

America's Talk: The Great Divide

*Do Indian languages hold clues
to the peopling of the New World?*

By BRUCE BOWER

Talk about your land of plenty. From sea to shining sea, throughout North, Central and South America, linguists have harvested more than 1,500 native Indian languages – a cornucopia that dwarfs linguistic yields anywhere else in the world.

But in the last several years, linguists have found themselves embroiled in a heated debate over whether their discipline can decipher the roots of this bounty. Many claim the tools of linguistics are not, and may never be, up to the task. But standing across a great philosophical and methodological divide is a vocal minority who contend Indian languages fall into three or fewer ancestral groups that offer unique insight into the vexing question of who originally colonized the New World, and how.

The debate keenly interests archaeologists, who are increasingly apt to reject long-standing notions that humans first entered the New World around 12,000 years ago and who instead push those estimates back as far as 50,000 years ago. Archaeologists are warming to the theory that at least some of the first settlers traveled in water craft from Siberia across the Bering Straits and then down the Pacific Coast, rather than trekking through an ice-free inland corridor often cited as the main route into North America.

Much of the linguistic battle – waged in a number of recent publications and at the “Language and Prehistory in the Americas” conference held last March in Boulder, Colo. – concerns what type of evidence to use in establishing language relationships. Most researchers study a few languages at a time in search of “sound correspondences,” or different sounds consistently used in the same way. For instance, where an English word has the sound “th” as in “the,” German has a “d” as in “das” – just one of many clues that the two languages are related

but have undergone systematic changes since diverging from a common ancestral tongue. Linguists who study sound correspondences between two or more languages attempt to derive a “proto-language,” or general outline of how a mutual ancestral language must have sounded.

This approach splits North and South American Indian languages into about 155 families. Many, or even all, of these language groups may be distantly related, but current linguistic methods cannot dredge up the shared characteristics that would prove this, maintains linguist Lyle Campbell of Louisiana State University in Baton Rouge. Languages inevitably change over time for a variety of reasons, including borrowing or imitating of words and random deviations in geographically isolated languages. Such changes obscure historical relationships among languages after about 6,000 years, Campbell says.

“Linguistics currently doesn’t have much to say about the peopling of the Americas,” he contends.

Thus, Campbell and many of his colleagues express outrage at the methods and conclusions of a small band of linguists led by Joseph H. Greenberg of Stanford University. Greenberg’s group looks for shared characteristics in hundreds of languages that they maintain signify distant historical relationships among the welter of tongues. Of prime interest are words with similar sounds and meanings that, according to Greenberg, change slowly and rarely get borrowed, including pronouns, numerals and terms for body parts.

This technique, called mass comparison, encompasses more common sense than hard-nosed empirical science, Greenberg acknowledges. But he argues that linguists must group languages in this fashion before making the systematic analysis of sound correspondences fa-

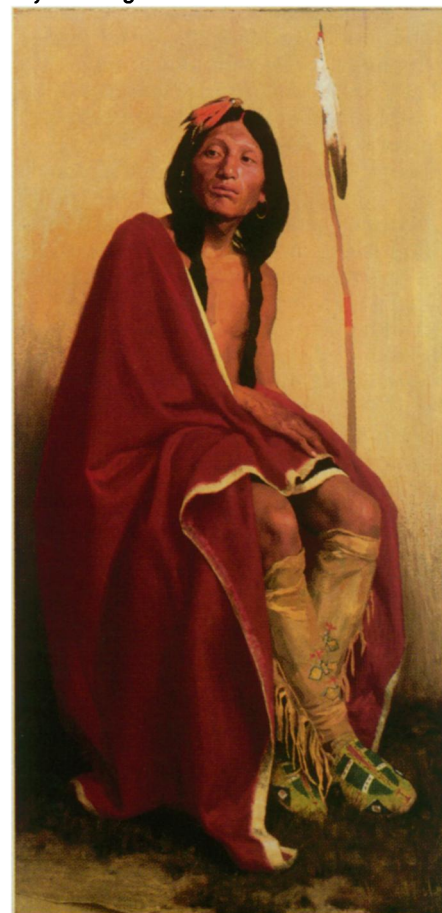
vored by Campbell and others. “You have to know what languages to compare to make sense of them with sound correspondences,” Greenberg says.

In *Language in the Americas* (1988, Stanford University Press), Greenberg describes his mass comparison of Indian vocabularies throughout the Americas. His conclusion: The bushels of New World languages coalesce into three language families, each with a common ancestral tongue. The largest family, dubbed Amerind, consists of all native South and Central American languages and most of those in North America. Amerind consists of 11 language subgroups, he says. Na-Dene, which includes Navajo, Apache and many Pacific Northwest languages, and Eskimo-Aleut round out his proposed trio of American language families.

Greenberg’s approach extends ideas proposed more than 75 years ago by anthropologist and linguist Edward Sapir. A renowned scholar who acknowledged that intuition played an important role in his work, Sapir identified six stocks of North American Indian languages and held out the possibility of reducing them to just three. Like Greenberg’s analysis, Sapir’s research evoked sharp criticism for its lack of scientific rigor.

Critics often castigate Greenberg’s use of pronoun similarities to promote the unity of Amerind – by far the most

“Elk-Foot of the Taos Tribe” was painted by E. Irving Couse circa 1909.



National Museum of American Art, gift of William T. Evans

controversial of his American linguistic families. Greenberg says the letter "n" is used in the same way in first-person pronouns and "m" is uniformly used in second-person pronouns in hundreds of Indian languages extending from southern Chile to British Columbia.

But he glosses over many American Indian tongues that lack this pronoun pattern, says linguist Ives Goddard of the Smithsonian Institution in Washington, D.C. Furthermore, the n/m pronoun pattern developed relatively recently in some languages, such as Cheyenne, and cannot be traced to a distant Amerind ancestor, Goddard says.

The same consonants show up in pronouns from languages throughout the world, not just in American Indian languages, according to Campbell. Primary units of grammar such as pronouns contain only a few commonplace consonant sounds, including "n" and "m," he observes. By simply browsing through a library for a half-hour, Campbell says he turned up 10 non-American languages with "n" and "m" pronouns.

Accidental or random convergences in sound and meaning also occur for words denoting numerals and body parts, Campbell says. Mass comparison based on these words winds up lumping all sorts of languages, including Finnish and Basque,

into the Amerind family, rendering the linguistic group meaningless, he asserts.

To drive the point home, Goddard refers to Greenberg's technique as "massive superficial comparisons."

Greenberg remains undeterred. He says his critics demand overly restrictive criteria for making mass comparisons that would deny the unity of even well-established major language families, such as Indo-European. Basic linguistic similarities that apply only to Indo-European languages become glaringly obvious in examining vocabulary lists, he notes. This principle must apply elsewhere, he maintains.

Greenberg and two colleagues argued in the December 1986 *CURRENT ANTHROPOLOGY* that the three American linguistic families identified by mass comparison coincide with dental and genetic evidence pointing to three waves of migration from northeast Asia to the New World. The initial migration consisted of Amerind speakers who came to North America around 12,000 years ago, the researchers concluded. This was the time when many archaeologists contend the so-called Clovis big-game hunters emerged from an ice-free pathway in western Canada. The Clovis

people, long regarded as North America's first settlers, draw their name from an archaeological site in Clovis, N.M., where their elegantly fashioned stone spear points were found amidst mammoth bones.

But Greenberg now says Amerind-speakers may have trekked into North America around 20,000 years ago. He notes that linguists cannot reconstruct the timing of language movements and that the "Clovis-was-first" theory now stands in considerable archaeological doubt.

"The Clovis culture was strictly a local North American phenomenon," says archaeologist Dennis Stanford of the Smithsonian Institution. "More and more of the 'Clovis-was-first' archaeologists are throwing in the towel."

Their change of heart is spurred by the continued unearthing of diverse cultural remains, not at all like those of Clovis folk, dating to at least 10,500 years ago throughout the Americas, from the eastern United States to Mexico, Argentina to the Amazon basin. Many non-Clovis artifacts were made from bone and wood by people who primarily foraged, rather than hunted, for food. Clovis people would have had to travel throughout the hemisphere at a dizzying pace and undergo tremendous cultural changes to

Tracking New World genes

Researchers are increasingly turning to genetic studies to test controversial claims of linguists such as Stanford's Joseph H. Greenberg. And even in the controlled confines of biochemical laboratories, divisions exist.

One study, presented in Miami at the March annual meeting of the American Association of Physical Anthropologists, revealed a surprising amount of variability in the mitochondrial DNA of 75 American Indians, most of whom belong to Pacific Northwest tribes. The analysis turned up 30 separate mitochondrial DNA lineages that extend back approximately 40,000 to 50,000 years, says study director Svante Pääbo of the University of California, Berkeley. Whereas Greenberg proposes three waves of migration to America, Pääbo says many more influxes would have been needed to fuel the observed genetic differences.

Mitochondrial DNA, inherited only from the mother, contains 37 fully mapped genes. For each subject, Pääbo and his co-workers isolated the chemical components of a specific section of mitochondrial DNA, called the d-loop, which changes rapidly through random mutations. The chemical substitutions occur fast enough to allow researchers to identify mitochondrial lineages arising within the past 100,000 years. A

controversial report in 1987 describing "mitochondrial Eve" — the proposed maternal ancestor of all modern humans, who lived in Africa around 200,000 years ago — was based on the analysis of more slowly changing segments of mitochondrial DNA.

Scientists have yet to pin down the average rate of change in the d-loop, says Rick H. Ward of the University of Utah in Salt Lake City, a participant in Pääbo's study. Thus, it remains unknown whether Pääbo's estimate of 40,000 to 50,000 years represents a minimum age for the origin of the Pacific Northwest mitochondrial lineages. Researchers continue to debate whether mitochondrial DNA change occurs constantly enough to serve as a molecular clock.

Each small group that migrated to North America undoubtedly already possessed a good deal of genetic diversity, Ward asserts. Analysis of mitochondrial DNA from modern populations in Siberia and China may clarify the amount of genetic variation carried to North America by early settlers, he says. "Linguistic and biological evolution may proceed at very different rates," Ward remarks.

However, a report published in 1988 by Luigi L. Cavalli-Sforza of Stanford University and his colleagues indicates

a close match between worldwide populations defined by the frequency of specific genes and language families, including the Amerind, Na-Dene and Eskimo-Aleut families described by Greenberg. Genes and languages evolve at roughly the same rate, Cavalli-Sforza's group contends.

Using a mathematical calculation of differences among 120 genes in 42 populations, the scientists estimate that humans first arrived in the New World around 35,000 years ago.

Cavalli-Sforza's study comes under heavy fire in the February *CURRENT ANTHROPOLOGY*. Several Smithsonian Institution researchers, including linguist Ives Goddard, assert that languages are extremely volatile and cannot possibly evolve at the same rate as genes do. Researchers may eventually agree upon rates of genetic change over time, but language evolves erratically in response to all sorts of political and social influences, Goddard and his coauthors argue. A "linguistic clock" is simply not ticking away, they conclude.

On a more optimistic note, Ward predicts that "the increasing use and refinement of molecular techniques to define genetic diversity within American Indian populations will ultimately allow us to evaluate claims based on linguistics."
— B. Bower

account for these finds.

Moreover, some South American sites date back farther than the earliest accepted Clovis dates in North America. Carbon-14 dating indicates a prehistoric camp in Monte Verde, Chile, is 13,000 years old. Some artifact-bearing sediment layers at Monte Verde may be more than 30,000 years old. Researchers recently assigned a comparable 30,000-year age to a rock shelter in northeastern Brazil, but both the Chilean and Brazilian evidence is controversial (SN: 6/28/86, p.405).

One scientific team is exploring the presumed pre-Clovis settlement of North America by combining linguistics with geography. Indian language groups range across all sorts of modern-day environments, but many of the language families correspond to geographic zones that existed during the peak of the last Ice Age, between 14,000 and 18,000 years ago, maintains archaeologist Richard A. Rogers of the Origins Research Institute in Des Moines, Iowa.

For such linguistic diversity to develop, speakers of the many languages must have lived in North America for a considerable time before the Ice Age apex, Rogers and his co-workers assert in the March *JOURNAL OF BIOGEOGRAPHY*. Since the languages with the most disparate features (requiring a longer time period to diversify) bunch along the Pacific Coast, the earliest native Americans probably settled there first, they add.

Rogers says the link between language and Ice Age geographic zones — which several scientific groups have reconstructed from the analysis of fossil pollen, ice cores and animal remains — will not resolve the debate over Greenberg's classifications. Indian language groups originally may not have been distinct from one another as Greenberg holds; instead, they may have taken shape in New World populations geographically separated by ancient glaciers, Rogers asserts. Languages in the proposed Amerind group cut across several environmental regions created during the last glacial maximum. Early inhabitants may often have borrowed and transferred words across the boundaries of those regions, Rogers notes.

He and his co-workers find that North American Indian language families accepted by most linguists fall rather neatly into geographic zones that existed during the Ice Age.

The Indian languages in the Algonquin family lie within one such zone, a strip running from modern-day Montana to the East Coast. This relatively cold region was heavily forested and inhabited by creatures such as the woodland musk-ox, stag moose and giant beaver.

The Gulf language family took root in the tropical forests that covered much of

what now constitutes the southeastern United States. The area was a breeding ground for the capybara, giant armadillo and small tropical cats.

A transition zone between the two forested environments served as home to speakers of the Siouan, Iroquoian and Caddoan language groups. Another language family, Aztec-Tonoan, arose in a dry savanna that covered much of the western half of the United States and northern Mexico. Penutian languages correspond to conifer forests that blanketed the Pacific Northwest, and the Eskimo-Aleut group lies within what was then Alaska's ice-free tundra.

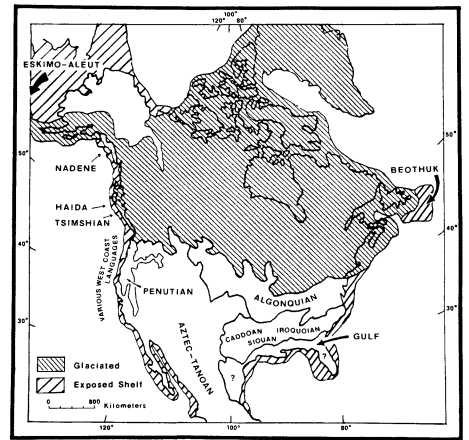
A few languages and small language groups, such as Na-Dene, sprang up in ice-free coastal areas and are not clearly related to any larger linguistic families, Rogers says. Until the Ice Age ended 10,000 years ago, those groups probably remained isolated from other New World settlers, he contends.

Archaeologist Ruth Gruhn of the University of Alberta in Edmonton says the Ice Age evidence and ongoing excavations of pre-Clovis sites suggest that a single population — speaking a language ancestral to all three of Greenberg's language groups — crossed the Bering Straits around 50,000 years ago. These New World pioneers, representing a marine culture, traveled by water all the way down the Pacific Coast to South America before heading inland, Gruhn maintains.

A few other archaeologists have advocated the coastal-entry scenario over the past 25 years (SN: 3/12/88, p.164). A major problem, however, hampers this hypothesis. If early settlers camped along the Pacific Coast, anything they left behind was submerged when the sea level rose as continental glaciers melted. Finding a coastal site dating to between 30,000 and 60,000 years ago "would be truly incredible luck," Gruhn concedes.

"Gruhn's theory is feasible, but it's not supported by good archaeological evidence," says Stanford, the Smithsonian archaeologist. He suspects a series of migrations or "pulses of population movement" spread into the New World at least 24,000 years ago. In his scenario, the hardy travelers probably took both coastal and inland routes.

Greater linguistic diversity in the West does not necessarily indicate that the Pacific Coast was the first home of New World settlers, adds Smithsonian linguist Goddard. The profusion of West Coast tongues may reflect a historical accident, Goddard argues. Eastern languages could easily have been as abundant as those in the West, but probably dwindled due to disease and warfare soon after European settlers reached the East Coast in the 16th century, he says. Sheer geographic luck may have preserved a



Map shows proposed distribution of North American Indian languages and language families during the last glacial maximum, between 14,000 and 18,000 years ago. Archaeologist Richard Rogers and his colleagues say the linguistic groups fall within different Ice Age geographic zones.

greater number of western languages long enough for study by linguists.

Analysis of the small number of known language families in eastern North America demonstrates they are no more than 5,000 years old, and their distribution had little to do with Ice Age geography or the entrance of the earliest humans to the New World, Goddard says.

Furthermore, variations in language characteristics suggest the Eskimo-Aleut languages that now stretch across northern Canada are no older than about 3,000 years, he points out.

Linguistic diversity likely characterizes most coastal regions, not just the Pacific Coast, observes Campbell of Louisiana State. The year-round protein sources along seacoasts are usually exploited by small, relatively isolated groups in which language variations proliferate, he argues.

Given the complex twists and turns taken by languages, the survival of words or sounds signifying shared, ancient language families and their geographic origins seems quite unlikely, Goddard says. "I don't think we really know what a population migration is or how it shows up in the ground and in language," he maintains. "What is known is that at some point many different, unrelated linguistic entities came into the New World."

Most American Indian language specialists agree with Goddard, taking a dim view of efforts to understand the peopling of the Americas through linguistics, and heaping particular scorn on Greenberg's work. Meanwhile, the Stanford investigator and his supporters defiantly dig in their heels. And for now, no bridges span the great divide. □