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WILLIAM C. STURTEVANT

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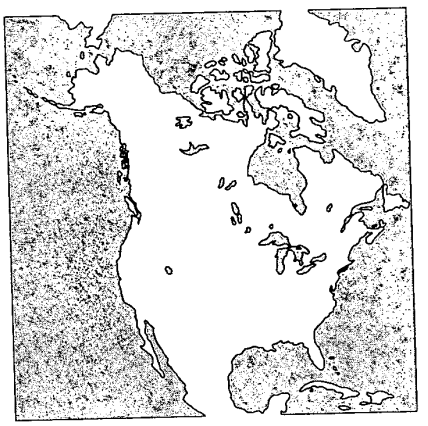
IVES GODDARD

Volume Editor



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Language and the Culture History of North America

MICHAEL K. FOSTER

Language as an Instrument of Prehistory

The methods of comparative and historical linguistics are used to establish genetic relationships among languages, reconstruct hypothetical parent forms (protolanguages), and separate borrowed from inherited features. When the primary interest is the history of the languages themselves, the term linguistic prehistory is used (Haas 1969, 1976). Because languages are not spoken in a vacuum, but by human beings living in particular places at particular times, they reflect the social and cultural conditions of their speakers (Sapir 1912, 1916, 1949:432-433; Watkins 1971:1498). Words whose form and meaning have been reconstructed at the level of a protolanguage may contain clues about the economy, social organization, religious life, and environment of the speakers of the protolanguage, while the distribution of a language family on the map may, when the divisions internal to it have been properly determined, point to a homeland and indicate the direction of later spreads from it. Similarly, patterns of linguistic borrowing can shed light on the nature of prehistoric contacts. The term paleolinguistics (or linguistic archeology) has been used for the various concerns, assumptions, and methods by which language serves as an instrument of prehistory (Sapir 1916; Saussure 1959:224; Swadesh 1952, 1959a; Lounsbury 1968:182-183). For the distribution of the languages and language families in North America, see "Introduction" and the pocket map, this volume. See also "The Classification of the Native Languages of North America," this volume.

In spite of the strong stance in twentieth-century American anthropology toward treating race, language, and culture as independent variables (Sapir 1921c:213-214), historical linguistics has in fact long acted as a handmaiden to archeology, and to a lesser extent physical anthropology, in confronting problems of North American prehistory. In the absence of written records for all but the most recent centuries, it has been regarded as useful to consider all the inferential techniques available to deal with the many millennia of pre-European occupation. It is true that unless an artifact contains linguistic inscriptions, as in the case of the Mayan stelae, identifying a prehistoric assemblage by language remains a matter of sophisticated guesswork, fraught with interpretive difficulties (Kroeber 1955:104; cf. Hughes 1992). At the same time, linguistics and archeology can, when certain precautions are observed, lend perspective to each other's findings and compensate for each other's weaknesses (Eggan 1952:37; Ehret 1976). A major strength of archeology is the variety of means it has for assigning dates, or ranges of dates, to artifacts and whole cultures; but archeology is constrained in terms of the inferences that can be made about nonmaterial aspects of prehistoric cultures, and here linguistic evidence is often useful for filling in the gaps. For its part, historical linguistics has means for determining the relative order of prehistoric events, such as deciding on the order of splits within a family tree, but it lacks accurate methods for assigning dates to such events. Here, the archeologist's methods and evidence may bring precision to the linguist's inferences.

Kinds of Linguistic Evidence Used for Culture-Historic Inference

Language Distribution and the Center of Gravity Principle

Assuming that change in language proceeds at a more or less even rate over time, the deepest splits within a family reflect the greatest age, and the location of these splits on the map points to the area where the protolanguage began to diversify (Sapir 1916, 1949: 452-455; cf. Swadesh 1964:548). Shallower splits are also significant: when these are placed in relation to the deeper splits it may be possible to infer the directions in which a language family spread as it continued to diversify. It is important not to confuse a family's center of gravity as determined by its internal divisions with the family's geographic center, which may fall in a different location. Thus, the geographic center of Salishan is found within the western part of the Plateau—roughly the region where Okanagan and Thompson were spoken aboriginally—but the deepest splits within Salishan occur on the coast, and it is there rather than on the Plateau that the Salishan homeland must be assumed to lie. Failure to understand the difference between a family's center of gravity and its geographic center has sometimes led to misinterpretations of North American linguistic prehistory.

The center of gravity principle can provide valuable clues about linguistic prehistory, but it must contend with certain limitations. First, although linguistic relationships are often represented in the form of branching tree diagrams, the actual histories of languages are usually far more complex than such schemata imply. The so-called chain model may better represent the history of a language family in a given case (Bloomfield 1933:310-319; Swadesh 1959, 1964:546; Lounsbury 1968:179-182; Krauss 1976a:311-312; Miller 1984), but such a model does away with the hierarchy of internal divisions upon which the center of gravity principle operates. Second, it should be possible theoretically to extend the center of gravity principle to groupings beyond the family level such as stocks and "phyla," and this has been done in a number of cases, in order, for example, to infer the relative age of early migrations to the Americas (C.F. Voegelin 1945, 1958). But unlike family-level groupings, only a few of the proposals for higher-order relationships are well supported, and culture-historical inferences based on such relationships must be regarded as speculative. Third, the area implied by the center of gravity principle as a homeland may or may not be suitable for human habitation at the appropriate time level. Thus, Death Valley emerges as a plausible homeland for the Numic branch of Uto-Aztecan (Lamb 1958:98) only if the area was more hospitable for human occupancy 2,000-3,000 years ago than it is today. In general, linguistic diversity is a function not only of time but also of environmental factors (cf. Jett 1977:73-75). Finally, although the linguistic homeland concept may be useful for addressing issues such as whether the Salishans originated on the Northwest Coast or in the interior, the areas designated as protolanguage homelands must be assumed in most cases to be far more restricted geographically than the areas occupied by the descendant languages, a situation that arises through processes of language extinction and replacement. As a consequence, large sections of the continent, which often contain hundreds of prehistoric sites, are unaccounted for linguistically and are therefore beyond the scope of paleolinguistics (Lamb 1964a; cf. Kinkade and Powell 1976:93, fig. 5).

Lexicostatistics and Glottochronology

The term glottochronology refers to a mathematical method for calculating the dates of splits within a language grouping (Hymes 1960:4; C.F. Voegelin 1962:147; Swadesh 1964a:289); in many respects it is simply a more precise formulation of the center of gravity principle (Swadesh 1952:454). To the extent that glottochronology draws upon statistical procedures, it may be seen as a type of lexicostatistics, and the two terms are often used interchangeably. But lexicostatistics is a broader field and includes other statistical approaches, such as comparative lexicostatistics, whose purpose is to classify languages (Dyen 1962, 1962a, 1964, 1965, 1975; Miller 1984). As a generalization, it may be said that lexicostatistical procedures yield measures of distance among genetically related languages, whereas glottochronological procedures purport to translate measures of relative distance into actual dates. Such dates should include error ranges at specified confidence levels, although frequently they do not, leaving the false impression that a pair of languages began to diverge from each other in a particular year.

Glottochronology was developed by Morris Swadesh and his coworkers in the 1950s. Its key assumption is that words belonging to a language's so-called basic vocabulary—that segment of the general vocabulary relating to categories of human experience presumed to be universal and therefore most resistant to borrowing—are replaced at a constant rate as the language evolves over time. The constant, expressed as a percentage of loss (or retention) in basic vocabulary per unit of time, usually the century, was discovered empirically by studying replacement rates in a variety of Old World languages with documented histories. These rates were found to cluster within a sufficiently narrow mathematical range to suggest that the replacement rate was a "near universal" in the world's languages. It was this feature that made glottochronology an immediate success in North America, since it provided a way of dating splits within language families lacking records for all but the most recent centuries.

The principal assumptions of glottochronology—that the meanings of basic vocabulary items are universal, that basic vocabulary undergoes replacement at a constant rate and is unaffected by factors such as word taboo and contact between languages, and that change in vocabulary is a measure of change in language generally—have all been called into question and vigorously debated. This has resulted in a number of improvements to the method, particularly with regard to the mathematical formulas used in determining time-depths. On balance, glottochronology has had about as many supporters as detractors over the years (Embleton 1986:45-59). Despite the controversy surrounding the method, glottochronological dates are still routinely cited in discussions of North American prehistory, even as the writers sound warnings about the method's lack of reliability.

The Analyzability of Words

Words that are analyzable into segments (e.g., *railroad*), are normally of more recent coinage than those that are unanalyzable, and this provides a means for establishing the relative age not only of the words but

while Proto-Aleuts continued to develop in the Aleutian Islands (McGhee 1976, 1978, 1988). The main difficulties with this model are the great age it accords Eskimo-Aleut and the tenuousness of the links between the Norton tradition found north of the Alaska Peninsula and contemporaneous cultures in South Alaska (Clark 1982). The second view, which takes as a point of departure the estimates of linguistic age based on glottochronology and analogies to Old World families, greatly reduces the time frame for the development of Eskimo-Aleut in the New World to the period 2500-500 B.C. (Bergsland 1986:68-69, 1989:72-70; Dumond 1987, 1987a). Anangula is thus removed from the direct line of Eskimo-Aleut ancestry, and the search continues for a "composite" culture on the Alaska Peninsula that can serve as a plausible ancestor for the Aleutian midden tradition (2000 B.C.) and the Norton tradition (1000 B.C.), two cultural manifestations that resemble each other closely enough to suggest the likelihood of a common source despite the difference in their ages.

Athapaskan-Eyak

One branch of Athapaskan-Eyak consists of a single language found in a restricted area along the Gulf of Alaska; the other is a ramified branch of over 30 languages spread discontinuously over large portions of western North America. Although Eyak has been known since the 1930s (Birket-Smith and De Laguna 1938), its relationship to Athapaskan was established only in the 1950s and 1960s (Krauss 1964, 1965, 1965a; Victor Golla, personal communication 1993). Lexicostatistical measures showed it to be no more closely related to its immediate Athapaskan neighbor Ahtna than to Navajo in the Southwest (Krauss 1976a:330). Much of the classificatory work on the family and the culture-historical inferences drawn from it were conducted before the link with Eyak was known, and the single term Athapaskan occurs most frequently in the literature. Another development that occurred before Eyak was formally linked to Athapaskan was the proposal of a deeper genetic relationship between Athapaskan, Tlingit, and Haida (Sapir's Na-Dene hypothesis), and this added to speculation about Athapaskan origins and for a while had considerable impact on Alaskan archeology.

The Athapaskan branch proper comprises three geographic groupings that fall within four culture areas: indeed, Athapaskan has long served as a favorite example of the anthropological dictum that linguistic and cultural groupings need not coincide (Sapir 1921c:213-214). The northern Athapaskan languages are spoken throughout the western Subarctic and on the northern Plains (vol. 5:67-85; Krauss 1982a). Despite efforts beginning in the 1930s to provide a coherent classification of northern Athapaskan, early attempts ended up merely being lists of low-level groupings often referred to as "divisions" (Osgood 1936; C.F. Voegelin 1941c:19-20; Hoijer 1946:11, 1963). The present view is that northern Athapaskan comprises a vast dialect-and-language complex consisting of up to 30 separate languages; some scholars consider any attempt to represent this complex in the form of a branching tree diagram to be misleading (Krauss 1976a:323ff., 1979:847-849), while others think that meaningful subgroups can be suggested ("Introduction," table 3, this vol.). The Apachean (or Southern Athapaskan) languages, spoken in the Southwest and southern Plains, appear to comprise a dialect complex in which anywhere from two (Hoijer 1971a) to seven (vol. 10:393-400) languages have been counted. Of these, Kiowa Apache is generally considered the most divergent. A third grouping, Pacific Coast Athapaskan, consists of from four (Krauss 1976a:304, 1979:871; Whistler 1979:14) to eight languages (vol. 5:67) in northwestern California and southwestern Oregon and an additional language on the lower Columbia River. The central historical problem in Athapaskan paleolinguistic studies has been to explain the far-flung distribution of the languages falling within the Athapaskan branch.

The Northern Origin of the Athapaskans

The center of gravity principle and reconstructed vocabulary both figured in early demonstrations of the northern provenience of the Athapaskan branch, and both are classic illustrations of paleolinguistic method. In the first, it was argued that because the divergence among various "divisions" of northern Athapaskan was greater than the divergence between those divisions and the languages belonging to the other two branches, the "historical centre of gravity" for the family must lie in the north (Sapir 1916, 1949:457). Subsequent comparative and lexicostatistical studies have confirmed that the northern Athapaskan languages are more diverse than the other two groupings and have shown that Pacific Coast Athapaskan is more diverse than Apachean (Hoijer 1956a; Hymes 1957). It is generally agreed that the Athapaskan homeland lay in interior Alaska and perhaps parts of northwestern Canada, with incursions first into California and Oregon and later into the Southwest (Krauss 1976a:284, 1979:805, 860, 1980:11-12; vol. 5:67-68). According to one theory, the breakup of Athapaskan may have been triggered by a devastating volcanic eruption in the eastern Saint Elias Mountains, followed by a massive eastward-spreading ash fall in the southern Yukon during the middle of the first millennium A.D. (Workman 1974: 253-256, 1979:352). While this claim has not been substantiated archeologically, it finds support in northern

Athapaskan oral traditions (Moodie, Catchpole, and Abel 1992). A late eastward expansion of northern Athapaskan languages toward Hudson Bay is suggested by the lower linguistic diversity of the Chipewyan area. With the discovery of Eyak the case for northern provenience was further strengthened, since the deepest cleavage within the family now occurred in the lower Copper River area of southern Alaska. As a coastal language, Eyak may represent an early movement of Proto–Athapaskan-Eyak speakers out of the interior. The lack of Proto–Eskimo-Aleut loanwords in Apachean and of Proto–Athapaskan-Eyak loanwords in the more easterly Eskimo languages implies absence of contact between the Athapaskans and the coastally oriented Eskimos during their early histories (Krauss 1979:804-806, 1980:5-6).

The second demonstration of the northern provenience of Athapaskan, also by Sapir (1936), was based on reconstructed vocabulary, or, more precisely, on changes in the meanings of key cultural terms in Navajo. The Navajo word for 'gourd', for example, is traceable to a Proto-Athapaskan noun stem meaning 'animal's horn', which evolved first into 'horn ladle' and then into 'gourd ladle' in early Apachean, and finally into 'gourd' (*Cucurbita*) in Navajo. Similarly, the Navajo term 'seed lies' (following broadcasting) is an extension of an earlier term reconstructible as 'it lies like flakes of snow'; and a Navajo ritual expression for 'sleeplessness' includes a verb traceable to a Proto-Athapaskan stem meaning 'travel by canoe'. These and other semantic shifts are more easily interpreted as coming about as a result of speakers' making linguistic adjustments as they moved from the northern boreal forest to the Southwest than the reverse.

Attempts to tie the Pacific Coast languages in with particular segments of the northern Athapaskan complex have not proven very successful, although certain features suggest a link with Tahltan rather than Chilcotin, the southernmost member of the northern group (Krauss 1976a:304-305). Two alternative routes south have been proposed, one across the Columbia River basin through central Oregon to the river systems of northern California (Jacobs 1937:67), and the other along the eastern side of the Coast Ranges (Cressman 1977:93-94; Whistler 1977:171, 1979:24; Fredrickson 1984:484). Neither route has been substantiated archeologically, but the Coast Ranges route has the advantage that it offers immigrants from the western Subarctic a higher degree of environmental continuity. It has been suggested that speakers of Athapaskan languages may have arrived in northwestern California around A.D. 1300 or perhaps a few centuries earlier, the more southern groups eventually expanding up the Eel River at the expense of Yukian-speaking groups (Whistler 1977, 1979; Victor Golla, personal communication 1993). This would make the Athapaskans the latest aboriginal arrivals in prehistoric California (vol. 8:82). However, the archeology of northwestern California is sketchy, and only the early presence of the Tolowa along the California-Oregon border seems adequately supported (Fredrickson 1984:501; Moratto 1984:565, 570).

Apachean forms a shallower and more clearly defined subgroup than Pacific Coast Athapaskan. Glottochronology indicates a divergence from the northern languages around A.D. 1000 (Hoijer 1956a). Proto-Apacheans probably did not reach the Southwest much earlier than A.D. 1400 (vol. 10:385), and some would argue not until a century later (vol. 9:162). The archeology of the early Apacheans is meager; assemblages such as the Dismal River aspect, which are known to be associated with them, postdate contacts with Spanish explorers. The question of the route by which the Apacheans reached the Southwest thus remains open. Some have argued for an intermontane route through the Plateau and Great Basin, with groups like the Kiowa Apache and Lipan later moving onto the Plains (cf. vol. 10:382-385). Others favor a route through the Plains along the east side of the Rocky Mountains, with a late incursion by Navajos and other western Apachean groups into the Southwest culture area (D. Gunnerson 1956; J. Gunnerson and D. Gunnerson 1971; vol. 9:163; vol. 10:393). Although Apachean appears to have the closest ties with Sarcee in the north, this does not necessarily support a Plains route, since the Sarcee themselves only recently moved onto the Plains from the Subarctic (vol. 5:69). Ecological arguments have been advanced for both routes: a fairly high degree of continuity between the northern Athapaskan area and the Plateau in the first case, and a southward drift by nomadic hunters in pursuit of the bison in the second (D. Gunnerson 1972). A third possibility is that the original Apachean community may have split in the north, with the ancestors of the Kiowa Apache taking the Plains route and the remaining groups taking a route through the Plateau and Great Basin (Wilmeth 1979), a view that is consistent with the linguistic separation of Kiowa Apache from the other Apachean groups (Hoijer 1971a). However, until the archeology of groups like the Navajo is better understood, the question of routes cannot be satisfactorily resolved (vol. 10:489).

Lexicostatistics and Glottochronology

Experiments with Athapaskan glottochronology confirmed the existence of the three principal subbranches and reinforced the idea that Pacific Coast Athapaskan had separated earlier from the northern languages than Apachean had (Hoijer 1956a). The first time-depths arrived at for the three branches were regarded as too shallow (Kroeber 1959:241; Hymes 1960:22), and

recalculations resulted in somewhat earlier dates without altering the basic picture of subgrouping or relative separation times (Hymes 1957).

Navajo was the focus of a study that challenged the notion that the items in the basic vocabulary list could be translated unambiguously into all languages (Hoijer 1956). Another study compared subgroupings of Athapaskan as determined by lexicostatistics and by the comparative method, the resulting discrepancies being attributed to the greater susceptibility of lexicostatistics to the distorting effects of borrowing (Hoijer 1962). The most perplexing discrepancy between the two methods was the different subgroupings they yielded for Apachean. The traditional subgrouping, based on a comparative study of stem-initial consonants, indicated a division into a Western Group (Navajo, San Carlos, Chiricahua, and Mescalero) and an Eastern Group (Jicarilla, Lipan, and Kiowa Apache) (Hoijer 1938). From this it was inferred that Proto-Apacheans came to the Southwest as a single group and then split into the two subgroups that subsequently diversified. The conclusion drawn from the lexicostatistic application, on the other hand, was that there were only two languages, Kiowa Apache and all the rest, which formed a dialect complex. Although this conclusion has been criticized as representing a too radical foreshortening of time-depth (cf. Krauss 1976a:332), the notion that Kiowa Apache stands apart from the remaining languages has gained some acceptance and suggests that the Kiowa Apache may have arrived separately from the other Apacheans in the Southwest and perhaps at a later time (Hoijer 1971a; cf. Hollow and Parks 1980:72).

The earliest divergence times obtained for Athapaskan as a whole ranged between 1,300 and 1,500 years ago (Hoijer 1956a; Swadesh 1958). Improved data, refinements in glottochronological method, and repeated experimentation resulted in deeper divergence times: 2,400 ± 500 years ago for Athapaskan alone, and 3,400 ± 500 years ago for Athapaskan-Eyak (Krauss 1965a:185; cf. Krauss 1979:846). These dates suggest that Proto–Athapaskan-Eyaks could have inhabited interior Alaska and the Yukon between three and four millennia ago and that ancestral Eyaks may have split off from the parent community around three millennia ago and moved to the coast.

The Na-Dene Hypothesis, Glottochronology, and Northwestern Prehistory

Although speculation about a genetic relationship among Athapaskan, Tlingit, and Haida dates to the early nineteenth century (Krauss 1964:128), an attempted demonstration of the relationship based on comparative phonological, lexical, and particularly morphological evidence came only in the twentieth (Sapir 1915b; cf. Sapir 1925:491-492). The hypothesis had two immediate consequences for Alaskan prehistory: it gave additional weight to the idea that the Athapaskans originated in the north, and it provided the basis for inferring a coastal homeland—specifically on the Alaska panhandle—for the presumed common ancestor of the three groups, since it was here that the deepest cleavages in Na-Dene were found (Sapir 1915b:558, 1916, 1949:457; cf. Greenberg, Turner, and Zegura 1985:34). Athapaskan was seen as a "specialized interior offshoot" and Haida a "specialized island offshoot" from the common coastal ancestor.

Sapir's Na-Dene hypothesis was greeted initially with some skepticism (P.E. Goddard 1920; Boas 1920, 1929), but by the 1950s it had gained acceptance among the majority of linguists (Hoijer 1941:4-6, 1954:6; Swadesh 1951, 1952:453, 1954; Newman 1954:633; Hymes 1955a, 1956; Haas 1964:495; C.F. Voegelin and F.M. Voegelin 1965:127-128). Its acceptance in other fields was encouraged by the publication of two wall maps of North American language groupings (C.F. Voegelin and E.W. Voegelin 1944; C.F. Voegelin and F.M. Voegelin 1966; cf. Carlson 1983:86) (figs. 1-2). From the beginning, Haida was understood to be the most divergent member of Na-Dene, and most of the discussion revolved around the relationship between Athapaskan and Tlingit. Although these two were shown to have a number of structural similarities, it proved difficult to find cognate stems on which sound correspondences could be based, particularly when Eyak was included, and this stymied comparative work for a time (Krauss 1964, 1965, 1965a, 1969, 1976a:336-343; but cf. Pinnow 1964a, 1968, 1977). Despite these difficulties, glottochronological applications were made to Na-Dene, both with and without Haida. The wide fluctuations in divergence times that resulted reflected the poor quality of the source data as well as revisions to glottochronological method taking place in the 1950s (table 1, notes). The earliest studies proposed a minimum time-depth for Athapaskan and Tlingit of 2,000 years (Swadesh 1951, 1952:453, 1954), but this figure was revised to 5,000 years (Swadesh 1959b) after the first figure was recognized as being improbably low (Kroeber 1955:92-93; Eggan 1958:648-649). Taking the Athapaskan-Eyak divergence time of 3,400 ± 500 years into account, a 5,000-year divergence time for Athapaskan-Eyak and Tlingit was considered likely, although the problem of establishing cognates in stem lexicons and other uncertainties precluded drawing more than tentative conclusions (Krauss 1976a:333).

In the 1970s linguists became skeptical about Na-Dene as a genetic grouping (Krauss 1979:841-842; Thompson 1979:752). Following a thorough review of the evidence and arguments, Haida was removed from

the grouping and returned to the status of an isolate (Levine 1979). Although Na-Dene in its classic form has had later defenders (notably Greenberg 1987), the consensus among linguists in the 1990s was that a convincing case had not been made. A genetic link between Athapaskan-Eyak and Tlingit, on the other hand, appeared likely (Krauss 1979:890; vol. 5:67), and the name Nadene was retained for this smaller grouping (here labeled with Sapir's alternate spelling without the hyphen).

The use of Sapir's Na-Dene hypothesis in other fields of prehistory has not kept pace with its changing fortunes in linguistics. Even after serious doubts had been raised about its validity as a genetic grouping, it was being used along with other controversial superstocks as the basis for plotting the distributions of genetic and other physical traits in native populations (Spuhler 1979; Ubelaker and Jantz 1986). Na-Dene was also used to give ethnolinguistic identity to a population cluster (the "Greater Northwest Coast Indians") defined on grounds of dental morphology, although the linguistic and dental distributions did not match at all closely (Turner 1983, 1986; cf. Szathmary 1986:490). Later, dental evidence was combined with linguistic and—more tentatively—genetic evidence, to argue that Na-Dene constituted one of the three founding aboriginal migratory movements to the New World (Greenberg, Turner, and Zegura 1985, 1986; Greenberg 1987). All these correlations are flawed to the extent that Na-Dene as a linguistic grouping is unproven, and the linguistic and biological connotations of the term remain as discrepant as they are.

Within archeology, the distribution of Na-Dene on the map suggested to some prehistorians that speakers of ancestral Na-Dene could have been carriers of the microblade technologies found at sites in interior Alaska as early as 9000 B.C. and in western Canada and Washington state by 4500 B.C. (Borden 1970, 1979:970; cf. Clark in vol. 6:107-129 on the distribution and composition of microblade sites). In one interpretation, it was hypothesized that the microblade carriers were still undifferentiated Na-Deneans who, after reaching the southern limit of their expansion, came in contact with people who made side-notched blades; after adding this new technology to their tool kit the Proto–Na-Deneans then spread back to the north, splitting into the major subbranches along the way (Dumond 1969). The south-to-north spread was inferable both from the fact that the mixed assemblages appeared to represent progressively later stages toward the north and from the fact that the deepest cleavages within Na-Dene occurred in the southern part of the area. In a more general version of this hypothesis, four "basal" archeological cultures were correlated with language phyla of the 1964 Consensus Classification as shown on the C.F. Voegelin and F.M. Voegelin (1966) map (fig. 2), the microblade tradition being assigned to Na-Dene purely on distributional grounds (Carlson 1979, 1983; vol. 7:60-69).

It has been suggested that Athapaskan-Eyak and Tlingit may corrrelate with the Interior and Coastal variants of the microblade tradition (vol. 5:67). The archeological relationship between the Interior and Coastal microblade subtraditions is not well understood, and both have roots that reach back so far before the hypothetical date of 3000 B.C. for the Athapaskan-Eyak–Tlingit split that the correlation seems dubious (vol. 7:68; cf. vol. 6:110; Wright, Prest, and Vincent 1987; Donald Clark, personal communication 1992).

Proto-Athapaskan Kinship and Society

Athapaskan, before it was connected with Eyak, became the focus of a debate over methods of reconstructing prehistoric kinship systems and the inferences that can be drawn from them. It was early suggested that the kinship systems found among Apachean groups in the Southwest could be classified into two principal types, the "Chiricahua" (a bifurcate collateral system with Hawaiian cousin terms) and the "Jicarilla" (a bifurcate merging system with Iroquois cousin terms), and that the prototype for both of these was a system like the Chiricahua (Opler 1936). This view was criticized for ignoring the linguistic facts and making unwarranted historical claims about the prototypical system, which linguistic reconstruction showed to be more like that of the Navajo, classified as Jicarilla in type (Kroeber 1937). The linguistic approach was thought to be superior, because it traced the actual histories of the terms comprising the systems, whereas the typological approach was not regarded as a strictly historical process at all (Kroeber 1937:607).

This early exchange defined the poles of a debate that unfolded between those who argued that prehistoric kinship systems could be reconstructed solely by comparing kin categories and piecing together their logical antecedents (Murdock 1949, 1955; White 1957) and those who argued that linguistic reconstruction was the primary, if not exclusive, means of recovering such systems (Hoijer 1956b; Hymes and Driver 1958; Dyen and Aberle 1974; cf. Hockett 1977). Neither of the approaches led to consistent conclusions about the nature of the Proto-Athapaskan kinship system or its social correlates. The supposition that the system had Hawaiian cousin terms, for instance, from which bilateral descent might reasonably be inferred, had supporters from both camps (Murdock 1949; Hoijer 1956b), as did the supposition that Proto-Athapaskan (or earlier Na-Dene) had Iroquoian cousin terms, from which some form of unilineal descent might be inferred (Murdock 1955; Dyen and Aberle 1974). And whereas the method of lexical reconstruction led in one case to

the conclusion that, of the Apachean systems, the Navajo most closely resembled the Proto-Athapaskan system (Kroeber 1937), in another it led to the conclusion that the Eastern Apachean and Kiowa Apache systems were closer to the protosystem, from which the inference was drawn that the eastern groups had arrived in the Southwest later and perhaps by a route different from that of the Western Apacheans (Hoijer 1956b).

The most exhaustive review of the subject, which was based primarily on lexical reconstruction (Dyen and Aberle 1974; cf. Aberle 1974, 1984; Hockett 1977; Wurm 1977; Campbell 1976), concluded that the Proto-Athapaskan system had Iroquois cousin terms and bifurcate aunt and uncle terms, although whether collateral or partially merging could not be determined. A statistical comparison based on 250 societies indicated that such a system reliably predicted unilineal or double unilineal descent and unilocal residence. However, the longstanding issues of whether Proto-Athapaskan descent was matrilineal or patrilineal, and whether Proto-Athapaskan residence was matrilocal or patrilocal, could not be conclusively resolved, although the authors suggested that the most parsimonious explanation for the variety of descent and residence rules found among contemporary Athapaskan groups was that the Proto-Athapaskans were matrilineal and matrilocal, with various groups later shifting to bilateral or even patrilineal descent after coming in contact with surrounding peoples (Dyen and Aberle 1974:428; cf. Hockett 1977: 89-90).

Salishan

The 23 languages of the Salishan family once occupied a nearly continuous area from southern British Columbia, Washington State, and northern Oregon to Idaho and western Montana. The languages of the coastal area comprise four branches: a large Central Salish group; Tsamosan (or Olympic) in western Washington; Tillamook, an outlier in northwestern Oregon; and Bella Coola, an outlier in British Columbia. The precise subgrouping of the main body of the coastal languages has been a matter of continuing debate. The Interior languages, on the other hand, were early recognized as forming a distinct subgroup.

The earliest attempts to classify the Salishan languages were motivated primarily by the need to determine family affiliations in a heterogeneous linguistic region: they did not go beyond grouping dialects into languages (Powell 1891:104-105; Boas 1894; C.F. Voegelin 1941c; C.F. Voegelin and E.W. Voegelin 1944). Interest in a more comprehensive classification was stimulated by two developments: the careful mapping of sound correspondences among the approximately three dozen known Salishan dialects (Boas and Haeberlin 1927; Boas 1928a), and the reduction of these to a more tractable list of some 16 languages, based on fieldworkers' judgments with regard to mutual intelligibility (C.F. Voegelin 1941c:18-19). Despite these efforts, isoglosses for a number of the sound shifts were found to cut across language lines, and this raised the possibility of prehistoric contacts among groups that in some cases were now geographically separated (Swadesh 1949, 1952a). The early injection of the contact factor into discussions of Salishan linguistic prehistory influenced the direction of later research. At the same time, a question was raised about the reliability of mutual intelligibility tests as a basis for classifying languages. It was suggested that comparative studies of vocabulary might yield a more accurate picture of relationship (Swadesh 1950:162-163), and with this the idea of lexicostatistics was born.

Lexicostatistics and Glottochronology

Salishan contributed significantly to the theory and practice of glottochronology and lexicostatistics. The first comprehensive classification of the Salishan languages was also the first published application of lexicostatistics to an American Indian language family (Swadesh 1950; cf. Swadesh 1952:454). The tables of cognate percentages used to classify Salishan suggested an early separation of Bella Coola from the main group and a later split between the Interior and the Coast languages. The most important finding for prehistory was that the Coast division was considerably more diverse than the Interior division. According to the center of gravity principle, this implied that the Salishan homeland lay on the coast, specifically in an area extending from the lower Fraser Valley somewhat to the northwest. The Interior languages were taken as representing a later expansion across the Pacific Ranges (Swadesh 1950:166-167, 1952:461; cf. Kroeber 1955:98-101). These findings were ignored by archeologists at the time, because they were incompatible with the current theory that the Salishans had originated in the interior.

The tables of cognate percentages in the 1950 study were at first used for purely lexicostatistical purposes to establish relative distances among the languages and to provide a classification. Following the standardization of the basic vocabulary list to 200 items and the setting of the retention rate at 81 ± 2% per millennium, time-depths were announced of 1400 to 1500 B.C. for the Interior division, 2600 B.C. for the Coast division, and 3500 B.C. for the family as a whole (Swadesh 1952:461, 1953:41ff., 1954:362). The last figure was corrected to 2900 B.C. (Swadesh 1958:673), after the basic vocabulary list and the replacement rate were revised (Swadesh 1955).