LINGUISTIC EVIDENCE IN SUPPORT OF THE COASTAL ROUTE OF EARLIEST ENTRY INTO THE NEW WORLD

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A study of aboriginal language distributions supports Knut Fladmark's hypothesis that the initial route of entry of peoples into the New World was along the Pacific coast rather than through the interior ice-free corridor. The greatest diversification of aboriginal languages, as indicated by number of language isolates and major subdivisions of language phyla, is observed on the Pacific Northwest Coast, in California, on the northern Gulf of Mexico Coast, in Middle America, and in South America. Following a conventional principle of historical linguistics, it is assumed that the development of language diversification is proportional to time depth of human occupation of an area. A review of the archaeological evidence from the areas of greatest language diversification indicates a time depth of at least 35,000 years for human occupation of most of the Americas.

Knut Fladmark has made a case for the possibility of a Pacific coastal route of initial entry of peoples into the New World (Fladmark 1975; 1978; 1979; 1983). With a detailed presentation of compelling geological and biogeographical evidence for well-spaced breaks in the chain of coastal glaciers (Fladmark 1978: fig. 3) and the existence of refugia for plants and animals, he pointed out that human groups with relatively simple watercraft could have successfully occupied the coastal zone even at the height of the last glaciation. Yielding shellfish, fish, sea mammals, and birds to a simple technology, the coastal zone would have provided a richer biomass for human exploitation than the mid-continent ice-free corridor, which was likely to have been the scene of shifting proglacial lakes with a much reduced biota long after the ice began melting about 15,000 years ago.

Fladmark admitted that no definite archaeological evidence of a really early settlement of the Northwest Coast was known because any Pleistocene occupation sites would have been drowned under the rising sea level in postglacial times. Independent evidence in support of his coastal entry model *is* directly observable: it is the known distribution of aboriginal language groups throughout the New World.

Richard A. Rogers (1985*a*; 1985*b*) has recently called attention to the significance of aboriginal language distributions in North America. Rogers (1985*a*) plotted and compared the relative density and exclusiveness of aboriginal languages in the unglaciated and deglaciated areas of the continent. Studying the distribution of 213 native languages, he found that the deglaciated area (most of Canada and a portion of the northern United States) had an average of only 18 languages per million square miles; in contrast, the unglaciated area to the south featured an average of 52.4 languages per million square miles (Rogers 1985*a*: 131). Using standard premisses of comparative linguistics, Rogers considered that the much greater density of languages in the area south of the continental ice sheets indicated that the unglaciated area had been occupied for longer, producing greater linguistic differentiation. He concluded that most of North America must have been occupied *before* the Late Wisconsinan glacial maximum, because if people had initially moved into the interior of the continent from Alaska only after the last ice sheets retreated and the ice-free corridor opened, there should have been much greater language diversity in the northern deglaciated area than in the lands to the south occupied later. In fact, most of the deglaciated area of northern North America is occupied by only three language groups, Athapaskan in the northwest and Algonquian in the central and eastern zones, with Eskimo-Aleut on the Arctic coast and part of the Pacific coast. Rogers postulates that the ancestral Athapaskans moved into the interior of Alaska from an ice-free refugium on the south Alaskan coast; and he follows Siebert (1967) in placing the original centre of dispersal of Algonquian speakers in the Great Lakes area, with expansion over the northeast quarter of the continent as that area became deglaciated.

In a subsequent paper, Rogers (1985*b*) pointed out that the greatest linguistic diversity in North America is found in the Pacific Coast zone, a distribution suggesting an initial coastal entry route, and only secondary occupation of the interior. I propose to elaborate upon Rogers's work by analysing the complexities of the language distributions throughout the New World in closer detail. The data suggest that the Pacific coast of North America was indeed settled first, with movement along the coastlines into Central America and around the Gulf of Mexico, and into South America.

The assumptions made in this analysis go back to Sapir (1916: 79–83), and have been basic in historical interpretations of language distributions (cf. Dyen 1958; Diebold 1960; Ehret 1976). On the premiss that the degree of language divergence is a function of time elapsed, geographical areas of greatest linguistic diversification are assumed to be the areas longest occupied. Linguistic diversification may be reflected as major subdivisions of a given language family or phylum: an area of concentration of major subdivisions of a language group in a particular geographical region is assumed to be the heartland of the language group, and occupied longer than areas of less divergence among the languages of the group. A geographical concentration of language isolates—individual languages or small families which cannot be demonstrated to be related to any other—also suggests a very long occupation of the region, with the long-term processes of linguistic change eventually obscuring all discernible evidence of past relationships. Defining a language as an isolate does not mean that it must be completely independent of all other languages; only that relationships cannot be demonstrated conclusively. The great number of New World language phyla and isolates cannot be the result of a stream of separate migrations from Asia, and I agree with Greenberg (Greenberg *et al.* 1986; Greenberg 1987; Gruhn 1987) that all American Indian languages must ultimately be related—but the extremely high degree of language diversification indicated by highly ramified phyla and concentrations of isolates suggests great time depth for original relationships.

My analysis of language distributions will closely examine these geographical areas of high linguistic diversification—concentrations of language isolates, or major subdivisions of particular language phyla—beginning with the Northwest Coast and working south to California, the northern Gulf of Mexico, Central America, and South America. A map (fig. 1) is included to indicate the possible centres of development and dispersal of major language phyla and isolates.

Review of language distributions in the New World

All but one of the seven language groups on the Northwest Coast of North America are currently considered language isolates or an independent family. The Chimakuan group is comprised of two languages on the northern Olympic peninsula, in northwestern Washington state (cf. Jacobson 1979*a*). Wakashan includes two language families (Kwakiutlan and Nootkan) on Vancouver Island and the mainland adjacent to the north (Jacobson 1979*c*). Haida on the Queen Charlotte Islands, once considered a Nadene language distantly related to Athapaskan, is now ranked as a language isolate (cf. Krauss 1979: 838) following detailed comparative analysis by Levine (1979). Also, it is now realised that the genetic relationship of Tlingit, in the Alaska panhandle, with Athapaskan is not demonstrable (Krauss 1979: 838). Eyak to the north is still identified as coordinate in the Nadene phylum with Athapaskan (Krauss 1979: 845–6), suggesting an ultimate coastal homeland for the interior Athapaskan groups: one Athapaskan language, Tanaina, is on the south Alaska coast, at Cook Inlet. Tsimshian, on the northern British Columbia coast, has been considered a Penutian language; but its membership in that phylum is now doubted (Silverstein 1979: 680–1), and it may have to be counted as an isolate. Finally, Salishan, although widely distributed in the Puget Sound/Gulf of Georgia area and southern interior B.C. into northern Idaho and Montana, is an independent family not demonstrably relatable to any other in North America (cf. Thompson 1979: 748–50). The greatest diversity of the Salishan family is in the coastal zone, with Bella Coola most divergent (Thompson 1979; Kinkade & Powell 1976); and it is probable that Salishan speakers expanded from the coast up the Fraser River and into the interior. Of the seven language groups on the Northwest Coast, then, three are isolates, two are probable isolates, and the most widespread group (Salishan) is independent of any other family.

The tremendous diversity of the languages of aboriginal California has been common knowledge to anthropologists since Kroeber's day. Sixty-four languages are attested for this small area (Shipley 1978), and recent studies indicate that eighteen small language families or language isolates are only very remotely related to others. In fact, contemporary linguists have been unable to demonstrate conclusively that the dispersed California languages grouped as Hokan —including the Pomoan family, the Palaihnihan family, the Shastan family, the

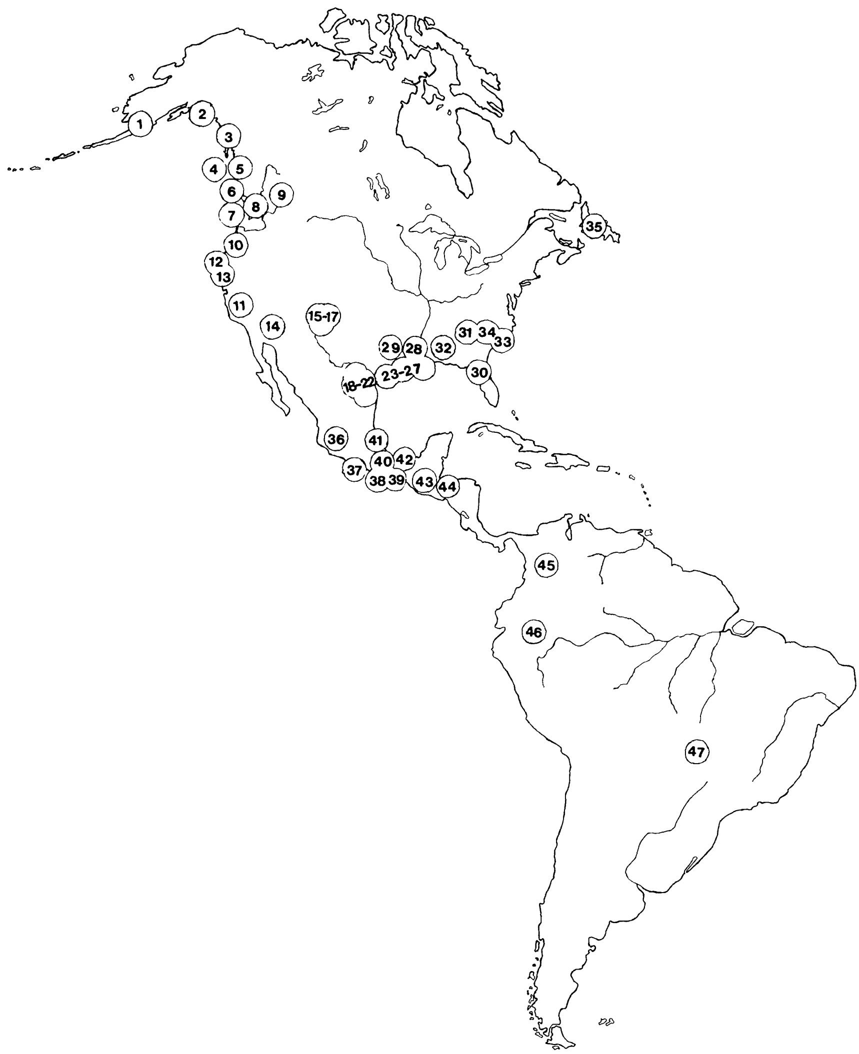

FIGURE 1. Possible centres of major language phyla and isolates. 1. Eskimo-Aleut. 2. Na-Dene. 3. Tlingit. 4. Haida. 5. Tsimshian. 6. Wakashan. 7. Chimakuan. 8. Salishan. 9. Kutenai. 10. Penutian. 11. Hokan. 12. Algic. 13. Yukian. 14. Uto-Aztecan. 15. Zuni. 16. Keresan. 17. Kiowa-Tanoan. 18. Coahuiltecan. 19. Cotoname. 20. Comecrudan. 21. Aranama. 22. Solano. 23. Karankawa. 24. Tonkawa. 25. Atakapa. 26. Chitimacha. 27. Natchez. 28. Tunica. 29. Caddoan. 30. Timucua. 31. Yuchi, 32. Muskogean. 33. Siouan. 34. Iroquoian. 35. Beothuk. 36. Tarascan. 37. Tlapanec. 38. Tequistlatec. 39. Huave. 40. Otomanguean. 41. Totonacan. 42. Mixe-Zoquean. 43. Mayan. 44. Jicaque. 45. Macro-Chibchan. 46. Andean-Equatorial. 47. Ge-Pano-Cariban.

Yanan family, the Salinan family, the Chumashan family, the Yuman family, the Chimariko isolate, the Washo isolate, the Esselen isolate, and the Karok isolate—are actually genetically related (Shipley 1978: 81; Langdon 1979). It seems that an ultimate genetic relationship is probable, but it is so remote in time that linguistic change has left almost no definite traces of relationship (Jacobson 1979*b*: 570–1; Langdon 1979: 591–6). The overall genetic relationships of the member families of the California Penutian group—including the Yokutan, Maiduan, Wintuan, Miwok, and Costanoan families—are more definitely established (Silverstein 1979: 675); but there is great divergence between the families, and only a very few features of the Penutian protolanguage can be reconstructed (Shipley 1978: 82; Silverstein 1979). It may be inferred that the Hokan group and the Penutian group have been in California for a very long time in order for such marked internal divergence to develop. In regard to Penutian, the relationship of certain Oregon and Washington languages—the Klamath/Modoc isolate, the Molale isolate, the Coos family, the Alsea isolate, the Siuslaw-Lower Umpqua isolate, the Takelma isolate, the Kalapuya family, the Chinookan family, and the Sahaptin family—to each other or to the California Penutian group is very uncertain although considered probable (Silverstein 1979: 678–80; Shipley 1978: 84–5). The time depth of these distant relationships must be very great.

An outstanding case of linguistic divergence within California is the Ritwan group, comprised of Yurok and Wiyot. It has been demonstrated that these two languages are definitely genetically related to the Algonquian languages, in a greater Algic stock (Haas 1958*a*; 1966); but although geographically adjacent on the far northern California coast, Yurok and Wiyot are as divergent from each other as they are from all the Algonquian languages (Haas 1966; 1969: fig. 3.2). The proposal of two separate long-distance migrations ending in contiguous areas is not the most economical migration hypothesis (Dyen 1958: 613). The simplest explanation, involving the least number of moves, is that Yurok and Wiyot diverged in place, in California, over a very long period of time, while the proto-Algonquian group travelled elsewhere. The puzzle is not how Yurok and Wiyot came to be in California but how the proto-Algonquian group reached the southern Great Lakes area.

Finally, there is a small language isolate in northern California, in the coastal zone north of San Francisco Bay. The Yuki and Wappo languages, although geographically separate from each other, are believed to be very distantly related in a Yukian family (Shipley 1978: 87).

The Uto-Aztecan family, the members of which are easily recognised although discussion continues about the subdivisions (Steele 1979), is also well represented in California. This language family was ultimately distributed from the northern Great Basin through the southwestern United States and northern Mexico into central Mexico, with small late outliers in Central America. In terms of linguistic diversification, the centre of gravity of this widespread language family lies in southern California and Arizona. In considering the American Southwest, it should be noted that there are three small language isolates centred in New Mexico in the upper Rio Grande area: Zuni, Keresan, and Kiowa-Tanoan (Davis 1979).

A zone of marked linguistic diversity is observed on the northern coastal plain of the Gulf of Mexico, Formerly most of the languages of the lower Rio Grande area were grouped as 'Coahuiltecan', and affiliation assigned to Hokan (Sapir 1920). More recent analysis of available linguistic material from this area by Goddard (1979*b*) has led to the rejection of this idea. Spanish missionaries working in the area in the eighteenth century commented upon the very marked diversity of languages encountered among the Indians of the region: a native sign language was mentioned as a necessity in inter-tribal communication (Goddard 1979*b*: 354–5). Goddard's study of available texts led to the identification of at least seven language isolates—Karankawa, Tonkawa, Cotoname, Comecrudan, Coahuilteco, Aranama, and Solano—restricted to the area of northeast Mexico and south Texas.

The zone of linguistic diversity continues farther east along the Gulf of Mexico. Five languages in southern Louisiana, Mississippi, Alabama, and Florida were once classified together as 'Gulf' by Haas (1951; 1958*b*); but she now feels that a genetic relationship cannot be conclusively demonstrated, and the five languages are ranked as language isolates (Haas 1979). The list of Gulf Coast language isolates now includes Atakapa, Chitimacha, Natchez, Tunica, and Timucua. A long time period for occupation of the northern Gulf Coast is implied.

In the interior, in the eastern and central sectors of North America, less linguistic diversification is evident. Only one language isolate is present, Yuchi in Georgia (Crawford 1979).[1] Members of the Muskogean family, which dominated the Southeast, are readily identifiable (Haas 1941), indicating relatively little internal divergence despite wide geographical distribution. Caddoan on the southern Plains (Chafe 1979), Siouan in the central Mississippi area with late outliers on the central Plains and a very divergent outlier (Catawba) in the Carolinas (Rood 1979), and Iroquoian in the Northeast with a divergent outlier (Cherokee) in the Southeast (Mithun 1979) may be very remotely related to each other (Chafe 1979: 216); but there is relatively little internal divergence within each family. Algonquian languages, widely distributed in the Northeast including the eastern half of southern Canada, with outliers on the northern Plains, are readily identifiable (Goddard 1978*a*; 1978*b*; 1979*a*); and a relatively late divergence is indicated. In the far Northeast, Beothuk was a language isolate on Newfoundland (Goddard 1979*a*: 106–7).

For North America, then, the areas of greatest linguistic diversification, as indicated by number of language isolates or degree of internal divergence of major language groups, are the Pacific Coast and the north coast of the Gulf of Mexico. Moving south into Central America and the South American continent, one again finds great linguistic diversification.

It has been said that 'the linguistic diversity of Middle America rivals that of the rest of North America taken as a whole' (Campbell 1979: 903). Estimates of the total number of languages spoken in Mexico and Central America range from about 200 to 350. Independent language groups listed by Campbell (1979) include representatives of the Uto-Aztecan family in the north and central areas; the highly diversified and widely distributed Otomanguean phylum in the central area; the highly ramified Mayan family in southern Mexico, Guatemala, Belize, and El Salvador; the Mixe-Zoquean family in the Isthmus of Tehuantepec area; and the isolates Totonocan (Gulf Coast), Huave (southern Oaxaca coast), Tarascan (Michoacán), Xincan (southeast Guatemala), and Lencan (Honduras). Previously postulated Hokan relationships of the isolates Tequistlatec (southern Oaxaca), Jicaque (Honduras), and Tlapanec (Guerrero)-Subtiaba (Costa Rica) are now regarded as highly tenuous (Campbell 1979: 965–7). A Macro-Mayan hypothesis, relating Mayan, Totonacan, and Mixe-Zoquean at a very remote time level, is considered weak but possible (Campbell 1979: 962); and Huave might possibly be very remotely related to Otomanguean (Campbell 1979: 964). Greenberg (1960) classified Xincan and Lencan as pertaining to the Chibchan subgroup of his Macro-Chibchan stock, and other Chibchan languages are identified farther south in Lower Central America and in northwestern South America.

The linguistic diversity in South America is so great that, compared to North America, relatively few linguists have ventured to undertake a classification of all the languages of the continent (cf. Mason 1946; Greenberg 1960; 1987; Loukotka 1968). It has been estimated that there were approximately 1,500 native languages in South America, and linguistic material is available for about 600 (Key 1979: 12). In the mid 1950s, Greenberg (1960) suggested a model of three major stocks, each highly diversified and very dispersed in distribution. This classification was later revised somewhat, with four major stocks recognised (Greenberg 1987: 64–122). The 1960 classification was accepted by Voegelin and Voegelin (1977) and Key (1979), although other linguists seem to be very sceptical that the diverse South American languages can be grouped into so few major stocks. Future studies as detailed as those on North American languages may well result in the recognition of more families and isolates; but at the moment Greenberg's classification is the best at hand and his model will be followed.

Greenberg's Andean stock now has six major subgroups, including (1) the languages of the southern Andes, Tierra del Fuego, the Pampas, and Patagonia, as well as (2) Quechua and (3) Aymará in the central Andes; plus as coordinate groups (4) the Kahuapan-Zaparo group, (5) the Itucale-Sabela group, and (6) the so-called Northern group, in southern or eastern Ecuador and adjacent Peru. The Equatorial-Tucanoan stock, possibly grouped with Andean, is dispersed throughout the Amazon basin and into the Caribbean area. The Equatorial branch includes the widely distributed and diversified Arawakan and Kariri-Tupian families, plus as coordinate groups ten other families or language isolates more limited in distribution. The Macro-Tucanoan branch, concentrated in the upper Amazon area, is very diversified, with nineteen subgroups.

Greenberg's Gê-Pano-Cariban stock has a broken distribution in lowland South America. The Macro-Gê subgroup, with fourteen families or isolates, includes most of the languages in the eastern Brazilian uplands. The Macro-Panoan subgroup includes four major language families in the Gran Chaco, plus the Pano-Tacana family in eastern Bolivia and the upper Amazon region, and the Charrua language in Uruguay. The Macro-Caribe subgroup includes not only the widely-dispersed Caribe family but also four small families in the upper Amazon area.

In Greenberg's Macro-Chibchan or Chibchan-Paezan stock, two major subgroups, Chibchan and Paezan, are centred in Lower Central America, Colombia, and Ecuador. Chibchan has a distant outlier (Shiriana or Yanomama) on the Venezuela/Brazil border, and Paezan has several distant outliers: Yunca or Chimu on the north coast of Peru, Atacameño in northern Chile, Itonaman in northeast Bolivia, and possibly Warao in the lower Orinoco basin.

Greenberg's classification of South American aboriginal languages into three or four major phyla would imply that only three or four separate language groups entered the southern continent, with subsequent population dispersal and great internal diversification over a very long period of time. A bottleneck effect in Lower Central America would be seen, with only three or four language groups passing south at a remote time. The distribution of each of the three or four major language stocks postulated by Greenberg for South America is so broken that it is difficult to reconstruct the pattern of earliest population movements within the southern continent. The ancestral Ge-Pano-Cariban stock may have been first to expand into lowland South America, probably via the Caribbean coast. Its continuity in eastern South America was broken by much later movements of Equatorial groups of Amazonian origin, particularly Arawakan and Tupian. Languages of the Macro-Chibchan stock, now concentrated in the northwestern part of the continent, may have once been more widely distributed, to judge from the position of its separate outliers; perhaps it once spread down the Pacific coast as far as the Atacama desert of northern Chile. Analysis of the major subdivisions of the Andean stock would suggest that the ancestral Andean group may have once been situated just east of the Andes in the Peru/Ecuador *montaña* area, with a spread west into the high Andes and south into central and southern Chile, and ultimately a movement into the Pampas, Patagonia, and Tierra del Fuego.

An examination of the distribution of aboriginal languages, then, demonstrates great linguistic diversification and implies great time depth for human occupation of the Pacific Coast, the Gulf Coast, Central America, and South America. How much time depth is involved is suggested by the archaeological evidence for the earliest settlement of these particular areas. Linguistic data and archaeological data are separate lines of evidence, and both data sets indicate independently that human populations have occupied certain areas of the New World for a very long period of time. Of course specific linguistic data cannot be correlated directly with particular archaeological materials, especially at such an early time level; but the archaeological data independently indicate that human populations had arrived in areas now showing great linguistic diversification by at least 35,000 years ago.

Review of archaeological evidence for the time depth of New World linguistic diversity

At the present time the earliest definitely dated *in situ* archaeological evidence of human settlement in the Americas is known from two occupation sites in remote areas of South America, Toca do Boqueirão da Pedra Furada in northeast Brazil (Guidon 1984; 1986; Guidon & Delibrias 1986; Delibrias & Guidon 1986) and Monte Verde in south-central Chile (Dillehay 1984; 1986). Both these well-stratified occupation sites were carefully excavated and radiocarbon-dated. The dates extend back to approximately 33,000 years B.P.

Toca do Boqueirão da Pedra Furada, located at the mouth of a canyon near the town of São Raimundo Nonato in the state of Piaui, is a large rockshelter in a hard sandstone formation. First drawn to the site by spectacular panels of rock art, Guidon has carried out excavations from 1978 to the present (Guidon 1984; 1986; Guidon & Delibrias 1986; Delibrias & Guidon 1986). She has encountered a series of well-stratified occupation floors with hearths which yielded a long and consistent series of radiocarbon dates on charcoal ranging from 6,000 years B.P. to over 32,000 years B.P. In direct association with the hearths in the lower occupation levels of the site were numerous choppers and scrapers made on quartz pebbles, and flake tools of quartz or quartzite. There is also evidence for rock art. The assemblage from the lower occupation levels has been designated the Pedra Furada phase, with four substages. Excavations and analyses are continuing at this site.

Monte Verde, located about 30 km west of the town of Puerto Montt, has been the focus of intensive archaeological and paleo-environmental research from its discovery in 1976 up to the present time (Dillehay 1984; 1986). Materials of the upper occupation level have been preserved in waterlogged conditions directly under a peat bed: there are remains of at least nine contiguous rectangular houses with wooden foundations and skin covers; and numerous wooden artefacts, including wooden mortars, hafted stone tools, digging sticks, and a probable spear. The associated lithic industry is extremely simple (Collins & Dillehay 1986), with utilised fractured pebbles or utilised flakes most abundant, although a few grooved bolas stones and two large bifaces were also found. A diversity of edible plant remains, and shellfish, as well as a few mastodon and camelid bones, suggest a generalised foraging economy. The upper settlement at Monte Verde has been radiocarbon-dated approximately 13,000 years B.P. In 1984, while excavating a stratigraphic test pit on the periphery of the site area, an earlier occupation level was exposed in a known geological stratum two metres below the level of the upper settlement. To date, this zone has yielded over a dozen utilised stone flakes and several hammerstones, in association with charcoal which has been deated 33,370 ± 530 years B.P. (Beta-6754) and over 33,020 years B.P. (Beta-7825) (Dillehay 1986: 336). The radiocarbon age of this stratum is supported by the detailed geological and palynological research which has been carried out in this region of Chile.

The occupation sites of Toca do Boqueirão da Pedra Furada and Monte Verde indicate that people had moved well down the Pacific coast and probably also along the Caribbean and Atlantic coasts of South America before 33,000 years ago. Another reported early South American archaeological site, the cave of Pikimachay in central Peru, presents evidence suggesting penetration of the high Andes by 20,000 years ago (MacNeish 1979; 1981). In Pikimachay, lithic artefacts of the Paccaicasa complex were found in the lowest stratigraphic levels, compact silts, in association with remains of extinct fauna, including horse and giant ground sloth; and six bone fragments bear marks of human modification. The Paccaicasa lithic assemblage features simple choppers, scrapers, and flake tools, most made of the local tuff, but a few made of exotic stones. Radiocarbon dates of 20,050 ± 1,050 years B.P. (I-5851) and 19,650 ± 1,200 years B.P. (UCLA-1653A) were obtained on a bone from the Paccaicasa horizon. At a higher stratigraphic level in the consolidated silt deposits is a similar artefact assemblage termed the Ayacucho complex. Lithic artefacts are more numerous, and there are a few ground bone points. Remains of extinct fauna including sloth and horse are associated, and a radiocarbon date of 14,150 180 years B.P. (UCLA-1464) was obtained on bone from the Ayacucho horizon.

A possible Pleistocene archaeological site in Nicaragua is El Bosque, located in Esteli province not far from the Honduran border. Limited excavations were carried out at this site, preserved on a level area about 20 metres above a small creek, in 1975 and 1976 (Espinosa 1976; Gruhn 1977; 1978; Page 1978). The geomorphology of the site, detailed by Page (1978), is complex: it is a small remnant of a deep swamp deposit, probably of Late Pleistocene age. Fragmented bones of extinct taxa, including *Eremotherium* and *Mastodon*, were encountered; and radiocarbon analyses of the bone and associated carbonate deposits indicated an age greater than 32,000 years (Page 1978: 254–7). Associated with the bones were flaked pieces of jasper, which occurs downstream from the site; and there were several unexplained arrangements of bone fragments or pebbles (Gruhn 1978). To date the potential of the El Bosque Site has not been fully explored: only a limited area has been excavated, and no detailed analyses of the flaked stone or the distribution of bone elements have been done.

In Mexico three archaeological zones have produced radiocarbon dates older than 20,000 years B.P.: Valsequillo in the Valley of Puebla (Irwin-Williams 1967; 1978), Tlapacoya in the Valley of Mexico (Mirambell 1978), and El Cedral in the state of San Luis Potosí (Lorenzo & Mirambell 1986). Excavations were carried out in the Valsequillo area of Puebla during the 1960's; the area is now inundated by a reservoir. There is a radiocarbon date of 21,850 ± 850 years B.P. (W-1895) on shell associated with a stone scraper at the Caulapan locality. Steen-Macintyre *et al.* (1981) have postulated an age of greater than 250,000 years for the bone and artefact-bearing strata at other Valsequillo localities on the basis of fission-track and uranium series dates on bone, and correlation of weathered volcanic ash horizons in the Valsequillo area. The excavator, Irwin-Williams (1978; 1981), disagrees with their interpretation of the evidence; and does not believe the archaeological sites to be so old. Extinct fauna, including mastodon, horse, and camelid, are definitely associated with simple lithic artefacts at several stratified localities in the Valsequillo area, so a Pleistocene age is clearly indicated.

At Tlapacoya, broken bones of extinct fauna (including horse, camelid, and mammoth) were found in excavations from 1965 to 1973 on an ancient lake beach on a small volcanic island in the eastern Basin of Mexico. A stone-lined hearth (Mirambell 1978: fig. 2) and simple lithic artefacts were associated with the ancient beach. There is a radiocarbon date of 21,700 ± 500 years B.P. (I-4449) on charcoal from this hearth, and charcoal from another hearth on the ancient lake beach was dated 24,000 ± 4,000 years B.P. (A-749B).

El Cedral, in the northern part of the state of San Luis Potosi, was the site of an ancient spring, ephemeral lake, and swamp on different occasions during the Late Pleistocene (Lorenzo & Mirambell 1986). A cycle of lake deposition in moist periods and artesian spring activity in drier periods was documented for a period of over 40,000 years. Definite evidence of man in association with remains of extinct fauna including horse, camel, mammoth, mastodon, sloth and glyptodon was found in undisturbed sediments in excavations conducted from 1977 to 1980. Artefacts recovered include a discoidal scraper of chalcedony found *in situ* in a stratum dated 33,300 ± 2,700–1,800 years B.P. (GX-7684), and a modified horse bone found *in situ* in a stratum dated at 21,960 ± 540 years B.P. (I-10436). A hearth containing a concentration of charcoal encircled by proboscidean tarsal bones yielded a radiocarbon date of 31,850 ± 1,600 years B.P. (I-10438).

To date, no archaeological sites in the 20,000 year old range have been identified in the Gulf Coast area of the United States. The Pleistocene shoreline is now under water, part of the continental shelf. In Florida, even archaeological sites only 12,000 years old are now below the water table (Clausen *et al.* 1979). In interior Texas, near Dallas, excavations in the mid 1960's at the Lewisville Site produced evidence of several hearths and simple stone artefacts in river terrace deposits associated with remains of a variety of extinct fauna (Crook & Harris 1958; 1962). Radiocarbon dates greater than 37,000 years were obtained on the hearths. A Clovis point of obviously much younger age also found in association long rendered the site suspect; and new investigations of the site in 1980 have led Stanford (1982: 208–209; 1983: 70) to suggest that the archaeological materials are not 37,000 years old, but a description of Stanford's later investigations has not yet appeared.

Over the years many claims have been made for Pleistocene archaeological sites in California, and virtually all professional archaeologists have discounted them. Moratto (1984: 39–73) provides a concise description and critical discussion of most of the major sites. It is notable that very few of them have been thoroughly investigated by a professional archaeologist. One who has recently addressed the problem of the San Diego sites claimed to be of Pleistocene age—Texas Street (Carter 1957), Buchanan Canyon (Minshall 1976), and the Charles H. Brown Site (Minshall 1981)—is Brian Reeves, who carried out salvage excavations at the Mission Ridge Site, which appeared essentially similar in geomorphological antiquity and primitive artefact typology to Carter's and Minshall's sites. Reeves *et al.* (1986) concluded that the bulk of the lithics excavated at the Mission Ridge Site were naturally fractured but had been collected for their useful edges and brought to the site for utilisation by man. Fresh unrolled percussed flakes with eraillures, as well as a horse-hoof chopper, were considered the product of human workmanship on the site. Reeves generally supports the conclusions of Carter and Minshall; although the Mission Ridge Site was not directly datable, and Reeves can argue for a Late Pleistocene age only on the basis of unmatching typological comparisons with the local lithic industries known to be of Holocene age. At the Charles H. Brown Site, however, simple choppers and cores were found in cemented river gravels stratified on a high terrace remnant under a paleosol and Holocene artefact assemblages; and analysis of the paleosol and the geomorphology of the site by the geologist/pedologist Roy Shlemon indicates an early Wisconsinan dating for the river gravels (Minshall 1981).

The most controversial early site in California is the Calico Site (Leakey *et al.* 1968; Leakey *et al.* 1972; Schuiling 1979, Simpson *et al.* 1986). Most professional archaeologists have denied the artefactual nature of flaked stone found in deep excavations in this very ancient alluvial fan in the Mohave Desert (cf. Haynes 1973; Payen 1982); however, a few pieces carefully excavated at great depth must definitely be artefacts (Bryan 1978: 312–14), and recent analyses of flakes by the lithic expert Leland W. Patterson (preliminary report in Simpson *et al.* 1986) have demonstrated the presence of a large number of flakes with definite characteristics of human flaking. Archaeologists see the apparent great age of the site as an insurmountable problem. Bischoff *et al.* (1981) obtained a uranium-thorium date of approximately 200,000 years B.P. from a basal level in the excavations. A larger areal excavation with detailed geological analysis is essential to examine the possibility that the zone of flakes and artefacts is contained within inset beds in the ancient fan, and the dating is possibly not as early as has been suggested.

Certainly worthy of attention by professional archaeologists are the northern Channel Island localities reported by Orr (1956; 1964; 1968), Orr and Berger (1966), and Berger (1982). During periods of low sea level, the northern Channel Islands formed a single large island several kilometres from the mainland, and could have been reached by simple watercraft. With complete exploration of the islands over a 20-year period, Orr reported a number of exposures of Late Pleistocene terrestrial deposits (Tecolote Member) in which red lenses of sediment were associated with broken pygmy mammoth bones which he thought charred. Radiocarbon dates on associated carbonised wood ranged from greater than 40,000 years B.P. to about 11,000 years B.P. Simple but definite stone artefacts were also reported *in situ* in the upper part of the Tecolote Member. Recently chemical, X-ray diffraction, and magnetic analyses of samples of red lenses of sediment at two localities on Santa Cruz Island and one on Santa Rosa Island have indicated that the red colouration resulted from natural low temperature non-heating processes; and mammoth bones that Orr collected were found to be stained with dark minerals and not burned (Cushing *et al.* 1986). However, such analyses apparently were not carried out on any samples from the Woolley Mammoth Site on Santa Rosa Island, a site which produced definite stone artefacts in close association with broken mammoth bones in a red lens with carbonised wood (Berger 1982); so this site has not been disproven, nor has the presence of stone artefacts in island Pleistocene sediments been explained. Most archaeologists have considered the published data on the Channel Island sites inadequate to judge (Stanford 1983: 71; Moratto 1984: 59; Waters 1986: 132). Obviously professional archaeologists need to work at the Pleistocene localities on the islands.

During the early 1970's Emma Lou Davis directed an intensive project of palaeoenvironmental and archaeological research in the China Lake basin of the Mohave Desert (Davis 1978*a*; 1978*b*). In surface surveys and limited excavations, simple stone artefacts were found in ancient lakeshore or marsh environments associated with bones of Pleistocene fauna. Some surface assemblages of choppers, scrapers and flake tools were much more deeply weathered and patinated than Clovis-type projectile points and tools found in the same area; so a late Pleistocene age was argued, although it has remained unproven stratigraphically. The research of Davis has made an exceedingly important point: it is necessary to be able to locate reconstructable remnants of habitable Late Pleistocene landforms if Pleistocene archaeological sites are to be identified in the Americas (Davis 1986). One probable location for Pleistocene occupation is a high strandline of a pluvial lake: the East Rim Site, on an ancient shoreline of pluvial Lake Manix which has radiocarbon dates of 19,500 ± 500 years B.P. (LJ-269) and 19,300 ± 400 years B.P. (UCLA-121) on associated organic tufa, yielded a variety of simple lithic artefacts in subsurface deposits associated with a fossil pollen spectrum (pine, fir, grasses, marshland plants) which has been found only in other Mohave Desert core samples radiocarbon-dated between 37,000 and 22,000 years B.P. (Alsoszatai-Petheo 1975).

For California, then, possible archaeological sites of Pleistocene age have been reported; but few have been excavated by professionals, and none is generally accepted. Moratto comments, 'For some inexplicable reason, California has produced far more than its share of putative Early Man sites—most of which are easily disqualified' (Moratto 1984: 70). Considering the linguistic evidence for the great antiquity of the California population, sites not easily disqualified merit thorough professional investigation.

Summary and discussion

The model of earliest peopling of the Americas taking form in this article supports the idea that the first settlers in the New World entered along the north Pacific coast, probably following expansion along the southern edge of the Bering land bridge. The following scenario is hypothesised on the basis of the linguistic evidence. At the height of the last glaciation, populations on the Northwest Coast were restricted from movement far into the interior; it is likely that the ancestral Salishan group was the first coastal group to expand into the interior of southwestern Canada, following the Fraser River system as that area became deglaciated sometime after 12,000 years ago. Previously, other populations had moved farther south into western Washington and Oregon. Again, for a long time populations may have been concentrated west of the Cascades. The ancestral Sahaptin group expanded into the interior by following the Columbia river system, probably after the last Spokane Flood of 13,000 years ago; and possibly preceded by the Kutenai isolate. In California, the earliest populations may have remained west of the Sierras until people reached southern California. From the area of the present United States/Mexico border, human groups entered the Central American funnel. Early groups may have crossed the Isthmus of Tehuantepec and expanded north up the coast of the Gulf of Mexico (Rogers 1985*b*: 109). Eventually there may have been a three-pronged expansion from the Lower Central America bottleneck into South America, one line along the Caribbean and Atlantic coastlines, one line down the Pacific coast, and a third line down the east slopes of the Andes into Patagonia. The central and eastern United States may have been first populated in the Gulf Coast area, with subsequent expansion throughout the southeast and then north and west. The last major areas of the New World to be occupied in postglacial times were the previously glaciated interior subarctic areas in the northwest (by Athapaskans from the south Alaska coast) and in the northeast (by Algonquian speakers from the Great Lakes area). The archaeological evidence indicates a very long time frame for the development of the observable linguistic diversification, with much of South America being settled by at least 33,000 years ago; and settlement of the last areas, the deglaciated Subarctic as well as the far Subantarctic, underway by 12,000 years ago.

The model of earliest peopling via the coastline of North America fits the evidence of language distributions (and current archaeological data as well) much better than does the model of interior peopling via the ice-free corridor by migratory Clovis hunters no earlier than 12,000 years ago (Haynes 1969; 1980; Martin 1973; Mosiman & Martin 1975). There is simply no linguistic evidence in support of the notion that interior northern North America or the Great Plains were the earliest populated zones; indeed the linguistic evidence, as pointed out by Rogers (1985*a*; 1985*b*), indicates a relatively late expansion into these areas from the south. The point of dispersal of Algonquian is not Edmonton but the southern Great Lakes area (Siebert 1967). For the archaeological evidence, Fladmark (1979: 57) has remarked upon the fact that the oldest archaeological sites are not in the area of the ice-free corridor. With the elimination of the famous caribou tibia flesher, eastern Beringia, the Old Crow area of the Yukon, now offers only a few modified mammoth bones dated between 45,000 and 25,000 years ago (Nelson *et al.* 1986); then there is a temporal gap while lakes flooded the Old Crow area. A small lithic assemblage with a blade and burin in a loess deposit with a radiocarbon date of 15,550 ± 130 years B.P. (GSC-3053) on butchered mammoth bone at Bluefish Cave I (Cinq-Mars 1979; Morlan & Cinq-Mars 1982) may relate to the earliest entry of Athapaskans into the Yukon from interior Alaska. In the ice-free corridor itself, there is only a relatively late date of about 10,500 years B.P. for a fluted point in the stratified site of Charlie Lake Cave near Fort St John, B.C., (Fladmark *et al.* 1988), and a date of 9,570 ± 320 years B.P. (Gx-8808) for an excavation level just above fluted points in the stratified site of Sibbald Creek west of Calgary, Alberta (Gryba 1983). There is no evidence of the expected progression from the oldest archaeological sites to more recent sites as one moves directly south of the ice-free corridor in the interior of North America: quite the contrary.

Archaeologists will protest that the archaeological evidence presented in this article to argue for great time depth for human occupation of specific areas of the New World has not been validated. For only a very few sites mentioned have final detailed descriptive reports been published to date; and preliminary reports have been doubted, as with over fifty years of historical precedence the well-established Clovis model of earliest entry only 12,000 years ago will not easily be dislodged. Maintaining the Clovis model, however, requires that each and every New World archaeological site with evidence of an age greater than 12,000 years has to be dismissed; an increasingly difficult and lengthy task despite the strongest efforts (cf. Stanford 1982; 1983; Dincauze 1984; Owen

1984; Waters 1986). The early coastal entry model incorporates the data from Pleistocene sites with unspecialised lithic technologies into a comprehensible framework which is the most reasonable alternative to the Clovis model, given present archaeological data. Certainly early South American prehistory is explained. In South America there are at present known more than a dozen stratified archaeological sites radiocarbon-dated to the time range of the North American Clovis complex between 12,000 and 11,000 years B.P. or older (six are dated over 14,000 years B.P.), which have no technological relationship at all to the Clovis complex, but rather feature unspecialised lithic industries.[2] It is now very clear that the earliest settlers of South America were not big game hunters with a sophisticated Upper Palaeolithic technology. The early coastal entry model proposes that their remote ancestors did not pass through the rigours of Arctic Beringia but along the North Pacific coast, where a technology as limited as that of the ethnographic Yahgan of coastal Tierra del Fuego would have sufficed for adaptation and survival.[3] It is notable that in much of lowland South America unspecialised lithic technologies continued from the late Pleistocene into the ethnographic record. In contrast, in Holocene North America, sophisticated stone flaking technologies with 'diagnostic' projectile points became a dominant characteristic of lithic industries after 11,000 years ago. As a result many North American archaeologists do not recognise evidence of unspecialised, non-formal lithic or bone workmanship or utilisation; and Pleistocene archaeological sites with such technology may not be recognised.

Reference to language distributions to support the model of early coastal entry is based on the premiss that geographical areas occupied longer will show greater language diversification than areas more recently settled. Certainly other factors as well may influence the degree of language diversification in a given area. Exceptions to the general rule might be found in extensive areas occupied by small bands of hunters and collectors, as these societies are characterised by a flux in individual membership in particular bands over time, an adaptive factor contributing to maintenance of linguistic homogeneity over large areas (Shaul 1986). In regard to this explanation for the linguistic situation in the Subarctic, Rogers (1985*a*: 136) points out that the Athapaskan languages are more diversified than the Subarctic Algonquian, and he argues that it is no coincidence that the Northwest was deglaciated and probably populated before the Northeast.

One might also question whether there were special social factors or a high degree of ecological diversification which resulted in an unusually rapid diversification of languages on the Pacific Coast and the northern Gulf Coast of North America. Factors such as an extraordinary degree of ethnic isolation or extremely high population density which might greatly accelerate language diversification should be observable over the long term in the archaeological record for the Pacific Coast and the northern Gulf of Mexico coast; and the special factor demonstrable for those areas in marked contrast with all other areas of North America. Driver and Massey (1957: map 9) indicate that population density was high but not extreme (only 30–75 persons per 100 square kilometres) in the Pacific Coast area at the time of European contact, and the time depth of the situation of high population density has not been established. On the northern Gulf of Mexico coast, a relatively homogeneous environmental zone, population density at the time of contact was not high (12 to 30 persons per 100 square kilometres); and in the northeast Mexico/south Texas area, also a fairly homogeneous environment, population density was quite low (2 to 12 persons per 100 square kilometres), as low as in the Great Basin (Driver & Massey 1957: map 9); yet these areas featured marked language diversification. While the degree of ecological diversification and population density may well be factors in language diversification, not all cases in the New World can be explained solely by these factors.

The premiss that geographical areas occupied longer will show greater language diversification is perhaps best supported by example. A case particularly relevant to the settlement of the New World is the linguistic situation in Australia. As for the Americas, the southern island continent was long believed to have been initially settled only relatively recently, as (1) an advanced technology, in this case sophisticated watercraft, was believed necessary to pass the natural barrier to settlement, and (2) it was obvious from the absence of fossil hominid remains attributable to 'pre-*sapiens* man' that the entry had to be later than 20,000 years ago, the date commonly assigned to the presumed migration of *Homo sapiens sapiens* from an origin point in the Near East to Asia. So much for these *a priori* assumptions: the earliest radiocarbon-dated archaeological site in Australia (Upper Swan River) is placed at approximately 38,000 years B.P. (Pearce & Barbetti 1981); and human skeletal material of modern native Australian type has been dated at approximately 30,000 years B.P. at Pleistocene Lake Mungo in New South Wales (Bowler *et al.* 1970; Bowler & Thorne 1976).

Australian archaeologists now accept a date of at least 40,000 years ago for initial entry of the Aborigines (Flood 1983). The most likely route of entry was by boat across the Timor Straits, as during the low sea level of the last glaciation, the straits were only about 50 miles wide at maximum. Looking at language distributions in Australia (Gruhn 1980: fig. 1), one observes that the greatest diversification is found in northwestern Australia just opposite the Timor Straits. All Australian languages are believed to be very remotely related in a great Macro-Australian phylum (Wurm 1972). Of the twenty-eight phylic families comprising this macro-phylum, twenty-seven are concentrated in the northwest one-eights of the continent. The remaining phylic family, Pama-Nyungan, is distributed over the rest of the continent; but its greatest internal diversity is in the eastern part of Australia. The migration model derivable from the evidence of language distributions in Australia supports the hypothesis of Sandra Bowdler (1977) that the earliest settlers of Australia spread around the coast and up the major rivers of eastern Australia before a later expansion into the arid zone of central and western Australia.

Short of historical written records, there is no independent *linguistic* means of calculating the time of divergence of related languages in absolute terms. Glottochronology, developed in the early 1950s (Lees 1953), at first appeared promising; but severe problems with the basic premises and methodology soon became evident (Bergsland & Vogt 1962; van der Merwe 1966). The maximum time depth of divergence of New World languages calculated by Swadesh (1954) using glottochronology was only 86 centuries, and that in a doubtful comparison of an unspecified Salishan language with the Chimakuan language Quileute.

In reading speculations of linguists about the time depth of peoples in the New World, one usually comes upon a postulated age of 12,000 years. It was obtained from archaeologists who follow the Clovis model, and there is no linguistic basis for it. The archaeological evidence now suggests that much greater time depth is involved: *at least* 35,000 years and probably much more.

This article was written to collate recent data from diverse sources—drawn from Pleistocene studies, archaeological research, the ethnographic record, and historical linguistics—which together are now providing a basis for generating a new model of the circumstances under which the New World was initially populated. Ten years ago Fladmark, with an understanding of Pleistocene conditions in the Pacific Northwest, proposed the coastal entry model; but most archaeologists did not give the model serious consideration because there is no archaeological evidence—no really early site—in the Northwest Coast area. They have not thought of the linguistic evidence for the coastal route of entry. The comparative linguists for their part have not thought of the full implications of their data on the marked language diversification in the Pacific Coast area, Gulf Coast area, Central America and South America for the historical question of earliest population movements. It was Rogers (1985*a*; 1985*b*) who recently opened the question of the historical implications of North American language distributions, and this article is an expansion of his work.[4] The article has developed as well from personal knowledge of Late Pleistocene archaeological sites in Central America and South America, sites which demonstrate an unspecialised lithic technology and a generalised economy millennia before the development of the unique Clovis complex in southern North America.

The coastal entry model proposes that Pleistocene settlers were able to penetrate the New World by initially following the Pacific coast and exploiting littoral resources with a simple technology. The direct archaeological evidence —Pleistocene-dated human occupation sites—indicates that the earliest people to settle the Americas had a level of flaked stone technology more like the Lower Palaeolithic than the Upper Palaeolithic. All cultural development which followed, including the development of the Clovis complex and other specialised technologies, was the result of local indigenous evolution within the New World. The implications for our understanding of world cultural evolution and human cultural adaptation are tremendous, and anthropologists should begin to address the historical situation with the development of new theoretical models. Alan Bryan and I have made a start (Bryan and Gruhn n.d.*b*.), and we hope that other anthropologists will turn their talents to this research and analysis.

NOTES

An abridged version of this article was presented at the Great Basin Anthropological Conference in Las Vegas in October 1986. I am grateful to several colleagues for constructive criticism. Knut Fladmark, Roy Carlson and C. Melvin Aikens raised challenging questions; and Richard A. Rogers gently pointed out a major oversight. Alan Bryan suggested good points. I take full responsibility for the result.

[1] Interestingly, Elmendorf (1964) had published evidence for a very distant relationship between Yuchi, Siouan, and Yukian in California.

[2] The sites, with oldest radiocarbon dates noted, are Taima-taima, Venezuela, 13,000 ± 200 years

B.P. (Birm-802) (Bryan *et al.* 1978; Ochsenius & Gruhn 1979; Gruhn & Bryan 1984); El Abra, Colombia, 12,400 ± 160 years B.P. (GrN-5656) (Hurt *et al.* 1976); Tibitó, Colombia, 11,740 ± 110 years B.P. (GrN-9375) (Correal 1981; 1986); Pikimachay, Peru, 20,250 ± 1,050 years B.P. (I-5851) (MacNeish 1979; 1981); Tagua Tagua, Chile, 11,380 ± 320 years B.P. (Gx-1205) (Montané 1968); Monte Verde, Chile, 33,370 ± 530 years B.P. (Beta-6754) (Dillehay 1984; 1986); Los Toldos, Argentina, 12,600 ± 600 years B.P. (FRA-98) (Cardich *et al.* 1973; Cardich 1978); Alice Boër, Brazil, 14,200 ± 1,150 years B.P. (SI-1208) (Beltrão 1974; Bryan & Beltrão 1978; Beltrão *et al.* 1986); Lapa Vermelha, Brazil, 15,300 ± 400 years B.P. (Gif-3905) (Laming-Emperaire *et al.* 1975; Laming-Emperaire 1979; Prous 1986*a*; 1986*b*); Abrigo de Santana do Riacho, Brazil, 11,960 ± 250 years B.P. (Gif-5089) (Prous 1981; 1986*a*; 1986*b*); Lapa do Boquete, Brazil, 11,000 ± 1,000 years B.P. (Prous 1986*a*; 1986*b*); Toca do Boqueirão da Pedra Furada, Brazil, 32,160 ± 1,000 years B.P. (Gif-6653) (Guidon 1984; 1986; Guidon & Delibrias 1986; Delibrias & Guidon 1986); and Toca do Sitio do Meio, Brazil, 14,300 ± 400 years B.P. (Gif-5399) (Guidon 1984). The sites are summarised in Bryan and Gruhn n.d.*a*., and their significance discussed in Bryan 1983 and Bryan 1986.

[3] For a concise description of the habitat and technology of the Yahgan see Cooper (1946). For more detailed information consult the monograph by Gusinde (1937). The Yahgan survived in a harsh environment with dugout or bark canoes; brush shelters; untailored skin clothing; containers of bark, basketry, or netting; mussel shell scrapers; bone or wood spear points; wooden clubs; and a very simple lithic industry.

[4] I should also like to acknowledge the stimulus provided by Grover Krantz (1977), who proposed an explanatory historical model for language distributions in western North America assuming an ice-free corridor entry and migration of four major language phyla—Salisha, Penutian, Uto-Aztecan and Hokan—over specific mountain passes into the West, with positions later modified by a phase of depopulation of extensive areas during the hot dry Altithermal phase. In his analysis of geographic distributions Krantz does not take into account the distribution of the subdivisions of the major language phyla; and he must deny certain accepted language classifications: it is asserted that the Ritwan group must be Penutian; the Yukian group Hokan; and the Wakashan, Chimakuna, and Tsimshian groups Athapaskan. With all its flaws I cannot agree with Krantz's model, but I found his paper provocative of serious thought about the significance of language distributions in the far west.

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Preuves linguistiques soutenant l'hypothèse selon laquelle les premiers occupants du Nouveau Monde seraient arrivés par voie côtière

Résumé

Une étude des distributions des langues aborigènes vient étayer l'hypothèse de Knut Fladmark selon laquelle la route initiale empruntée par les tous premiers découvreurs du Nouveau Monde longeait la côte du Pacifique au lieu d'emprunter le couloir intérieur libre de glace. C'est sur la côte nord-ouest du Pacifique, en Californie, sur la côte septentrionale du Golfe du Mexique, en Amérique Centrale, et en Amérique du Sud que l'on observe la plus grande diversification des langues aborigènes, comme en témoigne le nombre de langues isolées et les principales subdivisions de phyles linguistiques. Un principe bien établi de linguistique historique veut que le développement de la diversification de la langue soit proportionnel à la durée de l'occupation humaine d'une région donnée. Une révision des évidences archéologiques issues de ces régions où la diversification des langues est la plus forte nous indique que l'occupation humaine de la plus grande partie des deux Amériques remonte au moins à 35,000 ans.