited by site inhabitants. In addition, pollen studies document an increasingly oak-dominated forest with recurring periods during which species adapted to wetter conditions are also present. This vegetation community would provide abundant food sources for both humans and game animals.

The intensity of cultural debris from the Archaic period

suggests that occupations from this time were probably substantial although not necessarily prolonged in duration. The recovery of pestles, grooved axes, manos, and a metate testify to the importance of exploitation of floral resources. A dominance of projectile points among the Archaic flaked stone tools reflects use of the area for hunting as well. Stone tool manufacture occurred concomitantly with these activites, utilizing the secondarily deposited cobbles close at hand.

Lack of extensive ceramic artifacts and Woodland-related features may indicate a more ephemeral use of this upland zone for specialized hunting and gathering uses. Nearly a century ago, T. D. Jones noted that Woodland village sites in this area were concentrated along the larger Patapsco River floodplain and terraces, and that upland sites with Woodland pottery were very rare.

Examination of the flaked stone tools provides evidence that retooling was an important activity at the site. Many whole projectile points discarded on the site exhibit multiple episodes of resharpening. Excessive resharpening is especially apparent among the Middle Archaic Otter Creek and other side-notched points.

Numerous biface fragments in various stages of completion and hammerstones attest to the manufacture of quartz tools directly on the site. Massive quantities of quartz debitage include numerous flakes from all manufacturing stages.

Other lithic resources utilized include the Paleoindian use of chert, and Early and Middle Archaic use of rhyolite. Most chert debitage is very small and reflects tool maintenance activity. Larger chert flakes are invariably retouched, and were heavily used. Rhyolite was apparently obtained directly from the Catoctin source area in at least several cases. Large rhyolite chunks and debitage from the beginning stages of the reduction process is present in some quantity, in addition to the more expected biface thinning and tertiary flakes.

Excavation of the Higgins site has also highlighted some methodological concerns in the excavation of buried Coastal Plain sites. Most obviously, the assumption should **not** be made that ridgetop settings in the Coastal Plain will necessarily have shallow soils and therefore shallow archeological deposits. In the same vein the assumptions **cannot** be made that all archeological deposits will be contained in the disturbed plowzone, nor that surface collections, even if acquired over a long period of time, will accurately reflect the cultural content of the site.

Finally, mindless shoveling out the plowzone without screening because it is "disturbed", as a means of saving

time, money, and getting to the intact deposits faster, is likely to be counter-productive in many instances. The contents of the plowzone, even if consisting of several mixed components, can be crucial for determining the degree of integrity of underlying deposits, the pre-plowing stratigraphy of the site, and for reconstruction of the geomorphological history of the site.

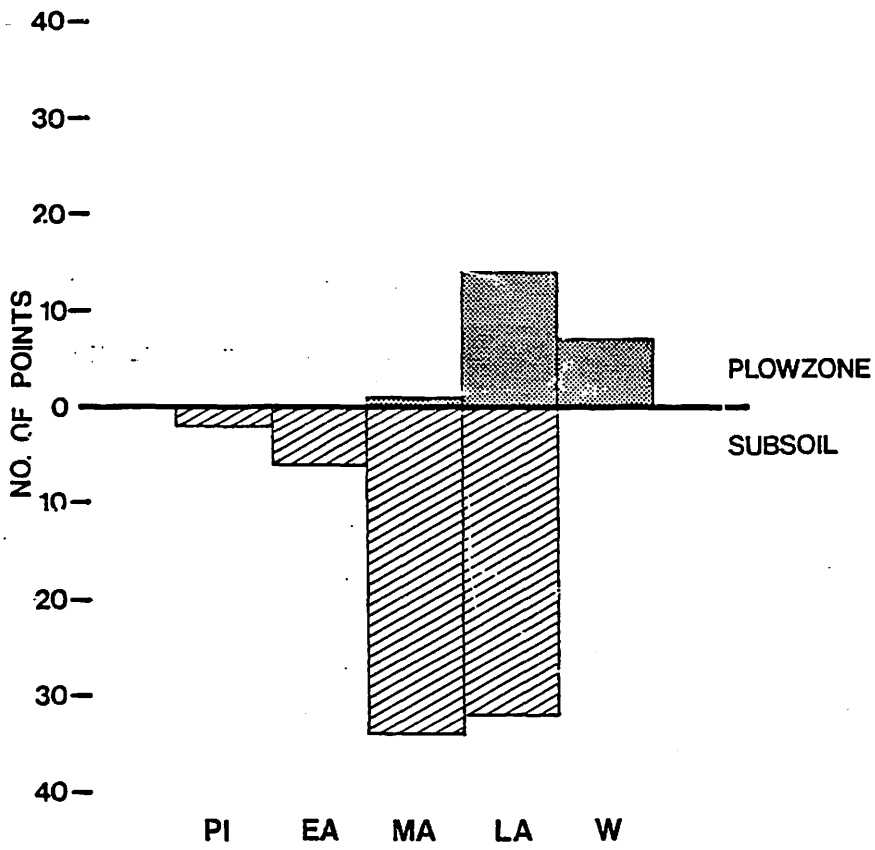

Fig. 1. Distribution of diagnostic artifacts from the Higgins site in theplowzone and intact subsoil.

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Stewart

INVESTIGATIONS

AT A

LACKAWAXEN GENERALIZED HUNTING SETTLEMENT

IN THE MIDDLE DELAWARE RIVER DRAINAGE

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ABSTRACT

Data recovery investigations at the Worrell Site (28Bu252) in Burlington County, New Jersey recorded a Delaware Valley Archaic complex settlement on the middle part of the Assiscunk Creek drainage. The approximately seven acre Lackawaxen settlement area was situated adjoining wetland and woodland ecozones at the juncture of the creek and a tributary. The generalized hunting camp was used for purposes of faunal and floral food procurement as well as lithic manufacturing and general settlement maintenance processes. The seasonality of the settlement has not been specifically defined, but it appears to have been in use from summer through fall.

The integrity of the cultural material patterns was preserved, which permitted a study of the site's infrastructure and tool assemblage. In addition to foodways activities, fabrication, processing, and general utility settlement practices were maintained with little change over time. The manufacture of flaked and groundstone tools also occurred at the site. Included in the assemblage were sherds from a Marcey Creek vessel, which raised the question of ceramic use by this Late Archaic culture. Recent radiocarbon dates from Lackawaxen components in the region, as well as thermoluminescence analysis of Marcey Creek ceramics in Burlington County, indicate a possible contemporaneity.

PURPOSE

The data recovery program conducted at the Worrell site (28Bu252) was part of a New Jersey state permit action associated with the construction of the Burlington County Waste Treatment Facility Complex. MAAR Associates, Inc. was contracted by the Burlington County Board of Chosen Freeholders to conduct the data recovery program during the summer of 1988.

Project research was directed by Ronald A. Thomas, Principal Investigator, and Ted M. Payne, Research Associate. Wayne Mellin was Field Supervisor and was assisted by Mark Shaffer. Veronica Riegel was the Field Registrar. Data analysis was conducted by Mark Shaffer and Ted Payne, with graphic illustration by Richard Green and artifact photography by Marge Green.

The purpose of the following paper is to provide a general introduction to this important single component Lackawaxen site - its history, cultural system, infrastructure, and processes - as well as to offer comments about the Lackawaxen settlement pattern to which it belonged. Time limits prevent a comprehensive presentation of the substantial number of research topics contained in the Worrell site data base.

LOCATION AND ENVIRONMENT

The seven acre Worrell site is located along the middle section of Assiscunk Creek, a stream that empties into the Delaware River at a point approximately 14 miles south of Trenton, New Jersey. Environmentally, the site is situated at the confluence of an unnamed small tributary and the creek. Wetlands, the creek's swamp forest and floodplain, adjoin the southern and southwestern boundaries while the inland landscape was once in a woodland setting. Topography of the area is relatively level with gently rising terrain extending inland from a steeply recessed creek basin along the south and southwest. The land had been mostly cleared for cultivation and used as a workout track for harness racing.

SITE HISTORY AND CULTURAL AFFILIATION

Results of earlier investigations (Payne and Baumgardt 1985; Payne et al. 1987) and the data recovery analysis indicate 28Bu252 was occupied by Lackawaxen cultural groups throughout the site's history. Any additional prehistoric site use was of a transitory nature. There were 61 Lackawaxen projectile points and eight other point forms recovered. Among the eight points, one was an Eshback type and three were Normanskill-like type. These four classified points are affiliated with the Late Archaic period's Piedmont tradition and contemporary with the regional Delaware Valley Archaic complex (Kinsey et al. 1972), to which the Lackawaxen phase belongs.

Because the Worrell site basically has a single component history, it is possible to assign its cultural system and associated processes to the Lackawaxen phase. Interpretations developed about the

tool assemblage basically correlate with those published for the Lackawaxen phase (Kinsey 1971; Kinsey et al. 1972), with one exception. It is possible that Lackawaxen cultures in the Middle Delaware River Valley were using Marcey Creek Plain pottery. Sherds of a single vessel were recovered from a preserved context, and in proximity to Lackawaxen projectile points. Eight sherds from apparently one vessel were clustered inside a complex of hearths where domestic as well as other settlement activities were carried out (Plate 1).

Immediately after the recognition of these ceramics, work was stopped in the general area and the services of a soil scientist were contracted. Dr. Raymond Mueller of Stockton State College was called to the site to make a study concerning the integrity of the site's soil and the history of disturbance, in any. His knowledge and previous experience with archaeological investigations in the region aided the study. Results of the study indicated the cultural material context below plowzone was essentially preserved, and valid interpretations concerning spatial correlations could be made. There was no indication of soil deflation in the excavation unit or throughout the site.

The recovery of Marcey Creek ceramics within Lackawaxen cultural deposits in the Middle Delaware River Valley should not be totally unexpected. The dating of Lackawaxen components from the Abbott Farm Complex and a Marcey Creek thermoluminescence date from the Larchmont site (28Bu125) indicate that there is a contemporaneity. The Shady Brook site (28Me20 and 28Me99) produced a Lackawaxen component date of 890 B.C. +/- 120 years, the Gropps Lake site (28Me100G) had a date of 700 B.C. +/- 120 years (Stewart 1986, 1987), while the Larchmont site's Marcey Creek date was 750 B.C. +/- 270 years (Mounier 1988). Based upon these dates and the results from the Worrell site, it appears that some form of Middle Delaware River Valley Lackawaxen culture continued later in time than the 1700 B.C. terminal date reported for the Upper Delaware River Valley (Kinsey et al. 1972).

CULTURAL SYSTEM

Analysis of the cultural system indicates 28Bu252 was used as a generalized hunting camp (Winters 1969). The cultural activity within the site was not only devoted to food procurement and processing but substantial attention was given to the manufacture and refurbishing of tools and weapons as well as other generalized camp maintenance necessary for a protracted period of occupation.

SITE SUBSISTENCE

Because of the lack of food remains, determination of subsistence practices must be based on a functional interpretation of food procurement and processing tools recovered from the site. Artifact types included projectile points, butchering tools, pulverizing and milling tools, and a limited number of nuttingstones. Subsistence practices indicated included animal hunting and butchering, plant collection - probably including roots and seeds - and some nut procurement. There was no evidence of aquatic resource use.

Because of the site's ecotonal setting, a diverse variety of animal and plant resources from the adjoining wetlands and woodlands was available for harvesting. Based on the accessible food resources and the documented tool types, it would appear that the Worrell site was occupied for an undefined period of time during the summer through fall seasons, particularly the latter.

SITE INFRASTRUCTURE

Pemberton sand's inability to preserve organic stains over time prevented the recognition of pit features and house post holes. Because of this possible feature omission, there is the potential for introducing a bias into the infrastructure interpretation of the site.

Over time, the horizontal size of the site enlarged with growth to the east. Out of the condensed initial habitation area expansion was directed inland away from the streams and into the central part of the site. Here activity loci were more dispersed.

The principal activity locus was the rock hearth. These features were found in each cultural strata. In the northeastern or earliest part of the site, 11 hearths were clustered with an average separation interval of 12 ft, while in the central or expansion area the interval between the 13 hearths was 24 ft. For some unexplained reason, hearths were more widely distributed in the central or expansion area of the site.

The study of the hearth as a locus for site activities was accomplished by the piece-plotting of surrounding artifacts and the functional analysis of their distribution at distances of 5, 10, and 15 ft radii. The functional analysis was focused more on presence and absence because of a limited artifact frequency. Foodways activities were prominent inside the 10 ft radius, and general utility tools mainly occurred between the 10 to 15 ft radii. Fabricating and processing tools for manufacturing were not common. It appears that hearths were a settlement activity focal point and were probably family directed.

In the central area, the second most common activity feature, the artifact cluster, was found. These features were only recognized in the central or expansion area where they were interspersed between hearths. Here, fabricating and processing tools were more common, indicating a locus for manufacturing and refurbishing processes along with other activities.

SITE PROCESSES

Artifact types and specialized features were classified by their functions and grouped according to the site processes to which they were affiliated. The groups consisted of domestic, weapons, general utility, and fabricating and processing (Winters 1969). Included in the study was lithic technology conducted at the site.

A quantification of the artifact functional analysis found weapons constituted 27% of the assemblage, 11% was made up of fabricating and

processing tools used, and domestic implements, primarily foodways related, amounted to 12%. Fifty percent of the assemblage contained general utility tools, tools devised for a general array of settlement processes with many having multiple purposes and some cross cutting other functional tool groups. Throughout the site history these functional group percentages changed, but the general pattern continued. This continuity indicates a relatively stable and conservative site system.

Domestic Group - The primary artifact types were affiliated with food processing practices. Cobble tools included pestles along with a limited number of nuttingstones. The nuttingstones were from the earlier deposits. Choppers were not prominent while mullers were common. Two millingstones were recovered, and a millingstone with muller were preserved in association.

Included in the foodways assemblage was the Marcey Creek vessel, associated with the later cultural deposits (Plates 2 and 3). The steatite-tempered sherds were relatively thick, ranging from 0.9 to 1.6 cm, and temper size varied from 0.2 to 1.0 cm. Vessel shape appeared to be rectangular with a flat bottom. Interior and exterior surface color ranged from light to pinkish brown. The core was black, which is indicative of improper oxidation during firing (Shepard 1954).

Weapons Group - The assemblage primarily consisted of projectile points which served in food procurement as well as other undefined activities. Fred Kinsey (Kinsey et al. 1972) proposed three subtypes for the Lackawaxen projectile point type. Two of these, Straight Stem and Converging Stem, were equally divided in the assemblage while the third subtype, Expanding Stem, was represented by one point (Plate 4). In form and dimension, the projectile points were generally similar to Kinsey's descriptions. The other projectile point forms and two possible argillite tie-on bannerstone fragments complete the Weapons Group (Plate 5).

General Utility Group - In this group were discoidal knives which were recovered in situ from the artifact cluster features. These tools may represent animal butchering which was conducted at locations away from the immediate vicinity of the hearth activity areas. Pebble and cobble tools included hammerstones, several of which were of the chert variety used in pecking groundstone tools. A series of scraping tool forms were found, including utilized flakes. Scrapers were generally "pick-up" tools as opposed to the more "classic" forms. Scrapers exhibited both hardwood and hide or softwood wear patterns (Cantwell 1979; Keeley 1980). Utilized spalls were recovered throughout the site. Their uses probably included chopping, cutting, and scraping.

A specialized feature type, the vertical pestle, was noted at three locations across the site and throughout the occupation levels. Two out of three were located near the 15 ft radius of hearths. The feature consisted of a pestle which was buried in an upright position with one polar surface exposed several centimeters above ground surface. No particular associated tool types or debitage were recognized, so the purpose of the feature must remain conjecture. The

vertical pestle might have been used as a platform, possibly for percussion activities. Attrition was noted on the exposed surface but such polar wear is characteristic of conventional pestle use.

Fabricating and Processing Group - These manufacturing tool types were both flaked and groundstone as well as just utilized cobbles and pebbles. Utilized cobble and pebble tools included anvilstones and abraders. Groundstone tools were limited to axes, with one exception where a pecked and ground pestle fragment was used in a vertical pestle feature. Axes, sufficiently complete to permit classification, were of the full-grooved type.

Flaked drills, microgravers, and micro-perforators were recovered across the site and throughout the site history. In almost every circumstance, microtools were found in the areas of increased frequency of non-argillite lithic debitage. In one small feature these tools were in direct association with the debitage. Microgravers have been interpreted as tools used in leather fabrication for footwear, clothing, and shelter; however, wood and bone working have been recorded (Cook 1976; Winters 1969). The association with lithic debris might indicate use in hafting or shaft scoring.

Lithic Industry - Lithic technology at the site offered several points of interest. First, insight into axe manufacturing was possible by the comparison of an incomplete and a finished full-grooved axe. In the manufacturing process, a cobble was selected for its natural form and then an extensive pecking process was conducted to shape the blade and pole edges as well as to create the hafting groove. Flaking does not appear to have been extensive. It was noted only in one section of groove preparation. The finished axe retained the pecking patterns found on the unfinished tool. The cobble cortex was not removed from the surfaces of the finished tool, except for areas essential to the tool's use as an axe. One point of importance here is the <u>lack</u> of grounding on the axe surfaces which is contrary to common axe technology. Only one ground axe fragment was recovered.

Another point of interest pertains to lithic artifact caching and flake technology. Three caches of argillite flakes, blanks, and preforms along with a cache of tabular quartz were found. The three argillite caches were dispersed across the site throughout occupation levels. Probably placed in pits, these cached lithics were stored for future use, and their presence indicates the substantial duration of the individual occupation term.

An analysis of flake technology for the site revealed that argillite decortication flakes were not common. Primary argillite flakes had the greatest percentage, followed by secondary flakes. The caching of reduced materials and the low frequency of decortication flakes can be interpreted to suggest that a substantial amount of the initial reduction of argillite occurred off-site, possibly at quarry locations to the north of Trenton, New Jersey. The elevated percentages of argillite primary and secondary flakes would result from reducing the cached materials on-site.

The argillite practices are contrasted by those used for chert, quartzite, and quartz reduction. These, particulary chert and quartzite, had high percentages of decortication, secondary, and tertiary flakes. This pattern suggests a manufacturing process where cobbles and pebbles were reduced on-site. Local Pleistocene deposits would have offered an ample supply of these lithics.

A lithic reduction tool kit was recorded in situ at the site, and the kit's components were typical for the site. Cores of chert and argillite were accompanied by a pebble hammerstone and abrader as well as a chert pebble hammerstone for pecking groundstone tools.

SETTLEMENT PATTERN

The Worrell site inhabitants were involved in the Lackawaxen settlement pattern, a pattern that has yet to be comprehensively defined. It would appear that an annual schedule was maintained for the harvesting of native flora and fauna and the procurement of other material resources, as well as undefined social scheduling for religious, marriage, and kinship purposes.

The continuing need for argillite to meet the demands of their lithic industry would indicate an active schedule of procurement trips to the north of Trenton for new materials. The tabular quartz cache was not obtained locally and the steatite used to temper the Marcey Creek pottery could only have been secured from sources in eastern Pennsylvania, eastern Maryland, or other distant locations.

One point of importance here is the geographic relationship of the lithic sources and the Delaware River drainage. All of the lithic materials were available by waterway routes and short portages. Thus, groups could, with relative determination, have acquired these selected lithic materials during their annual seasonal rounds.

It appears that the generalized hunting camp maintained at the Worrell site was part of a settlement pattern based, at least in part, on an annual seasonal schedule that utilized the Delaware River and its tributaries for the procurement of resources necessary to its cultural group's continuation.

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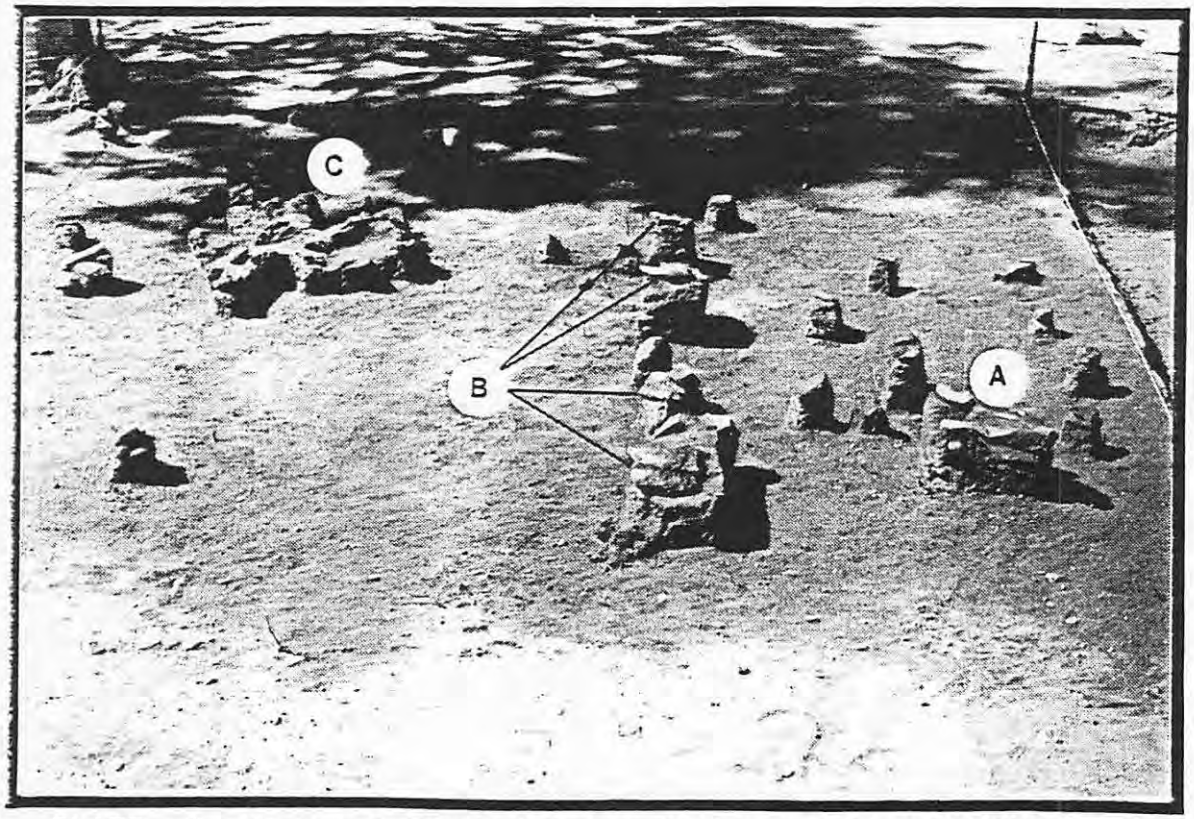

PLATE 1 : Feature 9, Hearth & Feature 2, Knapper's Tool Kit With Marcey Creek Sherds in Between - A: Feature 2, Knapper's Tool Kit, B: Marcey Creek Sherds, C: Feature 9 Hearth

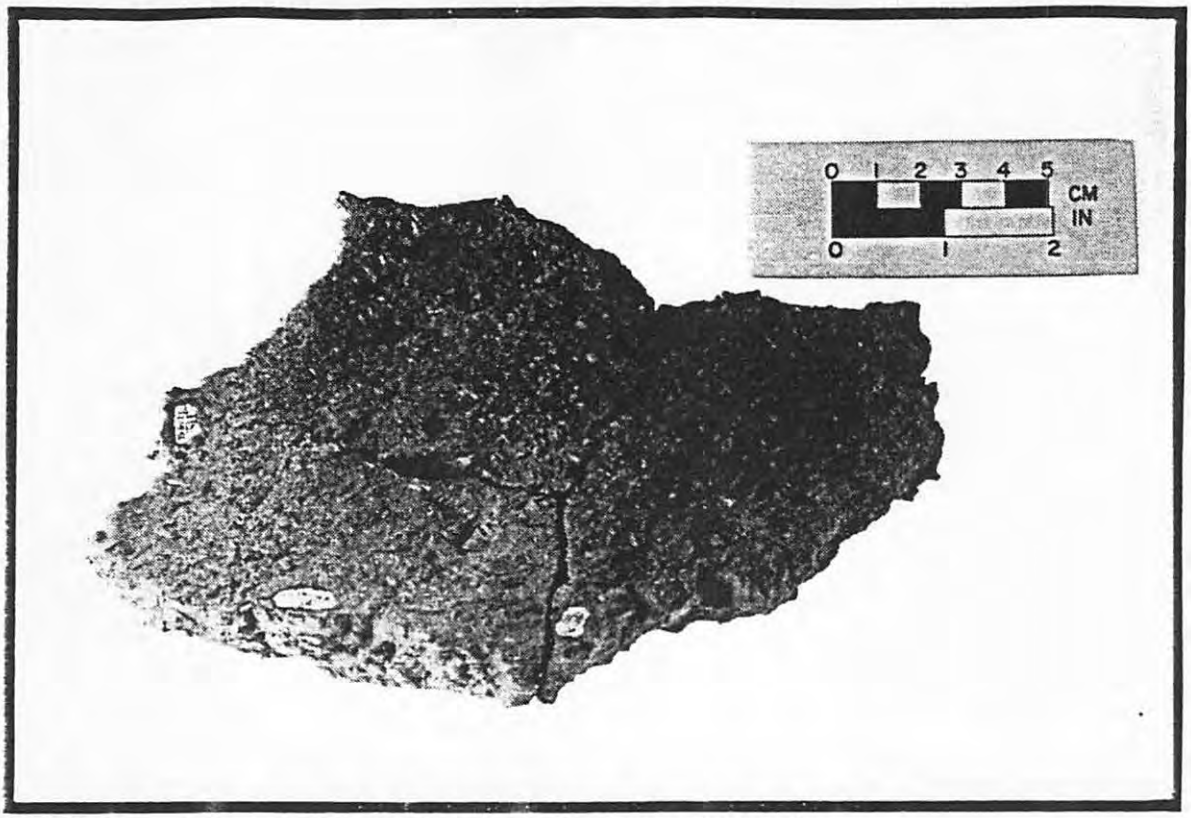

PLATE 2: Interior Surface of Marcey Creek Sherds

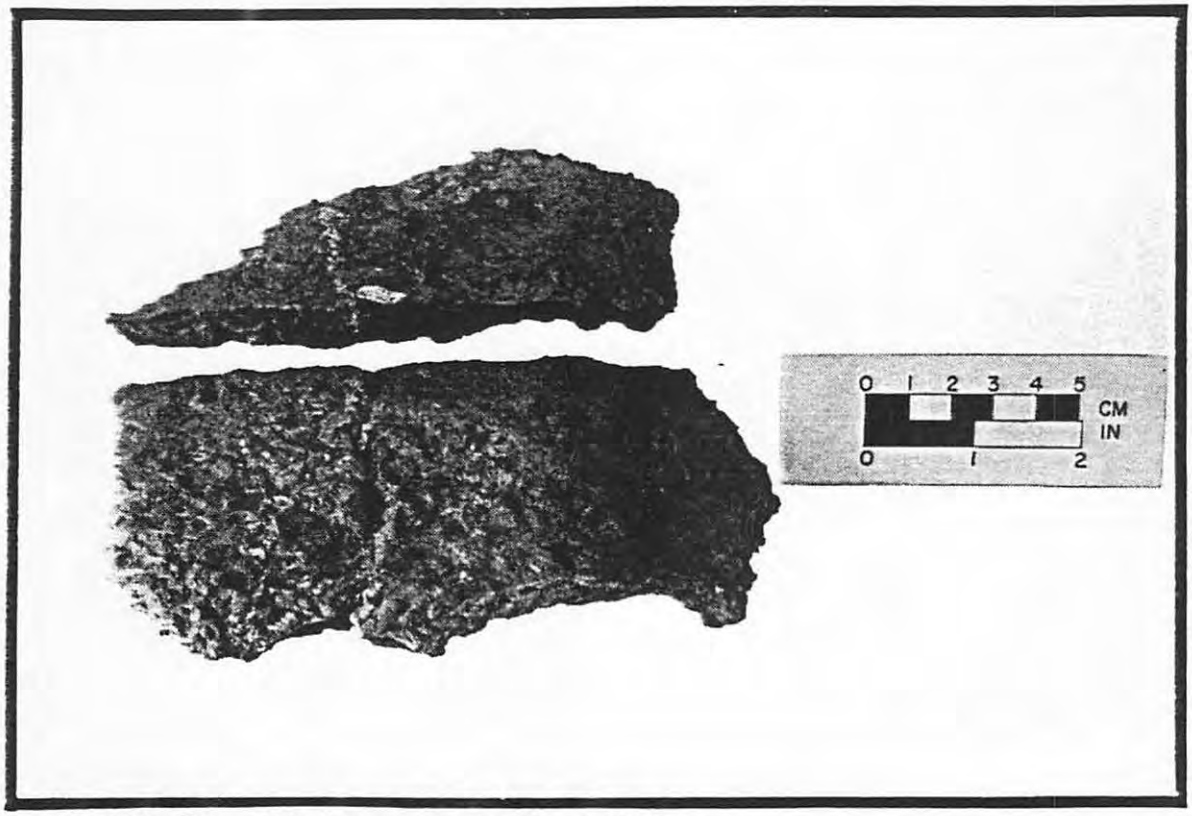

PLATE 3: Exfoliated Exterior Sherd Surface

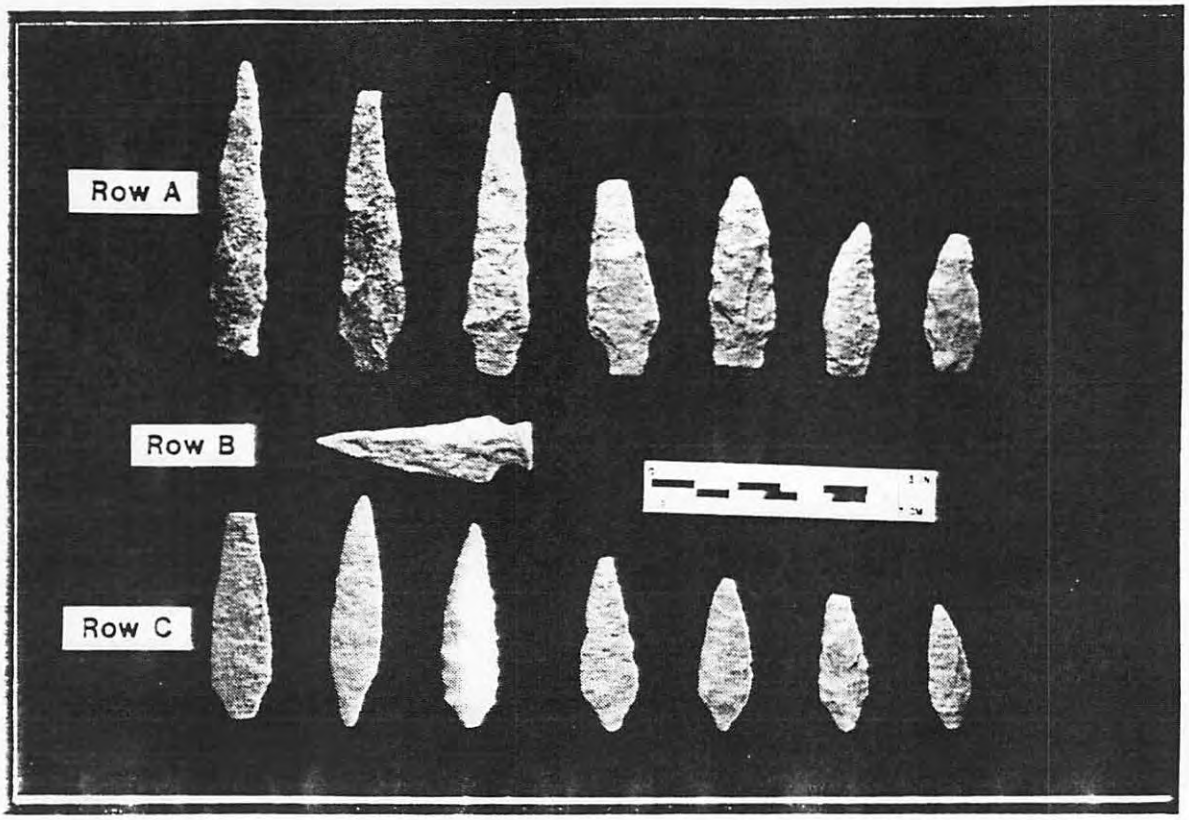

PLATE 4 Lackawaxen Subtype Projectile Point Examples - Row A: Straight Stem Subtype, Row B: Expanded Stem Subtype, Row C: Converging Stem Subtype

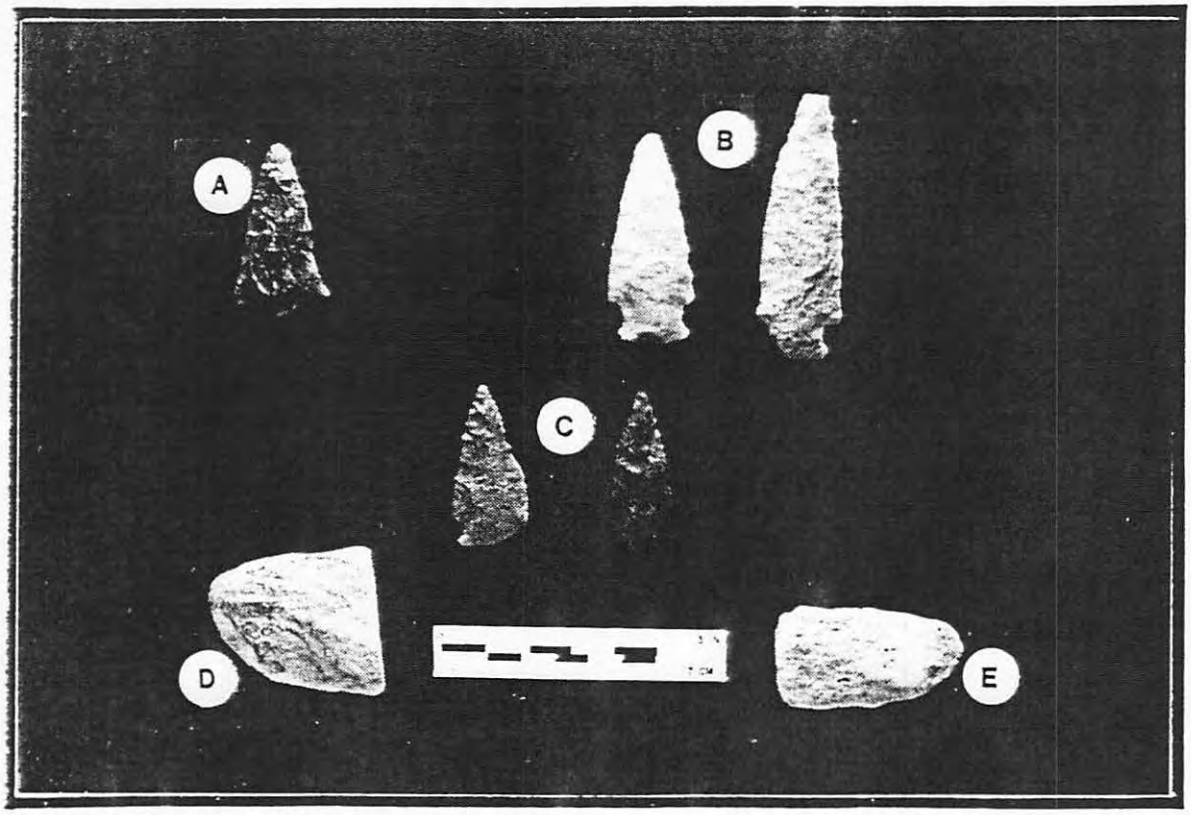

PLATE 5: Other Projectile Point Types - A: Eshback Type, B: Normanskill-like Type, C: Untyped, D & E: Possible Tie-on, Chipped Argillite Bannerstone Fragments

THE WOODLAND I - WOODLAND II TRANSITION IN THE DELMARVA PENINSULA AND SOUTHEAST PENNSYLVANIA

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ABSTRACT

The transition between Woodland I and Woodland II periods (ca. A.D. 800 - A.D. 1000) is one of the most pronounced cultural changes seen during the prehistoric occupation of the Delmarva Peninsula and southeastern Pennsylvania. Cultural changes manifested in the local archaeological record include changes in site distributions and settlement patterns, the abandonment of some sections of certain drainage basins, the demise of regional exchange systems, the demise of local complex socio-political systems, the appearance of new and diverse ceramic technologies and ceramic design systems, and the appearance of certain special exotic artifact forms and mortuary ceremonialism traits which are virtually identical to similarly dated archaeological complexes of the eastern Great Lakes, central Pennsylvania, and western Virginia. The Woodland I/Woodland II cultural discontinuity is probably the result of a migration of Algonkian-speaking groups into the area.

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The transition between Woodland I and Woodland II periods (ca. A.D. 800 - A.D. 1000) is one of the major cultural discontinuities in the 12,000 year occupation of the Delmarva Peninsula and southeastern Pennsylvania. Although ecological explanations have been proposed to account for this cultural change (Custer 1989a; 1984a; 1982a), these explanations were not always completely satisfying. Recent research has shown that the extent of the Woodland I/Woodland II cultural discontinuity was even greater than originally thought and that there were similar wide-ranging cultural events taking place at the same time throughout the Northeast and the Middle Atlantic (Custer 1989a; 1989b). Furthermore, recent lexicostatistical and glottochronological analyses of Algonkian languages (Luckenbach, Clark, and Levy 1987; Fiedel 1987, 1989) have suggested that there were population movements throughout the Northeast and Middle Atlantic at roughly the same time period. This paper will examine the new data on cultural changes during this time period and assess the relative utility of explanations based on ecological models and those based on linguistic models of population movements.

SETTLEMENT PATTERNS

The best information on changes in site distributions and settlement patterns comes from the Coastal Plain of the Delmarva Peninsula (Delaware Bureau of Archaeology and Historic Preservation 1978; Griffith 1974; Custer 1984a, 1982a, 1989b; Galasso 1983; Custer and Galasso 1983). In the Low Coastal Plain of central Kent County, particularly in the St. Jones,

Murderkill, and Mispillion drainages, the settlement pattern for the time period between 3000 B.C. and A.D. 500 is characterized by a series of large base camp sites and many dispersed ephemeral lithic scatter sites. The large base camp sites, identified as macro-band base camps, are generally located along the major drainages in the mid-drainage zone while the lithic scatter sites are found throughout the interior at low order ephemeral streams and near poorly drained swamps. Beginning in Carey Complex times (ca. A.D. 0 - A.D. 500), however, this settlement patterning begins to change. Large base camps are no longer common and the residential component of the settlement systems is mainly composed of smaller base camps, which have been identified as micro-band base camps. There also seems to be a shift from a focus on the mid-drainage zone to the coastal areas of the Delaware Bay. The distribution of small interior lithic scatter sites remains the same throughout the Carey Complex settlement shift.

Recent archaeological survey in the Nanticoke drainage of Delaware and Maryland (Custer and Mellin 1989) which identified more than 350 sites has shown what seems to be an abandonment of, or at least a highly reduced settlement focus on, the middle and upper sections of the drainage during late Woodland I times. Prior to A.D. 500 there is extensive settlement throughout the middle and upper section of the Nanticoke and its higher order tributaries including many macro-band base camps. However, it is difficult to find sites dating to Late Carey Complex times (ca. A.D. 500 - A.D. 1000) anywhere in the Nanticoke drainage. There are numerous Woodland II sites post-dating A.D. 1000 all through

the middle and lower drainage but few, if any, late Woodland I sites. Because of the intensive coverage of the survey, and the existence of a well-developed ceramic chronology for the region which ensures the recognition of sites from this time period (Artusy 1976; Griffith 1982), the significantly low number of late Woodland I sites in the drainage is not due to sampling biases or other methodological problems.

In the Atlantic Coast zone of Delaware, which includes the Indian River and Rehoboth Bay drainages, there is also evidence of a settlement pattern change even though the survey data are not as comprehensive as the Nanticoke data (Custer and Mellin 1987; Custer 1987a). Large base camp sites are seen throughout the middle portion of the Indian River drainage, especially near the confluence of Indian River and Vine and Pepper Creeks, during the Woodland I period up to ca. A.D. 500. However, after A.D. 500 smaller base camps become more common and the earlier settlement focus on the middle portion of the drainage gives way to a pattern of extensive settlement throughout the drainage, especially in the areas immediately west of the barrier island complex. By Woodland II times there is extensive settlement throughout the entire Indian River/Rehoboth Bay drainage (Custer and Griffith 1986).

In the Piedmont Uplands and Lancaster/Frederick lowlands of southeastern Pennsylvania, the settlement pattern data on the late Woodland I period are not as extensive as the data for the Woodland II period. Nonetheless, some changes can be noted. The available data for Woodland I period (Kinsey 1977; Custer 1982b,

1989c) suggests that there is a continued focus of fairly large residential sites on the floodplains of the Susquehanna and Delaware Rivers and their major tributaries. As was the case in the Coastal Plain, there are also many small lithic scatter sites throughout the interior areas that probably represent procurement sites (Custer 1988). By A.D. 1000, the settlement pattern changed to one dominated by small farmsteads along the major drainage floodplains in the Lancaster/Frederick Lowlands (Custer 1986; Graybill 1973). In the Piedmont Uplands there is little or no settlement pattern change at this time (Stewart, Hummer, and Custer 1986). The extensive use of upland interior areas which characterized Woodland I times does not extend into Woodland II times and although there are some interior procurement sites dating to Woodland II times, they are not as numerous as they were during Woodland I times (Custer 1982b, 1986:128-129, 1988).

In sum, numerous changes in settlement patterns characterize the end of the Woodland I period. Some of the changes seem to have begun as early as A.D. 500, while others occurred later. Nonetheless, it is accurate to say that the time period between A.D. 700 and A.D. 1000 was characterized by realignments of local population distributions throughout southeastern Pennsylvania and the Delmarva Peninsula.

REGIONAL INTERACTION AND SOCIO-POLITICAL SYSTEMS

One of the main characteristics of the Woodland I period on the Delmarva Peninsula is the development of extensive regional exchange networks, some of which are linked to systems of mortuary ceremonialism indicative of incipient ranked societies

(Custer 1982a, 1984a, 1984b, 1989). The Delmarva Adena Complex (ca. 500 B.C. - A.D. 0) represents the apogee of the development of these exchange and mortuary ceremonialism systems and is focused in the central Delmarva Peninsula, particularly in the St. Jones, Murderkill, and Choptank drainages (Thomas 1970; Custer 1987b). There is a good archaeological sequence spanning the time period from ca. 3000 B.C. to A.D. 0 which documents the development of the far-ranging exchange networks which brought exotic raw materials and finished artifacts into the Delmarva Peninsula region (Custer 1984a, 1984b, 1987b, 1989b). However, after A.D. 0, the exchange networks which brought the most exotic items into the Delmarva Peninsula apparently collapsed, as did the complex social systems to which they were related. There are only a few scattered instances of Hopewellian artifacts found on the Delmarva Peninsula (Custer 1989b; Smith 1972, 1979). However, the more localized exchange networks did continue to operate although in slightly altered forms.

Exchange systems which brought rhyolite into the southeastern Pennsylvania and Delmarva Penninsula region from south central Pennsylvania show some changes during the middle part of the Woodland I Period (Custer 1984b, 1989b). Prior to A.D. 0, rhyolite is a relatively minor component of the most well developed exchange networks on the Delmarva Peninsula. Also, the main path of the exchange networks seems to be from north to south down either the Delaware River and Bay or the Susquehanna River and the Chesapeake Bay. After A.D. 0, the main axis of the exchange systems shifts and seems to be from northwest to southeast down the Potomac River. In some areas, such as the

Nanticoke, there seems to be a relatively constant flow of rhyolite via the Potomac networks from as early as 3000 B.C. to A.D. 1000 (Custer and Mellin 1989). However, in other areas, such as the Indian River and lower Choptank drainages, the influx of rhyolite prior to A.D. 200 is quite low and increases dramatically after that time (Custer 1984b).

In addition to changes in the exchange networks that moved lithic resources, there are other archaeological indications that regional interactions among prehistoric societies changed at the time of the Woodland I/Woodland II transition. The distribution of ceramic types and manufacturing attributes can be used to identify territories and interaction zones (Stewart 1985; Custer 1987c) in the Delmarva Peninsula and eastern Pennsylvania. From ca. 700 B.C. to A.D. 0 the central section of the Delmarva Peninsula, an area focused on the St. Jones, Murderkill, and Choptank drainages, is differentiated from the sections of the Peninsula to the north and south. The central Delmarva region is the heartland of the Delmarva Adena complex and is distinguished by a series of clay-tempered ceramics (Custer 1987b). Large-scale regional exchange networks and specialized mortuary ceremonialism further differentiate the area from surrounding areas. During this time period the southern Delmarva region was drawn into increasingly frequent contacts and interactions with cultures on the western shore of the Chesapeake Bay and northern Delmarva cultures were most frequently interacting with cultures of the Pennsylvania Piedmont. It appears as if the Delmarva Adena culture territory actually blocked interaction up and down

the Delmarva Peninsula from 500 B.C. until at least A.D. 0. However, by A.D. 200, the entire Delmarva Peninsula was drawn into a single interaction sphere which allowed the spread of shell-tempered Mockley ceramics throughout the Middle Atlantic Coastal Plain.

As was the case with the settlement patterns, there are major changes in exchange networks, regional interaction patterns and complex social stystems with their associated mortuary ceremonialism. It is quite likely that the realignment of regional population densities evidenced by the settlement pattern data is directly responsible for the changing regional interaction patterns. However, the reasons for the demise of the complex social systems are much more obscure.

CERAMIC SEQUENCES

The distribution of ceramic types and ceramic manufacture and design attributes have been noted as indicators of changing regional interaction patterns. A closer look at a longer time range and a wider area reveals even more significant changes in technological development which are indicative of broad scale cultural changes during the Woodland I/Woodland II transition. Figure 1 shows the distribution of various ceramic types and temper attributes between ca. 500 B.C. and A.D. 1250 in southeastern Pennsylvania and the Delmarva Peninsula. Solid lines divide unrelated ceramic wares and broken lines divide ceramic types which are related technologically and which are perhaps indicative of culture continuities. Descriptions of the ceramic types can be found in Smith (1978), Artusy (1976),

Griffith (1982), and Custer (1984a, 1989b, 1989c).

From a common base of grit-tempered, coiled, conoidal, cord-marked and net-marked ceramic technologies which are found throughout southeastern Pennsylvania and the Delmarva Peninsula, there is a diversification of ceramic technologies. In the central Delmarva Peninsula, within the Delmarva Adena heartland, there is a distinctive development of clay tempered wares between 500 B.C. and A.D. 200. Sometime during this same time period shell-tempered ceramic wares also appeared in the southern Delmarva Peninsula.

The appearance of a ceramic technology based on the use of shell temper is thought to be the result of a process of diffusion for numerous reasons. First, there is good evidence that use of shell temper was grafted onto existing ceramic technologies to produce transitional wares such as Wilgus ceramics (Custer, Stiner, and Watson 1983). Second, there seems to be a south-to-north time slope in the initial appearance of shell-tempered ceramics (Gleach 1988; Custer 1987c) that includes areas well beyond those covered by Figure 1 (Lavin 1980). Third, there is evidence of a developmental technological sequence within Mockley ceramics which again seems to follow a south-to-north time slope. And finally, there are no signs of cultural discontinuities associated with the initial appearance of Mockley ceramics. Thus, there are several reasons for believing that the distribution of Mockley ceramics through time and space in the study area resulted from a process of diffusion.

The southward spread of grit-tempered Hell Island wares ca. A.D. 500-700 is very different from the spread of Mockley

ceramics. There are no signs that these grit-tempered wares were ever grafted onto existing shell-tempered wares and there are no transitional ware types known at the present time. Furthermore, Hell Island ware is a fully developed grit-tempered ceramic technology when it first appeared in the Delmarva Peninsula archaeological record. There is little, or no, developmental sequence within the ware type and Hell Island ceramics just seem to suddenly appear "full blown" in the local archaeological record. In southeastern Pennsylvania, the roots of Hell Island wares seem to lie in the Susquehanna Series (Smith 1978; Custer 1989c); however, their distribution in the northern and central Delmarva Peninsula region clearly seems to indicate an intrusive technological element. And, this "intrusion" of a new ceramic technology is associated with numerous other cultural discontinuities.

During the time period of the "intrusion" of ceramic techologies noted above, there are some appearances of "exotic" ceramic types and attributes in the central Delmarva region. For example, the previously noted survey of the Nanticoke drainage (Custer and Mellin 1989) identified the presence of punctated ceramic sherds similar to Clemson Island ceramics of central Pennsylvania which are dated to ca. A.D. 700 - A.D. 1200 (Stewart n.d.). Also, a distinctive series of ceramics either tempered with finely crushed clay or manufactured from clays rich in hematite are also present in the area and have been radiocarbon dated to ca. A.D. 1000 (Custer 1984a:167). Clemson Island-like ceramics have also been identified at the Island Field Site. The

appearance of the northern Clemson Island-like ceramics is not surprising given the fact that there are more than superficial similarities between Hell Island ceramics and Point Peninsula ceramics of New York, specifically Point Peninsula Cord-marked (Ritchie and MacNeish 1949). Indeed, recent analysis of the ceramics from the Kipp Island Phase and Hunter's Home Phase occupation areas at the Kipp Island No. 4 Site and the Hunter's Home Site (Custer n.d.) has shown significant similarities between Point Peninsula and Hell Island ceramic technologies. Because the closest links of the "exotic" and "intrusive" ceramics appear to be located in areas to the north, central Pennsylvania and western New York would be the source area of these ceramics and any associated "cultural" intrusions.

A final aspect of regional ceramic attribute distributions to be noted are the design motifs on Woodland II ceramics. Analysis of design motifs (Griffith 1977; Griffith and Custer 1985) have noted a basic similarity among Townsend, Minguannan, Overpeck, and Bowman's Brook ceramics which spans the Coastal Plain areas and the Delaware River Valley from northeast North Carolina and the Virginia Tidewater to Long Island Sound. The distribution of these related ceramic wares is coterminous with the Coastal Central Algonkian culture sub-area (Flannery 1939) and the distribution of speakers of southern Algonkian languages (Goddard 1978). Analysis of design grammars for these Woodland II ceramics also shows regional similarities (Custer 1987d) and analysis of spatial and temporal distributions of certain design elements of the ceramic types also showed that these distributions were very similar to those known for historically

and archaeologically documented migrations (Rouse 1986). Originally, I thought that the potential migration which created these design attribute distributions occurred during Woodland II times (Custer 1987d). However, it is now clear that the varied design attribute distributions were in place by A.D. 1000 and underwent change after that date. Therefore, if the design attribute distributions were the result of a migration, it would have to have occurred prior to A.D. 1000. The relationships between ceramic distributions and possible population movements will be discussed in more detail at the end of this paper.

MORTUARY CEREMONIALISM - THE ISLAND FIELD SITE

The Island Field Site in central Delaware provides a chance to look in some detail at mortuary ceremonialism during this time period of cultural and archaeological discontinuities. Reviews of mortuary ceremonialism in the Delmarva region (Thomas 1987; Custer 1984a, 1989b) have been able to show that there are a series of rather spectacular mortuary sites located within the central Delmarva Peninsula during the time period between 500 B.C. and A.D. 1000. If some of the small ossuary features of the Slaughter Creek Complex (Custer and Griffith 1986:50-51) are included as part of this pattern, the mortuary ceremonialism extends well into the Woodland II period. Indeed, an evolutionary sequence of mortuary ceremonialism has been postulated for the central Delmarva region (Thomas 1987) and some researchers have even postulated the existence of tenuously defined archaeological complexes, such as the "Oxford Complex" (Thomas 1977, see comments in Custer 1989b and Doms and Custer

1984) to fill gaps in the sequence of culture continuity. I suggest here that the record of continuity noted by earlier researchers is more apparent than real, that the Webb Complex cemetery at the Island Field Site is quite different from earlier cemeteries, and that the Webb Complex represents a significant cultural discontinuity coeval with the cultural discontinuities discussed earlier.

As was noted earlier in the discussion of regional interaction and socio-political systems, there is a clear pattern of increasing scope and complexity of regional exchange systems and socio-political organization which culminates in the Delmarva Adena Complex (ca. 500 B.C. - A.D. 0). The Delmarva Adena Complex is also the source of the most spectacular mortuary systems known for the Delmarva Peninsula (Thomas 1970; 1976; Custer 1987b). There are no known cemeteries dating to the period between A.D. 0 and A.D. 300 and a small section of the Island Field cemetery, dated to ca. A.D. 300-400, has no grave goods associated with burials. Thomas (1977) suggests that the Oxford Site on the Maryland Eastern Shore may fill this temporal gap in the sequence, but based on a more recent and extensive analysis of the collections from the Oxford Site and their context (Custer and Doms 1984), I do not agree. The Oxford Site's spectacular artifacts, which presumably were grave goods, seem to date to Webb Complex times (ca. A.D. 700-900) and are roughly coeval with the Island Field Site. Thus, it is possible that there are no spectacular cemeteries in the central Delmarva dating to the period between A.D. 100 and A.D. 650.

After A.D. 650, the Island Field Site provides an example of a new and different type of mortuary ceremonialism in the central Delmarva. The locations from which the Island Field grave goods are derived are not as "exotic" as those of the Delmarva Adena Complex and their distribution through the Island Field cemetery is not as suggestive of social ranking as are the artifact distributions at Delmarva Adena sites (compare Thomas and Warren 1970 and Thomas 1976). In general, the Island Field Site mortuary ceremonialism is less extensive, and definitely less spectacular, than that of the Delmarva Adena Complex. Thus, it seems unlikely that the Island Field pattern of mortuary ceremonialism has its developmental roots in the Delmarva Adena Complex and a significant cultural discontinuity in mortuary systems was coeval with the others noted in this paper.

It is interesting to consider the grave goods from the Island Field Site in a larger regional perspective given some of the earlier comments on "intrusive" ceramic technologies. There is no doubt that the Island Field grave goods, particularly the pipes, Jack's Reef projectile points, pendants, large pentagonal bifaces, bone tool handles and flint knapping gear, antler harpoons and flint knapping batons, and ground stone tools, are very similar to Kipp Island and Hunter's Home materials from New York. However, even more pronounced similarities can be noted with Ritchie's (1969) Point Penninsula materials from southern Ontario. Indeed, the materials in the child's cache from the Port Maitland Site in southwestern Ontario illustrated by Ritchie (1969:233) contains materials virtually identical to those found at Island Field. Ritchie (1944, 1969) also illustrates several

other similar caches and artifacts from Ontario and Western New York sites. Artifact forms very similar to those from the Island Field Site have also been found at Intrusive Mound Complex sites of Ohio and Michigan (Fitting 1970), at the Bowman Mound in the Shenandoah Valley of Virginia (Fowke 1894; Carpenter 1950), at a large array of sites throughout what Mason (1981) calls the "Central and Northern Tiers" of Middle Woodland cultures of the Great Lakes, at sites of Virginia's Lewis Creek Mound Culture (MacCord 1986), and at some Clemson Island Mound sites of Pennsylvania (Stewart n.d.).

Not only are artifact forms from the Island Field Site similar to those of coeval groups to the west and north; but, when contextual data on caches and burial treatments are available, important similarities can be noted. As was noted earlier, cache contexts among the archaeological complexes noted above are quite similar. Flint knapping tools and the products of flint knapping dominate many of the cache assemblages. Often, these flint knapping caches accompany children's burials (eg. - Ritchie 1969:233) and those of females. Finished and unfinished bone and antler tools and ornaments are also commonly found together in children's and adult's graves. Puma distal phalanges within claw sheaths are associated with child graves at several sites as are drilled sharks' teeth. Where age and sex data are available, many of the sites show that children and females received more grave goods than did adult males.

Because many of these sites were dug without the kinds of provenience controls used today, it is often difficult to

ascertain varieties of burial treatments. However, where such data are available, it is clear that many of these cemetery sites are characterized by a wide variety of burial treatments. This variety is especially well illustrated at the Island Field Site (Thomas and Warren 1970), the Hunter's Home Phase cemetery at the Kipp Island No. 4 Site (Ritchie 1969:263), the Bowman Mound (Carpenter 1950; Fowke 1894), and several of the Clemson Island burial mounds (Jones 1931). In sum, it seems clear that the closest links to the Island Field Site lie to the north and west and that these links are apparent in terms of burial treatments, grave good artifact forms, and burial cache assemblages.

DISCUSSION

It is apparent that the time period of transition between the Woodland I and Woodland II periods was one of significant cultural discontinuities in the Delmarva Peninsula and southeastern Pennsylvania region. Discontinuities are evident in several components of the archaeological record including site distributions, settlement patterns, regional exchange and interaction patterns, inferred levels of socio-political integration and complexity, and mortuary ceremonialism. However, the explanations of this discontinuity are not as clearcut as the archaeological identification of the the discontinuity itself.

In earlier publications (Custer 1982a, 1984a), I have suggested that ecological factors, specifically the temporally varied effects of environmental circumscription, could account for the rise and fall of complex societies, exchange systems, and mortuary ceremonialism on the Delmarva Peninsula. However, this

argument is not particularly satisfying because to date no methods have been devised to measure levels of circumscription in an objective way. Also, it was difficult to effectively "turn off" the mechanism of circumscription at the end of the Delmarva Adena Complex and then "turn it on" at the beginning of Webb Complex times in order to explain the hiatus in growth of sociocultural complexity and mortuary ceremonialism. Recent paleoenvironmental research (Brush 1986, Custer et al. 1989), however, has shown that there were significant environmental changes in the Delmarva Peninsula which could have effected the degree of environmental circumscription during this time period. Nonetheless, even with the newly available paleo-environmental data, arguments based soley on circumscription or other ecological processes still cannot account for all of the cultural discontinuities noted above.

Recent studies of historic linguistics, particularly lexicostatistical and glottochronological studies of Algonkian languages (Fiedel 1987, 1989; Luckenbach, Clark, and Levy 1987), have indicated that the distribution of southern Algonkian speakers along the Atlantic Coast of Eastern North America is the result of a migration of these people into the area. Glottochronological studies (Fiedel 1989) provide an age estimate for the separation of the coastal Algonkian speakers from a Great Lakes proto-language source area of ca. A.D. 500 - A.D. 700. The proto-language source area and the date of the linguistic separation, or migration, fits nicely with the archaeological data on cultural discontinuities at the Woodland I/Woodland II transition in the Delmarva Peninsula. At the very least, a

migration of Algonkian speakers into the central Middle Atlantic Coastal Plain is a possible explanation of the archaeological discontinuities described in this paper.

In conclusion, the cultural discontinuities described in this paper are difficult to explain by environmental or ecological models alone. A consideration of migration models is necessary to augment the ecological models and it is likely that the population disruptions are due to environmental changes. As we study these cultural changes we may better understand the human ecology of the central Middle Atlantic region from a broader perspective.

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THE MIDDLE TO LATE WOODLAND TRANSITION IN THE LOWER/MIDDLE DELAWARE VALLEY

by

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ABSTRACT

The transition between Middle and Late Woodland cultures is a gradual one in terms of changes in adaptations. A stylistic/typological boundary between the periods can be drawn sometime between AD 700 and AD 900 and involves the persistent use (after this date) of triangular projectile points and the manufacture and use of a suite of ceramic types different from those of earlier times. Alterations of adaptive strategies, as reflected in settlement patterns, do not seem to appear until later, ca. AD 1200/1300. The most dramatic change is seen in lowland aspects of settlement patterns. Large group settlements of the Middle Woodland period (and presumably the early Late Woodland period), oriented around portions of fresh water tidal marshes, shift to broad floodplain settings sometime during the Late Woodland period. In part, this shift may reflect alterations of subsistence patterns involving an increased focus on the cultivation of domesticated crops, and a shift in fishing practices and the role of this food source in aboriginal subsistence. Seasonal exploitation of anadromous fish runs was an essential component of Middle Woodland subsistence practices as reflected in the location of lowland sites and associated material culture. Upland aspects of settlement systems and related subsistence foci, however, remain remarkably conservative through both periods. Further, the geographic extent of settlement territories is similar for the Middle and Late Woodland periods.

Lithic technologies are comparable for both periods. Moderate change is seen in the decrease in the use of argillite for tool manufacturing and the relative lack of cache blades in later Late Woodland assemblages. These changes may be indirectly linked to the shift in the importance of anadromous fish in subsistence practices. Ceramic technologies and typological variability remains high during both periods but may decrease slightly during Late Woodland times. Influences on ceramic design reflect contacts with groups from a broader portion of the Middle Atlantic Coast during the Middle Woodland rather than Late Woodland period. Evidence of trade and exchange is low for both periods although the social environment of the time is such that a high level of trade would be expected and would have had adaptive advantages.

This paper provides greater detail on the noted changes and similarities at the Middle to Late Woodland transition. Hypotheses dealing with explanations for these changes are also explored.

INTRODUCTION

The Middle Woodland and Late Woodland periods of Lower/Middle Delaware Valley prehistory have been addressed as separate entities in previous publications and in papers presented before this conference (Cavallo 1984; Cross 1956; Kraft and Mounier 1982; Stewart 1982a, 1985, 1987, 1988; Stewart et al 1986; Williams and Thomas 1982) their validity as heuristic devices for organizing relatively common lifestyles and adaptations has been discussed (Stewart 1982a; Stewart and Cavallo 1983a, b; Stewart et al 1986). A stylistic or typological boundary between the periods can be drawn sometime between AD 700 and AD 900 with the persistent use of triangular projectile points and the presence of a suite of ceramic attributes and types different from those of earlier times (Stewart 1985) characterizing assemblages after AD 900. Alterations of adaptive strategies, as reflected in settlement patterns, do not seem to appear until later, ca. AD 1200/1300. This range in dates reflects the gradual nature of the changes that can be identified (Cross 1956:184; Stewart et al 1986).

This paper highlights the continuity and change that is archaeologically visible during the transition between the periods in the lower to mid-range of the Delaware Valley at the transition from the Coastal Plain to the Piedmont. Possible explanations for observed patterning are also explored. Discussions focus on settlement and subsistence patterns, material culture (especially ceramics), and participation in regional trade or exchange.

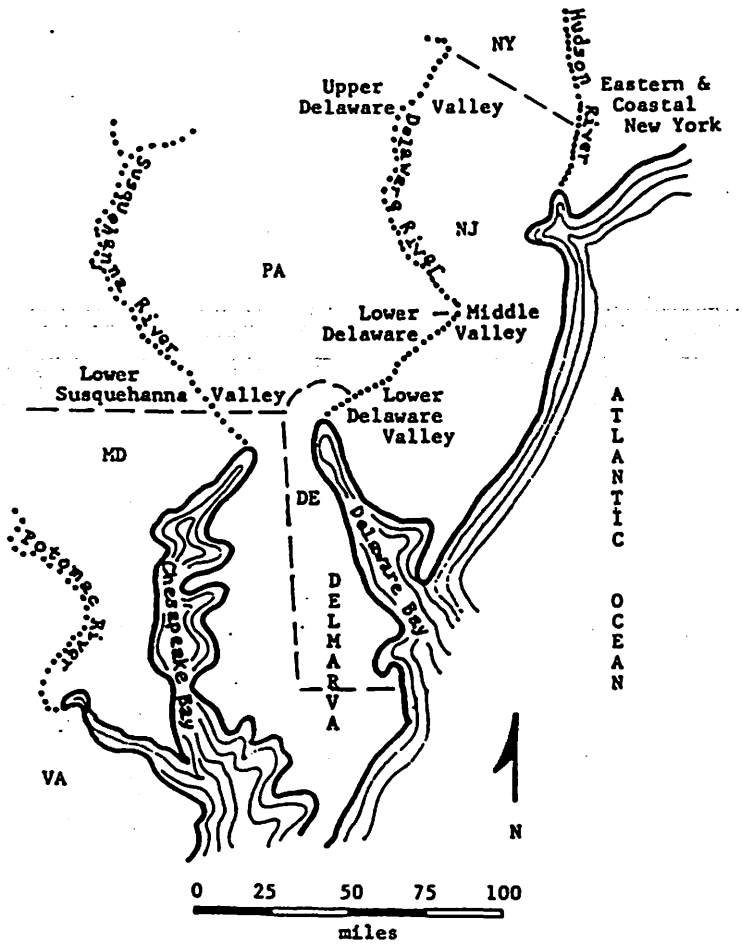
Ongoing research at the Abbott Farm National Landmark and related sites, and the regional syntheses that have been prepared as a part of these investigations form the basis of the following presentation (Figure 1). Archaeological research to date has shown that when not the central focus of a prehistoric group's exploitative territory, the Coastal Plain to Piedmont transition (represented by Abbott Farm environs) was nonetheless the scene of concerted aboriginal activities (Cavallo 1984, 1986; Foss 1986; McLearen and Dumont 1986; McLearen and Fokken 1986; Perazio 1986; Stewart 1986a, b, 1987; Stewart and Cavallo 1983b).

SETTLEMENT PATTERNS

The most significant difference between archaeological cultures firmly grounded in the Middle and Late Woodland periods is a change in lowland aspects of settlement patterns. Large group settlements of the Middle Woodland period, oriented around portions of fresh water tidal marshes, shift to broad floodplain settings sometime during the Late Woodland period. A review of the way in which lowland environments are used through time emphasizes the gradual nature of the settlement change and helps to pinpoint the timing of the change during the Late Woodland period.

FIGURE 1

STUDY AREA AND ADJACENT REGIONS



The largest lowland sites can be linked with the exploitation of anadromous fish runs and the earliest focus on this environmental zone can be dated to the Late Archaic period (Cavallo 1986). The depositional intensity, number and variety of features, and artifact types at the Area B Site at the Abbott Farm support the interpretation of this locality as a specialized fish procurement and processing site during the Late Archaic and Early Woodland periods, but not as a habitation site of any appreciable duration (Cavallo 1986). Middle and Late Woodland remains represent very minor components at this site and in no way can be functionally compared to those of the Late Archaic and Early Woodland periods. Stations representing the residue of individual or small group hunting and gathering forays are indicated by the Middle and Late Woodland archaeological deposits.

The location of major lowland sites shifts upstream during the Middle and Late Woodland periods and Cross's (1956) Excavation 14 and the locus of nineteenth century excavations by Ernest Volk (1911) in Roebling Park document this shift. Excavation 14 is especially important since it contained stratified archaeological deposits bridging the Middle and Late Woodland periods. The archaeological deposits found in the third "humus" or buried surface at Excavation 14 include materials that can be ascribed to the Middle Woodland and possibly earlier periods (Stewart 1983a, 1985; Stewart and Cavallo 1983a:56-60). On the basis of soil development, diagnostic projectile and ceramic types radiocarbon dated elsewhere in the local area and in the region, it can be inferred that the third humus was an occupational surface at least by AD 300 and that it was buried no later than AD 700/800 (Stewart 1985:6-8). The higher second humus would therefore date from at least AD 800 and later times and essentially includes late Middle Woodland, Late Woodland, and some historic period archaeological deposits (Cross 1956:Table 18).

The depositional intensity observed in the third humus, the number and variety of features, and the variety of artifact types represented can be interpreted as the remains of major habitation sites. Cavallo (1984) presents an excellent case for the use of this site during seasonal runs of anadromous when prehistoric groups coalesced to exploit this rich resource. Faunal remains from Excavation 14 provide evidence of occupations that could have presumably spanned most of the year (Williams et al 1981:Figure 2). The fact that formerly specialized and spatially distinctive fishing and fish processing activities are now carried out at a major habitation site cannot be over-emphasized, especially since large group habitations dating to the same period do not seem to occur in broad river floodplain areas away from the interior wetlands.

The post-AD 700/800 remains in the second humus at Excavation 14 are somewhat different from those in the third humus in showing a slight decrease in the number of artifacts and features. The impression gained from a review of Cross's data (1956) is that

the area of Excavation 14 was not as intensively used during the Late Woodland period. This is admittedly a subjective evaluation since the second humus post-dates AD 700/800 and it is not possible to completely isolate late Middle Woodland and Late Woodland components on the basis of the published data. Regarding the differences between the second and third humuses Cross (1956:196) states:

> "This layer, known as the second humus, contained much less charcoal and refuse, and fewer hearths than the third. Although hunting, fishing and gathering continued to provide the greater part of the food supply, agriculture must have increased. Possibly this made the population spread out more thinly on the (nearby) bluff" (parenthetical addition mine).

The focus of major habitation sites ca. AD 1200/1300 is in the floodplains of the river or major high order tributaries where intensive Middle Woodland occupations seem to be lacking. By AD 1200/1300, maize is clearly being cultivated by Late Woodland cultures living in hamlets or small villages (Stewart et al 1986:82, 85). Other cultigens such as beans are also present but have thus far been retrieved from undated Late Woodland contexts (Forks of the Delaware Chapter 1980). It is presumed that the bulk of fishing activities and related processing is also focused at the floodplain settlements, or that the marshes and floodplain areas are both being used but at different portions of the fishing season to take full advantage of the migrating populations (Cavallo 1984; Kraft 1986:107; Kraft and Mounier 1982; Schalk 1977; Stewart et al 1986:73-76; Thomas et al 1985:V1, VII8). During this time, convincing evidence for the intensive use of sites oriented around the tidal marsh and interior wetlands for fishing and related processing, however, is lacking.

Evidence for the timing of the shift to major floodplain settlements is inferred from work at the Williamson Site located in the mid-section of the Delaware Valley (Stewart et al 1986). Although major Late Woodland sites are known to occur in the Delaware River floodplain at the Coastal Plain to Piedmont transition in and adjacent to the Abbott Farm, no radiocarbon dates are yet available and ceramic seriations are inadequate to isolate distinctive components within the Late Woodland period.

Evidence from the stratified Sturgeon Pond Site located near the Coastal Plain to Piedmont transition provides supportive, albeit indirect, evidence for the suggested timing of the noted shift. The Sturgeon Pond Site is located in the Delaware River floodplain and adjacent to some interior wetland areas (Stewart, n.d.). Its archaeological deposits represent a palimpsest of short term hunting and gathering activities related to forays and not encampments. The archaeological deposits are found in three distinctive buried surfaces whose development and sequence of burial mimics that of Excavation 14. The upper of these buried

surfaces is clearly grounded in the Late Woodland period, post-dating AD 1390 +/-80 (Beta 15626) with its subsequent burial occurring sometime after AD 1510 +/-100 (Beta 15627). The next lower surface can be dated to mid- to late portions of the Middle Woodland period with assays ranging from AD 430 +/-180 (Beta 15628) to AD 680 +/-80 (Beta 15625). The repeated use of the area is extremely intensive during that portion of the Late Woodland period represented by the uppermost of the buried surfaces. The second and third buried surfaces pale in comparison. In turn, the more intensive use of Sturgeon Pond and floodplain areas in general has been conceptually tied to the existence of floodplain-based large group settlements (Stewart 1983b, n.d.).

The noted shift to the floodplain likely reflects alterations of subsistence patterns involving an increased focus on the cultivation of domesticated crops, a shift in fishing practices, and possibly the role of this food source in the aboriginal diet. Settlement shifts within the general wetland habitat prior to AD 1200/1300 can be linked with both environmental and cultural factors (Stewart 1982a:26-27; Stewart et al 1986:76, 78). Upland aspects of settlement systems, and related subsistence foci, however, remain remarkably conservative through both periods (cf. Stewart 1986a, b, 1987b). Middle and Late Woodland upland sites, characteristically containing components dating from AD 200 into the sixteenth century, consist of hearths with related lithic fabrication and other processing activity areas. The components are functionally identical. The same series of sites are reoccupied during Middle and Late Woodland times. Although a number of alternative models are being explored to explain how individual sites are articulated into the settlement system (Stewart et al 1986:73-77), available evidence suggests that late Middle Woodland and Late Woodland patterns prior to are comparable.

On both the local and regional level, the environmental features associated with sites remain the same through the Middle and Late Woodland periods (Stewart 1982a:25-26; Stewart et al 1986:70-71). The geographic extent of settlement territories, estimated on the basis of the distribution of distinctive suites of ceramics (Stewart 1985) and catchment analysis of the lithics and faunal materials found on sites in the Abbott Farm area (Stewart and Cavallo 1983b; Stewart 1987b), is similar for the Middle and Late Woodland periods (Figures 2, 3). In turn, they correspond well with historic data on the size of individual and group Delaware Indian territories (Wallace 1947:4).

SUBSISTENCE

With the exception of the appearance of cultigens after AD 1200/1300, known subsistence items are comparable for the late Middle Woodland and Late Woodland periods and generally include fish, shellfish, reptiles, fowl, large and small game, mast,

FIGURE 2

PROPOSED TERRITORY/SOCIAL BOUNDARY CIRCA AD200-800
FOR GROUPS OF THE
LOWER/MIDDLE DELAWARE VALLEY

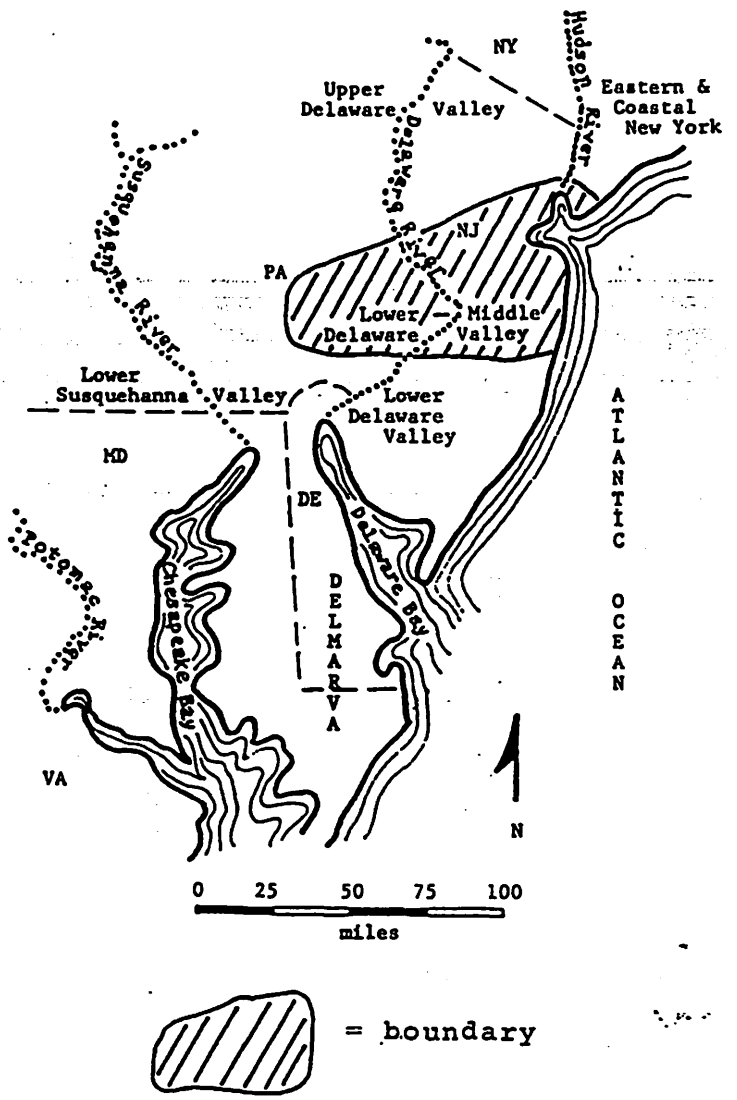
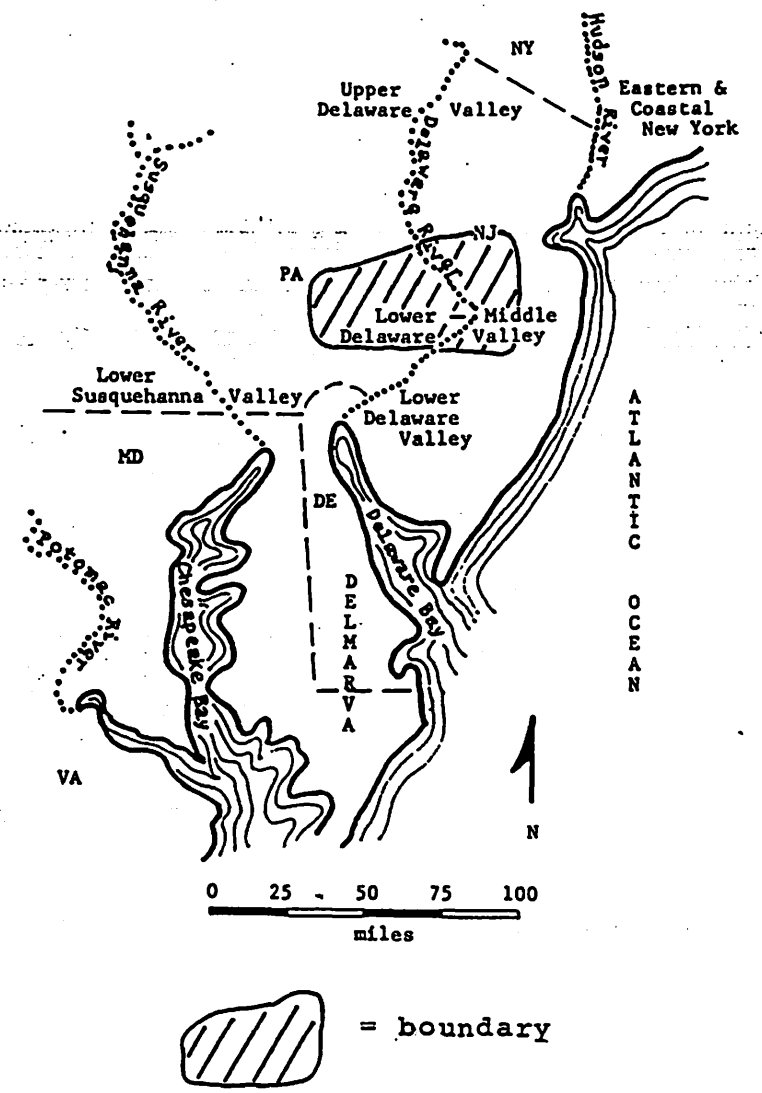


FIGURE 3

PROPOSED TERRITORY/SOCIAL BOUNDARY CIRCA AD800-1600
FOR GROUPS OF THE
LOWER/MIDDLE DELAWARE VALLEY



fruits, and berries (Stewart and Cavallo 1983a, b; Stewart et al 1986; Williams et al 1981). What has not been determined is the relative importance of these items in the prehistoric diet. The potential range of plant foods that could have been obtained in the area is poorly represented in the archaeological record, even when the systematic flotation of soil samples has been employed in the investigation of sites.

At Excavation 14 where organic preservation is best, deer represents the greatest source of meat by weight and the overall representation of meat sources is not significantly different between the third and second humuses (Williams et al 1981:10). On upland sites a variety of small mammals, as well as deer, are found but estimates of the minimum number of individuals or pounds of meat represented have not been attempted (cf. Stewart 1987b). The taphonomy of the lowland and upland sites is such that accurate estimates of the importance of food sources may never be forthcoming if based solely on recovered faunal remains. Trace element analysis of local skeletal populations has begun (Byrne 1984) for the purposes of examining aboriginal diet but considerable additional studies remain to be done. Future explorations of settlements dating to ca. AD 1200/1300 will ultimately bear directly on the relative importance of cultigens and fish in the aboriginal diet.

During the seventeenth century, the Delaware were observed living in floodplain settlements where maize was cultivated and where fishing was a seasonal activity (Holm 1702 cited in DuPonceau 1834:123; Lindestrom 1654 cited in Johnson 1925:166; see also Goddard 1978:217; Newcomb 1956:13 for summary). It must be noted, however, that this may not have been the traditional subsistence base prior to European contact.

MATERIAL CULTURE

With the exception of stylistic changes, the aboriginal stone toolkit remains relatively the same throughout the time under consideration here (Cross 1956; Stewart 1982a; Stewart and Cavallo 1983a; Stewart et al 1986). Middle and Late Woodland assemblages reflect the functional diversity associated with the exploitation of a broad resource base. Studies have also indicated that the technologies involved in the production of many tool types has remained remarkably conservative, especially as regards the use of cobble sources of material (Stewart 1987a, b, 1988).

The frequency with which argillite is used, however, suggests that some subtle alterations occurred either in the technology of tool production or the ways in which certain tools were used. The use of argillite for the production of projectile points and bifaces throughout the Middle Woodland period is substantial with chert and jasper comprising the bulk of flake tools, scrapers, and expedient tools in general. Through the Late Woodland

period, there is a noticeable decrease in the use of argillite in bifacial industries (and an increase in the use of chert and jasper) while the use of chert and jasper for other types of tools continues with little change.

Reasons for the decreased use of argillite have not been pinned down. Argillite would have still been easy to obtain during Late Woodland times, with natural sources of the material located well within hypothesized exploitative territories. Argillite presents no problems in bifacial reduction that would not have had to have been conquered in the use of other lithic materials. In cutting and scraping tasks, an argillite tool requires more resharpening than its chert or jasper counterpart so perhaps the ways in which bifacial tools were used may have changed. Studies of this change in lithic preference are further complicated by the fact that the degree of argillite utilization can vary depending on the functional type of site that is being examined.

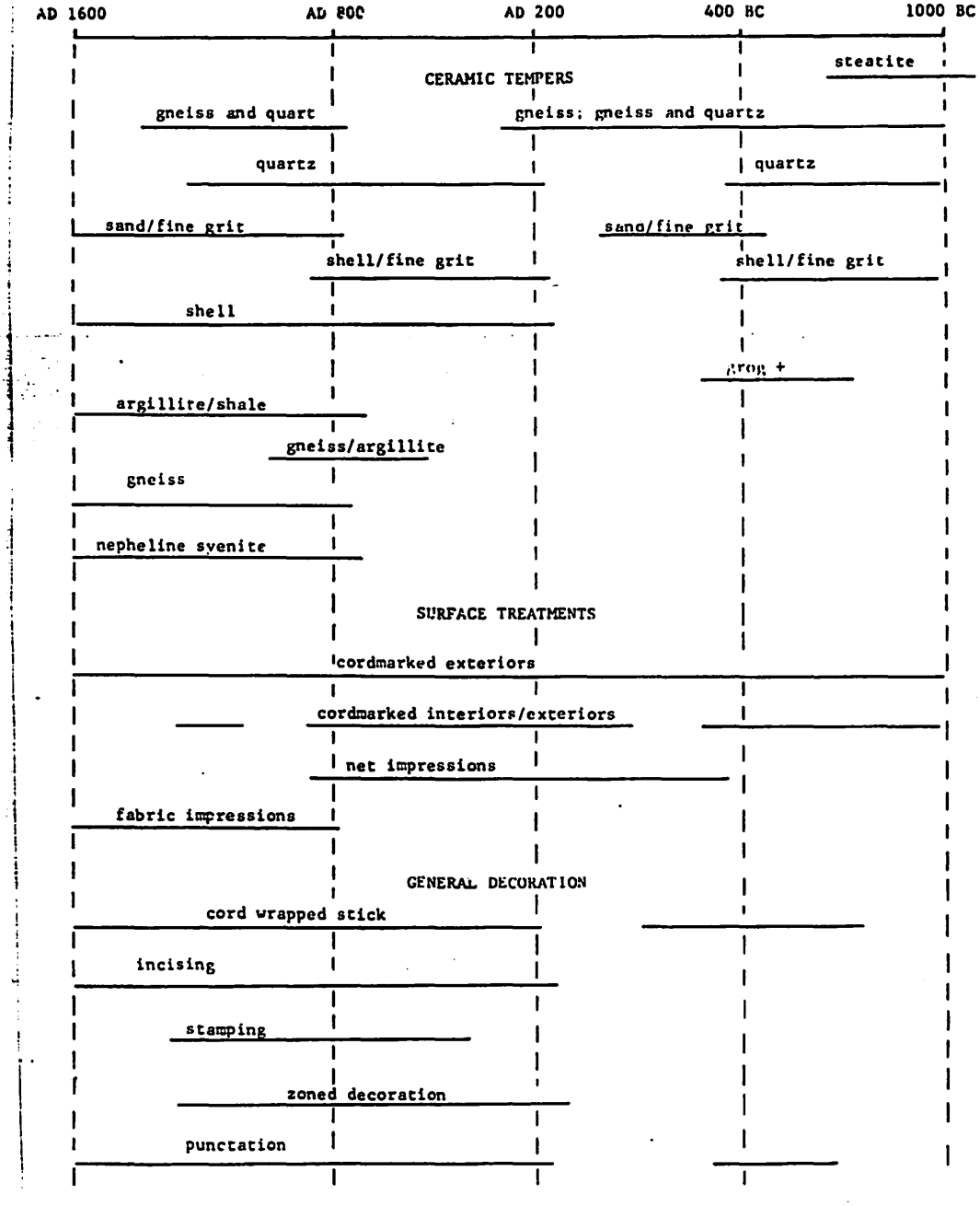
Cavallo (1984) has presented a convincing argument for the important role of argillite bifaces and cache blades in the processing of fish resources at lowland sites during the Middle Woodland period (see also Stewart and Cavallo 1983a:III-66 to III-79). In some respects, the decrease in the use of argillite may tie in with a change in the importance of fish in subsistence pursuits or perhaps the ways in which fish were utilized during Late Woodland times. However, similar types of argillite artifacts occur throughout the area on sites that don't have a lowland or fishing focus. This does not negate the validity of Cavallo's argument for the Abbott Farm assemblages; it does suggest that his argument may not explain argillite utilization elsewhere. Further, the decrease in the use of relatively tough (Callahan 1979:Table 3) lithic materials like argillite during the Late Woodland period is a common phenomena throughout the Middle Atlantic Region.

Ceramic technologies and typological variability remains high during both periods (Stewart 1982a:24-25, 1985; Stewart and Cavallo 1983a; Stewart et al 1986:69-70) but decreases somewhat during the latter portions of the Late Woodland period, especially when "exotic" types (Owasco, Susquehannock), probably gained through trade, are factored out (Stewart 1985: Table 1; Table 1 this report). In part, the high variety in contemporaneous wares is a direct reflection of the geographic zones encompassed by settlement movements throughout the year and where ceramics are manufactured during the course of these movements (Stewart 1985:42-43). As might be expected, ceramic variety for either of the periods is greatest on large wetland-oriented or floodplain sites and presumably reflects the coalition of small groups or families.

Table 2 summarizes trends through time in the use of temper, surface treatment, and general decoration. Although the use of fabric in impressing ceramic surfaces seems to have originated prior to AD 700/800, it was definitely used with greatest

TABLE 2

TRENDS IN CERAMIC DESIGN
LOWER/MIDDLE DELAWARE VALLEY



N.B.: Trend lines are approximations and absolute beginnings and ends are unkown.

(from Stewart 1985)

frequency after this time (Cross 1956:184; Stewart 1985). The use of incised decoration transcends the Middle and Late Woodland periods but is much more common during Late Woodland times. Conversely, zoned decorations are observed most frequently on Middle Woodland ceramics dating after AD 200 and are attributed to the various Abbott ceramic types identified by Cross (1956) and Pollak (1971). The frequency of net impressed ceramic surfaces is also much greater during Middle Woodland times. During early portions of the Late Woodland period the use of this surface treatment is dramatically curtailed.

During the period from approximately AD 200 to AD 700/800 influences on local potters seem to have increasingly come from adjacent coastal areas, especially those to the south, than from more northern sections of the Delaware Valley, the Lower Susquehanna Valley, or central New York. The numerous Mockley and Mockley-like ceramics from the study area (over 32% of the material cataloged by Cross from Excavation 14 and nearby sites) reveal a striking relationship with ceramic developments in the Coastal Plain zones of Delaware, Maryland, and Virginia. The highly decorated and aberrant Abbott Zone Decorated types from the area are largely manufactured on Mockley-like ceramic bodies (Stewart 1982a:24, 1985). The relationship with the southern coast is even more striking given the fact that Mockley ceramics or variants are rare in southern New Jersey and related sections of the Lower Delaware Valley (Jack Cresson and Alan Mounier, 1985 personal communication). Associations with northern coastal areas (New York) are best seen in interior and exterior cordmarked and modified Vinette-like ceramics that are found in both areas and the general use of shell tempering and net impressed surface treatments (Kaesar 1968, 1974; Lopez 1982; Stewart 1985). Although part of regional trends, the nature and variety of local ceramic wares distinguishes the study area from surrounding zones.

The greatest influence on Late Woodland potters seems to be from the Lower Delaware Valley; the connection with the southern Middle Atlantic Coastal Plain is not as marked as it was during the Middle Woodland period. Affinities can still be seen with coastal New York and relationships with the Upper Delaware continue to be weak.

SOCIETY

Few burials from the area can be confidently assigned to latter portions of the Middle Woodland period and expressions of status appear to be nonexistent (Cross 1956:57-68, 183, 195; Clabeaux n.d.; Stewart 1982a:27). Evidence regarding Late Woodland burials is also somewhat meager (but see Skeletons 11, 41, 60, 82 in Cross 1956:60-67). Intentionally placed grave goods consist of what appear to have been personal items of the deceased. For example, Skeleton 60 in the second humus at Excavation 14 had four triangular projectile points placed at the head and a pile

of 79 scrapers and a ceramic pipe placed at the feet (Cross 1956:66). Deer antler were associated with two of the other Late Woodland burials. These types of grave offerings resemble the goods found in some of the late Middle Woodland/early Late Woodland interments at the Island Field Cemetery in Delaware (Custer and Rosenberg 1988). While the Abbott Farm burials indicate some differential treatment of the dead, their implications for the nature of social status and social organization are vague.

Previous arguments have been presented for the tentative beginnings of complex societies during the Middle Woodland period in conjunction with an adaptation in which the seasonal exploitation of anadromous fish played an important part (Cavallo 1984; Stewart 1982a:26-27, 1982b). The basis of the argument is that the key to making the most efficient use of this highly productive and predictable resource is the organization and management of labor; however, the archaeological expressions of complex societies dating to this time are tentative at best. Martin (1974) and Schalk (1977) both link this type of adaptation to complex societies and in many cases, ones that are matrilineal or organized on a uterine basis.

During early historic times, the Delaware Indians of the study area were presumably matrilineal (Wallace 1947:17) and autonomous communities apparently consisted of more than one village (Thurman 1974:112, 126-127). Within the study area, two distinctive Delaware groups, the Sankhikans and Atsayonck, are placed at the falls of the Delaware near Trenton and on Crosswicks Creek respectively (Goddard 1978:214). Their locations are not more than 15 miles apart, which seems rather close given the exploitative territories thought to be associated with distinctive groups during the Late Woodland period. The political and social relationship between the Sankhikans and Atsayonck is unclear.

TRADE AND EXCHANGE

Evidence of trade and exchange is low for both periods and declines through the Late Woodland period. West to east and south to north trends in the movement of exchanged items can be noted during the Late Woodland (Custer and Griffith 1986:31; Kraft and Mounier 1982:141), even with the overall decline in trade, and parallels the patterning evident during the Middle Woodland period. This flies in the face of the fact that broad regional interactions are clearly seen in the nature of local ceramic assemblages, at least during the later half of the Middle Woodland period.

Previous characterizations of the Abbott Farm as a regional trade center have been refuted elsewhere (Cavallo 1984; Stewart 1982b; Stewart and Cavallo 1983a:III-66 to III-68). Two types of exchange systems, broad-based and focused, have been defined and

can be identified in some form from Late Archaic through Late Woodland times in the Middle Atlantic Region (Stewart 1989). Broad-based networks are characterized by hand-to-hand, down-the-line exchange and web-like relationships common throughout the region. Broad-based networks can be manipulated by groups who hoard items gained in trade within the confines of their specific territories. Focused exchange networks involve relatively few contacts, not the series of interlocked, down-the-line transactions associated with broad-based systems. Trade goods moving through focused exchange show extremely discontinuous spatial distributions, not gradual falloff from a point of origin.

Frequency distributions of argillite artifacts in the Delaware Valley suggest that broad-based and focused exchange networks were disrupted or severely attenuated during the Late Woodland period (Figure 4). The rare occurrence of copper artifacts in the area during the Middle and Late Woodland periods could be a function of the direct procurement of the material and not trade (Stewart and Cavallo 1983a:III-64; Stewart et al 1986:69; Williams and Thomas 1982:115; Williams et al 1981). It is also likely that the mica that appears in Middle Woodland and some Late Woodland contexts in the area was also directly procured from nearby sources in southeastern Pennsylvania (Williams et al 1981). Soapstone artifacts and raw material once moved through the region as part of broad-based exchange systems. During the Late Woodland period, extremely spotty distributions of soapstone pipes and ornaments seem to be the result of focused exchange (cf. Stewart 1987b:VI-43 to VI-46). Again, direct procurement could explain some of the occurrences since sources of soapstone are not that distant from the area (Cross 1956:194; Richards 1941:22). Trace element sourcing studies are needed to clarify the situation.

Some trade in ceramic vessels is evident during the Late Woodland period by the occurrence of classic Owasco and Susquehannock pottery types on some sites (Cross 1956; Stewart 1985). Trade in ceramics is not as visible in late Middle Woodland assemblages, in large part because of the widespread distribution of Mockley and Mockley-like pottery. The extremely discontinuous, low frequency, and geographically far flung distribution of Abbott Zone Decorated ceramics away from the Lower/Middle Delaware Valley (Gregory 1983; Hemmings 1966; Kaesar 1968; Kinsey 1973; Lopez 1961; Pollak 1971; Ritchie and Funk 1973:133-148) is probably related to focused exchange during the Middle Woodland period.

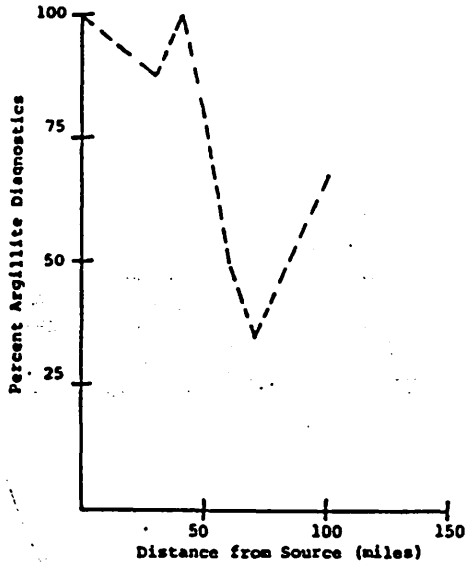
DISCUSSION

The shift to what is presumed to be an agricultural life is gradual in the study area and suggests that reliance on domesticated crops was not perceived by prehistoric peoples as a more viable alternative than earlier subsistence strategies.

Figure 4

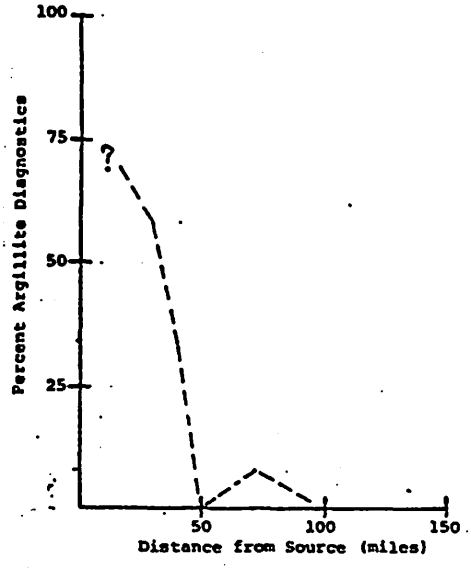
EXAMPLES OF MIDDLE AND LATE WOODLAND FALLOFF PATTERNS
ARGILLITE ARTIFACTS

Middle Woodland Direct Procurement and Broad-Based Exchange
(Hoarding)



Argillite: from source south through the Delaware Valley.

Late Woodland Direct Procurement and Broad-Based Exchange



Argillite: from source south through the Delaware Valley.

Local Native Americans were in some type of contact with other aboriginal groups (e.g. Owasco) who were farming well before AD 1200/1300, so it can be argued that knowledge of the existence of domesticates and subsistence alternatives has some antiquity in the study area. Contacts with Owasco groups, possibly via the upper reaches of the Delaware River, is evident in the occurrence of representative ceramics ostensibly gained in trade.

Even after AD 1200/1300, it is difficult to conclude that domesticated crops and agriculture radically changed Late Woodland lifestyles relative to what they were during earlier times. We have yet to identify a nucleated or planned Late Woodland village, and palisaded or fortified settlements are unknown for the lower, middle, and upper segments of the Delaware Valley. If the noted settlement shift does in fact reflect the new or growing importance of agriculture in subsistence, this way of life does not appear to have fostered or supported large or complex societies.

Population pressure and related resource stresses had little to do with the presumed shift in, or intensification of subsistence practices (cf. Boserup 1965; Cohen 1977). Tentative evidence for population pressure (cf. Cohen 1975) is seen during the Middle Woodland period in the form of some settlement shifts and technological adaptations that have been linked to the intensification of fish procurement and processing (Cavallo 1984; Stewart 1982a). Following Boserup (1965), population growth drives technological change and/or productive intensification. While augmenting the role of domesticated plants in overall subsistence strategies could be viewed as a form of productive intensification or response to population growth during the Late Woodland period, we should see a continuation of the intensive fishing and processing associated with late Middle Woodland cultures in the area. We do not, although fishing undoubtedly continued to be practiced. The Late Woodland data also do not suggest the existence of densely packed local populations.

Braun and Plog (1982:508) argue that an increase in the cultivation of food resources or the adoption of agriculture as the core of the subsistence base, should not occur within an existing social network without a change in the level of cooperation and communication within and between neighboring communities. Thus, some type of shift in social organization might be expected to occur during the Late Woodland period in the study area. However, if we accept the matrilineal nature of Delaware society at the dawn of European contact, and the possible female-based social organizations of Middle Woodland fishing cultures, such changes may be difficult to detect.

Following the premise of Braun and Plog further, if the observed shift to floodplain settlements ca. AD 1200/1300 is closely tied to prehistoric agriculture, then increased levels of trade should also be apparent; they are not. Trade or exchange is a viable means of promoting inter-group communications, reducing the

potential for conflict or mitigating actual conflict. It can serve as an important basis for establishing an individual's, family's, or group's access to resources or hospitality beyond their home territories, especially during times of resource failures and other crises (Brose 1979:7-8; Custer 1984:111; Dalton 1977; Ford 1974:394; Hodder 1980:154; Simms 1979).

The gradual decline in the exchange of lithic and other goods through the Middle and Late Woodland periods is thus puzzling considering the social functions of trade and the conditions that originally fostered regional networks (Stewart 1989). It is possible that through time, perishable goods are used more frequently in transactions and these are simply not well preserved in archaeological deposits. It is also possible that trade relations are left increasingly in the hands of real or putative heads of kin groups or communities, and that exchanges involve fewer, but more symbolically powerful items (cf. Hall 1977; Kuhn 1987:306).

The paucity of evidence of trade after AD 1200/1300 is even more enigmatic considering that sedentary lifestyles and the practice of agriculture would have entailed considerable resource risks that could have been partially offset through trade relations. This is a time when archaeologically visible traces of trade are at their lowest ebb throughout much of the Middle Atlantic Region (Stewart 1989). Brose (1979:8) suggests that reliance on an agricultural subsistence base and storage technology offset many of the economic uncertainties that previously stimulated trade relations. In contrast, Braun and Plog (1982:508) contend that prehistoric farming entailed more subsistence risks than many hunting and gathering modes of production and therefore agricultural societies would be deeply involved in regional exchange systems as one means of mitigating shortfalls and access to resources beyond their home territories. The reality in the Lower/Middle Delaware Valley is far from clear.

MacCord (1984), Gardner (1986:79-80), and Custer (1987) feel that there is evidence for small, but dramatic population movements during the Late Woodland period in portions of the Middle Atlantic Region. Group movements may have disrupted traditional exchange networks but would not necessarily have supplanted the need for, or utility of trade relations.

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ANALYSIS AND INTERPRETATION OF LITHIC REDUCTION STRATEGIES AND SITE FUNCTION: A METHODOLOGICAL APPROACH

by

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ABSTRACT

Lithic artifact assemblages from two prehistoric sites recently investigated near Waterford, New York were analyzed to identify lithic reduction strategies. The analyses include; 1. a technological classification of debitage, with postulated reduction sequences and; 2. a comparison of the flake size distributions using analytical techniques borrowed from petrographic studies of sediments. Flake size distributions were analyzed using a standard logarithmic transformation of the size data based on the phi scale. Interpretation of the combined results suggests that the two sites are typologically different. Lithic reduction at one site (site 1) consisted of bifacial reduction of flakes and reflects an expedient use of small, well-rounded cobbles available from a glacial till outcrop located at the site. In contrast, reduction strategies at the second site (site 2) emphasized the production of unifacially worked flake-tools. Materials selected include silicified slate and tabular cherts that were probably obtained from primary outcrop sources. Functional differences are postulated for the two sites. Both sites appear to be procurement sites, however,lithic reduction strategies suggest that processing activities were a major emphasis at site 2 where there was a focus on flake tool production and use. At site 1, the activities were focused on bifacial tool production and rejuvenation. The results of the analysis demonstrate the utility in combining two complimentary approaches to the analysis of debitage: technological classification of reduction sequence and quantitative analysis of flake size distributions. The combined approach increases the understanding of reduction strategies at sites where lithic materials are the primary artifact type.

INTRODUCTION

During 1987 and 1988 Ebasco Services Incorporated conducted Phase I and II archeological field investigations at a 124 acre tract located in the upper Hudson River Valley just north of the confluence of the Mohawk and Hudson Rivers near Waterford, New York. The project area falls within the Hudson Lowland physiographic province.

The Hudson-Mohawk Lowlands are characterized by glacial deposits, lacustrine sediments, and flood plain sediments unconformably overlying Ordovician-age sedimentary bedrock units. The bedrock units consist predominantly of shale, but include siltstone, sandstone, graywacke and chert.

The surficial geology of the Hudson-Mohawk Lowlands is largely a product of Pleistocene glaciation modified by recent erosional and depositional processes. While the topography at the project area itself resembles a broad, recently formed floodplain of the Hudson River, site specific geologic studies conducted by Ebasco (1988) indicate a much more complex geomorphology. Surficial materials are derived from a variety of sources including glacial till, glacial outwash, colluvial, alluvial and lacustrine sources.

Most of the project area has a layer of glacial till between bedrock and overlying soil units. The thickness of the soil units varies from 0 to 28feet, with the thinnest cover encountered in the northeast portion where the till outcrops on the surface

Phase I investigations included shovel testing at fifty foot intervals over the the most of project area. Two prehistoric archeological sites, Site 1 and Site 2, were identified during this phase. Site 1 is located in the Hudson

floodplain/valley approximately 1/3 the distance from the base of the bluff to the Hudson River. Site 2 is located near the base of the bluff approximately 2,000 feet to the northwest of Site 1.

Site 1 covers an area measuring approximately 350 by 750 feet and includes three artifact clusters. Each of the clusters was comprised of high concentrations of flakes with a small percentage of tools and worked artifacts. One cluster appears to be associated with the till outcrop. The other two are located within 250 feet of the outcrop. These clusters were designated as the Till area, Area A and Area B.

Stage II testing at Site 1 involved the excavation of 12 five-by-five foot test units; three in each of three artifact concentrations and three units in other selected areas. 3,815 total artifacts were recovered, including 2,971 pieces of debitage, and 56 worked stone tools (30 bifaces and 26 worked/utilized flakes).

Six diagnostic projectile points were recovered from plowzone contexts on site 1, five from the Till Area and one from Area B. The Till Area finds include a Brewerton side-notched point, a Beekman triangular point, one Susquehanna Broadspear point and two Late Woodland Madison points.

Site 2 is approximately 150 by 200 feet. Two subsurface pit features were identified. Phase II testing at this site included the excavation of ten additional shovel tests and three five by five test units. A total of 787 artifacts were recovered from the site, including 751 pieces of debitage and 34 worked stone tools (8 bifaces and 26 worked/utilized flakes). No diagnostic artifacts were recovered from site 2

THEORETICAL ORIENTATION

We make the assumption that lithic assemblages reflect human behavior as they are part of larger resource exploitation systems (Flenniken 1985, Towner 1986). Because all of the artifacts recovered from both sites were products of tool manufacturing and use, we felt that a study of the reduction strategy employed would best provide avenues to interpret site function. To this end two analytical approaches were applied to determine lithic reduction technology: 1. a quantitative analysis of the flake size distribution, and 2. technological analysis of the tools and by-products (debitage).

ARTIFACT ANALYSIS

Raw Material Utilization

Lithic raw materials utilized at each of the sites include black chert, gray chert, argillite, silicified slate and a few rare occurrences of quartz and quartzite. The black chert occurred in two grades: a medium grain chert with a dull luster, and a glossy, fine grained chert. The gray chert ranged from medium to fine grain in texture and varied in color from light to dark gray. The silicified slate was generally reddish brown in color and does not fracture conchoidally. The argillite materials are predominantly greyish-brown in color with moderately weathered friable surfaces.

Grey and black cherts were the predominant materials at all three clusters at site 1,although argillite and quartz were also present in low quantities.. The Till area had a greatest variety of materials present.

Although over half of the material recovered from site 2 consisted of grey chert, silicified slate, not found at site 1, comprised 26% of the material. Virtually all of the silicified slate was recovered from a pit feature and its immediate vicinity.

Size Distribution Analysis.

Previous analyses of debitage from archeological sites and from experimentally produced assemblages [cf. Patterson and Sollberger 1978, Patterson 1982, Stahle and Dunn 1982, Taylor 1987] have shown that various kinds of lithic reduction result in characteristic flake size patterns. Flake size distribution data in conjunction with other evidence from flaked tools, bifaces, and debitage can be useful in identifying the lithic reduction strategies used by prehistoric populations.

Patterson and Sollberger (1978), Patterson (1982) and Stahle and Dunn (1982) have all shown that biface reduction produces characteristic, highly skewed, size distributions that resemble exponential curves. Patterson and Sollberger (1978) also found that size distributions from true prismatic blade industries produce bell shaped curves approximating a normal distribution. Finally, Patterson (1982) found that primary quarrying activities produced a bi-modal distribution. The results of these studies suggest that comparisons of flake size distribution can be a useful tool in contrasting reduction strategies between artifact assemblages.

Petrologists commonly employ particle size analysis of sedimentary rocks and sediments in which the grain size distribution of samples are compared. These methods are directly applicable to the analysis of lithic debitage. The major difference is one of scale. Flakes are measured in centimeters while sedimentary grain size can range from centimeters for pebbles, to microns for clay particles. The goal, in both cases, is to systematically quantify size distributions which will allow for accurate representation of the samples under study. These data can then be statistically analyzed.

Grouping the Data

Most archeological studies that have dealt with flake size distributions have utilized metric units (centimeters and millimeters) while grouping the data into constant size class intervals, usually of 10 mm. (cf. Patterson and Sollberger 1978; Stahle and Dunn 1982). Petrologists on the other hand use a phi (ϕ) scale (Folk 1974:3). By using the phi scale, the data is transformed to a logarithmic scale which groups the data at the smaller end of the size range into smaller class groupings. The phi scale is an inverse transformation that, as the value of phi increases, the actual size in millimeters decreases. Each successively larger value in phi units represents a decrease in size by 1/2. A phi value of 1 is equal to 0.5 mm., 2ϕ equals 0.25 mm. and so on. This scale was developed by Krombein (referenced in Folk 1974) and is now universally used by petrologists. It is also the scale used in most geologic screens and sieves used in sediment particle size analysis. Its advantages are that this type of scale seems to more closely represent natural processes in addition to simplifying mathematical computations (Folk 1974). The use of this scale is simple to apply and it eliminates the need for "normalizing" the data through a mathematical transformation (cf. Stahle and Dunn 1982). The

transformation is built into the scale. Conversion charts for translating metric units into phi units have been devised (Folk 1974:26). [Table 1], or, units can be expressed by the mathematical formula:

$$\text{Size in millimeters} = 2^{-\phi}$$

Here a value of 0.0ϕ is equivalent to 1 mm. Measurements greater than 1 mm. (including virtually all measurable flakes) will have negative phi values.

Each flake included in the analysis was measured using vernier calipers. The length (l) was measured as the greatest dimension along the axis perpendicular to the striking platform. Width was taken as the greatest dimension perpendicular to the axis of (l).

A class interval value for phi of 0.25 is used in the following analysis. This interval was felt to be best suited to the size range commonly observed in lithic debitage. A larger interval would have grouped the larger flakes into too few classes while a smaller interval would have resulted in too many classes to be useful. Table 1 provides the size in millimeters associated with each value of phi. The cut-off point at the smaller end of the scale is -2.75ϕ (or approximately 1/4 inch) and corresponds to the size of the screens used in artifact recovery. This interval results in a total of 13 classes between 6.7 mm. (-2.75ϕ) and 64 mm. (-6.00ϕ). The smallest class includes flakes ranging from 6.7 mm. to 8.0 mm. while the largest class includes all flakes between 53.8 mm. and 64.0 mm. (no flakes in the sample were larger than 64 mm.).

Flakes were assigned to one of the 13 phi classes listed in the table on the basis of their width in millimeters. Three different types of size distribution graphs-- frequency, cumulative frequency and cumulative percent

were plotted for each site, and for each of the clusters within site 1 [figures 1 thru 7].

The frequency graphs (figures 1,2 and 3) provide a quick means of making general comparisons in the variation in flake size distribution between the sites and clusters. They show striking differences between sites 1 and 2. The Till area, Area A and Area B at site 1 all exhibit highly skewed distributions with greater frequencies of smaller flakes. In contrast, the distribution curve for site 2 assemblage approximates a bell shaped curve (after transformation). However, as is illustrated in figure 1, it is difficult to make direct comparisons between the two sites due to the large differences in sample sizes (n).

Frequency distribution curves (figures 4 and 5) also relect differnces in the "shape" of the size distributions between the two sites, however, as was the case for the frequency curves, the large difference in the sample sizes between the two sites prevents a direct comparison of the two distributions. The flake size data expressed as cumulative percentages (figures 6 and 7) allows for a direct comparison on the same graph irrespective of the differing sample sizes. The results again reflect the <u>similarities</u> between the three clusters at site 1 and the <u>differences</u> between site 1 and site 2 distributions. The Site 2 curve is "S" shaped where the slopes at the two tails of the curve are relatively flat and the mid-section slopes are the steepest. This indicates that the transformed data (phi) from site 2 is "normally" distributed over the phi scale. Site 1 on the other hand reveals a highly skewed distribution resulting in an "exponential" curve which have a progressively increasing slope. This pattern holds true for each of the clusters within site 1 as well as for the site as a whole.

Clearly, the flake size distribution pattern for site 1 is different than that of site 2, suggesting that different lithic reduction strategies are being employed at each site. What we feel this indicates is that bifacial reduction was employed at site 1 while the production of flakes was the predominant reduction strategy at site 2. This interpretation is supported by the results of the second phase of the analysis.

Flake Technological Analysis.

In the second phase of the analysis the debitage was classified according to technological and morphological attributes. These attributes were selected from recent debitage studies (Pokotylo 1979, Magne 1982, Gilreath 1983, Stephenson 1985). The following defined categories were designed to enable identification of apparent patterns in lithic reduction (tool manufacturing) strategies between sites and areas within sites. These categories generally correspond to the sequential stages of reduction.

Core: nucleus with one or more flakes removed (Crabtree, 1972)

Decortication flake: flake with cortex covering over 10% of the dorsal surface.

Early reduction flake: flake with a single facet platform and one to three flake scars on the dorsal surface.

Bifacial thinning flake: flake with a platform prepared by either abrasion or chipping and more than three flake scars on the dorsal surface.

Late reduction flake: flake with a multi-faceted platform prepared by abrasion and chipping and, in general, having two dorsal scars and a single arris on the dorsal surface. These flakes are produced by a pressure technique and often exhibited collapsed platforms in the recovered sample.

Shatter: distal ends and midsections of flakes too small and lacking diagnostic characteristics to be placed in another category.

Miscellaneous: flakes which do not fit any of the above categories. This includes resharpening flakes characterized by a multi-faceted platform with a pronounced lip and multiple flake scars on the dorsal surface.

A comparison of the relative percentages of flake (reduction stage) classes between the two sites show differences in only two of the categories, bifacial thinning flakes and late reduction flakes. Bifacial thinning flakes comprise 16% of the debitage at site 1 compared with 25% at site 2. Conversely, late reduction flakes at site 2 comprised 16% of the debitage compared to 23% at site 1. A chi-square analysis of these differences indicate that they are significant at the .001 level.

Worked/utilized Flakes

Flakes having been modified after detachment, either through intentional flaking or through use were classified as worked or utilized flakes. This includes scrappers and other unifacial tools. Twenty-six worked or utilized flakes were recovered from site 1 and 27 were recovered from site 2. The ratio of utilized flakes to other flaked stone tools is .41 at site 1 and it is 0.74 at site 2 . This difference suggests a greater emphasis on utilization of flake tools at site 2 indicating possible functional variation between the sites. The majority of the flake tools at site 2 are made from silicified slate and consist of large tabular flakes that have been worked along most or all of the edges. Many of them exhibit possible use-wear in the form of abrasion and smoothing or step fractures.

INTERPRETATIONS

Analysis of the artifact assemblages from sites 1 and 2 suggests that each represents a distinct site type. Site 1 appears to have served as a lithic procurement and reduction station--what Binford (1980) has termed a "logistically oriented" site--in which the primary activities were biface reduction and biface (tool) maintenance. The latter activity is suggested by the presence of resharpening flakes which are considered indicative of bifacial tool rejuvenation. The till source may have served as an occasional raw material source for small hunting groups during the Late Archaic, Transitional and Late Woodland periods. The till is unlikely to have been considered a major chert source by aboriginal groups because of the small quantity of high quality chert within its matrix. The lack of features is also suggestive of casual, intermittent usage.

The lithic reduction strategy which appears to have been employed at site 1 suggests that the prehistoric occupants of the site were using small, locally available cobbles, to produce flakes large enough for bifacial tool manufacture. These cobbles were likely obtained from the till outcrop which exists within the limits of site 1. Flakes were further worked by both percussion and pressure techniques to form finished tools. Both the black and grey chert materials seem to have been worked in this manner. These conclusions are based on the following observations:

- all of the lithic material selected for use appears to be from sub-rounded and sub-angular cobbles with incipient cortex;
- the relatively few mid-range reduction flakes suggests the use of small cobbles similar to that found in the till Area, and
- many of the finished projectile points recovered were manufactured from flakes;

In contrast, site 2 may represent a multi-function occupation. This is suggested by the presence of features and the comparatively high number of utilized flake tools in the assemblage. Its small size, however, suggests that it did not function as a base camp. Base camps are represented in the area by several other larger sites reported along the Hudson River and which contain both features and/or burials.

The production of unifacially worked flake tools seems to have been the principle activity at the site. This is supported by the low percentage of late reduction stage flakes, indicative of final preparation tools. This is clearly apparent for the silicified slate materials and may also be the case for the grey chert materials. The sources of the lithic materials appear to be tabular blocks rather than glacial till cobbles. The source of the silicified slate material found at site 2 is unknown. However, a chert outcrop source is located nearby on the Hudson River at Pleasantdale Quarry site (Brumbach 1980). Comparisons of materials from site 2 and the Pleasantdale Quarry site may identify the latter as the source of the site 2 material.
These conclusions are based on the following observations:

- the presence of natural rather than cobble cortex on the decortication flakes.
- the presence of tabular silicified slate flake tools; and
- the occurrence of "blade-like" chert flakes which, it is believed, could only have been produced from block sources; (their presence may also indicate flake tool rather than biface tool reduction);

SUMMARY

Analysis of the artifact assemblages from site 1 and site 2 suggests that each represents a distinct site type. Site 1 appears to have served as a lithic procurement and reduction station during the Late Archaic, Transitional, and

Late Woodland periods. This site type, a small and apparently intermittently used "glacial till quarry" with tool manufacturing remains in direct association with it, has not been previously investigated in the literature dealing with the central Hudson River valley.

Site 2, small, multifunctional processing station, may also represent a not yet understood component of the prehistoric settlement system in the central Hudson River valley. Like site 1, it is located relatively far from the river in a topographic setting about which little is known archeologically.

In sum, the artifact assemblages from two prehistoric sites were analyzed to identify lithic reduction strategies and provide information on site function. The analyses included: 1. a comparison of the flake size distributions using analytical techniques borrowed from petrographic studies of sediments and, 2. a technological classification of the flaked stone artifacts, with postulated reduction sequences. Interpretation of the combined results suggests that the two sites are typologically different. The results of the analysis demonstrate the utility in combining the two complimentary approaches to the analysis of debitage and increases the understanding of reduction strategies and site functions at sites where lithic materials are the primary artifact type.

TABLE 1

METRIC EQUIVALENT OF PHI ϕ VALUES USED IN DEBITAGE ANALYSIS

Phi unit(ϕ)	Equivalent size (mm.)
-6.00	64.00 mm.
-5.75	53.80 mm.
-5.50	45.25 mm.
-5.25	38.05 mm.
-5.00	32.00 mm.
-4.75	26.90 mm.
-4.50	22.60 mm.
-4.25	19.00 mm.
-4.00	16.00 mm.
-3.75	13.50 mm.
-3.50	11.30 mm.
-3.00	8.00 mm.
-2.75	6.70 mm.
-2.50	5.70 mm.

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FLAKE SIZE FREQUENCY DISTRIBUTION

IAS–1 vs IAS–2

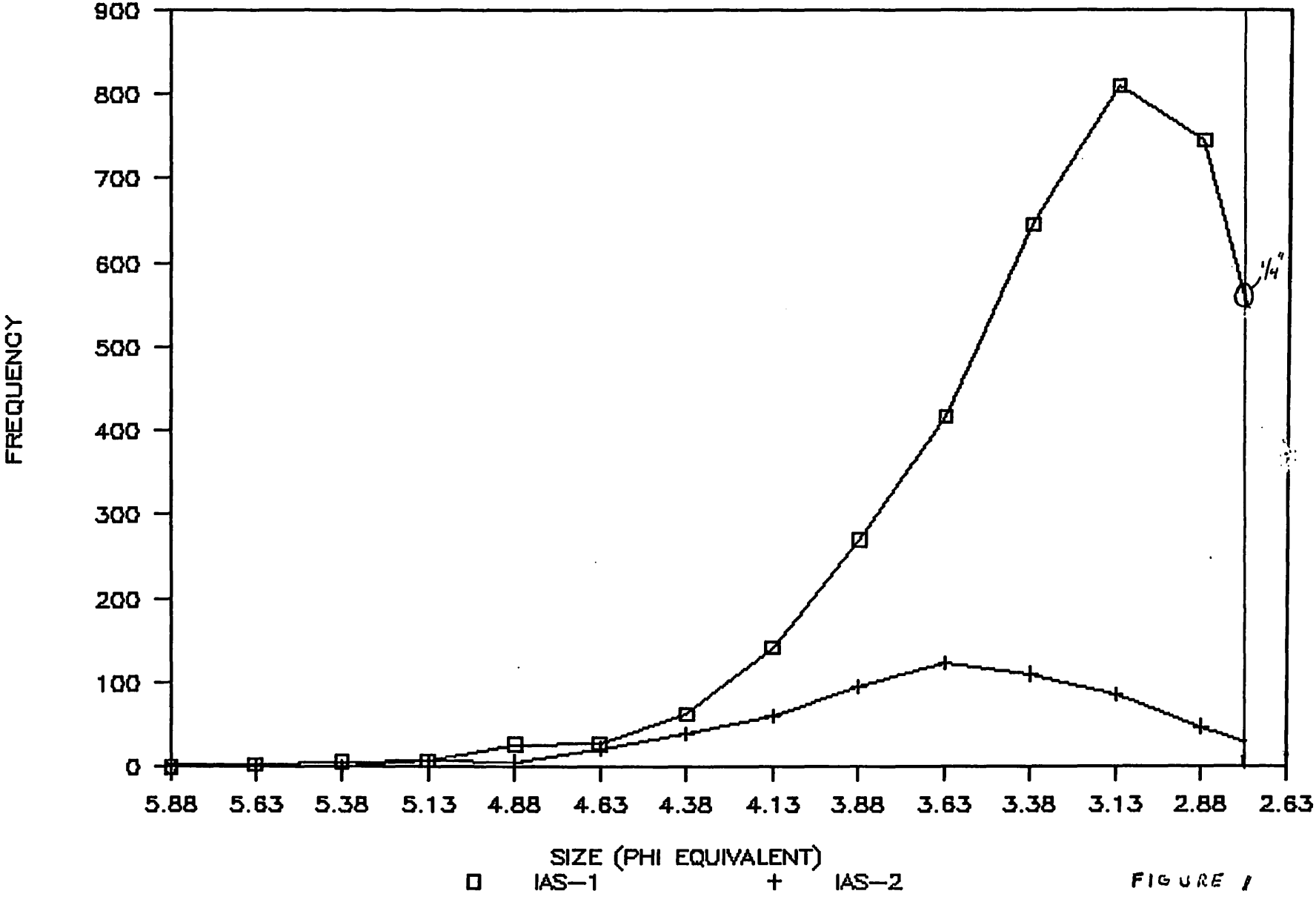
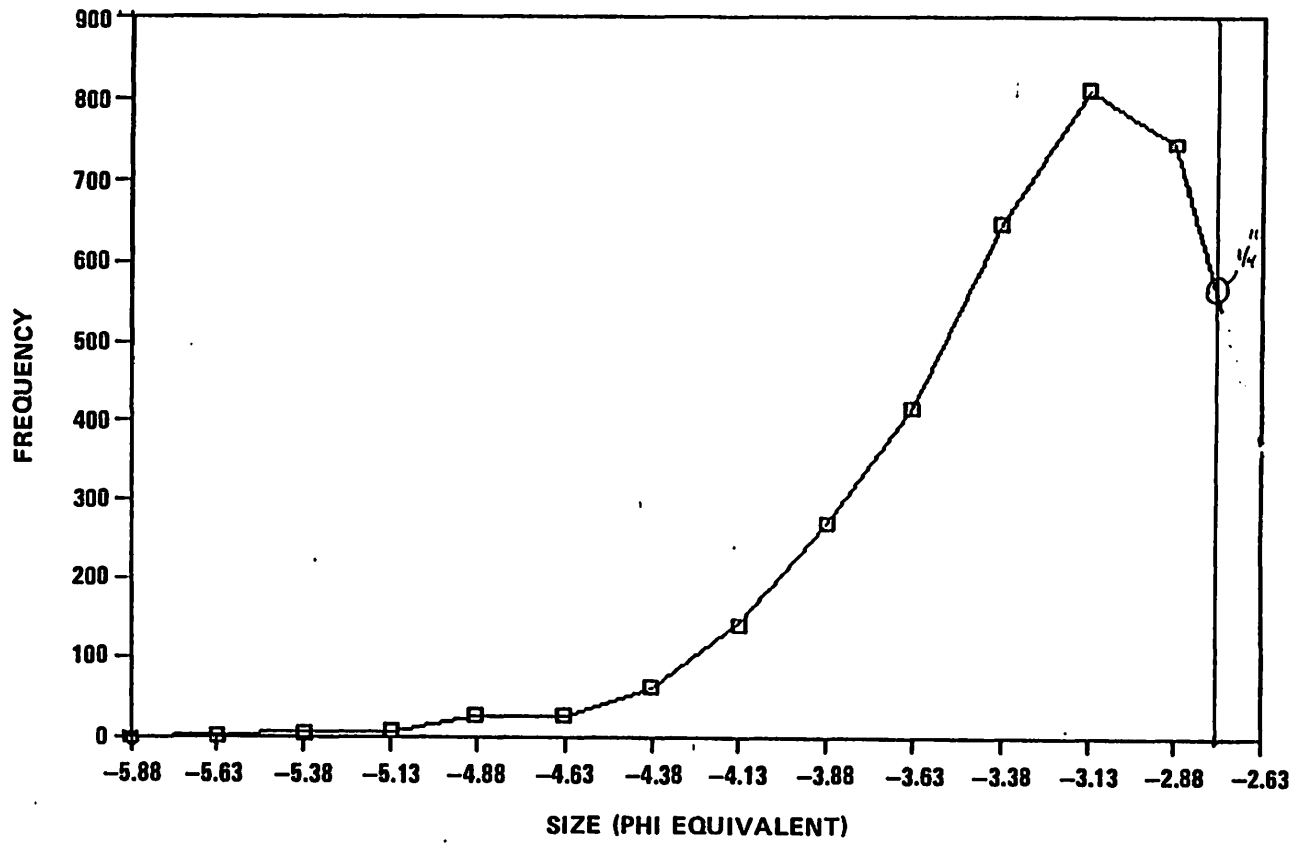


FIGURE 1

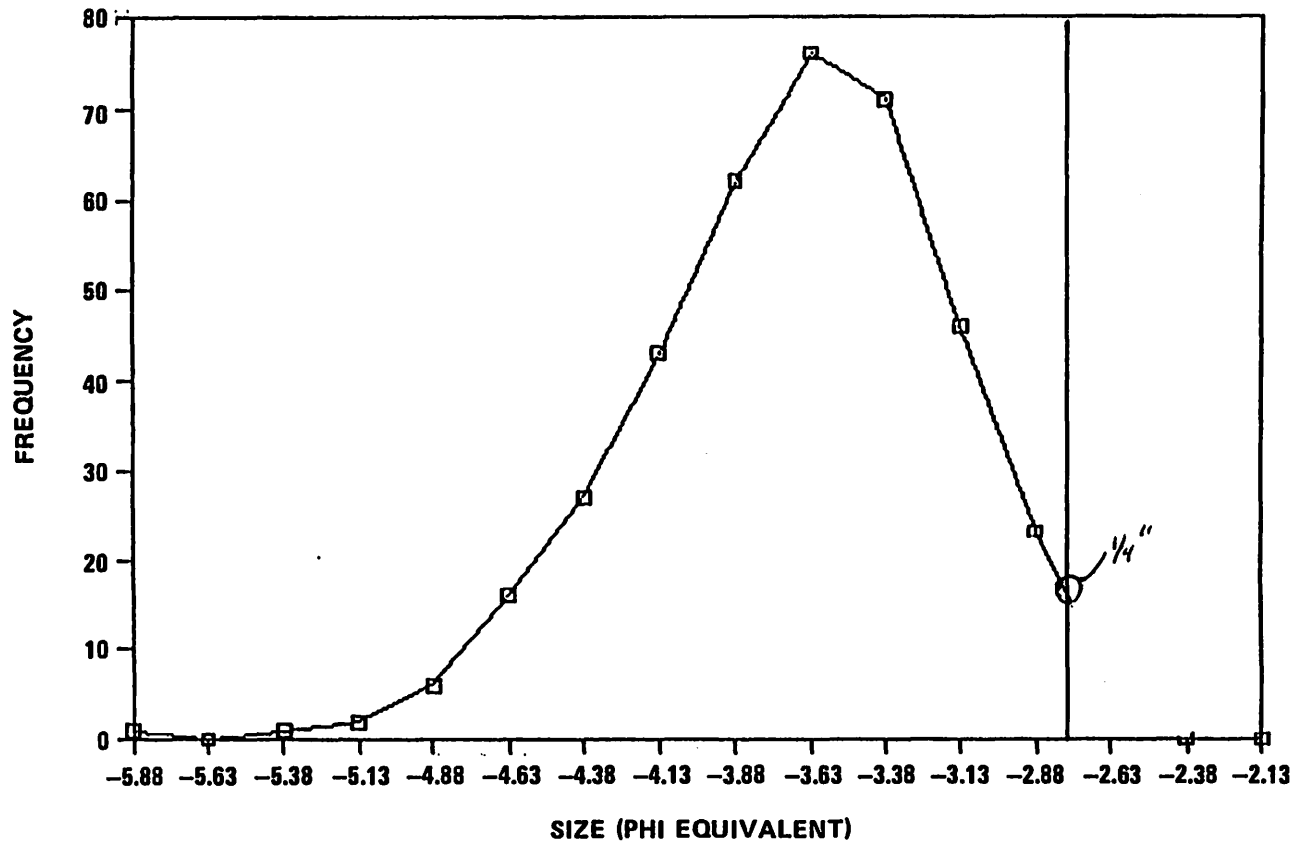


CULTURAL RESOURCES REPORT

FIGURE ~~4-26~~ 2

FLAKE SIZE, FREQUENCY DISTRIBUTION BY AREA, SITE IAS-1

DECEMBER 1988	EBASCO SERVICES INCORPORATED

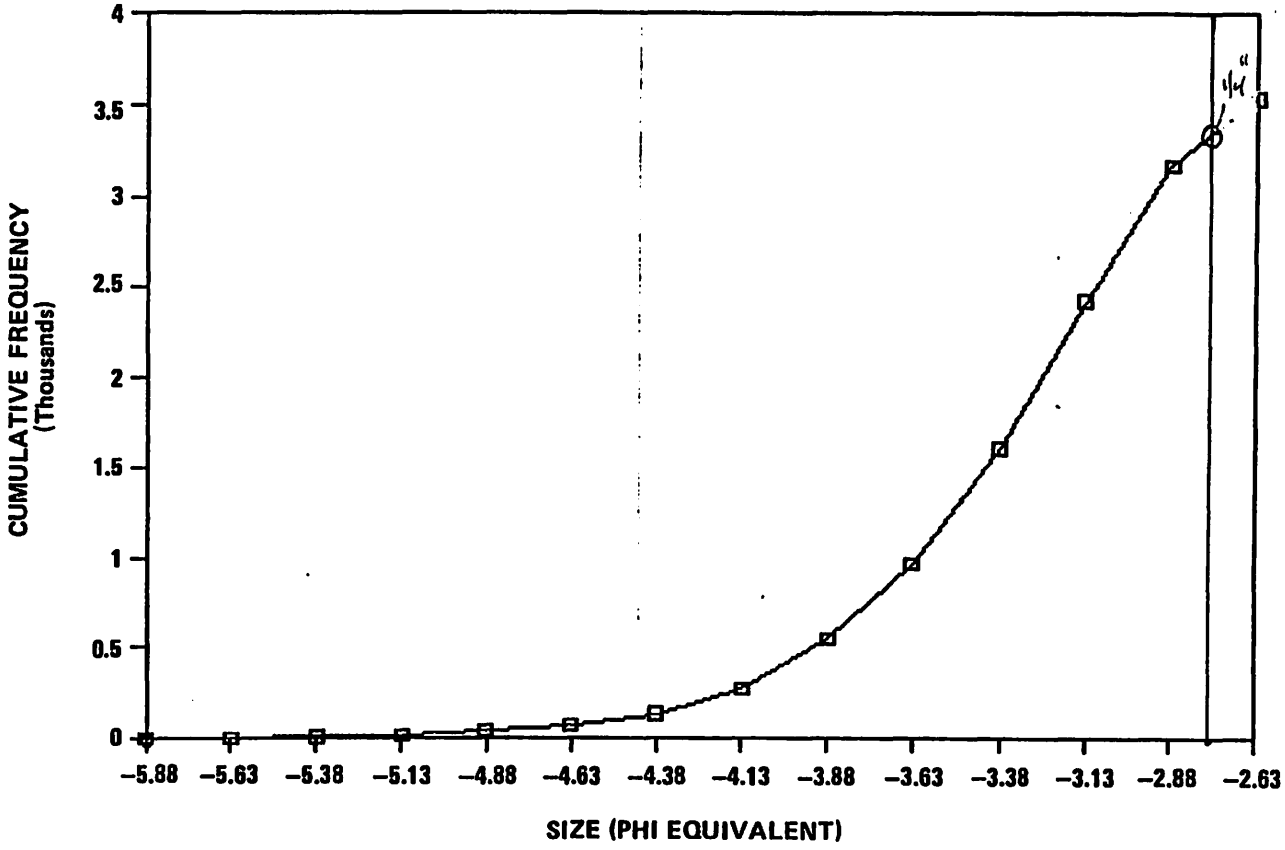


CULTURAL RESOURCES REPORT

FIGURE ~~4-27~~ 3

FLAKE SIZE, FREQUENCY DISTRIBUTION BY AREA, SITE IAS-2

DECEMBER 1988	EBASCO SERVICES INCORPORATED

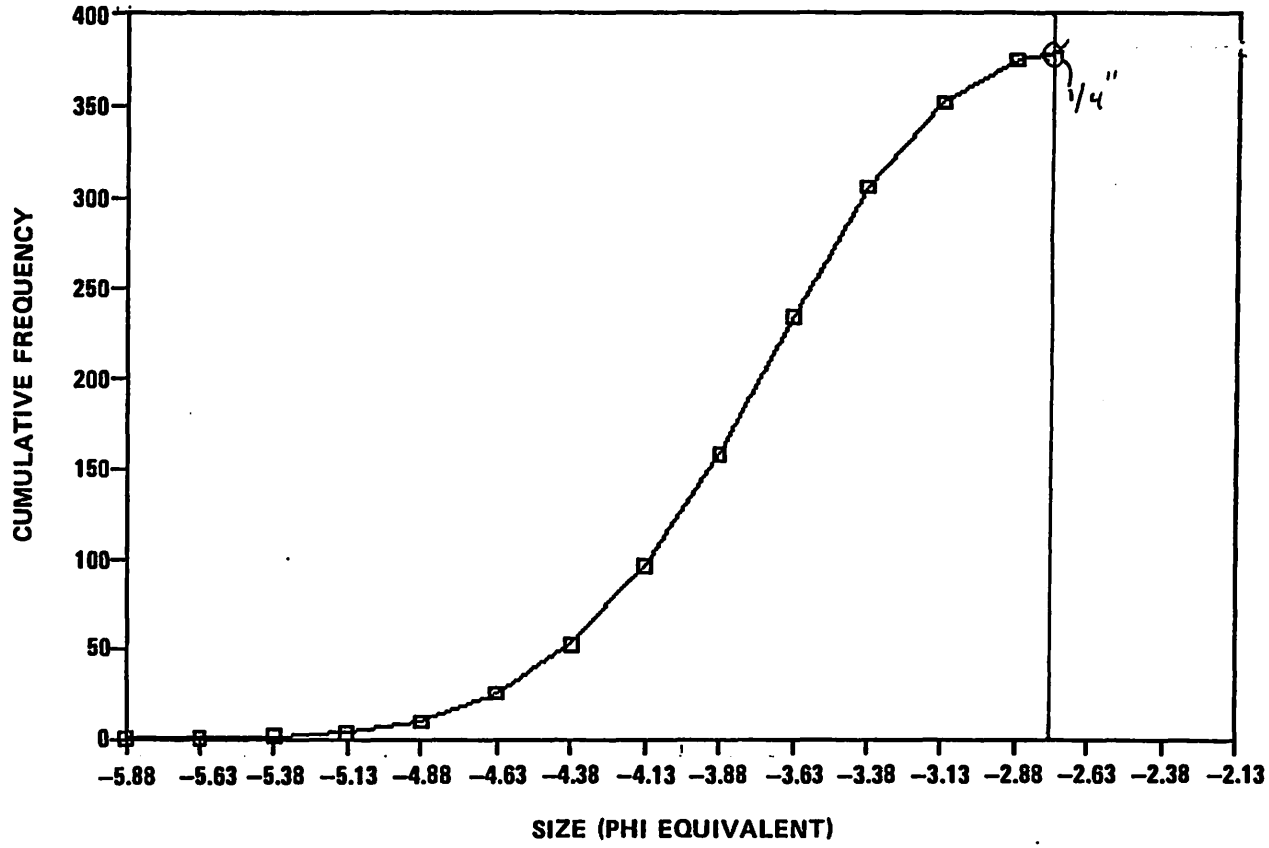


CULTURAL RESOURCES REPORT

FIGURE ~~4-29~~ 4

FLAKE SIZE, CUMULATIVE FREQUENCY
BY AREA, SITE IAS-1

DECEMBER 1988 | EBASCO SERVICES INCORPORATED



CULTURAL RESOURCES REPORT

FIGURE ~~4-30~~ 5

FLAKE SIZE, CUMULATIVE FREQUENCY BY AREA, SITE IAS-2

DECEMBER 1988	EBASCO SERVICES INCORPORATED

FLAKE SIZE FREQUENCY DISTRIBUTION

IAS–1 VS IAS–2

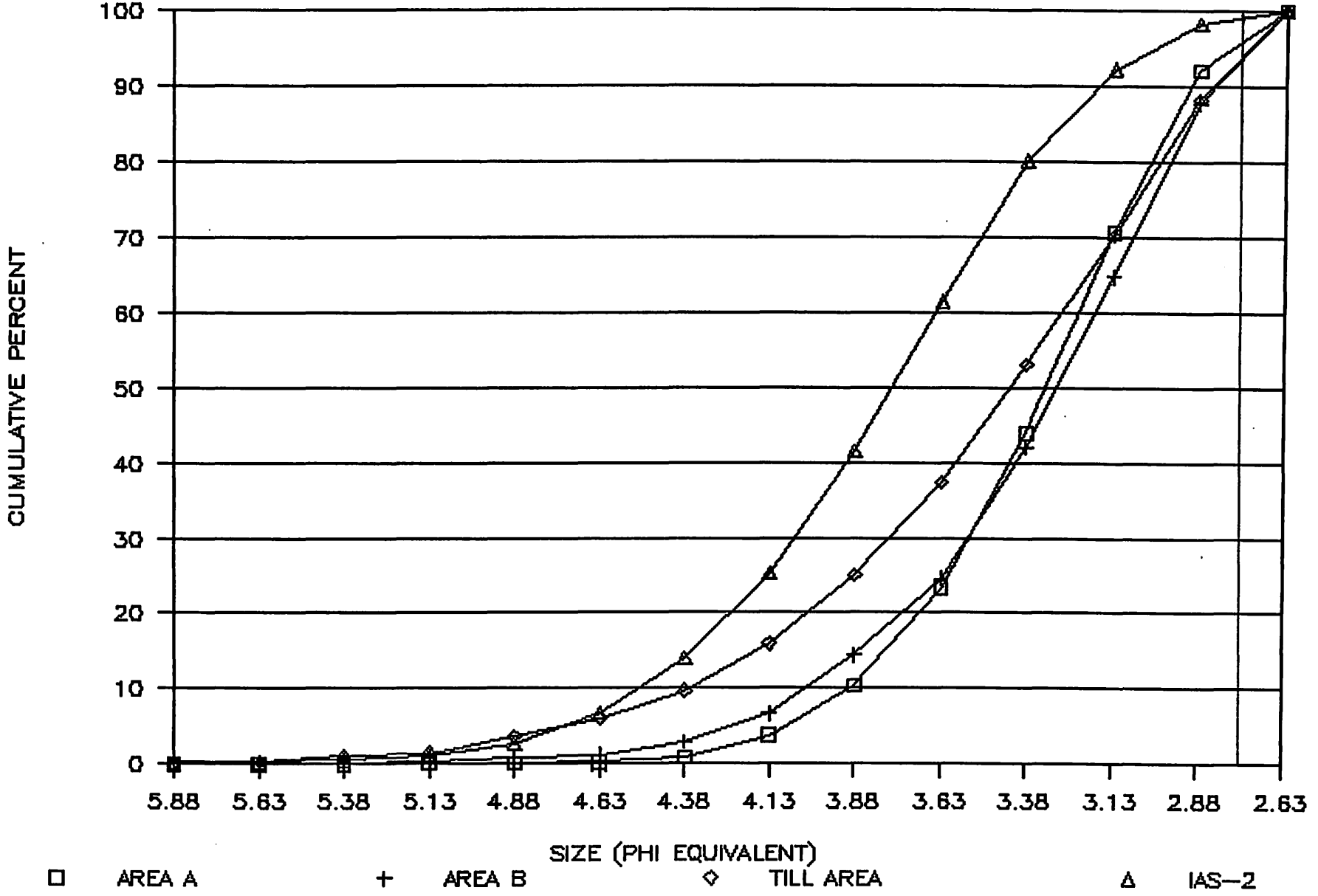


Figure 6

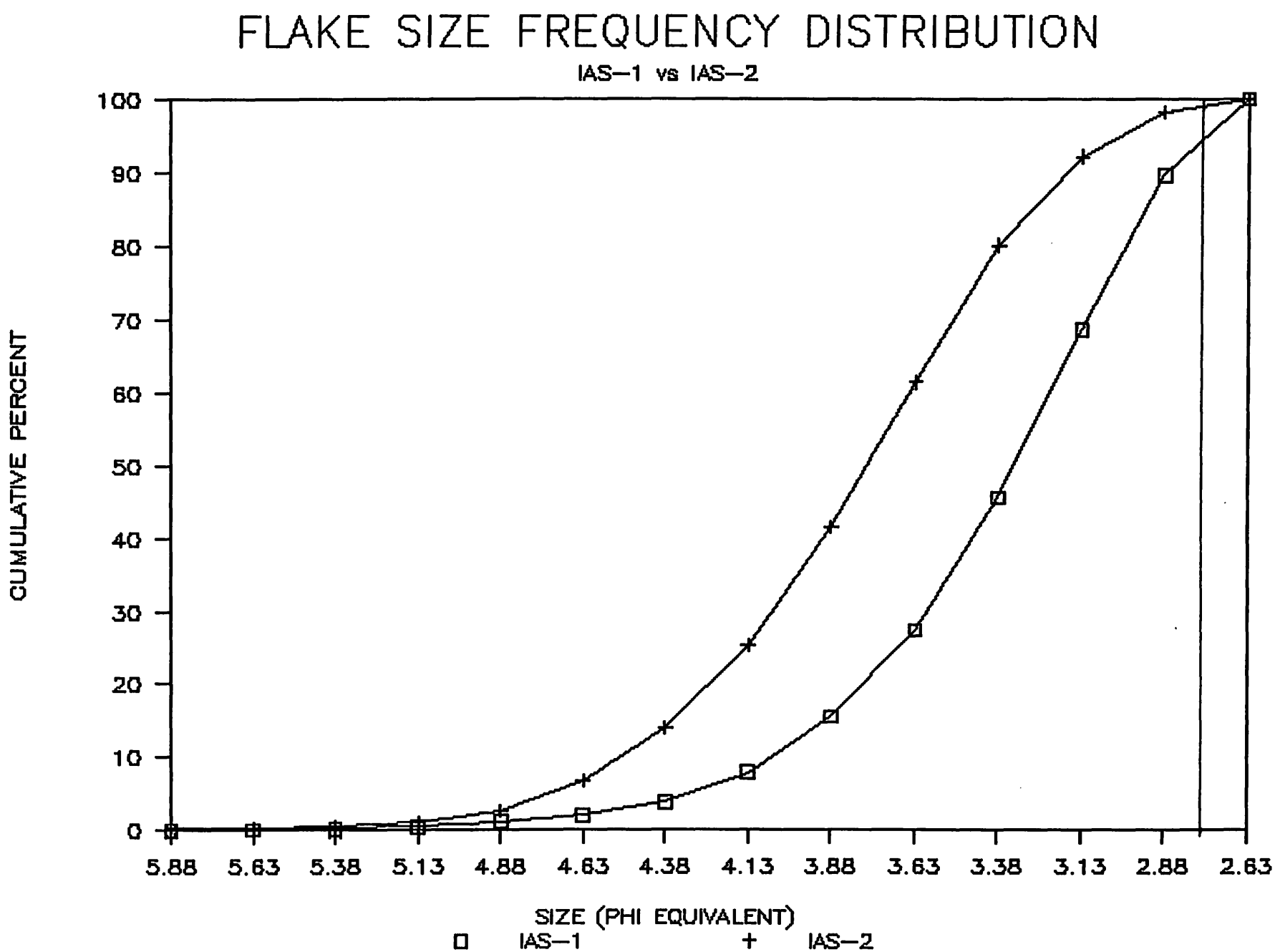

FLAKE SIZE FREQUENCY DISTRIBUTION
IAS-1 vs IAS-2
CUMULATIVE PERCENT
100
90
80
70
60
50
40
30
20
10
0
5.88
5.63
5.38
5.13
4.88
4.63
4.38
4.13
3.88
3.63
3.38
3.13
2.88
2.63
SIZE (PHI EQUIVALENT)
IAS-1
IAS-2

FIGURE 7

The Renaissance and the Rebel: Nathaniel Bacon at Curles Plantation[1]

By

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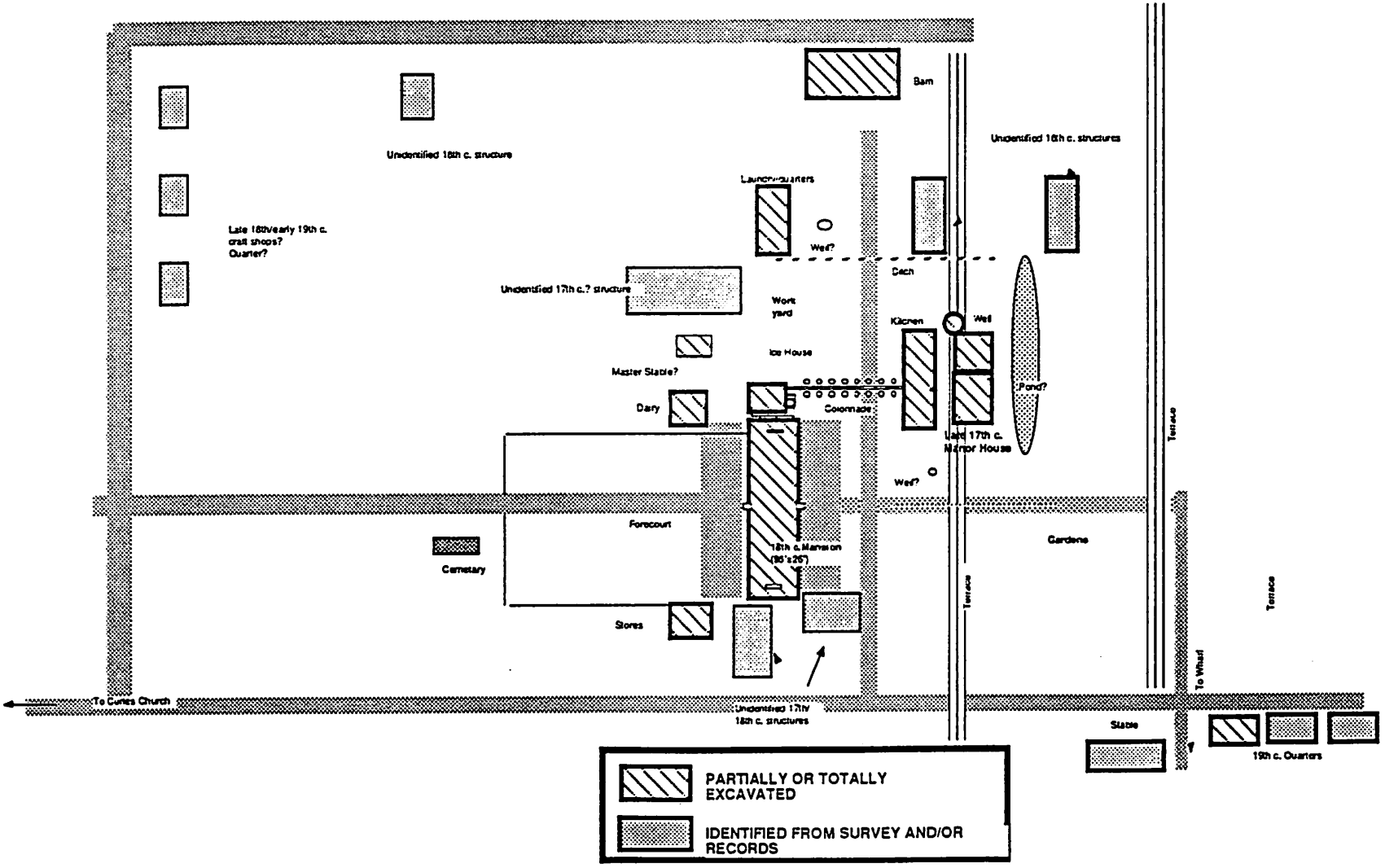
1. This is the text of an oral presentation prepared for the Middle Atlantic Archaeology Conference, Rehobeth Beach 1989. A longer, referenced version is in preparation for publication. The author is grateful to project historian, Katharine Harbury for transcribing the inventory and account of Nathaniel Bacon's estate, from the microfilms of the Colonial Records Project. Thanks is also due to the British Public Records Office for permission to quote at length from this important document (C.O.5/1371, Pt.II, 227vo-230, May 11, 1677, "An Account of the Estate of Nathaniel Bacon, Jr., Dec'd").

Curles Plantation, Henrico Co., Virginia



The peninsula known as Curles Neck, which is formed by a large meander loop of the James River, was settled in 1613 as Digges' Hundred, one of five "hundreds" of English North America's first incorporated community, alternately known as Bermuda City, Bermuda Hundred, or Charles City. The lower end of Curles Neck had been the home of Thomas Harris, one of the longer-lived of the "ancient planters" or original settlers of Virginia. Harris had come to Curles Neck as military commander of Digges' Hundred under Marshal Sir Thomas Dale. Following Harris's death in 1654, the property passed to Roger Green, whom documents record as "a merchant for Thomas Ballard", and then to Ballard himself, a member of Virginia's prestigious Governor's Council. During Ballard's tenure, the plantation was probably operated as a "quarter", rather than a "home" plantation.

In 1674, Ballard sold the property to Nathaniel Bacon, Jr., a man Ballard would become dangerously closely involved with two years later when Bacon led the major insurrection that bear's his name in history. Following Bacon's death in late 1676, Curles became entangled in a long series of litigations. Following the collapse of Bacon's Rebellion, Governor Sir William Berkeley had seized Curles along with numerous other plantations. He granted ownership of many of these properties to gentlemen who had been loyal during the rebellion, while other properties, including Curles, had been reserved "to the use of the King". As the land had been seized without due process of law, legal ownership was contested until 1698, at which time the colony's escheator, William Randolph, called for an inquisition to clarify title to the Curles tract. In 1699, the inquisition found that Bacon's property had duly escheated, by reason of Bacon's attainder of high treason, leaving it free for purchase. Randolph, who had acquired Turkey Island plantation on the eastern edge of Curles Neck, now more than doubled his holdings by purchasing Curles from the crown for a pittance.

By 1715, Curles was in the hands of William's son, Richard Randolph. Over the past few years we have excavated the Randolph house which, by the late 18th century, had grown into a two-storey mansion nearly 100 feet in length. In addition, we have excavated the 54' x 22' brick

kitchen. The excavation of this kitchen has been made all the more exciting by the discovery of Jane Bolling Randolph's personal account and recipe manuscript. This document contains recipes and cures dated as early as 1743, as well as some of the plantation mistress's accounts from as early as 1739.

Historians Louis Manarin and Clifford Dowdy have called Curles the spiritual, political, social and economic heart of the Henrico County throughout much of the Colonial period. From their Curles Neck wharves and storehouses, the Randolph and Pleasants families dominated much of the local commerce; Randolphs and the neighboring Cockes and Eppes families ran the local courts, the vestry, and monopolized the county's seats in the Assembly. The Curles church, built by Richard Randolph, was the principal chapel of the parish, and the Friends Meeting House built by the Pleasants served a sizeable dissident sect in the county. In the late 18th century a large flour mill, a tannery, a tavern, a store, and a very extensive pottery manufactory grew up at Curles forming the nucleus of a non-incorporated village known as "New Market". In the immediate Ante-Bellum Period the plantation was owned by William Allen, of Claremont Manor in Surry County. Allen quartered a manager, overseer and slaves at Curles until the Civil War, during which Federal troops dismantled the remaining buildings of "Old Curles".

The "manor house complex", as we've come to call the nearly 10 acre archaeological site we've been working on, contains remains of at least 23 buildings, as well as gardens, shops, wells, ditches, terraces, fences, and other features of a major plantation occupied between 1613 and ca. 1865.

While excavating a drainage ditch and enormous trashpit for the 18th century kitchen in 1987 we discovered the remains of a 17th century brick house. Nothing so elaborate would have been constructed for an overseer and servants. A brick house constructed prior to Harris' death in 1654 would be a very unusual find, while one built by Bacon upon his arrival in 1674 would be only somewhat less surprising. In the summer of 1988 we began the excavation of this structure.

Features piercing the destruction debris of the house indicated that the building had ceased to stand by the turn of the 18th century. For example, lenses of clay which had washed over the ruins filled cracks and crevasses in the upper levels of destruction debris. The lower of these contained fragments of wine bottles that were made in the late17th or early 18th century. The mold left by post-destruction fence post contained 17th century English delftware and an agateware terra cotta pipestem stamped with a Tudor Rose motif.

The excavation of the destruction levels themselves provided a fairly clear picture of the building's last moments. First, a layer of soil and charcoal had washed over the floor at the west end of the building, apparently entering through a doorway connecting the brick house with an earthfast structure. The charcoal and ash suggest that this latter structure had burned. The next thing that had happened was the heavy tile roof and thick lead flashing had come crashing down to rest on the tiled cellar floor. Some intense but localized burning on some of the roof tiles suggested that rafters or a roof beam had caught fire. With the failure of a roofing member, the heavy weight of the tile and lead roof had caused a sudden collapse that probably snuffed out any remaining fire.

The brick walls were pulled into the building, probably by the heavy ceiling beams. Compression cracks and shear failures in the foundation walls point to stress loci which can be interpreted as positions of falling interior posts or crumbling partition bearing points. Numerous cut, wedge-shaped bricks of a barrel arch or vault were found, giving another indication of rather elaborate construction for this early period.

From the northeast corner of the building, in a wall-fall layer, came a drawer pull from some unknown bit of 17th century furniture, and a wine bottle. Lying directly over the floor at the western end of the building, we found scraps of fish and animal bone and a beautiful rouletted pipestem: a type that was probably made between 1650-1680. Stuffed in a void where a floor tile was missing were dozens of bony plates from a sturgeon.

Other artifacts in the primary destruction fill included both the iron frame and lead cames of one or more casement windows, and an iron cleaver or chopper. The window frame is nearly identical to one excavated from the cellar of Robert Carter's Corotowman. Ivor Noel Hume interpreted that window as having been stored in Carter's basement after he had updated the old windows in the 17th century family home standing near his 18th century mansion. The leading for our window was twisted into a tight pretzel. We untwisted it, and gently opened two of the turned lead pieces searching for possible maker's marks. And they were there. Both pieces were marked "1647 John Mason of Bristol Fecit".

Susan Hanna of St. Mary's City has recorded other windows made by John Mason, apparently a Bristol glazier of the mid-17th century. Of course, all the dated window leads told us was that the lead itself had been turned in the glazier's vice sometime in or after 1647. While we had pretty good evidence that the house was destroyed in the late 17th century, we still could not pin down the builder of the house. Was it Harris, Ballard or Bacon?

The structure was a square brick building which had sported a fine tile roof and, still intact, a beautiful - if prosaic - tile cellar floor. The two-brick-thick wall suggested a building of one storey and, probably, a garret. We had found ornamental brickwork in sufficient quantities and varieties to indicate that the structure had been no "Plain Jane" frontier blockhouse. Mitered and cut bricks suggest a water-table course, although these may have been used only on chimney haunches. Cyma reversa and other molded bricks suggest that classical treatments were used somewhere in the house. We don't known whether this treatment was in pilastered and pedimented door and window surrounds and cornices, or whether this simply reflects the somewhat older treatment of chimneys as columns. Half- and three-quarter-round bricks indicate some ornamental coping, perhaps along a parapetted gable. The house had "Purbeck marble" accents, probably in the fireplace surround. Interior walls had been plastered, as had the

ceiling. Some interior walls appeared to have been color-washed with bright red ochre.

Centered on the eastern wall was a flush internal chimney which had remained standing after the house walls had collapsed and had been used as a lime-burning kiln in the early 18th century. The hearth was at least six feet across, judging by the space between the cheeks. Beside the chimney in the southeastern corner of the building was an outside entrance to the cellar formed within the foundation itself rather than with a bulkhead.

The brick building was, in actuality, only part of a larger house, the remainder of which was built in the traditional Virginia manner of pairs of stout timber posts planted firmly in the ground with no other foundation material used, or needed. This timber-framed portion of the house contained a shallow wood-lined cellar which had begun gathering trash and filling with washed-in silt by the last decade of the 17th century. This portion of the house will be excavated this summer.

Square floor tiles have been uncovered in excavations of small cellars on numerous Tidewater Virginia houses of the late 17th c. Terra cotta tile roofs are also a relatively common find from this period. Some of the wealthy, powerful men who had come to rule Virginia in the 1650's -1680's had built relatively elaborate houses in the precincts around Jamestown. These included Governor Berkeley's Green Spring, and the plantation manor houses of Arthur Allen, Thomas Swann, and Thomas Warren. Of these, however, only Green Spring might be considered comparable in size and stylishness with what would be considered a gentleman's proper home a century later.

A brick house, however, remained an uncommon sight in the 17th century countryside. Architectural historian Cary Carson and his colleagues have dubbed the typical post-in-ground or earthfast building tradition of 17th century Virginia "impermanent architecture". The vast majority of 17th century Virginians lived huddled in one- or two-room earthfast houses of 150 - 500 square feet, hoping to make a few

profitable crops of tobacco, and go home or to build a better house later. Few in the 17th century ever realized either dream.

By 1660, the more domestic and stable forms of life that would typify the next century were beginning to form. The English government tried to promote a more civil life in the colony by constantly urging the construction of towns, and they tried to force the larger plantation owners to build brick houses, both on their plantation lands and in Jamestown. Laws were eventually passed banning wooden houses from being built in Jamestown proper, although little heed was paid to these laws.

The goal was to produce tobacco, and precious little time or effort could be expended on such frivolities as building brick houses. Furthermore, there was a continual shortage of able craftsmen in all the trades. A brick house was an expensive, and wholly unnecessary affair. Most people were too closely bound to the labor and capital demands of tobacco farming to ever build the houses they envisioned leaving their sons.

Digging in the dirt was not giving us the evidence we needed to decide for certain who had been the builder of the brick house at Curles. Digging in the archives, however, provided a very pleasant surprise. Rarely is an archaeologist's question so clearly answered; the brick house was Nathaniel Bacon's. Bacon was a young man when he arrived in Virginia, but due to his family's status in England, and his own familial relationship with Virginia's royal governor, he was immediately appointed to a prestigious and lucrative position on the Governor's Council and was granted a license to participate in the profitable Indian trade monopoly. Had he continued to play the role of a privileged gentlemen by the rules of Virginia, we would probably not have our mystery answered. We know that the brick house was Bacon's only because of his role as 17th century America's most notorious revolutionary.

Falling tobacco prices, Indian attacks on the frontier, a shortage of good land, and the abusive perogatives of the colony's leaders are

usually blamed for the massive discontent which spread throughout Virginia in the 1670's. When Indians killed the overseer at Bacon's quarter plantation near present-day Richmond, as well as two men at the plantation of his Indian-trade partner William Byrd, Bacon offered to lead an army to rid the countryside of Indians and to open new lands on the frontier of the colony. When Governor Berkeley, who profited considerably from the Indian fur trade, refused to grant Bacon a commission against the Indians, Bacon led his unofficial army in attacks against the "friendly" Appomattox and Occaneechee Indians who served as the principal middlemen in the fur trade.

Berkeley declared this act treasonous and prepared a warrant for Bacon's arrest. Over the next several months Bacon's Indian campaign grew into a general rebellion. Tradition states that Berkeley sailed to Curles Plantation and informed Mrs. Bacon that he intended to see her husband hanged as a rebel. Bacon contracted dysentery in the field and died. Within a few months the rebellion had collapsed, and Berkeley had hanged 23 of the rebels. Bacon's friend and former Curles owner, Thomas Ballard, managed to slip through the governor's noose by jumping to the winning side just in time. Berkeley summarily seized numerous plantations, including Curles, of those he had hanged or who, in his eyes, had participated in the rebellion. In doing so, the governor actively ignored a pardon proclaimed by King Charles II.

The seizures of property were in violation of common law and the pardon. The king sent a commission to investigate the causes and consequences of the rebellion, and the commissioners ordered inventories of all the seized estates. In Bacon's inventory, made in May of 1677, the real estate is described as "Curles...an ancient seat..." According to the document, Bacon had lived - and his widow was living - in a "*small, new, brick* house". Three adjectives. Had any one been omitted, we would still be in the dark. But this was evidence about as certain as archaeologists are likely to get. The small brick house we had excavated was "new" in 1677. It had probably been built two years earlier.

The inventory stated that the house had a "brick cellar" in which were stored various stoneware jugs, barrels, hogsheads, 27 bushels of bay salt, and two good quality powdering tubs, used for salting fish and meat. Apparently the cellar served both as meat house and wine cellar. The "low room in the brick house", or first floor, appears to have been a chamber and withdrawing room, containing - among other things - the good feather bed, pillows, bolsters and drapery, along with trunks, drawers, dressing boxes, mirrors, warming pan, family portraits, a large Bible and a small table with six chairs. The only non-homey reminders of the rebel's way of life in this room was a basket of "eight hand grenades with iron shells loaden and fitted".

In the garrett of the brick house was another feather bed, perhaps for guests. There was also a desk with 5 quire of paper, trunks, sewing and spinning tools and materials, lots of books, the pewter, chamber pots and basins, kitchen utensils, candle sconces, hunting and fishing tools and supplies, and most of the plantation hardware. Skins and Indian trade cloth reflect Bacon's trading activities.

Besides the brick house, there was the "old hall" which was probably the earthfast house connected to the brick structure. Because this was called an "old" hall, it probably predates Bacon at Curles. Under Bacon's tenure, this single room served as the social or semi-public portion of the house, rather than as the all-purpose living space suggested by the name. The furnishings in the "old hall" included, among other things, two tables, eight large chairs, andirons, and a very fine "Turkey" carpet.

There was also a separate well-stocked kitchen, above which was a two-room loft used for both storage and quartering of servants. One of the rooms above the kitchen was the "Negro woman's room" wherein lived one of the plantations five black servants and, probably, her "molatto" child, who was inventoried with seven Indian servants. Adjoining the kitchen was a blacksmith's shop, also well equipped. Here is where the "yards of steele" in the inventory were undoubtedly transformed into the very numerous hatchets, trading hoes, weeding hoes, carpenters' tools, and other iron goods stored in the garrett and

elsewhere on the plantation. This was the work of Bacon's only white servant, a Dutch blacksmith described as a godson of Governor Berkeley. Presumably the smith lived in the sparsely furnished "quarter" adjoining the kitchen and his shop. Bacon's other servants included five Blacks and seven Indians.

There was also a "little wooden house" containing Indian trade material, carpenter's tools, agricultural implements, guns, shot, and other sundry items. A wash house, which seems to have doubled as a brewhouse, completes the enumerated structures, although there were undoubtedly others among the "much other good wood buildings" mentioned in the inventory.

Among Bacon's goods for the Indian trade were two dozen iron tomahawks, nine "trading hoes", "red fringed cloth for the Indian weare", a trunk of Indian "truck" which included beads, mirrors and scissors. In his cellar, Bacon had stored, or was curing, bear skins and raccoon skins, probably acquired in the trade. Bearskins and buckskins were found in various other buildings of the plantation. He also had what was described as a very finely wrought "Indian matchcoat". Other historic records describe a fine Indian matchcoat that was taken as a prize by Bacon on one of his raids against the Indians.

Archaeological indications of the Indian trade of the period come from the numerous sherds of Colono-Indian pottery found around the house, and one sherd found on the cellar floor. This pottery, originally described by Ivor Noel-Hume, is typical Colono ware made in English vessel shapes like that produced by the Pamunkeys as late as the 19th century. The ware has also been called "Camden Plain" by MacCord from his excavations of a 17th century Indian cabin on the Rappahannock River, and "Courtland Pain" by Binford who recovered similar wares from early 18th century Meherrin and Nottoway Indian sites in southeastern Virginia.

The artifact collection from Curles includes numerous finely rouletted pipes; nearly identical tobacco pipes with similar dentate-stamped and

corded motifs have been widely found on prehistoric and proto-historic Indian sites. Some of the pipes are made by English methods and are stamped with English motifs. One unique example is a white clay pipe decorated with rouletted chevron designs and stamped with a frieze containing a repeated cartouche with a European stag or Red Deer standing within a classical arch. The stamp appears to have come from a seal or signet. Emerson has suggested that some of the Chesapeake pipe designs may be of African origin.

The brick house at Curles was built into the side of a natural terrace - a terrace that was much enhanced by excavation to give a formally landscaped aspect to the manor house complex. The naturally occurring terrace was undoubtedly selected to give a symbolic visual impression of the high place in society to which Bacon aspired.

A letter of 1676 describes a defensive palisade around Bacon's house, probably similar to that constructed around the Clifts Plantation house on the Potomac River as revealed by Fraser Neiman's excavations there. This summer's excavations will be aimed at uncovering evidence for the fortification at Curles, as well as to completing the excavation of the earthfast portion of the structure and its wood-lined cellar.

When Bacon acquired Curles, Virginia was in transition. A young gentlemen, like Bacon, could hope to establish not only an estate, but a place of privilege approaching that of a landed gentlemen in England. Architecture too was in a state of transition. Medieval styles and technologies had given way to the full flower of the Renaissance in England and Europe. New decorative styles were accompanied by changing approaches to the use of domestic space. Our discovery of Bacon's house at Curles provides some insight into the ways in which this conceptual and aesthetic transition were expressed, on the frontiers of a colony which stood on the frontier of the Civilized World. Bacon was a young member of the gentry newly arrived, with timely ideas of fashion fresh in his mind, and a full understanding of the role of style as a signal of the status of a man whose world-view, personal power, and wealth placed him in a milieu beyond the yeomanry of his neighborhood. That Bacon aspired to a position of social leadership

beyond most men of Virginia is apparent in his architecture, as well as his personal history in the colony.

It would be fifty or more years before large plantation houses set among symmetrically placed offices and wings would come to dominate the social and visual landscape of the Tidewater James, but Bacon's Curles had taken on some aspects of an 18th century plantation seat. The ancient all-purpose hall had become a transitional space between private and public domains mediating the external world and the chamber or withdrawing room. Servants were segregated from masters and were differentiated among themselves on racial lines and occupational hierarchies. Spaces for "dirty," activities, such as cooking and laundering, were distinguished from spaces for "clean" activities, such as social dining.

Bacon's house, like the heirloom Roman coin found in it, speaks of a man born into the fashions and world-view of the Renaissance. But there is, in the archaeology, more than an obtuse symbolism of two conflicting realities: that of the aspiring social leader inspired by the world-culture of England of the late 17th century; and that of the Virginia frontier. Alongside the Roman coin, with its symbolism of classical order and self-awareness, lay rouletted and stamped tobacco pipe fragments signaling the creolization of English, Native American, and African folk cultures. And with the family portraits and fine Turkey carpet Bacon's material world included a basket of hand-grenades ready for use. Attached to the "small, new, brick house" with ornamentation that would have been well understood in the homeland, was the "old hall", an earthfast structure built of a form and technology selected and evolved for survival in Virginia.

History is ambiguous about Nathaniel Bacon. He was either a reckless, megalomaniacal rogue, or a revolutionary man of the people whose personal courage and charisma preceded the leadership of Patrick Henry and Thomas Jefferson by a century. Bacon's house and his behavior suggest a man who felt his role was to lead common men into the new order, but the "old hall" pulled down the new house just as

the ancient regime pulled down Bacon and his rebellion. Revolution - both architectural and political - would have to await a new century.

ANALYSIS OF CORDAGE IMPRESSIONS ON LATE WOODLAND CERAMICS FROM THE PATAWOMEKE SITE (44ST2) AND FIVE MONTGOMERY COMPLEX SITES IN THE POTOMAC RIVER PIEDMONT AND RIDGE AND VALLEY PROVINCES

OR

A NEW TWIST TO AN OLD TALE

by

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ABSTRACT

Researchers have postulated that the Potomac Creek complex represents a late intrusion of Montgomery complex people into the Potomac River Coastal Plain. Since the mid-1970s, archaeologists have been utilizing cordage twist direction as it is preserved on aboriginal ceramics in the Middle and Upper Ohio River Valley both to delineate cultural areas and to measure continuity or replacement through time. Cordage impressions preserved on Potomac Creek Cord Impressed ceramics from the Patawomeke site (44St2) and on Shepard Cord Marked pottery from five Montgomery complex sites in the Potomac River Piedmont and Ridge and Valley provinces, Winslow (18Mo9), Gore (18Mo20), Frye (44Ld4), 18Wa23, and 18Wa62, are examined to determine the preferred twist direction exhibited on each. Both wares display impressions of predominantly final Z twist cordage indicating that the Montgomery complex could represent the ancestral population for the Potomac Creek complex.

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INTRODUCTION

Karl A. Schmitt, Jr. (1952: 68) was the first archaeologist to propose a relationship between Potomac Creek Cord Impressed ware from the Patawomeke site (44St2), located adjacent to the Potomac River estuary on Potomac Creek in Stafford County, Virginia, and Shepard Cord Marked ceramics, the primary diagnostic artifact of sites assigned to the Montgomery (focus) complex. The Montgomery complex villages and hamlets are situated upstream from the Patawomeke site, above the Fall Line, along the main stem of the Potomac River and the lower reaches of its major tributaries in the Piedmont and the Ridge and Valley provinces of Maryland and Virginia. In 1944, Schmitt (1965: 30) had suggested that the putative relationship between these two ceramic wares might be the result of an intrusion of Montgomery complex people from the Piedmont into the Coastal Plain province of the Potomac River estuary rather than of an example of simple diffusion of ceramic styles and technology. This migration was seen as possibly the result of military pressure, perhaps a reaction to Iroquois political influence or actual incursions late in the Late Woodland period, resulting in a coalescence of the Montgomery population in the Tidewater area and the construction there of large palisaded villages. This proposed intrusive manifestation was defined as the Potomac Creek (focus) complex with the Patawomeke site (44St2) as its type station. This theme was later reiterated by Howard A. MacCord, Sr., in MacCord, Slattery and Schmitt (1957: 25, 28), by John Witthoft (1963: 65-67) and most comprehensively by Wayne E. Clark (1980), among others.

Most recently, MacCord (1984, Manson and MacCord 1985) has reported the results of his analysis of the distribution of selected ceramic attributes and other artifact classes from an assemblage derived from Carl P. Manson's 1957 and his own 1983 test excavations in the deep midden associated with the stockade complex at the Patawomeke site (44St2). Manson excavated two ten foot squares by natural levels and arbitrary six inch increments within natural levels below the plow sole. MacCord's 1983 stratigraphic test - four five foot square units - also followed natural strata but maintained tighter stratigraphic control within the midden which was removed in two inch levels (MacCord 1984:12). MacCord (1984: 13-15, Tables 1-4; Manson and MacCord 1985: 20, Table 2; 38, Table 8) presented the results of his analysis of select attributes of ceramics derived from both Manson's 1974 and his 1983 excavations by relative percentages of temper clast size and type and frequency of certain chronologically sensitive vessel lip and rim profile modes. The data presented by excavation level indicated, in general, a gradual shift through time away from attributes characterizing Shepard Cord Marked ceramics of the putative donor Montgomery population toward those more diagnostic of the Potomac Creek Cord Impressed wares. MacCord argued that these time/stratigraphic trends suggested a gradual evolution away from the specific constellation of ceramic technological and stylistic attributes diagnostic of the pottery tradition brought

by the Montgomery complex potters when they abandoned the Potomac River Piedmont toward a new combination of attributes peculiar to the ceramic industry of the Potomac Creek complex.

To more precisely measure first the degree of similitude between Shepard Cord Marked and Potomac Creek Cord Impressed wares and, therefore, the synonymy of the two populations of potters and second to ascertain the degree of certainty that the Potomac Creek complex was indeed intrusive into the Tidewater Potomac River area, an examination of the twist direction of the cordage impressions preserved on the sherds recovered from MacCord's 1983 excavation at the Patawomeke site was initiated. This cordage assemblage was compared to those cord impressions preserved on a sample of sherds derived from five Montgomery complex sites in the Potomac River Piedmont and Ridge and Valley provinces.

Cordage manufacture is one of the oldest perishable technologies recorded in the archaeological record of North America. Cordage twist direction is a stable attribute in textile technologies and was highly standardized and population specific among Native American groups. Among an ethnographic modern population Newton (1974) has demonstrated the validity of the use of material culture - in this case twining styles and cordage twist direction in hammock construction - to delineate social differences and relative degrees of mixing of two Timbira tribes in the northeastern corner of Brazil. Studies of dry cave and rockshelter sites in the arid western United States, where entire and often very large perishable assemblages are regularly preserved, indicate that specific spin and twist patterns in cordage manufacture as well as slant direction and splice and salvage techniques in basketry construction are the results of highly standardized, culture specific motor habits. These learned behavior patterns frequently demonstrate persistence in culture areas for considerable periods of time (*e.g.*, Adovasio 1970, 1977, 1986a; Maslowski 1978; Andrews and Adovasio 1980). As Maslowski (1984a: 51; 1984b: 1-3) has argued, the motor habits involving the manufacture of cordage are learned at an early age by children from older family or group members and are transmitted from generation to generation within those same groups. As modification in these basic motor habits generally has no adaptive value, these habits are more resistant to change than are predilections or behavior modes associated with other decorative, ceremonial and subsistence related technologies. In fact, there is not one example in the archaeological and ethnologic literature of North America which documents either a random pattern of final twist or a shift from one direction to the other in the absence of population change. (J. M. Adovasio, 1988 pers. comm.). Additionally, most cultural groups as a whole were probably not even aware of the results of their patterned habits of cordage manufacture and the associated initial spin and final twist direction of the cords they produced.

The presence of a subsequent reversal of the prevailing cordage twist pattern in the archaeological record of a geographic or cultural area signals - of necessity - either a population replacement by a group with a different cordage production tradition or a major technological innovation, perhaps the introduction of a new raw material source for cord fibers. A new raw material might be processed via a different manufacturing technique, such as the employment of a spindle whorl, thus producing cordage with the potential of exhibiting the opposite twist direction. This latter scenario can be eliminated from case studies in the Eastern Woodlands as no examples of the use of a spindle whorl are known ethnographically or archaeologically. The presence of an approximately equal distribution of twist direction within a cordage assemblage may indicate population mixing in a cultural area either by the influx of alien groups displaying different cordage manufacturing techniques (see Newton 1974: 247-249) or the proximity of that population to an edge area between two cultural areas with different cordage and textile manufacturing traditions. This scenario could result in a mixing of people, *e.g.*, through marriage exchange, with an attendant blending of textile and other traditions. Finally, most cordage assemblages exhibit some variation in the prevailing twist pattern, probably due to handedness or more likely to other idiosyncratic behavior manifested by the cordmakers.

Since the late 1960s, archaeologists have been utilizing cordage twist direction along with other textile industry attributes to measure change or demonstrate continuity within specific geographic/cultural areas in the Eastern Woodlands (*e.g.*, Munson 1971: 10-11; Maslowski 1973, 1984a, 1984b; Johnson 1975, 1981:48; 1986: 20-21; 1987a: 534-536, Table 67; 553-555, Table 69; Peterson and Hamilton 1984; Peterson and Hamilton with LaBar and Hedden 1984) and in the arid western United States (*e.g.*, Fry and Adovasio 1970, Maslowski 1978, Andrews and Adovasio 1980: 358-369, Andrews, Adovasio and Whitley 1988, Adovasio

1986b, Adovasio with Andrews 1985). In the Middle and Upper Ohio River Valley cordage twist direction as preserved in negative impressions on aboriginal ceramics is regularly reported in both mitigation and published site analysis reports (*e.g.*, Boyce 1985: 42; Dancey 1988: 229; Fassler 1987: 159; George 1983: 29; Hemmings 1984: 29; Henderson 1986: 41; Henderson and Pollack 1985: 143, Table 1; Herbstritt 1981: 36; 1983a: 50, Table 6; 70, Table 10; 1983b: 49, Table 24; 161, Table 28; Johnson 1978: 45, Table 6; 1987b: 102; Marwitt, Sauser and Sterling 1986: 12; Maslowski and Dawson 1980: 21; Morton and Carskadden 1987: 8; Moxley and Bloemker 1985: 20; Pollack and Henderson 1984: 7; Railey, editor and compiler 1984: 74-75; Seeman 1985: 44, Table 4; Sharp and Turnbow 1987: 143).

Closer to the study area Holland (1970: 49-50, 55-56, 70) noted that particular cordage twist directions were associated with certain of his ceramic types including Dan River Cordmarked, Grayson Cordmarked, Grayson Net and Knot Roughened and Wythe Cordmarked. Of even greater interest is the fact that Holland also indicated that the cordage used to construct the nets utilized in the manufacture of Dan River Net Impressed wares, evidenced final S twist when preserved on sherds derived from sites in the Piedmont but final Z twist on sherds recovered from Grayson and Floyd counties in the Ridge and Valley province. Unpublished data (Johnson, on-going research) from select areas on the Coastal Plain in Virginia south of the James River estuary and north of Pamilco Sound in North Carolina suggest cordage twist direction predilections there display considerable antiquity (Middle through Late Woodland periods) and are probably tribe specific.

Cordage impressions derived from negative patterns preserved on sherds of Potomac Creek Cord Impressed ceramics from the Patawomeke site (44St2) - or at least those employed in the application of corded decoration on the sublips and collars of vessels - have been analyzed by Falk (1983). However, she, like Hurley (1979) and Wigglesworth (1986), treated the various cord impressed designs as decorative attributes *per se* and not as the bearers of culture specific attributes. Consequently, cordage twist direction for Potomac Creek Cord Impressed ware was only casually reported by Falk (1963: 19) and then only for cordage employed in direct cord impressed decoration on rim sherds. Cordage twist direction was apparently not recorded for cords employed to wrap the tools utilized in the application of the pseudo-cord impressed decoration displayed on the Patawomeke site rimsherd sample because Falk (1983: 12, 14-15, 19) did not believe that the cord positives she examined exhibited evidence suggesting the presence of two-ply twisted elements. This observation may be attributable to the fact that Falk seemingly misinterpreted Hurley's (1979: 5-6) definition for "bead" and "segment". Falk (1983:3) observed no "bead" impressions in the cord positives she obtained from the pseudo-cord decorated sherds and, therefore, assumed the fiber imprints in each "segment" of cordage preserved in the pseudo-cord decorated impressions represented untwisted or unspun fibers. Beads, as defined by Hurley (1979: 5) are present only in replied cordage, *i.e.*, cords composed of multiple spun elements which are twisted together in the direction opposite the initial spin direction and then combined with similar cords and twisted together, again, in the opposing direction. None of the cordage impressions derived from the Potomac Creek Cord Impressed sherds examined in this study exhibited evidence indicating the presence of replied cords.

The twist direction of the cords employed to wrap the stamping implement utilized in the application of the pseudo-cord decoration on the Potomac Creek Cord Impressed and Shepard Cord Marked sherds analyzed herein; in fact, was often difficult or impossible to determine. This deficiency is attributed to the fact that much of the cordage employed in this variety of decoration exhibited extremely fine diameters and was often loosely twisted. Not infrequently, this combination of attributes resulted in only the preservation of the images of a parallel series of incompletely preserved, isolated segments along the edge of the stamping implement. In such examples the final twist direction of the cord could not be discerned as no two successive segments were preserved in the passage of the cord around the stamping tool. The initial spin direction of the component elements of these cords was also not determinable as they were too fine and loosely spun to leave a diagnostic print in the impressions preserved on the sherd surfaces.

METHODOLOGY

Three hundred twenty Potomac Creek Cord Impressed sherds exhibiting either a cord-marked surface finish and/or a direct corded or pseudo-corded decoration were selected from each of the nine excavation levels in MacCord's 1983 Unit D strata

test at the Patawomeke site (44St2). A minimum of 25 sherds were selected from each two inch arbitrary level within the midden. Care was exercised to avoid selecting multiple sherds derived from the same vessel in order to not skew the sample. A larger group of 70 sherds was sampled from Level 1, the plow zone, in Unit D as it represented a larger volume of matrix and presumably of pot sherds. Additionally a sample derived from the tilth zone would be more representative of vessels broken and dumped in the immediate area of the stockade-related midden because subsequent plowing would distribute the sherds over a wider area. Casts were also obtained from an additional eight sherds of Rappahannock Fabric Impressed ware, essentially all those examples from Unit D which exhibited relict impressions of the original plaited dowel-stamped surface finish. The selection of sherds from only Unit D was predicated upon the fact that it represented the deepest portion of the midden tested by MacCord and, therefore, might chronicle more precisely time/stratigraphic change in artifact attributes than would the other three tests in shallower midden deposits. In retrospect, a sample with a wider areal distribution might have been more desirable as the ratio of final cordage twist direction in the plow zone sample deviates furthest from the mean for the entire sample. This fact probably reflects its derivation from a larger and more representative universe of vessels and associated cordage impressions.

For comparison, casts from a smaller sample of sherds from five Montgomery complex sites in the Potomac River Piedmont and Ridge and Valley provinces were also examined. These sites include the Winslow site (18Mo9), 32 sherds; the Gore site (18Mo20), 18 sherds; and the Frye or Fisher site (44Ld4), 23 sherds. All three sites are located along the floodplain of the Potomac River on or adjacent to Selden Island. The remaining two sites, 18Wa23 and 18Wa62, are located upstream in the Hagerstown Valley portion of the Great Valley section along the main stem of Antietam Creek and at its confluence with the Potomac River, respectively (Stewart 1982: 78, 84-87). The sample from 18Wa23 includes 19 grit-tempered sherds and that from 18Wa62, 75 sherds. The sample from the Winslow site consists of rim sherds, loaned by Howard A. MacCord, Sr., and derived from a variety of unit proveniences from R. Gates Slattery's excavation there. The two smaller samples from the Gore and Frye sites represent surface collections by MacCord in 1983. The assemblages from 18Wa23 and 18Wa62 were derived from excavations and various surface collections from several sources and were loaned to the author by R. Michael Stewart.

The exterior surfaces of the sherds from the six assemblages were dry scrubbed with a hard bristle tooth brush and pharmaceutical grade talc. Talc is often employed as a mild industrial abrasive. This process cleaned the negative impressions in the sherds without further distorting them by wet washing and thus enhanced the recordation of the finer detail of the cordage impressions. Latex positives of the preserved cordage impressions were then made. The casts of the cords were analyzed for twist direction as outlined in Maslowski (1973: 4-6) and Hurley (1979: 5-11), *i.e.*, initial spin and final twist direction were recorded as the cord appears in the positive, as is the prevailing convention in North America, rather than as it appears in the negative on the sherd, the customary norm in Japan. The cordage represented in the impressions appeared to be generally two-ply, that is composed of two spun elements twisted together in the opposite direction from the spin. No obvious examples of replied cordage was observed.

RESULTS

Of the 320 latex impressions lifted from the Potomac Creek Cord Impressed sherd sample, 258 are sufficiently distinct or unambiguous enough to be classified as to twist direction manifested. The balance of the casts record impressions that either are too distorted by the original smoothing of the cord roughened surfaces or are not precise enough in delicate detail (the pseudo-cord decorated examples) to accurately classify. An additional group of casts do not unequivocally represent cord-marking. Several of these casts suggest the presence of open simple or diagonal twined fabrics with obliquely applied tension (see Winfree 1972) and of at least one example of a close, diagonal, Z twist twined textile. The final twist direction of the cordage impressions derived from the Potomac Creek Cord Impressed sherd assemblage from Unit D at the Patawomeke site is presented in Table 1 by excavation level and by surface finish and decorative technique. Regrettably, none of the Rappahannock Fabric Impressed sherds preserve impressions distinct enough to even guess at the final twist direction of the cordage utilized to plait together the dowels employed in malleating the vessel walls during the construction

process (see Lafferty 1981: 316-317; 321, Plate 53; *contra* Wigglesworth 1986: 43; Figure 8). All the sherds from the Winslow site (18Mo9) sample yielded casts sufficiently distinct to determine cordage twist direction, although a small minority did not unequivocally represent cord-marking. The surface derived sherds from the Gore (18Mo20) and Frye (44Ld4) sites were characteristically small and weathered as would be expected from a plow zone sample. Although the sample of grit-tempered sherds from site 18Wa23 is small, all examples preserved clear negative cordage impressions. The only adequate sample of grit-tempered sherds was derived from site 18Wa62. Of the sample of 77 sherds examined, 75 yielded distinct cordage impressions. Preliminary analysis of the remaining two examples suggests the presence of open twined fabrics. The casts from the Gore, Frye, and 18Wa23 sites suitable for analysis are too small in number to be considered adequate samples *per se*. However, in conjunction with the larger samples from the Winslow and 18Wa62 sites, they suggest a pattern for the cordage manufacturing habits of the Piedmont and Great Valley Montgomery complex population. The cordage twist direction for each of the five Montgomery sites is displayed in Tables 2 and 3 by the temper aplastic exhibited by the sherds from which the casts were lifted.

The overwhelming cord twist direction preference in the Potomac Creek Cord Impressed sample is initial S spin, final Z twist, 92.64%. The slightly lower frequency of final Z twist cordage (87.27%) in the Level 1 (plow zone), sample from Unit D may reflect - as noted above - a more representative sample, derived from vessels exhibiting a wider provenience in the stockade midden.

The under-representation of final S twist cordage in the total Unit D sample is also suggested by the twist direction evidenced in Falk's (1983: 19) sample of 33 direct cord impressed rim sherds assigned to her Type I, Variety A decoration category. In this group, final Z and S twist examples were represented in "almost equal" frequencies. The cords utilized in the application of direct cord decoration in Falk's Type I, Variety B and Variety C, apparently did exhibit a predominantly final Z directional twist which is more consonant with the pattern displayed by the total Unit D sample. The preferred final twist direction of the cords preserved on the sherds from the five Montgomery complex sites was also predominantly Z and was present in frequencies of 86.67% (n=30) of the examples from the Winslow site, 84.62% (n=13) from the Frye site, 81.82% (n=11) from the Gore site, 84.21% (n=19) from site 18Wa23, and 83.00% (n=75) from site 18Wa62.

DISCUSSION

The result of the analysis of the 258 casts of cordage impressions from a sample of Potomac Creek Cord Impressed sherds recovered from MacCord's 1983 Unit D strata test at the Patawomeke site (44St2) indicates that the preferred final twist direction of cordage employed in wrapping both the paddles employed in the manufacture of vessels and the tools used to impress corded designs on these pots is predominantly Z. The final twist direction ratio obtained from the sample from Level 1 (the plow zone) in Unit D suggests that the pattern for the Patawomeke site as a whole may not be as overwhelming Z as the 92.64% for the Unit D assemblage indicates. The ratio of final Z to S twist in this study is consistent with the less precisely reported predominant twist direction reported by Falk (1963: 19) for a sample derived exclusively from 68 rim sherds exhibiting direct cord impressed decoration. It is noteworthy that the cordage employed in wrapping both the paddles used in the manufacture of Potomac Creek Cord Impressed vessels and the dowels utilized in their decoration appears to be constructed in the same fashion.

No cordage twist direction information is available for the Potomac Creek Cord Impressed assemblage from the contemporary and culturally related Accokeek Creek site across the Potomac River estuary and upstream from the Patawomeke site. However, an examination of the photographic plates displaying examples of Potomac Creek Cord Impressed ware in Stephenson (1963: Plates 13-18) suggest that the majority of the rim sherds depicted evince the impressions of final Z twist cordage when the cordage twist direction can be discerned. Although this is a notably unsatisfactory method for determining cordage twist direction displayed by a ceramic assemblage, it does suggest that the prevailing final cord twist for the Potomac Creek complex as a whole may prove to be Z. This possibility will have to be confirmed by the direct examination of casts derived from Potomac Creek Cord Impressed ceramics from other assemblages assigned to this complex.

Although the cordage sample derived from the Winslow (18Mo9), Gore (18Mo20) and Frye (44Ld4) sites in the Piedmont and sites 18Wa23 and 18Wa62 in the Great Valley is hardly adequate, it does suggest that final Z twist is a reflection of the preferred cordage manufacturing technique among the Piedmont and Ridge and Valley Montgomery complex folk. While this fact does not "prove" that the Potomac Creek complex population represents an intrusion of alien Montgomery people into the Tidewater Potomac River, the presence of cordage manufactured with a primarily final S twist in either one or the other complex would categorically eliminate the possibility that the two ware types were the time-successive products of the same population of potters.

Finally a larger and more completely preserved sample of Middle and earlier Late Woodland cord-marked, fabric-marked (read: plaited dowel-stamped) and cord-decorated ceramics from the vicinity of Potomac and Piscataway creeks needs to be examined to determine the preferred final twist direction evidenced by the preserved cordage impressions on those sherds. None of the eight Rappahannock Fabric Impressed sherds from Unit D from the Patawomeke site from which latex casts were obtained preserved impressions sufficiently precise enough for analysis. Presence of a pattern suggesting a predilection for motor habits producing final S twist cordage on Middle Woodland and/or on early Late Woodland ceramics around either Potomac or Piscataway creeks would indicate that the Potomac Creek complex was indeed intrusive. Again, the presence of a pattern of predominantly final Z twist in the cordage manufacturing process in either area would not obviate the possibility of an intrusion by a displaced Montgomery complex population. Obviously, one final Z twist cordage producing group could replace another. The presence of cordage impressions exhibiting the opposite final twist direction (final S twist) on earlier indigenous Mockley Cord Marked or Rappahannock Fabric Impressed ceramics would make that replacement unequivocal. Synonymy of the results of the cordage manufacturing process of early and late Late Woodland/Proto-historic populations along the Tidewater Potomac River would force archaeologists to look for the preservation of other group specific cultural or biological attributes to examine in order to confirm or reject Schmitt's (1965: 30) original hypothesis. Clearly larger samples from a greater universe of sites assigned to both the Potomac Creek and Montgomery complexes need to be analyzed in order to verify even the preliminary results of this study.

Parenthetically, the analysis of the directional twist of cordage preserved on sherd exhibiting a variety of temper aplastics from the five Montgomery complex sites also provides evidence suggesting two additional cultural patterns in the Potomac River Piedmont and Ridge and Valley provinces that were not the subject of scrutiny in the original study. The first pattern manifest is that the potters who manufactured the limestone-tempered vessels - traditionally referred to as Page Cord Marked ware - employed cordage with the same predominant final twist direction to wrap their paddles as did the makers of the quartz and granite-tempered Shepard Cord Marked ware. This fact could indicate a continuity at least in the Potomac River Ridge and Valley province of populations traditionally separated by an association with either quartz and granite-tempered or limestone-tempered wares. Temper aplastic differences here may represent merely changes in ceramic technology through time without implying a population replacement.

The implications of the second apparent pattern are more evident and of greater significance. Amongst the artifactual inventory from the Frye site (44Ld44) and site 18Wa23 were a number of shell-tempered Keyser Cord Marked sherds. Keyser Cord Marked is considered to be the primary diagnostic of the Luray (focus) complex, the terminal Late Woodland cultural manifestation in the Potomac River Piedmont and Ridge and Valley provinces. Only three shell-tempered sherds from the Frye site preserved cordage impressions distinct enough to determine final twist direction. However, a much larger sample (n=56) was present in the site 18Wa23 assemblage (Tables 2 and 3). The final cordage twist direction displayed by the limited Keyser Cord Marked sample from the Frye site (S twist=100.00%) and site 18Wa23 (S twist= 89.29%) is the opposite of that evinced by the grit-tempered wares from the five Montgomery complex sites. If this pattern is documented in Keyser Cord Marked assemblages from other sites in the Potomac River drainage - as the cordage twist direction patterns from both the Page and Keyser ware components at the Cresaptown site (18Ag119) on the North Branch of the Potomac River seems to indicate (Robert D. Wall 1988 pers. comm.) - then two implications are inescapable. The first is that the Luray complex population is indeed intrusive and apparently replaced the indigenous

Montgomery and Mason Island folk, if, in fact, they represent two successive populations. The second implication is of equal importance for Potomac River cultural history. Although the Luray complex people are intrusive, they are unequivocally not representatives of a Late Prehistoric period Monongahela intrusion from the Upper Ohio River Valley. Elsewhere I have argued for the exclusion of cis-Appalachian shell-tempered and otherwise pedestrian cord-marked pottery-making complexes from the Monongahela cultural umbrella (Johnson 1981: 77-78). These objections were based on minor stylistic variations between Monongahela and Keyser ware and, more importantly, on the apparent absence of a catalyst for triggering a migration of Monongahela populations across the high Allegheny Mountain section at a time, *ca.* A.D. 1400-1450, when that area's severely curtailed frost-free day growing season could not support one or more village removals whose economy were based primarily on a reliable annual surplus of maize. The Allegheny Mountain section today displays a mean frost-free day growing season some eight to ten weeks shorter than that exhibited by the Lower Monongahela River Valley, the Monongahela culture heartland. Limited final cordage twist direction data from Keyser Cord-Marked ceramic samples analyzed herein offers the potential for rejecting a Monongahela intrusion into the Potomac River Valley and the synonymy of the Monogahela and Luray populations. With the exception of a small pocket of final S twist cordage makers situated along the main stem of the Ohio River at the confluence of the Beaver River, Monongahela ceramic assemblages uniformly exhibit predominantly final Z twist cordage (Maslowski 1984a: 54, Table 2; Johnson 1981: 48; 1986: 20-21; 1987b: 102; 1989; George 1983: 29; Herbstritt 1983a: 50, Table 6; 70, Table 10, 1983b: 49, Table 24; 161, Table 28; Boyce 1985: 42). Presuming that the putative final S twist cordage pattern for Keyser Cord Marked ceramics is further documented, then the two populations - Monongahela and Luray - simply cannot be synonymous. The source of the donor population for the Luray complex folk must be sought elsewhere.

CONCLUSION

The examination of the positive casts of cordage impressions derived from Potomac Creek Cord Impressed sherds from the Patawomeke site in the Potomac River Tidewater and from various grit-tempered ware sherds from five Montgomery complex sites in the Potomac River Piedmont and Ridge and Valley provinces indicates a pattern of predominantly final Z twist cordage for both areas. Synonymy of the preferred cordage twist direction in the perishable textile industry of both areas indicates that the Montgomery complex could have supplied the donor population for the subsequent Potomac Creek culture as has been repeatedly argued. Examination of cordage impressions preserved on the surfaces of earlier Middle and initial Late Woodland cord-marked, fabric-marked and cord decorated ceramics from the vicinity of the later Potomac Creek sites is still necessary to determine conclusively whether the Potomac Creek culture is actually intrusive or whether its ceramic industry could merely represent the diffusion of an alien pottery-making technology.

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TABLE 1

Number and Percent of Z and S Twist Cordage Impression Specimens from Potomac Creek Cord Impressed Ceramics from Excavation Unit D at the Patowomeke Site (44St2) by Excavation Level and Surface Finish and Decorative Technique

UNIT D	Cord-Marked Surface Finish				Corded Decoration				Pseudo-Corded Decoration				All Cordage					
	Z Twist		S Twist		Z Twist		S Twist		Z Twist		S Twist		Z Twist		S Twist		Total	
LEVEL	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Level 1	33	94.29	2	5.71	8	80.00	2	20.00	7	70.00	3	30.00	48	87.27	7	12.73	55	100.00
Level 2	17	89.47	2	10.53	4	100.00	0	0.00	5	100.00	0	0.00	26	92.86	2	7.14	28	100.00
Level 3	16	100.00	0	0.00	4	66.67	2	33.33	4	80.00	1	20.00	24	88.89	3	11.11	27	100.00
Level 4	14	100.00	0	0.00	2	100.00	0	0.00	6	100.00	0	0.00	22	100.00	0	0.00	22	100.00
Level 5	23	92.00	2	8.00	8	100.00	0	0.00	6	100.00	0	0.00	37	94.87	2	5.13	39	100.00
Level 6	21	100.00	0	0.00									21	100.00	0	0.00	21	100.00
Level 7	15	93.75	1	6.25					2	100.00	0	0.00	17	94.44	1	5.56	18	100.00
Level 8	22	91.67	2	8.33									22	91.67	2	8.33	24	100.00
Level 9	21	91.30	2	8.70	1	100.00	0	0.00					22	91.67	2	8.33	24	100.00
TOTAL	182	94.30	11	5.70	27	87.10	4	12.90	30	88.24	4	11.76	239	92.64	19	7.36	258	100.00

TABLE 2

Number and Percent of Z and S Twist Cordage Impression Specimens from Ceramics from the Winslow (18Mo9), Gore (18Mo20); and Frye (44Ld4) Sites by Tempering Agent and Surface Finish and Decorative Technique

	WINSLOW (18Mo9)													GORE (18Mo20)					FRYE (44Ld4)				
	Cord-Marked Surface Finish				Pseudo-Corded Decoration				All Cordage					Cord-Marked Surface Finish					Cord-Marked Surface Finish				
	Z Twist		S Twist		Z Twist		S Twist		Z Twist		S Twist		Total	Z Twist		S Twist		Total	Z Twist		S Twist		Total
TEMPER	N	%	N	%	N	%	N	%	N	%	N	%	N	N	%	N	%	N	N	%	N	%	N
Various Grits																							
Granite	1	100.00	0	0.00	1	100.00	0	0.00	2	100.00	0	0.00	2	3	100.00	0	0.00	3	1	100.00	0	0.00	1
Quartz	8	80.00	2	20.00	7	77.78	2	22.22	15	78.95	4	21.05	19	2	66.67	1	33.33	3	3	75.00	1	25.00	4
Sand	2	100.00	0	0.00	3	100.00	0	0.00	5	100.00	0	0.00	5	0	0.00	1	100.00	1					
Limestone and Quartz														2	100.00	0	0.00	2	2	66.67	1	33.33	3
Limestone														1	100.00	0	0.00	1	5	100.00	0	0.00	5
Chert														1	100.00	0	0.00	1					
Untempered/ Incidental Grit Inclusions	2	100.00	0	0.00	2	100.00	0	0.00	4	100.00	0	0.00	4										
TOTAL Various Grits	13	86.67	2	13.33	13	86.67	2	13.33	26	86.67	4	13.33	30	9	81.82	2	18.18	11	11	84.62	2	15.38	13
Mussel Shell														0	0.00	3	100.00	3					

TABLE 3

Number and Percent of Z and S Twist Cordage Impression Specimens from Ceramics from Sites 18Wa23 and 18Wa62, Washington County, Maryland, by Tempering Agent and Surface Finish Level and Surface Finish and Decorative Technique

	18Wa23 Cord-Marked Surface Finish					18Wa62 Cord-Marked Surface Finish				
	Z Twist		S Twist		Total	Z Twist		S Twist		Total
TEMPER	N	%	N	%	N	N	%	N	%	N
Various Grits										
Quartz	13	81.25	3	18.75	16	36	92.31	3	7.69	39
Limestone	3	100.00	0	0.00	3	30	83.33	6	16.67	36
TOTAL Various Grits	16	84.21	3	15.79	19	66	88.00	9	12.00	75
Mussel Shell	6	10.71	50	89.29	56					

Stewart

THE MIDDLE TO LATE WOODLAND TRANSITION IN MARYLAND*

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ABSTRACT

The Middle to Late Woodland transition in Maryland is examined geographically, from the Appalachians to the Chesapeake Bay. In far western Maryland, the Middle Woodland--though poorly known--is marked by mixed-temper ceramics with a probable Ohio Valley influence. The Late Woodland is marked by limestone- and shell-tempered wares, and appears directly related to expansion of Monongahela groups in southwestern Pennsylvania. The Great Valley is also poorly known, but may represent a buffer area between coastal and western groups. In the Monocacy Valley, there appears to be no resident Middle Woodland population. Coastal Mockley ceramics are restricted mainly to rockshelter sites, with open sites consisting primarily of lithics. Clearly, the Middle Woodland in the Monocacy is related almost exclusively to rhyolite exploitation by Coastal groups. This is followed by an expansion of northern Owasco-related groups, and is manifested in Late Woodland Shepard ware. Except for along the Potomac, the Piedmont appears to have been virtually uninhabited throughout the Middle and Late Woodland periods, being represented in the archeological record by only small, scattered hunting and/or campsites. On the Western Shore of the Coastal Plain, the Middle Woodland is represented by the Mockley-using Selby Bay complex, with an apparent concentration in the Patuxent drainage. The population appears fairly sedentary, and in situ development to Late Woodland Townsend groups is likely.

INTRODUCTION

This paper examines the transition from Middle to Late Woodland in Maryland. It is organized geographically, and ranges from the Appalachian Mountains in western Maryland to the Chesapeake Bay on the Coastal Plain (see Figure 1). Within this broad area, five sub-areas are defined based on both physiographic and archeological parameters: western Maryland, the Great Valley, the Monocacy Valley, the Piedmont, and the Western Shore of the Coastal Plain (see Figure 2). The Eastern Shore of the Coastal Plain is not included in this review because it is treated in another paper in this symposium (Custer 1989).

In dealing with the transition from Middle to Late Woodland, this regional overview

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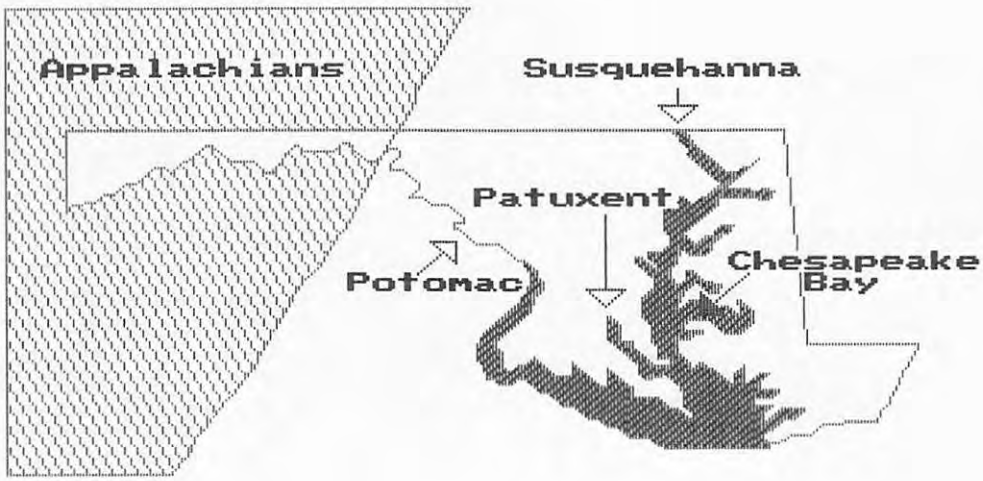

Figure 1. Major geographic features in Maryland.

Figure 2. Physiographic/archeological sub-areas defined for Maryland.

attempts to illustrate cultural patterns using a series of sites. These sites are described in a general way, although they are used to examine four central themes whenever possible: (1) the adoption and intensity of agricultural subsistence; (2) regional exchange systems; (3) ceramic types; and (4) population movements.

WESTERN MARYLAND

For the purposes of this paper, western Maryland is defined as that portion of Maryland west of the Great (Hagerstown) Valley. In essence, this includes the Valley and Ridge and Allegheny Plateau physiographic regions of Maryland, and is largely encompassed by Allegany and Garrett Counties. The northwest corner of western Maryland is drained by the Youghiogheny River, a component of the Ohio drainage, and the remainder is part of the upper Potomac basin (see Figure 3).

Western Maryland Sites

Friendsville (18GA23)

The Friendsville village site, located on the Youghiogheny River, was excavated in the early 1970s (Hynson et al. 1972; Boyce-Ballweber 1987). Ceramics at the site are dominated by limestone-tempered Watson ware and shell-tempered Monongahela ware. Elsewhere in the Ohio Valley, Watson ware is considered a late Middle Woodland type (Mayer-Oakes 1955), and is radiocarbon-dated at Friendsville at A.D. 930 $\pm$ 85 (SI-7100). The other reliable radiocarbon dates from Friendsville range from A.D. 1035 to A.D. 1130 (Boyce and Frye 1986), and presumably date the later Monongahela component,

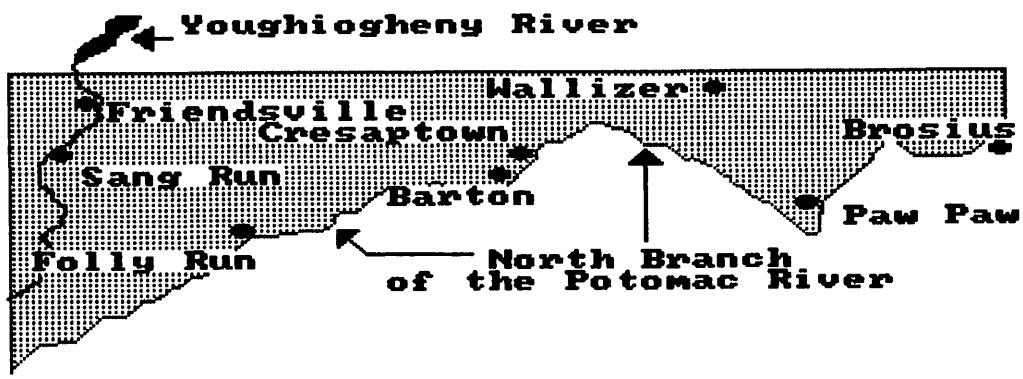

Figure 3. Sites discussed in western Maryland.

although the samples were from pits containing both limestone- and shell-tempered wares. Also notable at the site was the presence of post-lined pits, a ceramic pipe, bone and tooth beads, and a cannel coal pendant, all established Monongahela traits.

Although cultigens were not recovered at Friendsville, their occurrence at the site cannot be discounted; flotation was employed only selectively and only a small portion of the village was excavated. In fact, agricultural pursuits may be inferred from related sites in the region. Friendsville is remarkably similar to the Gnagey site, located 36 km to the northeast in Pennsylvania. The sites share the limestone-to-shell ceramic continuum, various Monongahela traits, and an overlap in radiocarbon dates. At Gnagey, corn, beans, and squash are present, and date between A.D. 920 and A.D. 1190 (George 1983:86-87).

Sang Run (18GA22)

The Sang Run site, located 10 km upstream from Friendsville, resembles the Friendsville site in a number of ways. Pottery is again represented by limestone-tempered Watson ware and shell-tempered Monongahela ware. Other Monongahela-related artifacts from Sang Run include bone and clay beads, cannel coal pendants, perforated canine teeth, and a square-bowled hematite pipe (Corliss 1949, 1955; Dragoo 1950). Excavations also yielded a double-post-lined refuse pit, 3 meters in diameter and 25 cm deep (Corliss 1949), and a stone-lined grave is reported.

Folly Run (18GA53)

The Folly Run site, located on the Potomac River, also illustrates the limestone-to-shell transition in ceramic wares, as well as exhibiting clay pipes, bone beads, a canine tooth pendant, and cannel coal pendants(?). Of four burials found during testing, two were infants, both of which were covered by rock slabs; one of these burials contained a complete shell-tempered pot (Corliss and Wright 1967; Wright 1966).

Barton (18AG3)

Located 35 km downriver from Folly Run, the Barton site was subjected to limited testing by Henry T. Wright in 1960. Here, a single bank cut revealed a stratigraphic progression from a mixed-temper ware to limestone-tempered ware to shell-tempered ware. Wright (1963) views these as representing a local Late Woodland, early Late Prehistoric/early Monongahela, and Late Prehistoric/Monongahela component, respectively.

Cresaptown (18AG119)

The Cresaptown village, located just a few kilometers downriver from Barton, is marked by numerous postmolds, trash pits, sheet middens, and burials (Wall 1983, 1984). Artifacts are dominated by limestone-tempered (Watson) Monongahela ware, although shell-tempered Monongahela sherds and Clemson Island sherds occur in smaller quantities. Burials are often associated with grave offerings including a set of bone chisels, marginella beads, a columella bead necklace, and a miniature limestone-tempered pot from an infant burial.

Cultigens represented at Cresaptown include corn and beans (Wall, personal communication 1989). Charred corn kernels from one feature (#275) are radiocarbon-dated to A.D. 855 $\pm$ 60 (SI-7026) (Boyce and Frye 1986:44). This charcoal sample was small and diluted, and may be slightly early. Nonetheless, a series of dates from nearby features range between A.D 965 and A.D. 1035 (Boyce and Frye 1986). [A second suite of

dates--from the first field season--is less conclusive, with a broad range from A.D. 1260 to A.D. 1635 (Boyce and Frye 1986).]

Wallizer (18AG44)

The Wallizer site is somewhat unique in western Maryland, in that it is located some distance from a major river. The site is situated along Town Creek, 16 km from its confluence with the Potomac. Very limited testing at the site revealed postmolds, pits, and a sheet midden (Kavanagh and Ebright 1988). Ceramics are dominated by limestone-tempered wares, although earlier chert-tempered and later shell-tempered wares occur in minor amounts. As with other sites reviewed here, the limestone-tempered pottery is a Monongahela-related Watson-like ware. At Wallizer, two radiocarbon dates from a single feature place this ceramic ware between A.D. 1155 $\pm$ 50 (SI-7097) and A.D. 1355 $\pm$ 95 (SI-7096) (Kavanagh and Ebright 1988).

Paw Paw (18AG144)

Located on the inside of a sharp meander bend of the Potomac River and sitting some 20 m above the river, the Paw Paw site appears to be a compact village (Curry 1983; Kavanagh 1984). Ceramics from the site are dominated by chert/crushed rock/mixed-temper wares similar in some respects to Clemson Island (McCann 1971) and in other respects to Buck Garden (McMichael 1965). In either event, this collection of pottery at Paw Paw appears to represent a late Middle Woodland manifestation. Also present at Paw Paw--although in lesser amounts--is a limestone-tempered ware (Watson?) related to Monongahela.

Radiocarbon dates were obtained for two of three trash pit features excavated at the site. Feature 1, which contained mostly crushed rock/chert/mixed-temper pottery, dates to A.D. 730 $\pm$ 150 (SI-6142) (Kavanagh 1984:44). Feature 3 also contained mostly crushed rock/chert/mixed-temper ceramics in addition to 5 carbonized corn kernels (Kavanagh 1984:Table 1); it is radiocarbon dated at A.D. 1010 $\pm$ 65 (SI-6447) (Boyce and Frye 1986:8).

Brosius (46MN2)

The Brosius village, although located across the Potomac in West Virginia, is mentioned here briefly for two reasons. First reported by Wright (1959), pottery at Brosius was noted as being primarily chert-tempered, with lesser amounts of limestone-tempered ware. This presumed pottery sequence mirrors that indicated at Wallizer and Paw Paw, above. Subsequent work at the site by the West Virginia Geological and Economic Survey in 1976 (Rogers n.d.) confirmed this pottery assemblage, as well as uncovering burials, trash pits, house patterns, and a portion of a palisade line.

Also of interest at Brosius is the analysis of cordage used to cordmark the ceramics. Analysis by Maslowski (personal communication 1984) indicates a strong correlation between S-twist cordage and the chert-tempered ware, and between Z-twist and the limestone-tempered ware, possibly suggesting two distinct occupations at Brosius.

Western Maryland Overview

Although the Middle Woodland is poorly understood in western Maryland, there is a definite pattern that can be discerned from what is known. Ceramics of the Middle Woodland are represented by crushed rock/chert/mixed-temper wares and, eventually, limestone-tempered wares. The origins of these wares are unclear, but they appear to be

derived from both the north and from the southwest. Maryland sites in the Youghiogheny drainage seem to have limestone-tempered (Watson) ware at the beginning of their Middle Woodland ceramic sequence, and are likely reflecting trends established on the Somerset Plateau of Pennsylvania. Along the upper Potomac, however, there are indications of influences from the southwest. The crushed rock/chert/mixed-temper wares may be related to Buck Garden ceramics which appear somewhat earlier than Watson ware [at Friendsville, Watson dates between A.D. 820 and 930, whereas Buck Garden is estimated at between A.D. 500 and 1000 in West Virginia, and is radiocarbon-dated to A.D. 730 and later at Paw Paw]. Whether these crushed rock/chert/mixed-temper wares evolved into the limestone-tempered wares, or were replaced by limestone-tempered wares used by separate cultural groups is unclear. However, analysis of cordage used on ceramics at Brosius would tend to infer the latter.

The Late Woodland in western Maryland is slightly better represented, but perhaps not much better understood, especially during its early stages. There is a noticeable predominance of limestone-tempered Watson-like ware in the early Late Woodland, which is consistently replaced by shell-tempered wares of later Monongahela influence. Again, the origin of the limestone-tempered pottery is unclear, although the general Somerset Plateau region of Pennsylvania must be suspected if only for the sheer concentration of Monongahela sites in that area.

In any event, the Middle-Late Woodland transition in western Maryland clearly falls under a general Monongahela influence, and sites share a number of common Monongahela traits. In addition to the crushed rock/chert/mixed--limestone--shell ceramic sequence, many of the sites hold the following in common: post-lined pits (especially in the Youghiogheny); cannel coal pendants; bone and clay beads; canine tooth pendants; slab-covered (especially for juveniles) and stone-lined graves; and ceramic and stone pipes.

Certainly the exchange of ideas throughout the western Maryland region is evident in the spread and pervasiveness of the Monongahela culture. Trade and exchange of material goods, however, is less obvious. One avenue for future research would be to study the origin and distribution of cannel coal pendants. These occur on at least three of the western Maryland sites (Friendsville, Sang Run, and Folly Run), as well as on numerous West Virginia and Pennsylvania sites. Readily available sources of cannel coal in Maryland are unknown today (Brezinski, personal communication 1989), and the closest known exposed sources occur some 100 km north of Garrett County in Pennsylvania.

Agricultural pursuits in western Maryland are inferred at most or all of the sites discussed above. Hard evidence, though, is scanty. Two sites have produced cultigens: Cresaptown yielded corn and beans, with the corn radiocarbon-dated to A.D. 855, and Paw Paw produced corn radiocarbon-dated at A.D. 1010. This fits rather well with dates from Gnagey on the Somerset Plateau where corn, beans, and squash are dated to between A.D. 920 and 1190. That more evidence of agriculture has not been found might be considered surprising until one considers two factors. First, most of the western Maryland sites have been only *minimally* excavated, in some cases less than 1%. And second, even where *complete* village plans have been exposed, such as at Gnagey, the actual specimen counts for cultigens are underwhelming (at Gnagey, corn=50, beans=31, squash=3).

THE GREAT VALLEY

The Great Valley (locally known as the Hagerstown Valley, and the Shenandoah Valley in Virginia) lies east of the Valley and Ridge province and west of the Blue Ridge (see Figure 4). The Blue Ridge is significant in that its two most prominent features, South and Catoctin Mountains, contain major outcrops of rhyolite. Hydrologically, the area is drained by Conococheague Creek in the west and Antietam Creek in the central portion; both feed into the Potomac River.

Great Valley Sites

Williamsport group (18WA14, 18WA26, 18WA69)

Three village sites are known near the mouth of Conococheague Creek at Williamsport. At the Conococheague Creek site (18WA14), Wright (n.d.) notes the presence of chert-tempered sherds, limestone-tempered ware (most likely Page), and shell-tempered New River ware [which Stewart (1982:82) equates with Monongahela/Keyser wares]. Just downstream, the Williamsport site (18WA26) has also yielded chert/mixed-temper pottery. And west of Williamsport, an extensive village at Pinesburg Station (18WA69) has produced chert-tempered ware, grit-tempered Shepard ware, limestone-tempered Page ware, and shell-tempered Keyser/Monongahela ware during extremely limited investigations (Curry 1978). Whether or not the chert/mixed-temper wares are related to Clemson Island is uncertain, although it is interesting to note a folded-over Clemson Island rimsherd reported from 18WA54 further up Conococheague Creek near the Pennsylvania line (Stewart 1982:77-78). The remainder of the ceramics from these three sites fit fairly well into established Late Woodland types such as Shepard (A.D. 900-1300), Page (A.D. 1300-1500), and Keyser/Monongahela (A.D. 1450 to contact).

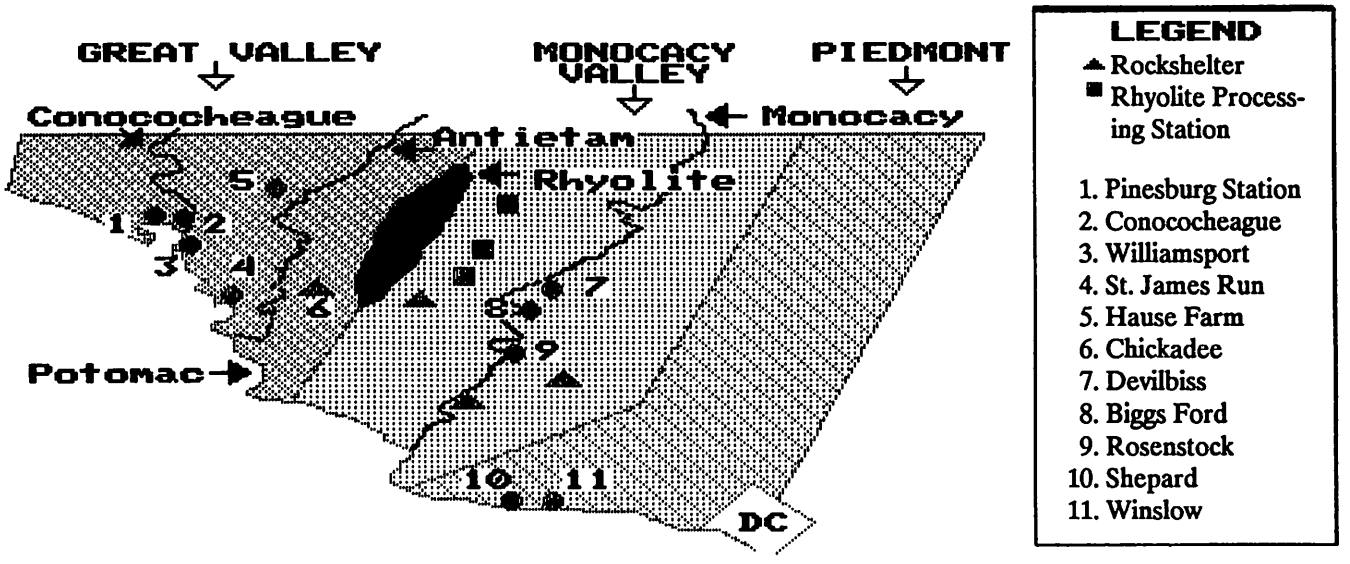

Figure 4. Sites discussed in the Great Valley, Monocacy Valley, and Piedmont.

St. James Run (18WA42)

The ceramic sequence at this site, located at the confluence of St. James Run and the Potomac River, exhibits a mixed-temper ware (sand/grit and leached limestone or shell), followed by Shepard ware, followed by a grit/sand-tempered ware akin to Potomac Creek or Moyaone (Stewart 1980:301, 1982:84) and Keyser/Monongahela ware. Stewart (1982:75, 84-85) assigns an Early/Middle Woodland date to the mixed-temper ware, and places the grit/sand-tempered ware at A.D. 1300+, while allowing for an introduction date as early as A.D. 1200.

Hause Farm (18WA163)

The Hause Farm site is noteworthy due to its location removed from a major river/stream. The site is located along Marsh Run, a tributary of Antietam Creek. The ceramic sequence is that of Shepard--Page--Keyser, and it is possible that components may be spatially separate as well as overlapping/mixed. Preliminary evidence from reconnaissance-level testing indicates the presence of pits on the site, and a burial was reportedly unearthed at the site during construction work (Curry 1981).

Chickadee Rock Shelter (18WA13)

The Chickadee Rock Shelter is located along Little Antietam Creek, just a few kilometers east of the main branch of Antietam Creek, and just a few kilometers west of the foot of South Mountain. The ceramic sequence for this rockshelter site spans the Woodland period from Vinnette I and Selden Island to Potomac Creek. Notable in terms of the present discussion, however, is the occurrence of shell-tempered net-impressed Middle Woodland Mockley ware from the Coastal Plain (Gross 1972:14 et seq.). [Mockley comprised 11% of the Chickadee ceramic assemblage in terms of weight, the unit of quantification employed by Gross.] The Mockley pottery at this site marks the only unequivocal occurrence of a defined Middle Woodland ceramic ware in Maryland west of South Mountain.

Great Valley Overview

The Middle Woodland is once again poorly represented in the Great Valley. As was the case in western Maryland, chert- and mixed-temper wares seem to mark the Middle Woodland, although this remains largely assumption. The mixed-temper ware at St. James Run is assigned its Early/Middle Woodland date based on its stratigraphic position (Stewart 1980:377) below Shepard pottery. The remainder of the chert/mixed-temper wares are considered Middle Woodland based on their similarities to types such as Clemson Island, a type defined for the Susquehanna drainage in Pennsylvania. The occurrence of these chert/mixed-temper wares, especially those fairly reliably considered Clemson Island [such as at 18WA54], in the Great Valley is illuminating. Chert/mixed-temper wares are best represented on or near Conococheague Creek, a major Potomac tributary whose headwaters lie within 50 km of the Susquehanna River, making Conococheague Creek a likely avenue for introduction of Clemson Island pottery to the Great Valley and upper Potomac region in general. Of course, some of these chert/mixed-temper wares may be more closely linked to the Buck Garden type from West Virginia, in which case they most likely were introduced into western Maryland and from there spread down the Potomac into the Great Valley.

The only undeniable Middle Woodland ceramic type from the Great Valley is the Mockley ware found at Chickadee Rock Shelter. However, the occurrence of this Coastal

Plain type in the eastern Great Valley, especially at a rockshelter site, should not be surprising. Its occurrence is quite clearly linked to the intensive rhyolite exploitation carried out by the Selby Bay/Mockley groups of the Coastal Plain (see below), and merely represents a slightly more western expression of the rhyolite procurement patterns noted in the Monocacy Valley (see below). [In essence, the occurrence of Mockley at Chickadee is the result of groups coming up the Potomac, bypassing the Monocacy River, and following Antietam Creek instead, thereby approaching the South Mountain quarries from the west.] Furthermore, as Stewart (1987:54) has noted, rockshelters are the campsites (or "prehistoric 'motels'" as Stewart puts it) most likely to be used by Coastal Plain groups: they are readily recognized, sheltered, and easily defended.

The Late Woodland in the Great Valley continues to reflect the influence of Monongahela cultures to the northwest. However, two additional spheres of influence are recognized in this area as opposed to western Maryland. The first is clearly an Owasco influence from the northeast which is manifested in the appearance of Shepard wares. This northeastern influence emerging in the Great Valley is perhaps unimpressive when compared to Owasco-related sites of the Monocacy Valley or Potomac Piedmont (see below), but it clearly demonstrates the extent of Owasco expansion in Maryland. The second influence noted in the Great Valley that was not present in the Late Woodland period of western Maryland is that from the Shenandoah Valley. This surely is expected, given that the Great Valley is merely a northern extension of the Shenandoah Valley. In fact, it is somewhat surprising that cultural groups from the Shenandoah Valley do not exert more influence in the Great Valley. In partial explanation, we offer the possibility that the Great Valley served as a "buffer" area between Monongahela groups to the northwest, Owasco-related groups to the northeast, and groups from the Shenandoah to the south. Each cultural group is represented, but no one group dominated the region. [This "buffer" concept also holds true for the Middle Woodland, where Stewart (1987) notes an "open territory" approach to the Blue Ridge area in general. In this scenario, different cultural groups periodically visited--sometimes perhaps co-existing with one another--the rhyolite sources of the Blue Ridge, mindful of the non-exclusive nature of their exploitation.]

There is no direct archeological evidence for agricultural subsistence in the Great Valley, but this is almost certainly a result of the lack of professional excavation on village sites rather than a reflection of reality. In addition to a demonstrated agricultural base linked with both the Monongahela and Owasco-related cultures, several of the Great Valley sites are likely candidates for agricultural pursuits based on site size alone. The Pinesburg Station village, based on aerial photography evidence, measures on the order of 300 meters by 100 meters. The nearby Conococheague Creek site, though largely destroyed and undocumented, reportedly yielded burials in numbers indicative of a sizeable village. And the Hause Farm village, inland on Marsh Run, most likely relied on an agriculturally-based subsistence.

Evidence for trade and exchange in the Great Valley is limited to the rhyolite exploitation network established by the Selby Bay/Mockley groups of the Coastal Plain. While this evidence is less apparent than in the Monocacy Valley (see below), the situation at Chickadee Rock Shelter mirrors the more evident Monocacy pattern of Coastal Plain groups entering the area, obtaining rhyolite at the sources, quickly reducing the raw material to transportable size, and immediately returning to the Coastal Plain.

THE MONOCACY VALLEY AND PIEDMONT

The Monocacy River region occupies a broad lowland valley at the western margin of the Maryland Piedmont (see Figure 4). It is underlain by easily eroded limestone and shales, as contrasted with the eastern Piedmont which is formed by resistant metamorphosed rocks. The resultant level and gently sloping lowland of the Monocacy Valley afforded an attractive location for prehistoric populations, much more so than the steeply sloped Piedmont uplands to the east.

Monocacy Valley Sites

Rhyolite Processing Stations

A primary attraction of the Monocacy Valley was direct access to the rhyolite outcrops in Catoctin Mountain and South Mountain immediately to the west. Utilized throughout the Archaic and Woodland periods, their exploitation was particularly intense during the Middle Woodland. Once the raw material had been obtained, the rough blanks were brought to large base camps in the foothills, termed rhyolite processing stations by Stewart (1982). Three of these have been identified in the Monocacy Valley. The intensity of their use is reflected in their size; the Mountaindale site (18FR28) is over 100,000 square meters in area. These sites, located in or near the foothills on Hunting, Fishing, and Owens Creeks, are characterized by large numbers of broken and rejected late stage bifaces, cores, and rhyolite flakes indicative of reduction processes Stewart (1987:51). As Stewart (1987:51) notes, these sites also served as expedient sources of rhyolite. Although these sites were occupied repeatedly, they all appear to have a sizeable Selby Bay component. The Mountaindale site also had Mockley ceramics present (Kavanagh 1982).

Rosenstock (18FR18)

The Rosenstock site was tested by the Archeological Society of Maryland in 1979 (Kavanagh 1982). This site is located on a high bluff overlooking the Monocacy and represents a small Late Woodland village. Radiocarbon dates fall into two ranges, one date at A.D 1015 $\pm$ 60 (SI-4582), and four dates between A.D. 1335 and A.D 1475 (Boyce and Frye 1986). Only one carbonized corn kernel was recovered from flotation of four features, and probably is associated with the later occupation. Ceramics at the site are granite- and quartz-tempered, collared with an added rim strip, and decorated with a variety of cord and cord-wrapped stick designs. They fall within the type Shepard ware (Schmitt 1952).

Biggs Ford (18FR14)

Biggs Ford is a multicomponent site representing several Late Woodland complexes. One radiocarbon date associated with Shepard ceramics at Biggs Ford is A.D. 1035 $\pm$ 60 (SI-3661). Although this site is dominated by the later component, five elongated pits attributed to the earlier Montgomery component were arranged "end-to-end which presumably would have proven to be part of a complete circle had a larger area been excavated" (Bastian 1974). An abundance of corn was recovered at Biggs Ford, but is likely associated with the later components.

Devilbiss (18FR38)

Like the Rosenstock site, Devilbiss is located on a high bluff above the Monocacy and is less than an acre in size. Devilbiss received very limited testing but appears to have

only one major component. A radiocarbon date from a pit containing Shepard ceramics was A.D. 1105 ± 85 (SI-2898) (Peck and Bastian 1977). No floral remains were noted.

Eastern Piedmont Sites

Shepard (18MO3)

Excavations at the Shepard site in the 1950s revealed over 80 overlapping pits with no discernible pattern (MacCord, Schmitt, and Slattery 1957). Thirty-one burials were excavated, and were predominantly flexed and semi-flexed, in individual graves. Corn was recovered, but no beans or squash. The ceramics of the primary component are granite- and quartz-tempered (primarily granite), with rounded or semi-conoidal bases, slightly constricted necks, and collars produced by adding a rim strip. Decoration is primarily simple cord, cord-wrapped stick, and occasional incising. Shepard site dates range from A.D 320 to A.D. 1630, but given the presence of multiple components, two dates of A.D. 1220 ± 60 (SI-553) and A.D.1200 ± 50 (SI-554) most likely date the primary occupation (Boyce and Frye 1986).

Winslow (18MO9)

Located on a slight terrace above the Potomac floodplain, the Winslow village site was tested in the 1940s by Slattery and Stabler and in the early 1960s by the ASM Southwest Chapter (Slattery and Woodward n.d.). The midden varied in thickness from 8 to 14", indicating intensive occupation. The limited excavations revealed an oval village plan, and uncovered 15 single, flexed burials. Ceramics at the site were almost exclusively Shepard type, with the majority granite-tempered. Floral analysis was limited but several carbonized corn cobs were recovered. Three radiocarbon dates from the Winslow site were: A.D. 825 ± 150 (M-1189), A.D 1315 ± 80 (SI-37), and A.D. 1285 ± 100 (SI-41) (Boyce and Frye 1986).

Monocacy Valley and Piedmont Overview

An analysis of site data points to the presence of Coastal Plain Selby Bay groups in the Monocacy Valley during the Middle Woodland. The number of sites with Selby Bay points is second only to the number of Late Archaic sites, and, considering the shorter duration of the Middle Woodland period, indicates intensive use. Ceramics, in contrast, are extremely scarce. This paucity of ceramics does not reflect a survey bias since, like the Great Valley, this area has been systematically examined (Kavanagh 1982). The only Middle Woodland ceramics are Mockley, which have been identified from seven sites: three rockshelters, one rhyolite processing station, and three open riverine sites south and east of the quarries along the river. As the Mockley ceramics are clearly imports from the Coastal Plain, their presence indicates that groups were traveling directly to the quarry areas in order to obtain rhyolite. The rockshelters contain a mixture of materials from the Early Archaic through the Late Woodland, thus providing little additional information on the Middle Woodland rhyolite exploitation strategies. It is worth noting, however, that nearly all of the other ceramics present in these shelters are local varieties (Geasey 1965, 1968, 1971a, 1971b, 1975). In the adjacent Piedmont uplands to the east, the Middle Woodland is represented only by a few scattered small hunting sites.

In the Late Woodland there is a sudden shift in settlement type and distribution. Village sites appear along the Potomac River in the Piedmont, and along the Monocacy, beginning sometime between A.D. 900-1000. Termed the Montgomery Focus (Schmitt 1952; Slattery, Tidwell, and Woodward 1966), this manifestation has its center in the southern Potomac Piedmont, about 20 kilometers downstream from the mouth of the

Monocacy. Village patterns are not clear but usually have an oval pattern of trash pits surrounding an open plaza, and along the Potomac cover an area of 1 to 2 acres. Subsistence activities include cultivation of the maize, bean, and squash complex, and possible cultivation of indigenous plants. Burials are most commonly single, semi-flexed or flexed, with few or no grave goods. The artifact assemblage includes Shepard ceramics, rhyolite and quartz triangular projectile points, and an assortment of bone and antler tools (MacCord, Schmitt, and Slattery 1957:19). The Shepard ceramics have quartz and granite temper (primarily granite), cord-marked surfaces, constricted necks, collared rims created by adding a clay strip (approximately 75% of the vessels), and primarily cord and cord-wrapped stick decoration with some incising. Punctate decoration is extremely rare (about 1-4% of the assemblages [Slattery and Woodward n.d.]).

In addition to the large villages, a series of smaller sites have been noted, and it is postulated that these may represent hamlet-type farmsteads which either preceded or were coeval with the villages (Slattery and Woodward n.d.). Additional small associated hunting sites have been identified in the Monocacy Valley (Kavanagh 1982), but again, as in the Middle Woodland, the interior eastern Piedmont remains an archeological wasteland.

The relationship of the Montgomery Focus sites to northern Owasco groups is clear. The similarities of the Shepard ceramics to Owasco ceramics are striking, particularly early forms such as the Carpenter Brook Cord-on-Cord (Ritchie 1969:229), Owasco Corded Horizontal, and Owasco Corded Collar (Ritchie and Funk 1973:189, 209). Given the lack of an identifiable Middle Woodland resident group in the Piedmont, it appears that there was an expansion of northern agricultural groups into the Monocacy Valley and Piedmont Potomac at least by A.D 1000 and perhaps as early as A.D 900.

THE WESTERN SHORE OF THE COASTAL PLAIN

The Western Shore of the Coastal Plain is bordered by the Piedmont (Fall Line) on the west and Chesapeake Bay on the east (see Figure 5). It is a gently rolling plain

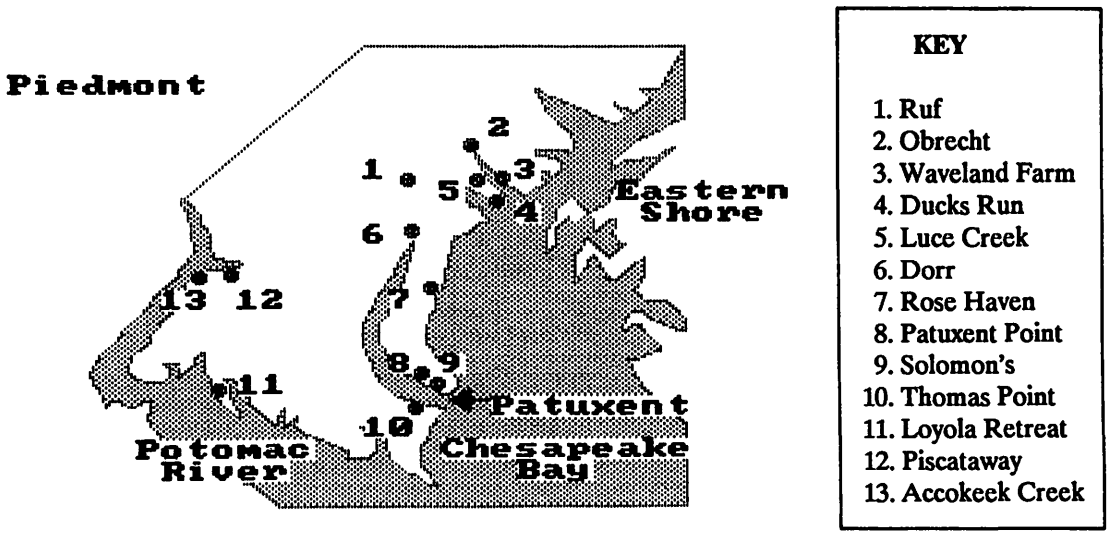

Figure 5. Sites discussed on the Western Shore of the Coastal Plain.

underlain by unconsolidated sands and clays. Principal rivers in the region include the Potomac, Patuxent, South, Severn, Magothy, and Patapsco, each of which is embayed to some extent. The combination of freshwater/brackish riverine environments and the presence of Chesapeake Bay provided an exceptionally attractive setting to prehistoric inhabitants.

Western Shore Sites

Ruf (18AN65)

The Ruf site is the type site for what Thomas E. Mayr termed the Selby Bay complex (Mayr 1957, 1972). Based on excavations at Ruf, Mayr compiled the following list of traits characteristic of the Selby Bay complex: blue rhyolite, purple argillite, brown/green jasper, Mockley ceramics, lanceolate and stemmed [Selby Bay] projectile points, large blanks and cache blades, 3/4-grooved axes, and two-hole elliptical gorgets. More than 90% of the lithic material recovered from Ruf is exotic in origin (i.e., rhyolite, argillite, and jasper). Faunal and floral remains from the site midden include oyster, deer, and walnut. As Mayr (1972:3) points out, the presence of oyster in sizeable numbers is significant, since the nearest sources are 40 km downriver on the Patuxent and 11 km overland to the South River.

Obrecht (18AN113)

Obrecht is a multicomponent Archaic and Woodland site with major Middle and Late Woodland occupations, located near the head of the Severn (Peck 1976, 1977a). Mockley and Townsend ceramics comprise the majority wares. Of the Townsend ceramics recovered, 196 of the decorated sherds were incised, while 35 were cord-decorated. That, plus several Bowman's Brook Incised sherds point to an early Late Woodland date. Peck noted that the pastes of the Mockley and Townsend ceramics were virtually indistinguishable, and were differentiated primarily by surface treatment and decoration. He noted that there is a tendency for the crushed oyster shell in the Townsend Ware to be slightly larger than in the Mockley ceramics (Peck 1977a:20).

Other artifacts associated with these occupations could not easily be identified due to the multicomponent nature of the site. However, it is worth noting that only three Selby Bay points were found during excavations.

Waveland Farm (18AN17)

The Waveland Farm site, located on the Severn River, exhibits a stratigraphic sequence with Mockley ceramics confined to a dark red sandy layer over which lies a shell midden associated with Sullivan Cove/Townsend ware (Peck 1978). A single aboriginal pit at this site, containing Sullivan Cove/Townsend pottery as well as oyster, deer, and fish remains, yielded a charcoal radiocarbon date of A.D. 1385 $\pm$ 55 (SI-3665); a shell date obtained for the same pit was A.D. 1040 $\pm$ 60 (SI-3666) (Peck 1978:18-19).

Ducks Run (18AN546)

The Ducks Run site, located near the mouth of the Severn River, is a Late Woodland shell midden containing the remains of a seasonal camp site (Koski-Karell 1988). Ninety-eight percent of the ceramics recovered in excavation were classified as Townsend, with Rappahannock Fabric-Impressed, Rappahannock Plain, and Rappahannock Incised identified. Two radiocarbon dates on bone from the midden were A.D. 1030 $\pm$ 110 (Beta-11638) and A.D. 1140 $\pm$ 80 (Beta-11639).

Luce Creek (18AN143)

Also located on the Severn River, the Luce Creek site represents a Middle Woodland shell midden. A single excavation unit dug into the shell heap by Wright (1978) revealed Mockley ceramics; flakes of blue rhyolite, purple argillite, and green jasper; and oyster shells, soft shell clam shells, mussel shell, deer bone, and turtle carapace. A charcoal sample from the midden was radiocarbon-dated to A.D. 580 ± 120 (M-1608), and provides a reasonable date for the Selby Bay phase (Wright 1978:29).

Dorr (18AN19)

The Dorr site, located on the Patuxent River, is a multicomponent site which has yielded substantial Middle Woodland Selby Bay phase materials from two main areas of the site. A large trash pit (1.5 meters in diameter and depth) yielded 44 Mockley net-impressed sherds, oyster shell, freshwater and marine clam, deer, beaver, tortoise, turtle, sturgeon, gar, and turkey (Woodward 1969). Woodward also notes the overall preference for rhyolite in the lithic assemblage, and its exclusive use for knives [Selby Bay points?] (Woodward 1969:7). Later excavations carried out in 1976 (Croney et al. 1976) revealed another large pit (2 meters in diameter, 1.5 meters deep) at the site. This pit yielded an assemblage remarkably similar to that reported by Woodward: 76 Mockley sherds, points and knives [numerous Selby Bay specimens are illustrated in Croney et al. (1976), but the provenience is vague], oyster, clam, deer, beaver, turtle, and turkey. As was the case with Ruf, the occurrence of oyster at Dorr is notable; the nearest source is 30+ km downriver.

Rose Haven (18AN279)

The Rose Haven site lies adjacent to a present-day marsh on the west shore of Chesapeake Bay. Test excavations in 1977 concentrated on a Selby Bay component (Peck 1977b). Unlike the Obrecht site, Selby Bay points were numerous, constituting half of the diagnostic projectile points. Lithic debitage was 50% rhyolite, while jasper and argillite were 3% each. Two radiocarbon dates were obtained from the same feature, one on shell (A.D. 175 ± 65, SI-3669), and the other on wood charcoal (A.D. 700 ± 90, SI-3670) (Boyce and Frye 1986). Based on faunal remains it is postulated that the site was a seasonal camp, perhaps occupied during the summer months.

Patuxent Point (18CV272)

Located along the lower Patuxent, this site has yielded the first documented Middle Woodland house structure in the Middle Atlantic region. Work by Gardner and Barse (Barse, personal communication 1989) has exposed a 9 by 4-meter oval house pattern, at one end of which is located a large pit (3 meters in diameter, 2.5 meters deep) surrounded by four large postmolds. This presumably covered pit, stratified in five distinct levels and having a puddled clay floor, contained Mockley ware, projectile points, and faunal and floral material including deer, fish, acorn, and hickory. Notable in terms of projectile point chronology is the occurrence of Selby Bay and Piscataway points in equal numbers within this large pit and on the site as a whole. A radiocarbon sample from the pit dated to 70 B.C. ± 130 (Beta-27175), while a second pit, also containing Mockley ware, dated to A.D. 900 ± 140 (Beta-27174). Gardner and Barse interpret this site as a central base camp with a communal storage facility which probably served several related hamlets. They take care to note that the foods stored at this facility are seasonally available types, not necessarily cultigens.

Solomons (18CV254)

At Solomons Island Wastewater Facility near the mouth of the Patuxent, two Late Woodland features were salvaged in the midst of a construction project (Koski-Karell and Ortiz 1986). Two radiocarbon dates on wood charcoal from a roasting pit were A.D. 1330 ± 50 (Beta-13050), and A.D. 1420 ± 70 (Beta-13051). The associated ceramics were shell-tempered with either cord-marked or smoothed surfaces and some incised decoration. The investigators classified the pottery as Sullivan ware (after Wright 1973). There was also a small amount of Potomac Creek pottery at the site. No interpretation of site function was possible given the disturbance and the limited nature of the testing.

Thomas Point (18ST570)

Located one kilometer north of the mouth of the Patuxent, the Thomas Point site was excavated by staff of the Jefferson Patterson Park and Museum in 1988. Two major periods of occupation were identified, dating to the Little Round Bay Phase and the Sullivan Cove Phase. Four radiocarbon dates were obtained on charcoal from features and from a buried sheet midden: A.D. 970 ± 80 (Beta-27069); A.D. 700 ± 60 (Beta-27070); A.D. 880 ± 70 (Beta-27073); and A.D. 1070 ± 50 (Beta-27074). All but the earliest date appear to be associated with Townsend Series ceramics (*ASM Ink* 14[12]:5-6).

Loyola Retreat (18CH58)

The shell midden at Loyola Retreat on the lower Potomac produced stratified deposits with a Mockley component occupying a zone above Popes Creek ware and below Potomac Creek ware. The zone containing Mockley ceramics was radiocarbon-dated to A.D. 815 ± 95 (I-5246) (Gardner and McNett 1971; Boyce and Frye 1986).

Piscataway (18PR7)

This large multicomponent site on Piscataway Creek is dominated by Middle Woodland remains, with more than half of the nearly 12,000 ceramics belonging to the Mockley type [referred to as Chickahominy but equated with Mockley by Woodward and Phebus (1973)]. A minor component is represented by circa 600 Rappahannock/Townsend sherds which Woodward and Phebus (1973) recognize as related to the earlier Mockley ware. A series of pits and the general site midden at the Piscataway site yielded an array of faunal remains, including freshwater clam, oyster, mussel, turtle, terrapin, ray, shark, sturgeon, elk, deer, beaver, raccoon, muskrat, squirrel, dog, woodchuck, and turkey; deer, terrapin, and sturgeon are concentrated in the Middle Woodland levels. A charcoal sample from a "clam bake pit" dated to A.D. 200 ± 90 (SI-449) (Woodward and Phebus 1973).

Accokeek Creek (18PR8)

Stephenson first defined Mockley ware based on his analysis of artifacts from the Accokeek Creek site (Stephenson and Ferguson 1963). Located at the mouth of Piscataway Creek where it joins the Potomac, the Accokeek Creek site is perhaps best known for the Piscataway Indian village of Moyaone and the Susquehannock Fort of 1675. However, a substantial Mockley component (approximately 15% of the ceramic assemblage) exists at the site, concentrated mainly in the Mockley Point area of the site (i.e., outside both the Moyaone village and the Susquehannock Fort). Stephenson recognized Mockley as a Middle Woodland ware (suggesting A.D. 900 to 1200 as a date range) and noted that "it seems obvious that the Mockley ware is...probably ancestral to the Townsend [pottery]" (Stephenson and Ferguson 1963:190).

Western Shore Overview

The Middle Woodland period is well-represented on the Western Shore by a series of sites belonging to the Selby Bay complex. Characteristics of this complex include the use of exotic lithic materials (rhyolite, argillite, green/brown jasper), Mockley ceramics, lanceolate and stemmed projectile points, large blanks and cache blades, 3/4-grooved axes, and two-hole elliptical gorgets.

Settlement associated with the Selby Bay complex focuses on the Patuxent drainage and seems to be oriented around central base camps/storage facilities that are supported by widespread procurement sites. Examples of the base camps include Ruf, Dorr, Patuxent Point, and possibly Piscataway. These are characterized by large pits (in the case of Patuxent Point, the pit was apparently covered by some sort of structure) used to store a wide variety of seasonally available floral and faunal resources. Ruf and Dorr are notable in that they contained sizeable numbers of oyster and/or marine clam shells that were transported up to 40 km from their sources. [Gardner and Barse, based on their work at Patuxent Point, conjecture that these base camps served several related hamlets.] Examples of procurement sites are likely to include a series of sites along Piscataway Creek such as 18PR142 (Gardner 1976) and the Mockley Point area of the Accokeek Creek site. Sites of this category are expected to lack large pit features, sometimes lacking pits altogether. Most characteristic, though, are their locations in strategic settings where seasonal resources could be efficiently exploited. In the case of the Piscataway Creek procurement sites, these resources are likely to include anadromous fish (sturgeon are noted in the assemblages at the Piscataway site and at Dorr on the Patuxent) and possibly wild rice.

The Late Woodland period on the Western Shore sees a settlement shift to the floodplain areas, presumably indicating a shift to agriculture (Gardner 1976). Since large villages are not apparent during the early Late Woodland, hamlets are more likely indicated. Steponaitis (1986) also infers a shift to an agricultural subsistence during Late Woodland times based on an indicated population increase, increase in residential group size, and greater residential permanence. Also during Late Woodland times, the Patuxent River focus of the earlier Selby Bay complex is de-emphasized.

In terms of ceramics, the entire Middle to Late Woodland transition period is dominated by shell-tempered wares. There is no evidence to suggest anything other than an in situ development from Mockley to Townsend/Rappahannock. Often, the ranges in paste and tempering overlap between the two wares, and, in fact, radiocarbon dates may overlap (cf. Thomas Point and Patuxent Point, for example). The changes in decoration evident between the two wares may represent nothing more than an indication of greater social complexity with time.

The Middle Woodland trade and exchange network is perhaps most visible in terms of the lithic materials used. While the exploitation of rhyolite sources in South and Catoctin Mountains appears to be more of a direct procurement operation, the argillites and jaspers prevalent in the Selby Bay complex are likely the result of trade/exchange networks. The emphasis on procurement/distribution evident in the Selby Bay complex indicates an alliance network requiring surplus production (cf. Steponaitis 1986). This is reflected in the predominance of cache blades (Geasey 1974), as well as in the storage of local seasonal foodstuffs discussed above.

During the Late Woodland, this exchange network breaks down. Rhyolite exploitation is curtailed, and the regional food procurement/distribution pattern gives way

to nucleated settlements. Steponaitis (1986:289) attributes this to Late Woodland "tribalization". In fact, at least in terms of lithic exploitation, the drop-off in rhyolite usage during the Late Woodland may mark the end of Stewart's (1987) Blue Ridge "openness" of Middle Woodland times. This, in turn, is likely related to Owasco expansion into the Monocacy Valley and Potomac Piedmont regions, as discussed below.

Direct archeological evidence for agriculture on the Western Shore is totally lacking prior to at least A.D. 1450 (i.e., at the Stearns site [18CV17], Clark, personal communication 1989). The Middle Woodland period on the Western Shore appears to rely on a subsitence pattern based on intensive gathering of seasonal resources (both floral and faunal). Cultigens cannot be ruled out, but the productivity of the Chesapeake Bay and its environs may have obviated the need for agriculture to any significant extent. During the Late Woodland, the settlement shift to arable floodplains infers agricultural pursuits, but there is no direct evidence.

SUMMARY AND CONCLUSIONS

The Middle to Late Woodland transition in Maryland (see Figures 6 and 7) can be summarized with respect to four broad themes: 1) ceramic types; 2) adoption and intensity of agriculture; 3) regional trade and exchange; and 4) population movements.

In Western Maryland, the ceramics of the Middle Woodland are comprised of mixed crushed rock, sandstone and chert-tempered wares, and affiliations appear to be primarily with Buck Garden ceramics. Later limestone-tempered ceramics probably represent a replacement rather than evolution, appearing around A.D. 900-1000, and are clearly related to the Monongahela Watson ware. The onset of agriculture is indicated at two sites by dates of A.D. 885 and A.D. 1010. This coincides with dates from Monongahela sites on the Somerset Plateau to the north. Evidence for regional exchange is very limited. In the Late Woodland the cannel coal pendants reported from many of the sites may have been a traded item as there are no known sources in Maryland today. Their pervasiveness at other Monongahela sites indicates intra-group trading rather than any formalized exchange network. Throughout the Middle and Late Woodland, the ties to the upper Ohio valley groups in West Virginia and Pennsylvania are clear. The scanty evidence for Middle Woodland occupation suggests that Monongahela groups expanded into the area around A.D. 900.

Further east in the Great Valley, the Woodland period is an archeological mixed bag. Early ceramics include mixed crushed rock and chert-tempered wares which may be related to Clemson Island. Early Late Woodland wares are primarily Shepard. There is no direct evidence for adoption of agriculture, but villages affiliated with both Monongahela and Montgomery Focus groups imply a date of A.D. 900-1000 for agriculture in this region. The area is seen as an open territory during the Middle Woodland through which many groups had direct access to rhyolite quarries. The same pattern holds for the Late Woodland with a limited encroachment of Monongahela, Montgomery Focus, and southern agricultural groups. This area thus served throughout as some sort of buffer zone that was not dominated by any one group.

During the Middle Woodland the Monocacy Valley appears to be annexed by coastal Selby Bay groups who utilized the area for rhyolite procurement and hunting, while virtually ignoring the eastern Piedmont. The only known ceramics are small amounts of imported Mockley. Beginning about A.D. 900, large agriculturally-based village sites appear, characterized by Shepard ceramics. Given the lack of a prior resident population, this seems to be incontrovertible evidence for movement of Owasco groups from the north,

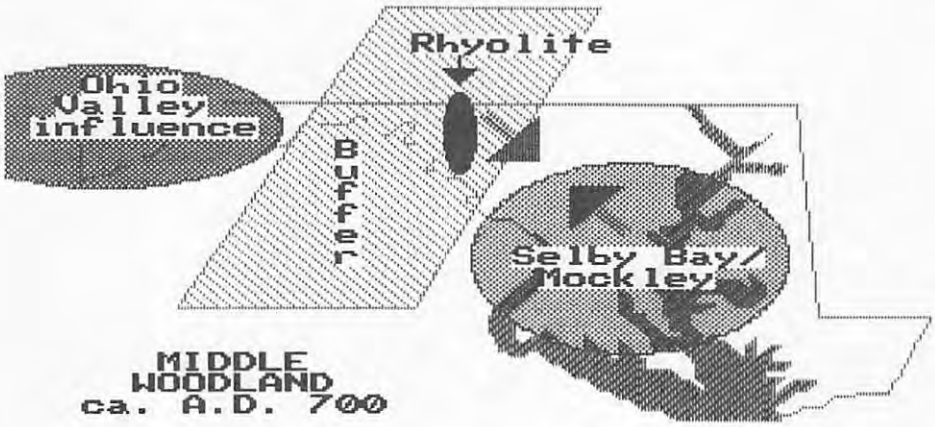

Figure 6. Middle Woodland cultural dynamics in Maryland.

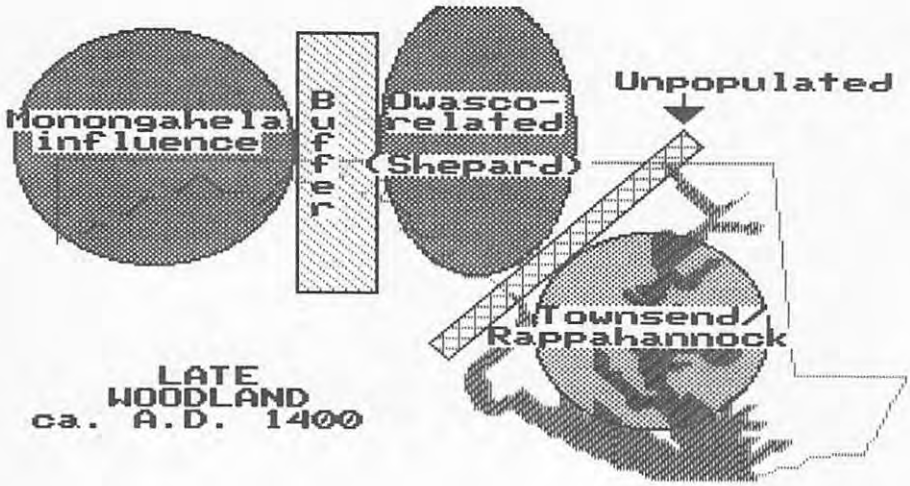

Figure 7. Late Woodland cultural dynamics in Maryland.

although the specific origin and nature of this movement, whether expansion or migration, remains unclear.

The Western Shore of the Coastal Plain had a large resident Middle Woodland population which supported itself by a wide-spectrum resource base. The adoption of agriculture is inferred by about A.D. 900-1000 based solely on a shift in settlement. Even if introduced at this time, it is unlikely that it assumed much importance in the economy until later. While during the Middle Woodland rhyolite was directly procured and argillite and jasper were obtained by trade, in the Late Woodland there is a cessation of the import of these materials. There does not appear to be any movement of populations other than local shifts; all evidence points to in situ evolution from Middle Woodland Mockley groups to Late Woodland Townsend groups.

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