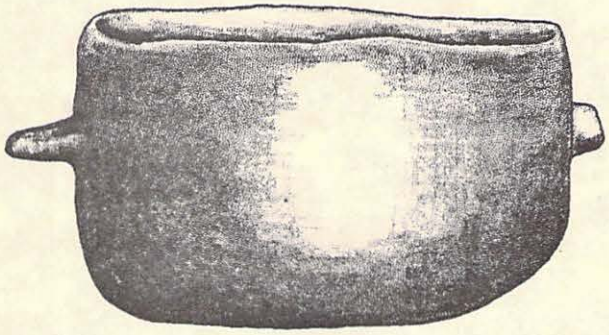
MIDDLE ATLANTIC ARCHAEOLOGICAL CONFERENCE

Rehoboth, Delaware

Program and ABSTRACTS



APRIL 2 - 4, 1982

National Museums and the Reification of the Jacksonian Myth

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Museums in general, and the government-supported National Museums in particular, are a curious blend of the empirical matter of history and the conscious creation of myth. As such, they are ideotechnic artifacts on a grand scale, and their operation reveals how Western ideology is projected and enforced through the manipulation of material culture. Using as a focal point the museums within the Smithsonian Institution, this paper reflects on the reification of the Jacksonian man, the expectant capitalist on the American frontier. A brief historical account of the development of the Jacksonian image is followed by an analysis of the manifestation of the mythology in our National Museums.

HISTORICAL ARCHAEOLOGY AND THE CATEGORY OF THE IDEOTECHNIC

Symposium organized for the 1982 Middle Atlantic Archaeology Conference, Rehoboth Beach, Delaware. Scheduled for Sunday morning, April 4, 1982.

Abstract for Symposium

It has now been almost two decades since Lewis R. Binford (1962) invented the category of ideotechnic artifacts: "items which signify and symbolize the ideological rationalizations for the social system" and provide a symbolic milieu for everyday life. With the exception of some Mayan interpretations no one has had great success in discovering the ideotechnic amongst the archaeological records of premodern societies. The papers in this symposium explore this dilemma through systematic examinations of ideotechnic artifacts in historic and contemporary settings. A variety of data are analyzed including living historical museums, architectural history and preservation theory, historic sites, contemporary museums, and processes such as urbanization and industrialization. All of these analyses trace a significant connection between the category of the ideotechnic and the emergence of capitalism, implying that such a category either does not exist in the premodern world or that its form is encompassed by process and not artifact in such societies.

Participants and Schedule

9:00 - Russell G. Handsman
Brief Introductory Comments

9:05 - Richard J. Dent
Gentrification and Cultural Resource Management in Historic Urban Settings: The Poverty of Preservation Theory and Praxis

9:30 - Anne Yentsch
Houses Remembered and Houses Forgotten

9:55 - Mark P. Leone
Ideotechnic Artifacts around the Chesapeake Bay

10:20 - BREAK

10:30 - Russell G. Handsman
The Differentiation of Labour: Cultural Processes and Ideotechnic Artifacts

10:55 - John McCarthy, Stephen Graff
The Growth of Industrial Capitalism and Class Formation in the Early Nineteenth Century: A Case from Southeastern Pennsylvania

11:20 - David J. Meltzer
National Museums and the Reification of the Jacksonian Myth

The Growth of Industrial Capitalism and Class Formation in the Early Nineteenth Century: A Case from Southeastern Pennsylvania

John McCarthy, Stephen Graff
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Temple University
Philadelphia, Pa. 19122

This paper documents the process of social transformation from a merchant to an industrial capitalist economic formation in Delaware County, Pennsylvania, in the first half of the nineteenth century. The growth of industrial capitalism in this region was coupled with changes in patterns of land ownership and settlement. The proportion of landless people grew dramatically as industrialization intensified, reflecting changes in the relations of production and patterns of ownership. The increasing disparity of wealth between different social classes, i.e. owners and workers, was accompanied by changes in the existing ideology and the emergence of a new ideological structure which ensured the reproduction of the developing social system. Traces of this newly emergent ideology are reflected in the larger artifacts of the period, e.g. mills, worker housing and owners' housing, of the period. This study examines a number of means that can be employed to recover this information.

The Differentiation of Labour: Cultural Processes and Ideotechnic Artifacts

Russell G. Handsman
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Washington, Ct. 06793

Archaeologists have never been fully conscious of the interpretive insights encompassed by Karl Marx's idea of the relations of production - an ensemble of economy and society which determines the expressions of everyday life. This over-sight may not matter much to prehistory, especially in the Middle Atlantic. However it is crucial to historical archaeology. Without the theory we are incapable of differentiating premodern industrial relations and activity from those associated with the emergence of capitalism. A variety of ethnographic and archaeological data are examined which reveal how capital is different from capitalism, how these differences might be encoded in the archaeological record, and why ideotechnic artifacts finally make their long-awaited and hoped-for appearance.

Gentrification and Cultural Resource Management in Historic Urban Settings: The Poverty of Preservation Theory and Praxis

Richard J. Dent
Anthropology Department
University of Maryland
College Park, Md. 20742

It is a central paradox of Cultural Resource Management that we can preserve and enhance many historic settings yet at the same time destroy the extant social fabric of those same settings. This paper examines the process of gentrification, the creation of ideotechnic artifacts, and, in the process, the destruction of the cultural integrity of human aggregates. Examples are drawn from the on-going gentrification of neighborhoods in urban Baltimore, Maryland, and Washington, D.C. It is argued that this type of examination offers keys toward an understanding of the underlying structure of preservation policy which forces it to become a handmaiden to social destruction throughout Middle Atlantic urban centers in particular and broader urban centers in general.

Houses Remembered and Houses Forgotten

Anne Yentsch
Anthropology Department
University of Maryland
College Park, Md. 20742

Historiographers have always known that the writing of history is as much a study of the forgotten as it is an examination of the remembered. Even though everyone understands the interpretive significance of revisionist scholarship, there have been few systematic attempts to understand how and why history gets forgotten or remembered. This paper examines the cultural process of society's memory through an analysis of New England architectural history and oral tradition. By isolating patterns of memory lapses it is possible to demonstrate how the social and political context of memory intrudes into the realm of material culture, helping to substantiate particular versions of the historic past. This is one place where the category of the ideotechnic exists and can be unmasked by historical archaeology.

Ideotechnic Artifacts around the Chesapeake Bay

Mark P. Leone
Anthropology Department
University of Maryland
College Park, Md. 20742

Ideotechnic items were defined by Lewis Binford in the early papers that formulated the new archaeology. The definition never played a role in prehistoric archaeology; the category was never discovered and may not have been conceptualized fully enough to have been useful to the profession. The model also may identify a level of culture not separated in the societies normally worked on by prehistorians. Ideology and its artifacts abound in historical, colonial, and industrial societies, all of which exist around the Chesapeake Bay. Definitions are offered and examples are described in an effort to extend our understanding of historic artifacts from a materialist perspective. Along the way some part of the original new archaeology's theoretics is extended into historical archaeological practice.

1982 MIDDLE ATLANTIC ARCHEOLOGICAL CONFERENCE

April 2 - April 4

Conference President - Victor A. Carbone, National Park Service

Program Director - Stephen M. Perlman, Virginia Commonwealth University

Session and Paper Schedule

April 2nd Afternoon:

1:30 Opening Remarks

General Session

1:45 Artifact Volume: A Behaviorally Significant Dimension of Cultural Residues - Conrad J. Bladey, Laurel, Maryland.

2:05 Differential Utilization of Environmental Resources at Eight Sites in Wise County, Virginia - Anne F. Rogers, Western Carolina University.

2:25 Soils and the Prehistoric Archaeology of the Abbott Farm - R. Michael Stewart, Louis Berger and Associates, Inc., New Jersey. Copies to Perlman, Kathin

2:45 New Techniques in Oyster Shell Analysis - Bretton Kent, St. Mary's City Archeological Research.

3:05 Break - 15 minutes

3:20 Distinctions Between the Jersey and the Pennsylvania Lenape: Ethnohistoric Record as a Reflection of the Archaeological Past - Marshall J. Becker, West Chester State College, Pennsylvania.

3:40 Clay Workability - Gordon Bronitsky, Virginia Commonwealth University.

4:00 Lithic Resources in Virginia and Henrico County, Virginia - Stephen M. Perlman, Virginia Commonwealth University.

April 2nd Evening

Ceramics Workshop

7:30 Pottery in the Middle Atlantic Region.
This is an open session. Bring your samples or just come to discuss common concerns about Middle Atlantic Ceramics.

April 3rd Morning

Early Woodland Session

9:00	Introduction to Papers - Dan Mouer, Virginia Commonwealth University.
9:05	Holocene Climatic Change in the Middle Atlantic Area: Preliminary Observations from Archeological Sites - Dennis Curry, Maryland Geological Survey, and Jay F. Custer, the University of Delaware.
9:25	Indigenous Regional Population Growth in the Chesapeake Drainage in Virginia: An Elegant and Parsimonious Model for Explaining Adaptive Change During the Late Archaic Period - Mark Caltin, the University of Virginia.
9:45	Early Woodland in Southern New England: Alternative Interpretations - Peter Thorbahn, Brown University.
10:05	Early Woodland Settlement in the Delaware and Chesapeake Bay Coastal Plains - Ron Thomas, Mid-Atlantic Archaeological Research, Inc.
10:25	Break - 15 minutes.
10:40	Floodplain/Tidal Marsh Adaptations in the Abbott Farm Historic District - John Cavallo, Louis Berger and Associates, New Jersey.
11:00	Two Buried Early Woodland Components in the Lower Potomac Valley, Virginia - Gregory Waselkov, Auburn University.
11:20	Early Woodland in the Middle Atlantic: Review and Overview - William Gardner, Catholic University and Thunderbird Research Institute.
11:40	Patches and Plains: Optimal Foraging Strategies and the Adoption of Sedentism in the Middle Atlantic - Dan Mouer, Virginia Commonwealth University.

End of Morning Session

12:00 - 1:30 Lunch

April 3rd Afternoon

Middle Woodland Session

1:30	Introduction to Papers - Victor Carbone, National Park Service, Atlanta, Georgia.
1:35	General Overview of the Middle Woodland Period in the Middle Atlantic Area - William Gardner, Catholic University and Thunderbird Research Institute.
1:55	A Reconsideration of Middle Woodland Complexes in Eastern Pennsylvania - W. Fred Kinsey, Franklin and Marshall College.
2:15	The Middle Woodland of the Abbott Farm: Some Hypotheses - Michael Stewart, Louis Berger and Associates, New Jersey.
2:35	A Reconsideration of the Middle Woodland Cultures of the Upper Delmarva Peninsula - Jay Custer, University of Delaware.
2:55	The Vertebrate Faunal Utilization Pattern of the Middle Woodland Mockley Ceramic Users: The Maycock's Point Shell Midden Site, Prince Georges County, Virginia - Michael B. Barber, Jefferson National Forest.
3:15	Rethinking Cultural Stability in Eastern North American Prehistory: Linguistic Evidence from the Eastern Algonquian - Richard S. Levy, Alvin Luckenbach, and Wayne Clark.
3:35	Break - 15 minutes
3:50	Middle Woodland Society: A View from the South Atlantic Slope - David G. Anderson, Commonwealth Associates, and Michael Trinkley, South Carolina Department of Transportation.
4:10	The Middle Woodland of Lower Middle Tennessee - James E. Cobb, Savannah District, Corps of Engineers.
4:30	Environment and Society in Middle Woodland Times - Victor A. Carbone, National Park Service, Atlanta, Georgia.

DINNER

April 3rd Evening

7:30	Business Meeting President Victor Carbone Presiding. Contact Vic if you have any topics for the agenda.

April 4th Morning

Historic Session

9:00	Introduction to Papers - Russell Handsman
9:05	Houses Rembered and Houses Forgotten - Anne Yentch, University of Maryland.
9:25	Gentrification and Cultural Resource Management in Historic Urban Settings: The Poverty of Preservation Theory and Praxis - Joe Dent, University of Maryland.
9:45	Ideotechnic Artifacts Around the Chesapeake Bay - Mark P. Leone, University of Maryland.
10:05	Break - 15 minutes.
10:20	The Differentiation of Labour: Cultural Processes and Ideotechnic Artifacts - Russell G. Handsman, American Indian Archeological Institute.
10:40	The Growth of Industrial Capitalsim and Class Formation in the Early Nineteenth Century: A Case from Southeastern Pensylvania - Joe McCarthy and Stephen Graff, Temple University.
11:00	National Museums and the Reification of the Jacksonian Myth - David J. Meltzer, Smithsonian Institution.

ABSTRACTS

GENERAL SESSION

BECKER, MARSHALL J., West Chester State College, West Chester, Pennsylvania - DISTINCTIONS BETWEEN THE JERSEY AND THE PENNSYLVANIA LENAPE: THE ETHNOSHISTORIC RECORD AS A REFLECTION OF THE ARCHAEOLOGICAL PAST.

Studies of land tenure among the Jersey Lenape in the seventeenth and eighteenth centuries suggest that these bands operated entirely apart from their relatives in Pennsylvania. Migration patterns of Lenape bands in the early period of land sales reinforces this belief. Linguistic studies to verify these distinctions are urged.

BLADEY, CONRAD J., Laurel Mills Archaeological Research Associates, Laurel Maryland - ARTIFACT VOLUME: A BEHAVIORALLY SIGNIFICANT DIMENSION OF CULTURAL RESIDUES.

Recent archeological and ethno-archeological research in Laurel, Maryland, has demonstrated the utility of describing the behaviorally significant physical dimensions of cultural residues which underlie the initial perception of and relation to the residues by the human operatives in the process of site formation. Recognition of the fact that characterization of material cultural residues functionally and typologically is insufficient for the development of effective analytical constructs built from the principles of adaptation and transformation has been influential in the development of a new analytical framework. This framework calls for the re-characterization of cultural residues into physical terms more useful for the production of processual theory and explanation. The paper discusses both the new method of recharacterization and the middle-range theoretical contributions by which the analytical construct is supported. Suggestions for the application of the analytical framework are illustrated with examples from current research in Laurel, Maryland.

BRONITSKY, GORDON, Virginia Commonwealth University, Richmond, Virginia - CLAY WORKABILITY: A PILOT STUDY.

The prehistoric ceramics studied by archeologists represent the end-product of a sequence of pottery production, use and discard. As part of an analysis of Woodland ceramics from Henrico County, an extensive examination of clay sources was conducted in 1981 and 1982. This phase of the analysis focused on the suitability of different clay sources for ceramic manufacture in conjunction with the chemical and mineralogical characterization of these sources. The results of the first part of the analysis are reported and their relevance for archeological studies in the region is discussed.

ROGERS, ANNE F., Western Carolina University, Cullowhee, North Carolina - DIFFERENTIAL UTILIZATION OF ENVIRONMENTAL RESOURCES AT EIGHT SITES IN WISE COUNTY, VIRGINIA.

Recent excavation of eight rockshelters in southwestern Virginia has provided information concerning the prehistoric utilization of that area from Early Archaic through Late Woodland periods. These sites are located along a south facing cliffline which overlooks a small intermittent stream. The area of the cliffline in which they occur is approximately 500 meters in length. While all appear to have been used for hunting-related activity, there are indications of differential utilization apparent in floral and faunal remains recovered and in the diverse lithic materials found at these sites. Excavation of these shelters has provided important information concerning an area which has recieved little attention form archaeologists in the past.

STEWART, R. MICHAEL, Louis Berger and Associates, Inc., East Orange, New Jersey - SOILS AND THE PREHISTORIC ARCHAEOLOGY OF THE ABBOTT FARM.

Soil studies generated during recent archaeological investigations at the Abbott Farm Site Complex in New Jersey have partially resolved many of the stratigraphic problems and inconsistencies inherent in the earlier landmark work of Dorothy Cross, especially as concerns her excavations on the Abbott Farm "bluff". The interaction of wind blown sediments with on-site erosion and redeposition are viewed as the natural processes affecting site burial and the integrity of the cultural deposits on the high Delaware River terrace bluff. Site excavations completed during Phase II investigations by Louis Berger and Associates within the Abbott Farm are used to demonstrate the salient features of these processes and their relationships with paleoenvironmental models. A number of Cross' bluff-top excavations are then reevaluated using these data. The burial of multiple "humuses" at Cross' Excavation 14 in the lowlands and the implications for archaeological remains are also reevaluated. The general applicability of these studies to other Eastern North American Coastal Plain sites is discussed.

ABSTRACTS

EARLY WOODLAND SESSION

CALTIN, MARK, University of Virginia, Charlottesville, Virginia - INDIGENOUS REGIONAL POPULATION GROWTH IN THE CHESAPEAKE DRAINAGE IN VIRGINIA: AN ELEGANT AND PARSIMONIOUS MODEL FOR EXPLAINING ADAPTIVE CHANGE DURING THE LATE ARCHAIC PERIOD.

The shift from the Middle Archaic to the Late Archaic is characterized by changes in such cultural manifestations as artifact assemblage, distribution of stylistic attributes, settlement pattern, and demographic structure. Numerous models have been proposed which attempt to explain why these changes occurred. These range from models of simple historic diffusion to a variety of models which emphasize the importance of culture as a means through which human societies adapt to their natural and social environment. This latter group of models vary in that they stress different kinds of cultural processes as the underlying cause for the changes in the Late Archaic. The cultural processes that are stressed range from the diffusion of adaptive technologies to the adaptive radiation of related groups of people from a parent population. While all of these models succeed in varying degrees in explaining why some of the changes occurred in the Late Archaic, it is argued that one of these models is more elegant and parsimonious in its explanations of these changes than any of the others. This is the model which emphasizes indigenous regional population growth (IRPG) as the underlying process precipitating adaptive change. Through an examination of the data for the Chesapeake drainage area in Virginia, it will be argued that the IRPG Model is more elegant and parsimonious because, 1) it provides logically consistent explanations for all of the changes that occur during the Late Archaic, 2) it is internally consistent (that is, not independent on such arguments as the influx of outside populations to explain change and therefore does not have to seek explanations for why such migrations occurred in the first place), and 3) it explains why certain innovations, such as pottery occurred in the piedmont region before they occurred in the coastal plain region.

CAVALLO, JOHN A., Louis Berger and Associates, Inc., East Orange, New Jersey - FLOODPLAIN/TIDAL MARSH ADAPTATIONS IN THE ABBOTT FARM HISTORIC DISTRICT.

The Abbott Farm Historic District (AFHD) can be characterized as a unique aggregation of juxtaposed, resource-rich zones and habitats situated near the interface of the Inner Coastal Plain/Piedmont physiographic provinces in the Delaware River Valley. Archaeological, geological, and pedological evidence obtained during Phase II investigations of the AFHD by Louis Berger and Associates, Inc. indicate that human exploitation of the floodplain/tidal marsh zones began as early as Middle Archaic times but drastically intensified and continued to increase from approximately 2500 B.C. to A.D. 900. Post 2500 B.C. occupations of these zones are viewed as being coincedental with climatically induced

shifts in resource distribution, concurrent reductions in water tables, and the initial incursions of anadromous fish populations.

Data secured during recent excavation of several floodplain/tidal marsh sites will be correlated with those of earlier investigations of the same zones within the AFHD. A model will then be presented which attempts to explain social transformations that culminated with the establishment of semi-permanent-sedentary communities during the Middle Woodland cultural sub-period.

THORBAHN, PETER, Brown University, Providence, Rhode Island - THE EARLY WOODLAND IN SOUTHERN NEW ENGLAND: ALTERNATIVE INTERPRETATIONS.

The Early Woodland and its percursor, the Transitional (or Terminal Archaic) are concepts based on the appearance of a limited number of cultural traits in the archaeological record of southern New England (projectile point types, steatite bowls, ceramics and burial ceremonialism). Recent evidence from the Narragansett Basin of Rhode Island and Massachusetts indicates that changes in the paleoenvironment and social organization, especially settlement systems, were the more fundamental processes operating in the last millenium B.C. and first millenium A.D. Findings from drowned river valleys along the coast, lowland interior wetland margins and upland headwater streams will be presented that show a much greater degree of complexity in settlement patterning than has been previously reported. The paper will focus on the implications of this complexity for formulating models of regional settlement systems that are not bound by cultural-historical considerations.

WASELKOV, GREG, Auburn University, Auburn, Alabama - TWO BURIED EARLY WOODLAND COMPONENTS IN THE LOWER POTOMAC VALLEY, VIRGINIA.

Twenty-six cultural components or occupation areas have been identified during excavations at the White Oak Point Site (44WM119), including two radiocarbon dated to the twelfth century B.C. The associated pottery type, Bushnell Plain, resembles Marcey Creek Plain, but the temper consists primarily of muscovite schist and hornblende schist. Analysis of the two components indicates that they were individual occupation areas of small shellfish gathering groups (on the order of extended families) with adjacent shell disposal heaps. The sites were occupied for relatively short periods during the late winter/early spring, and probably were not absolutely contemporary.

ABSTRACTS

MIDDLE WOODLAND SESSION

ANDERSON, DAVID G., Commonwealth Associates, Inc., Jackson, Michigan and MICHAEL TRINKLEY, South Carolina Department of Transportation - MIDDLE WOODLAND SOCIETIES: A VIEW FROM THE SOUTH ATLANTIC SLOPE.

Investigation of the Middle Woodland in the Southeast Atlantic slope has been hampered by a severe problem of recognition; until very recently even basic sequence information has been obscure for much of the area. The analysis of survey and excavation assemblages collected from Georgia and the Carolina's in recent years, however, is resulting in a marked refinement in local artifactual sequences. This, in turn, is permitting the investigation of subsistence and settlement topics to proceed with some degree of confidence, although work along these lines is only beginning to emerge. Middle Woodland societies over much of the Southeast Atlantic slope appear to have been locally focused and relatively uncomplicated. Little evidence exists for political organization beyond the level of fairly small groups or for any kind of monumental construction. Evidence for the use of domesticates or extended settlement is also minimal, and a residentially mobile foraging adaptation during portions of the year is probable. Evidence for influence or interaction with other regions has been noted only in the southern and western peripheries of the region, near the Gulf coast in south Georgia, and in the Appalachian Summit area of western North Carolina and northern Georgia.

BARBER, MICHAEL B., Jefferson National Forest, Virginia - THE VERTEBRATE FAUNAL UTILIZATION PATTERN OF THE MIDDLE WOODLAND MOCKLEY CERAMIC USERS: THE MAYCOCK'S POINT SHELL MIDDEN SITE, PRINCE GEORGE COUNTY, VIRGINIA.

The vertebrate faunal analysis of a stratified mussel shell midden at 44Pg40 revealed a consistent utilization pattern from c 300 A.D. to c. 900 A.D. for the makers of the shell-tempered Mockley Ware. The focal economy rested on Odocoileus virginianus, Lepisosteus osseus, Meleagris gallopavo, and the testudines in combination. Constant through time, the pattern raised questions concerning the effects of incipient horticulture (and the movement towards more dependence on cultigens) on the basic hunting strategy. The Maycock's Point data pointed to a procurement continuity suggesting an uninterrupted sexual work dichotomy with females involved with the changing botanical utilization system and the males dealing with the same faunal universe in the same manner.

The environment surrounding 44Pg40 was also examined and the local ecology, if utilized efficiently, could result in little annual community movement. It is suggested that this type of Middle Woodland sedentarianism set the stage for the Late Woodland "horticultural" system.

CARBONE, VICTOR A., National Park Service, Atlanta, Georgia - ENVIRONMENT AND SOCIETY IN MIDDLE WOODLAND TIMES.

A number of classic studies such as those by Murdock, Steward, Forde, and Kroeber have attempted to deal with the relationship between culture, environment and society on a grand scale. The research in the Middle Atlantic area has had a strong emphasis on the influences of environmental change on cultural change, as well as on cultural ecological explanations of the archeological record. If a successful synthesis is ultimately to be achieved we must begin to delineate social-environmental correlates, and derive archeologically measurable entities in order to determine what the social responses would be to changing environmental circumstances. This paper makes an initial attempt to study these "elementary structures of cultural ecology" by focusing on the time-space-environment dynamics during the Middle Woodland Period.

CLARK, WAYNE E., LEVY, RICHARD S. AND ALVIN H. LUCKENBACH - RETHINKING CULTURAL STABILITY IN EASTERN NORTH AMERICAN PREHISTORY: LINGUISTIC EVIDENCE FROM EASTERN ALGONQUIAN.

Results obtained in a historical study of Eastern Algonquian languages seem to refute recent assertions of in situ development for the historic tribal distributions extending back "several thousands of years" (Snow 1978:60; Griffin 1976). A least-effort interpretation of the lexical analyses reported here would instead posit at least two geographical expansions by Proto-Algonquian populations within the last two millenia. The latest of these would require a movement down the Atlantic Seaboard during the Middle Woodland Period.

Although the archaeological record may be inherently incapable of providing the "absolute documentation" often required of migration hypotheses (cf. Tuck 1975:13), history still provides frequent and varied testament to the reality of such population shifts. Despite their current disfavor, it is argued that adaptive radiations are viable evolutionary models possessing a diverse and significant evidentiary force in the prehistory of Eastern North America.

COBB, JAMES E., Savannah District, Corps of Engineers, Savannah, Georgia - THE MIDDLE WOODLAND OF LOWER MIDDLE TENNESSEE.

The Middle Woodland occupations of lower Middle Tennessee are well-represented by the early and late McFarland and Owl Hollow phases respectively. Almost a decade of intensive data recovery on numerous

floodplain/terrace and upland sites have revealed community patterns, settlement types and subsistence strategies and their social concomitants. Differences between the Middle Woodland phases are relatively dispersed, seasonal McFarland habitation sites and the more concentrated, intensively occupied and probably year round settlements of the Owl Hollow phase. Temporally, the Middle Woodland occupations range from ca. 200 B.C. to around A.D. 600. The material culture is locally distinctive with little evidence of regional interaction. The McFarland phase has diagnostic triangular, Copena-like projectiles and limestone-tempered, plain and check stamped pottery. The Owl Hollow phase is associated with lanceolate-shaped "spike" projectiles and limestone, limestone/chert tempered plain and stamped pottery. Although numerous Middle Woodland sites are in the locality of the Old Stone Fort, a hill top enclosure similar to Fort Hill in Ohio, there is little evidence of direct Hopewell interaction in these contemporary regional cultures. Broad similarities are recognized, however, between the Middle Woodland phases of Middle Tennessee and the LaMotte phase of the lower Wabash River of Indiana. The evidence strongly suggests that the mountains were a formidable barrier preventing contact with contemporaneous cultures of the Atlantic slope, but the data do invite both qualitative and quantitative comparisons.

CUSTER, JAY F., University of Delaware, Newark, Delaware - A RECONSIDERATION OF THE MIDDLE WOODLAND CULTURES OF THE UPPER DELMARVA PENINSULA.

Archaeological data from Delaware have been reevaluated over the past two years and the research has indicated that the societies living on the Delmarva Peninsula between 500 B.C. and A.D. 1000, traditionally labeled as Middle Woodland, show sufficient similarity to local Late Archaic and Early Woodland cultures to warrant the definition of a Woodland I Period on the Delmarva Peninsula dating between 3000 B.C. and A.D. 1000. Continuity in settlement patterns, subsistence, supra-local exchange, and mortuary ceremonialism is noted through the Woodland I Period. This continuity is seen as the result of selective pressures operating upon the social systems of the Woodland I Period and the selective pressures are seen as the result of relatively sedentary lifestyles and high local population densities. Changes in relative population densities ca 800 1000 A.D. cause the end of the distinctive Woodland I trade systems and mortuary symbolism.

GARDNER, WILLIAM M., Catholic University, Washington, D.C. - THE EARLY AND MIDDLE WOODLAND PERIODS IN THE MIDDLE ATLANTIC AN OVERVIEW: PART II MIDDLE WOODLAND.

The Middle Woodland period is divided into two phases: Middle Woodland I (500 B.C. - A.D. 200) and Middle Woodland II (A.D. 200 - 900). Ceramic diagnostics from the various regions are discussed and compared with inter-relationships noted. In situ change and development is seen for the entire Middle Atlantic during the Middle Woodland with migration and/or population replacement rejected as an explanatory concept. Settlement patterns and societal developments are contrasted and discussed for a number of areas. The Middle Woodland I Development of two different but contemporary ranked systems (Western Virginia Stone Mound complex and Delmarva Adena) is also discussed and contrasted with much wider areas where similar systems are not developed. In all cases, the development of ranked societies, their lack of development, and their subsequent restructuring into non-ranked societies is addressed with the intention of offering comments on causation. While the ultimate explanations are not particularly satisfactory, it is suggested that these lie partially in ecological factors, techno-economic limitations, and interaction or non-interaction with similar systems throughout the East, but the major cause for the differences in developmental tracks is seen as reflecting different social solutions to similar problems with the interaction only serving as a catalyst for systems which were already headed in the direction of societal ranking. The Middle Woodland II restructuring of these systems is interpreted as reflecting many of these same factors particularly the weaknesses of the techno-economic base, social overreach, and geographic over extension.

STEWART, R. MICHAEL, Louis Berger and Associates, Inc. East Orange, New Jersey - THE MIDDLE WOODLAND OF THE ABBOTT FARM: SOME HYPOTHESES.

Phase II archaeological investigations by Louis Berger and Associates within the Abbott Farm Site Complex of New Jersey has produced a variety of new data regarding the Middle Woodland period of the Middle Atlantic Coastal Plain. The Abbott Farm and its Middle Woodland components were brought to eminence during the 1930's following the work of Dr. Dorothy Cross. Site distributions, functional assessments, and artifact assemblages are summarized. A number of hypotheses are then presented to account for the patterning observed. This includes an evaluation and integration of models dealing with regional cultural ecology, social organization and development, and interactions with other cultural and geographic areas. It is suggested that certain anomalous patterning during the Middle Woodland at Abbott Farm may be an indication of the existence of ranked societies in this Inner Coastal Plain/Piedmont zone of the Delaware River Valley. It is emphasized that the data supporting such a claim can only be understood

against the backdrop of basic settlement and subsistence studies couched within a cultural ecological framework. The utility of distinguishing a Middle Woodland cultural/temporal within the Middle Atlantic Region is also addressed.

ABSTRACTS

HISTORIC SESSION

DENT, RICHARD J., University of Maryland, College Park, Maryland, GENTRIFICATION AND CULTURAL RESOURCE MANAGEMENT IN HISTORIC URBAN SETTINGS: THE POVERTY OF PRESERVATION THEORY AND PRAXIS.

It is a central paradox of Cultural Resource Management that we can preserve and enhance many historic settings yet at the same time destroy the extant social fabric of those same settings. This paper examines the process of gentrification, the creation of ideotechnic artifacts, and, in the process, the destruction of the cultural integrity of human aggregates. Examples are drawn from the ongoing gentrification of neighborhoods in urban Baltimore, Maryland, and Washington, D.C. It is argued that this type of examination offers keys toward an understanding of the underlying structure of preservation policy which forces it to become a handmaiden to social destruction throughout the Middle Atlantic urban centers in particular and broader urban centers in general.

HANDSMAN, RUSSELL G., American Indian Archaeological Institute, Washington, Connecticut - THE DIFFERENTIATION OF LABOUR: CULTURAL PROCESSES AND IDEOTECHNIC ARTIFACTS.

Archaeologists have never been fully conscious of the interpretive insights encompassed by Karl Marx's idea of the relations of production - an ensemble of economy and society which determines the expressions of everyday life. This over-sight may not matter much to prehistory, especially in the Middle Atlantic. However, it is crucial to historical archaeology. Without the theory we are incapable of differentiating premodern industrial relations and activity from those associated with the emergence of capitalism. A variety of ethnographic and archaeological data are examined which reveal how capital is different from capitalism, how these differences might be encoded in the archaeological record, and why ideotechnic artifacts finally make their long-awaited and hoped-for appearance.

LEONE, MARK P., University of Maryland, College Park, Maryland - IDEOTECHNIC ARTIFACTS AROUND THE CHESAPEAKE BAY.

Ideotechnic items were defined by Lewis Binford in the early papers that formulated the new archaeology. The definition never played a role in prehistoric archaeology; the category was never discovered and may not have been conceptualized fully enough to have been useful to the profession.

The model also may identify a level of culture not separated in the societies normally worked on by prehistorians. Ideology and its artifacts abound in historical, colonial, and industrial societies, all of which exist around the Chesapeake Bay. Definitions are offered and examples are described in an effort to extend our understanding of historic artifacts from a materialist perspective. Along the way some part of the original new archaeology's theoretics is extended into historical archaeological practice.

MCCARTHY, JOHN AND GRAFF, STEPHEN, Temple University, Philadelphia, Pennsylvania - THE GROWTH OF INDUSTRIAL CAPITALISM AND CLASS FORMATION IN THE EARLY 19TH CENTURY: A CASE FROM SOUTHEASTERN PENNSYLVANIA.

This paper documents the process of social transformation from a merchant to an industrial capitalist economic formation in Delaware County, Pennsylvania, in the first half of the 19th century. The growth of industrial capitalism in this region was coupled with changes in patterns of land ownership and settlement. The proportion of landless people grew dramatically as industrialization intensified, reflecting changes in the relations of production and patterns of ownership. The increasing disparity of wealth between different social classes, i.e. owners and workers, was accompanied by changes in the existing ideology and the emergence oa a new ideological structure which ensured the reproduction of the developing social system. Traces of this newly emergent ideology are reflected in the larger artifacts of the period, e.g. mills, worker housing and owners' housing, of the period. This study examines a number of means that can be employed to recover this information.

MELTZER, DAVID J., Smithsonian Institution, Washington, D.C. - NATIONAL MUSEUMS AND THE REIFICATION OF THE JACKSONIAN MYTH.

Museums in general, and the government-supported National museums in particular, are a curious blend of the empirical matter of history and the conscious creation of myth. As such, they are ideotechnic artifacts on a grand scale, and their operation reveals how Western ideology is projected and enforced through the manipulation of material culture. Using as a focal point the museums within the Smithsonian Institution, this paper reflects on the reification of the Jacksonian man, the expectant capitalist on the American frontier. A brief historical account of the development of the Jacksonian image is followed by an analysis of the manifestation of the mythology in our National Museums.

YENTSCH, ANNE, University of Maryland, College Park, Maryland - HOUSES REMEMBERED AND HOUSES FORGOTTEN.

Historiographers have always known that the writing of history is as much a study of the forgotten as it is an examiniation of the remenbered. Even though everyone understands the interpretive significance of revisionist scholarship, there have been few systematic attempts to understand how and why history gets forgotten or remembered. This paper examines the cultural process of society's memory through an analysis of New England architectural history and oral tradition. By isolating patterns of memory lapses it is possible to demonstrate how the social and political context of memory intrudes into the realm of material culture, helping to substantiate particular versions of the historic past. This is one place where the category of the ideotechnic exists and can be unmasked by historical archaeology.

Stewart

EARLY AND MIDDLE WOODLAND

IN THE MIDDLE ATLANTIC:

AN OVERVIEW

Part I: Early Woodland
Part II: Middle Woodland

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Paper presented at the 1982 Middle Atlantic Archeological Conference, Rehoboth Beach, Delaware.

A Poem--of sorts

Like trees to the biologist,
or bumps to the phrenologist,
pottery raises the passions of the archeologist,
ultimately turning him into a frenzied typologist.
Soon sherds
become the only words
he utters.
With multiple stammers and stutters
his vision impaired by shutters,
types
soon replace all other hypes.
Taking these shreds and patches of culture,
he picks their bones like a selective vulture.
"S" twists, he shouts.
Or is it "Z" twists, he pouts.
Settling upon him like a fog of depression,
his mind grapples with the implications of fabric
impression.
Net and knot, knot or net?
Was the clay dry or wet?
Will his colleagues take stock
of his statements concerning crushed rock?
Or sadly, will he be forced to quit
when, pedantically, they call it detrital grit.
Well, what the hell,
surely they cannot question shell.
But what if some computer clone
insists the holes are leached limestone.
Colleagues, please do not mock me.
It must be Rockley.
No, the doubters will speak
and call it Stony Creek,
or maybe Elk Island from the James.
God, all these names.
Will I ever learn
to tell a pot from an urn,
a vessel from a sherd,
untired clay lumps from a--ahem--coprolite?
Oh, what have we all wrought?
Is this what Julian Steward taught?
Can we not separate the model from the data
and worry about the details later?
And, what about Kroeber, A.L.?
Would he not tell us all would be well
if all the while
we simply adhered to a belief in the perturbations of style
and were able to show
that battleship curves were really the way to go.
And Gimbutas and Renfrew, how little they were aware
that for battle axes and corded ware
and Indo-European faces

we would substitute new faces
as, undaunted, we trace each types spread
and map the remains of the proto-linguistic dead.
Modes, Rouse cried.
Means, Spaulding sighed.
Real types, Ford plied.
Not to be thwarted
Evans and Hill retorted,
be realistic,
they're simply heuristic.
All this nonsense aside,
we now know they all lied,
for in the gospel of the hypothetico-deducer,
and the soft murmurings of the inductive seducer,
we can still detect a belief in Randolph Scott,
    the virtuous mate,
the Boys of Summer, Meadowcroft, and the
    ideal mental template.

INTRODUCTION

The purpose of this paper is to present an interpretive overview of the Early and Middle Woodland of the Middle Atlantic. Within this geographic framework, the focus will be represented by an idealized transect running from the Ridge and Valley to the Coastal Plain, with an emphasis on Virginia, Maryland and Delaware. Due to the restraints of time and space dictated by the forum for which this paper was written, the presentation will be synthetic and somewhat sweeping in scope. The data base exists with varying degrees of completeness, and this presentation represents a distillation of information retrieved from my own cultural resources management investigations, background research connected with these investigations, and research connected with a book on the Middle Atlantic which I am currently writing. Since the paper serves as an overview to sessions dealing with the two different periods, each of these temporal units will be discussed separately. Reference to and comparisons between the different periods will, however, be made, as will comparisons between the Late Archaic and Early Woodland, and the Middle and Late Woodland.

The Woodland period in the Middle Atlantic is defined herein as beginning with the introduction of pottery. While using a single artifact to denote the onset of one period and the end of another is somewhat arbitrary, it is done in this paper in order to provide a chronological baseline. It should also be noted that we are dealing with a continuum and that the division between the Late Archaic and Early Woodland, and, indeed, between Early and Middle Woodland as well, is largely an artificial construct. Nevertheless, there are indeed significant changes between these various periods. For instance, in the transition from the Late Archaic to Early Woodland, pottery, in and of itself as a single artifact, is both a reflection and an integral part of these changes, as for instance, in the way in which it: reflects increased sedentism; demonstrates universal access to container medium (clay); shows reduced dependence on trade or other procurement practices to obtain steatite; and illustrates the occurrence of a technological innovation. Similarly, while the appearance of net marking is the principal chronological diagnostic for the transition from Early to Middle Woodland and it, in and of itself, is useful only as a time marker, the differences between the two periods of which net marking is but the archeological signal in certain areas, are of considerable magnitude.

Based on current radio-carbon dates, pottery appears at approximately 1000 B.C., or perhaps even as early as 1100 B.C. For reasons which will be elaborated on later in this paper, the Early Woodland is defined as the period ranging from ca. 1000 to 500 B.C., while the Middle Woodland is placed between 500 B.C. and A.D. 900. Within each, subdivisions can be made, and each

Early-Middle Woodland time frame

of these is marked, with varying degrees of clarity, by its own chronological index, or indices, and other sets of changes. These subdivisions are called Early Woodland I, II, and III, and Middle Woodland I and II.

The Coastal Plain

The Coastal Plain can be divided into Inner and Outer sub-zones. The salient characteristics of the Outer Coastal Plain are the brackish/salt water estuaries, and the interior tidal, but fresh water, streams. Also notable are a lack of primary outcrops of lithic materials, but abundant and widespread sources of cobbles and pebbles of diverse origins which are nearly ubiquitous, especially along shorelines and stream valleys. The Inner Coastal Plain consists of the tidal fresh water streams and estuaries, and the interior non-tidal, freshwater stream settings. Like the Outer Coastal Plain, lithics are present only in cobble and pebble form. Although there are subtle and not-so-subtle differences in vegetation between these two zones, such as an east-west increase in conifers, the exploitable terrestrial biota were essentially the same. The significant differences in food resources lie in the fauna inhabiting the hydrologic environment. Basically, the principal contrast is found between the oysters, shrimp, crab and clams of the Outer Coastal Plain, and the anadromous fish, and fresh water clams and mussels of the Inner zone. Within the Coastal Plain, the most diverse habitats are in the transitional zones between fresh and salt water (low salinity or higher solubility) where access to the resources of both settings was facilitated.

Inner & Outer Coastal Resources

The Piedmont

The Piedmont can also be divided into inner and outer segments, with the principal differences being in topography and a decreased richness of riverine resources in the inner portion. The contrast between the Inner and Outer Piedmont lessens toward the extreme northeastern portion of the Middle Atlantic as this physiographic province becomes increasingly narrow. The rivers which have the longest course in the Piedmont are the Susquehanna, Potomac, Rappahannock, James, and Roanoke. In terms of terrestrial vegetation, the major differences appear to be a higher density of chestnuts in the western segment, and a higher percentage of hickory and pine in the east. The floodplain vegetation was essentially similar. Terrestrial fauna were almost identical. The variation in riverine richness stems from the greater abundance of anadromous fish in the outer portion with a marked decrease, but not an absence, toward the interior. Floodplain widths vary markedly. In general, the broadest floodplains on the James are found in the Outer Piedmont, while on the Potomac, they are located more toward the Inner Piedmont. When these floodplains are broad, they are impressive, and within them is a diversity of habitats with a wide variety of resouces. As in the Coastal Plain, resources

Piedmont Resources

diminish abruptly in the inter-riverine areas, especially away from the tributary streams. The most ubiquitous lithic material in the Piedmont is quartz. Sandstone and quartzite of varying quality also occur. Between Richmond and North Carolina, a variety of cherts and chalcedonies of varying quality outcrop sporadically and not infrequently. Each of the rivers which heads in the Ridge and Valley has in the past carried cobbles or pebbles of quartzite, chert, jasper, and greenstone, depositing them on old terraces and channels. The Rappahannock bed load contains quartzite and greenstone from the Blue Ridge. The Potomac is apparently the only stream which has moved rhyolite. Steatite, of limited use during the Woodland era, outcrops sporadically from Baltimore to, at least, Charlottesville. Argillite was available in some abundance northwest of Trenton.

The Blue Ridge

The Blue Ridge is a low mountain system which is volcanic in origin. The primary natural food resources were chestnuts and various types of game, notably, deer and turkey. The system has a limited productive season, and was used only seasonally by populations from the lower elevations. Important lithic materials available are greenstone and quartzite, with rhyolite occurring in a limited portion of the system in Maryland and Pennsylvania. In addition, at the base of the Blue Ridge, near Point of Rocks, there is a small outcrop of jasper.

The Ridge and Valley

The Ridge and Valley system consists of two basic sub-divisions. The Great Valley, which is a well watered, low relief area extending virtually uninterrupted from the Roanoke area well into Pennsylvania, occupies the eastern portion of the province. The more rugged western and southwestern portion of the system consists of a series of low ridges separated by valleys of varying width. Like the other provinces, horizontal zonation is important, with the river systems being the most diverse and rich. Compared to the other provinces, the inter-riverine areas are not so reduced in resource richness, a factor attributable, in part, to the numerous streams and springs. Overall, the Great Valley has greater abundance and diversity than the more rugged portions. Another important factor in the Ridge and Valley is that of vertical zonation, a variable which is also of importance in the Inner Piedmont. Lithic resources consist of quartzite and jasper at the interface with the Blue Ridge, as well as a rich variety of chert, quartz, and river cobbles of varying lithic types.

PART I: EARLY WOODLAND

Ceramics

Early Woodland I

Soapstone tempered pottery

The earliest ceramics in the area were molded into trough-shaped containers with flat bases. Surfaces, except for exterior portions of the bases which may have been net marked or basket/mat impressed, were plain. The type names prevalent in the literature include Marcey Creek Plain and Ware Plain. In the Marcey Creek category, steatite is the tempering agent. The distribution of Marcey Creek is approximately, if not almost completely, coterminous with the distribution of the carved steatite vessels of the Late Archaic. On the periphery of this distribution, steatite tempering may become rare or absent, and replaced by other aplastics such as sand, crushed rock, shell, or combinations of these, or combinations of any of these with steatite or steatite-like materials. Beyond this point, steatite tempered pottery rarely occurs, and Ware Plain variants are dominant or exclusive. These pottery types mark Early Woodland I, which covers the time from 1000-900 B.C. It is unknown just where within the Middle Atlantic the concept of pottery manufacture developed. Tradition, largely the results of historical accident, indicates that it was along the Potomac Piedmont, and that the concept developed among the riverine adapted, stone bowl using groups, such as representatives of the Susquehanna tradition. This may yet prove to be correct. Conversely, it is possible that pottery making developed among those groups which did not have access to stone bowls, or among those which found dependency on a medium with limited distribution and access too expensive or difficult. Regardless, the concept spread rapidly, and was soon adopted by groups from the northern Shenandoah north to eastern Pennsylvania and New Jersey (and beyond), and south along the Coastal Plain and eastern Piedmont to at least the James River.

origin of ceramics

definition Early Woodland II

The major ceramic innovation during Early Woodland II was the development of the coiling technique, and the smoothing of these coils on their exterior surface by the use of a textile wrapped paddle. In certain areas, conoidal based vessels predominate, as in the Selden Island type, where steatite tempering continues. In other areas, as in the southeastern Virginia Coastal Plain in the "beaker" ware (Croaker Landing series), flat bases on tapered vessels are the prevalent or exclusive form. Like its predecessor, Ware Plain, shell, sherds, sand, pebbles, or combinations of these are used as aplastics. This same shape also occurs in the Dames Quarter pottery, found in portions of Delmarva, in which crushed rock is the tempering medium, and in the Half Moon series of the extreme western and southwestern margins of our area, where, again, crushed rock is employed. Crushed rock tempering also blankets much of the northern margins of the Middle Atlantic pottery in the Vinette series, although the vessel form is of the conoidal type. Changes seem to have taken place in certain localities by

900 B.C., and the evolved styles continue until around 750-650 B.C., in certain localities (the later dates tend to coincide with the peripheral margins).

During Early Woodland II, a region-wide standardization develops as cord marked exterior surfaces and conoidal bases become ubiquitous. Within tempering choice, two variations are discernible. Blanketing the core of the Middle Atlantic is sand tempering. While a variety of type names are applied, such as Accokeek, Stony Creek, Elk Island, and Prince George (some of which is pebble tempered), they all appear to be variations on the same theme. In the northeastern, northern, northwestern, western, and southwestern margins, crushed rock tempering dominates. Again, a variety of names exists: Vinette-like, Exterior Corded/Interior Smoothed, Dames Quarter and Swannanoa or Swannanoa-like, and, again, there appears to be a broad, if more diffuse, linkage. The temporal range of these types is from circa 750 to 500 B.C. By this time, probably earlier, the use of ceramics has become pan-Middle Atlantic.

Early Woodland Cultural Systems

General

An overall characterization of the Early Woodland in an area so diverse as the Middle Atlantic is difficult to make. If any one characteristic is applicable across the board, it is that, in comparison to the preceding Late Archaic (from which it developed), a greater degree of sedentism is evident. This seems to be related to several factors, including: increased efficiency in exploiting a variety of localized resources with settlement choice geared to enhancing such opportunities; the development of social institutions encouraging or enforcing the generation of surpluses; and the stabilization of particular local habitats and the radiation within these habitats of important sets of food resources. In some areas, some horticulture may have been practiced, but at present there is no evidence in the Middle Atlantic to support this proposition. Indeed, given the proper habitats, localized intensification, perhaps supplemented by some manipulation, accelleration of storage technology, social institutions or norms encouraging the generation of surpluses, and outlying exploitive foray camps allowing for extension of the local resource base, would have been sufficient to allow the deveopment of a sedentary life style.

Regional Patterns

Recent work by Thunderbird Research Corporation archeologists in the Portsmouth area has provided the basis for my interpretation of the basic model for the Outer Coastal Plain (Figure 1A). In this locality, two primary types of sites are seen. The first of these is characterized by a diverse range of artifacts and a relatively large use area, and is classified as

a base camp inhabited by a relatively large population. For shorthand purposes, this is termed as a macro-social unit base camp. These macro-group base camps are concentrated on the shorelines of major estuaries at their junctions with fresh water streams. At least one focus is evident--the bivalves of the estuary. This, however, is not the almost mono-resource focus evident in "classic" shell middens, but is only one aspect, albeit an important one, of the total procurement. The one large site studied, for instance, shows that shell fish were utilized quite heavily in one section, but barely at all in the other, yet the latter occupation was no less intense.

large group sites

Outer Coastal Plain

small group sites

Interconnected with these shoreline sites as part of the total settlement system are interior limited purpose, small group camps, classified as micro-group transient camps. Artifacts from these locations occupy a much smaller space and are consistently made from cobble cores and core fragments, cobble core reduction debitage, bifaces, broken projectile points (generally unfinished), and infrequent ceramics. There are two ways to interpret these sites. They could either be base camps for micro-social units, or exploitive outposts associated with a base camp some distance removed. Since the distance involved between the shoreline base camps and the interior sites is no more than a mile or two, and since the interior camps contain such a limited repertoire of artifacts, I interpret them to be exploitive foray or trek camps utilized by people operating out of the more permanent and diverse function base camp. If this interpretation is correct, this extends the area exploited, broadens the potential food base, and, through movement of the resources back to the base camp, provides the possibility for continual supplementation of the resource potential of the base camp locus. It should be noted that these foray sites need not be seasonally used loci, but could be exploited on a continuous, or need, basis. It should also be noted that other shell fish procuring localities were likely a part of this system and thus many shell middens are likely to fall into the foray and not the base camp category.

Late Archaic contrast

Comparing this with the Late Archaic pattern in the same locality (Figure 1B), some major changes can be noted. During this earlier interval, base camps occur in at least two localities. The locations of the macro-social unit base camps are around the Dismal Swamp (Rappleye and Gardner 1978), which lies less than 20 miles to the southwest. Associated with these base camps are smaller foray camps which occur both within well drained ground in the swamp and along smaller streams to the west. The second location for base camps is in the interior freshwater stream setting where the Early Woodland foray camps were noted. These base camps appear to be base camp loci for smaller groups, or micro-social unit base camps. They differ from the latter foray camps in containing a wider range of functional tool classes indicating both general maintenance as well as localized resource exploitation. Exploitive foray camps also occur with these micro-social unit base camps and radiate

- one has to wonder how you are separating the interior Late Archaic occupations from Early Woodland. Are we talking about stratified sites?

out in various directions including other less biotically diverse fresh-water stream settings, and the shoreline habitat.

It would thus appear that the Late Archaic pattern in this portion of the Outer Coastal Plain was still oriented to major seasonal shifts, a holdover from the Middle Archaic. A social unit fusion-fission model would appear to have been operative with the fusion stage, or macro-social unit base camp, occurring around Dismal Swamp, and the fission, or micro-social unit base camp, stage functioning in the near-estuary setting. In the Early Woodland, this seasonal fusion-fission no longer seems to have been part of the system, and, sedentism seems to have been established. This change between the Late Archaic and Early Woodland may have important environmental correlates with a rise in estuarine resources as the local estuaries became productive, and a reduction in the resources of Dismal Swamp as advanced seral progression reduced the natural productivity of the swamp.

Inner Coastal Plain - Early Woodland Models

In the Inner Coastal Plain of the Potomac, two possible patterns exist for the Early Woodland (Figure 2). The first pattern, which has two variants based on a fresh water - salt water dichotomy, stresses an intra-zonal adaptation. Within each of these variants there are two possibilities: sedentism and seasonal shifts. The former would assume that the resources of the immediately local environment plus the extension of this environment through foray or trek camps would produce a sufficient volume of food, which, combined with storage and surpluses, would allow year-round habitation. The second operates on the seasonal fusion-fission model similar to the Late Archaic of the Portsmouth Outer Coastal Plain.

Looking first at the fresh water zone and using the Piscataway Creek area as the type example, if the sedentary model was operative during the Early Woodland, a single, or series of macro-social unit base camps exhibiting a range of functions should be expected, which would, in turn, be supported through extended procurement by a series of transient foray camps. Based on the evidence available from Catholic University's work (Gardner 1977, Stewart and Gardner 1977), Stephenson's report (1963), and other sources, this is not the case. Instead, what occurs is one or more large macro-social unit camps which exhibit a highly specialized adaptation - fishing. These camps, while providing evidence of extended stays, are not sedentary units per se, and appear to be seasonal anadromous fishing camps. Associated with these sites, and apparently operating simultaneously, are micro-social unit fishing camps at various strategic locations. Those located along the Fall Zone contain relatively high quantities of net sinkers, while the ones along Piscataway Creek contain scores of projectile points and almost no net sinkers. This suggests different procurement techniques, but not different seasonal components. Associated with the Pisctaway Creek sites, along the smaller first and second order tributary streams, are cobble quarry and tool manufacturing camps that are best interpreted as

specialized technological arms (point manufacturing stations) of the fishing camps. The function of the Early Woodland sites at the mouth of Piscataway Creek and at various embayed creeks along the immediately adjacent Potomac also appear to be micro-social unit fishing camps.

Based on this evidence, the Piscataway Creek area does not seem to contain any Early Woodland sedentary base camps, but, instead, appears to be the locus for specialized seasonal activities. This means that if an intra-zonal movement was the pattern (Figure 2A), then either macro-social unit, or micro-social unit base camps should occur in the interior non-tidal, fresh water zone. Investigations in these locations, while not exhaustive, have failed to discover sites of this nature. Smaller, limited purpose camps have been recorded, but these are reminiscent of the exploitive foray camps, not of micro-social unit base camps. At present, then, a model which proposes an intra-zonal shift for the fresh water zone cannot be supported.

Much the same pattern exists for the salt water zone, as, for instance, in the Popes Creek area, which is only a little more than 20 miles overland from Piscataway Creek, and where the salinity is such that oysters can be supported. In one setting, the Popes Creek, Loyola, and other shell middens and fields of varying size occur. In addition, there are outlying interior fresh water camps that are best interpreted as transient foray stations. This situation could replicate that seen in Portsmouth. In the Portsmouth area, however, as we have seen, the estuary shoreline sites are base camps. None of the shell middens in the Popes Creek area at the Early Woodland level appear to be base camps, and, if shell fishing is substituted for anadromous fishing, we are again dealing with a highly specialized adaptation. An intra-zonal model (Figure 2B) can therefore be rejected, by the same reasoning applied for the Piscataway area.

Inner Coastal Plain Early Woodland model

Since neither of the two intra-zonal models seems to adequately explain the observed evidence, the best explanation is based on inter-zonal movement (Figure 2C). In this model, both zones are exploited by the same population, but at different seasons. During the spring and early summer, they would be located in the fresh water zone, focusing on anadromous fish. At least one macro-social unit camp would be operative, serving as a demographic or social base camp, if not as a functional one. This camp, or camps, would have been surrounded by numerous satellite sites operating in conjunction with the major camp(s) as exploitive foray camps, point manufacturing loci, and micro-social unit fishing camps. These latter could have served as independent economic units, or as dependent units which served primarily to maximize the cooperating group's harvest by extending the total area exploited. At the end of the fish runs, this interacting unit would have broken up and moved down river, perhaps exploiting other zones in a series of

seasonal micro-social unit base camps, or moving directly to the various oyster bearing estuaries. In this area, the populations would have been deployed in a similar fashion with a main base camp surrounded by numerous satellite sites.

Use of Shellfish

The anadromous fishing aspect of this model was operative in the Late Archaic. The evidence from the Loyola and Popes Creek sites indicates that the saline estuary portion was not; use of oysters does not appear locally until the Early Woodland. Futher down river in the Northern Neck, however, Stephen Potter indicates that shell middens began to be built up during the latter part of the Late Archaic. In the fresh water estuary, since anadromous fishing was practiced then, the seasonality aspects were present during the Late Archaic. The settlement shifts, however, were intra-zonal, from macro-social unit fishing camps with similar satellite settlements, to micro-social unit base camps in the interior fresh water zone. The general absence of Savannah River points much above the Fall Zone of the Potomac and the high density of Susquehanna Broadspears and later Orients and Dry Brooks, suggests that the movements of the Coastal Plain populations were almost exclusively within the Coastal Plain, and not from Coastal Plain to the Piedmont. The reverse holds true for the Piedmont groups.

"Savannah River" groups

As is the case in the Portsmouth area, a seasonal fusion-fission model exists in the Late Archaic of the Inner Coastal Plain along the Potomac. Unlike Portsmouth, where a move into full sedentism was present by Early Woodland, in the Inner Coastal Plain a dual focus seasonal pattern continued into the Early Woodland. This difference may reflect the fact that the Inner Coastal Plain becomes seasonally wealthy during the spring and early summer fish runs, enough so that the sudden influx of resources would be sufficient to lure the entire group away from the oyster bearing localities. Such was not the case in the Outer Coastal Plain at this juncture, since the spawning grounds would have been extremely limited. The differences between the Late Archaic and Early Woodland patterns in the Coastal Plain are, however, considerable. While seasonal movement continues, the fission aspect of the seasonal shift was not operative in the Early Woodland as it was in the Late Archaic.

In Delaware, on the rivers draining into the Atlantic, Jay Custer has noted large Late Archaic base camps at the point on these streams where the salt and fresh water zones intersect. These are also associated with transient micro-social unit camps. As to whether these are the remains of seasonal site fissioning, or are exploitive foray camps operating out of the larger and, perhaps, permanent base camps, or both, is not known. I would suggest, given the luxury of being located at a major riparian ecotone, that sedentism was probable, which is more in line with some of the social complexity Custer has suggested for these Late Archaic sites. On the other hand, the

absence of extensive shell deposits suggests that the resources may have had spring and early summer maxima, and a fusion-fission model seems more probable. The lows in the seasonal cycle could, however, have been supplemented by extensification through the use of foray sites with movement of these resouces back to the population centers. Data are lacking on the Early Woodland. Given, however, developments during the Middle Woodland, some pattern approaching sedentism can be predicted.

On the Eastern Shore of the Chesapeake Bay, the available evidence is meager at best, primarily because of an apparent low incidence of Early Woodland ceramic diagnostics. The impression one gains from a review of the literature concerning the Eastern Shore is that there is a hiatus during the Early Woodland, a temporal lag in the spread of ceramics, or a sampling error. The first explanation seems unlikely since no similar population lull occurs on the Western Shore. A temporal lag in adoption of ceramics also seems unlikely considering the fact that the Eastern Shore was surrounded by populations manufacturing pottery from at least Early Woodland I in essentially similar environments. Sampling error seems a more reasonable explanation.

What evidence is available comes from the Dames Quarter site, an Early Woodland II component. This is a non-shell midden site located in a zone with fresh water streams, and an extensive tidal marsh only a short distance from the Bay shoreline. My visits to the site indicate this was a base camp. Numerous small sites, primarily lithic scatters, can be found in the vicinity on various stream settings, and some of these are probably satellite foray camps. Early Woodland shell middens per se have not been reported. It is likely, however, that they do exist, but have either eroded away, or are masked under shell deposits from subsequent episodes. Even if they exist, it would appear that most will not be sedentary base camps but exploitive foray camps related to fresh-salt water transition sites like Dames Quarter. From this perspective, the Eastern Shore model is probably more similar to the Delaware mid-drainage sedentary base camp model, than it is to the Portsmouth model.

TRENTON N.J.

The inner Coastal Plain of the Delaware around Trenton appears to replicate, in part, the anadromous fishing zone aspect of the Piscataway model. The only question is whether a sedentary model was operative, or some variation of a fusion-fission model such as seasonal dispersement to the interior, or interzonal movement to the coast.

Mouer, et. al., (1981) have recently commented in detail on the Early Woodland in the Outer Piedmont of the James. In this locality, sedentary macro-social unit base camps (villages in his terminology) of some considerable size with storage pits are present. The floodplain in this area is rather broad and, typical of broad floodplains in the non-Coastal Plain Middle

Atlantic, the micro-habitats are rather diverse and including the resources of the river, intersecting streams, backwater swamps, and the immediately adjacent uplands. Seasonally, anadromous fish would have provided a high volume surplus. Presumably, although not noted by Mouer, there are exploitive foray camps in various zones which would have further extended the food resource base of the immediately local floodplain habitat. This is a pattern which apparently begins during the Late Archaic, when the riverine focus on anadromous fish marked a shift from the broad spectum seasonal fissioning pattern of the Middle Atlantic. The only addition needed, in that situation, for sedentism to become a reality by the Early woodland was an intensification of subsistence focus on the total resources of the floodplain, coupled with the foray satellite sites and the development of social institutions or norms that encouraged the generation and storage of surpluses, plus, perhaps, increased knowledge in the area of food production. In this scenario, I do not see the necessity for invoking horticulture, since sufficient surpluses for sedentism could be generated without such activity. This is not to imply that cultivation had not begun, but, until we find evidence to the contrary, which we have not, there is little validity in assuming such practices were known locally simply because there is some possible evidence to indicate this was going on elsewhere.

Monocacy survey reports?

In the Potomac Piedmont, Early Woodland sites are found on both island and mainland settings (Figure 3A). Most of the island sites seem to be rather small and specialized, representing fishing camps similar to those observed for the Late Archaic in the same locations. At least one location, the Selden Island site, based on its position on the island, the range of artifacts, and probable pits, appears to be similar to the type of site described by Mouer for the James. The non-island floodplain sites, at least those which have been tested, such as Monocacy and Catoctin Creek, seem to be, at best, micro-social unit base camps. It is possible that larger macro-social unit base camps will be found in the broader floodplains. There are also a number of sites on smaller streams, in inter-riverine rock shelters, and in the mountains. The mountain sites are generally near the rhyolite outcrops and appear to be oriented, primarily, toward extraction and processing of this material. Many of the stream sites have the appearance of exploitive foray camps. Some could well be micro-social unit base camps.

a "Stewart" reference would be appropriate here

This latter suggests the possibility of different types of settlement patterns at different points along the river, with those populations located along the less productive floodplains practicing a seasonal fission-fusion model, and those in more favorable habitats employing the more sedentary strategy. If this was the case, it could be explained ecologically by the reduction in floodplain variability and the upriver attrition of anadromous fish through natural events and downriver harvesting.

A not dissimilar picture is seen among Athabascans in Alaska: the more sedentary and complex societies are closer to the mouth of the river where the Salmon runs are exploited; sedentism and complexity decrease as one moves upriver and the number of salmon decreases. Such a situation would seem more likely to occur on the James which flows a considerable distance through the Piedmont. The Potomac has a comparatively short Piedmont run and, unless we assume a dense population with each segment having its own prescribed territory, a dual model for the Potomac Piedmont seems unlikely.

Based on the currently available data, the Late Archaic Potomac Piedmont pattern (Figure 3B) seems to have consisted of two types of seasonal micro-social unit sites, with one oriented toward fishing along the rivers, and the other to inter-riverine and montane hunting, without a macro-social unit base camp. The absence of the latter in the Potomac and Monocacy valleys does not fit with evidence for the Susquehanna tradition elsewhere, or Late Archaic patterns in the Coastal Plain, and may well be a sampling error.

The Early Woodland in the Northern Shenandoah Valley represents yet another variation (Figure 4A). Sedentism, as defined by multi-purpose base camps with storage pits, is evident, but rather than macro-population units, what occurs is a series of widely scattered micro-social unit sedentary settlements. Each of these is, in turn, supported by a series of smaller, exploitive foray stations. The absence of macro-population sedentary base camps such as are present in the James and Potomac Piedmont probably reflects differences in carrying capacity--most notably the absence of dense populations of anadromous fish. The loss of this social aspect seems to have been solved by smaller population base camps, several of which were likely socially linked, even though dispersed, into a larger interacting unit. The majority of the Early Woodland micro-social unit base camps are located on outer levee settings. Beginning with Early Woodland I and increasing through Early Woodland III, there is a shift in economic focus that is reflected in increasing numbers of sites being located in the inner floodplain, immediately adjacent to poorly drained backwater areas. The levee settings, however, remain viable throughout and were not abandoned until the beginning of the Middle Woodland.

In the earliest part of the Late Archaic in the Northern Shenandoah Valley, a modified version of the seasonally controlled broad sectrum economy of the Middle Archaic prevails. In the simplest model (Figure 4B), this consists of macro-population base camps along the bluffs overlooking the floodplains, and micro-population base camps in the foothills and the mountains. Each of these camps is the home base from which satellite foray camps radiate, with the largest number of these types of sites located at varying distances from the macro-social unit camp. This differs considerably from what is

observed in the Early Woodland when the riverine focus becomes intense and the seasonal shifts are dropped out of the system. There is some suggestion of a transition during the next phase of the Late Archaic (Figure 4C) as stream side settings in the inner floodplain become the locus of the base camps. In addition, there is evidence, admittedly meager, of a reduction in the fusion-fission aspects of the seasonally based broad spectrum focus.

In the latter part of the Late Archaic, there was an intrusion of "classic" Susquehanna tradition groups into the Northern Valley. These sites seem to represent forays by small fishing groups well out of their normal range and the range of anadromous fish. From one perspective, the evolution of point styles, the effects of these intrusive groups on the resident Late Archaic populations seem negligible, since subsequent Early Woodland Northern Valley points are best derived from Savannah River styles. Presumably this implies there was only minimal interaction with the resident groups, a thesis which is supported by the failure to find Susquehanna and Savannah River-derived points co-occurring in the same sites, and the fact that Susquehanna sites are levee oriented, as opposed to the inner floodplain and bluff top orientation of the Savannah River derived points. This also indicates that the two groups, while archeologically contemporary, inhabited somewhat mutually exclusive space with somewhat different economic foci. The limited interaction thesis is, however, not supported by the identical Early Woodland ceramic evolution from Marcey Creek to Selden Island to Accokeek, present in both the Northern Valley and the Potomac Piedmont, the heartland of the Susquehanna and descendant populations, and the ultimate Middle Woodland co-occurrence of side notched and stemmed points. An alternative to the mutually exclusive space thesis is an evolution from Savannah River types through Susquehanna Broadspears into the Orient-Dry Brook continuum.

Due to the failure of most previous workers to penetrate anything below Late Woodland deposits, almost nothing is known about the Early Woodland elsewhere.

PART II: MIDDLE WOODLAND

Introduction

The Middle Woodland can be divided into at least two phases: Middle Woodland I, dating from 500 B.C. to A.D. 200/300, and Middle Woodland II, from A.D. 200/300 to A.D. 900. The first of these, Middle Woodland I, is a time of considerable systemic change in certain resticted areas, while in other localities little appreciable difference can be discerned over the preceding period. The most notable characteristic of those areas where change occurred is evidence of participation in extensive trade networks, the development of ranked societies, changes in settlement pattern and site types, and the appearance of elaborate burial ritual, all of which are linked together as part of a total system. The areas where these changes can be documented are in the Western Virginia and related stone mound complexes of the Northern Shenandoah Valley and areas to the west (Appalachian Plateau) and northwest (western Pennsylvania), and the Adena related complexes of the Delmarva Peninsula. Other localities, such as the southeastern Virginia Coastal Plain, the Inner Coastal Plain and the Western Shore, the Piedmont, south central Virginia, and southwestern Virginia, based on current evidence, continued much as before.

changes during the M.W

Although there are more differences than similarities in the Western Virginia Stone Burial Mound and Delmarva Adena complexes, the socio-cultural systems which evolved and the general ways in which these were expressed are remarkably alike. While some evidence exists which hints at connections during the early stages of development of these two complexes, the bulk of the data indicates a largely separate and approximately contemporaneous evolution for the two systems. This obvious parallelism in two disparate areas of the Middle Atlantic has important ramifications beyond our immediate area, touching ultimately on the entire question of "Adena" and "Hopewell", and the rise of similar types of expressions throughout much of Eastern North America. Generally, this pan-Eastern congruence is passed over with statements concerning interaction spheres and trade (C.f. Griffin 1978, and Muller 1978), yet so important as these concepts are as mechanisms for idea movement, they do not suffice as explanations for social change. This is nowhere more apparent than in the Middle Atlantic, where participation by certain groups in the larger regional and areal interaction spheres of Adena and Hopewell probably served as the catalyst which pushed the local systems in the direction they went, but, in itself, was not causative.

effects of Adena-Hopewell interaction

It is also insufficient to attempt to address this problem as Streuver (1968) did for Illinois when he suggested Hopewellian societies arose in areas where food surpluses and sedentism were generated where "mud-flat horticulture" could be practiced and did not develop in areas where such practices

could not be undertaken. As I have attempted to demonstrate for the Middle Atlantic, by Early Woodland III sedentism and surpluses were being generated in a number of areas, some of which evolved "complex" societies, some of which did not. A techno-economic "pre-adaptation" was obviously not all that was involved. Given the fact that what is really being considered in this aspect of the archeological record are different types of social systems, it would seem, however, that some sort of social structural "pre-adaptation" was quite pertinent. In other words, given an Early Woodland III social system which was evolving in the direction of the types of systems which appear in certain areas by Middle Woodland I, then participation in an interaction network with societies which were already structured in this manner would have facilitated, accelerated, and channeled the evolutionary end product. Put simply, the rudiments of ranked societies must have already been present in certain areas during Early Woodland III, and were simply crystallized or formalized through idea interchange with like systems.

evolution of social forms

This, of course, does nothing to explain why some Middle Atlantic systems moved in the direction of ranked societies and some did not. An explanation I currently favor, while at the same time remaining cognizant of alternative explanations, lies in the ecology of the various areas. For instance, if sedentism evolved in an area which was not naturally productive enough to support long term sedentism, and intensification of local production had plateaued, then redistribution of surpluses might have been the solution which arose to maintain the sedentary state. Once it had become an integral part of the structure, control of the redistribution system, as well as other authority, could have gradually passed into the hands of a select few, with this authority ultimately becoming regularized and inherited. I also feel that the underlying ideological component of the "Adena" or "Hopewell" system had "sacred" overtones that went beyond mere status symbolism, and that this is reflected in the mounds and cemeteries and many of the artifacts associated with them, and, from this, envisioning the entire authority complex as being a merging of the sacred and secular. I would also suggest that this was a necessary ingredient, providing, as it would have, further reinforcement and underwriting of the centralization of authority.

resource redistribution

In those areas where ranked societies did not evolve, alternative solutions to the problems of productivity limitations and maintenance of sedentism could have centered around continued population fissioning, and the development of independent socio-economic units without institutions to keep the populations bound together as a single functioning unit. It is also possible that isolation from the major trade and interaction networks might have had something to do with this lack of movement into ranked societies. This, however, seems unlikely for two reasons. In the first place, as an explanation, it has no more power than diffusion, since it is

simply diffusion under another guise. In the second place, it seems unlikely that we are dealing with a true state of isolation.

contrary to Custer's arguments

The changes which appear by Middle Woodland II occur in the same areas where change occurred during Middle Woodland I, and are in two directions. The first of these is a structural reorganization away from everything which evolved during Middle Woodland I, toward a pattern more similar to that prevailing in Early Woodland III. In other words, a movement away from ranked systems to more egalitarian societies. This is manifested in the Northern Shenandoah Valley, adjacent westerly and northwesterly regions, and the southern two-thirds of Delmarva. To continue the parallelism noted previously, these changes occur almost concurrently in the two Middle Atlantic locations as well as throughout much of the East. Evidence for this set of changes includes the loss of burial mounds and cemeteries, a reduction in the associated ritual, loss of heirarchical aspects of the settlement system, and a reduction in the role of trade. In the Northern Shenandoah Valley, trade seems to disappear altogether, not reappearing again until the Late Woodland. In southern Delmarva, the reduction in trade is more correctly viewed as a geographic attenuation over what existed previously rather than any reduction in volume. It is possible that this continuing trade, although more localized, may represent a holdover from the earlier system, providing a link in Delmarva between the Middle Woodland I and II societies, and may also indicate that some elements of the older ranking system prevailed.

Rhyolite info won't support this for Selby Bay phenomena

The second set of changes, rather than representing a swing toward "democracy", is an exaggeration of the Middle Woodland I system. This latter takes place in the nothern one-third of Delaware and further north along the coast. The Delaware manifestation of this is the Island Field site. Trade, in this locality, appears to be nearly as extensive as it was in the preceding, and obviously ancestral, Delmarva Adena.

Middle Woodland changes

Explaining the abrupt changes in the Northern Shenandoah Valley and the bulk of Delmarva during Middle Woodland II is almost as easy as explaining the development of these systems in the first place. For want of any other explanation, and assuming there is some basis in the ecological aspects of the suggested explanation offered previously, I see these changes tied together in the ecology, the limitations of the techno-economic base, population growth, geographic over-extension, the failure of the previously evolved structures to satisfy the needs of the population or to effectively keep the system operative, and the ultimate evolution of a system with less or no ranking which was more in tune with conditions that were operative some 300 to 400 years after the evolution of the ranked system. This is a systemic explanation and involves multiple causality, some aspects of which may be more important than others, but all of which ultimately resulted in new types

of organization.

It should be noted that in both instances, in the development of ranked systems during Middle Woodland I and the subsequent development of non-ranked systems, that I have attempted to explain these various social developments internally rather than seeking external causes, as is the wont of culture historians when they offer explanations for change grounded in diffusion and migration. Admittedly, diffusion was resorted to in the introduction of trade and, more importantly, of idea exchange as providing a catalyst which steered the evolving systems in certain directions during Middle Woodland I. Evidence for diffusion, however, can be documented and, as a mechanism for change, obviously played a significant role. Despite assertions to the contrary, and notwithstanding propositions to be made in a subsequent paper in this session, there is no substantive evidence for migration, neither that of whole populations, a trading elite, or a group of missionaries. Even if population expansion or replacement could be demonstrated for portions of the Coastal Plain, it cannot be demonstrated for the Northern Shenandoah Valley, nor for other areas where there were similar pulses of ranked societies followed by non-ranked societies. Not that it is necessary to attribute single causality to all of these changes, but it certainly seems more reasonable to seek explanations in a similar set of phenomena, especially since they were nearly all coeval.

Middle Woodland group movements

Ceramics

The most widespread addition to the ceramic attribute list during Middle Woodland I is net marking. Several dates, 490 B.C. from the Loyola site in the Potomac Coastal Plain (Gardner and McNett 1971), 505 and 500 B.C. from Delaware (Artusy 1976), and 480 B.C. from the Brodhead site in the Upper Delaware (Kinsey 1972), place the appearance of net marking at 500 B.C. and provide the beginning date for Middle Woodland I. Two other dates, 320 B.C. (Maryland Geological Survey Files) and A.D. 80 (Wright 1973) from sites in Maryland provide evidence for the continuation of this type of surface treatment. Once it appears, net marking becomes ubiquitous throughout the Coastal Plain, as is attested by numerous named variants: Wolfe Neck Net Marked, Coulbourn Net Marked, Smallwood Net Marked, Popes Creek Net Marked, Stony Creek Net Marked, and Prince George Net Marked. Net impressed pottery also occurs in the Outer Piedmont of the James, where it is known as Elk Island Net Impressed. Stony Creek Net Marked may also be present in this same area and further inland along the James, although it is now difficult to tell whether Stony Creek Net Marked is the same as Elk Island Net Marked, or is the Late Woodland Stony Creek Knot and Net Roughened, which fits into the general knot and net roughening that occurs over a wide area of south central and southwest Virginia during the Late Woodland. In other areas, Smithsonian collections contain net marked pottery from the Outer Piedmont

also Mockley date from Delmarva of 770 A.D. (Delaware)

of the Rappahannock, which most closely resembles Popes Creek, and Popes Creek pottery occurs along the Fall Line Zone of the Potomac (McNett 1975). Popes Creek is also reported for the Lower Susquehanna (Smith 1971), and net marked types not greatly dissimilar to Popes Creek occurs in the Inner and Outer Coastal Plain of the Delaware (R. M. Stewart, personal communication 1982).

While all of these types have different names (given enough archeologists it is probable the number of names would multiply), and while the different "types" may have significance beyond the historical development of archeological particularism in the Middle Atlantic, it is sometimes difficult to distinguish between them, and laid end on end from Dover to Newport News they would form an overlapping and miscegenated continuum. Accepting, however, the probability of some distinctions over this geographic spread, the major dichotomy in the Coastal Plain appears to be between the sand and grit and crushed rock tempered series. All except the Wolfe Neck, Smallwood and Coulbourne series are tempered with sand, or some variations such as sand and grit, or sand and pebbles. The former two exceptions tend to be tempered with crushed quartz, reflecting, probably, an ancestry in the crushed rock tempering that prevailed in portions of Delmarva during the Early Woodland (from Vinette-like to Dames Quarter and the like). Coulbourne ware represents yet another exception, which I find difficult to resolve. The surface treatments, net and cord, are the same as Wolfe Neck. Coulborne has a limited distribution, which is essentially a pocket within the Wolfe Neck universe. A number of alternative explanations are possible: Coulbourne could simply be an expedient (in terms of temper) form of Wolfe Neck; Coulbourne could be a localized expression of Wolfe Neck (for perhaps the expedient purposes noted previously) which ultimately became a localized tradition; Coulbourne could actually be different from Wolfe Neck, and not really related. The contemporaniety of Wolfe Neck and Coulbourne plus a number of considerations, to be discussed below, makes me lean toward one of the former two interpretations. The ancestry of the other variants appears to be in the Early Woodland III sand tempered types. In most of the area, cord marked surfaces co-occur. The major exception to this, if it is indeed an exception and we are not overlooking a "Popes Creek Cordmarked", is in the Popes Creek series. It would thus seem that net marking is a surface treatment which was grafted onto indigenous ceramic traditions and not the results of migrations of a "net culture". Although why such a surface treatment became so popular is indeed puzzling, but certainly can be attributed to a network.

Coastal Plain differences in ceramics

Coulbourne may be associated with Delmarva Adena phenomena (c.f. Custer)

Throughout the non-Coastal Plain Middle Atlantic, ceramics with net marked exterior surfaces drop off rapidly beyond the Fall Zone and immediately contiguous Piedmont. Exceptions to this are in the Upper Delaware, where Brodhead Net Marked appears, in the Susquehanna and in the Northern Shenandoah

Valley, where Albemarle Net Marked occurs as a minority type. The spread of net marking into the James River Piedmont and the southeastern Virginia Coastal Plain, as well as into the Potomac River Coastal Plain and the Western Shore, indicates groups in these areas, while not developing ranked societies, were not totally isolated from events around them, suggesting that the conservatism in social structure did not extend to technological or stylistic elements.

Since, based on radio-carbon dates and associations at the Nassawango site (Cara Wise, personal communication 1981), the Wolfe Neck series seems to be the ceramic assemblage associated with Delmarva Adena, the spread of net marking along the Delaware and Susquehanna can probably be associated, in part, with the role these particular drainages played as corridors along which trade and ideas flowed in the Delmarva area. The fact that Susquehanna Net Marked and Brodhead Net Marked are both tempered with crushed quartz, and probably fit into a "Wolfe Neck gestalt", suggests the relationship along these corridors was much more intimate than that associated with the expansion of net marking or other pottery concepts alone. The Rosenkrans site in the Upper Delaware (Kraft 1971) provides support for this, although it is surprising more Adena related sites have not been found along these tributaries.

Conversations with Jay Custer and a re-reading of the St. Jones Neck National Register District nomination after the above paragraph was written indicate that opinion is divided as to the ceramic series which is associated with the Delmarva Adena. This in turn ties back into the relationship between the Wolfe Neck and Coulbourne series. If we remove ourselves from the center of the distribution of Coulbourne, it seems obvious to me that Adena manifestations elsewhere, e.g. West River, Sandy Hill, and Nassawango are best linked with Wolfe Neck. The distribution of Wolfe Neck-like ceramics up the Susquehanna and Delaware also suggests an association of Delmarva Adena with Wolfe Neck. The apparent evolution of the Hell Island series out of Wolfe Neck and the linkage of Hell Island with the Webb phase and such burial sites as Island Field also supports a connection between Wolfe Neck and, at least, some manifestations of Delmarva Adena. This does not mean, locally at least (e.g. St. Jones River, Frederica, and Killeen Pond), that there is not an association between Adena manifestations and Coulbourne. What is ultimately going to be necessary, however, is a systematic investigation of the relationship between Coulbourne and Wolfe Neck and the processual and social significance, if any, of these distinctions.

Following this line of reasoning, the appearance of Albemarle Net Marked and Albemarle Cord Marked in the Northern Shenandoah Valley as a marker type for Middle Woodland I could also be taken as an indication of some kind of participation within this "gestalt". Support for this goes even further than net marking, because crushed rock tempering replaces sand

tempering at the same time. Also indicating interaction are certain other stylistic elements such as stemmed and side notched projectile points, both of which occur in burial contexts in the Northern Shenandoah Valley and Delmarva. The stemmed points in the Northern Valley mounds are by no means "classic Adena" types, but consideration must be given to the fact that they are made on local quartz and quartzite, not on the various exotic flints or cherts on which the grave furniture points in Delmarva Adena cemeteries are fashioned. Nevertheless, they are recognizable as belonging in the same generalized tradition. All of this is suggestive of some level of interaction. Still, the ultimate overall expressions are so different that the interaction must have been brief or dilute, but is perhaps sufficient enough to help explain some of the parallelism mentioned earlier.

Crushed rock tempering also blankets the Great Valley well into southwestern Virginia. Pottery with similar tempering also occurs in the Potomac Piedmont where it is probably the marker type for the Middle Woodland (Gardner and McNett 1971). The spread of this tempering concept need not be unidirectional, since crushed rock tempered pottery was prevalent during Early Woodland II and III all along the southwestern, western, and northern margins of the Middle Atlantic. Net marking in the Shenandoah Valley is apparently restricted to the Northern Valley, since further to the south only cordmarking is reported. It also appears that the distribution of stone burial mounds in the Shenandoah Valley is approximately coterminous with the distribution of net impression, further underscoring the connection mentioned previously.

At the same time the ceramicists of the Valley are switching their tempering allegiance from sand to crushed rock, these same bordering areas, except those to the north, where crushed rock tempering prevailed earlier, shift to crushed limestone. The date on this in Eastern Tennessee is 400 B.C. (Chapman 1979). Limestone tempering spreads north through West Virginia where, at least by the latter part of the Middle Woodland, in the form of Watson Ware, it is the principal means of tempering all the way into western Pennsylvania. At some point in space in southwestern Virginia, e.g. Daughtery Cave (Benthall n.d.), crushed rock tempering gives way to the crushed limestone tempered tradition.

In addition to adopting limestone as a tempering agent, the Middle Woodland I eastern Tennessee - southwestern Virginia populations also adopt a surface treatment, fabric impressed, that sets them even further apart from the rest of the Middle Atlantic. Fabric impression, however, does become the marker for Middle Woodland II throughout the Shenandoah Valley as Albermarle Net Marked is dropped out of the inventory to be replaced by Albemarle Fabric Impressed. This same surface treatment also appears as the Middle Woodland II diagnostic in the northern one-third of Delaware in the form of Hell Island

Fabric Impressed, which has now been dated at Delaware Park to A.D. 100 (Ronald A. Thomas, personal communication 1981). As is the case with the Albemarle series, net marking is dropped from Hell Island. Because of the narrowing of the radio-carbon gap between Hell Island and Wolfe Neck, the continuance of crushed rock tempering, and the maintenance of an elaborate burial complex, Hell Island would seem to be an obvious descendant of Wolfe Neck. In both the Albemarle and Hell Island series cord marking continues.

Fabric impression seems to have moved independently of crushed limestone because it is not reported for Watson Ware. Fabric impression may also be a Middle Woodland II marker in the Inner Piedmont where it crops up as Stony Creek (or is it Elk Island?) Fabric Impressed. Unfortunately, in both the Albemarle and Stony Creek series, fabric impression continued into the Late Woodland, and is therefore not uniquely Middle Woodland. The route by which this surface treatment moved would seem, on temporal precedent alone, to have been from south to noth. Interestingly, like net marking, the concept moved across tempering tradition boundaries. Such shifts and borrowings, as well as changes in tempering which mark these Middle Woodland ceramics, all seem quite inexplicable, perhaps because I have yet to resort to concepts such as the movement of "net folk", "fabric impressed people", "crushed rock hordes", or "limestone tempered legions". Regardless, I am forced to say that although I am impressed by the intricate net of this entire fabric of behavior, I am nevertheless crushed by the absence of a rock on which to place my faith. Even so, I should be able to keep my temper.

South of the distribution of the Hell Island series and throughout most of the Coastal Plain, shell tempered pottery in the form of the now generally accepted monolith known as the Mockley series, replaces the previously ubiquitous sand and/or crushed rock tempered pottery. Since most of the Coastal Plain south of the Hell Island ceramic area escapes adoption of fabric impression until Late Woodland, only cord marked and net impressed types occur in the Mockley series. Reported dates in Delaware are A.D. 200, 300, 325, and 330 (Artusy 1976). Maryland dates are A.D. 385 (Maryland State Archeologist Files), A.D. 580 (Wright 1973), A.D. 700 (Maryland State Archeologist Files), and A.D. 815 (Gardner and McNett 1971). Virginia dates are A.D. 245, 445, 460 and 875 (Opperman 1980). The range of dates for the Mockley series wherever it occurs is probably from A.D. 200/300 to A.D. 900, at which juncture the series appears to evolve into the Townsend/Rappahannock group, and fabric impression replaces all previous surface treatments.

Burial Ceremonialism, Trade, and Settlement Systems

During Middle Woodland I, two distinct burial traditions with important ramifications for the interpretation of social systems emerge. One of these, the Western Virginia Stone Burial

Mound Complex, is centered along the South Fork of the Shenandoah, from Luray northward through the Great Valley to the junction of the Shanandoah and the Potomac rivers, and thence westward into the eastern edge of the Appalachians. There is also a lesser extension of these mounds southward along the South Fork to the Elkton area, down to the headwaters of the North Fork, and, to some degree, to the headwaters of the James in extreme western Virginia. Stone mounds also occur in the Appalachian Plateau of West Virginia, western Maryland and western Pennsylvania. The only date available for the Shenandoah Valley is 430 B.C., from a mound on the Thunderbird Ranch. Dates from western West Virginia are 150 B.C. for Morgan Stone Mounds, and A.D. 50 and 210 for Wright Mounds (Fowler et.al. 1976). This provides a maximum span of between 430 B.C. and A.D. 210 for the stone mound phenomenon. A more likely range for the western Virginia complex is between 400 B.C. and 0 A.D. An examination of the artifacts recovered by Fowke (1894), artifacts and notes contained in the Smithsonian, and private collections, corroborates this temporal span, with some mounds containing characteristic non-Hopewellian Adena assemblages and others having Hopewellian related artifact sets.

The second tradition is exemplified by the Adena related complexes of the Delmarva Peninsula which have been discussed to varying degrees by a number of workers (Thomas 1970, 1976, and Ford 1976). Radio-carbon dates on these complexes are equally as wide-ranging, covering the period from 785 B.C. to A.D. 320, with most clustering between 360 B.C. and A.D. 100. The various artifacts from cemetery to cemetery are so similar that it is difficult to believe that the maximum range is correct; a more acceptable range is between 400 B.C. and before A.D. 0.

In interpreting the significance of these burial systems, it is important to note that they are probably not inclusive of the total population; interment of this nature was likely limited to only a small percentage of the residents in the areas in which such systems were operative. This is primarily a logical assumption, or inference, drawn from several lines of indirect evidence, most notably demographic considerations. For instance, there do not seem to be sufficient burial mounds or cemeteries to account for the total population which lived and died in these areas for the 300-400 or more years in which these complexes were present. As an example, and using very rough figures, there are 15 mounds at the Thunderbird Ranch. Employing a maximum average of four individuals per mound, this gives a total number of deaths over the 300-400 year period covered by mound use of 60--hardly an expectable number, unless we are dealing with remarkable longevity and a maximum of between 4 and 5 families over the 12-16 generations possible during this period.

While this suggests that participation in mound and/or cemetery burial was restrictive with respect to the total population, it does nothing toward informing us of who was

allowed entry. There is, however, some evidence to indicate that the exclusion principles were not based on sex and age. This is supported by the few available comments regarding individuals in some of the Delmarva sites and in one instance of the Stone Burial Mounds, where it can be demonstrated that sub-adults and males and females were part of the population afforded burial of this nature. From this, it can be inferred that if neither gender nor age grade were criteria for inclusion, the primary remaining criterion would appear to be kinship, indicating that it was lineage membership which was important. If age had nothing to do with entry proscriptions, then it is logical to assume that entry right was ascribed rather than achieved. With this considered in light of other elements of ranked societies, it would appear that the above supports a concept of social ranking among lineages.

social ranking & burials

Pursuing yet another tack, although the grave furniture includes items of both local and non-local raw material, the burial setting is generally the locus in which the latter types of artifacts are found. While this association could be signaling a number of things, at least it seems that access to imported items was primarily restricted to those members of society who were accorded the preferential burial treatment. This suggests that these items, in at least part of their value loading, were symbolic of the rank of these individuals. I would also suggest that, by virtue of a limited segment of the population having control of the inter-group distribution system (e.g. trade), that they also controlled intra-group distribution (e.g. redistribution of surpluses).

This, of course, brings me to the very edge of the definition of a chiefdom; perhaps, within the parameters of what defines a chiefdom type, we have a type variety. Having brought us here, my own inclination is to accept, as a working model, that this is what existed. As a caution to myself and the reader, I must note that alternative explanations for any of the observed phenomena exist, not all of which would land one in the middle of an inferred ranked society. The fact that other interpretations exist, however, is really beside the point. The real point is that it is time to move beyond the continued emphasis on descriptive reports and over-emphasis on spatial and temporal relations, and move toward another level of interpretation, even if it is initially over-interpretation. After all, how far can research proceed if we continue to concentrate our intellect on whether or not a particular burial contains a Robbins blade, a Cresap Stemmed, or whether a particular type of raw material came from Ohio? Although this type of analysis is important for certain considerations, we must be continually aware that it is not the artifact per se that is significant, but rather it is the context in which the artifact occurs, and the position of that context as it fits within the total system.

Moving from the general to the particular, the mounds which

are included in the Western Virginia Stone Mound complex are almost universally made of stone, generally consisting of a stone cap, occasionally covering earth fill, all of which covered one or more burial pits which had been excavated into the original surface of the ground. The location chosen is such that stones (generally cobbles and boulders, but also, possibly, scree) for construction are immediately at hand, reducing the need for great expenditure of labor. Their visually prominent position vis-a-vis habitation loci and their immediate recognizability suggest that they possessed a symbolic value easily visually perceived by all and sundry. Underneath these one or more caps, and associated with whatever activities took place at the mound, are fire pits indicative of intensive burning. In one instance, the fire was covered by mound construction while still burning, and it is from this that the excavator, Joan Walker, obtained the charcoal sample which dated at 430 B.C. These pits do not seem to have been cremation pits, since there was no evidence of any calcined bone, even though covering the fire while it was still hot resulted in incomplete burning of the wood.

The mounds, as such, are single event tumuli and are not accretional, nor is there any evidence of multiple mound stages. While single graves have been reported, the more common practice appears to be multiple linear pits, in each of which a single individual was interred. Although we, ourselves, have recovered no skeletal material--the soil pH is such that bone would not be expected--chemical tests show a high phosphorus blip inside the grave, indicating decomposed organic material concentrations. In one instance, skeletal fragments were lent to us by a local resident, who reported they came from backdirt in a vandalized mound; these were identified as coming from a sub-adult human. When multiple graves are involved, Walker's excavations demonstrated that some graves appeared to have been deliberately covered with rocks, while others received stones only as a result of the collapse of the grave after the mound was constructed. This has led us to the conclusion that the individual graves which were covered with stones were left open for some time, with the stones serving as protection, and that at the interment of the last individual(s), the entire area was mounded over as if this signaled the end of a cycle.

In terms of distribution, the mounds are invariably located on bluffs, or ancient terraces, overlooking a major river or stream system, and in association with broad, diverse micro-habitat floodplains. It is within these floodplains that the habitation sites are located. Not all bluffs overlooking similar floodplains, however, contain associated mounds, but most do contain archeological sites of the appropriate period. This introduces what I interpret to be a locational variable which transcends ecology and is probably a reflection of the importance of the localities containing mounds within the settlement system.

For instance, within the Northern Shenandoah Valley and immediately adjacent areas, distinct clusterings of mounds can be recognized (Figure 5). These can be grouped into major, medium, and minor clusters. Major clusters which can be recognized are found at the Luray-Indian Grave Ridge area (13), at Thunderbird Ranch (15), both on the South Fork, and on the South Branch of the Potomac at Romney, West Virginia (18+). Medium clusters, consisting of between 4 and 8 mounds, can be noted for the North Fork near Strasburg, the South Fork, some few miles below Front Royal, north of Winchester on the Opequon, and in areas mentioned by Fowke in West Virginia, on large tributaries of the South and North Branches of the Potomac. Minor clusters are scattered at various points in this distribution, and generally consist of from two to four mounds. Single mounds are rare or absent. There are also vast areas within this distribution where there are no mounds. I suspect that these distinctions in clusters represent ranking differences vis-a-vis the importance of any particular locale and that the clusters are but a variation on a form of central place ordering. Within the clusters, as for instance at Thunderbird Ranch, sub-clusters of 2, 3 and 4 can be noted on different bluff promontories overlooking the floodplain, with the abandonment of a cluster representing, perhaps, cyclical events, and of a lineage segment, or some other socio-ceremonial event.

The artifacts associated with the graves within the mounds include tubular stone pipes (apparently rare), platform pipes (apparently equally rare), copper beads, copper pendants, copper celts, hematite paint cups, hematite celts, stone celts, bannerstones, projectile points, and cache blades. Artifacts in any particular grave or mound are generally uncommon. With perhaps the exception of copper, any of the materials from which the artifacts are fashioned could have been obtained from localities in the immediate or general vicinity. This has led me to tentatively group the materials into three categories based on distance: long, medium, and short. Copper is, so far, the only demonstrably long distance material, presumably ultimately originating in the Great Lakes area. The major medium distance materials are slate, Pennsylvania rhyolite, and, probably, hematite. Short distance, or local, material consists of quartz, quartzite, chert, and jasper. Viewed in its entirety, the materials are from predominantly local sources. At the other end of the extreme, however, in the sample of two artifacts from the one Thunderbird Ranch mound which has yielded artifacts, both were of medium distance materials.

marginella shell beads

In Delmarva, while cemeteries replace mounds, apart from this difference in form, which can probably be linked with heritage, the two are not that intrinsically different. The Adena cemeteries, like the Stone Burial Mounds, for instance, are the repositories for the remains of only a limited portion of the population. The same rules of entry seem to apply. The cemeteries are slightly isolated from the habitation loci and,

in this sense, are "sacred" precincts. And, the bulk of the non-local raw materials wind up in the graves. Much like the mounds, Adena cemeteries, based on size, differences in grave goods, and differences in total burial population, can be grouped into cluster sizes, in this case, major and minor cemeteries. Reported major cemeteries would be St. Jones River, Sand Hill, West River, and Frederica, while minor cemeteries are Nassawango Creek and Killen Pond. Corroboratively, the settings of the major cemeteries are in locations where large macro-social unit base camps would be expected (Figure 6). For instance, St. Jones River and Frederica are located at points between the fresh and salt water transition, while Sandy Hill and West River are located near the mouths of rivers on the Chesapeake Bay, in close proximity to lower order fresh water tributaries. Killen Pond is located near the headwaters of one of the Delaware Bay draining streams, while Nassawango is situated in a similar position, but on a Chesapeake Bay draining tributary. In the former instance, optimal productivity can be expected, while in the latter instances, natural resource abundance is considerably reduced.

difference between ranked societies on coastal plain & in Great Valley and interior

Since there are certain important differences in the ecology of the Delmarva Peninsula and the Northern Shenandoah Valley, some differences in cultural patterns should be expected. In the Delaware situation, resource abundance varies along drainage systems in a linear fashion, with the approximate mid-point being the most environmentally productive. During the Early Woodland, this was the location of the sedentary base camps. If, as it appears, the number of sedentary sites fissioned along these stream lines, then those located near the headwaters or the mouths would be more dependent on extension of production through numerous nearby exploitive foray camps, or, alternatively, would be forced to place greater stress on redistribution, which would in turn lead to even greater dependence on the various central places, particularly the highest order central place. I would therefore expect a more exaggerated version of the ranked society in the Delmarva peninsula than I would in the Shenandoah Valley, where resource productivity does not vary so greatly, particularly in the most productive zone, the floodplain.

This, I think, is reflected to some degree in the archeology. The best evidence we have on site sizes at this time in the Shenandoah Valley does not show a great deal of variation in population clusters. There is some variation between overall density based on differences in floodplain size and variability, but, within any floodplain, clusters of micro-populations appear to prevail. This, I think, is different from the Delaware situation, where truly large sites appear to operate in conjunction with numerous micro-social unit centers.

The differences in quantities of traded material and distance categories may also reflect some of these distinctions

in ranking. Put bluntly, any single grave or cache of artifacts in a Delmarva Adena cemetery setting contains almost as many artifacts as all the mounds which have been dug in the Shenandoah Valley. Delmarva Adena cemeteries are much richer by comparison. When the non-local Delmarva Adena artifacts are considered in terms of distance from source, while the same categories apply, there are considerably more long distance materials than those in the medium and short distance categories. This suggests there was not only a difference in emphasis on trade, but also in "wealth" accumulation, reflecting, possibly, a more rigidly structured system.

It should also be noted that in both areas, the exploitive foray camp continues to be part of the settlement and support systems, and such sites must be viewed as a necessary element in maintaining sedentism, even with the addition of social factors. While it may be possible that some agriculture was introduced at this time, there is no evidence to support such a possibility. Plant cultivation would not be necessary. Such systems could develop without any major additions to the techno-economic base, simply through a continued evolution of the solutions arrived at during the Early Woodland with the addition of more formalized and structured social institutions, and an extension of these institutions into the means of production, surplus generation, and redistribution.

Beyond the societal level, it is apparent in both areas that several centers of this type of activity developed. In Delmarva, a total of five sub-areas, centering on different drainage systems, can be delineated (Figure 7). If these sub-areas were functioning concurrently, and the available evidence suggests that this was the case, then we either have independent expressions of the same type of activity, or groups which were integrated into a larger macro-polity, perhaps through some sort of confederacy. Expansionistic tendencies in this system are implied by the West River site, the only Delmarva Adena cemetery reported for the Western Shore, and which also happens to be the major locus of crushed rock tempered pottery (Smallwood phase pottery being interpreted as derived from Wolfe Neck ceramics). A similar alignment of sub-sets can be seen in the Shenandoah Valley. In this case, the sub-sets would be the mound centers of various sizes, with the macro-polity representing an integration of all the sub-sets.

Elsewhere, the settlement systems which prevailed during the Early Woodland appear to have been operative in the Middle Woodland. There may, however, have been some exceptions to this (Figure 8). For instance, in the Upper Potomac Coastal Plain, the Popes Creek and some of the other nearby shell middens seem to be much larger in areal extent during Middle Woodland I. The Popes Creek site, in particular, seems to blossom into a macro-population center. Similar increases in site size can be seen in the upriver portion of this settlement system around

Piscataway Creek. It appears that some of the camps which were previously exploitive foray camps during Early Woodland III became micro-social unit seasonal base camps during Middle Woodland I, introducing, if not site ranking based in the social sector, then site unit fissioning with some loci developing into population centers. In this situation, it is probable that social-political integration would have been maintained among all of these units, with sites like Popes Creek serving as the focal point in the system, but without an integrating mechanism leading into macro-polities. It is also possible that some social ranking did develop, but was expressed in ways other than that followed in the Northern Shenandoan Valley and Delmarva, in which case, it would be less readily discernible archeologically.

It would seem obvious that population growth combined with the limitations of the techno-economic base everywhere would inevitably lead to site unit fissioning. Evidence for population growth can be seen in growth in site size in a number of localities, as, for instance, in the Porsmouth area. If fissioning and the development of dependent satellite sites was operative in this region, it is not evident. The impression gained from our work in the Portsmouth area is one of development of independent sites, if independence can be measured on the basis of greater spatial distance between sites and size comparability.

Continued population growth during Middle Woodland II can also be documented as an increasing number of shell middens show Mockley components. In some areas, such as Portsmouth, the sites with long occupational histories expand somewhat, but not markedly. In other areas, decrease in site size seems to be the norm. For instance, in the Popes Creek area, the Popes Creek site itself becomes much smaller. Loyola, on the other hand, either grows slightly or remains stable. This apparent reduction in the size and assumed earlier importance of the Popes Creek site indicates that the Upper Potomac Coastal Plain did not escape the changes that were sweeping other areas of the Middle Atlantic, if, indeed, the type of structural developments I proposed for this area during Middle Woodland I did develop. A comparable reduction in the size of the major fishing site at Piscataway can also be documented.

The role of the shell midden and anadromous fishing camp in the Coastal Plain as specialized base camps, or sedentary base camps, does not disappear until the beginning of the Late Woodland (Figure 9A). At this juncture, in a number of Coastal Plain locations, this long running settlement system which developed in the Early Woodland, and, perhaps, Late Archaic in some localities, changes abruptly, as new base camp loci are sought. This is seen partially as a response to the demands of cultivated crops and the necessity for broad expanses of arable land, which further indicates agriculture was not an important aspect of any of the Middle Woodland systems. The older shell

midden sites continue to be used, but, almost exclusively, as exploitive foray locations. Ranked societies (c.f. Turner 1976) once again occur in the Coastal Plain, at some juncture in the Late Woodland. Interestingly, these systems do not appear where they had previously evolved, a further testimony that the area's ecology is not all that was involved. Nor can agriculture be employed as a precipitating factor, since almost everyone moves into plant cultivation at this time and ranked systems are the exception, not the rule.

The use of exploitive foray sites as an extension of the support system continues. This is nowhere more obvious than in the Piscataway area (Gardner 1977, Gardner and Stewart 1978) where a number of small Late Woodland Potomac Creek phase sites have been found well removed from the Potomac in the deep valleys of low order streams draining into Piscataway Creek. In the locality near Portsmouth, Rappahannock pottery is found at some of the same transient foray camps which were inhabited during the Early and Middle Woodland, but such pottery is quite rare. Since the shoreline estuary base camp of the Early and Middle Woodland had been abandoned by this time, this is not surprising, since the study area would likely have been at the extreme margins of the catchment area of the newly located Late Woodland base camp. Even this small amount of Late Woodland pottery, however, shows that the exploitive foray camp remained as an arm of the total subsistence system. The use of such sites should not be unexpected since, even with the addition of cultivated crops, there were still severe techno-economic limitations on the productivity of the aboriginal systems in the immediately local area. These limitations developed out of poor husbandry techniques such as a lack of fertilizer, failure to rotate crops, shallow penetration of the organic soil zones, and low plant population density per acre.

Recent work in the Northern Shenandoah Valley (Gardner, Fehr, and Snyder n.d.) has corroborated a long suspected parallel with the Coastal Plain. For instance, by the beginning of the Late Woodland, fairly securely radio-carbon dated at A.D. 1000, the prehistoric populations of what is now known as the Ivan Habron farm shifted the location of their sedentary base camps from the inner floodplain to the levee (Figure 9B), in essentially the same location their Early Woodland ancestors had occupied. The excellent faunal preservation indicates it was not the river alone which attracted them, and since this location places them immediately adjacent to the most productive and easily tilled farmland, it is assumed the shift was dictated by the adoption of maize cultivation. The size of these sites, perhaps a maximum of six to eight houses, indicates that this was the functioning socio-economic unit size at this juncture. Surveys along the levee noted the presence of at least one more of these sites about two thousand feet downriver, indicating small, dispersed populations planting and exploiting a rather wide expanse of floodplain. Without societal mechanisms designed to ensure increased productive efficiency, this appears

to be about the right amount of area a group of this size could exploit on a year round basis. The transient foray camps, as in the Coastal Plain, were still utilized, although probably on a less intensive basis. The abundance of Late Woodland triangular points scattered throughout various localities from the valley floor to the tops of the mountains may be related more to later Late Woodland populations, at a time when site numbers and sizes in the floodplains increase. This is especially true after A.D. 1400 when the widely scattered hamlets consolidated into stockaded villages, or other nucleated settlements, with associated farmsteads and the strain on the resources of the immediately local area increased (Figure 9C).

The Middle Woodland elsewhere in the Middle Atlantic has suffered from neglect due to an excessive and largely unproductive emphasis on the Late Woodland. Work by Mouer and his associates (Mouer 1982), however, has provided us with a partial glimpse of what the historic and protohistoric and Early Woodland periods in the James River Piedmont were like and, except for the addition of agriculture to the techno-economic base and population change, these temporal opposites appear very much alike. This, once again, indicates a high degree of conservatism in this portion of the Piedmont, a situation which, if it is real, is relatively surprising. Perhaps the application of sophisticated cultural ecological analysis may shed some light on this subject.

SUMMARY

In summary, we may note that sedentary societies evolved in a number of areas of the Middle Atlantic during the Early Woodland. In part, this was built on the estuarine and riverine adaptations which began in a number of areas, but by no means everywhere, during the Late Archaic. The sedentism of the Early Woodland was, however, much greater than even that of the Late Archaic, and the Early Woodland has to be seen as something other than Late Archaic with pottery. The wherewithal for sedentism seems to have stemmed primarily from intensification of localized food procurement, aided by site settlement in areas where natural food diversity was spatially concentrated. While some manipulation of local plant species may have occurred, plant cultivation, if it existed at all, would have provided, at best, only a minimal addition to the wild food base. The major solution to the limitations of the local ecology and the techno-economic base was the extension of the food procurement system, through the use of exploitive foray sites, which at best seem to have been occupied for short periods of time by few people. The food stuffs procured at these locations must have been primarily for the enrichment of the food base at the sedentary site locus, and, thus, can be considered as seasonal camps only in the sense that such locations might have been exploited more efficiently during certain seasons, but were not used as seasonal habitation sites. Seasonal movements do seem to have prevailed in certain localities, as, for instance, the inter-locked Piscataway and Popes Creek areas, but this appears to have been a limited phenomenon, which can be attributed to propinquity to locales with high productivity peaks.

what about the Mockley ceramics data that seems to be pointing to fusion/fission of groups operating on the Patuxent

The Early and Middle Woodland systems are thus markedly different from the Middle Archaic pattern of seasonal fission and fusion. The extension of the food procurement system during the Middle Archaic was also marked by forays out of the seasonal macro and micro social unit base camps, but the base camps at this time are best viewed as staging areas, a concept that is only marginally applicable to Early and Middle Woodland base camps. The Late Archaic provides a bridge between these two periods, but in most areas probably resembles the Middle Archaic more than it does the Woodland.

Another element of the techno-economic system which enhanced sedentism was the development of a food storage technology as exemplified by the wide spread appearance of storage pits during the Early Woodland. While food storage must have occurred during the Middle and Late Archaic, the generation and storage of surpluses does not appear as a strong element in the Middle Atlantic until the beginning of the Woodland period. This may reflect a focus on different types of foods, especially wild plant foods growing around the poorly drained portions of the floodplains.

With the exception of the apparent anomaly along the James reported by Mouer and his associates (1981), the size of the population during Early Woodland at any one site seems to have been fairly small. This would be in keeping with the means of production available to these populations, and would have served to prevent rapid over-exploitation, thus ensuring stays of longer duration. Larger, macro-social unit sites did develop in Delmarva during Middle Woodland I, probably as a result of increased intervention of social institutions in the food procurement sector. This type of intervention would have resulted in the production of larger surpluses, ensuring relative stability in the food supply through a redistribution system without the necessity for substantive changes in the techno-economic base. With the loss of these organizing principles during Middle Woodland II, the larger population centers were no longer feasible and a more dispersed settlement system prevailed. With that, a greater intra-unit economic independence developed, with a reversion to the types of loosely or non-aligned systems prevailing during the Early Woodland.

With the advent of agriculture during the first part of the Late Woodland, greater surpluses could have been generated at the main habitation locus, thereby reducing the number of outlying exploitive foray camps. Such sites, however, would have continued to be necessary as limitations in the plant husbandry, such as inefficient techniques and the lack of domesticated animals and industrial crops, would have required a continuation of a spatially focused but nevertheless broad spectrum economy. In the Northern Shenandoah Valley, the earliest Late Woodland sites show a continuation of the Middle Woodland II pattern of small, multiple family socio-economic units with little evidence of wider integration. Sometime during the Late Woodlnd, ranked systems develop in the southeastern Virginia Coastal Plain, and, perhaps, in other areas such as the Potomac Coastal Plain and southwest Virginia, but the addition of agriculture, in and of itself, seems to have little effect on the socio-political institutions of the remainder of the Middle Atlantic. Subsequent population dis-equilibrium and extensive expansions and migrations, however, especially during the middle to late Late Woodland, ultimately result in major settlement pattern changes in a number of areas as population concentrates into increasingly larger settlements with allied satellite sites and, perhaps, situational alliances in the form of confederacies, but seemingly without extensive societal ranking.

Causal factors involved in the development of ranked societies in Delmarva and the Northern Shenandoah Valley remain important archeological problems to be investigated. In Delmarva, some antecedents can be traced back into the Late Archaic and Transitional, with the scattered cremation and/or red ocher burials and the flow of raw material such as argillite across a rather wide area leading, perhaps, to the rise of "big men" with achieved status and wealth. From such a base, an

expansion from control of inter-group trade of non-essential resources to intra-group distribution of essential resources and a transference from achieved to ascribed authority is but a small step. Current evidence does not provide for such a transition in the Northern Shenandoah Valley, and the appearance of Middle Woodland I ranked societies seems much more abrupt. This may be partially the result of a lack of intensive investigation at Early Woodland II and III sites, but, even so, there is sufficient evidence to indicate that an earlier base of external trade and "big men" was not present. The explanation in this case must lie with the evolution of increasing control by a certain segment of the population over the internal distribution of essential food stuffs, particularly surpluses, and the rise of institutions which sanctioned these individuals' authority, a much more difficult scenario to document archeologically.

Figure 10 provides a generalized picture of changes in the distribution of tempering at various points during the Early and Middle Woodland. At the initial stage, three approaches to the aplastic problem are evident. Within the Middle Atlantic, based on the evidence currently available, the most widespread was the use of steatite and, within the area of its distribution, it is approximately coterminous with the distribution of the stone bowls of the preceding Late Archaic period. To the east, and some degree south, tempering choice during this juncture was extremely variable and could include shell, sand and grit, crushed rock, and other sherds, or combinations of any or all of these. North and northeast of the steatite tempered pottery, crushed rock was the dominant choice. At the junctions of any of these different approaches, two or more choices are likely to occur. In other words, Vinette I and Marcey Creek, Marcey Creek and Ware Plain, Marcey Creek and Ware Plain-like, as well as Vinette I and Ware Plain, are likely to be found co-occurring.

Temporal precedence traditionally has been given to the steatite tempered group. In actuality, this remains to be demonstrated and the precedence of Marcey Creek is largely a result of precedence of discovery, the linkage of steatite tempering with steatite bowls, and a general ignorance of what was going on in the Early Woodland in most areas of the Middle Atlantic. As previously mentioned, it is not at all impossible that the non-steatite tempered ceramics were developed first as a local solution to solid container use in the absence of access to stone bowls, and that Marcey Creek was, in fact, a copy of some of the neighboring ceramics.

By Early Woodland II (EWII), the crushed rock tempering had spread south resulting in a contraction of the distribution of steatite tempering. The various category of tempering appears to have spread. In the Shananoah Valley, there are two examples of approaches to tempering at this juncture that provide some insight into what was occurring. Recent work by William Boyer and Douglas McClaren of James Madison University

at a strata test on the South Fork of the Shenandoah near Port Republic, which in another excavation at the same locality showed Marcey Creek at the basal level, produced a sand tempered plain vessel fragment below Accokeek Cordmarked that, except for tempering and the lack of cordmarking, is very similar to Seldon Island Cordmarked. That is to say, it is coiled and has the tapering open mouth jar form (although the base could have been flat and the overall shape in the flower pot form). Some 60 miles upriver at the Cabin Run and Corral site excavations, Seldon Island follows Marcey Creek. At the same levels, however, at both of these sites, there are similar sand tempered sherds, as well as crushed gneiss tempered, cord marked. In one sense, these instances could be viewed a ceramic experimentation. Yet from another perspective, it is simply a drift away from steatite which, in both areas, had probably become a rare commodity.

By Early Woodland III (EWIII), only two approaches to tempering are found: crushed rock and sand and grit. Crushed rock tempering continues to make a southerly spread, but the big explosion is in sand and grit tempering. It is dominant everywhere, except on the peripheral areas. From my perspective as a lumper, these ceramics appear to be the same from their easternmost occurrence on the Chesapeake Bay to the westernmost extremity on the Jackson River in Bath County.

Shortly after this level of standardization was reached, crushed rock tempering begins a westward, and probably a southeastern, expansion, resulting in a contraction of sand tempering. Unlike the earlier steatite and various tempering, sand tempering, although it continues to contract through the Late Woodland, remains the major tempering solution in the south central portion of the Middle Atlantic until the historic period. Also at this juncture, Middle Woodland I (MWI), an entirely new tempering concept, crushed limestone, appears at the very southwestern margins of our area.

By Middle Woodland II, several dramatic changes can be seen. Limestone tempering spreads northward, along essentially the same corridor that crushed rock tempering had initially expanded, only in the opposite direction. This in turn leads to a contraction of crushed rock tempering. To the east, shell tempering suddenly appears and expands, partially at the expense of crushed rock tempering, but mainly causing a further contraction of sand tempering.

Although not included in Figure 10, the stage is set by Middle Woodland II for further changes in the distribution of tempering concepts during the Late Woodland. Briefly, limestone tempering expands north, and perhaps east, through the Great Valley. Crushed rock tempering contracts within the Valley, but moves east across the Blue Ridge into the Piedmont, especially the James River Piedmont. After a minor expansion west into the Great Valley, sand tempering undergoes a further contraction

southward. Shell tempering remains basically constant, but undergoes a small contraction as the result of an eastward expansion by crushed rock tempering in the northeastern part of the Middle Atlantic. The final tempering incursion into the area comes from the west, northwest, and, probably, southwest and is marked by shell tempering.

Having gone to the trouble of delineating all of this, I feel obligated to make some comments on its meaning. This is not an easy task, however, a number of things do stand out. In the first place, in certain areas, crushed rock tempering is a rather long-lived phenomenon, as is sand tempering. Whether or not these represent actual traditions, in the sense of some sort of long-lived cultural tradition, is a moot point. In general, I have no problems with interpreting these as traditions that indicate continuity throughout much of the Woodland period. In fact, with some minor hesitation, I could link such series as the Late Woodland Stony Creek with the Early Woodland Accokeek/Elk Island, and crushed rock variants such as Montgomery focus and Potomac Creek with Early Woodland crushed rock, or, at least, Middle Woodland I Albemarle variants.

In this sense, an argument for long continuity, at least in certain areas of the Middle Atlantic, could be offered. In other areas, on the other hand, there are obvious fluctuations in tempering. Does this latter mean there was a continuing series of population replacements, or did long resident populations periodically change their approach to tempering, and if so, exactly what does that mean? Are these tempering changes all to be explained by in-migrations and out-migrations, in-migrations and assimilation, or switch in tempering preferences under some sort of stimulus diffusion? Or if we eschew cultural historical explanations, did a group suddenly decide that crushed rock was somehow technologically or adaptively more efficient than sand and grit? Or from a social organization perspective, are we dealing during the times of change with patri- or viri-local residence patterns, or some other type of female residential fluidity?

Tempering, of course, cannot be really considered independent of surface treatment (or so far as that goes, a myriad of other attributes), because despite periods of stability and/or fluctuation in tempering, surface treatment attributes seem to move independently of and across the boundaries of tempering traditions. And, what does that mean, from the cultural historical, ecological, or socio-archeological perspective? At this point, I confess I really do not know. At the Late Woodland level, since a variety of attributes are exchanged across numerous ceramic "boundaries", site unit intrusions are present, co-occurrence occurs, and assimilation can be demonstrated, migration seems a testable explanation. This does not seem to be the case at pre-Late Woodland levels.

Perhaps at this juncture it is most discrete to retreat, and simply note tht there is considerable variation in time and space across this thing we call the Middle Atlantic during the Woodland, and a diversity in pottery that equals or exceeds some of the more well known ceramic areas.

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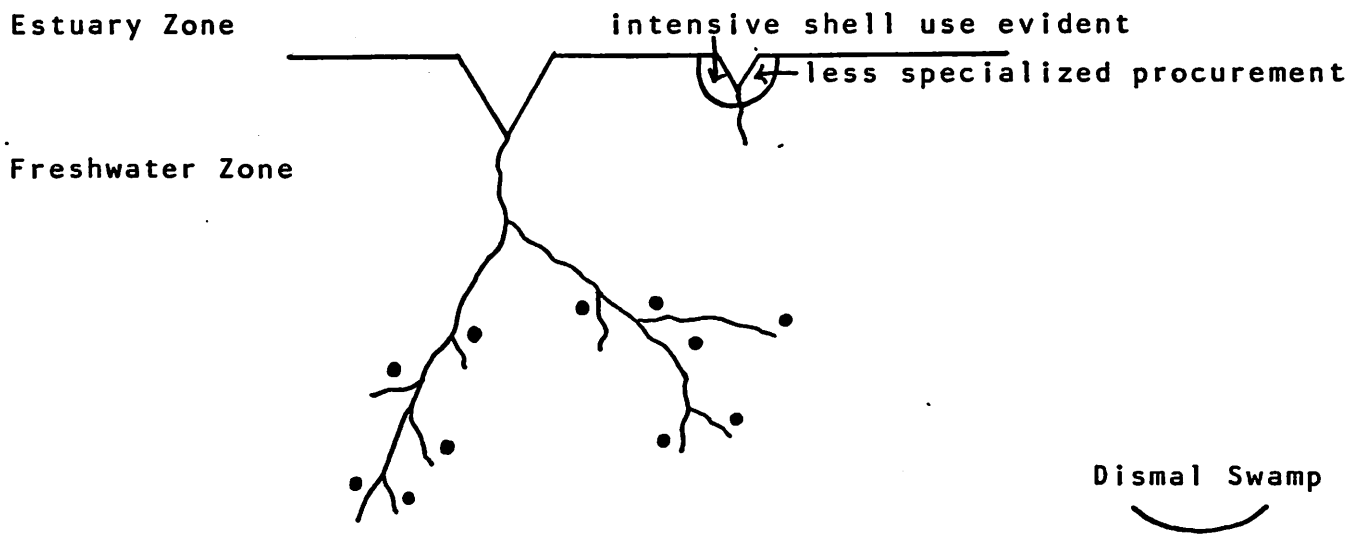
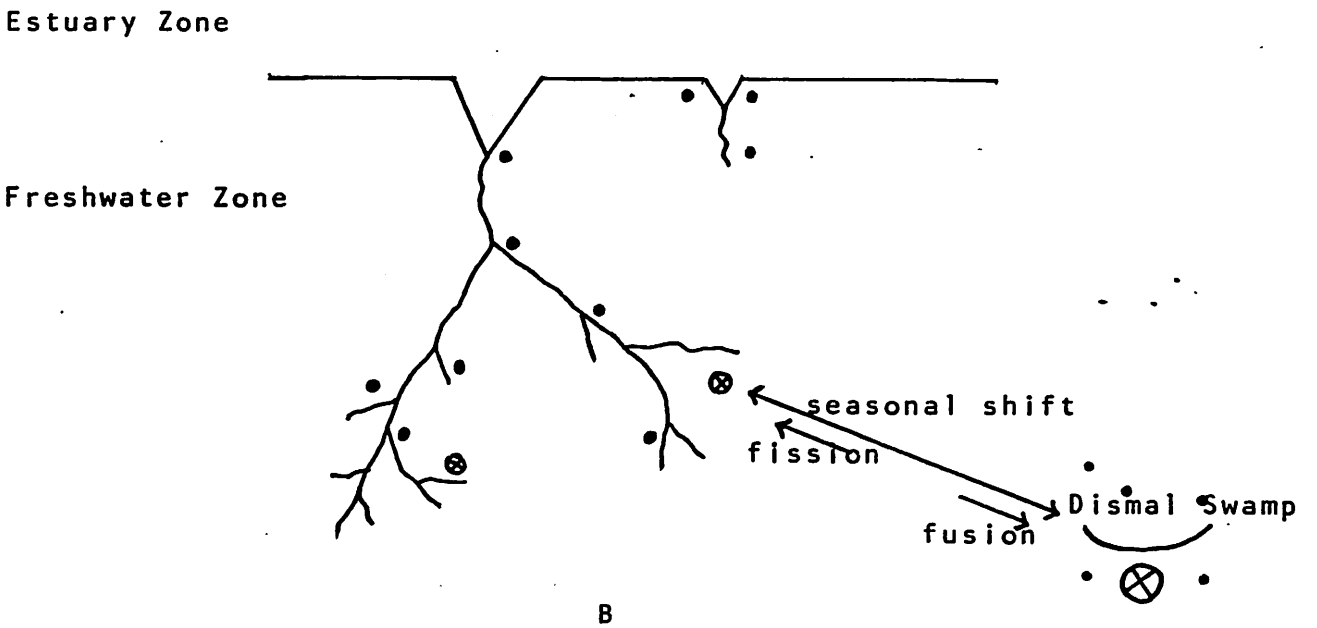
FIGURE 1

Outer Coastal Plain (Portsmouth Area)
Late Archaic-Middle Woodland Settlement Model



A
Early-Middle Woodland

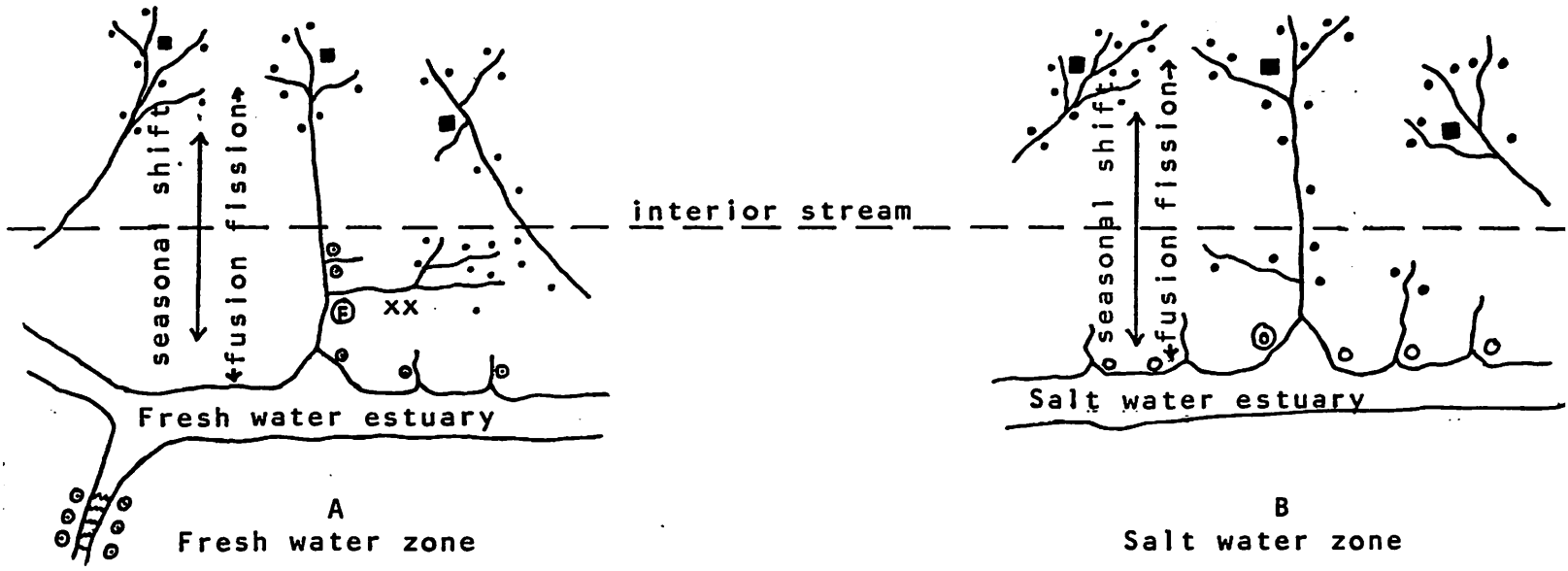


B
Late Archaic

⊗ -- seasonal macro-social unit base camp
⬭ -- sedentary macro-social unit base camp
• -- exploitive foray camp
⊗ -- micro-social unit seasonal base camp

Figure 2
Inner Coastal Plain (Piscataway-Popes Creek)
Late Archaic-Early Woodland Settlement Pattern Models

Alternative 1 - Fusion-fission model with separate zones

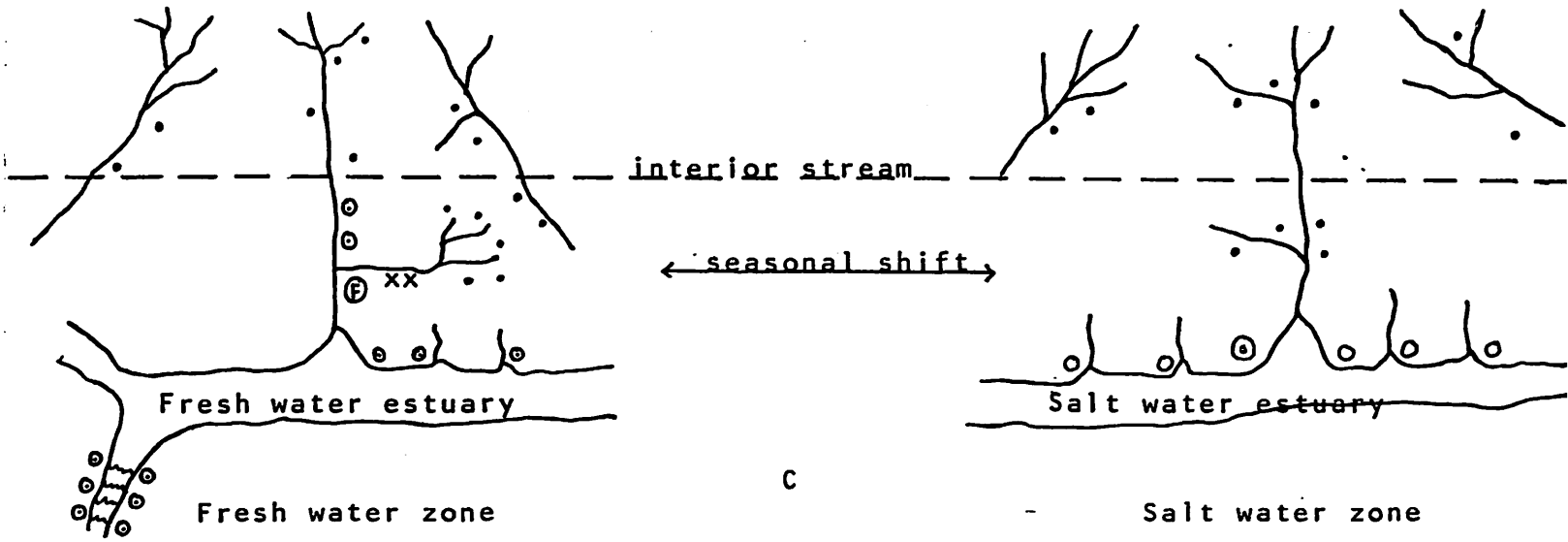


A
Fresh water zone

B
Salt water zone

- Ⓕ seasonal macro-social unit base camp (fishing)
- ⊙ seasonal micro-social unit foray camps (fishing)
- x quarry/point manufacturing stations
- • exploitive foray camps (non-fishing)
- ■ seasonal micro-social unit base camps

- ◎ seasonal macro-social unit base camp shell middens
- o seasonal micro-social unit foray camp shell middens
- • exploitive foray camps (non-shell)
- ■ seasonal micro-social unit base camps



C

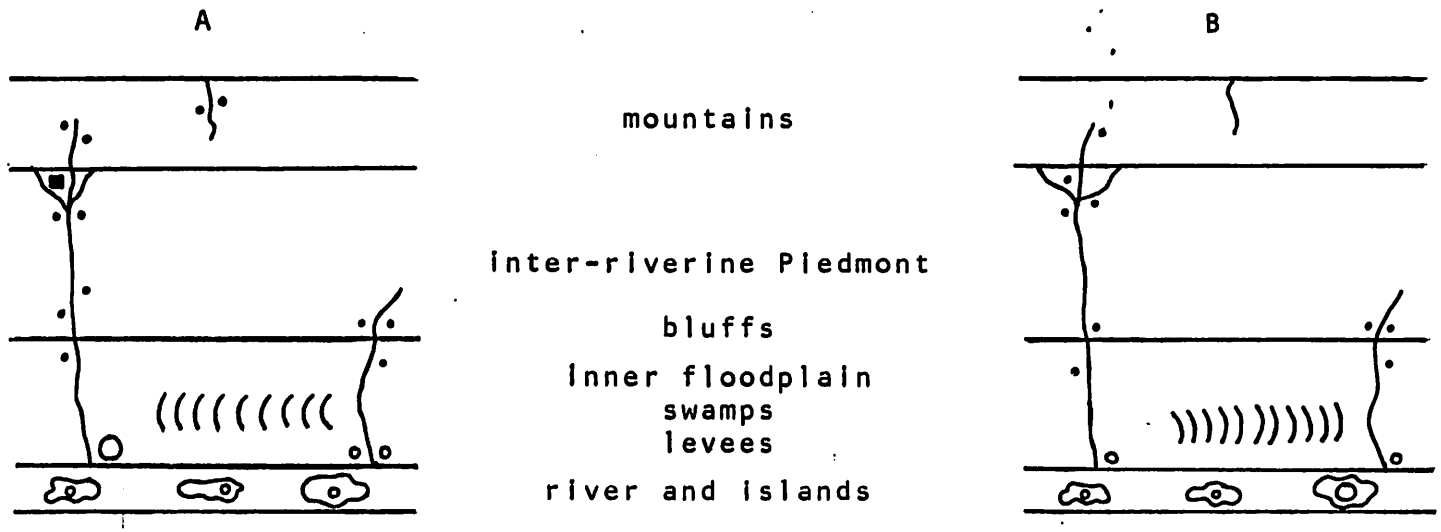
Fresh water zone

Salt water zone

Alternative 2 - Seasonal shift between zones

- Ⓕ seasonal macro-social unit base camp (fishing)
- ⊙ seasonal micro-social unit foray camps (fishing)
- • exploitive foray camps (non-fishing)
- x quarry/point manufacturing stations

- ◎ seasonal macro-social unit base camp shell middens
- o seasonal micro-social unit foray camp shell middens
- • exploitive foray camp (non-shell)



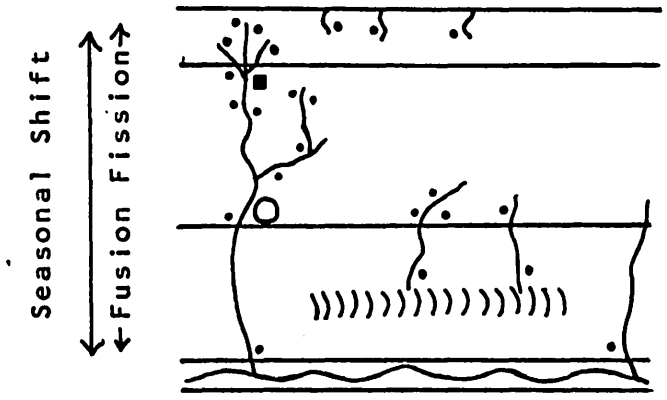
macro-social unit base camps
micro-social unit foray (?) camps (fishing)
micro-social unit base camps
exploitive foray camps

Late Archaic fusion-fission model

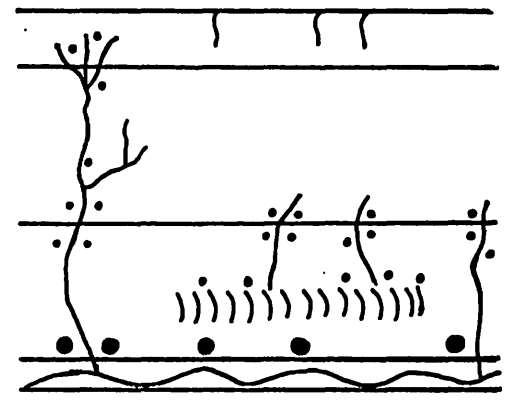
macro-social unit sedentary base camp
micro-social unit foray (?) camps (fishing)
exploitive foray camps

Early Woodland sedentary model

FIGURE 3 - Late Archaic-Early Woodland Potomac Piedmont Settlement Pattern Models



A
Late Archaic
Fusion-Fission Model



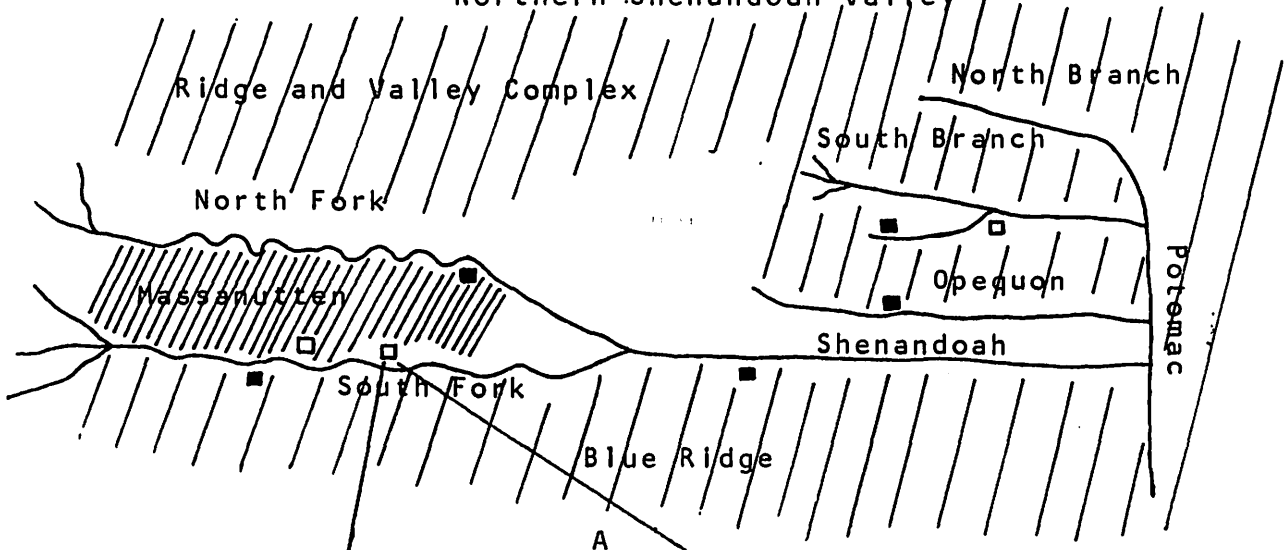
B
Early Woodland
Sedentary Model

○ macro-social unit base camp (seasonal)
■ micro-social unit base camp (seasonal)
• exploitive foray camp

● micro-social unit sedentary base camp
• exploitive foray camp

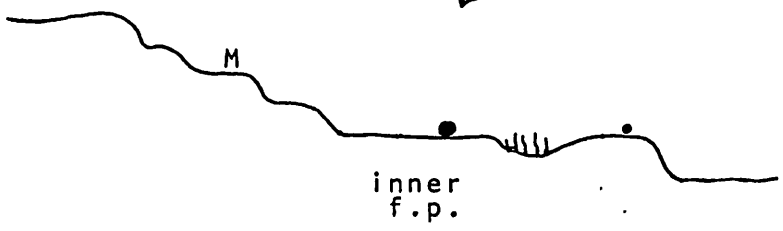
FIGURE 4 - Late Archaic and Early Woodland Settlement Pattern Models in the Northern Shenandoah Valley

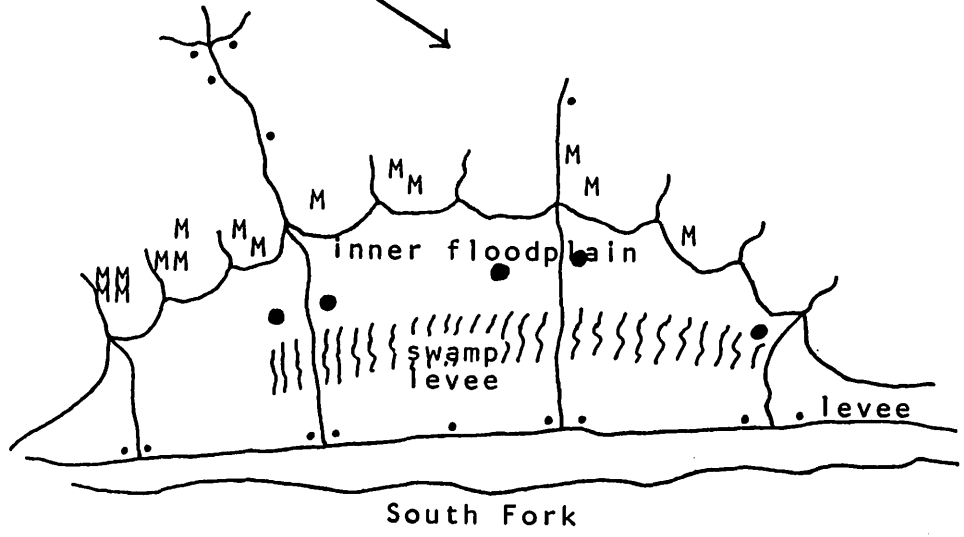
FIGURE 5 - Middle Woodland Settlement Pattern and Mound Center Distribution
Northern Shenandoah Valley



A
Schematized distribution of mound centers in Northern Shenandoah Valley

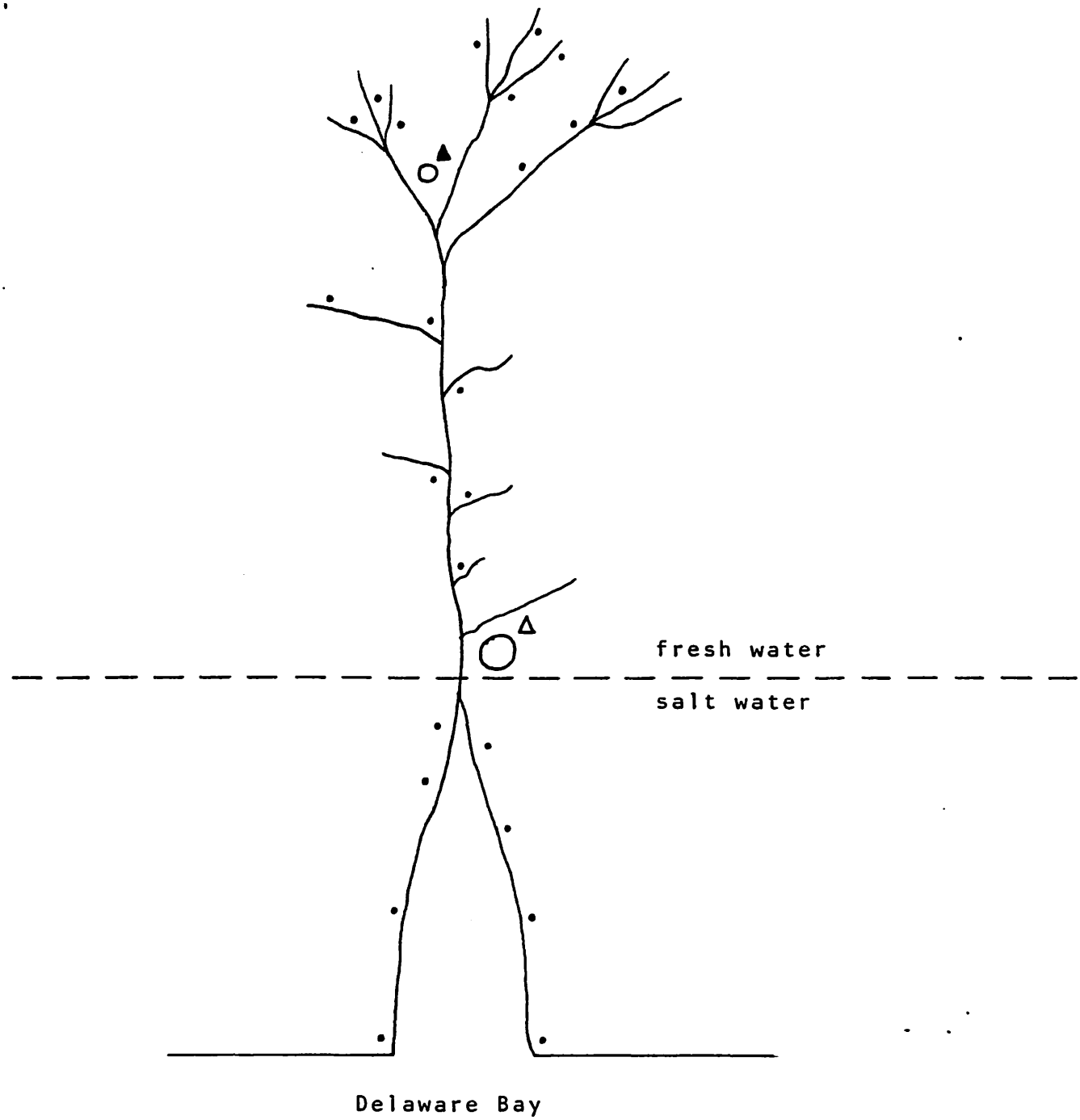
B
Cross section of Thunderbird Ranch





C
Plan view of portion of Thunderbird Ranch

M mound cluster
● sedentary micro-social unit base camp
• exploitive foray camp
□ major mound cluster
■ minor mound cluster



○ sedentary macro-social unit base camp
o sedentary micro-social unit base camp
Δ large cemetary (usually sedentary)
▲ small cemetary (usually sedentary)
• exploitive foray camp

FIGURE 6 - Middle Woodland Delmarva Adena
Sedentary Settlement Pattern Model

Figure 7

Distribution of reported Delmarva Adena cemetaries and hypothesized cemetaries

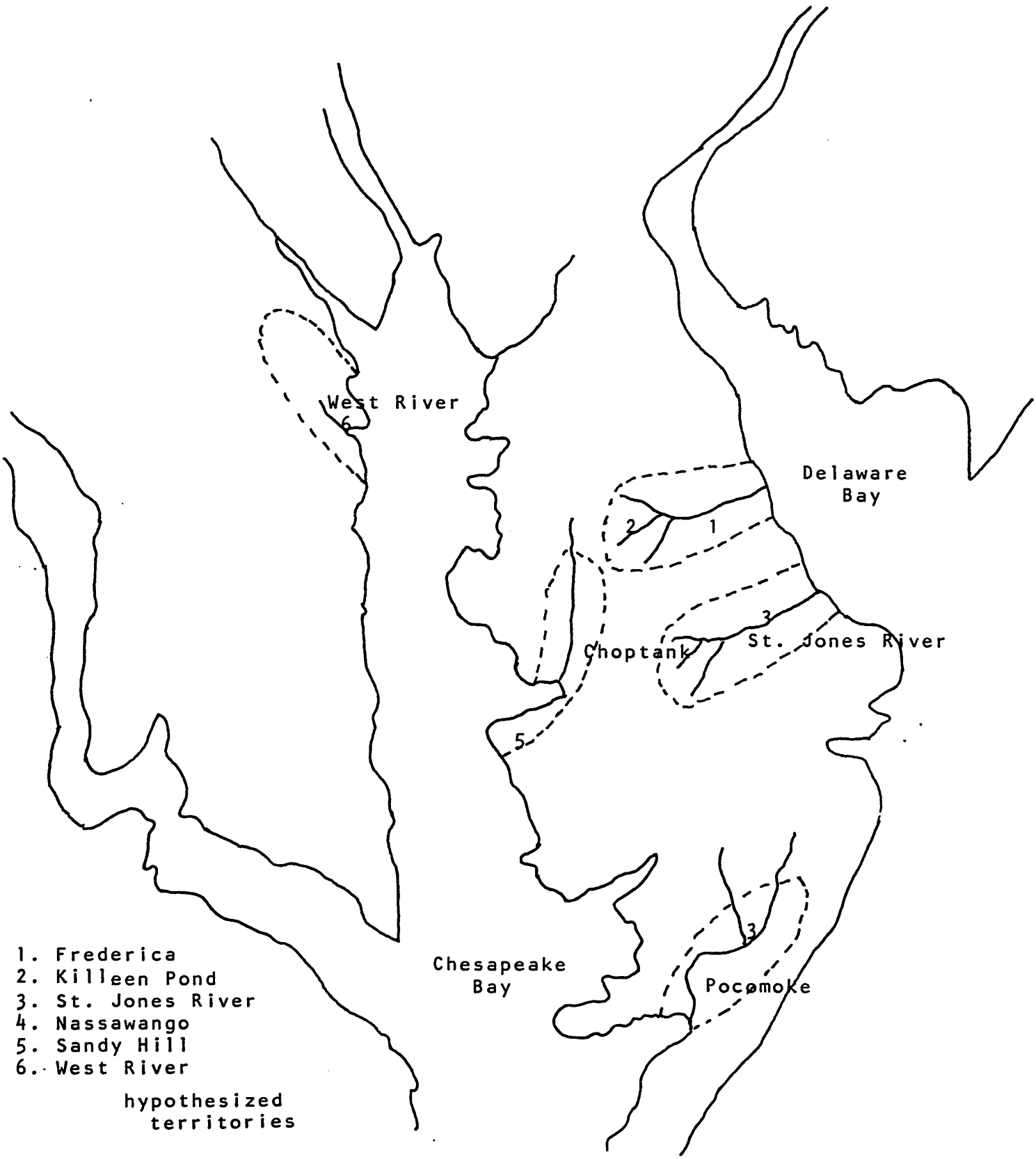
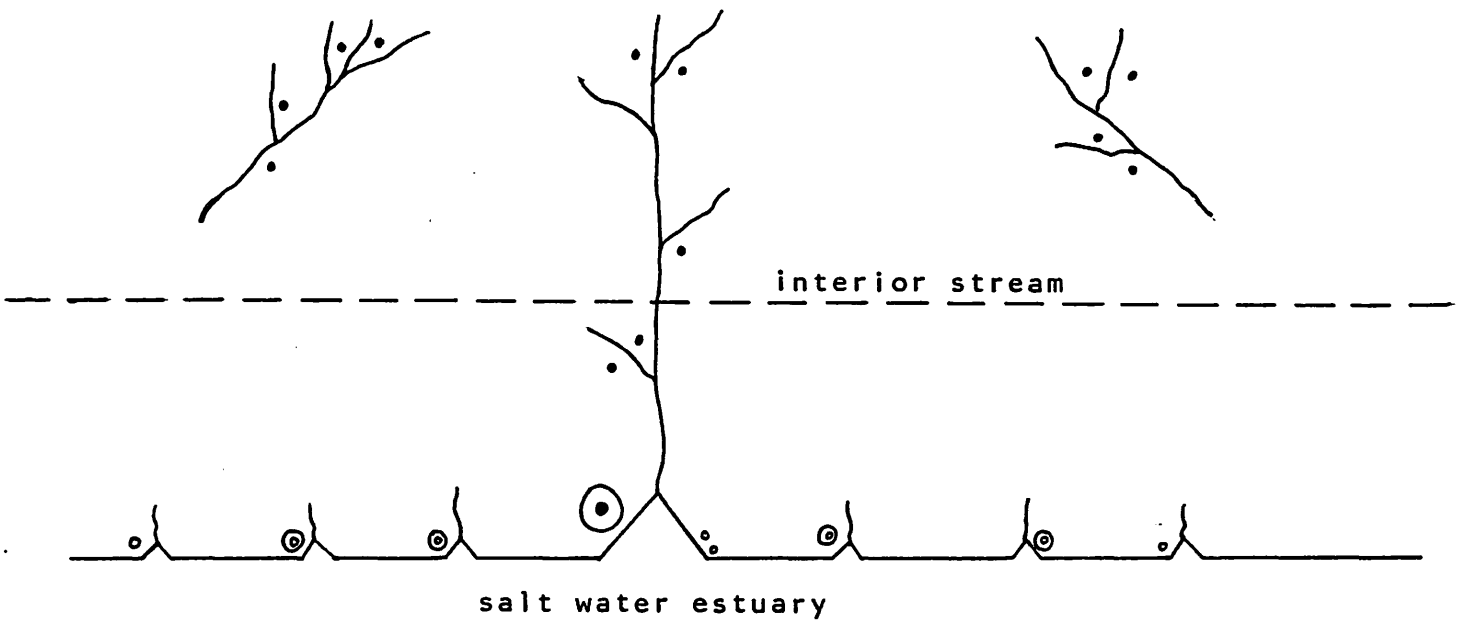
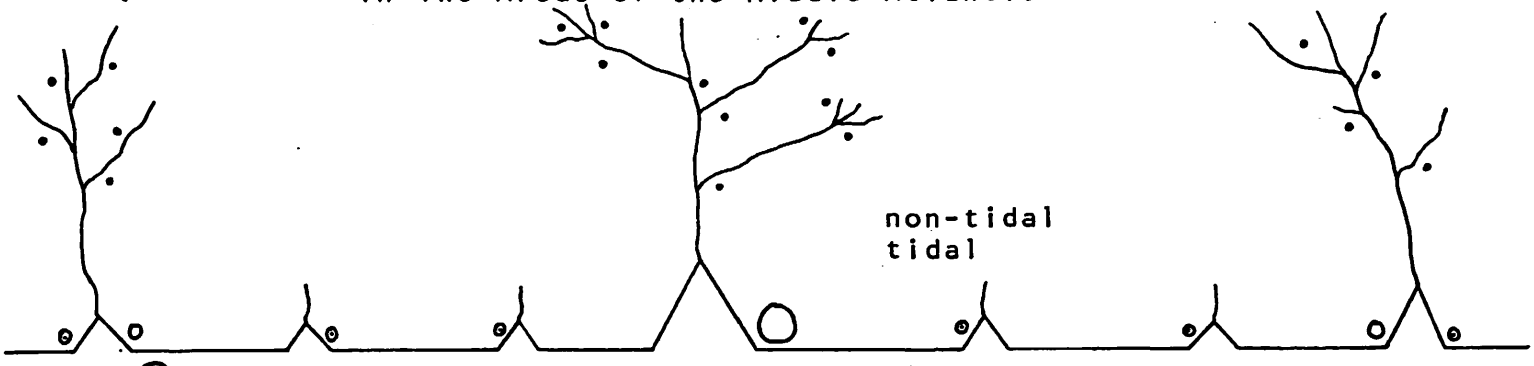


FIGURE 8 - Popes Creek Area Middle Woodland
Settlement Pattern Model



- ⊙ seasonal macro-social unit base camps (shell middens)
- ◎ seasonal micro-social unit base camps (shell middens)
- ∘ exploitive foray camps (shell middens)
- • exploitive foray camps (non-shell middens)

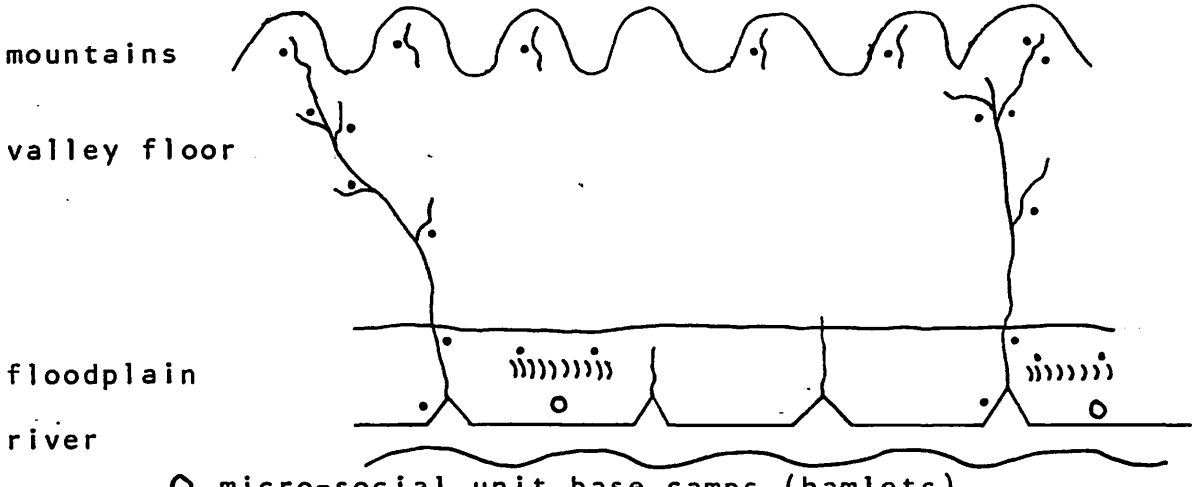
FIGURE 9 - Late Woodland Settlement Pattern Variations in Two Areas of the Middle Atlantic



macro-social unit base camp (village)
micro-social unit base camp (satellite hamlet/farmstead
exploitive foray camps (shell middens)
exploitive foray camps (non-shell middens)

A

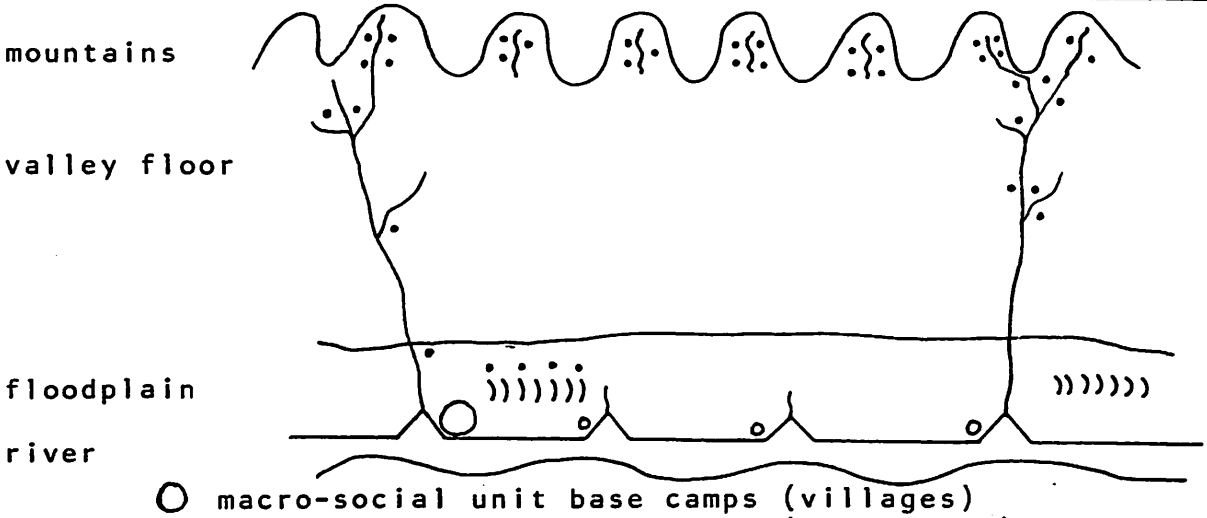
Late Woodland Coastal Plain Settlement Pattern Model



micro-social unit base camps (hamlets)
exploitive foray camps

B

Early Late Woodland Northern Shenandoah Valley Settlement Pattern Model



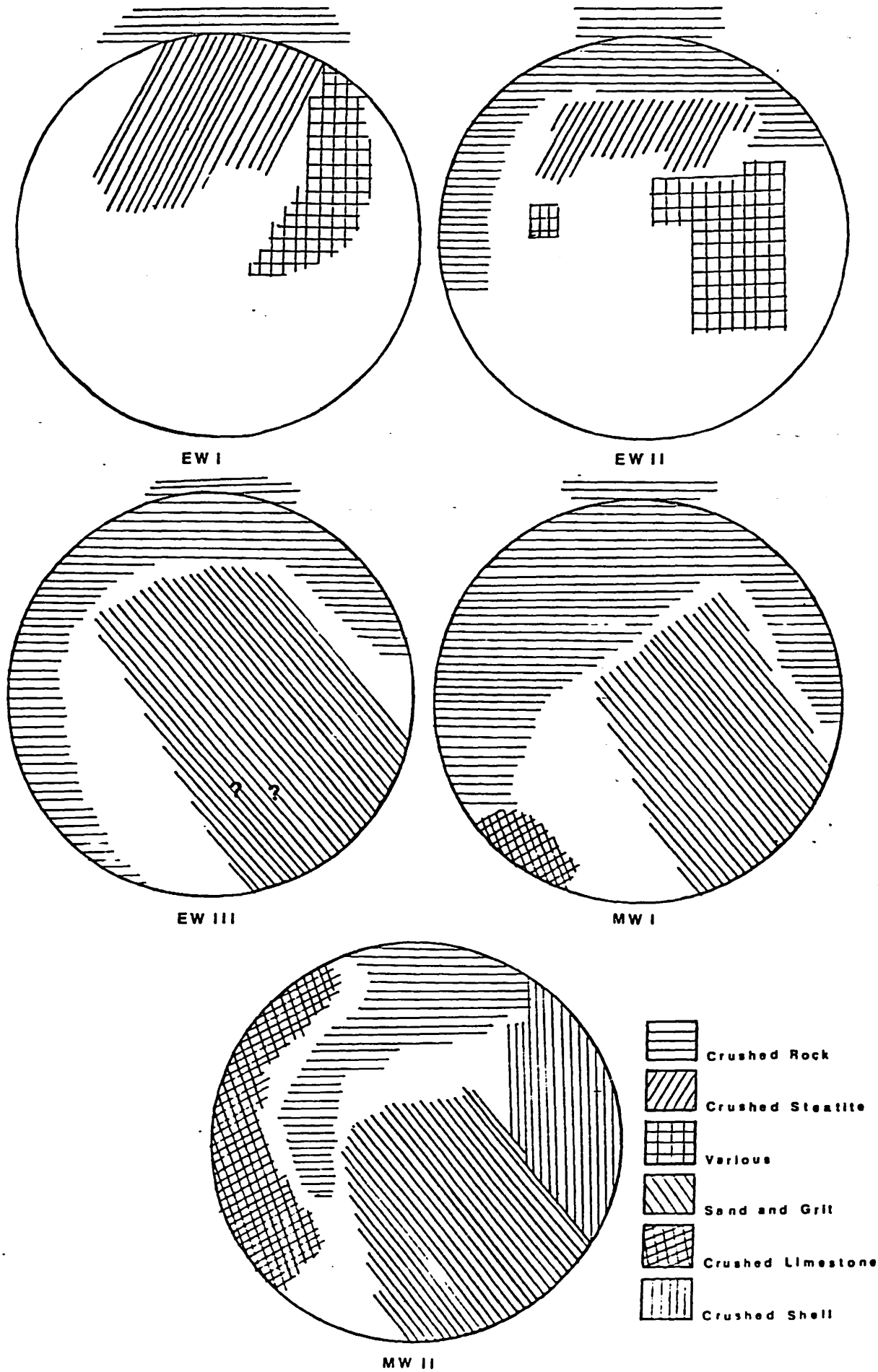
macro-social unit base camps (villages)
micro-social unit base camps (farmsteads)
exploitive foray camps

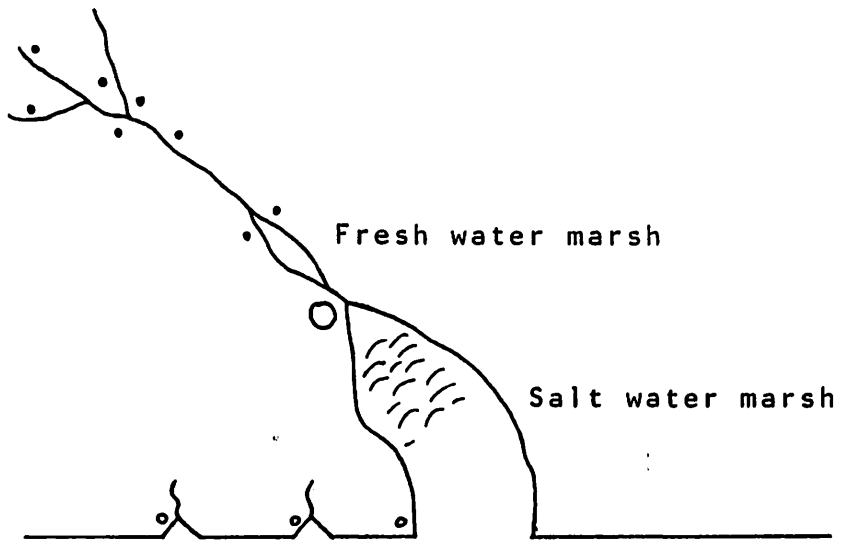
C

Late Late Woodland Northern Shenandoah Valley Settlement Pattern Model

Figure 10

Temper Grouping Distributions in Middle Atlantic from Early Woodland I (EW I) - Middle Woodland II (MW II)





○ sedentary base camp
∘ exploitive foray camp (shell midden)
• exploitive foray camp (non-shell midden)

FIGURE (no number--left out of text)
Eastern Shore Early Woodland Settlement Pattern Model

EARLY-MIDDLE WOODLAND CERAMIC TYPES

EARLY WOODLAND I

CRUSHED STEATITE
- MARCEY CREEK PLAIN

VARIOUS
- WARE PLAIN (CROAKER LANDING PLAIN?)

CRUSHED ROCK
- VINETTE I CORDMARKED

EARLY WOODLAND II

CRUSHED STEATITE
- SELDEN ISLAND CORDMARKED
- BARE ISLAND CORDMARKED

VARIOUS
- CROAKER LANDING CORDMARKED

CRUSHED ROCK
- VINETTE I-LIKE CORDMARKED
- EXTERIOR CORDED/INTERIOR SMOOTHED
- HALF MOON CORDMARKED

EARLY WOODLAND III

SAND AND GRIT
- ACCOKEEK CORDMARKED
- ELK ISLAND/STONY CREEK CORDMARKED
- PRINCE GEORGE CORDMARKED

CRUSHED ROCK
- EXTERIOR CORDED/INTERIOR SMOOTHED
- HALF MOON CORDMARKED
- DAMES QUARTER
- SWANNANOA CORDMARKED

MIDDLE WOODLAND I

CRUSHED LIMESTONE
- LONG BRANCH FABRIC IMPRESSED

SAND AND GRIT
- POPES CREEK NET MARKED
- ELK ISLAND/STONY CREEK NET MARKED
- ELK ISLAND/STONY CREEK CORDMARKED
- PRINCE GEORGE NET MARKED
- PRINCE GEORGE CORDMARKED

CRUSHED ROCK
- BRODHEAD NET MARKED
- SUSQUEHANNA NET MARKED
- WOODLAND CORDMARKED
- WOLFE NECK NET MARKED
- *COULBOURN CORDMARKED
- *COULBOURN NET IMPRESSED
- WOLFE NECK CORDMARKED
- SMALLWOOD NET MARKED
- ALBEMARLE NET MARKED
- ALBEMARLE CORDMARKED
- MAHONING WARE

MIDDLE WOODLAND II

CRUSHED LIMESTONE
- LONG BRANCH FABRIC IMPRESSED
- WATSON CORDMARKED
- WATSON FABRIC IMPRESSED

SAND AND GRIT
- SUSQUEHANNA CORDMARKED
- STONY CREEK FABRIC IMPRESSED
- STONY CREEK CORDMARKED

CRUSHED ROCK
- FABRIC IMPRESSED
- HELL ISLAND CORDMARKED
- HELL ISLAND FABRIC IMPRESSED
- ALBEMARLE FABRIC IMPRESSED
- ALBEMARLE CORDMARKED

CRUSHED SHELL
- MOCKLEY NET IMPRESSED
- MOCKLEY CORDMARKED

* CLAY OR SHERD TEMPERED

MIKE

HOLOCENE CLIMATIC CHANGE IN THE MIDDLE ATLANTIC AREA: PRELIMINARY OBSERVATIONS FROM ARCHEOLOGICAL SITES

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Division of Archeology
Maryland Geological Survey

and

Jay F. Custer

Department of Anthropology
University of Delaware

Paper presented at the 1982 Middle Atlantic Archeological Conference

ABSTRACT

Observations drawn from a variety of archeological sites in the central Middle Atlantic area are presented as possible indicators of mid-Holocene climatic change. Alluvial deposition records, sediment accretion in rockshelters, episodes of aeolian deposition, and evidence of extinct ponds indicate a series of depositional discontinuities that are dated roughly between 4200 and 2200 BP. These discontinuities are correlated with the xerothermic conditions of the Atlantic/Sub-Boreal period.

INTROUDCTION

Observations drawn from a variety of Middle Atlantic archeological sites indicate possible climatic change during mid-Holocene times. The sites (see Figure 1) exhibit depositional discontinuities that lend support to the existence of a warm/dry episode in the Middle Atlantic at around 4200 to 2200 BP. The evidence from these archeological sites, origionally summarized by Custer (1978) and expanded here, appears stratigraphically as one of the following: discontinuity in alluvial deposition records, discontinuity in sediment accretion in rockshelter sites, major episodes of aeolian deposition, and sedimentation from Holocene ponds. While these observations are preliminary, they are presented in the hope that comparison with independent sources of data will add to our understanding of Holocene climatic change.

ALLUVIAL DEPOSITION

Four sites with well-dated archeological components provide evidence of breaks in the alluvial stratigraphic record. The Faucett site, located in the floodplain of the Upper Delaware River Valley of Pennsylvania, shows a distinctive increase in the rate of sediment accumulation between the time periods of 3380 BP and 2650 BP (see Figure 2) based on radiocarbon dates for a series of cultural features (Kinsey 1975:64, 96-97; Ritter et al. 1973). The increase in sediment accumulation is indicative of the transition from dry to wet environments (Knox 1972). The Miller Field site, also in an Upper Delaware River Valley floodplain, shows a discontinuity in particle size in samples taken throughout the profile (see Figure 3). Two horizons show a marked increase in silt-sized particles with significant concomitant reduction in the coarse sand-sized particles (Kraft 1970: 10). The change in particle size indicates a shift from a higher energy depositional environment to a lower energy environment. Based on a series of radiocarbon dates and associations with diagnostic projectile point forms dated for the local area, the dates for the depositional discontinuity at the Miller Field site are from 3790 BP to 3400 BP (Kraft 1970:27, 31, 33). The Kent Halley site, located on Bare Island in the Lower Susquehanna River Valley, also shows a depositional discontinuity. A buried paleosol with high organic content was encountered beneath a layer of coarse sands and gravels indicative of deposition in a fairly high energy environment (Kinsey 1959: 111-112). Artifacts were found in both horizons and a series of micro-faunal remains indicate a transition from an initial wet environment suggesting a river edge swamp to a dry period in which the site was a gravelly and sandy river edge beach (Kinsey 1969:112). Based on diagnostic artifacts from the site, the transition in depositional environments most likely took place beginning around 3680 BP, although it could have occurred as early as 3930 BP. The end of site use dates to around 3520 BP (Kinsey 1959:114). The Maddox site and the Corral site in the Shenandoah Valley, Virginia, show a correlation of alluvial processes and site occurrence. Curry (1978) notes that a buried point bar deposit was discovered at the Maddox site. This point bar indicates

a marked change in the channel geometry of the Shenandoah River in mid-Holocene times with the date of activity based on reconstructions of floodplain surfaces. Also, Curry notes that the point bar deposit seems to be associated with a braided stream channel which represents an equilibrium adjustment of the Shenandoah in the face of decreased discharge in relation to bed load. Such a change in bed load/discharge equilibrium could be associated with drier climatic intervals (Morisawa 1968). Excavations at the Corral site, which is located in the same floodplain, indicate that the earliest cultural deposits in the floodplain are associations of Savannah River Broadspears and steatite bowls. Absence of earlier components is probably due to destruction of the sites by the shifting channels of the Shenandoah. It is only after a stable landscape is achieved that sites are preserved. Based on dates for the diagnostic artifacts from other sites in the Middle Atlantic and Southeast (Coe 1964:44-45, 119), the stable landscape would have to post-date 4140 BP and, therefore, the dry/braided stream conditions would have occurred prior to this date.

ROCKSHELTERS

Rockshelter sites also provide a useful source of information on stratigraphic discontinuities. Adovasio et al. (1977, 1978, 1979) have compiled stratigraphic data from the Meadowcroft Rockshelter in southwestern Pennsylvania. Using the percentage of roof fall over time (see Figure 4), Adovasio et al. (1977:33) demonstrate pronounced episodes of roof fall that seem to last up until about 3300 BP. After this point in time, there is a period of decreased sediment accumulation spanning from 3300 BP to 2850 BP (Adovasio et al. 1977:33). Decrease in accumulation is most prominent from 2850 BP to 2200 BP, a period represented by little roof fall and a series of clay/silt laminae that characterize the dripline accumulations within the shelter (Adovasio et al. 1977:37). Roof fall again increases during the period from 2200 BP to around 1200 BP. Adovasio et al. (1979:29) postulate that periods of increased roof fall were promoted by colder and/or wetter periods. Warmer and/or drier periods, in turn, would be characterized by decreased roof fall and possibly (Adovasio et al. 1979:28) by the accumulation of clay/silt laminae.

Data from the Sheep Rock Shelter Site, also in Pennsylvania, show a pattern of roof fall episodes and sedimentation similar to Meadowcroft (see Figure 5). Bebrich and Willey (1968:57-58) note that an episode of high rates of sedimentation from roof fall (1968:43) occurs from at least 7300 BP up to 5500 BP based on radiocarbon dates from the site. After 5500 BP, the rate of sediment accretion decreases until it reaches a minimum at 3060 BP. A marked increase in roof fall is again noted at around 3000 BP.

AEOLIAN DEPOSITION

The presence of aeolian deposits in mid-Holocene contexts within the Middle Atlantic area has been noted as a number of archeological sites. For the Western Shore of the Upper Chesapeake Bay region, Curry (1980) has described a series of sites buried by aeolian sands. While most of these sites have failed to yield buried diagnostic artifacts, surface and plowzone artifacts indicate an essentially Late Archaic date (circa 4000 to 2500 BP); sites producing diagnostics from the subsoil confirm this chronological placement. The Harmans North site, located on a paleoterrace of a third or fourth order tributary of the Patapsco River, has yielded Accokeek ware sherds from a depth of 15 to 56 cm, and stemmed and notched projectile points to 68 cm below surface. The ceramics range in date from 2700 to 2400 BP (Artusy 1976:3), while the Late Archaic projectile points span a period from 3680 to 2400 BP (Kinsey 1975:96-97; Kinsey 1979:30). Artifacts recovered from the Harmans South site, situated in a similar setting, include Marcey Creek pottery dating from 3200 to 2900 BP (Artusy 1976: 2) and an Orient Fishtail point type placed at 3290 to 2760 BP (Kinsey 1975:96-97); cultural material was found up to 76 cm deep. To the south of the two Harmans sites, the Baldwin site is located atop a high bluff overlooking the confluence of the Patuxent River and a low order tributary. Here, Accokeek sherds (2700 to 2400 BP) and various broadspear and stemmed projectile point types ranging in date from 3940 to 2400 BP (Kinsey 1972:425-430; Kinsey 1975:96-97) are found to depths of up to 59 cm. Work by Gardner (1978a) at the Harundale site along Marley Creek uncovered evidence of an apparent single event hearth buried by wind-blown sands. The hearth, resting on an older surface exhibiting clay ped development (Gardner 1978a:15-16), was directly associated with two Brewertown-variant point types probabl dating from 5360 to 3710 BP (Kinsey 1972:404-407); a Bare Island projectile point type dated between 3800 BP and 3000 BP (Kinsey 1959:114) was found immediately above the hearth at the base of the plowzone. In each of these instances, a significant depositional event is demonstrated for the period ranging roughly from 4000 BP to 2400 BP. Aeolian deposition of sand-sized particles varied in thickness from 10 to 60 cm during this period. Burial has been shown (Curry 1980) to be directly related to xerothermic conditions.

HOLOCENE PONDS

In addition to stratigraphic data, changing settlement pattern data can also provide clues to environmental change. Although many settlement pattern studies are based on paleoenvironmental data (Gardner 1978b), others provide information on correlations of human settlement choices and changing geomorphological development of special landforms. Recent investigations by Stewart (1980) in the Great Valley of Maryland and Pennsylvania have demonstrated an association of aboriginal settlement patterns and now-extinct ponds. The evidence for these ponds consists of poorly drained floodplain marls containing fresh water snail shells (Stewart 1980; Matthews 1962:50). Results of several highway-related archeological surveys in this area (Epperson 1979, Curry 1981) have supported Stewart's findings. Several small

sites and isolated artifacts have been recorded in situations overlooking extinct ponds. Based on projectile point chronologies, types from the Paradise and Avilon tracts, including Morrow Mountain II and Lackawaxen, indicate cultural manifestations spanning the 6500 to 3700 BP (Coe 1964:121; Kinsey 1972:411) time range for these pond-edge sites. Diagnostic artifacts recovered from sites located atop the marls consistently indicate a later date. The Hause Farm and Marquette sites both produced triangular projectile points and Page and Shepard ceramic wares, all dating from around 1200 to 400 BP (Kinsey 1972:442; Peck and Bastian 1977:8; Peck 1980:15). Other diagnostic tools recovered from the marl soils in this area include stemmed and broad-spear point types ranging in age from 3800 to 2400 BP (Kinsey 1972: 420, 429; Kinsey 1975:96-97; Stephenson 1963:182). Although tentative, these preliminary data appear to offer corroborative archeological substantiation of the hypothesized mid-Holocene climatic shift. Evidence from the Avilon and Paradise tracts seems to indicate at least a Middle through early Late Archaic (i.e. 6500 to 3700 BP) orientation of exploitative patterns around extant ponds. Artifactual data recovered from the marly soils indicate probable drying of the ponds beginning around 3800 to 2400 BP, with pond extinction and fillin complete by the time the Late Woodland sites are established at Hause Farm and Marquette (circa 1000 BP).

SUMMARY

Data from a wide range of archeological sites in the Middle Atlantic area have provided potential indication of a climatic shift in mid-Holocene times. A series of alluvially buried sites all demonstrate stratigraphic discontinuity between roughly 4000 BP and 2600 BP. In each case, the discontinuity can be related to hypothesized changes in stream morphology relating from climatic change, i.e., a change from a dry to a wet environment. Roof fall at rockshelter sites has also been shown to be directly related to wet/dry episodes. A dry environment is at least one prerequisite for aeolian deposition of sand. Sites buried by wind-blown sand demonstrate at least temporary, local dry conditions, and major episodes of aeolian activity at a number of sites discussed herein may indicate extended dry periods. And finally, evidence presented from extinct-pond sites in the Great Valley demonstrate a dry period beginning at around 3700 BP based on prehistoric settlement pattern shifts.

Figure 6 attempts to graphically represent the climatic shift postulated above. In general terms, it can be seen that dry conditions are indicated at each site at some point in the circa 4200 BP to 2200 BP time period, and a wet-dry shift is also noted at individual sites during this time span. These data compare favorably with climatic reconstructions proposed by others (Wendland and Bryson 1974; Carbone 1976; Ogden 1977) who note a warm interval during the Atlantic/Sub-Boreal transition (i.e., circa 5000 BP to 2600 BP). Lag periods may account for some differences between the time of initial climatic change and the first appearance of evidence of that change in the sedimentary record. Knox (1972) indicates that such a lag period can

be expected in alluvial environments during a transition from dry to moist conditions. Other local lag intervals are also probably evident among the initial climatic shift, the response of the vegetation, the response of the geomorphological processes, and the "fossilization" of those processes in the sedimentary record.

The cultural implications of this warm/dry interval during mid-Holocene times are not fully understood at this time although several hypotheses have been offerred (Custer 1978; n.d.). However, the significance of the dry period with respect to the effects on regional biota is accentuated by Brush's (1982:25) recent conclusion that "in Maryland, the prime factor (controlling the aggregation of plant species into communities) is apparently the availability of water." Given this assumption, the eventual cultural implications should prove to be substantial. Hopefully, this paper will spur additional research (archeological and otherwise) aimed at more fully demonstrating mid-Holocene climatic change and, ultimately, at interpreting the effect of that change on aboriginal settlement and subsistence patterns, both locally and regionally.

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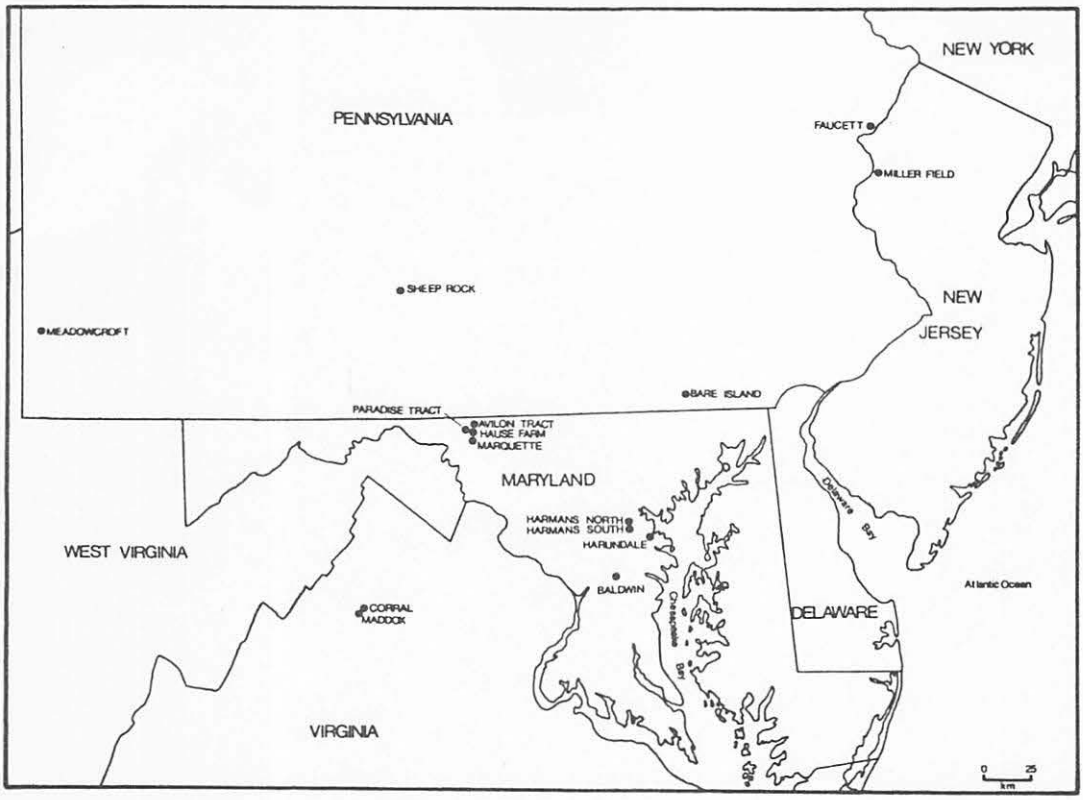

Figure 1. LOCATION OF SITES DISCUSSED IN TEXT.

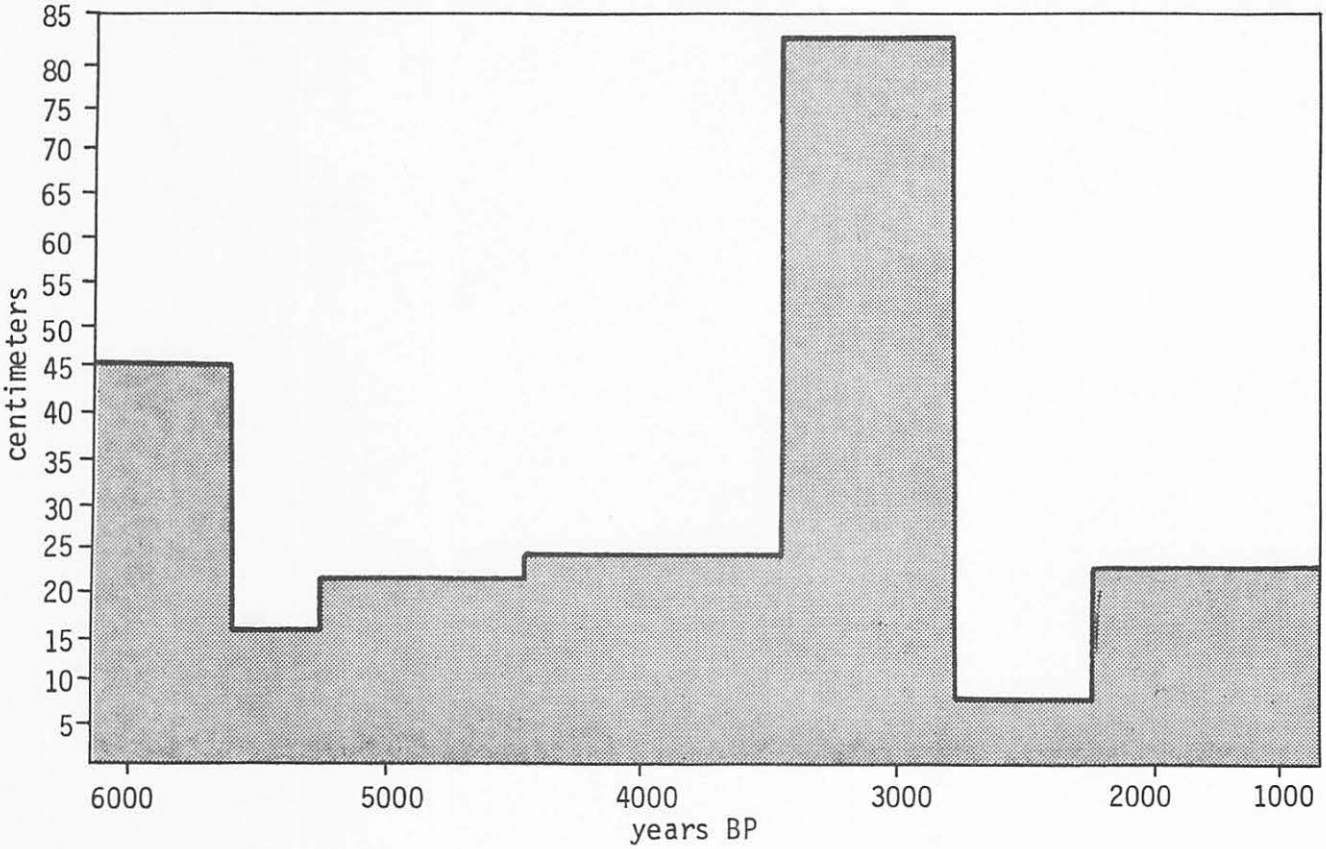

Figure 2. FAUCETT SITE, FLOODPLAIN ACCRETION THROUGH TIME.
(After Kinsey 1973: Figure 34)

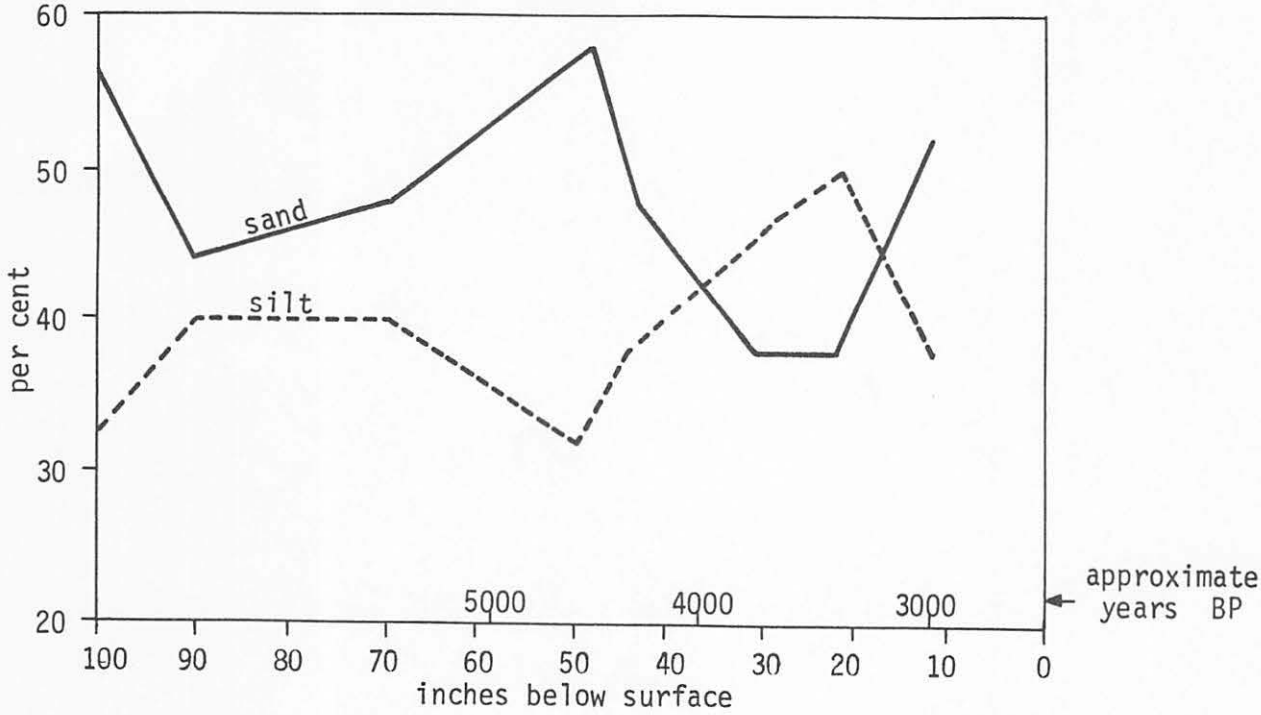

Figure 3. MILLER FIELD SITE, SAND AND SILT FRACTION THROUGH TIME. (Adapted from Kraft 1970: Table 1)

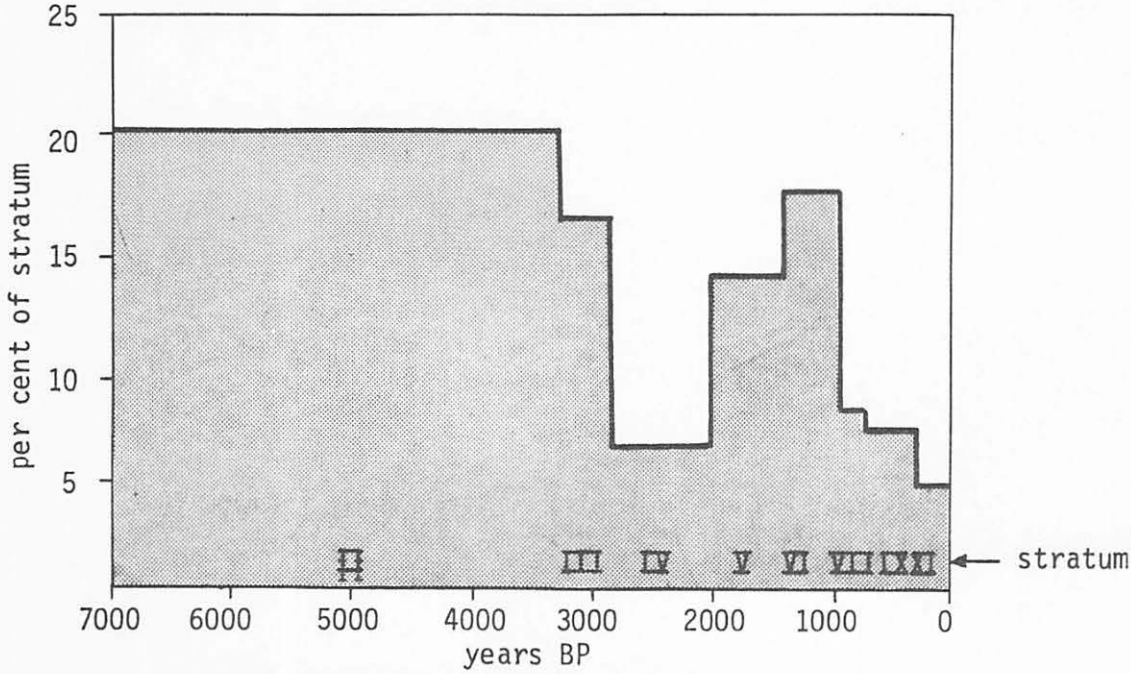

Figure 4. MEADOWCROFT ROCKSHELTER, ROOF FALL THROUGH TIME. (Abstracted from Adovasio et al. 1978: Table 2; Adovasio et al. 1979: Table 1)

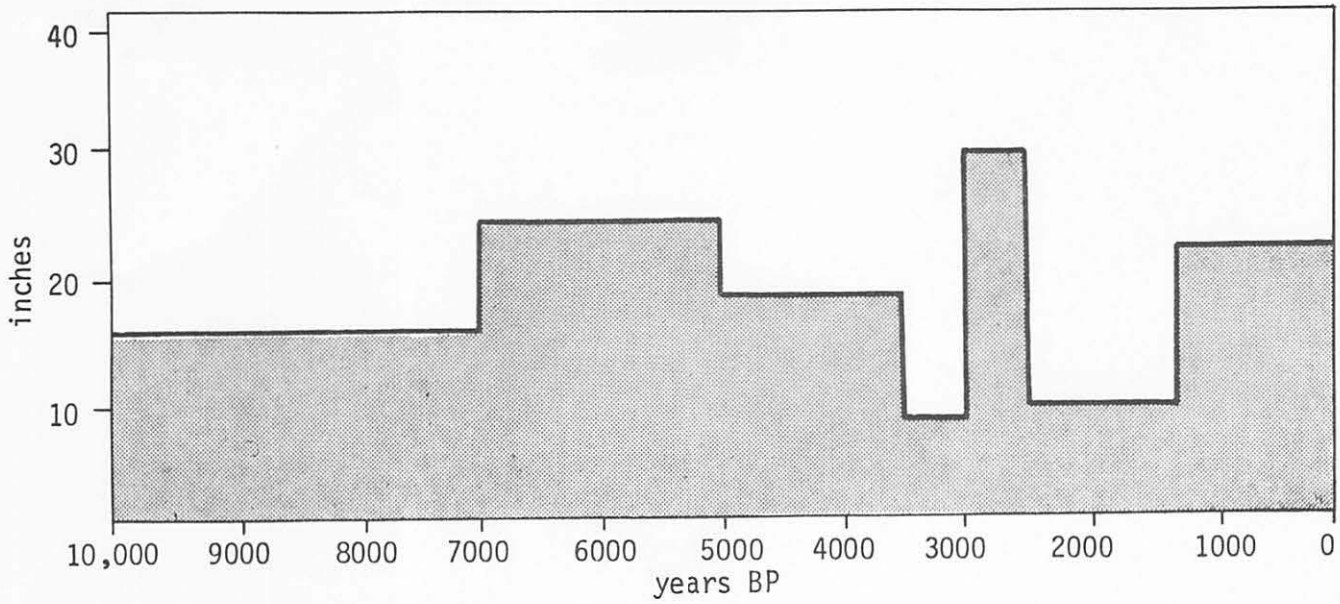

Figure 5. SHEEP ROCK SHELTER, ROOF FALL ACCRETION THROUGH TIME. (Abstracted from Bebrich and Willey 1968:56-58)

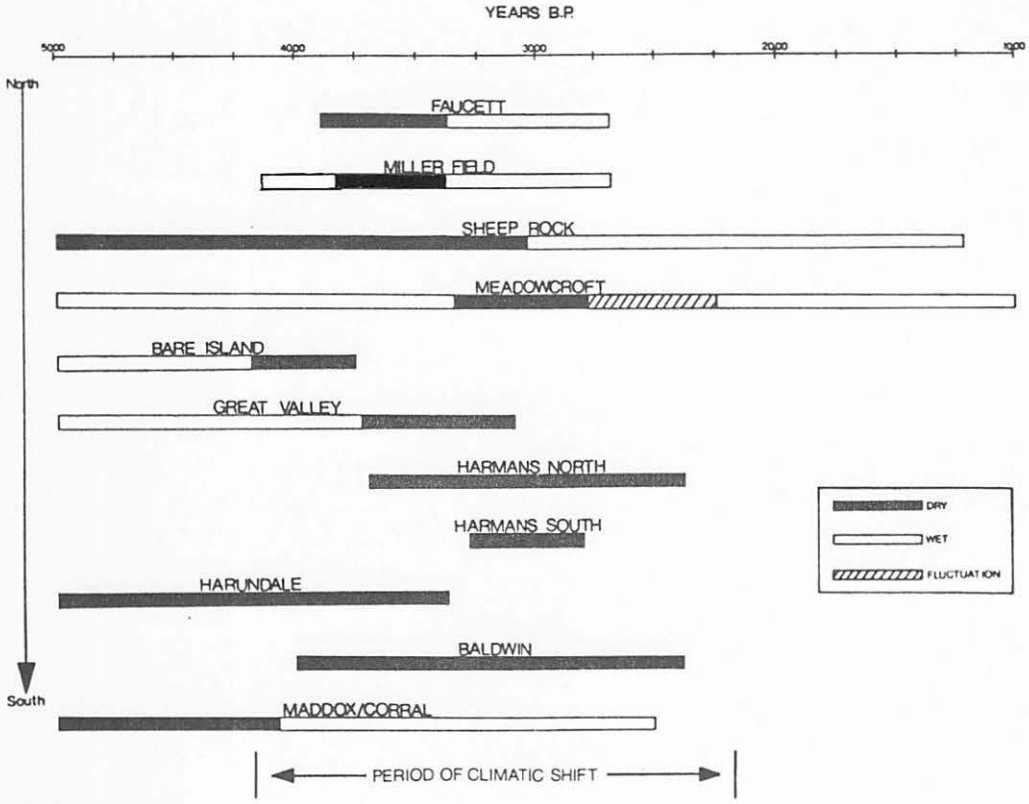

Figure 6. TIME CORRELATIONS OF STRATIGRAPHIC DISCONTINUITIES.

RMS

Late Archaic - Middle Woodland Continuity in Delaware

by: Jay F. Custer
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The purpose of this paper is to outline the current interpretation of the archaeological record in Delaware for the time period between 3000 BC and AD 1000, and present this interpretation for discussion at the Delmarva Archaeological Colloquium. Responses which question the validity of this interpretation and the supporting data or which consider this interpretation's application to other adjacent areas of the Middle Atlantic are invited and encouraged so that a dialogue may be developed.

Most of this paper will be organized in an outline format. In most cases the interpretations presented are based upon data gathered as a part of a two-year review of the current state of archaeological research in Delaware (Custer 1980, 1981) and a recent review article on settlement patterns in the Piedmont Uplands (Custer and Wallace 1982). The specific site data will be listed as applicable; however, general citations to these summary works are not included in order to limit the length of this paper.

Basic Proposition

1. The time period from 3000 BC to AD 1000 in Delaware, and probably most of the Delmarva Peninsula, is characterized by a continuity of adaptation including settlement-subsistence patterns, tool kits, participation in exchange networks, and appearance of incipient ranked social organizations.

2. This continuity of processes is sufficient to warrant the use of the term "Woodland I" to describe this time period.

Theoretical Position

1. The relatively continuous variation of the archaeological record in time and space requires division into analytical units for meaningful study.

2. The principles for developing analytical units should reflect total lifeways, or adaptations, not just diagnostic artifact styles.

3. Proposed attributes include settlement-subsistence patterns, tool kits, participation in exchange networks, social organizations.

4. The above attributes should be considered within a paleo-environmental context.

Paleoenvironmental Context

1. The time period in question corresponds to the climax of the mid-postglacial xerothermic, its amelioration, and the establishment of relatively modern conditions (Carbone 1976; Custer 1978).

2. Pronounced environmental stability is indicated by some pollen diagrams (Table 1: 7NC-E-41).

3. Moisture stress and drastic changes in subsistence resource distributions are the major features of the paleoenvironment that would affect human populations.

4. Sea level rise begins to slow down and create relatively stable estuarine resource settings.

Woodland I Model for Delaware

1. Table 2 lists the recognized cultural variation in time and space through the Woodland I Period in Delaware (diagnostics are noted in Table 3).

2. The term "complex" implies a continuity of adaptation in time and space and is preferred to the more restricted term "phase" which is usually applied to diagnostic artifact styles

Continuity of Adaptations through the Woodland I Period

1. Settlement-subsistence patterns

   a. Overall shift from diffuse to focal adaptations
   b. Large base camps found in highly productive environmental zones (Fig. 1).
      1) Larger than preceding Middle Archaic base camps
      2) Some appear to be occupied through more seasons than preceding base camps (almost year-round?)
   c. Coastal Plain Settlement Pattern
      1) Focus on major floodplains and mid-drainage freshwater, saltwater inface zones (Fig. 2).
      2) Procurement sites in a variety of specialized settings
      3) Previous Middle Archaic base camp sites at interior swamps grow in size (eg. Churchman's Marsh-Clyde Farm)
   d. Piedmont Uplands Settlement Pattern
      1) Focus for base camps on floodplains and well-watered lowlands
      2) Non-functionally specific, very diffuse procurement sites found away from well-watered areas
      3) "Tethered nomadism" settlement pattern focused on available surface water.
   e. Intensification of food production through intensive gathering of plant foods, estuarine resources (especially shellfish), anadramous fish; use of storage features.

overall settlement pattern and functional site types data?

ask R.T. about floral analysis at Delaware Park Site

f. Overall trend toward intensive use of a relatively more limited range of food resources in circumscribed environmental zones seen as an indication of a conservative settlement-subsistence strategy utilizing the most abundant and predictable resource locations. This is particularly true for potable surface water.

g. A consequent development is increased sedentism.

2. Tool kits

will vary between areas

a. A wider variety of tools including more plant processing tools and specialized cutting tools (broadspears).

b. Container technology (stone bowl and ceramics) develops increasing cooking efficiency and storage potential. These become more useful as the degree of sedentism increases.

c. Facilities (pits) enhance role of containers for storage and are also linked to increasing sedentism.

3. Exchange

a. A variety of non-local lithic raw materials appear in greater abundance than previously seen.

b. In Delaware, major non-lithic raw materials include argillite, rhyolite, Flint Ridge chalcedony, and steatite.

c. Raw materials linked to specific artifact forms, mainly broadspears, bifaces in various stages of reduction, and stone bowls.

d. Debitage of exotic raw materials found at some sites, but not all.

e. Finished artifacts of exotic raw materials found at varied types of sites including base camps and procurement sites.

f. Exchange viewed as the result of a need for sociotechnic artifacts in the face of population growth, occasional surpluses of labor, and the need for high quality materials for production of knife forms with low width/thickness ratios.

4. Incipient Ranking

a. Woodland I societies viewed as ranked in Fried's (1967) sense of the term.

b. Indicators of ranking include caches of specialized artifact forms usually manufactured of exotic raw materials. These caches are viewed as temporary surpluses that are removed from circulation within the exchange system as a form of conspicuous consumption.

c. Mortuary ceremonialism is the major indicator of ranking with certain individuals taking symbolic indicators of their differential status into the grave with them thereby removing the artifacts from circulation in exchange networks.

d. Ultimately, the exchange systems are probably organized and maintained by limited segments of Woodland I societies and may operate in a manner similar to the kula ring of Melanesia or the varied trade networks of the Tsembaga of New Guinea.

Spatial-Temporal Variation - special features of each of the cultural complexes listed in Table 2 are listed below.

1. Clyde Farm and Barker's Landing Complexes
   a. Correspond to traditional "Late Archaic", "Transitional", or "Broadspear Tradition" cultures.
   b. Mark the initial appearance of the patterns that distinguish the Woodland I Period.
   c. Clyde Farm Complex would look more like typical Late Archaic cultures and exotic materials, although present, are minority compositions of the raw material assemblages.
   d. Barker's Landing Complex includes more non-local than local raw materials and resembles the classic "Transitiona sites described by Witthoft.
   e. At the Barker's Landing Site exotic raw materials are apparently exchanged as primary bifaces and then reduced to tools following a normal biface reduction trajectory.
   f. Occasional caches of argillite primary bifaces noted (Kiunk Ditch) and are viewed as incipient forms of conspicuous consumption.
   g. The development of the exchange and conspicuous consumptic is linked to population growth in circumscribed mid-drainage environments and attendant intensification of food production, most likely in the form of intensive gathering.

2. Wolfe Neck and Delmarva Adena Complexes
   a. Relationship between Wolfe Neck and Delmarva Adena Complexes is the same as the relationship between Clyde Farm and Barker's Landing Complexes.
   b. Basic settlement patterns continue with some apparent growth in local population densities.
   c. Delmarva Adena, which is found in the same location as the preceding Barker's Landing Complex, shows an increase in the complexity of the exchange systems to include diagnostic Adena materials and an increase in the complexity of the conspicuous consumption to include well developed mortuary ceremonialism (Frederica, Killans Pond, and St. Jones Adena sites).
   d. The more complex exchange and mortuary systems of the Delmarva Adena may represent the development of supralocal networks of social relationships where higher ranked kin groups sponsor special rituals, such as burials, and create special social situations where ritualized exchange of special artifacts are carried out. Figure 3 summarizes potential relationships among Delmarva Adena sites.

3. Carey Complex
   a. Long distance trade and exchange networks are no longer in operation on the Delmarva Peninsula. Argillite and rhyolite exchange seems to continue, but is somewhat reduced in quantity.
   b. Basic adaptation remains the same.
   c. The disappearance of the mortuary complexes and long distance trade seems to indicate that the societies of the Delmarva Peninsula no longer are incipient ranked

societies and have returned to being egalitarian.

d. Amelioration of the moisture stress, and expansion of the size of the productive estuarine zones due to slow sea level rise may have reduced to degree of circumscription of social units so the local population pressures did not cause intensification of food production and attendant social changes. Fissioning of communities may have occurred rather than the development of more complex social organization are evident in the archaeological record.

4. Delaware Park and Late Carey Complexes
   a. Continuity of basic patterns of the Carey Complex
   b. Changes in artifact styles seen in Delaware Park Complex not seen as indicative of changes in basic adaptation.

5. Webb Complex
   a. St. Jones Neck Comprehensive Survey seems to indicate an absence of large base camps during this complex.
   b. Absence of large base camps during this complex seen as indicative of the fact that the process of fissioning of communities that might have begun as early as Carey Complex times has finally taken place.
   c. New clusters of smaller base camps may have been faced with a circumscription that created the necessary conditions for the re-emergence of ranking within the social organizations. Island Field mortuary site represen one of the centers of the emerging ranked societies. However, evidence from Island Field suggests that only individuals are ranked, not kin groups as in the Delmarva Adena case. Exchange networks associated with Island Field mortuary complex are more diffuse than the Adena networks.

End of the Woodland I Complex

1. By AD 1000 the exchange systems, mortuary ceremonialism and settlemont patterns seem to change.

2. Large base camps, or villages appear at interface zones of the Delaware Bay Coastal Zone and the mid-drainage zone in Kent and Sussex County.

3. New Castle County sees a basic continuity of settlement and subsistence systems.

4. The adoption, to varying degrees of agricultural food production systems may play a role in these changes.

5. Societies of Delaware after AD 1000 are "tribalized" in Fried's sense of the term.

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Table I: Pollen Percentages from Dated Features at 7NC-E-41

Feature	Date	Lab #*	Grasses	Herbaceous	Wetland	Total NAP**	Pine	Oak	Elm	Hickory
Fea. 63	AD 640	UGa-3439	18.3	23.3	18.3	59.9	5.8	8.7	7.2	2.6
Fea. 51	AD 455	UGa-3438	24.6	14.9	19.8	59.3	7.7	11.1	8.2	0.0
Fea. 39	AD 275	UGa-3501	24.4	22.9	16.6	63.9	7.8	10.2	7.3	0.4
Fea. 56	AD 100	UGa-3467	20.8	20.3	21.3	62.4	7.8	10.9	7.2	0.5
Fea. 45	AD 85	UGa-3503	22.3	17.1	19.7	59.1	9.8	14.0	12.5	2.6
Fea. 43	AD 80	UGa-3465	18.2	26.1	19.1	63.4	6.3	9.2	7.3	1.2
Fea. 12	AD 65	UGa-3504	17.8	21.3	20.8	59.9	8.4	9.9	7.9	0.9
Fea. 149	10 BC	UGa-3500	18.9	21.0	12.6	52.5	8.0	12.2	7.6	2.6
Fea. 138	740 BC	UGa-3469	17.6	22.3	19.2	59.1	6.0	9.1	9.3	2.5
Fea. 94	1850 BC	UGa-3440	15.9	24.2	17.6	57.7	7.9	11.0	7.9	1.3

Source: Thomas (1981:IX-135)

*Wherever radiocarbon dates from Delaware are used in the text, the laboratory number is noted in parentheses following the date or in footnotes. Appendix I lists all radiocarbon dates from Delaware with the laboratory number, radiocarbon years, standard deviation, site location, and significant associated artifacts

**Non-arboreal pollen

Table 2: Woodland I Culture Complexes

Date	Low Coastal Plain Sussex County	Low Coastal Plain Kent County	High Coastal Plain New Castle County	Piedmont/Fall Line New Castle County
AD 1000	Late Carey Complex	Webb Complex		Delaware Park Complex
AD 500				
		Carey Complex		
AD 0	Oxford? Rickerton?	ceremonial/burial aspect presently unrecognized		
600 BC	Wolfe Neck Complex	Delmarva Adena Complex	Wolfe Neck Complex	
3000 BC	Clyde Farm Complex	Barker's Landing Complex	Clyde Farm Complex	

Table 3: Woodland I Complexes and Diagnostic Artifacts

Late Carey Complex

Mockley/Claggett ceramics
Large triangular projectile points

Webb Complex, Delaware Park Complex

Hell Island ceramics
Misc. stemmed projectile points
Jacks Reef pentagonal projectile points (Webb Complex only)

Carey Complex

Mockley ceramics
Rossville stemmed projectile points
Fox Creek projectile points (southern Delaware only)

Wolfe Neck Complex

Wolfe Neck ceramics
Susquehanna Series ceramics (northern Delaware only)
Misc. stemmed projectile points

Delmarva Adena Complex

Adena side and corner notched projectile points
Coulbourn ceramics
Misc. stemmed projectile points

Clyde Farm Complex and Barker's Landing Complex

Bare Island/Lackawaxen projectile points
Broadspears
Fishtail projectile points
Marcey Creek and Dames Quarter ceramics
Steatite bowls
Long projectile points (Clyde Farm Complex, northern Delaware only)
Selden Island ceramics (Clyde Farm Complex, northern and central Delaware only)

FIGURE 1: LATE ARCHAIC/WOODLAND I SETTLEMENT SYSTEM

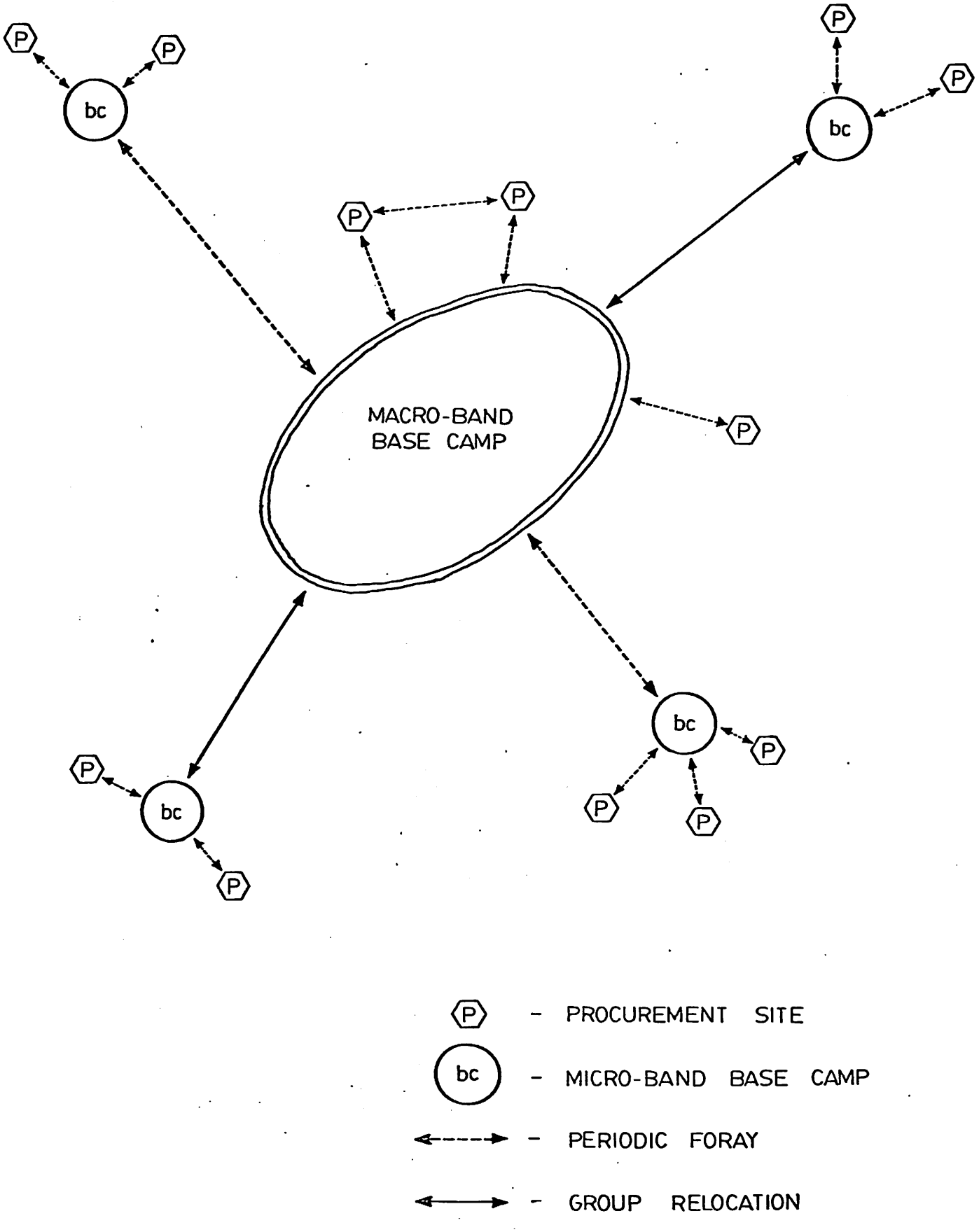
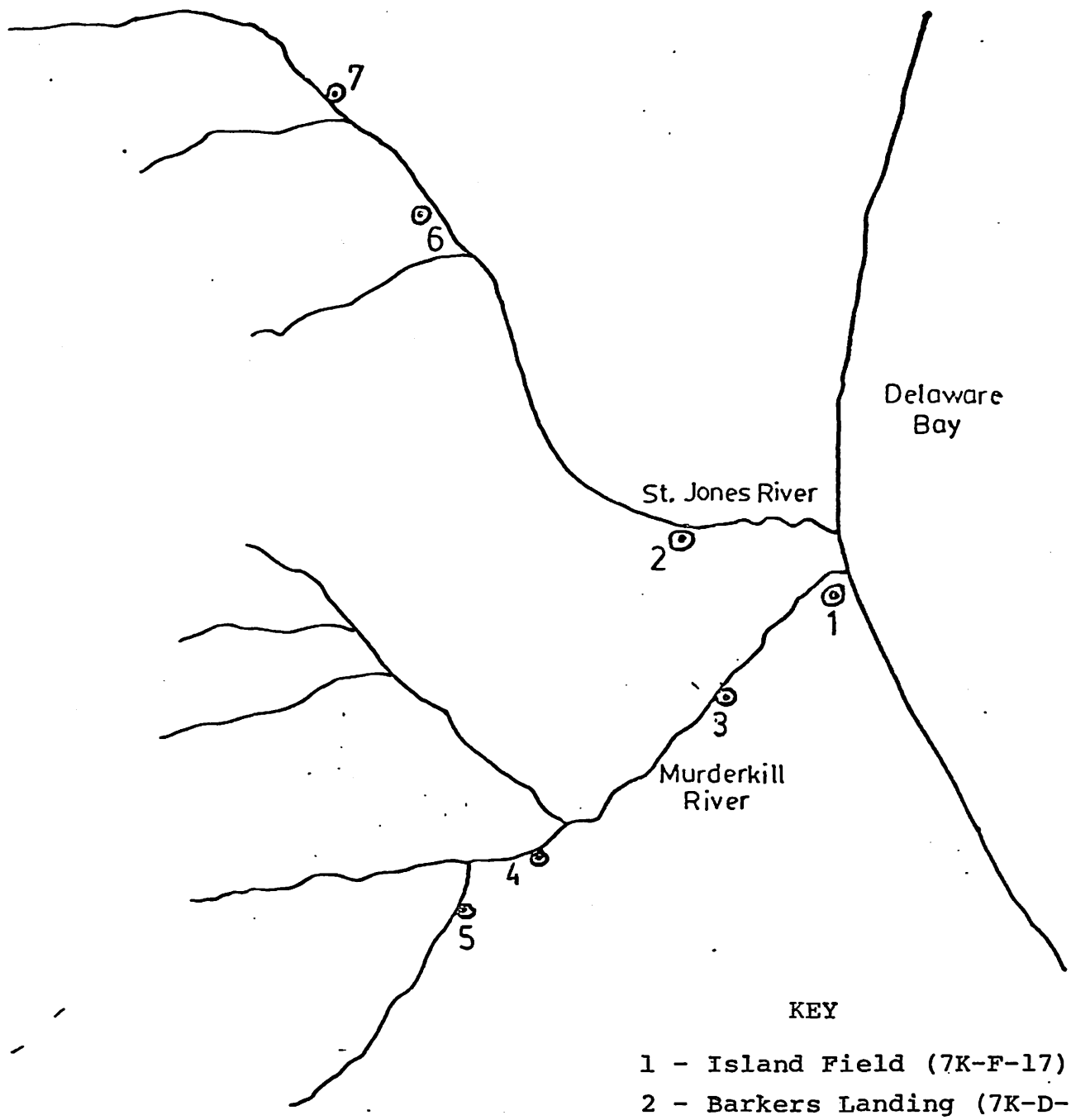


FIGURE 2.: Woodland I Sites of Central Delaware

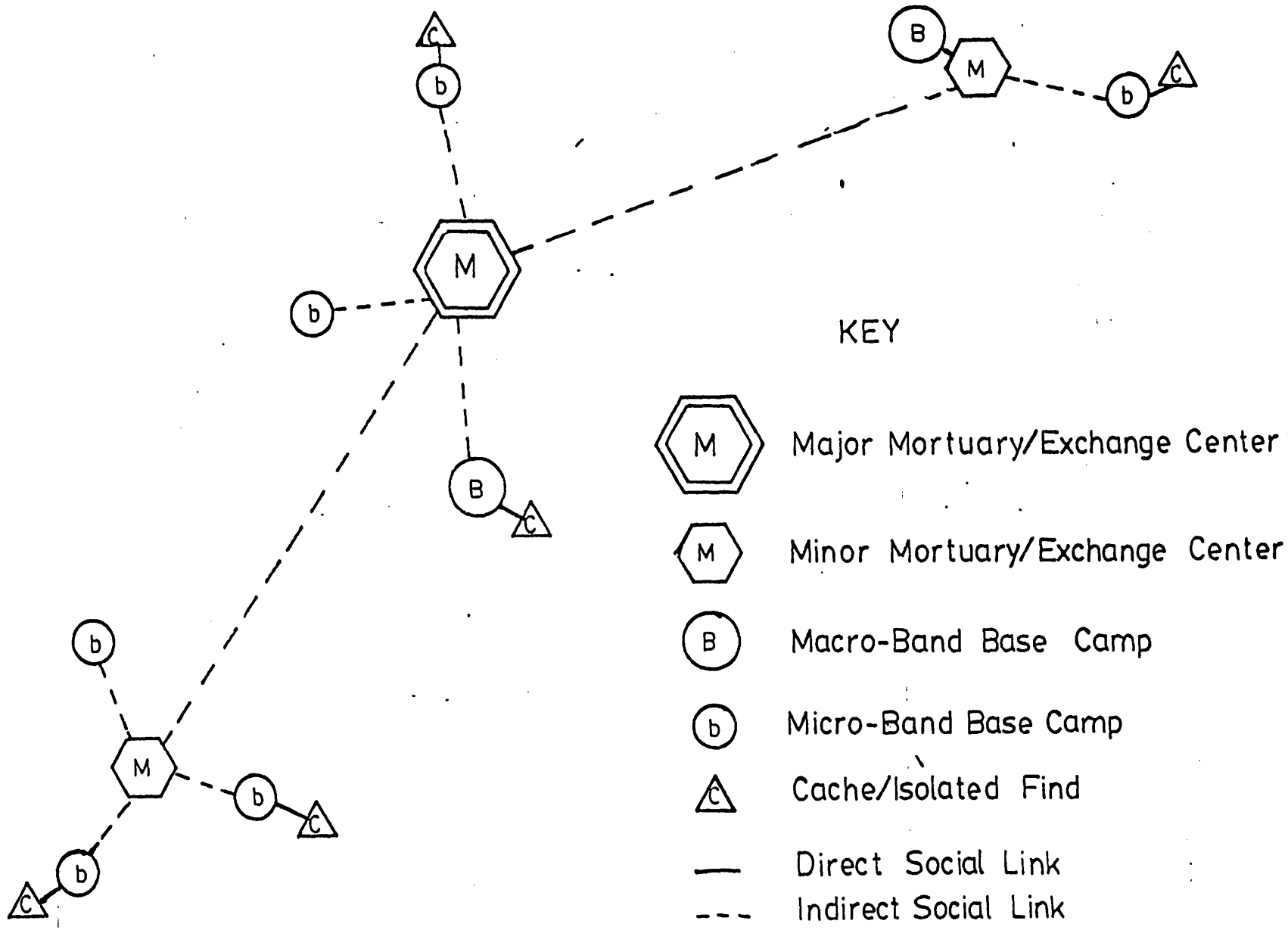


(NOT TO SCALE)

KEY

1 - Island Field (7K-F-17)
2 - Barkers Landing (7K-D-13)
3 - Coverdale (7K-F-38)
4 - Frederica Adena (7K-F-2)
5 - Killens Pond (7K-E-3)
6 - St. Jones Adena (7K-D-1)
7 - Carey Farm (7K-D-3)

FIGURE 3 : Delmarva Adena Complex Settlement System



R.M. Stewart

INDIGENOUS REGIONAL POPULATION GROWTH IN THE CHESAPEAKE DRAINAGE IN VIRGINIA: AN ELEGANT AND PARSIMONIOUS MODEL FOR EXPLAINING ADAPTIVE CHANGE DURING THE LATE ARCHAIC PERIOD

by

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presented at

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April 2, 3, 4, 1982
Rehoboth Beach, Delaware

INTRODUCTION

During the Late Archaic period, a number of major behavioral changes take place along the Atlantic slope. In the Virginia Chesapeake drainage area (see Figure 1), several regional traditions (whose boundaries include this area) are identified with these changes (Ritchie 1965:150; Willey 1966:258; Mouer et al. 1981:29). The Savannah River complex is one of these traditions. The specific behavioral changes characterizing that complex are examples of the kinds of Late Archaic behavioral changes occurring in the area. Mouer, Ryder, and Johnson (1981:2930) have summarized those characteristics as follows:

1) The use of specific projectile point types, often classed together as broadspears. This includes a shift to a stone industry based on the bifacial reduction of large cobbles.

2) A shift in lithic material preference, favoring tough materials over sharp materials (Perlman 1981; Turnbaugh 1975; Reinhart 1976; Kinsey 1972).

3) A focus on riverine settlement (Salwen 1975; Wilkins 1978; Kinsey 1972; Turner 1976, 1978; See figures 1 and 2) and, presumably, riverine resources (Kinsey 1972). The widespread use of boats can be inferred (Kinsey 1972; Turnbaugh 1975).

4) An apparent change in demography implying that local populations have grown or, at least, that the resource base has been stressed by demographic changes (Turner 1976, 1978).

5) A significant increase in the numbers of large woodworking tools (Turnbaugh 1975; Kinsey 1972; Sears 1954) especially in the Piedmont floodplain sites.

6) The use of large hearths in the Piedmont and Coastal Plain (Turnbaugh 1975; Kinsey 1972; Reinhart 1979). Such hearths appear to be rare further upstream (Geier et al. 1980; personal communication).

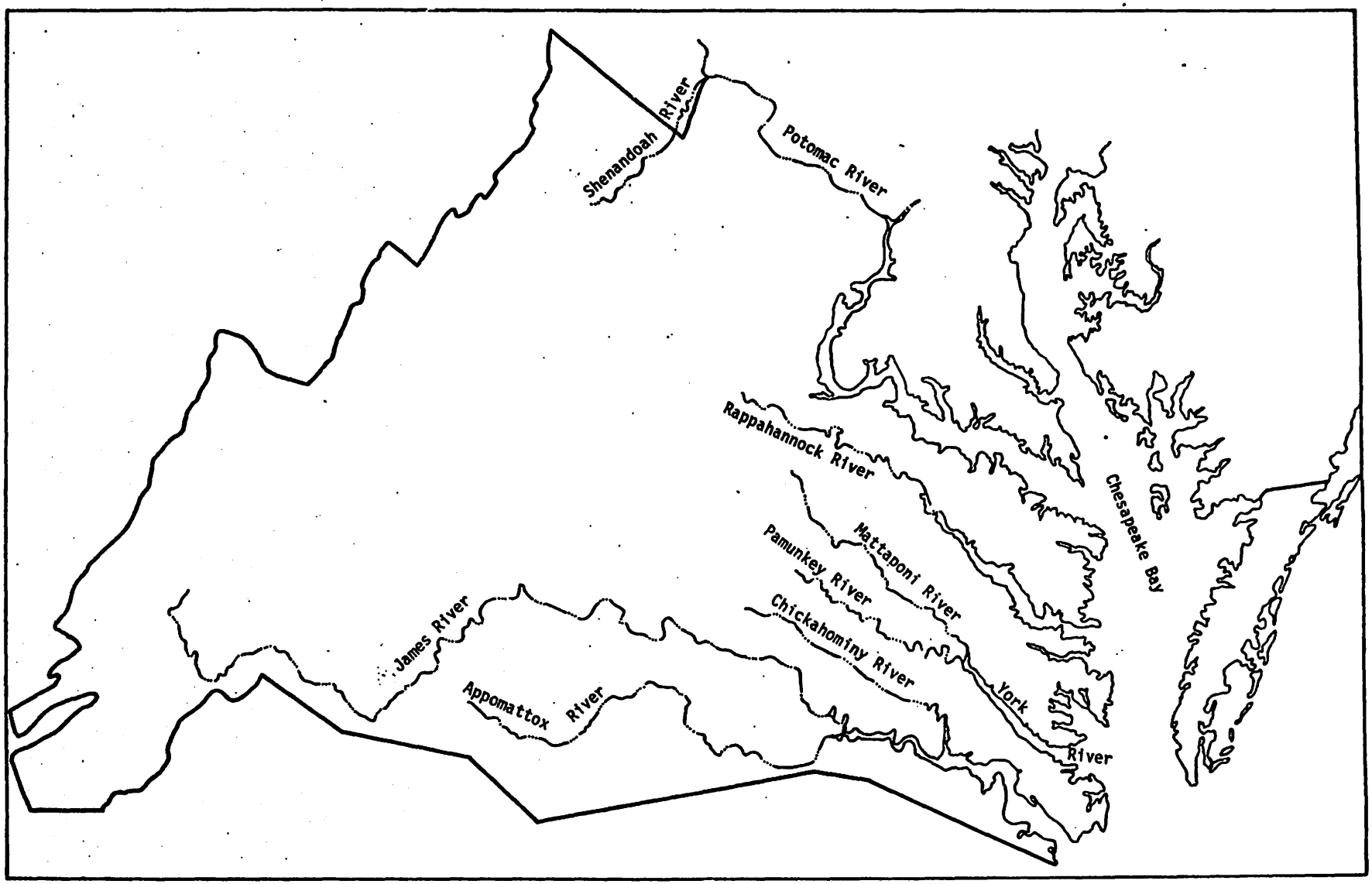

Figure 1. Approximate Boundaries of the Virginia Chesapeake Drainage Area Showing Parts of Some Major Drainages.

7) The appearance of stone bowls and/or pottery (Witthoft 1953; Turnbaugh 1975; Wise 1975; Gardner 1975; Kinsey 1972).

8) The likelihood of a pronounced fission-fusion cycle (Turnbaugh 1975) with a possible bimodal distribution of site sizes.

9) A marked areal stylistic uniformity in contrast with the more regional trends of other Archaic periods or cultures (Turnbaugh 1975; Kinsey 1972).

10) An increase in the use of grinding stones. This may be limited to the Piedmont, however.

Over the past several decades, archeologists have employed a variety of models in an attempt to explain how and why some or all of the culture changes of the Late Archaic occurred. These models range in character from an emphasis on simple historic diffusion to a stresss on the importance of culture as a means for human societies to adapt to their natural and social environment. Models having the latter focus vary in that they stress different kinds of cultural processes as the underlying cause for the behavioral changes in the Late Archaic. These include, for example, such processes as the diffusion of adaptive technologies, the in-place evolution of a new adaptive pattern in response to demographic stress, and the adaptive radiation of related groups of people from a parent population "into a previously unoccupied or underexploited niche" (Mouer 1981:30). The purpose of this paper is to present a model which emphasizes the in-place evolution of a new adaptive pattern in <u>relation</u> to population <u>growth</u>. I shall hereafter refer to this model as the IRPG or Indigenous Regional Population Growth model. Critics of similar models maintain that these models do not adequately demonstrate stress conditions nor explain the stylistic uniformity that occurs during the Late Archaic (Mouer et al. 1981:30).

In the process of presenting the IRPG model, I will attempt to show that these arguments are either moot or unfounded.

THE IRPG MODEL

The IRPG model corresponds to the theoretical view that culture is a complex behavioral system made up of an integrated set of subsystems (Binford 1962:218, 1965:205; Flannery 1967:120, 1968; Hill 1970:19). According to this view, culture change occurs as a result of these subsystems adapting to changes in the natural and social environment (Binford 1965:210, 1968; Hill 1970:20). To explain the appearance of particular cultural changes, therefore, one must identify the processes through which specific behavioral subsystems adapt to these changes (Flannery 1968:87, Plog 1974). In the past, models focussing on cultural processes have attempted to explain Late Archaic behavioral changes by stressing change in ecological processes (Turnbaugh 1975; Carbone 1976; Custer 1978, 1980). While ecological processes are important, the IRPG model attempts to place emphasis on other cultural processes as well, specifically on those occurring in the structure of Late Archaic populations. By identifying some of these processes and then examining how they interact with different processes in other behavioral subsystems (e.g. subsistence-settlement, social organization, ex change), I will be able to develop a series of interrelated propositions that will provide an explanation for why the cultural changes appearing during the Late Archaic happened.

Population Change

Ford (1974) has indicated that, in general, there is a trend of increasing prehistoric population growth throughout the Northeastern portion of the United States. The available evidence for the Virginia Chesapeake drainage area suggests that there is a distinct change in the rate of this increase between the Middle and Late Archaic. Turner's (1976, 1978) analysis of demographic data from the coastal plain region of the Virginia Chesapeake drainage suggests the existence of such a change in the rates of both the overall size and density of the population at this time. While his analysis is limited in its areal extent and by a number of interpretive problems (which he discusses 1976, 1978), it is the only study available for the study area that 1) provides demographic data and 2) suggests a possible population curve It is through his hypothesized curve that interpretations about change in the overall size and density of the study area's prehistoric population will be made.

Figure 2 presents Turner's curve. He constructed it by plotting the number of sites which he recorded for each period by the midpoint of the corresponding period. (The dotted lines indicate periods for which no data was available.) Based on historical information, Turner was able to estimate that at 1600 A.D. a population of approximately 13,000 persons existed in the Virginia coastal plain. Using this figure, he then employed the curve to project population estimates for earlier dates (1978:67). In this way, he arrives at population estimates for the entire span of prehistory in the Virginia coastal plain area, beginning with the Early Archaic.

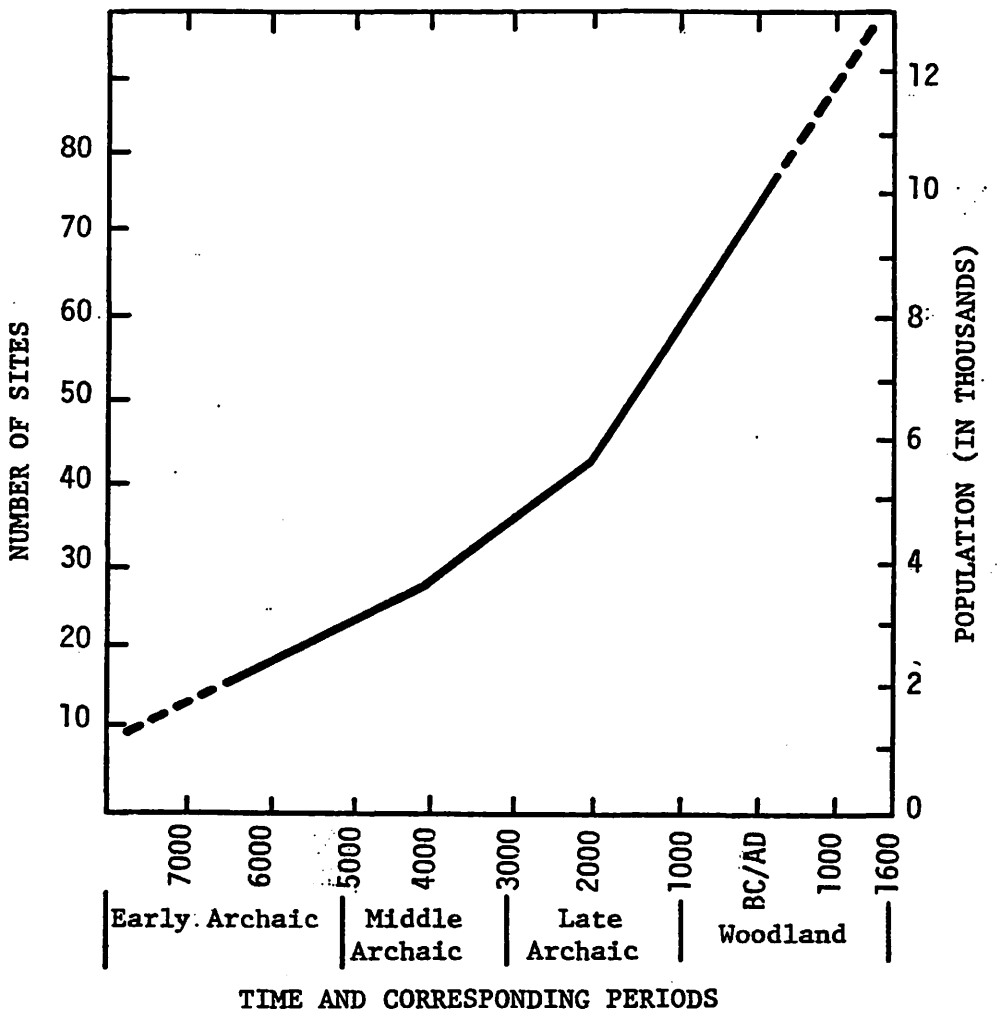

Figure 2. Projected Population Curve for the Virginia Coastal Plain, 8000 B.C. to A.D. 1600 (adapted from Turner 1978a:68).

According to the graph there is a distinct upsurge in population growth just prior to the Late Archaic which carries through most of the period. An upsurge also occurs near the end of the Late Archaic. This latter increase is just prior to the Woodland period and the corresponding development in agriculture. Thus, the upsurge is probably associated with the shift from hunting and gathering to cultivation. Since the purpose of this paper is to deal with changes that lead to the Late Archaic cultural system rather than changes leading to the Woodland cultural system the analysis will focus on the former population increase.

The actual rates of population increase, as measured by the number of people added to the population per 1,000 years, during each cultural period can be determined by substracting the number of people at the end of a period by the number at the beginning to get the total increase, and then dividing that total by the length of time for the period. This computation yields the increase of persons per unit of time in the period. Table 1 presents these rates of growth for the four prehistoric periods that Turner considers in his study. As expected, the figures reflect a steady climb in population growth through time, with the Woodland period having the highest rate of growth per 1,000 years. What is particularly interesting, however, is the fact that the greatest magnitude of change between growth rates of adjacent periods occurs between those of the Middle and Late Archaic, with a change between these two growth rates of 500 persons per 1,000 years.

A trend similar to this can also be shown for the rates of growth in population density between periods. Given an approximate area of

TABLE 1.

RATES OF GROWTH AND MAGNITUDES OF CHANGE OVER TIME FOR POPULATION SIZE (BASED ON TURNER'S ESTIMATES OF POPULATION SIZE FOR THE BEGINNING AND ENDING OF EACH PERIOD (1978:67)

TIME PERIOD	EARLY ARCHAIC (8000-5000 B.C.)	MIDDLE ARCHAIC (5000-3000 B.C.)	LATE ARCHAIC (3000-1000 B.C.)	WOODLAND (1000 B.C.-AD 1600)
Beginning population	1000	3000	5000	8000
Ending population	3000	5000	8000	13000
Rates of growth within periods persons/1000 years	667	1000	1500	1923
Rates of growth between adjacent periods (magnitude of change) persons/1000	333	500	423	

16,400 km. sq. (Turner 1978:67) and the population estimates for the beginning and end of each period (shown in Table 1), one can calculate the approximate population densities at the start and finish of each period. Table 2 presents these densities. Using these figures, the rate fo increase in population density per 1,000 years can be calculated for each period in the same way that it is done in Table 1 for the rate of increase in absolute number of persons. Again, the greates rate of increase occurs in the Woodland period. However, when one compares the changes between the growth rates of adjacent periods the greatest magnitude of change is that occurring between the Middle and Late Archaic periods (see Table 2). It is argued that this relatively rapid change in population growth is associated with accelerating changes in the environment and in other aspects of the cultural system existing at this time. Apparently these changes were fairly dramatic since the population shifts to a higher rate of growth faster than at any other time, including the change to the Woodland period. I will now begin examining the nature of these changes by looking at some of the specific biological and social processes that directly effect the structure of a population.

Processes of Population Change

A number of biological and social processes directly effect the size and density of a population. Many of these, such as age of menarche, length of lactational amenorrhea, and age of marriage relate to fertility. Others, such as malnutrition, disease, infanticide, warfare and accidents are tied to mortality. Traditional demographic theories hold that

TABLE 2.

RATES OF GROWTH AND MAGNITUDES OF CHANGE OVER TIME FOR POPULATION DENSITY (BASED ON TURNER'S ESTIMATES OF POPULATION SIZE FOR THE BEGINNING AND ENDING OF EACH PERIOD AND ON HIS GIVEN AREA OF 16,400 KILOMETERS SQUARE)

TIME PERIOD	EARLY ARCHAIC (8000-5000 B.C.)	MIDDLE ARCHAIC (5000-3000 B.C.)	LATE ARCHAIC (3000-1000 B.C.)	WOODLAND (1000 B.C.-AD1600)
Beginning density persons/100 km sq.	6	18	30	49
Ending density persons/100 km. sq.	18	30	49	79
Rates of growth within periods persons/100km. sq./ 1000 years	4	6	10	12
Rates of growth between adjacent periods (magnitude of change) persons/100 km. sq./ 1000 years		2	4	2

prehistoric populations have basically had high fertility and mortality rates and that it is because of processes leading to decreasing mortality that there are increases in growth (Binford and Chasko 1976:63; Zubrow 1976:16). Ethnographic evidence has shown, however, that there is a wide variety of mortality and fertility rates in present day nonindustrialized societies (Zubrow 1976:17). Also, paleoanthropologists have shown that in some instances prehistoric populations have had moderate fertility and mortality rates and not the uniformally high levels purported by traditional theories (Zubrow 1976:17). Thus, it appears that fertility is not a constant with variation in mortality the prime factor effecting growth. Instead, population increase involves variation in processes that effect fertility as well as mortality. In fact, there is ethnographic evidence for hunting and gathering societies that shows that as sedentism increases there is a marked rise in fertility while mortality remains constant (Binford and Chasko 1976). In order to simplify the presentation of the IRPG model, however, I will only deal with fertility and leave a consideration of the processes relating to mortality to a later expansion of this model.

There are a variety of biological processes that influence a population's fecundity, or reproductive ability, and thus its overall fertility, or actual rate of reproduction. These processes include the age at which menarch begins, the length of adolescent sterility, the length of lactational amenorrhea, the frequency of reproductive errors such as miscarriages and stillbirths, and the age of menapause (Frish 1975, 1980). Studies of modern and historic populations have suggested that these and other processes relating to reproductivity are directly cor-

related to the amounts of stored fat relative to body weight in females of the population (Frisch 1975, 1978, 1989; Frisch and McArthur 1974). Evidence suggests that with some of these processes, particularly with the age of menarche and the maintenance of regular menstrual cycles there are critical weights below which menarche will not occur and amenorrhea will happen (Frisch and McArthur 1974). In other instances, it is shown that certain levels of stored fat shorten periods of adolescent sterility, enable longer periods of lactation, improve reproductive success and increase the age to menopause (Frisch 1975, 1978, 1980; Frisch and McArthur 1974). The reasons for why there appears to be critical levels of stored fat for the initiation and maintenance of various reproductive processes include two basic arguments: The first argument maintains that such processes as pregnancy and lactation require a great deal of energy. For example, nearly 170,000 calories are necessary for a pregnancy and a four month lactation period (Frisch 1975:20). Stored fat is the most efficient way to mobilize such energy (Frisch and McArthur 1974:950). The second argument is that critical levels in stored fat appears to be an ecological adaptation to a reduction in subsistence resources (Frisch 1978:29). Females in undernourished populations would have less caloric intake and thus less stored fat, which would reduce fecundity. This would be an advantage to a population because it would be a less wasteful mechanism for regulating overpopulation than the mechanism of increased mortality (Frisch 1978:29). It should be noted that Howell (1979) has tested some of the hypotheses concerning the relationship between nutrition, fat levels,

and fecundity on a living hunting and gathering population and was unable to provide support for these hypotheses. However, because there were problems with her data, and because other ethnographic studies of hunters and gatherers have indicated support for the role of nutrition in increasing fecundity (Binford and Chasko 1976), I shall proceed with the above arguments.

In addition to the processes related to fecundity, human fertility is also effected by different social processes. These include such things as age of marriage, social customs regulating the birth interval, the use of contraception, and the degree of mobility in the subsistencesettlement strategy. In regard to this last process, Lee (1972) has argued that in societies where mobility is high the birth interval will be relatively wide because of the advantage of having less children to transport during daily subsistence rounds. (Some mechanisms for increasing this interval might include increasing the duration of lactation or infanticide (Binford and Chasko 1976:136).) As mobility decreases (i.e. as sedentism increases), children would be less of a burden and the birth interval would be reduced (Binford and Chasko 1976:136). With increasing sedentism, children may also become an asset in that they could help in the collection of localized resources where few technological skills are required (Ford 1974:392). Thus, as Cowgill (1975:516) has suggested, there are circumstances under which children are an advantage and people are motivated to have more.

It should also be noted that the degree of mobility in a society's subsistence strategy can directly effect fecundity. Some ethnographic evidence suggests that in highly mobile societies energy expended in

daily gathering and seasonal activities reduces the overall amount of energy available in women for reproduction (Frisch 1980:27). On the other hand, assuming that other things are equal, an increase in sedentism would reduce energy expendages from foraging and thus increase available energy for reproduction.

A population's rate of fertility is clearly the result of many interrelated processes. Some of these are biological like the age of menarche, others are cultural such as the economic assets and liabilities of children, and some involve aspects of both, such as the effect that a mobile subsistence strategy has on fecundity. One variable that is critical to variation in many of these processes is nutrition. It is the primary factor influencing fat levels and thus whether critical values of stored fat are achieved. This, in turn, effects whether or not the biological reproductive processes function. Just prior to and during the Late Archaic period there are a number of changes which, according to the present model, ultimately improve nutritional levels and thus fecundity and fertility. Changes in environmental processes initially triggered changes in cultural processes, initiating a feedback system that led to increased efficiency in exploiting the environment and thus improved nutrition. I will now examine some of the processual changes in the environment and some of the resulting changes in various process within the Late Archaic cultural system in an effort to show how this feedback system evolved and then maintained itself.

Processual Change Leading to Improved Exploitation Efficiency

Just prior to and during the Late Archaic there are changes in the climate which directly effect the distribution of available resources. Carbone (1976) and Custer (1978, 1980) provide detailed studies of the available information on these changes for the Middle Atlantic area in general. For the purposes of this discussion, I will only consider the salient points of their studies.

Near the beginning of the Late Archaic, the moisture content in the climate begins to oscillate and a general trend towards decreased moisture develops (Custer 1980:9). The vegetational configuration under these conditions are described by Carbone (1976:76) as xeric. Prior to this period plants adapted to wetter conditions such as hemlock and oak dominate the pollen rain. During the Late Archaic, plants adapted to dryer conditions such as hickory tend to dominate (Carbone 1976:76). The xeric conditions would effect subsistence resource distribution in several ways. For instance, the range of animals not tolerant to these conditions would shrink (Carbone 1976:77). At the same time, there is evidence that many prairie adapted species from the west penetrate into the area, getting as far as the Atlantic coast (Smith 1957:211). Hickory nuts would become increasingly dominant (Custer 1978:3, 4). Also, because of an overall increase in nutbearing trees, wild turkey populations would increase (Custer 1978:3). Deer populations would decrease, however, because of decreasing vegetation cover (Custer 1978:3). Because of relatively wetter conditions in riverine settings, vegetation could be expected to concentrate more in these areas and in turn so would the declining deer populations. It is likely

that the more moist riverine areas would also be attractive to many of the other animal species not tolerant to the xeric conditions.

In addition to the effect of changing moisture and vegetation conditions, subsistence resources are also effected during the Late Archaic by rising sea levels (a maximum height was reached at around 2000 B.C.) (Shepard 1964; Emery and Edwards 1966; Bloom 1971). The valleys in the lower protions of major rivers were flooded producing estuaries and salt marshes. Rates of river flow were reduced because of the flooded river mouths enabling increased meandering, silting, and more frequent flooding (Turnbaugh 1975:59). The creation of estuaries and salt marshes together with slower moving water and lower stream gradients ultimately produced better and larger habitats for many different animal species including waterfowl, anadromous fish, and shellfish (Turnbaugh 1975:59). With the expansion of these habitats, the range of some of these animals would have also expanded. For instance, suitable conditions for spawning would have been at their furthest location upstream, enabling greater inland penetration of anadromous fish (Custer 1978:3). Slower river flows and the resulting silting and flooding would also enlarge and improve flood plain habitats existing upstream, beyond the lower flooded portions of the rivers. This in turn would increase and expand the populations of various plant and animal species adapted to this habitat.

To summarize, the related changes in climate, vegetation, and hydrology occurring at the time of the Late Archaic causes numerous shifts in the distribution of resources in the general area that includes the Virginia Chesapeake drainage. These shifts consists of alterations

in the composition, number, and specific location of available resources (Custer 1978:10). In some instances, entirely new species of animals are even appearing in the region (Custer 1978:4). In the riverine environments, the various changes lead to increases in the diversity and density of available resources. Diversity becomes greater because 1) new animal species appear in the area, 2) species not tolerant to the xeric conditions gravitate to the wetter riverine settings, and 3) habitats of various animal species expand into areas along the rivers where such animals had never occurred before. Resource density is increasing in the riverine environment because of improved habitats for species already existing in this setting and for the reasons given in 1) and 2) from above. It is argued that this trend of increasing resource diversity and density triggered a series of alterations in the subsystems of the Late Archaic cultural system. These alterations ultimately led to more efficient means of exploiting resources.

Prior to the Late Archaic the subsistence and settlement system consists of a generalized foraging strategy (Ford 1974:392). Exploitation areas are relatively large and include the establishment of numerous temporary collecting and hunting camps both within and outside the riverine environment. Resources are exploited throughout this area with an emphasis on those areas of habitat overlap or ecotones (Custer 1978:10). During the Late Archaic, however, the largest number of settlements tend to occur in riverine settings (Mouer et al. 1981:29). The increased diversity and density in subsistence resources in these settings would be attractive to hunting and gathering populations. It is argued that these increases were enough to enable Late Archaic popu-

lations to focus exploitation activities in the riverine enviroment and thus explains why Late Archaic settlement concentrates in these areas. It is further argued that this would reduce the overall exploitation area of these populations. In this situation, travel time between gathering camps or hunting stations is reduced thereby increasing overall foraging efficiency.

The subsistence and settlement focus on the riverine environment would have been amplified by the development of tools and exploitation methods specifically adapted to the resources in this location and/or which would have increased exploitation efficiency in general. A major exploitation activity in the riverine setting is fishing. The general improvement of river habitats during the Late Archaic and the expansion in the range of anadramous fish would have made more and a greater variety of fish available. A number of tools in the Late Archaic assemblage may have been explicitly adapted to the exploitation of this resource. The presence of net sinkers in these assemblages (Custer 1978:12) is one obvious case in point. Another case, not so obvious, is the presence of broadspears. Some researchers have suggested that these tools functioned specifically for spearing fish (it is argued that the wide shoulders of these points served as toggles (Custer 1978:12)). Others have argued that it is a heavy-duty blade that primarily functioned in cleaving and cutting penetrable materials such as wood, plants, and animal products (Cook 1976:353; Custer 1978:12). Specifically, it has been suggested that this tool may have functioned in the preparation and maintenance of other perishable tools particularly adapted to fishing such as harpoons, weirs, leisters, gigs, and scoop

nets (Custer 1978:12). Finally, it may have been a multipurpose tool whose functions includes all those indicated above. While specific functional analyses testing these hypotheses have yet to be performed, what little work that has been done on the broadspear shape in general seems to support the contention that it is a heavy-duty blade (Cook 1976:353). Also, the fact that there is a shift to tougher lithic materials for making these blades (Turnbaugh 1975; Perlman 1981) is consistent with this function. The presence of large hearths in Late Archaic assemblages could also be evidence of an adaptational innovation for the exploitation of fish. Kinsey (1972:347) suggests that such features functioned in the processing of large anadramous fish catches, for the drying and/or smoking of these fish. The fact that such hearths appear to be less frequent in the upper portions of rivers in the study area (Mouer et al. 1981:30) is consistent with this contention because amounts of anadromous fish would be expected to decrease with increasing distances upstream. Significant increases in the amount of large woodworking tools have been noted for Late Archaic assemblages (Mouer et al. 1981:29). Such increases would be expected with an intensification on fishing. There would be an increased need for such items as axes, adzes, and chisels for constructing boats (whose existence at this time have been argued elsewhere (Ford 1974:398; Mouer et al. 1981:29)) and for use in the process of making perishable fishing equipment. In addition to their function in fish exploitation, large woodworking tools would also be adaptive in a riverine setting simply because of the need to clear areas in such a heavily forested environment for establishing settlements.

Other tools that are found in Late Archaic assemblages that would increase exploitation efficiency include such items as stone bowls, and later in the period pottery (Mouer et al. 1980:30). These items would be adaptive not so much in the actual procurement of food but rather in its processing and storage. For instance, stone bowls and pots would increase cooking efficiency by enabling food to be boiled directly by the fire instead of by such indirect methods as hot stone boiling. Also, these items could function as storage vessels (Custer 1980:9) and would be a marked improvement over other storage techniques such as the use of skin bags, baskets or pits in keeping out moisture and rodents. Better methods of storage means that more efficient use could be made of perishable materials that can be kept for long periods of time, such as seeds or nuts.

Corresponding with improvements in the processing and storage of such plant resources as seeds and nuts is the increased frequency of grinding stones in Late Archaic assemblages (Custer 1980:9; Mouer et al. 1981:30). This association suggests that with better methods of processing and storing plant resources the actual procurement of them is intensified, requiring an increase in the number of tools used in doing the initial processing (i.e. grinding).

I should also point out that in addition to intensifying the exploitation of subsistence resources, cultural processes might have even aided in increasing the abundance of these resources. For example, clearing activities such as opening up localities for settlement and burn offs which may have been conducted in coordinated group hunts would have incidently improved the local habitats for the growth of annuals and

semi-annuals by eliminating the competition of other, large plants for sunlight and nutrients.

Thus far I have argued for a riverine subsistence-settlement focus in the Late Archaic because of 1) increases in the diversity and density of subsistences resources in these areas and then 2) because of various innovations in tools and exploitation methods which amplified exploitation efficiency and thus intensified the commitment of Late Archaic populations to a riverine focus. In spite of the trend of increasing resource diversity and density not all resources would be available or would be present in sufficient quantities in the riverine environment. Also, some resources would become unavailable different years because of climatic deprivations. Ecological zonation, which exists throughout the Virginia Chesapeake drainage area (Turner 1978a, 1978b; Mouer et al. 1981), would also effect the availability of resources because the habitat of certain subsistence resources would be restricted to certain zones. Thus the range of those resources along the river course would be limited. Resources not available to a population exploiting a local riverine environment could still be obtained, however, through exchange (Ford 1974:394; 1979:236; Plog 1980:135-136). This mechanism would provide security in times of want and would provide access to resources otherwise unavailable to a local exploitation area. In addition to providing resource security, exchange networks would furnish information pathways between local groups throughout wide areas (Custer 1980:11). Any adaptive innovation such as the broad-spear or soapstone bowl produced in one area could therefore spread fairly rapidly throughout an area because of this mechanism (Custer

1978:12). Also, as has been suggested by some ethnographic and archeological studies, the items themselves may have had sociotechnic functions in the initiation and maintenace of such relationships as political alliances (Changon 1968:100101) or marriage networks (Wobst 1974) [Plog 1980:136]. These functions could include such things as the communication of certain rights or obligations in these relationships (Custer 1980:11; Plog 1980:137). Thus exchange items would be important for their social communicative value as well as for their ecological adaptive value. This would result in an increase in their overall utility. These factors provide a strong argument for the existence of a widespread and integrated exchange system. Archeological evidence has shown that cultural items can be distributed over very large areas in the course of just several hundred years through such systems (Plog 1980). Given the importance of exchange networks to the maintenance of Late Archaic subsistence and social organizational systems and the rapidity through which items can be dispersed over large areas through such systems, it seems more plausible that the observed widespread distribution of cultural items at this time was because of exchange instead of by the movement of these items by their maker through some form of migration, as several authors have suggested.

SUMMARY

Basically, what I have presented as the interregional population growth model relates social processes to population change not in a linear but in a circular fashion as indicated in Figure 3. Prior to the

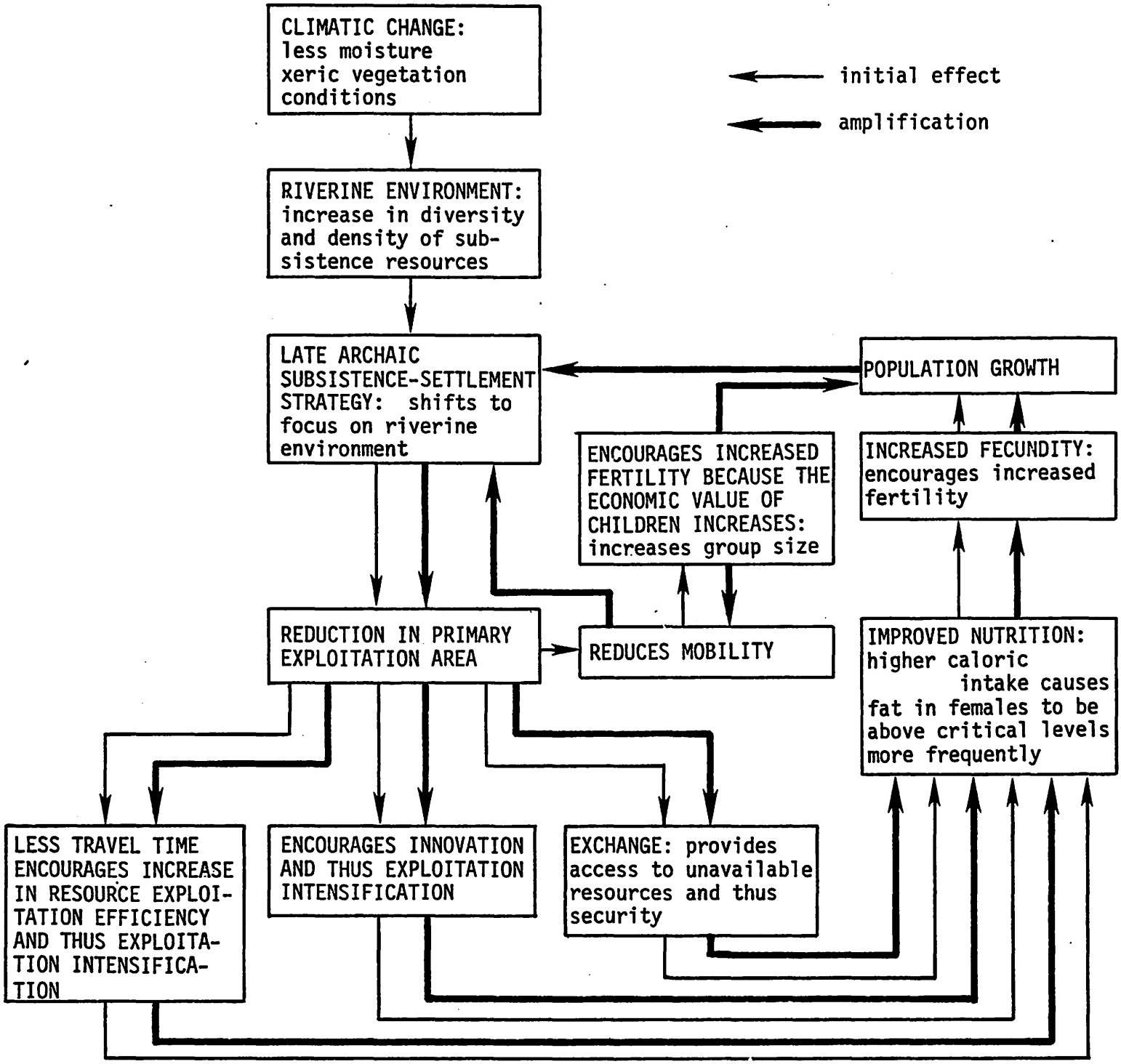

Figure 3. Amplification System of Environmental and Cultural Change During the Late Archaic.

focus on the riverine environment prehistoric populations met their subsistence needs by exploiting fairly large areas. Any variations in the environment deprivating one locality were dealt with by moving to another locality some distance away. In this way, some level of constancy in the diet was maintained. However, it is argued that climatic changes near the end of the Middle Archaic altered the distribution of subsistence resources to the point that the riverine setting became a more attractive exploitation locality than any other in the larger area of exploitation. With the focus of exploitation activities turning to the riverine locality, Late Archaic populations greatly reduce the size of the area which they primarily exploited and correspondingly decreased their mobility. The overall effect of this move was to increase the risk of an irregular diet because of the lack of certain resources or sufficient amounts of particular resources when variation in the environment occurred. As I have indicated, the available climatic data shows that during this period the frequency of oscillations in the environment, particularly in terms of moisture, is distinctively high. Thus, it is evident that populations in the riverine environment would have been subjected to much variability in their diet if they did not do something to counteract the variation in the environment. This "something" includes:

1) a reduction in the energy spent in travelling between foraging localities - which is a given because of the shift to the riverine focus,
2) the development of all the various technological innovations

and techniques which I have discussed for intensifying the exploitation of all the subsistence resources which the riverine environment offered,

3) a reliance on exchange networks to provide subsistence resources which the riverine environment failed to offer (i.e. subsistence security) either because such resources were never available or more importantly because such resources had been available but were depleated for a particular season, year, or years because of environmental flux.

These various cultural processes are buffering mechanisms which served to maintain a constancy in the diet. It is argued that these processes proved to be more efficient and thus maintained a higher level of consistency in the diet than before the shift to the focus on riverine localities. A higher level of consistancy in the diet meant an improved level of nutrition which increased fecundity and thus encouraged an increase in fertility and population growth. Ethnographic studies of hunters and gatherers which become more sedentary have indicated the same kinds of processes leading to an increase in population (Binford and Chasko 1976). As the Late Archaic populations increased, the risk of environmental variation depleating subsistence resources below the now accepted level of consistancy in the diet would increase. This increase together with a decrease in mobility, brought on by an enlargement in the size of individual groups, would amplify the original focus on riverine resources initiating another cycle of positive feedback between subsistence strategies, population levels, technological innovations and exchange relationships. The result of all this is an deviation

amplification system that would logically lead to increasing sedentism until a point is reached where either the environment or the subsistence-settlement strategy would have to change in order to maintain the growth rate.

Critics of populations growth models suggest that the explanatory power of these models is weak because they rely on a demonstration of stress. That is, that a populations's increasing size is outstripping its means. This criticism assumes that such models rely on stress as the ultimate reason for culture changes. Stress might be a factor but there are certainly many other factors that effect change in a culture as Cowgill (1975:516) has noted.

> We do not have to wait for the appearance of large, complex, and strongly ranked (in Fried's (1967) senses) societies for economic and institutional factors to loom large. Circulation of goods and services, redistribution, and at least part-time specialization were probably already major factors influencing both culture change and demographic trends as early as the onset of food-production, and probably even earlier.

The model in this paper has shown that culture change can happen in an in-place growth situation because of alterations in the systemic interrelationships between cultural processes like those to which Cowgill refers.

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Stewart

RETHINKING CULTURAL STABILITY IN EASTERN NORTH AMERICAN PREHISTORY: LINGUISTIC EVIDENCE FROM EASTERN ALGONQUIAN

Alvin H. Luckenbach
Wayne E. Clark
Richard S. Levy

ABSTRACT

Results obtained in a historical study of the Eastern Algonquian languages seem to refute present assertions of in situ development for the historic tribal distributions extending back "several thousands of years" (Snow 1978: 60,68; Dragoo 1976), if not to "Paleo-Indian times" (Fitzhugh 1975: 4; Griffin 1967: 175). A least-effort interpretation of the lexical analyses reported here and elsewhere (Siebert 1967) would posit at least two geographic expansions by Proto-Algonquian populations datable within the last two millenia. In southern New England and the Middle Atlantic regions, divergent dates for the different language families studies indicates regional population radiation and divergents of the languages during the Middle Woodland period (600 B.C. to 900 A.D.). A reexamination of the Middle Woodland phases from the Middle Atlantic will be presented as alternative interpretations to the difussionist arguments of the past.

Although inherent theoretical difficulties might preclude "absolute documentation" of migrations in the archeological record (Tuck 1975: 13), history provides frequent and varied testiment to the reality of population shifts. Despite the expressed preference of certain authors for a context of cultural stability in which to study ecologically induced cultural changes (Potter and Waselkov 1976; Snow 1977), the evidence required in support of migration hypothesis cannot be more strigent than is required for stability hypothesis. It is held that the adaptive radiation and frontier models of the migrationist paradigm should be considered as viable evolutionary models possessing a diverse and significant evidentiary force in the prehistory of Eastern North America.

Introduction

At the time of initial European contact, populations speaking related Algonquian languages were widely spread over the northeastern part of North America. The linquistically-distinct Eastern Algonquian sub-division of the family occupied a continuous area along the Atlantic coast from the mouth of the St. Lawerence River to North Carolina (Figure 1). While sharing a common linquistic heritage, the Algonquian-speaking cultures of this continuous distribution occupied both riverine and esturine environments except in those riverine areas occupied by Iroquoian or Siouxan speaking peoples. The relatively early disintegration of the Eastern Algonquian cultures as a result of European colonization and expansion severely restricted the amount of anthropological information preserved in the early historical accounts. But the historical record has been used to support numerous and varied speculations about the origins of these related Algonquian cultures. Early writers recognized the interpretive value of evoking migrationist arguments for explaining the historical distribution of the Algonquian languages (Holland 1966; Tuck 1975; et al.). The historical account of the Piscataway Indians of their recent (13 generation) migration from Maryland's Eastern shore and other such origin histories or myths further stimulated the search for the origins of the historic tribal distributions (Strachey 1953; Feest 1978a; 1978b). Yet the pioneer attempts to correlate disjunctions in the archeological record with the movement of Algonquian-speaking populations both failed to demonstrate such correlations and left subsequent researchers with a dissatisfaction with the migrationist paradigm.

This dissatisfaction has contributed to the major changes in theoretical orientation which is severely restricting the use of such cultural-historical models for explaining prehistory (Adams et. al. 1978). Emphasis on environmental and technological adaptations has come to dominate Eastern U.S.

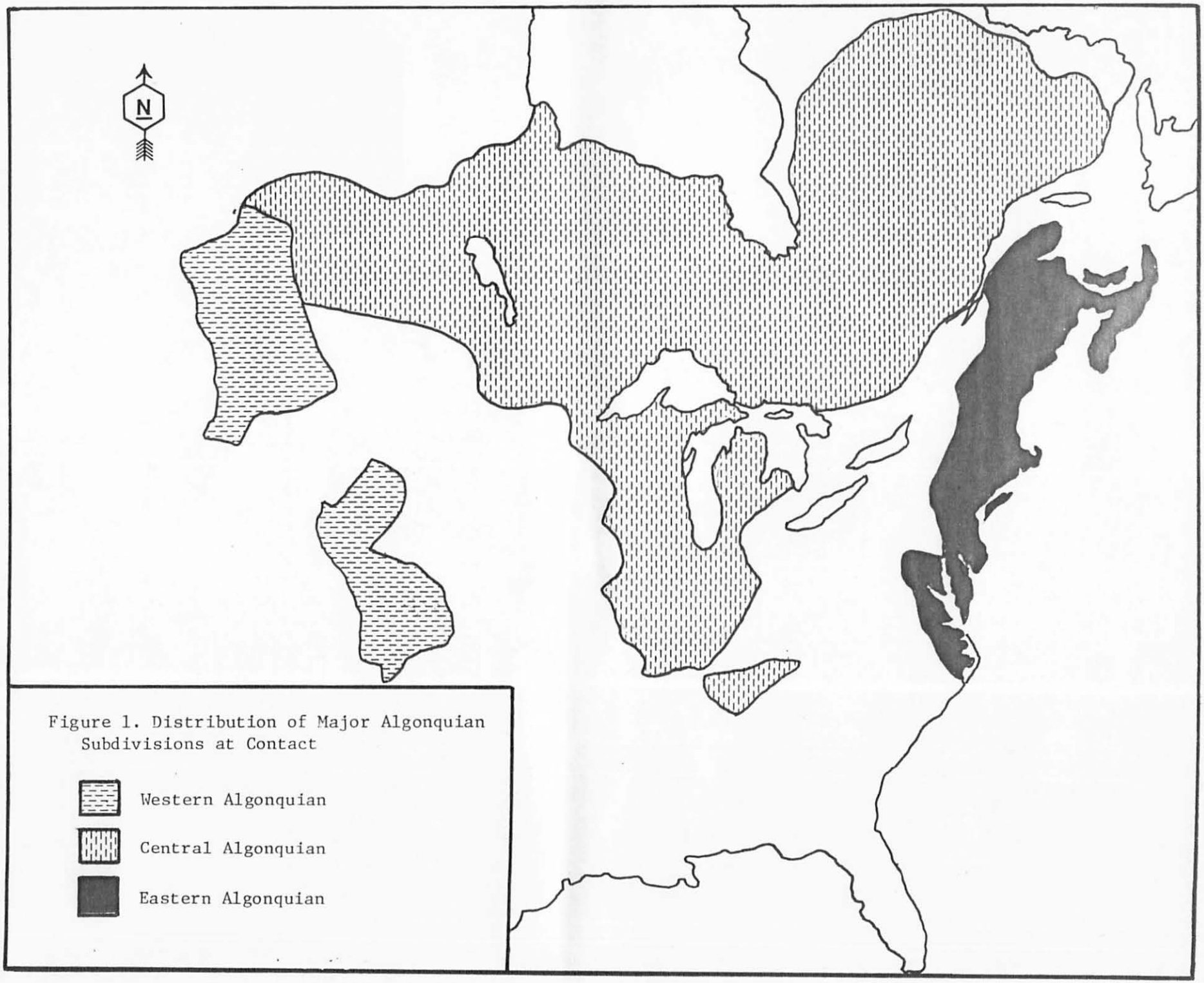

Figure 1. Distribution of Major Algonquian Subdivisions at Contact

prehistory (Snow 1977; Potter and Waselkov 1976). Since these cultural-ecological models are perceived as sufficient causalities to account for most changes observed in the archeological record, a clear majority of recent synthesizers have advocated the abandonment of any migration theories which fail to meet increasingly stringent evidentiary criteria (Rouse 1958; Sanger 1975; Tuck 1975). As a consequence, most contemporary archeologists have produced models of long-term in situ development for Algonquian tribal distributions which are projected back to the Early Archaic if not Paleo-Indian times (Griffin 1967; Tuck 1975; Dragoo 1976; Snow 1978). Practitioners of such models often evoke parallel evolution, diffusion or various models of "trade" to explain significant changes in archeological assemblages. Since all of the participants in this "stability controversy" are making implicit or explicit demands on Eastern Algonquian language history, a historical analysis of the lexical content of the Eastern Algonquian language members was clearly in order.

This paper presents the results of such a long overdue linguistic analysis and initiates discussion of their implications for reexamining current archeological theories for the Middle Atlantic and Northeast regions. Through the application of the comparative techniques called glottochronology and Worter und Sachen, the ancestrial "homelands" have been delineated for Eastern Algonquian populations. An estimated chronology for the expansion of the Eastern Algonquian into the historic configuration recorded at contact is provided. In conjunction with earlier work (Siebert 1967; 1975), the results presented here clearly suggest displacements which are spatially and temporally inconsistent with most models of long term, in situ population development.

During the classificatory-historical period of Eastern North American archeology, researchers' attempts to correlate linguistic history with the archeology record were unsuccessful because of the poorly developed chronologies,

inadequate linguistic analysis, and other factors; paramount of which is the inherent theoretical incomparability of linguistic histories and the archeological record. This last factor obviously precludes any final resolution of existing controversies even if this report were to elaborate upon the numerous localized sequences and the ecclectic evidentiary sources spanning 3500 years of prehistory and extending over half of the eastern seaboard. The brief speculations offered here, therefore, are limited to selective reinterpretations of data which previous researchers have presented to advocate various alternate reconstructions. Perceived changes in the archeological record of the terminal Archaic period in the Northeast and of the Middle Woodland in the Middle Atlantic which might be roughly syncronous to the linguistic results is presented. This analysis is presented not to assert a particularistic relationship between the linguistic and archeological evidence, but rather to argue for the viability of more aggressive models of human adaptations in these temporal and spatial contexts"

The evaluation of the relevant archeological literature from the Northeast and Middle Atlantic regions will also suggest that theoretical predispositions are more responsible for the exclusion of migration models in Eastern prehistory than is a "conflict with the archeological evidence (Wright 1980: 202). Based upon the reevaluated linguistic and archeological dates presented, the continued selective exclusion of adaptive radiation and frontier models as viable alternative models does not appear to be scientifically defensible. The explanatory principals of the migration, diffusion and evolution theories must be developed and applied in the Eastern United States to resolve persistent problems which continue to defy satisfactory solution by scholars concerned with culture process and culture change.

Linguistic Classification - Sampling Strategy

The validity of an Eastern Algonquian classification as a discrete component of the Algonquian language family has been fairly-well established on the basis of shared innovations in grammar (Goddard 1967; 1975) and phonology (Siebert 1975). While both of these studies provide useful classificatory information, Siebert's work contains a complex internal refinement (1975: 440) of great utility to this study. Siebert's phonological classification was used to select a diversified sample of Eastern Algonquian which would maximize the historical utility of the analysis. The languages chosen for analysis were selected to obtain a representative sample of Siebert's genetic "tree", to insure maximum spatial variability in the sample, and to select those languages in each lexical sub-division which contained the greatest amount of lexical data. This sampling procedure focused only on the major historical divisions of Eastern Algonquian, leaving the more recent (and statistically imprecise) relationships as a subject for future research.

The geographical locations of the seven languages included in this study have been depicted in Figure 2. The languages chosen include MicMac of the Boreal Division, St. Francis Abnaki of the Abnaki group of the Subboreal Division, Lenape (Delaware) of the Medial Division, Natick of the Eastern Southern group of the Archaic Coastal Division, and Powhatan of the Powhatan group of the Archaic Coastal Division as defined in Siebert's terminology (1975: 440). An eighth language (Pamlico) was originally included both for its unique geographical location at the southern end of the Algonquian continuum(Figure 2) and to complete the sampling of the Archaic Coastal Division through the inclusion of this Windandcon group member. Unfortunately, the remaining number of lexical items from this extinct group proved insufficient for the techniques being utilized. Only two other subgroups of

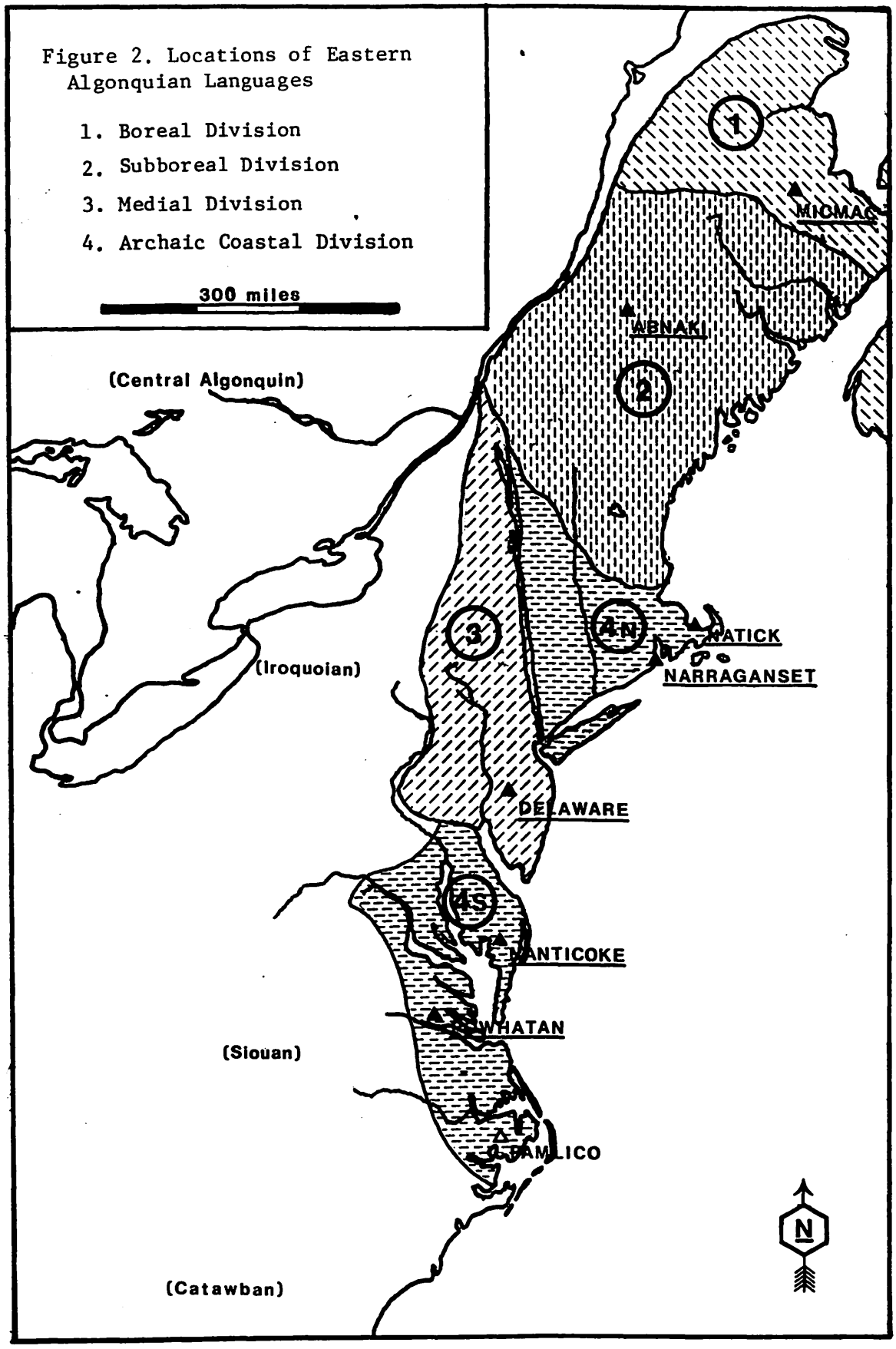

Figure 2. Locations of Eastern Algonquian Languages

1. Boreal Division
2. Subboreal Division
3. Medial Division
4. Archaic Coastal Division

300 miles

Siebert's divisions were not represented in the sample, the Taconic groups of the Medial Division (Machican), and the Etchemin group of the Subboreal Division (Malecite-Passamaquoddy). A reproduction of Siebert's classification is provided in Table 1 while the sources utilized for each language chosen and the number of lexical items available for standard glottochronological purposes are given in Table 2.

The Glottochronological Technique

Glottochronology is a lexicostatistical technique through which linguistic diversification can be determined in absolute years. The technique is based upon a statistical comparison of the lexical diversity displayed by related languages and theories of language change developed by Swadesh (1952); Lees (1953) and others. Good reviews of the methodology and assumptions underlying this technique are available in Gudschinsky (1956) and Hume's (1960), while several other important papers concerning its validity can be found in Dyen (1975).

While glottochronology has fallen into disfavor in the period since its inception, a number of recent important studies have added measurable support to the validity of "glottochronological years" to gauge the absolute time involved in language diversification. One of the most often repeated criticisms of the technique was Chretien's (1962) attack upon glottochronology's mathematical basis. However, more recent work by Dobson et al. (1972) demonstrates three fundamental errors in Chretien's work which dealt a devastating blow to his mathematical critique. Dyen's (1964) demonstration of a correlation between retention groups of test list items in Indo-European and Austronesian adds further support to the universality of replacement probabilities. In a recent effort Luckenbach and Levy (1980), the authors of this work, using sixteenth through twentieth century data recordings of Aztec, presented the first New World test of word-retention rates. This successive test helps to

Table 1: CLASSIFICATION OF EASTERN ALGONQUIAN (Siebert 1975: 444-6)

I. BOREAL DIVISION

1. Micmac

II. SUBBOREAL DIVISION

A. Etchemin
1. Malecite-Passamaquoddy

B. Abnaki
1. Eastern
a. Penobscot (most divergent E. Abenaki)
b. Caniba

2. Western
a. St. Francis (modern aggregate)
b. Pennacook
c. Penticket

III. MEDIAL DIVISION

A. Taconic
1. Mahican (Stockbridge, Modern)

B. Delaware - Lenape
1. Munsee (Minsi)
2. Unami
3. Unalachtigo (?)

IV. ARCHAIC COASTAL DIVISION (PEA-A descendents)

A. Southern New England (SNE)
(1) Eastern SNE (n-languages)
1. Massachusee
a. Massachusee (N+S)
b. Natick (Cen. Mass.)
c. Nauset
2. Wampanoag
3. Cowesit (N. Narragansett)
(II) Western SNE (Brotherton, Modern (Y+R))
(a)y-languages
1. Narragansett
a. S. Narragansett
b.. Niantic
2. Mohegan-Pequot (E. Conn)
3. Montauk (E. Long Island)
a. Monatuk
b. Shinnecock
(b)r-languages
1. Wampano (Scaticook, Modern)
a. Quinnipiac
b. Mattabesec
c. Tunxis
d. Siwanoy
2. Insular Wampano
a. Unquachog

(c)l-languages
1. Nipmuck-Pocumtuck (Loup)

B. Chesapeake
*1. Nanticoke
2. Conoy (Kanawha)

*C. Powhatan
1. Chickahominy
2. Nansernonal

D. Windgandcon - n. ca.
1. Pamlico
2. Chowan

*Languages studied

Table 2: Eastern Algonquian Lexicostatistic Lists

Language	Items Available	Published Source
Powhatan	82	Siebert 1975, Harrington 1955
Nanticoke	68	Brinton 1893
Narragansett	71	Trumbull 1903
Natick	100	Trumbull 1903
Lenape	97	Brinton and Anthony 1888
Abnaki	99	Day 1964
Micmac	98	Rand 1888

alleviate the often expressed concerns over the lack of such New World data, since the value obtained was within the ranges found in the Old World by Swadesh (1952) and Lees (1953). Combining this case with the similar results now available from studies of Indo-European, Dravidian, Japanese, Arabic, and Turkic languages, demonstrates the strong and increasing evidentiary support for the universality of the word retention rates utilized in glottochronology.

The number of lexical items available for glottochronology from each of the seven languages used in this study can be found in Table 2. The determination of cognation between these lists relied heavily upon the application of the comparative method and previously established sound correspondences (Siebert 1975; 1967). The phonological and morphological complexity of Algonquian languages, coupled with the insufficiency of some sources, rendered this procedure more advisable than the simple inspectional judgements of lexical relationships which are all too frequently encountered in such studies. Older sources frequently introduced uncertainties in the cognate determinations as a direct result of their phonological and semantic inadequacies. The lexical data available from the Nanticoke language, for example, is particularly suspect in this regard. Conversely, previous studies of phonological history for Powhatan (Siebert 1975), Natick (Silver 1960), and Micmac (Hewson 1973) make the cognate judgements involving these languages particularly reliable. Finally, a measure of reliability was added to the entire process through the use of Proto-Algonquian lexical reconstruction available in a variety of sources (Cf. Siebert 1975 for bibliographic references). Etymologies were available from these sources for 81 of the 100 items on Swadesh's (1955) "basic vocabulary list."

Given the number of established sound correspondences and Proto-Algonquian etymologies available, a fairly high degree of confidence can be expressed in the percentages of shared cognates calculated between these languages.

These results can be found in Table 3, while the lexical data and individual determinations comprise Table 4 located in Appendix A.

The glottochronological classification of Eastern Algonquian produced in this study is shown in Figure 3. Comparing this "tree" to Siebert's (1975) classification (Figure 4), the main discrepancy apparent is the greater antiquity of Micmac in relation to the other major language divisions. However, the degree of relationship between divisions is precisely the kind of measurement which phonological classifications cannot be expected to make.

Given the attending uncertainties involved in this technique, a maximal segregation of the results shown in Figure 3 is not statistically defensible. Figure 5 therefore, presents an alternative dendrogram of the glottochronological results in which nodal averages have been utilized. Both of these "trees" are based upon mean separation dates rather than on the percentage of shared cognates (which are usually found in linguistic publications) because of the overtly historical intent of this study. Due to the variability of the collection dates for the various lexical sources (ranging from the early seventeenth to the mid-twentieth century) the percentages of shared cognates cannot be directly compared. A formula was utilized, therefore, which takes the disparities of these collection dates into account and then produces the divergences in absolute years as given in Table 3.

The interpretation of these results will be more fully developed following the results of the Worter und Sachen study. As stated, Micmac appears to be distantly related to all the other Eastern Algonquian languages with an average divergence date of 943 B.C. As the early date of 1248 B.C. for the divergents for Micmac and Nanticoke appears to be an anomily a more reasonable date might be around 900 B.C. (Table 3). This date appears to be almost as

Table 3 Percentages of Shared Cognates and Separation Dates, Eastern Algonquian Languages

	POW	NAN	NAR	NAT	LEN	ABE	MIC
POW	**	.57	.59	.62	.54	.54	.48
NAN	134 B.C.	**	.69	.66	.63	.52	.39
NAR	121 B.C.	A.D. 538	**	.89	.65	.62	.43
NAT	A.D. 70	A.D. 417	A.D. 1267	**	.64	.64	.43
LEN	298 B.C.	A.D. 345	A.D. 299	A.D.278	**	.59	.42
ABE	281 B.C.	229 B.C.	A.D. 212	A.D.323	A.D.168	**	.46
MIC	676 B.C.	1248 B.C.	1047 B.C.	1026 B.C.	1004 B.C.	657 B.C.	**

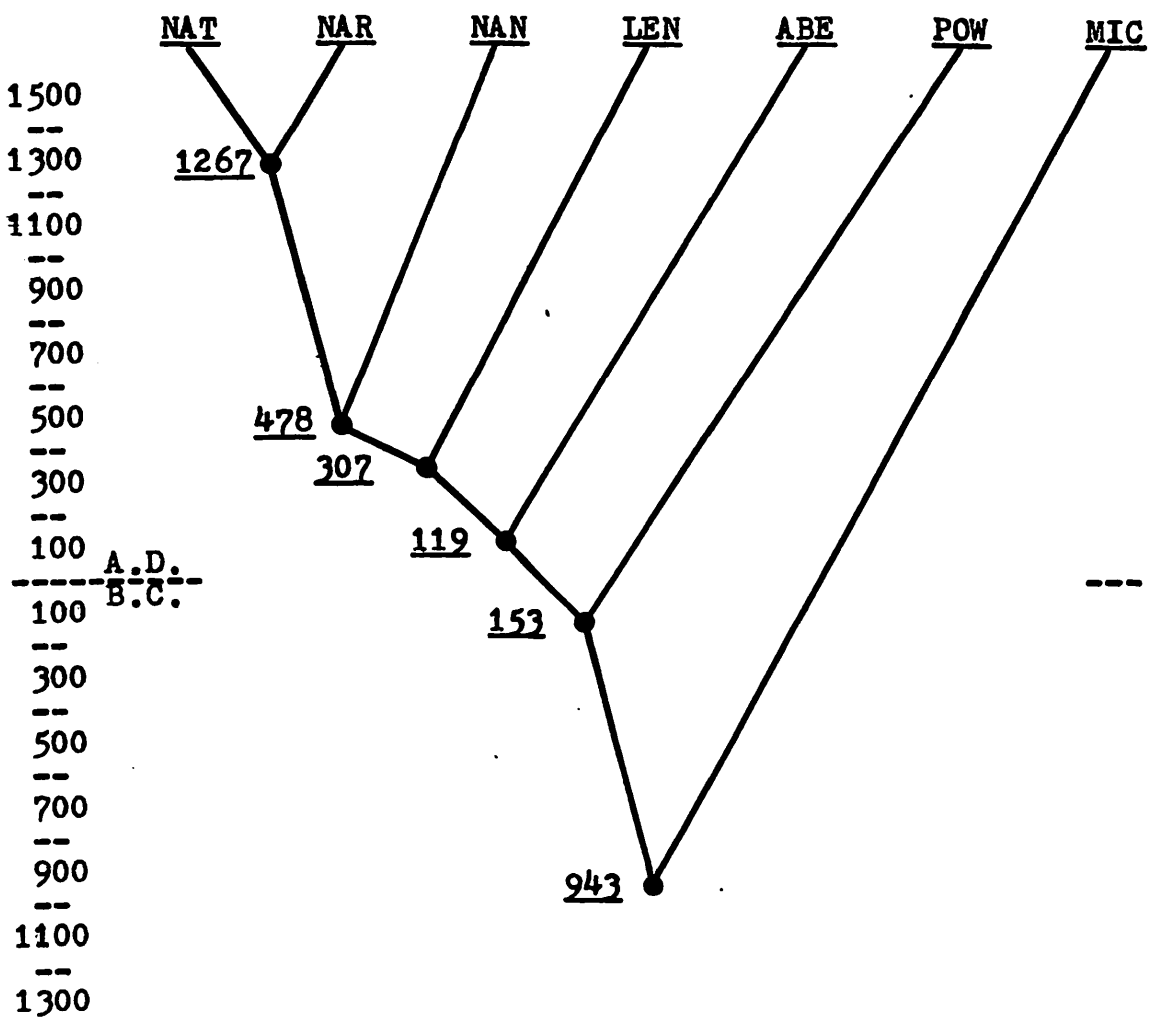

Figure 3. Lexicostatistical Classification of Eastern Algonquian Languages (Mean separation dates are given at nodes.)

distant as the divergent date of 1200 B.C. postulated by Siebert (1967) as representing the divergence of Proto-Eastern Algonquian from the Central Algonquian. The data indicates that between 1200 and 900 B.C. sufficient changes had occured in these related languages for them to be considered as different languages. Given the phonological and grammatical innovations shared and the relative consistency of the remaining five separation dates, we can readily accept the Micmac divergence from between 1200 to 900 B.C. as representing the Proto-Algonquian basal date. Further diversification within the Proto-Eastern Algonquian as discussed below occured somewhat later after this initial change.

As predicted by Siebert's classification (1975), Natick and Narragansett appear as the most closely related pair in the language sample with a divergent date of A.D. 1267. Both are members of the Southern New England group of Siebert's Archaic Coastal Division. When this pair is, in turn compared with the remaining languages (excluding Micmac) one sees Nanticoke, Lenape, Abnake, and Powhatan linked successively at dates of A.D. 478, 307, 199 and 153 B.C. (mean date of 188 A.D.). This chain-like array with most of the more southerly links falling later in time is usually suggestive of a sort of clinal variation along a continuous distribution of related speakers expanding from the north to the south. Further support for the north to south direction for this move will be supplied by application of the Worter und Sachen technique.

The early separation of Powhatan at 153 B.C. is anomolus to the north-south trend of divergent dates and therefore requires an interpretation more complicated than a simple least effort move explanation. In fact, Powhatan is the only language which cannot be reconciled with Siebert's genetic tree. Given the relatively relieable data available from this language, its status as a member of the Archaic Coastal Division must therefore be called into question. Again something more complex than the

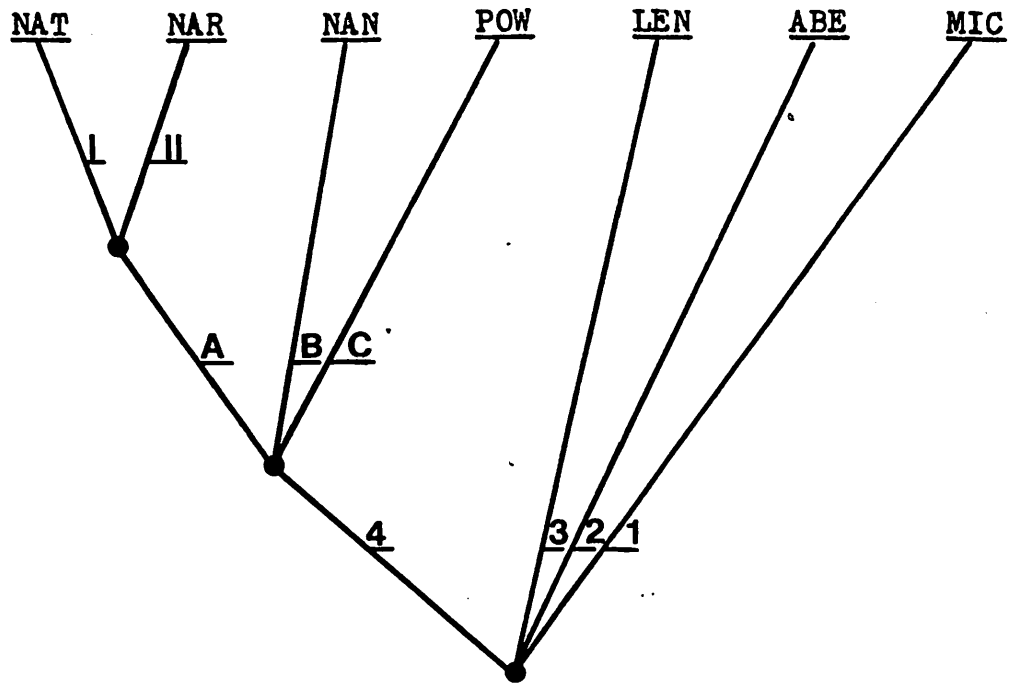

Fig. 4 SIEBERT'S PHONOLOGICAL CLASSIFICATION

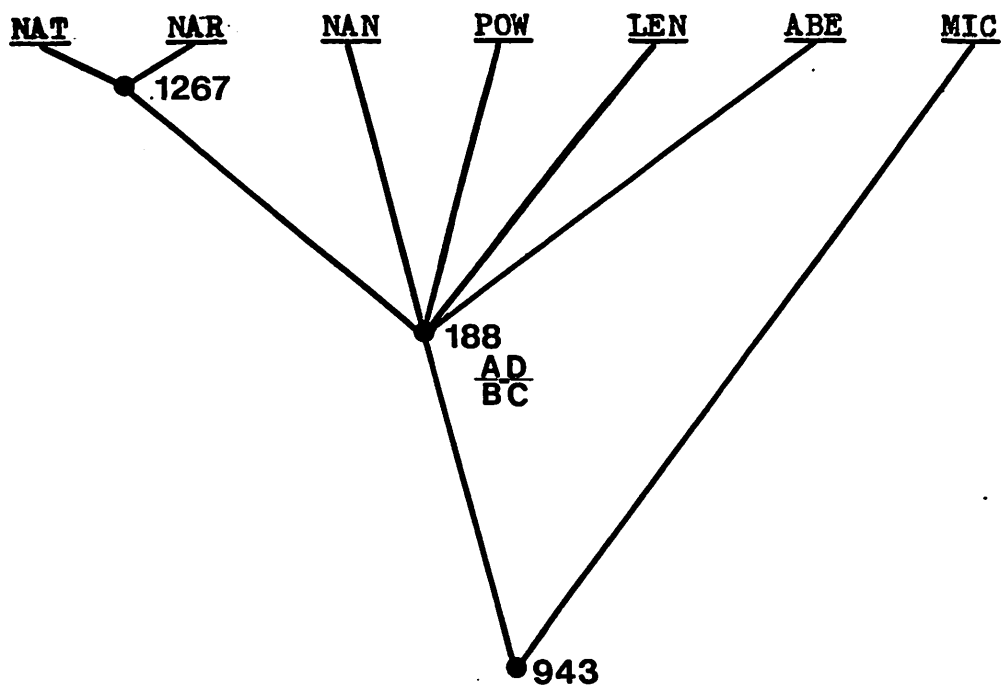

Fig. 5 GLOTTOCHRONOLOGICAL RESULTS (NODAL)

least-move explanation (such as shared independent innovations) must be considered. Clearly, further linguistic investigations will be required to resolve Powhatans actual status in the Siebert classification.

The 'Worter und Sachen' Technique

In addition to the kind of least-effort spatial interpreations possible with the glottochronological technique, specific geographical information can be obtained through the application of the Worter und Sachen technique. Utilizing the comparative method, this technique can reconstruct words and their meanings which existed in an ancestrial language (in this case Proto-Algonquian). When the cultural and natural items present in the ancestrial environment of these languages can be identified, then the geographical location of the people speaking the proto-language can be delineated. The "homeland" of a proto-language can be recognized as the Area where the distribution of floral and faunal taxa projected for the prehistoric period are found to overlap in distribution.

A great aid in determining the Eastern Algonquian homeland is available in Siebert's (1967) previous reconstruction of the homeland for all the Algonquian languages (Figure 6). A number of Siebert's lexical reconstructions are also applicable to the Proto-Eastern Algonquian, when at least one of the Eastern representatives retained a cognate form which preserved the original meaning. A list of these species items has been included as Table 4. A number of additional lexical items have been reconstructed on the basis of internal comparisons within Eastern Algonquian. Given the lexicostatiscal results, to establish Proto-Eastern lexical components through the comparative technique requires the identification of terms shared between Micmac and any of the other languages. The taxa shark, Great Blue Heron, Passanger Pidgeon, Eastern White Pine and Northern White Cedar.

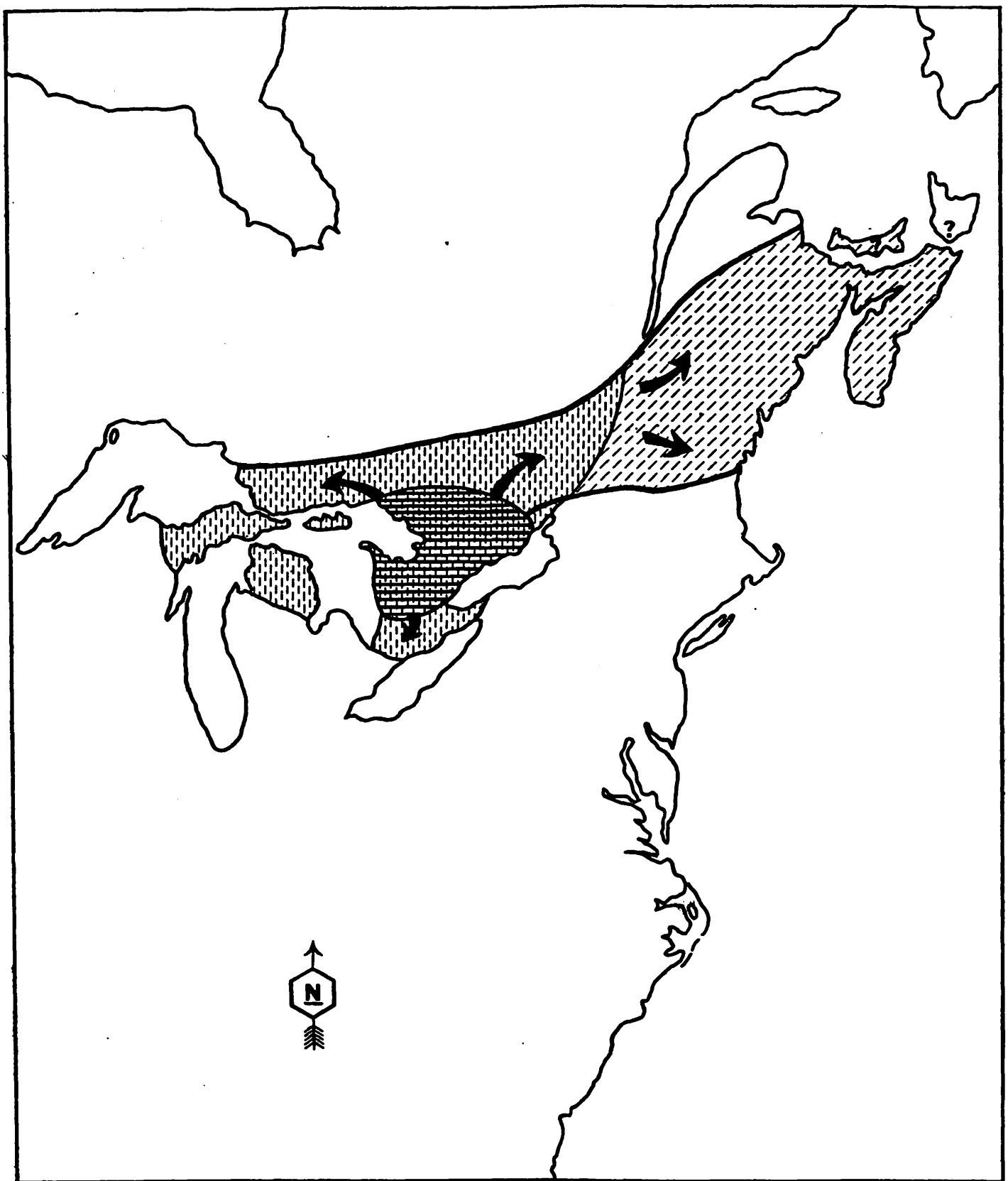

Figure 6. Proto-Algonquian, Central Algonquian, and Eastern Algonquian Homelands

Proto-Algonquian ca. 1200 B.C.

Proto-Central Algonquian ca. 900 B.C.

Proto-Eastern Algonquian ca. 950 B.C.

Table 4 Faunal and Floral Taxa in The Proto-Eastern Algonquian Homeland

Golden Eagle (Aquila chrysaetos)

Pileated Woodpecker (Dryocopus pileatus)

Oldsquaw (Clangula hyemalis)

Common Raven (Corvus corax)

Greater Yellowlegs (Totanus melonaleucus)

Bobwhite (Colinus virginianus)

Ruffed Grouse (Bonasa umbellus)

Kingfisher (Megaceryle alcyon)

Nighthawk (Chordeiles minor)

Blue Jay (Cyanocitta cristata)

Gull (Generic) (Larus sp.)

Great Horned Owl (Bubo virginianus)

Hawk (Generic)

Heron, Crane (Species undetermined)

Merganser (Generic) (Mergus sp.)

Harbor Seal (Phoca vitulina)

Raccoon (Procyon lotor)

Lynx, Bobcat (Lynx sp.)

Squirrel (Generic)

Flying Squirrel (Glaucomys volans and G. Sabrinus)

Moose (Alces americana)

Porcupine (Erethizon dorsatum)

Striped Skunk (Mephitis mephitis)

Red Fox (Vulpes fulva)

Bear (Generic)

Woodchuck (Marmota monax)

Buffalo (Bison bison)

Beaver (Castor canadensis)

Muskrat (Ondatra zibethica)

White Spruce (Picea glauca)

Tamarack (Larix laricina)

White Ash (Fraxinus americana)

American Elm (Ulmus americana)

Speckled Alder (Alnus rugosa)

Basswood (Tilia americana)

Sugar Maple (Acer saccharum)

American Beech (Fagus grandifolia)

Willow (Generic)

Quaking Aspen (Populus tremuloides)

Black Bass (Micropterus dolomieu)

Lake Trout (Salvelinus namaycush)

Brown Bullhead (Ictalurus nebulosus)

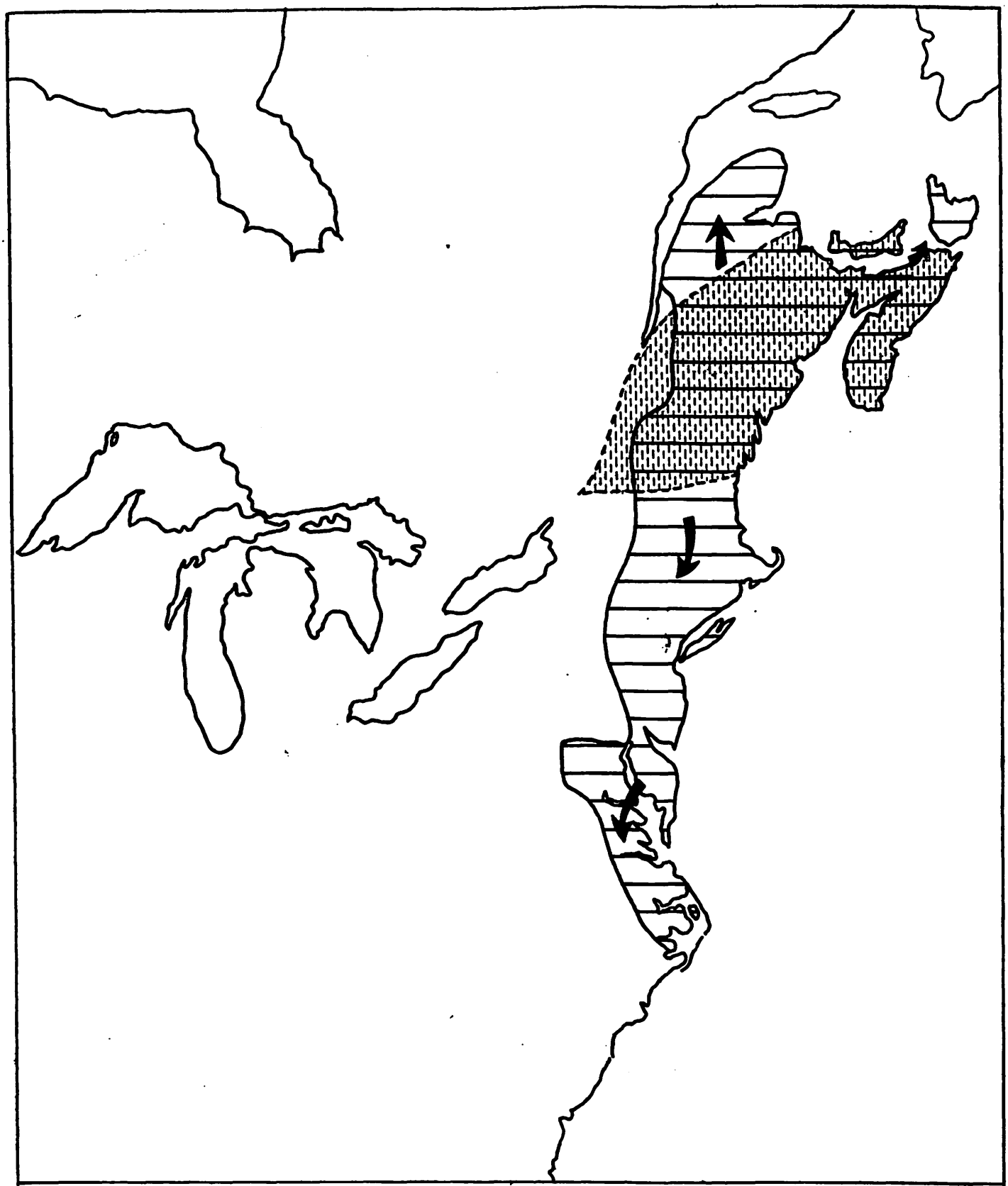

Figure 7. Proto-Eastern Algonquian Homeland and Historic Distribution

Homeland
ca. 950 B.C.

Historic Distribution
ca. A.D. 1650

The homeland of the Eastern Algonquian can be circumscribed within the area of overlap in the distributions of the taxa listed above and those presented in Table 4. The location of this homeland near the coastal region is mandated by the reconstruction of whale and shark, two species not present in the Proto-Algonquian vocabulary. The northern boundary of this area can be roughly delineated by the northern limit of the racoon, and the southern boundary determined by the southern limit of lake trout and caribou distributions. This area is shown in Figures 6 and 7 using Siebert's (1967) distribution maps for the significant species.

Because of the probability of some changes in species ranges between the first millenium B.C. and the present territory delimited in Figure 6 and 7 is intended only as a general approximation. We suggest that the southern limits of the distributions might be extended to the Mohawk River valley to incorporate the southern range of lake trout and extended further to the south in northern New England for the same region. While any precise localization might be suspect, the results certainly attest to a coastal and northerly homeland for Proto-Eastern Algonquian populations in an area ecologically similar to central New York, Northern New England, and the Canadian Maritime provinces. Despite these limited uncertainties, a least-effort reconstruction from these results clearly suggests an initial shift for these populations from Siebert's (1967) Great Lakes homeland in both a northeast direction along the St. Lawrence River and in a southeast direction across Lake Ontario and into the Finger Lakes region. Subsequent population expansion into the maritime provinces resulted in the development of both maritime and riverine adaptations, facilitating subsequent adaptive radiation south along the deciduous forest of the Hudson,

Susquehanna, and Delaware drainages.

Implications of the Linguistic Evidence (Northeast)

The results of the Worter und Sachen and glottochronological analyses just presented, when combined with those obtained by Siebert (1967), indicate at least two broad shifts in the geographic distributions of ancestral Algonquian populations. A least-effort interpretation would suggest that by circa 1200 B.C. these groups had diverged from an ancestral homeland in the upper Great Lakes region, and that by roughly 900 B.C. this expansion had resulted in the acquisition of a maritime-related vocabulary by the Proto-Eastern Algonquians. Since the reconstructions in this proto-vocabulary also indicate northern rather than southern ecological adaptations, a later movement down the coast must be posited to account for the distributions documented at contact.

Both Siebert's dates for the initial diversification of Algonquian (ca. 1200 B.C.) and the date obtained here for the separation of Micmac from Eastern Algonquian (943 B.C.) roughly equate with the terminal stages of the Archaic period. An areal perspective on linguistic time depth in Eastern North America suggests that these changes may be part of major shifts in linguistic distributions taking place during the climatic shift from the Xerothermic Interval to the cooler and moister conditions of the Sub-Atlantic episode (Carbone 1980: 192). Swadesh (1959) gives dates of roughly 1550 B.C. for Caddoan and Algonquian divergence and 1450 B.C. for Iroquoian, while Chapman (1974) places the Siouan-Catawba separation at ca. 1250 B.C. Wendland and Bryson's (1974) global analysis indicates that the environmental changes of this period had varying effects on a variety of cultures worldwide, and Carbone's

analysis has tended to support these contentions for the Middle Atlantic region (1976: 195).

Interestingly, in the geographical area relevant to the initial posited shift of proto-Algonquian populations during the Late Archaic period is the source of the major ongoing interpretive controversy (Sanger 1975). The debate centers around explaining the complex series of natural and cultural events which "deeply altered" Northeastern prehistory in the second millenium, B.C. (Tuck 1975: 144). However, as Dincauze aptly points out, "there are now as many interpretations" for this temporal period "as there are researchers working at it" (1975: 23).

Sanger, for instance, describes the archeological sequence for the coastal Northeast as indicating:

> clear evidence for an abrupt shift in cultural focus involving technology, subsistence, mortuary practices, and perhaps settlement subsystems. Gone is the ground stone complex...Absent also is the elaborate bone and antler complex...The swordfish pattern disappears and a new adaptation based on soft shell clam (Mya arenaria) emerges. In the mortuary subsystem the red ochre inhumations are replaced by cremation pits with artifacts in a very different style...(Sanger 1975: 69).

Although some authors question the validity of the shellfish data, positing instead an evidentiary gap (Salwen 1965; Brennan 1976), a majority appear to accept these disjunctions and perhaps even a decline in population density (Snow 1974: 136) in the terminal Archaic. Both Sanger (1975) and Bourque (1975) indicate that this "new way of life is so dramatically different that there are literally no vestiges of the older culture remaining, either in tools or in behavior patterns" (Sanger 1975: 69).

Proponents of long-term population stability models find either internally stimulated technological adaptation (Ritchie 1969; Snow 1972),

external cultural diffusion (Dragoo 1976: 3; Snow 1980: 248), or environmental causalities (Braun 1974; Snow 1974: 137; Tuck 1975: 145) to account for these changes. Based on their review of the archeological data, Sanger and Bourque argue that this shift reflected in the archeological record involved a population replacement and suggest that the replacement occurred as a result of migration of Susquehanna tradition groups from southern New England. Snow supports the arguments for migration of these groups from southern to northern New England, while at the same time arguing that diffusion of the material aspects of the Susquehanna tradition explains the appearance of this tradition in southern New England (1980: 248). Snow admits that such an explanatory approach "leaves some untidy loose ends" (1980: 248).

An environmental component to these adaptations appears to be particularly well established, in the form of the "significant vegetational and climatic events" which occurred at the end of the Hypsithermal period around 1300 B.C. (Bradstreet and Davis 1975: 7, 19). The paleo-vegetation maps developed by Bradstreet and Davis (1975) show that the forest conditions which existed during the Proto-Algonquian period exhibited a return to "northerly"climatic conditions around 1400 B.C. At this time, the Lake Forest biome is projected to have extended from the Northern Great Lakes to the Maritime provinces of northern New England. The continuous distribution of this beech-maple-hemlock and maple-basswood forest association across the northeast would have facilitated adaptive radiation of populations from the interior to the maritime provinces. In the maritime province of Maine, the period around 1500 B.C. was associated with substantial environmental changes which would have decreased the resource potential of maritime Archaic cultures by decreasing the availability of swordfish and cold-water adapted soft shell

clams as well as hardwoods and associated nut sources (Sanger 1975: 72).

The development of maintenance strategies in response to the imbalance of demand and the availability of resources resulting from environmentally caused stresses can take many forms, including the reinforcement of territoriality, the conservation of resources, development of storage technologies, intensified gathering, increased sedentism, population control, redistribution of resources (exchange), or the redistribution of people (Jochim 1981: 164-201). The last anticipatory strategy, redistribution of people, can occur through the normal budding-off of groups from a parent population. This alternative, which in evolutionary theory equates to adaptive radiation models, is perhaps the most basic of all patterns of evolution in the biological sciences and was an option often selected by various cultures, particularly those with normally high residential mobility and limited material culture (Jochim 1981: 191; Valentine 1973: 55). The amount of risk involved in such movements would depend upon whether force was needed to convince neighboring groups of the desirability of such an expansion and whether the emigrant groups had to adapt to similar or different environmental resources.

The linguistic evidence indicates that the Proto-Algonquin populations opted for an adaptive radiation strategy that initially involved emigrant groups expanding along a growing, familiar Lake Forest ecological setting until they reached the Maritime provinces and the Atlantic Ocean barrier. By comparing Siebert's (1967) list of species reconstructed for the Proto-Algonquin to the list of species reconstructed for the Proto-Eastern Algonquin (Table 4), the continued importance of various Lake Forest animal and plant species becomes apparent. Of the

four species of freshwater fish identified in Proto-Algonquian, the lake trout (Cristivomer namaycush) was probably the most important fish which continued to be exploited by the time of the Proto-Eastern Algonquian divergence. One of the largest of freshwater fish, the late trout is confined to the boreal forest region north of the Mohawk Valley in New York, and is found in the various lakes and rivers in northern New England. Lake trout are native to the Finger Lakes, Lake Champlain, Lake George, and various rivers which drain into the Northeast maritime province. Lake trout and harbor seal (which ranged from the St. Lawrence, Lake Champlain, and the east coast to the Chesapeake Bay), along with a variety of other species (Table 4) distributed throughout the projected area of the initial Proto-Algonquian adaptive radiation would have decreased the risk to emigrant groups by providing familiar resources which could be readily obtained by employing traditional subsistence and settlement strategies within the new territories occupied. The transfer of the term for caribou to deer in various southern Algonquian groups, of freshwater fish names to saltwater fish names, and of northern tree names to southern tree names, indicates that as the emigrant groups expanded from the boreal to the deciduous forests, obvious shifts of subsistence emphasis to similar but more abundant species apparently transpired. Thus, this would prepare the northern-adapted cultures for a second adaptive radiation along both the estuarine and riverine portions of the deciduous forest extending from southern New England south to the Middle Atlantic states (Siebert 1967).

Since the definition of the Susquehanna tradition by Witthoft (1949: 10-11), archeologists have alternated between general diffusionist (Kinsey 1972: 359), migrationist (Mouer et al. 1981; Turnbaugh 1975: 57), or a combined approach (Snow 1980: 248) to explain the spread of the material

culture, settlement-subsistence and mortuary aspects of this tradition from a "homeland" in the southeast (Tuck 1978: 37). Most scholars agree that the Susquehanna tradition began in the southeastern coastal plain around 2000 B.C. and spread northward along the east coast, arriving in northern New England by 1200 B.C., a time span of 800 years. During this period, rather extensive trade networks developed along with mortuary ceremonialism. In the Middle Atlantic states region, cultural continuity of the Susquehanna tradition into the early Woodland period is apparent, although in the northeast such continuity is less obvious (Steponaitis 1980; Snow 1980). Some authors have even gone so far as to speculate that:

> The presence of Algonkian speakers stretching from the Atlantic Provinces to the Southeast in early historic times is to be expected, given the movements of the Susquehanna people into the area (Sanger 1975: 73).

Sanger's speculations that the Algonquian language continuum resulted from a Susquehanna tradition migration is, of course, at variance with the linguistic evidence presented in this paper. Reconstruction of species words in Proto-Algonquian and Proto-Eastern Algonquian clearly demonstrates that the Algonquian-speaking people encountered at contact along the east coast had to have expanded from a northeast and not a southeast homeland. Moreover, the divergence dates for the different Eastern Algonquian languages corroborates these findings by providing a north-to-south slope for the rate of language change. The divergence of Proto-Eastern Algonquian from Proto-Algonquian between 1200 and 900 B.C., and the subsequent Middle Woodland divergent dates are much too late to be associated directly with the dates of the expansion or spread of the Susquehanna traditions. While the Susquehanna tradition provides rather

supportive evidence for adaptive radiation resulting in the displacement of Maritime Archaic cultures. This particular tradition cannot be correlated with the linguistic or archeological evidence for an Algonquian migration. However, the possible displacement of Maritime Archaic groups of the Susquehanna tradition may have facilitated expansion of subsequent adaptive radiations of Lake Forest adapted cultures, particularly since the Susquehanna tradition groups in the northeast Maritime province would have been at the northern limit of their biome in an area increasingly undergoing environmental change by around 1200 B.C.

Based on the preceding assessment, the debate concerning the explanations for the appearance of the Susquahanna tradition becomes of secondary importance to the question of which archeological complexes appeared in the northeast contemporary with or following the Susquehanna tradition. In Tuck's recent re-evaluation of the fate of the Maritime Archaic cultures south of the St. Lawrence, he states that:

> they are replaced after 1000 B.C. by what appear to be groups of interior hunters who moved to the coast and began to utilize the resources there, more conspicuously shellfish. These people may have had their origins in the Canadian Shield, from where they slowly spread to the open pine and spruce (boreal) forest of Maine and the Atlantic provinces. Furthermore, there is growing evidence that the Shield Archaic tradition can be traced forward in time to the present-day Algonquian-speaking peoples of the Northeast - Micmac, Maliseet, Abenaki - in an essentially unbroken sequence. (1978: 34)

While the boreal forest of the area occupied by the Shield Archaic cultures certainly contained a number of the species reconstructed for Proto- and Proto-Eastern Algonquian, a number of other species, such as raccoon, are clearly limited to the Lake Forest biome. Unfortunately, the currently available cultural syntheses for the Maine maritime region are insufficient to clarify the relationship between the Susquehanna and

subsequent archeological assemblages. However, the Lake Forest region of central New York does contain an adequate sequence, which is useful to concluding this discussion.

In the Finger Lakes and Mohawk River drainages of the Lake Forest region, the Frost Island phase (1595-1290 B.C.) represents the local manifestation of the Susquehanna tradition. Snow notes that the Frost Island phase contrasts significantly with the preceding Mast Forest and Lake Forest systems; was apparently not "as adapted to northern resources as the Lake Forest system" (Snow 1980: 251); and provides clear evidence for migration of groups into the region. Although Snow postulates that the subsequent Meado wood phase (1230-300 B.C.) developed out of the Frost Island phase, he also notes that Frost Island sites dwindle as Meadowood sites develop. The disappearance of statite vessels and the appearance of Vinette pottery, as well as a number of major shifts in various aspects of the archeological assemblages from Frost Island to Meadowood, call into question the continuity model proposed by Snow. The recent assignment of the Middlesex Adena mortuary phase as a subsystem to the Meadowood phase provides further support for the development of a rather different cultural complex, which has greater affinities to the Glacial Kame cultures of the area of the Proto-Algonquian homeland than to the Susquehanna tradition, Frost Island phase.

A least-effort interpretation of the available data would posit that the Maritime, Mast Forest, and Lake Forest cultures were initially disrupted from the South by Susquehanna tradition groups which expanded near the end of the warmer Xerothermic climatic period. In the Lake Forest environment of southern and northern New England, these groups were subsequently displaced by expanding Lake Forest Archaic groups, of which

the Meadowood/Middlesex phase has been clearly identified in central New York and the Mohawk drainages. The Meadowood/Middlesex phase development and spread provide interesting correlations with the adaptive radiation models suggested on the basis of the linguistic evidence. The development of the eastern Adena tradition, the spread of sites of this tradition at the expense of sites which developed out of the Susquehanna tradition, and the continuation of the interactions of subsequent Middle Woodland cultures following the breakdown of communications between the Ohio valley and the east coast groups, may all be related to the various strategies for survival, which resulted from the initial, culturally-induced changes caused in part by environmental changes dating to around 1500-to-1300 B.C. time period.

Despite the enormous number of precedents, to advocate any particularistic correlations between the disjunctions in these chronologies and the events in Algonquian linguistic history would be premature at this time. Not only are there axiomatic theoretical difficulties inherent in any such attempts, but the archeological data base in the region is diverse, complex, and rapidly growing. Obviously, many local sequences from the numerous political divisions contained in the Northeast need to be evaluated in this regard: a task left to specialists in the Northeast. Similarly, specialists will need to assess the implications of the linguistic information in re-evaluating evidence for the southern migration of Proto-Eastern Algonquian groups down the east coast during what should correspond to the Middle Woodland period. As the Middle Atlantic region should represent the terminal portion of the inferred Algonquian migration, discussion will now turn to the application of the adaptive radiation and frontier models to the Middle Woodland in the Middle Atlantic.

Implications of Linguistic Evidence (Middle Atlantic)

The Middle Woodland in the Middle Atlantic has always posed a number of explanatory problems to researchers concerned with unraveling the interrelationships which are apparent for the different cultures spanning the time period from 600 B.C. to 800 A.D. and the area from the mouth of the Chesapeake Bay to the middle portions of the Hudson drainage. Early researchers speculated that the historic Algonquian populations were derived from the northeast some time in the prehistoric period, but they lacked the linguistic and archeological evidence to support such a model (McCary 1957:1; Holland 1966: 2; Johnson 1972: 25). With the advent of radio-carbon dating and limited excavations throughout the region, the chronological sequences for the different states have been better defined, and initial interpretations of the interrelationships between phases have been advanced. Most researchers have noted cultural continuity between local sequences and have attributed the exotic items which appear during this period as indices to the development of trade networks associated first with the eastern Adena and subsequently with the Fox Creek, Cony and Selby Bay association of related lithic assemblages (Handsman and McNett 1974; Kinsey 1974; Funk 1974). While population movements have been used by some researchers to explain the similarities between Middle Woodland assemblages (Brennan 1974), most researchers have dismissed migration as an explanatory tool in preference to diffusionist and trade models (Handsman and McNett 1974).

The linguistic evidence provided in this paper indicates that, following the initial adaptive radiation of Proto-Algonquian groups from the Great Lakes homeland and subsequent adaptation to the deciduous and mari-

time resources of the new territory, subsequent generations of Proto-Eastern Algonquian populations expanded along a southern frontier which extended down the Hudson, Susquehanna and Delaware valleys and along the Atlantic coast. The subsistence-settlement patterns of the historic tribal distributions of the various Algonquian languages suggest that the second shift in populations may have originated from two populations of related Algonquian Indians, one adapted to the riverine environment and the other to the maritime environment. It is likely that the Unami and Munsee dialects of the Delaware language represented simply the upstream and downstream speech communities withinthe Delaware drainage (Snow 1980: 31). Since these populations were expanding into occupied territory and as each community would have had access to different resources, the continued communication, population exchange, and resource exchange predicted to be associated with this expansion would have reduced the risk to the migrant groups and the parent population.

Continuation of the kinship, exchange, residence rules, and other aspects, particularly if the emigrants were encountering hostile populations in the new frontier, would be advantageous to the successful colonization of the areas to the south (Jochim 1981; Hardesty 1980). Redistribution of resources would have continued to supply cononizing populations with familiar food and production resources while enabling the flow of previously unaccessible raw materials from the colonizing populations to the populations in the homeland. Formalization of these trade networks would have been facilitated by continued contact along kinship lines and the actual movements of individuals and families from the parent population to and from the immigrating population and vice versa. Development of mortuary and religious complexes would have further strengthened the need

for and reward of continued commuication and exchange. Many of the maintenance strategies discussed by Jochim (1981) could be applied to the adaptive radiation and frontier models, which may better explain the regional interaction spheres which are evident in the archeological record for the Middle Woodland period. While the elaboration and testing of the frontier model outlined above is beyond the scope of this paper, a summary of the archeological evidence in support of a north to south adaptive radiation during the Middle Woodland period will be provided to stimulate and direct research interest into this explanatory approach.

Since the inferred Proto-Eastern Algonquian homeland has been placed in the Lake Forest region extending across the Finger Lakes region to the maritime province of northern New England, the logical place to search for archeological manifestations of subsequent shifts in populations would be in southern New England. The development of the Meadowood/Middlesex Adena phase in the Finger Lakes and Mohawk drainages between 1200 to 300 B.C. is associated with the development of mortuary ceremonialism, regional exhange networks, and probably adaptive radiation of populations eastward across an environmentally similar zone. While a dissertation could be written on the exploration of various maintenance strategies as they apply to the reinterpretation of the Eastern and Central Adena developments, this paper will focus on the possible interrelationships of the Meadowood/Middlesex Adena phase with Middle Woodland components l ated in the Delaware and Susquehanna drainages.

Turning to the upper Susquehanna valley, Funk and Rippeteau attribute the archeological changes associated with the Susquehanna tradition, the Meadowood/Middlesex Adena phase, and the Fox Creek/Canoe Point phase to secondary diffusion rather than migration, although they do not rule out

minor movements of people in the area (1977: 37). This explanatory approach is not unexpected since these authors:

> feel that in situ development theories are more parsimonious and better supported by the evidence than migration theories. Hence, in the absence of compelling evidence to the contrary, in situ evolution should be a basic assumption (to be tested) in any regional research program (1977: 53).

Thus, they attribute the drop of population during the Meadowood times to environmental casualties, while at the same time noting that the resurgence of populations during the late Middle Woodland period "seems not to be correlated with any recognizable form of environmental change" (1977: 49). The various discontinuities observed in the archeological record are not adequately explained by the diffusionist and in situ evolutionist arguments, although the archeological data presented suggest that the examination of maintenance strategies, including population expansion, better explains the archeological record.

For example, Funk and Rippeteau (1977) point out that various authorities (Ritchie 1969) have posited a migrationist hypothesis to explain the relatively abrupt appearance of the Susquehanna tradition in the Northeast. The Frost Island phase of the Susquehanna tradition is well represented in the upper Susquehanna sequence for the period from 1450 to 1250 B.C., and apparently evolved into the Orient phase (1090-720 B.C.) whose sites are even more common in the region. However, "following the Orient-like occupation of the valley, a marked discontinuity is encountered with the onset of the Meadowood phase of the Early Woodland stage" (Funk and Rippeteau 1977). The decrease of sites associated with the Meadowood phase is correlated to environmental change, although an equal argument could be made for the displacement of Orient phase groups and initial frontier expansion of Meadowood/Middlesex Adena groups into the region.

Subsequent expansion of Meadowood/Middlesex groups into the valley may be reflected by the appearance of Canoe Point phase occupations between 120 to 325 A.D. and the apparent evolution of the Fox Creek phase (300-450 A.D.) cultures from the Canoe Point phase occupation. In summary, an alternative interpretation of the upper Susquehanna drainage sequence would posit (1) an initial immigration of Susquehanna tradition groups into the region, (2) followed by a displacement of these groups by around 700 B.C. by expanding emigration of Meadowood/Middlesex Adena phase pioneers, and (3) the subsequent population of the region by succeeding generations of the Meadowood/Middlesex Adena phase, which developed into first the Canoe Point phase and subsequently into the Fox Creek phase.

Previous attempts to describe the interrelationships of these closely related cultures have been unsatisfactory. This is because the causative factors for the similarities and for the development of the exchange networks characteristic of these cultures have not been fully developed (Handsman and McNett 1974). The accumulating archeological evidence indicates that the expansion of the Meadowood/Middlesex Adena phase groups, beginning around 800 B.C., led to the establishment of both riverine-and estaurine-adapted populations by around 700 B.C. These subsequently evolved along similar trajectories involving continued group contact, material exchange, and kinship interaction. The social maintenance strategies developed to minimize the risk involved in the initial expansion of these groups continued in operation during the subsequent Fox Creek, Cony and Selby Bay phases, although the demise of the Adena/Hopewell exhange system by 200 A.D. led to the subsequent limitation of this interaction to the area east of the Appalachian Mountains.

The development by 200 A.D. of the distinctive phases of the Fox Creek, Cony, Selby Bay complex can be seen as the evolution and population growth of frontier groups in the southern New England and Middle Atlantic regions and continued adaptive radiation toward the south in the area of the Chesapeake Bay. Archeologists concerned with interpreting the Middle Woodland in the Delmarva peninsula have suggested evolutionary models of in situ development from around 700 B.C. (Wolfe Neck phase) to 400 B.C. (Coulburn phase) and finally to about 200 A.D. with the appearance of the Carey phase (Griffith and Artusy 1977; Thomas et al. 1974). The earlier portion of this sequence is associated with the Delmarva Adena complex which has been radio-carbon dated at the Nassawango site in Maryland from 700 to 200 B.C. The recovery of Wolfe Neck ware from the Adena features suggests that Wolfe Neck ware is associated with the Delmarva Adena. Thus, in Delaware, initial expansion of the northern coastal adapted groups into the area would have occurred at the same time as expansion into southern New England (Lagoon phase). While more work will need to be completed to clarify the relationship between Wolfe Neck and Coulbourn phases, the close resemblage between Coulbourn and Mockley ceramics suggests that Mockley may have developed out of Coulbourn ware although ceramics similar to Mockley ware have been found in coastal New York and at the Abbott Farm site in the middle Delaware drainage.

Apparently a major center for the quarrying and redistribution of argillite blades, the Abbott Farm site reportedly contained a significant percentage (32.2%) of Mockley ware recovered during the excavations of the site by Cross (Stephenson et al. 1963: 189). The presence of Mockley ware at the Abbott Farm and other northern sites and the continued use of argillite during the Selby Bay phase throughout the Chesapeake

and Delaware Bay regions suggest that the parent populations from which subsequent adaptive radiations in the region developed may have not been limited solely to the Coulbourn and Wolfe Neck phase populations on the Delmarva peninsula.

On the western shore of the Chesapeake Bay centering around the Potomac and lower Patuxent River drainages, the Pope's Creek phase is contemporary with the Wolfe Neck and Coulbourn phases. Although the phase is defined by the presence of a sand-tempered, net-marked Pope's Creek type pottery, Gardner (1982) has recently pointed out that this sand-grit tempering tradition appears distinct from the crushed quartz tradition characteristic of the Wolfe Neck and other northern pottery types. Gardner postulates that the Pope's Creek ware represents the in situ evolution of local cultures from previous phases. The projectile points associated with this phase are the Calvert type (Wright 1973; Potter 1982). The lithics associated with this phase are almost exclusively made of locally available quartz and quartzite. Affinities of this phase are to the south with similarities apparent for the Prince George and Stoney Creek (Handsman and McNett 1974; Gardner 1982).

Handsman and McNett (1974) and Gardner (1982) note a shift in settlement-subsistence patterns between the Pope's Creek and the subsequent Selby Bay phases. While they attribute the shift in settlement-subsistence patterns to evolutionary developments in response to improved adaptations to a stabilizing environment, an equal if not stronger case exists for discontinuity and population replacement. The limited distribution of the "classic" Pope's Creek ware to the Patuxent and Potomac drainages and near absence of this pottery from the drainages north of the Rhode River suggest a restricted cultural group. The early appearance of an Adena

cremation site on the West River and of Adena material on the upper Patuxent River support an alternative interpretation, of frontier communities of Delmarva Adena groups becoming established on the western shore of the Bay at a time contemporary with the more western Pope's Creek phase sites. The early appearance of Selby Bay phase sites in Delaware from 200 to 400 A.D., followed by the latter dates for the Selby Bay phase of 400 to 800 A.D. on the western shore of Maryland and south to the James River valley, provide additional support for westward adaptive radiation of Selby Bay phase populations in the estuarine portions of the Chesapeake Bay. The frontier model would predict that parent populations of Selby Bay phase groups would have continued to evolve on the Delmarva peninsula, a prediction which may be supported by a recent radio-carbon date of 800 A.D. for a Selby Bay phase site in Delaware (Griffith 1982: per comm.).

Additional support for a major discontinuity between the Selby Bay and Pope's Creek phases is suggested by the radical change in lithic material preference and lithic point types associated with the two phases. Ever since Thomas Mayr's initial definition of the Selby Bay phase (1957, 1972), researchers have recognized the overwhelming dominance of exotic lithic material in the Selby Bay assemblage. Onondoga chert from the area of the Meadowood/Middlesex Adena homeland (Finger Lakes, New York) is a major diagnostic of Selby Bay sites and represents the first and only appearance of this material on a consistence basis in the Bay region (the related West River Adena site being a possible exception). The appearance of cache of argillite blades and points obtained from the Bryan and Abbott Farm site areas in the middle Delaware valley also contrast with the previous quartz and quartzite industry of the Pope's Creek phase and again demonstrates northern cultural affiliations. Finally, the

extensive utilization of rhyolite obtained from the Blue Ridge province of Maryland and Adams County, Pennsylvania, represents a substantial shift from lithic preferences during the preceding Pope's Creek phase (Figure 8, Table 5).

TABLE 5: PROJECTILE POINT - QUANTIFICATION

	Delmarva Peninsula		Hagerstown Valley		Monocacy Valley		Patuxent Valley	
	No.	%	No.	%	No.	%	No.	%
Paleo-Indian	7	15	7	0	11	45	1	0
Early Archaic	35	0	76	41	177	76	182	37
Middle Archaic	192	7	56	54	221	71	190	25
Late Archaic	258	7	417	75	1074	78	2280	7
Early Woodland	29	7	221	88	343	70	499	11
Middle Woodland	107	23	173	56	565	76	1043	70
Late Woodland	99	2	313	53	1163	49	600	4
Total	727	9	1263	66	3554	67	4795	23

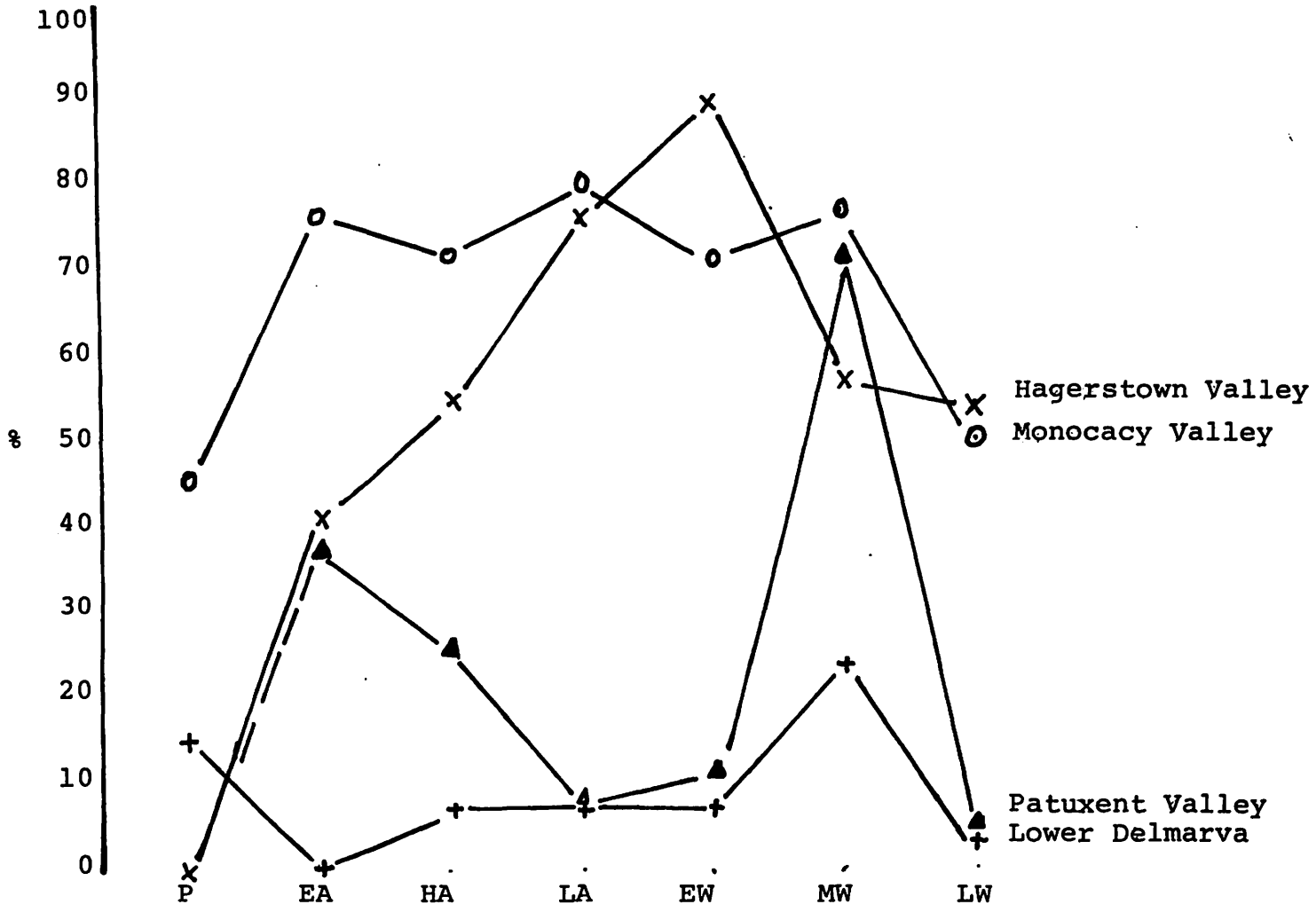

Figure 8

RELIANCE ON RHYOLITE FOR PROJECTILE POINTS THROUGH TIME

The projectile-point analysis summarized by Figure 8 and Table 5 clearly demonstrates this radical shift in lithic use in the Western Chesapeake Bay region during the Middle Woodland period. It is apparent from the above discussion that gravity models explain the percentage occurrence of argillite and Onondoga chert in the Bay region. Thomas Mayr (1957: 4) noted that at the Ruf site on the Patuxent River, the debitage recovered from a Selby Bay phase midden consisted of 56% blue rhyolite, 31.4% argillite, 4% Onondoga chert (green jasper) and only 5% and 3.6% for quartzite and quartz respectively. The lithic percentages support a gravity model for Onondoga chert and argillite with the percentage of blades traded from each region reflecting a decrease as distance increases. The very close similarity in lanceolate, stemmed and side notched point styles and dimensions for the Canoe Point - Fox Creek - Cony - Selby Bay phases provides further support for regional exchange and communication.

The preference for rhyolite in different portions of the Bay region indicate a down the line exchange mechanism was operative between the western and eastern shores of the Bay, but that a direct procurement method of rhyolite obtainment occurred for those groups living on the Western shore (Figure 8). The sharp rise in rhyolite use associated with the Selby Bay points identified in the Patuxent valley supports the direct procurement of rhyolite by coastal groups traveling to the quarry deposits. At the same time the change represents rather graphic support for a radical change over the lithic preference of the previous phase. Clark's (1974) analysis of the trajectory of manufacture and use life of Selby Bay points combined with Kavanagh's (1981) recent discovery of extensive quarry reduction stations of the Selby Bay phase located at the eastern side of the Blue Ridge Mountains provide further support for direct procurement of rhyolite

by the Selby Bay phase coastal groups. The interesting drop of rhyolite use in the Hagerstown valley during the Selby Bay phase (located to the west of the Blue Ridge) provides evidence of possible culture conflict between the coastal Selby Bay phase cultures and the interior adapted cultures, a subject worthy of continued research into the issue of prehistoric evidence for buffer zones.

The available evidence fits the frontier model discussed earlier in the paper. The initial establishment of frontier communities on the western shore of Maryland are projected to have been associated with the Delmarva Adena, Wolfe Neck and Coulbourn phases beginning around 400 to 300 B.C. These communities would have been initially limited to the rivers north of the Rhode River, would have spread into the upper Patuxent and by the time of the Selby Bay phase would have become widespread throughout the estuarine portions of the Chesapeake Bay drainages. The sparsity of Adena material on the Coastal Plain and Piedmont portions of the Potomac has eluded explanation in the past, but can be readily explained if one accepts the contention that the Pope's Creek phase groups in the area represented relic communities in competition with Delmarva Adena groups who had not successfully expanded into this area until after the demise of the Adena exchange network and the subsequent development of the Selby Bay phase. The collapse of the Eastern Adena exchange networks due to possible cultural disruption in the projected original homeland of this archeological complex (Finger Lakes-Mohawk valley region) was followed by continued communication and exchange during the subsequent late Middle Woodland period (Selby Bay-Fox Creek-Cony-Carey phases). The subsequent demise of the exchange networks at the end of these phases (800 A.D.) further correspond to frontier models which predict that as the populations of a region

stabilize and diversify, the need for continued economic and kinship ties to reduce risk are diminished as the competition for resources within the region increases. The appearance of corn-bean-squash agriculture around 900 A.D. would have further decreased the need for economic interdependence. The related need for prime agricultural lands to support an increasing population led not only to intensified use of marginal areas such as the Piedmont portions of the Susquehanna drainage, but also to increased competition between related groups, culminating in the fortification of villages by 1300 A.D. and the development of inter-tribal hostilities which continued until the historic period (Clark 1981). The subsequent accommodation, displacement, disintegration and absorption of the Algonquian speaking tribal groups during the frontier expansion period of our European ancestors provides interesting insights into the effects on native relic population by a dominant culture with radically different religious, linguistic, economic, and political systems. While this paper has for laconic necessity focused only upon what is postulated to be participants in an expanding prehistoric society, the ethnohistorical and archeological data should be employed in future analysis to explain the responses of indigenous populations to the postulated sequence of changes outlined above (Waselkov and Paul 1981).

DISCUSSION

The above discussions of the archeological record in the Northeast and Middle Atlantic regions have clearly demonstrated the viability of adaptive radiations as explanatory mechanisms in the Late Archaic through Middle Woodland periods. Full elaboration of the various maintenance strategies that may be evident in the archeological record need to be developed for the region. Such refined models must also include possible maintenance strategies developed by the indigenous populations which were postulated to have been affected by the expending Eastern Adena tradition populations.

We have proposed that a continous sequence may someday be documented beginning with the Glacial Kame cultures in the Great Lakes, extending to the Meadowood-Middlesex Adena cultures in central New York, upper Hudson, Susquehanna and Delaware drainages; developing into the Buskill, Lagoon, Abbott Farm, Wolfe Neck and Coulbourn complexes of southern New England and the Middle Atlantic states; and evolving into the Canoe Point, Fox Creek, Cony, Carey and Selby Bay phases of the late Middle Woodland period. This developmental sequence of related archeological phases is proposed to comprise the Eastern Adena tradition which,while maintaining continued contact with the Central Adena area of the Ohio Valley via the Fingers Lakes region, developed somewhat different manifestations based on a projected common origins.

It must be stressed however, that regardless of the validity of these archeological constructs, the application of historical linguistic techniques to the Eastern Algonquian languages has by itself established a number of facts with important ramifications for current conceptions of the prehistory of eastern North America. Through the reconstruction of floral and faunal lexical terminology it was possible to delineate an ancestral "homeland" of these populations in areas to the north of their historic

tirbal distributions, and at relatively recent dates. Since these conclusions are in no way predicated on archeological data, archeological data alone can never solely refute them.

Rather than accept the "burden" of assembling "absolutely documented" "proof" before advancing any such "migration" hypothesis (Tuck 1975:13-145), it is argued that this information should be weighed as a single facet of a diverse evidentiary base which must be used to address these issues. The few discontinuities in the archeological and climatological records which are discussed as possibly synchronous to the posited linguistic diversifications are not intended as assertions of any particularistic relationships. They are instead seen as amply illustrating the viability of more aggressive models of human adaptations in these time/space contexts. The ultimate resolution of this controversy does not await "proof" of any strict correlations between Algonquians and any specific artifactual assemblage, but rather the resolutions of questions at the core of anthropological inquiry such as the relationships between language, technology, and the environment.

Before concluding this discussion it is necessary to address the dominance of "continuity" or "stability models" in the face of known stylistic and climatic changes, previously existing linguistic data, and even native origin myths "that seem to say most tribes were relatively recent arrivals" (Snow 1978:60). As seen, however, explanations for this apparent anomaly are less an evidentiary matter than a subject for discussion of current theoretical paradigms.

In part the shift to increasing emphasis on continuity models for Eastern prehistory is attributed to the inclusion of culture history studies under a more "inclusive study of ecological patterns and processes (Potter and Waselkov 1976:122). While these goals are most admirable and play an important role in continuity models, the new concern for delineating ecological systematics has resulted in some old conclusions. For instance,

Potter and Waslekov not only assert "stability" as the central research concern for studies of evolutionary processes (despite the fact that "change" would seem to represent a more viable model), but indicate that in order to take "full advantage of the great time depth of eastern prehistory" the "persistence of cultural traditions" must be investigated (1976:125).

In fact, however,

> ...for all their denunciation of diffusion and migration as 'non-scientific', what the materialists have actually contrived is not an opposed but an alternative paradigm in which migrations are ignored rather than specifically refuted. This is accomplished by agreeing in advance to dismiss stylistic phenomena as irrelevant. (Adams, et. al. 1978:505).

Part of the difficulty obviously lies in the theoretical perspective being utilized. If one's concerns are primarily centered on an analysis of the "fit" between ecological settings and material technology, particularly on a macro-scale such as Don Dragoo's (1976) traditions for the Eastern United States, then a "fit" can obviously be quite easily found. The size of these entities and their general correlation to major ecological zones undoubtedly suggests that some of the technological continuities noted in the archeological record might be better attributed to the limits placed on the adaptive strategies by the environment.

A much more ominous outgrowth of the new paradigm, however, is indicated by the preconceptions required of the data base. A particularly explicit instance of this can be discerned in the frequently cited synthesis by Snow (1978). In an earlier paper entitled "Shaking down the New Paradigm" Snow (1977) quite clearly reveals the dogmatic nature of this methodology is stating that:

> I first took this approach over a dozen years ago in Mexico when I needed (sic) to define an area within which I could assume cultural homogeneity at any point in time. I have used the same principle in subdividing the East Coast... (Snow 1977:89).

One hardly seems surprised, therefore, when Snow later concludes that in the East "each local sequence seems to reflect a long-term stability that belies the stories of recent migrations that have been popular for many years (1978:69).

In another instance of the preconceptions required of the data base is provided by James Tuck whose in situ or continuity approach to the Maritime province prehistory "attempts to account for the contemporary distribution of northeastern languages and takes as its basic tenet the explicit rejection of all migration hypotheses which cannot be absolutely documented" (1975:13). This basic tenent leads Tuck to conclude:

> A hypothetical construct, the "northeastern maritime continuum" is proposed to imply population continuity - culturally, linguistically and biologically - in the Atlantic Provinces from earliest times until European contact. It is suggested that the burden of proof for migration hypotheses rests with their proponents. (1975:145).

In response to Tuck's continuity model, David Sanger argues that:

> There is nothing magical about in situ hypotheses. Each instance of culture history must be treated as an individual case. It is not adequate scholarship to assume that one form of hypotheses is automatically correct unless proved wrong. The burden of 'proof' for the continuity, or in situ, hypothesis must be equal to that required to 'demonstrate' a discontinuity model (1975:61).

Yet the trend over the past twenty years in Eastern North American archeology has been toward increasing reliance on continuity models to explain prehistoric culture change with decreasing equal time given to the validity of discontinuity models. Dissatisfaction with the migration hypotheses developed by an earlier generation of scholars began in earnest with the development of the paleo-ecological approach to prehistory. As archeologists began to realize the complexity of climatic change during the Holocene and the concommittent effects on sea level rise rates and vegetation and faunal pattern changes, explanations for apparent rapid changes in the archeological assemblages of various periods have been increasingly explained as indigenous adaptations to the changing resource base. Such correlations of paleo-ecological data

with continuity models have resulted in powerful explanatory hypotheses of benefit to the advancement of our knowledge about the relationship between cultures and the environment in temperate North America. Similar advancements in knowledge have resulted when ecological data has been used to provide explanations for the possible factors leading to migrations. Yet given the popularity of evolutionary, ecological explanations of culture change and the rôle of environmental factors in predicting site locations for cultural resource management purposes, migration hypothesis are definitely out of vogue.

This swing of the paradigm pendulum needs to be returned to a more balanced position so that archeologists can discuss migration hypotheses with the same degree of candor that they now discuss in situ hypotheses. Because of the various migration theories developed in the past which have fallen with the accumulation of regional data, the use of migration as an explanatory tool has fallen into disfavor in the east in a similar way that inductive reasoning was frowned upon by the deductive minds of the new archeologists of the past decade. The recent increased awareness that both deductive and inductive reasoning are vital to a balanced approach to discovery and explanation provides encouragement that a similar realization will soon develop in regard to the value of continuity and discontinuity models in explaining prehistoric change. Equal application of the recent analytical techniques which have been developed in American archeology to derive explanations of discontinuities which persist in the archeological record should result in new insights. A balanced approach is essential if the implications of the linguistic data presented in this paper are to be resolved by the archeologists concerned with the time periods and regions under study.

To conclude, despite the notorious difficulties inherent in correlating archeological and ethno-linguistic manifestations the reality of past populational shifts cannot be disputed. The detection and delineation of such replacements would seem essential to the validity of even those studies primarily concerned with human ecological adjustments. It is asserted that models of culture process must be broad enough to include adaptive radiation as a viable explanatory mechanism. The exclusion of alternatives to stability by those advocating "processual" orientations would seem indefensible as a properly holistic evolutionary paradigm.

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