Introduction

The Terminal Archaic in the Middle Atlantic can be seen as a period during which major behavioral shifts were occurring. So striking are a number of these shifts that Witthoft (1953) named it the Transitional Period. In Witthoft's view, the Transitional Period is seen as a short-lived dramatic change from the preceding Archaic lifeways. While the Archaic and Woodland can be seen as Stages or Patterns, the Transitional must be viewed as a sequence which begins with Archaic and ends with Woodland.

Our main purpose is to present a detailed model which explains some of the presumed "shifts" of the Late Archaic or Transitional and attempts to explain how these shifts ultimately led to the emergence of the Woodland Pattern. We will draw heavily on ideas presented by others, especially from the works of Kinsey and Turnbaugh. We will examine Virginia data, particularly from the James River basin, in order to document evidence which supports or refutes these "shifts" and our model in particular. These data come principally from our work on the James River and from data culled from a review of Late Archaic components reported in the Archeological Society of Virginia Quarterly Bulletin.

Late Archaic Shifts

In general, these shifts in the James River Valley can be described for the Savannah River Tradition. Other Late Archaic complexes are either inadequately known or, as in the Halifax phase, appear to follow the traditional hunter-gatherer pattern of earlier groups.

In short, "shifts" of the Savannah River Tradition include:

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.


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 up-stream (Geier et al, 1980; personal communication).


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.

We will now turn our attention to some of the explanations which have been offered in the literature to explain these shifts. For the most part, those models (to use the term in its broad sense) which attempt to explain the Transitional can be summarized as follows:

1. Simple historical diffusion. Things changed because people learned a better way to live from other people. While diffusion is a valid cultural process, we find it unsatisfactory unless expanded with some explanatory power based on adaptation.

2. Diffusion of an adaptive techno-complex in light of increased technological efficiency and/or changing environments. We find an expanded diffusion model easier to accept but insufficient to explain: a. the rapidity of spread, b. the very broad homogeneity of the tradition and c. the possible persistence of local technologies and traditions alongside the new (Dincauze, 1971; Ritchie, 1969).

3. In-place evolution of a new pattern as a response to demographic stress (Turner, 1976, 1978). Those conditions could result from population growth and consequent stress leading to intensification of subsistence patterns and a contraction of the social settlement system into a riverine habitat. This would help explain the fact that there are shifts far inland from the focus of the most effective environmental changes. This model suffers from an inability to explain stylistic uniformity, and a failure to adequately demonstrate stress conditions in the Late Archaic.

4. In-place evolution as a result of "optimum adjustment to a generous environment" (Caldwell, 1964). This is analogous to Braidwood's (1960) "settling in" model of the Mesolithic Near East. The Archaic is seen here as a series of incremental upward adjustments in efficiency culminating in diverse, regionally specialized groups intensively exploiting their terrain in large, relatively sedentary groups. We feel that the uniformity of the tradition argues against Caldwell's process of regional specialization.

5. Migration of actual cultural groups into an environment to which they are pre-adapted. While many of the earlier objections disappear with a migration model, we are left with a problem similar to that of the Indo-European history students. How did some fatherland send out such a huge number of successful colonists while not suffering any apparent depopulation itself?

6. Expansion of daughter groups with an essentially riverine adaptation into a previously unoccupied or underexploited niche (Kinsey, 1972, Turnbaugh, 1975). This very likeable model has suffered from being mechanically attached to environmental change notions. We will discuss it at greater depth below:

The Kinsey/Turnbaugh Model

In our view the best statement of the expansion model comes from Kinsey (1972)
and Turnbaugh (1975). We can synthesize an expansion model for the Savannah River Tradition which we will refer to as the Kinsey/Turnbaugh Model. The salient points are as follows:

1. From a heartland, supposedly the estuaries of the southern coastal plain, a population of riverine/estuarine hunter-gatherers expanded northward.

2. This expansion was a response to the progressive development of modern estuarine conditions and forest composition due to changing climate and net eustatic sea level rise in the Atlantic climatic phase.

3. Shellfish utilization had been a major subsistence factor in the southern heartland, but gave way to fishing, supplemented by hunting and gathering in the north.

4. Social groups were small bands with circumscribed territories, probably a drainage basin.

5. Settlement systems consisted on temporary camps moved to take advantage of periodic resource availabilities within the zoned riverine environment. This might entail, for instance, seasonal movements between prime fishing spots, shellfish beds and deciduous uplands. Wise (1975) suggests a central-based wandering pattern of settlement.

6. It is suggested that indigenous Late Archaic groups coexisted alongside the Savannah River Tradition groups in some places.

7. Expansion was triggered by both environmental and technological changes, including improvements in fishing technology and the development of anadromous fish runs.

8. Sites become more numerous through time, suggesting a growth in population.

9. The tradition was a short-lived, nearly explosive phenomenon.

We believe that this scenario sums up some of the events of the Savannah River expansion quite well, but as a model it has drawbacks. For instance, Turnbaugh's notion that only a few groups penetrated as far as the fall line in at variance with the archeological record. Within the Roanoke, James and Potomac drainages, it seems clear that many groups penetrated hundreds of miles beyond the fall line, and their presence in the headwaters is nearly as impressive as it is in the estuaries.

While we feel that the scenario is fundamentally correct, we do not feel that it is adequate as explanation. In particular, the model suffers the following shortcomings:

1. It lacks generality. While describing possible historical events, there is no attempt to explain those events in terms of general behavior. The correlation between environmental and cultural change is simply a correlation, unless the processes of cultural response are made explicit.

2. The scenario is fundamentally tied to environmental change, and is therefore too deterministic. As Braidwood (1960) noted, environment has changed often, and in cycles. There are no automatic cultural responses to environmental stimuli. Noting that fish runs developed is clearly insufficient to explain the expansion of fishing culture.

3. The processes of expansion are left unstated. There is nothing in the scenario to predict the direction taken during the expansion process. There is no attempt to explain the range of habitats which came to be settled by broadspear users, or how the social groups and technologies differentiated into regional groups. An examination of such processes might explain how and when the fall line was "penetrated", and what determined the patterns of subsistence and settlement in the Piedmont and Mountain areas.
Figure 1: Idealized Scheme of Environmental Structure of the Middle Atlantic Slope
4. Homogeneity of the Tradition is not adequately addressed. While a notion of "explosive" expansion might explain stylistic similarities in the early phases, the apparent similarity of events in the different late regional variants (e.g. increased use of stone bowls, increased sedentism, adoption of ceramics, etc.) cannot be explained thereby. Processes of convergence, as well as diversification require study. The Kinsey/Turnbaugh model stops short. The ultimate trajectory and fate of the expansion process are left dangling. A more general model may serve to predict the outcomes of expansion.

The Chesapeake Drainage in Virginia

As we are attempting to deal with events of the period within the James River drainage, it will be useful to describe the environmental structure of the basin. The habitats available for colonization differ somewhat from drainages to the north. In many ways, the Roanoke, James and Potomac share structural elements which contrast with the Delaware, Susquehanna and Hudson. In particular, the former drainages share an elongated coastal plain section with a marked inner coastal zone, and an attenuated Piedmont with well-developed floodplains. Fig. 1 is an abstraction of the area in question.

Coastal plain environments can be summarized as follows: the floodplain is drowned for the most part, meaning that there is a shortage of fertile first alluvial bottoms, which are highly suitable for grasses and similar plants. There is marked zonation between uplands and river, and between the river mouths and the falls. Diversity is high. Territories are compressed and closely packed. Productivity of shellfish, anadromous fish and the flora and fauna of marshes and swamps is very high. Forest resources are somewhat limited, but easily available from riverine settlements. These latter resources are not so restricted in the fall line zone.

The Piedmont offers a stark contrast with the Coastal Plain. As a maturely dissected plateau, the Piedmont is characterized by very homogeneous uplands only rarely broken by a large, navigable stream with a well-developed floodplain. Distance between major rivers is very great. The Piedmont habitat can be summarized as follows: the major resource for hunter-gatherers is probably in the floodplain, with upland resources such as nuts, deer and small game nearly as important in the subsistence system of most hunter-gatherer groups. Deciduous forest upland resources are available in very large zones of forest between the major river valleys. Overall diversity is low, but productivity of certain resources such as nuts, can be quite high. Both productivity and diversity increase in the vicinity of major streams. The floodplain yields to management practices, and a small amount of labor input could return considerable amounts of floodplain resources. This contrasts with the coastal plain where management input probably adds little in the way of productivity.

While social spaces can be highly compressed in the coastal plain, the Piedmont is characterized by large interfluvial distances and very little patchiness in the environment. Some concentrations of territory could be expected near stream confluences, or other areas where the floodplain is exceptionally broad.

There is a zone which we can refer to as an inner Piedmont which has higher diversity and increased seasonality due to its proximity to the mountains. Holland (1978:41) has suggested that, throughout the Archaic, inner Piedmont settlement systems included seasonal transhumance up and down the Blue Ridge slopes. A similar view is expressed by Hoffman and Foss (1980).

For the present we have ignored the Great Valley, and we will speak only of a mountainous zone to the west. This zone gives rise to the headwaters of the Chesapeake drainage. While there are ample floodplains on major streams in the mountainous region, these tend to be
shallow and rocky, and limited by the length of their growing seasons. Anadromous fish probably did not penetrate this far inland in great numbers, although they were present. The mountainous zone is one of moderate diversity, due to vertical zonation and complex bedrock formations. Productivity is probably low compared with areas to the east.

The landscapes would be used differently by groups with differing technologies and social needs. In general, however, hunter-gatherer adaptations in the Chesapeake drainage can be dichotomized as either principally sylvan or riverine. These are not mutually exclusive categories, but simply models of subsistence strategies which carry different expected outcomes for social organization, settlement, technology and interaction.

Sylvan and Riverine Adaptations

A Sylvan adaptation is one which is diffuse (Cleland, 1966) or broad-spectrum (Flannery 1965). Of course the term implies a forested habitat. The basic pattern of Archaic culture in the Mid-Atlantic can be termed sylvan. There was undoubtedly exploitation of the littorals and river valleys, as water typically creates the hydro-successional communities which provide bounty and diversity sought by hunter-gatherer groups. However, we can postulate from archeological and paleo-environmental evidence, that these habitats did not develop their full potentials until late in Archaic times. If the potential for intensive estuarine adaptations did exist, and was exploited, the evidence is now buried under the waters of the continental shelf (Brennan, 1974).

Riverine adaptations can be seen as focal (Cleland, 1966), involving the intensive exploitation of a more narrow range of habitats. A specialized form of riverine adaptation could be called estuarine. Estuarine groups would rely on the diversity and richness of outer coasts and drowned river mouths. The use of the littoral is well-documented through ethnographic sources, but rarely for groups whose subsistence is limited to hunting and gathering. Where we have such evidence, as with the Andaman Islanders or among Eskimos and Aleuts, there is a strong reliance on boats and other technology for exploiting the natural zonation of the littoral.

Archeological evidence must be relied upon for comparing estuarine or littoral harvesters in various world areas, such as coastal Peru (Lanning, 1967), Southeast Asia and China (Gorman, 1971) and Mesolithic Europe (Tringham, 1971). There is evidence that littoral harvesters typically followed coastal zones, and exploited inland, up-river areas, in what was probably a seasonal round. We may expect, then, that littoral hunter-gatherers in the Middle Atlantic would have been fairly mobile and expansive, exploiting an area at least as far inland as the salt-freshwater transition, or the fall line.

We may go even further and postulate that littoral harvesters in the James, and analogous river valleys, would have had little reason to penetrate beyond the Fall Line. In the inner Coastal Plain and Fall Line zone, ample uplands exist for the harvesting of deer, chestnuts, or similar resources. Therefore, the resources of the Piedmont basically form a sub-set of those available in the Coastal Plain as a whole with the possible exception of certain non-essential lithics.

In contrasting the societies of sylvan versus riverine hunter-gatherers, we feel that the former would be more autonomous at the level of the local group, due to the homogeneity of the forest environment (Sahlins, 1968, p. 32). Likewise, packing of sylvan territories must be at a lower level, and interaction would be limited. Good examples exist in the Tasaday of Mandanae (Fernandez and Lynch, 1972), The Mbuti Pygmies (Turnbull, 1965) and the Semang of Malaysia (Schebesta, 1952).
In comparison, riverine and littoral hunter-gatherers may be expected to have higher interaction rates, through the need to more effectively exploit the heterogeneity of their habitats. Trade might be more highly developed, and both trade and mating nets may be rather elongated throughout the riverine or littoral zone. While individuals or task groups would be highly mobile, residence zones could become more stable with increasing density. Without the clear zonation of the estuaries however, it is doubtful that interior riverine groups would develop high levels of sedentism and integration without some technological jumps (e.g. horticulture).

Inland, we feel that riverine groups would have had to intensify their efforts through technology in order to achieve an increase in residential stability. We will argue, therefore, that horticulture was practiced earlier in the Piedmont, where it was always to have greater economic importance, than in Tidewater. Likewise, we might expect other evidence for an attempt to increase the stability and productivity of the riverine zone through technological adaptation. In areas where the riverine habitats become marginal as foci of economic activity, as in the mountainous headwaters, we would expect a retention of, or return to a pattern more like the sylvan adaptations of the Archaic.

In proposing a model for the expansion and development of the Savannah River Tradition in the Middle Atlantic, we feel that social components must be considered. Turnbull (1968) has stressed the importance of flexibility in hunter-gatherer group size, organization and composition. Assuming this importance to have been true in Archaic times, we can infer that there is a minimal interaction density between individuals which is required for a healthy, low risk adaptation. This interaction density is probably maintained through mating and kin nets, and through other forms of affiliation, such as formalized trade.

In a uniform plain, where all resources are evenly distributed, we may expect settlement and interaction densities to be distributed in a hexagonal net, or triangular lattice (Smith, 1976). We feel that such a model approximates the theoretical interactions of individuals and groups within a uniform forested environment. On the other hand, a linear environment, such as a coast or river basin, requires considerable extension and intensified interaction in order to maintain similar interaction densities for individuals in any given locus. Furthermore, the increased patchiness of the littoral environment may require higher interaction densities in order to assure that high quality information concerning resource availability flows along the network. (See Figure 6 for a graphic illustration of interaction among sylvan and riverine societies in a homogeneous resource environment.)

We can model societies of idealized sylvan and riverine groups on these assumptions. The former would likely include largely endogamous groups at the macroband or multiband level. Local groups would be nearly autonomous. The increased need and opportunity for interaction between groups in the riverine case would lead to a larger, regional endogamous group. Mating and social nets could be extensive and complex. Additional linkages between local groups, such as trading nets, would further improve information flow.

Expansion of population among sylvan groups would be confined to the margins of the territory. While we feel that nearly all Archaic societies did expand along river basins to some extent, it is fair to say that sylvan groups could most easily expand in a radiant fashion. In contrast to this, expansion of riverine groups would be linear, along major conduits, such as coast and river (Figure 6).

Expansion of hunter-gatherers in a situation in which the fundamental niche of the group is expanding, can be likened
to ecological succession. Vandemeer (1973) has outlined a useful theoretical approach to the problem of movement of species into habitats in succession. He models succession as a Markov process. That is, the movement of groups or individuals from habitat A to habitat B is a directed stochastic event which can be expressed as a matrix of transition probabilities.

While most biotic species are highly environmentally sensitive, we assume that human cultures are adaptive. Nonetheless, we also expect that decisions to change habitat include the attempt to minimize risk and effort by moving to optimal habitats. An optimal habitat can be defined as a habitat in which the realized niche of a group most clearly approximates the fundamental niche of that group (Vandemeer, 1973). In archaeological terms, we are simply asserting that the preferred habitat for colonization is one which is most similar to the stable habitat of the parent group, and which is most likely to maintain social links which existed in the parent group (proximity is probably the main consideration here).

Given the above assumptions, we can construct hypothetical decision trees in which we rank the resource similarities and the proximities of available habitats, and use these to generate transitional possibilities for a Markov chain. In our example, we will simply note general classes of habitat similarities and will assume that error between our model and the real-world can be subsumed under the stochastic elements of the process. This is, no doubt, an oversimplification.

We can liken the model to the specific case of succession known as adaptive radiation. Considering expansion as a radiation, we can expect that the endpoints of the expansion will differ from the beginning, and will likewise differ from each other in the direction of greater specialization. Nonetheless, all endpoints must evolve from logical connections to the parent "culture" of the radiation. As is generally the case in phylogeny, certain attributes of the cultures which evolve from the radiation may be shared by all members of the group, and the parent culture as well. These are known as retained traits. We presume that rivering adaptation was the mode of the parent group and is the most persistent retained trait of the Savannah River Tradition. A more variable retained is the stemmed broadspoon point. Riverine technology had to include substantial equipment and structure for the exploitation of the riverine environment. Also, due to the expansion along the coast, we will postulate that the parent group was generalized within this niche. We further concur with Turnbaugh in assuming that the homeland of the parent group was in the southern Atlantic coastal zone, in as much as a radiation to an expanding niche would be expected to follow the direction of that expansion.

Environmental evidence suggests a south-north trend in the development of the Middle Atlantic estuaries.

We agree that this description of the parent group of the Savannah River Tradition is sketchy at best. It certainly may pertain to the Savannah River Archaic of Georgia and South Carolina, but of this we can't be certain. The technology, trade, ceremonialism and subsistence/settlement patterns of the Savannah River Archaic, as represented at Bilbo or Stallings Island, suggests the sort of society we believe parented the Tradition.

It is believed that groups using small quartz points, and occupying both river and uplands of the Piedmont and Coastal Plain were extant at the time of the expansion. The best known, and most likely candidate for these groups in the James River Valley are those who made the Halifax projectiles. Their sites are numerous, particularly in the Piedmont. With the available data, it is not possible to distinguish the patterns of the Halifax period from those of the Morrow Mountain of Guilford periods which precede it. Like Guilford, Halifax appears to be more of a Piedmont phenomenon. Numerous sites containing Halifax points are found in the Coastal Plain however, especially just
Figure 2

DISTRIBUTION OF PIEDMONT SITES WITH MAJOR LATE ARCHAIC COMPONENTS

<table>
<thead>
<tr>
<th></th>
<th>SAVANNAH RIVER</th>
<th>HALIFAX</th>
</tr>
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<tbody>
<tr>
<td>RIVERINE</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>NON RIVERINE</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th>SAVANNAH RIVER</th>
<th>HALIFAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIVERINE</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td>NON RIVERINE</td>
<td>16%</td>
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</table>

Figure 3

DISTRIBUTION OF SITES WITH SOAPSTONE BOWLS

<table>
<thead>
<tr>
<th></th>
<th>COASTAL PLAIN</th>
<th>FAL LINE</th>
<th>OUTER PIEDMONT</th>
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<tbody>
<tr>
<td>with</td>
<td>8</td>
<td>4</td>
<td>12</td>
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<tr>
<td>without</td>
<td>18</td>
<td>9</td>
<td>8</td>
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|         | 25            | 13        | 20             | 59             |
below the Falls. We assume that numerous groups, with similar societies, made these points. In our research area, we believe that concentrations of Halifax groups could be found in the vicinity of the Fall Line, where they could exploit a major environmental edge.

Savannah River groups entering the James River valley would have had to contend with competition of some sort or another from Halifax groups. We cannot pretend to imagine what shape this competition took. We can note, however, that the establishment of Savannah River in the river valley in the Coastal Plain must have meant the end of the Halifax in that area. Simple competitive exclusion would rule out coexistence in that area. Within the Piedmont, however, it seems possible that a specialized riverine and a generalized sylvan adaptation could coexist. Our data seem to support this possibility. Figure 2 shows the distribution of Late Archaic sites in the Piedmont with respect to location on a major river. The distribution is complementary. The majority of riverine sites have Savannah River components, while the majority of the nonriverine sites have Halifax components. This could represent a distribution in space, as well as in time. These data were compiled from all site reports in the ASVQB since 1963, utilizing all sites with Halifax and Savannah River components.

A more detailed analysis of the niches possible is needed, and beyond the scope of this work. We feel, however, that decisions to move into the Piedmont would have had to involve concerns about competition from remaining Halifax groups. In the mountainous areas, there seems to be little in the way of Halifax present. We presume that other, similar Late Archaic groups inhabited that region when Savannah River arrived. Given the generally low productivity of that environment, we doubt that more than one Late Archaic group could have successfully exploited it.

The widespread presence of the Tradition in the headwaters suggests that Savannah River groups had substantially re-adapted to a more sylvan way of life. This would certainly call for the extirpation of other groups. This will be treated further below.

**Savannah River in the James River Basin: A Hypothetical Scenario**

Based on the foregoing model assumptions, we see the entry into the basin as the result of an expansion/radiation, from the south. We feel that the optimal niche would have consisted of the juxtaposed habitats of the salt-freshwater transition zone of the James. The entering groups are expected to be fully formed social groups, with unbroken social ties to parent groups immediately to the south, probably in the Roanoke/Carolina Sounds region. Therefore we would expect stylistic patterns during this period to be homogeneous.

The next optimal niche habitats were probably available in similar locations on the York, Rappahannock and Potomac. We would expect special purpose campsites, such as shellfish collecting, hunting and quarrying sites, to exist in a continuum up the Chesapeake coast, and in the mouths of these streams. These sites would have strata which date to the earliest phase of the Tradition. The initial, and primary site loci would be near the mouths of major tributaries, adjacent to swamps and marshes. Any element in a season round which included anadromous fish, shellfish, nuts, deer, small game, waterfowl, marsh grasses and starchy tubers could be easily accessed within a single day's journey by boat. (See Figure 1.) The society probably consisted of numerous small groups living near to each other, and moving in such small groups to various spots throughout the annual cycle. Large joint group encampments might be expected during spring fish runs, and perhaps during autumn hunts. This suggests that not only would population concentrations be found near the stream confluences, but the larger sites would also be found there. Needless to say, no Piedmont resources
(e.g. soapstone) would be present as there were no social ties at this time to groups west of the Fall Line.

The second phase of settlement would have followed the first very quickly. In this phase we would see the settlement of second optimal niches. These niches would also be riverine and coastal. Perhaps the outer coast would have been settled more permanently at this time. Certainly the fall line zone would be settled. Except for a decrease in diversity due to the lack of saltwater species, the Fall Line or inner Coastal Plain zone is still well suited to riverine adaptation. We would expect Fall Line resources and outer coastal resources to begin to circulate up and down river at this time.

Large tidal marshes, good fishing locations, and plentiful upland resources are available in this zone. Migratory waterfowl and small game are found at the head of Tidewater as well as further downstreams. Concentrations of population should still be found near the major stream confluences, especially adjacent to swamps. We could expect large macroband camps to be located up smaller streams, or at the mouths of smaller streams, and these would have been occupied primarily during the fish runs.

**Discussion**

Reinhart (1979) has noticed the placement of Savannah River sites in the tidal James to correspond with the above descriptions. Large and plentiful hearths, possibly for fish-drying, were noted at the Sassafras Springs site (Ibid.).

Muriel Farrington (Pers. Comm.) uncovered a large hearth in a sizeable Savannah River site in White Bank Park in Hopewell. Similar components are also known from Moysonec (McCary 1976) and the Hatch Site (Gregory, Pers. Comm.) within the transition zone, all adjacent to confluences and swamps.

Given the numbers of Savannah River sites in Tidewater which contain no soapstone (See Fig. 3), we can infer that a great many of these were occupied prior to the settlement of the Piedmont, where soapstone is found.

The next major phase in the expansion of Savannah River would have been a difficult one. It required that groups move into sub-optimal niches across the Fall Line, necessitating a new technology for dealing with floodplain habitat. We feel that the jump across the Fall Line was probably several generations, at least, after the initial settlement of the Coastal Plain.

Suitable spots for settlement would have been far enough above the Fall Line to allow relatively easy foraging both up and downstream by boat. This would have meant an almost certain attenuation of social networks across the Falls. We postulate that trading networks would have been immediately established to reduce risk in this pioneering situation. Trade patterns would have reflected regional social networks rather than acting simply as an exchange of necessary resources. It is likely that "luxury" goods would have been traded along specific lines, as compared with necessities across general boundaries or territories. It is at this time that Piedmont resources might begin to appear in the Coastal Plain. Piedmont soapstone is frequently found on sites to the east.

As resources are more or less continuously distributed along the river, in the Piedmont, settlement would have been considerably different from that of the Coastal Plain. Relatively autonomous band groups could more efficiently exploit larger territories in the piedmont. Nonetheless, we feel that the riverine adaptation and the needs of minimizing risk in a colonizing situation would have promoted the extension of social networks through multiband fusion cycle.

This cycle might have continued to focus on the fish runs, although communal up-country hunts are also possible. The complex bedrock geology of the Piedmont
Figure 4: Distribution of Selected Artifacts and Features at Site 44Go42
would have led to the use of diverse local lithic resources. This, combined with a decrease in interaction between groups, could have led to stylistic divergences in the Piedmont.

New technology for dealing with the floodplain resources would have arisen. This would have included the use of axes and other large woodworking tools for forest clearing along with mortars, grinding tools and other seed preparation technology. Multiband encampments in the neighborhood of geological transitions might indicate a variety of lithic materials and stylistic sets in smaller clusters within the sites. Once the readaptation to the Piedmont was completed, it is likely that groups settled into rather restricted territories based on areas of expansive floodplain and river confluences. The former assured a greater resource base, and the latter promoted fishing efficiency and communication with sister groups.

Discussion: Piedmont Savannah River sites show increased diversity in point styles and lithics. Lithic types form clusters on large encampments, such as Go 42. Go 42 also shows a multiband structure with possible community activity areas. (Fig. 4).

The soapstone trade cycle develops after the Piedmont is settled. Trace element analysis by Luchenbach, Allen and Holland (1976) has suggested that clear lines of trade of soapstone bowls existed. While Piedmont sites seem to contain soapstone from the closest quarries, Coastal Plain sites seem to contain materials obtained by trade from specific locations, within apparent regional trading nets.

Our survey of sites in the James River Piedmont has revealed several Savannah River sites with large numbers of axes, chopping tools, mortars, pestles and other implements associated with seed and fiber preparation. Fourteen mortars were mapped on Go 42 alone (See Fig. 4).

Although similar tools are found on Coastal Plain Savannah River sites (McCary, 1976; Reinhart, 1979), we know of none with such large inventories of these artifacts.

As saturation of the Piedmont major river valleys occurred, it became necessary for daughter groups to make new decisions once more. The smaller stream valleys of the Piedmont remained open, unless they had become the focus of settlement of the Halifax groups, or their derivatives. Yet another option was to move further upstream.

The James and Potomac have large riverine headwaters. The Potomac system includes the Shenandoah and the Great Valley, while the James includes the Jackson and other mountainous river systems with broad floodplain valleys. The latter floodplains are frequently covered with shallow soils, but they are nonetheless productive in terms of useful annual plant resources. We believe that these major headwater streams would have been settled first, followed by the small streams.

Anadromous fish do not penetrate the headwaters regions in great quantities, and it is likely that substantial technological and social adjustments had to be made. We feel that Savannah River, while remaining basically riverine, would have taken on much the character of a sylvan system in this region. In that sense, it may not have been substantially different from other local Archaic groups.

Navigation on the mountain streams is considerably more difficult than in the Piedmont or Tidewater. Social nets might have been trimmed substantially, and long-distance trade or mating cycles would have become difficult to maintain. Substantial specialization within drainages or sub-regions is likely. Soapstone and other Piedmont goods probably did not make it into the mountains in any great quantities.
Discussion

Upland sites with substantial Savannah River components are reported in Rockbridge County (McClearen, Pers. Comm.) and in Albemarle County in the inner Piedmont/Blue Ridge area (Holland, 1967). These may be large seasonal base camps as Holland suggests. The Boone, North Carolina site reported by Wilkins (1978, p. 19) may fit this category as well.

Soapstone has been reported from a few sites in the mountain zone, but it is certainly rare. We suspect that where found, it will prove to come from some of the westernmost quarries, such as those in Bedford County.

We will speak of the ensuing phases of development just with respect to the Piedmont and Coastal Plain. It seems likely that the intensive use of seed plants, and the restricted territoriality of the Piedmont groups would lead almost naturally to even greater intensification of floodplain productivity through increased burning and clearing, and perhaps the manipulation of plants. With sufficient clearing, it is likely that the fertile bottom lands are capable of producing a large standing crop of useful plants, with sufficient seasonal diversity, to maintain nearly sedentary groups.

The Coastal Plain, with all its natural diversity and high productivity is not as likely yield to intensification efforts. Following the general thesis of Boserup (1965), we feel that hunter-gatherer intensification of the riverine niche in the Piedmont led to the existence of groups whose lifeways more nearly approach our concept of the Woodland.

Discussion

Interestingly, the earliest pottery in the Mid-Atlantic is a Piedmont phenomenon. A date of 950 ± 95 B.C. on Marcey Creek at the Monocacy Site, just above the falls of the Potomac (McNett and Ayers, 1974) may well represent some of the earliest ceramics in the East, north of the Savannah River basin. We have recently received a date of 890 B.C. ± 155 (UGA 3347) on Elk Island 1 pottery, a transitional type between Seldon Island and our widespread Early Woodland Elk Island phase ceramics.

It has been noted more times than necessary, that there are direct resemblances between Marcey Creek and soapstone bowls. Furthermore, the pottery is generally associated with the Small Savannah River variant points. At the Marcey Creek site, the lower stratum contained large Savannah River points, and no pottery, while the upper level contained both pottery, and the small variant points (Manson, 1948).

At the Stoneman West site, we have found Elk Island 1 pottery and a Savannah River variant in a large pit which produced the date mentioned above. Marcey Creek may also be associated with midden accumulation and pits at this and other sites. This is the first period in the James and Potomac drainages to show high levels of residential stability. In addition, the sites, such as Marcey Creek (Manson, 1948), Seldon Island (Slattery, 1946) and Stoneman West are frequently quite large, suggesting village occupations in some cases.

Westwood Winfree (1972) excavated a site containing Marcey Creek vessels on the south bank of the James in Powhatan County. At this site, too, the pots may have been associated with pits. In the coastal plain, we still have little information. Gardner has dealt with this period somewhat for the Potomac. Early Woodland ceramics and points are fairly abundant in the salt-freshwater transition zone of the James and, especially, in the Inner Coastal Plain. Reinhart (1979) feels that Early Woodland disappears from the areas further downstream although it was found in a lower stratum at the Croaker Landing site (Clark, Pers. Comm.). No exceptionally large sites are known, and there has not been sufficient study to determine the settlement or subsistence patterns.
### Distribution of Marcey Creek Ware

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<th>DISTRIBUTION OF MARCEY CREEK WARE</th>
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**Figure 5**
Our study of the distribution of Marcey Creek pottery from a total of 120 Late Archaic components (Fig. 5) revealed that it is truly a phenomenon of the Piedmont, as suggested by McNett (1974). The earliest dates on Coastal Plain ceramics are four hundred years later (Painter, 1977). We believe that the advent of the Woodland in the Middle Atlantic, as elsewhere in eastern North America, (Stuever, 1971), was the result of an attempt by riverine adapted groups to intensify their subsistence base by managing floodplain resources.

It is also clear to us that this represents a considerable divergence from those patterns. Statements, such as those by Spencer and Jennings (1977), which imply that the Woodland is little more than the Archaic with pottery added, are unfounded.

The adaptive radiation of the Savannah River Tradition resulted in the intensive exploitation of the riverine habitats of the Middle Atlantic States. Some of these habitats, such as those of the Coastal Plain, may not have required much change from previous lifeways, and were capable of supporting a stable and substantial population of hunters and gatherers. Other habitats, particularly those of the Piedmont floodplain, required technological and social changes which ultimately led to the Woodland pattern.

Conclusions

We have sketched the outlines of a general model of the adaptive radiation of riverine hunters and gatherers by identifying relevant parameters and suggesting processes. Although we find a high level of congruence between such a model and the archeological data pertinent to the Late Archaic of the James River basin, we do not claim to have tested hypotheses or to have successfully defended propositions. We have, hopefully, suggested a slightly more elegant and rigorous framework for explaining empirical observations. The tough work of operationalizing reliable and valid tests for such a model lies ahead.

While our presentation undoubtedly suffers from the attempt to be too general and too inclusive, we feel that this was a necessary place to begin. Hypotheses dealing with subsistence, population, technology, exchange and interaction can most profitably be drawn from a conception of ecological process. We have attempted to restate ecological processes and social realities in terms of archeological expectations: stylistic trends, material exchange, site structure, etc. Mostly we've attempted to understand the societies of the period rather than condemn them to the anonymity of projectile point typologies, diffusion diagrams or an overly mechanical form of environmental determinism.

NOTES

1. While Sahlins refers particularly to horticultural tribal societies, we believe that the posited relationship between habitat diversity and autonomy holds true for hunter-gathers as well. It is assumed here that there is sufficient diversity to supply an annual subsistence round, but this diversity is homogenously distributed among territories rather than in discrete clusters.

2. By "horticulture" we mean something which is structurally similar to traditional cultivation, even if it does not involve the use of domesticated plants. Clearing of alluvial floodplains leads to an abundant and useful natural flora. The intensive harvesting of this flora, and the purposeful efforts to promote its production through clearing or burning can be considered horticultural activity. Such clearing also has a positive feedback effect on fauna, such as small mammals, deer and turkey. We feel that once the intensification of floodplain harvesting began, it continued to evolve into a major element of the subsistence economy. This contrasts with the harvesting of natural diversity in a patchy environment such as Tidewater. The seasonal scheduling of
Expansion and Potential Interaction Among Sylvan Hunter-Gatherers

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exploitation of widely separated and highly productive "patches" of wild plant and animal foods in the coastal plain was probably a more reliable source of energy than the intensive harvesting of the rather restricted and sometimes droughty alluvial terraces.

3. A Markov "chain" or matrix is a mathematical process for predicting the likelihood that a group will arrive in a given place (or condition) if we know its starting place (or condition). The transition matrix is a formal listing of the likelihood that a group in one place will cross into a neighboring place.

4. The exchange of non-essentials along specific routes can be referred to as "Kula" exchange, after the Trobriand exchange system studied by Malinowski. Such systems seem to function to maintain social networks which decrease environmental uncertainty (cf. Sahlin 1968).

5. This comment is based on observations of several dozen sites in the floodplain of the James River. These sites, surveyed and collected by the authors during the last three years, can be dichotomized into very small single camps and large multi-camp sites. Both small and large Savannah River sites reflect a basic camp geometry with hearths surrounded by work areas. Points are found in large numbers around many hearths. Larger sites tend to contain larger percentages of processing tools, such as mortars or anvils. The diversity of both lithic materials and point styles within sites is often high. It is not uncommon to find a well-defined hearth area surrounded by debitage, a couple axes and a dozen points of varying styles—all within a 20 meter radius. Figure 4 illustrates selected artifact classes collected by exact provenience survey from a portion of a 10 acre Savannah River site which had been severely deflated by a recent flood. The large (approximately 12-15 m. diameter) hearths were surrounded by what appear to be individual family band camps. More than half the site was too damaged by flooding to reveal such intact structure. The site may have been occupied by as many as 200 persons at a time.

6. See our paper titled The Elk Island Tradition, this volume. Elk Island 1 is found stratigraphically above Marcey Creek and Seldon Island at the Stoneman West Site (44 Go 40). It seems that the intervening time between Marcey Creek and Elk Island 1 may be too short to allow for the widespread development of Seldon Island, and similar phases throughout the Mid-Atlantic. We suggest that Marcey Creek may, therefore, actually be somewhat earlier than is currently expected.

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