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

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ABSTRACT

Results obtained from 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 thousand 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 indicate regional population radiation and divergence of the languages during the Middle Woodland period (600 B.C. - 900 A.D.). These will be reexamined and alternative interpretations to the diffusionist arguments of the past will be presented. The adaptive radiation and frontier models of the migrationist paradigm should be considered as viable evolutionary models possessing a diverse and significant evidential 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 linguistically distinct Eastern Algonquian sub-division of the family occupied a continuous area along the Atlantic Coast from the mouth of the St. Lawrence River to North Carolina (Figure 1). While sharing a common linguistic heritage, the Algonquian-speaking cultures of this continuous distribution occupied both riverine and estuarine environments except in those riverine areas occupied by Iroquoian- or Siouan-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. Nevertheless the historical record has been used to support numerous and varied speculation about the origins of these related Algonquian cultures. Early writers recognized the interpretative value of evoking migrationist arguments for explaining the historical distribution of the Algonquian languages (Holland 1966; Tuck 1975). The historical account of the Piscataway Indian's comparatively recent migration from Maryland's Eastern Shore and other such origin histories or myths further stimulated efforts to trace their historic tribal distributions (Strachey 1953; Feest 1978a, 1978b). Yet the pioneer attempts to correlate disjunctions in the archaeological record with the movement of Algonguian

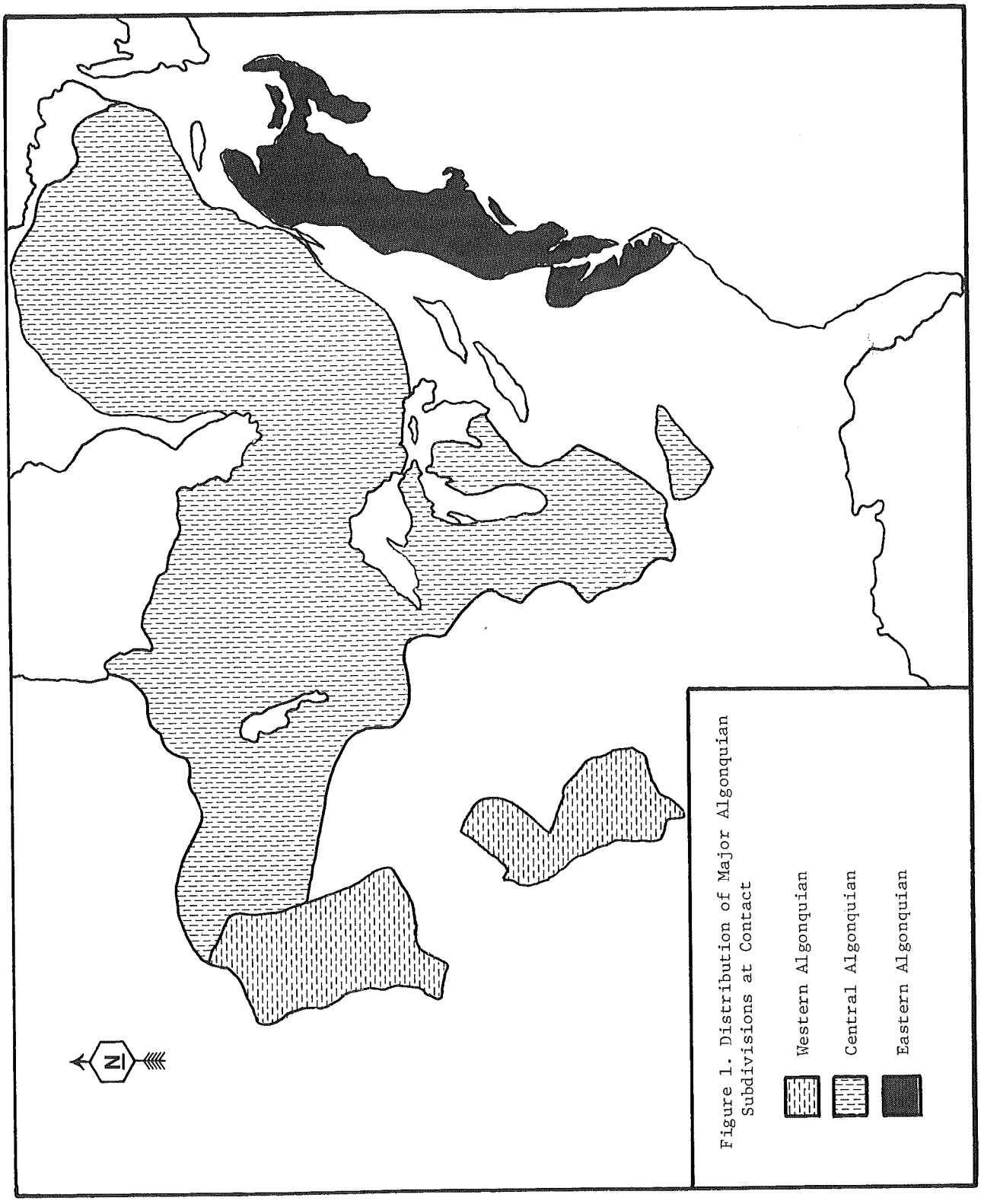

Figure 1. Distribution of Major Algonquian Subdivisions at Contact

speaking populations both failed to demonstrate such correlations and left subsequent researchers dissatisfied 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 United States 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 archaeological record, a clear majority of recent synthesizers has advocated the abandonment of any migration theories which fail to meet increasingly stringent evidential criteria (Rouse 1958; Sanger 1975; Tuck 1975). As a consequence, most contemporary archaeologists have produced models of long-term *in situ* development of 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 archaeological 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 context 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 its implications for reexamining current archaeological theories for the Middle Atlantic and Northeast regions. Through the application of the comparative techniques called glottochronology and *Worter und Sachen*, the ancestral "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 archaeology, researchers' attempts to correlate linguistic history with the archaeological record were unsuccessful because of poorly developed chronologies, inadequate linguistic analysis, and the inherent theoretical incomparability of linguistic histories and the archaeological 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 eclectic evidential 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 alternative reconstructions. Perceived changes in the archaeological record of the Terminal Archaic period in the Northeast and the Middle Atlantic which might be roughly synchronous to the linguistic results are presented. This analysis is presented not to assert a particularistic relationship between the linguistic and archaeological 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 archaeological 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 archaeological evidence" (Wright 1980:202). Based upon the reevaluated linguistic and archaeological data presented, the continued selective exclusion of adaptive radiation and frontier models as viable alternative models does not appear to be scientifically defensible. The explanatory principles of the migration, diffusion, and evolution theories must be

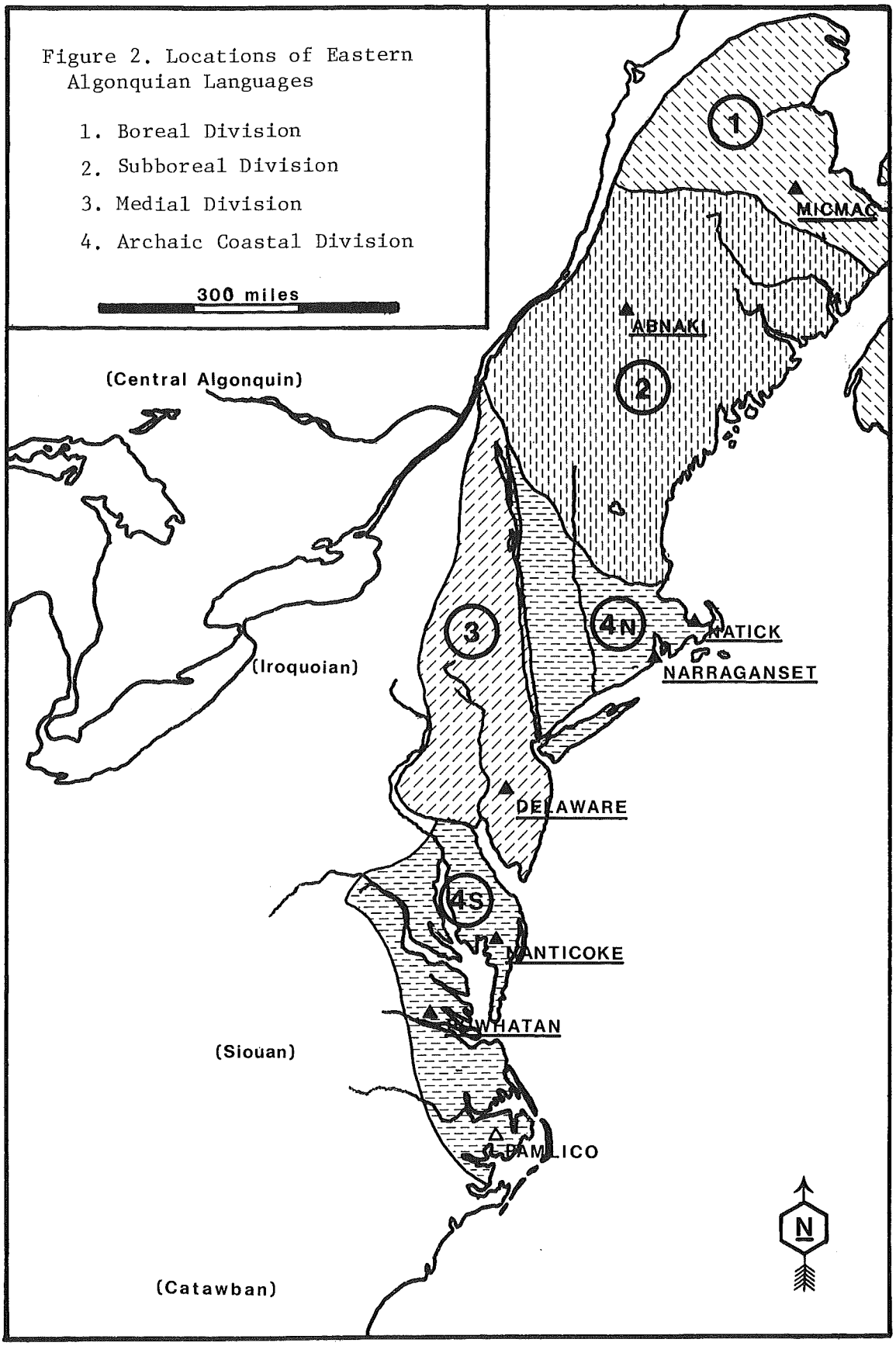
Figure 2. Locations of Eastern Algonquian Languages
1. Boreal Division
2. Subboreal Division
3. Medial Division
4. Archaic Coastal Division
300 miles
1
MICMAC
ABNAKI
2
(Central Algonquin)
3
4N
NATICK
NARRAGANSET
(Iroquoian)
DELAWARE
4S
NANTICOKE
POWHATAN
(Siouan)
PAMLICO
N
(Catawban)

developed and applied in the 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 (1975:440) work contains a complex internal refinement 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 speakers of the seven languages in this study have been depicted in Figure 2. The languages chosen include Micmac of the Boreal Division, St. Francis Abenaki of the Abenaki group of the Subboreal Division, Lenape (Delaware) of the Medial Division, Natick and Narragansett of the Eastern Southern group of the Archaic Coastal Division, and Powhatan and Nanticoke of the Powhatan group of the Archaic Coastal Division as defined in Siebert's (1975:440) terminology (Table 1). 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 Windgandcon 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 Siebert's divisions were not represented in the sample: Taconic groups of the Medial Division (Mahican), and the Etchemin group of the Subboreal Division (Malecite-Passamaquoddy).

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

I. Boreal Division
    1. Micmac*

II. Subboreal Division
  A. Etchemin
    1. Malecite-Passamaquoddy
  B. Abenaki
    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 descendants)
- A. Southern New England (SNE)
  - 1. Eastern SNE (n-languages)
    - a. Massachusee
      - (1). Massachusetts (N±S)
      - (2). Natick (Central Massachusetts)*
      - (3). Nauset
    - b. Wampanoag
    - c. Cowesit (N. Narragansett)
  - 2. Western SNE (Brotherton, modern (Y±R))
    - a. y-languages
      - (1). Narragansett*
        - (a). S. Narragansett
        - (b). Niantic
      - (2). Mohegan-Pequot (Eastern Connecticut)
      - (3). Montauk (Eastern 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. Nansemond
- D. Windgandcon (Northern Coastal)
  - 1. Pamlico
  - 2. Chowan

* Languages studied

The sources utilized for each language chosen and the number of lexical items available for standard glottochronological purposes are given in Table 2.

TABLE 2: EASTERN ALGONQUIAN LEXICOSTATISTICAL 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
Abenaki	99	Day 1964
Micmac	98	Rand 1888

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 Hymes (1960), while several 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 languages adds further support to the universality of replacement probabilities. In a recent effort Luckenbach and Levy (1980), using 16th - 20th century data recordings of Aztec, presented the first New World test of word-retention rates. This successful test helps to alleviate the often expressed concerns over the lack of 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 evidential 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 among these lists relied heavily upon the application of the comparative method and previously established sound correspondence (Siebert 1967, 1975). The phonological and morphological complexity of Algonquian languages, coupled with the insufficiency of some sources, rendered this procedure more advisable than the simple inspectional judgments 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 are 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 judgments 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, which are too lengthy to reproduce in this format, is available from the authors.

TABLE 3. PERCENTAGES OF SHARED COGNATES AND SEPARATION DATES, EASTERN ALGONQUIAN LANGUAGE

	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.	538 A.D.	**	.89	.65	.62	.45
NAT	70 A.D.	417 A.D.	1267 A.D.	**	.64	.64	.43
LEN	298 B.C.	345 A.D.	299 A.D	278 A.D.	**	.59	.42
ABE	281 B.C.	229 B.C.	212 A.D	323 A.D.	168 A.D.	**	.46
MIC	676 B.C.	1248 B.C.	1047 B.C.	1026 B.C.	1004 B.C.	657 B.C.	**

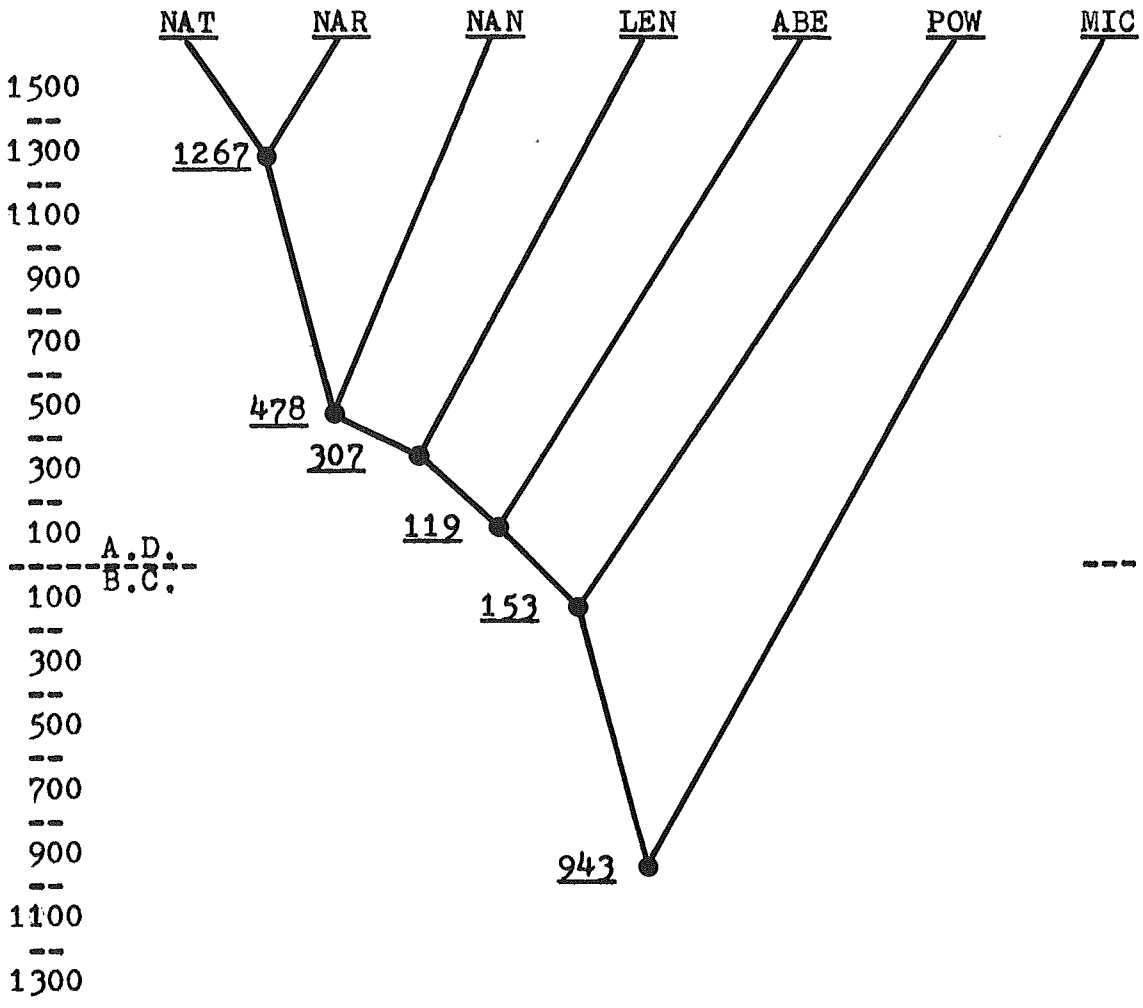

Figure 3. Lexicostatistical Classification of Eastern Algonquian Languages (Mean separation dates are given at nodes.)

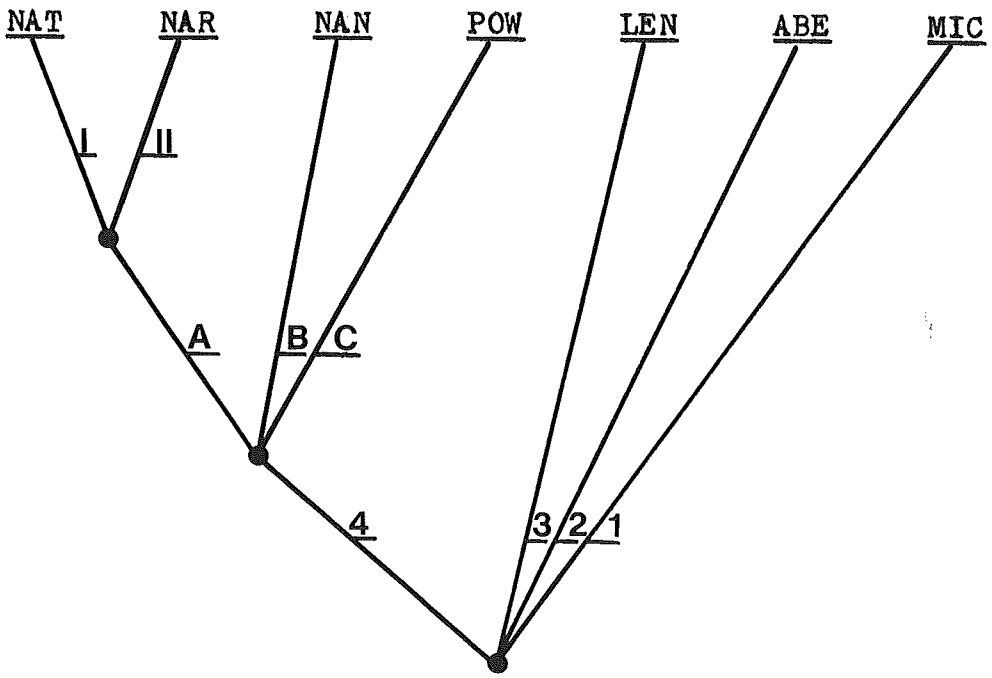

Fig. 4 SIEBERT'S PHONOLOGICAL CLASSIFICATION

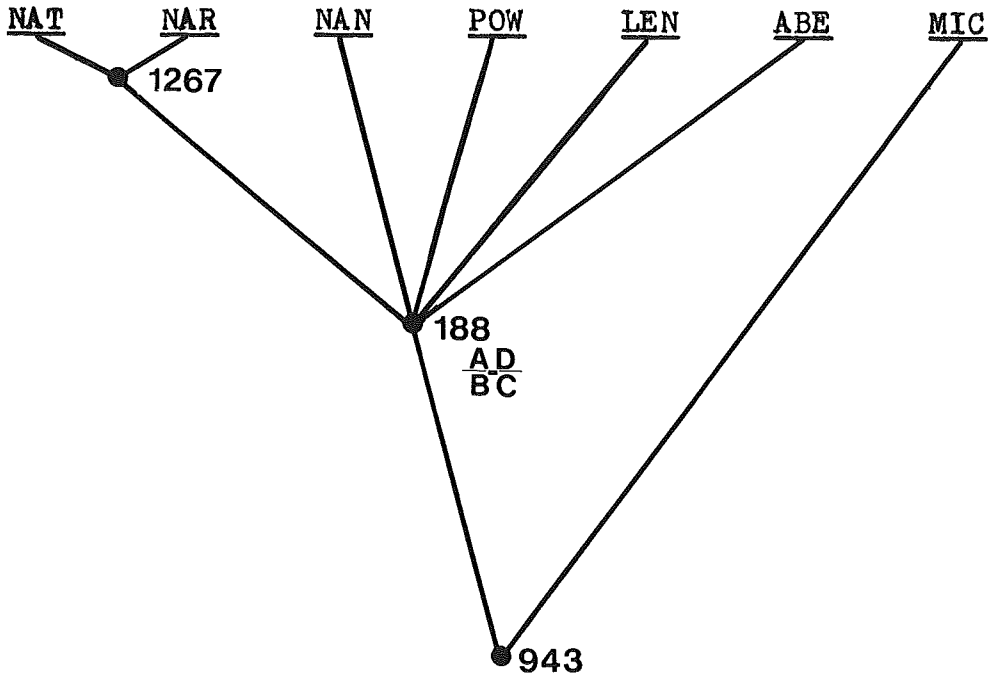

Fig. 5 GLOTTOCHRONOLOGICAL RESULTS (NODAL)

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 attendant 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 17th - mid-20th century) the percentages of shared cognates cannot be directly compared. A formula was utilized, therefore, which takes the disparities of these collections' dates into account and then produces the divergences in absolute years as given in Table 3.

The interpretation of these results will be developed in more detail 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 divergence for Micmac and Nanticoke appears to be an anomaly, a more reasonable date might be around 900 B.C. (Table 3). This date appears to be almost as distant as the divergence date of 1200 B.C. postulated by Siebert (1967) as representing the divergence of Proto-Eastern Algonquian from the Central Algonquian. The data indicate that between 1200 and 900 B.C. sufficient changes had occurred 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 1200 - 900 B.C. as representing the Proto- Eastern Algonquian basal date. Further diversification within the Proto-Eastern Algonquian as discussed below occurred 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 divergence date of 1267 A.D. 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, Abenaki, and Powhatan linked successively at dates of 478, 307, 119 A.D. 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 anomalous 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. It is noteworthy that Goddard (1979) has challenged Siebert on this point. Goddard's reconstruction, however does not clarify the lexicostatistical findings either. Given the relatively reliable lexical data available from this language, its status as a member of the Archaic Coastal Division must obviously be called into question. Again something more complex than the least-move explanation (such as shared independent innovations) must be considered. Clearly, further linguistic investigations will be required to resolve Powhatan's actual status in Algonquian classifications.

THE *WORTER UND SACHEN* TECHNIQUE

In addition to the kind of least-effort spatial interpretations 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 ancestral language (in this case, Proto-Algonquian). When the cultural and natural items present in the ancestral 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 has been included in Table 4. A number of additional lexical items have been reconstructed on the basis of internal comparisons within the Eastern Algonquian. Given the lexicostatistical results, to establish the Proto-Eastern Algonquian lexical components through the comparative technique requires the identification of terms shared between Micmac and any of the other languages. The taxa identified on the basis of this internal comparison are shark, great blue heron, passenger pigeon, eastern white pine, and northern white cedar.

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 (*Larus* spp)
Great Horned Owl (*Bubo* virginianus)
Hawk (Falconidae)
Heron, Crane (spp ind.)
Merganser (*Mergus* spp)
Harbor Seal (*Phoca* vitulina)
Raccoon (*Procyon* lotor)
Lynx, Bobcat (*Lynx* spp)
Squirrel (*Sciurus* spp)
Moose (*Alces* americana)
Flying Squirrel (*Glaucomys* volans and G. sabrinus)
Porcupine (*Erethizon* dorsatum)
Striped Skunk (*Mephitis* mephistis)
Red Fox (*Vulpes* fulva)
Bear (Ursidae)
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 (*Salix* spp)
Quaking Aspen (*Populus* tremuloides)
Black Bass (*Micropterus* dolomieu)
Brown Bullhead (*Ictalurus* nebulosus)
Lake Trout (Salvelinus namaycush)

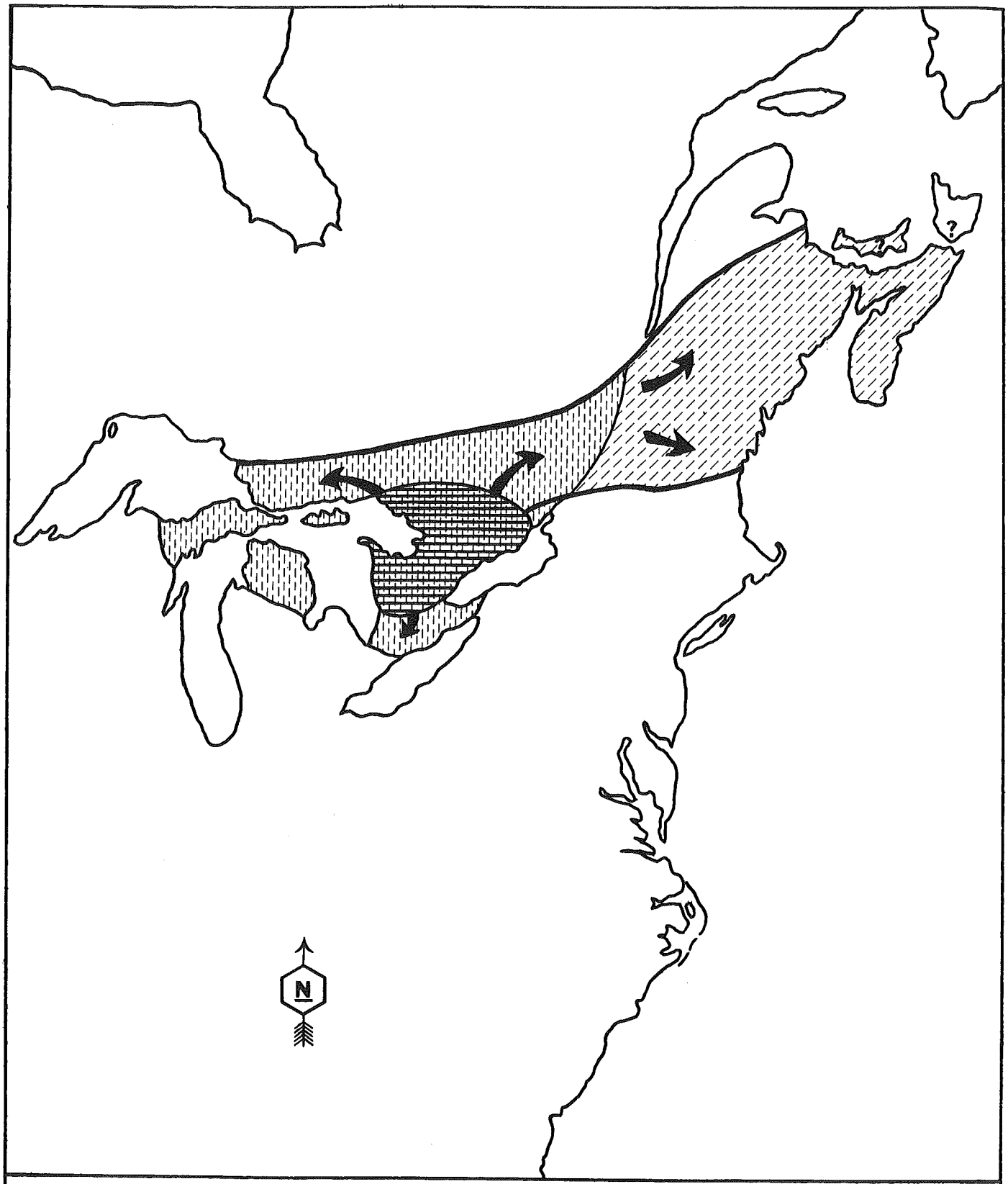

Figure 6. Proto-Algonquian, Central Algonquian, and Eastern Algonquian Homelands

Proto-Algonquian ca. 1200 B.C.

Proto-Central Algonquian ca. 900 B.C.

Proto-Eastern Algonquian ca. 950 B.C.

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 raccoon 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., the present territory delimited in Figures 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 farther to the south in northern New England for the same reason. 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 river 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 ca 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 Algonquian. 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 1976:192). 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 (1976:195; 1982) analysis has tended to support these contentions for the Middle Atlantic region.

Interestingly, in the geographical area relevant to the initial posited shift of Proto-Algonquian populations during the Late Archaic period is the

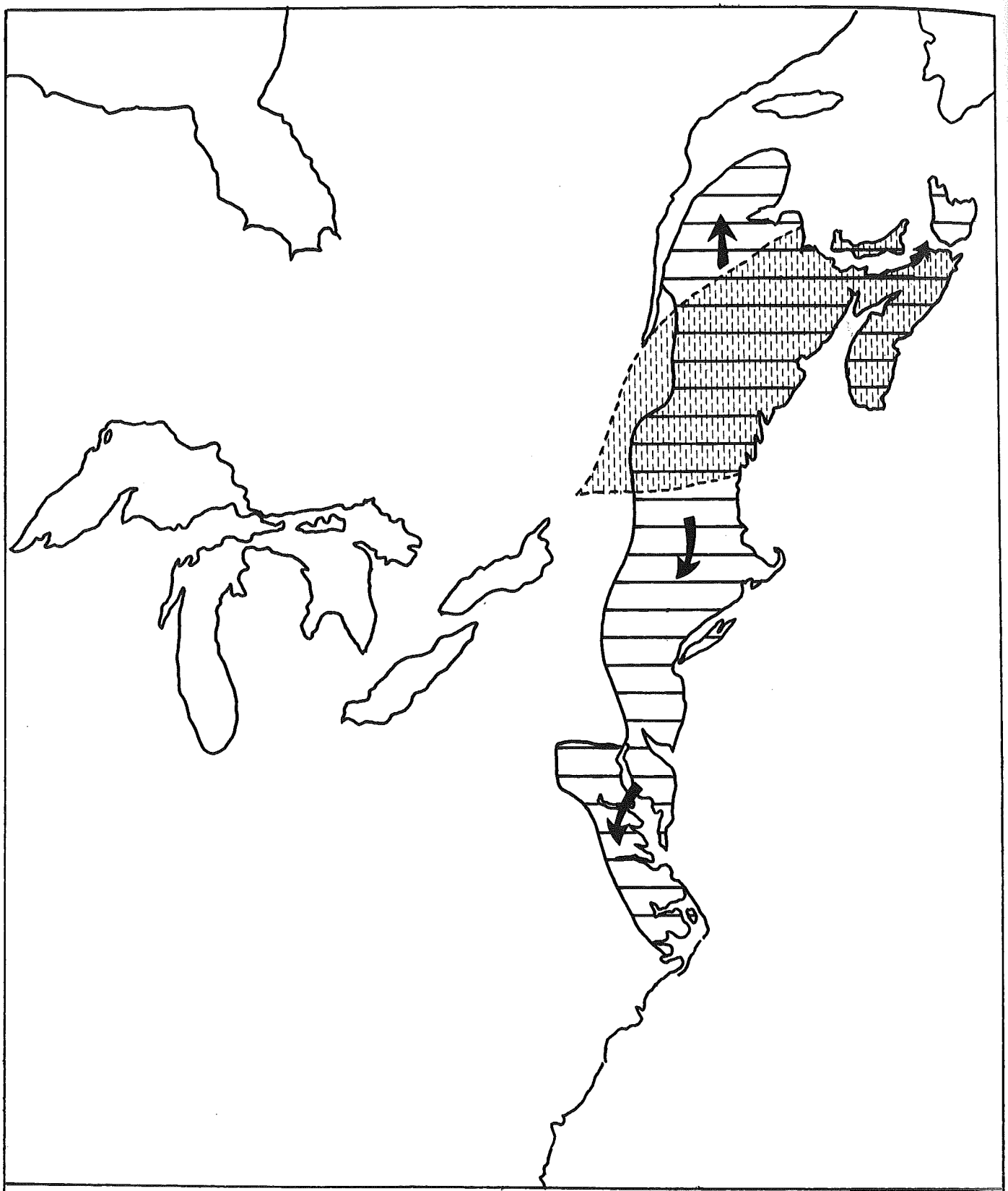

Figure 7. Proto-Eastern Algonquian Homeland and Historic Distribution

Homeland
ca. 950 B.C.

Historic Distribution
ca. A.D. 1650

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 (1975:23) aptly points out, "There are now as many interpretations" for this temporal period "as there are researchers working on it."

Sanger (1975:69), for instance, describes the archaeological 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...

Although some authors quostion the validity of the shellfish data, positing instead an evidential 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 (1975:69) 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."

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 archaeological data, Sanger and Bourque argue that this shift reflected in the archaeological record involved a population replacement and suggest that the replacement occurred as result of migration of Susquehanna tradition groups from southern New England. Snow (1980:248) 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. Snow (1980:248) admits that such an explanatory approach "leaves some untidy loose ends."

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 paleovegetational 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 region 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 deceasing 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. The 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 1981:119; 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-Algonquian 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-Algonquian to the list of species reconstructed for the Proto-Eastern Algonquian (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 lake trout is confined to the boreal forest region north of the Mohawk River 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 River, 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 (1953:10-11), archaeologists 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 Algonquian speakers stretching from the Atlantic Provinces to the Southeast in early historic times is to be expected, given the movement 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 here. 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 archaeological 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 Susquehanna tradition becomes of secondary importance to the question of which archaeological complexes appeared in the Northeast contemporary with or following the Susquehanna tradition. In Tuck's (1978:34) re-evaluation of the fate of the Maritime Archaic cultures south of the St. Lawrence River, 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.

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 archaeological 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 Meadowood 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 steatite vessels and the appearance of Vinette pottery, as well as a number of major shifts in various aspects of the archaeological 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 drainage. 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 the Susquehanna tradition, and the continuation of the interactions of subsequent Middle Woodland cultures following the breakdown of communications between the Ohio River 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 ca 1500 - 1300 B.C.

Despite the enormous number of precedents, to advocate any particularistic correlations between the disjunctions in the 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 archaeological 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 period 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. - 800 A.D. and the area from the mouth of the Chesapeake Bay to the middle portions of the Hudson River 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 archaeological evidence to support such a model (McCary 1957:1; Holland 1966:2; Johnson 1972:25). With the advent of radiocarbon 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 they 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 maritime 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 river 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 within the Delaware River 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 colonizing populations with familiar food and production resources while enabling the flow of previously inaccessible 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 or lineage 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 communication 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 archaeological 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 archaeological 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 archaeological 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 the Mohawk River drainages between 1200 and 300 B.C. is associated with the development of mortuary ceremonialism, regional exchange 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 located in the Delaware and Susquehanna River drainages.

Turning to the Upper Susquehanna River Valley, Funk and Rippeteau (1977:37) attribute the archaeological 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. 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 in population during the Meadowood times to environmental causalities, 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 archaeological record are not adequately explained by the diffusionist and *in situ* evolutionist arguments, although the archaeological data presented suggest that the examination of maintenance strategies, including population expansion, better explains the archaeological 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 River Valley sequence for the period from 1450 - 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 1977:36). The decrease of sites associated with the Meadowood phases 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 the Meadowood/Middlesex groups into the valley be may reflected by the appearance of Canoe Point occupations between 120 and 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 River 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 archaeological 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 estuarine-adapted populations by around 700 B.C. These subsequently evolved along similar trajectories involving continued group contact, material exchange, and kinship or lineage 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 exchange 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. Archaeologists 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. (Coulbourn phase) and finally to about 200 A.D. with the appearance of the Carey phase (Griffin and Artusy 1977; Thomas *et al* 1974). The earlier portion of this sequence is associated with the Delmarva Adena complex which has been radiocarbon dated at the Nassawango site in Maryland from 700 - 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 resemblance 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 River drainage.

Apparently a 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 not have 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 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 types (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 river 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 - 400 A.D., followed by the later dates for the Selby Bay phase of 400 - 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 the parent populations of Selby Bay phase groups would have continued to evolve on the Delmarva Peninsula, a prediction which may be supported by radiocarbon dates as late as 800 A.D. associated with Mockley pottery in Delaware (Custer 1984:181).

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 projectile point types associated with the two phases. Ever since Thomas Mayr's (1957, 1972) initial definition of the Selby Bay phase, researchers have recognized the overwhelming dominance of exotic lithic material in the Selby Bay assemblage. Onondaga 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 consistent basis in the Bay region (the related West River Adena site being a possible exception). The appearance of a cache of argillite blades and points obtained from the Byram and Abbott Farm site areas in the Middle Delaware River Valley also contrasts 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. Number is total known points from each location for each period. Percentage is occurrence of rhyolite.

	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

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 Onondaga chert in the Bay region. 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% Onondaga chert (green jasper), and only 5% and 3.6% for quartzite and quartz respectively. The lithic percentages support a gravity model for Onondaga chert and argillite with the

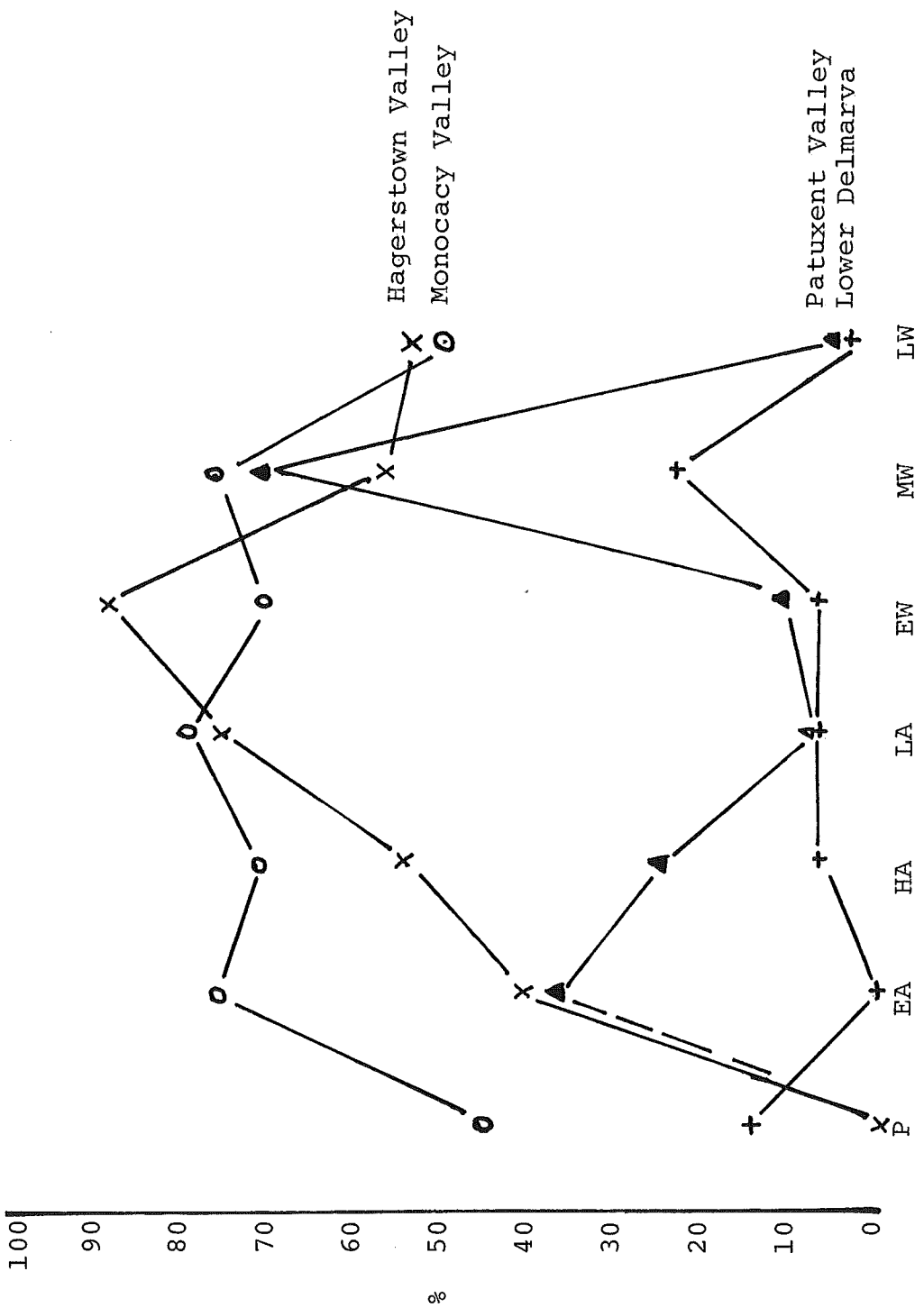

Figure 8

RELIANCE ON RHYOLITE FOR PROJECTILE POINTS THROUGH TIME

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, and Selby Bay phases provides further support for regional exchange and communication.

The preference for rhyolite in different portions of the Bay region indicates 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 was associated with the Selby Bay points identified in the Patuxent River 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 (1980) recent discovery of extensive quarry reduction stations of the Selby Bay phase located at the eastern side of the Blue Ridge Mountains provides further support for direct procurement of rhyolite by the Selby Bay coastal groups. The interesting drop in rhyolite use in the Hagerstown Valley during the Selby Bay phase (located to the west of the Blue Ridge) provides evidence of possible cultural 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. 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 - 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 River Valley and by the time of the Selby Bay phase would have been 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 River Valley 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 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 (Finger Lakes-Mohawk River Valley) of this archaeological complex 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 corresponds to frontier models which predict that as the populations of a region stabilize and diversify, the need for continued economic and kinship or lineage 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 River drainages, 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 1980). The subsequent accommodation, displacement, disintegration, and absorption of the Algonquian speaking tribal groups during the frontier expansion period of our European ancestors provide 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 are postulated to be participants in an expanding prehistoric society, the ethnohistorical and archaeological data should be employed in future analyses 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 archaeological 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 archaeological record need to be developed for the region. Such refined models must also include possible maintenance strategies developed by the expending Eastern Adena tradition populations.

We have proposed that a continuous sequence may someday be documented beginning with the Glacial Kame cultures in the Great Lakes area; extending to the Meadowood/Middlesex Adena cultures in central New York, Upper Hudson, Susquehanna, and Delaware river drainages; developing into Bushkill, Lagoon, Abbott Farm, Wolfe Neck, and Coulbourn complexes of southern New England and the Middle Atlantic states; and evolving into the late Middle Woodland period. This developmental sequence of related archaeological phases is proposed to comprise the Eastern Adena tradition which, while maintaining continued contact with the central Adena area of the Ohio River Valley via the Finger Lakes region, developed somewhat different manifestations based on projected common origins.

It must be stressed, however, that regardless of the validity of these archaeological 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 concept 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 tribal distributions, and at relatively recent dates. Since these conclusions are in no way predicated on archaeological data, archaeological data alone can never solely refute them.

Rather than accept the "burden" of assembling "absolutely documented" "proof" before advancing any such "migration" hypothesis (Tuck 1975:13-14), it is argued that this information should be weighed as a single facet of a diverse evidential base which must be used to address these issues. The few discontinuities in the archaeological 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 among 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 evidential 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 odd conclusions. For instance, Potter and Waselkov (1976:125) 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 to take "full advantage of the great time depth of eastern prehistory" the "persistence of cultural traditions" must be investigated. 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 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 suggest that some of the technological continuities noted in the archaeological 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 example of this can be discerned in the frequently cited synthesis by Snow (1978). In an earlier paper entitled "Shaking down the new paradigm" Snow (1977:89) quite clearly reveals the dogmatic nature of this methodology in stating:

> 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 homogeniety at any point in time. I have used the same principle in subdividing the East Coast...

One hardly is surprised, therefore, when Snow (1977:69) 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".

An another instance of the preconceptions required of the data base is provided by Tuck (1975:13) 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." This basic tenet leads Tuck (1975:145) 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.

In response to Tuck's continuity model, Sanger (1975:61) argues:

> 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 hypothesis 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.

Yet the trend over the past 20 years in Eastern North American archaeology has been toward increasing reliance on continuity models to explain prehistoric culture change with decreasingly 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 paleoecological approach to prehistory. As archaeologists began to realize the complexity of climatic change during the Holocene and the concomitant effects on sea level rise rates and vegetation and faunal pattern changes, explanations for apparent rapid changes in the archaeological assemblages of various periods have been increasingly explained as indigenous adaptations to the changing resource base. Such correlations of paleoecological 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 have 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 role of environmental factors in predicting site locations for cultural resource management purposes, migration hypotheses are definitely out of vogue.

This swing of the paradigm pendulum needs to be returned to a more balanced position so that archaeologists 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 the similar way that inductive reasoning was frowned upon by the deductive minds of the new archaeologists of the past decade. The recently 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 archaeology to derive explanations of discontinuities which persist in the archaeological 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 archaeologists concerned with the time periods and regions under study.

To conclude, despite the notorious difficulties inherent in correlating archaeological and ethnolinguistic 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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EPILOGUE

Ten years have passed since Luckenbach and Levy completed the linguistic research for this paper and developed the major theoretical criticisms of the cultural ecological models which dominated research interest in the Middle Atlantic and Northeast regions. The cultural ecological approach remained dominant in the region when Clark and Luckenbach expanded the paper in 1982. The 1982 paper, which appears here unmodified, was presented at the Middle Atlantic Archaeological Conference with the purpose of presenting alternate linguistic and archaeological models as a counter argument for the predominant paradigm of the time.

If written in 1987, the linguistic and archaeological models of this paper would have been elaborated upon, and the criticism of the cultural ecological approach would have been tempered by the recent advances by researchers who have evolved beyond the analytical pitfalls pointed out. In the past five years, great progress has been made in developing and interpreting data on local sequences upon which the true test of these models will be based (Granger 1978; Potter 1982; Steponaitis 1986; Stewart 1982). Others have continued to evolve increasingly sophisticated arguments which still hold environmental change as a driving force in explaining cultural evolution in the Middle Atlantic region (Custer 1984). Some adhere to cultural ecological explanations except for those instances when the "non-argument" of diffusion simply fails to explain the perceived changes in the archaeological record (Gardner 1984:124). Have the debates in the past five years between traditional cultural ecologists and the growing school of cultural behaviorists substantially changed the analysis presented?

Certainly the new data provide exciting new opportunities to refine and test the theories presented. Granger's (1978) major work, *Meadowood Phase Settlement Pattern in the Niagara Frontier Region of Western New York State*, is the type of in-depth phase definition which continues to be needed for the Middle Woodland phases of the Middle Atlantic region. A central contention of our paper is that the Middle Woodland cultures of the Middle Atlantic are derived from the Early Woodland cultures of the Meadowood phase. A close examination of the elements of the Meadowood phase as interpreted by Granger provides reassuring correlations between the Meadowood and the Delmarva Adena phases. While not discussed in this paper, the model of exchange for the Meadowood phase (regional band level reciprocal exchange along lineage or kin-based lines) appears to be a more appropriate model than the big-man, ranked society model offered by Custer for the Delmarva Adena phase (Granger 1978:282-287; Custer 1984:122-130). We still believe that the continuity from Meadowood to Delmarva Adena of the mortuary practices, ritual and utilitarian exchange, settlement and subsistence systems, and even political level of integration can be readily explained by the migration of Delmarva Adena than by the cultural ecological explanation. Custer's (1984) theory involving environmental circumscription of indigenous populations is founded on the belief that Delmarva Adena can be explained by diffusionist arguments.

Our final hope is that publication of this paper will focus research interest once again on a very old, but important series of questions: Where did the Algonquian speaking cultures of the Middle Atlantic and Northeast come from? What were the historical and social processes which can best explain the initial spread of the Algonquians and the subsequent development of cultures

which were documented at contact? What are the archaeological indices which we can predict from linguistic, ethnohistoric, and anthropological models to correlate with the proposed model of Algonquian adaptive radiation? How did this rather major event in Eastern Woodland prehistory affect the indigenous populations?

The answers to all these questions will rest with researchers who are willing to take a regional, anthropological perspective while conducting the essential detailed analyses of local phase definition which is the foundation for future advances in this exciting field of inquiry.

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