

## *Phonetic Clues Hint Language Is Africa-Born*

By Nicholas Wade

April 14, 2011

A researcher analyzing the sounds in languages spoken around the world has detected an ancient signal that points to southern Africa as the place where modern human language originated.

The finding fits well with the evidence from fossil skulls and DNA that modern humans originated in Africa. It also implies, though does not prove, that modern language originated only once, an issue of considerable controversy among linguists.

The detection of such an ancient signal in language is surprising. Because words change so rapidly, many linguists think that languages cannot be traced very far back in time. The oldest language tree so far reconstructed, that of the Indo-European family, which includes English, goes back 9,000 years at most.

Quentin D. Atkinson, a biologist at the University of Auckland in New Zealand, has shattered this time barrier, if his claim is correct, by looking not at words but at phonemes — the consonants, vowels and tones that are the simplest elements of language. Dr. Atkinson, an expert at applying mathematical methods to linguistics, has found a simple but striking pattern in some 500 languages spoken throughout the world: A language area uses fewer phonemes the farther that early humans had to travel from Africa to reach it.

Some of the click-using languages of Africa have more than 100 phonemes, whereas Hawaiian, toward the far end of the human migration route out of Africa, has only 13. English has about 45 phonemes.

This pattern of decreasing diversity with distance, similar to the well-established decrease in genetic diversity with distance from Africa, implies that the origin of modern human language is in the region of southwestern Africa, Dr. Atkinson says in an article published on Thursday in the journal *Science*.

Language is at least 50,000 years old, the date that modern humans dispersed from Africa, and some experts say it is at least 100,000 years old. Dr. Atkinson, if his work is correct, is picking up a distant echo from this far back in time.

Linguists tend to dismiss any claims to have found traces of language older than 10,000 years, “but this paper comes closest to convincing me that this type of research is possible,” said Martin Haspelmath, a linguist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany.

Dr. Atkinson is one of several biologists who have started applying to historical linguistics the sophisticated statistical methods developed for constructing genetic trees based on DNA sequences. These efforts have been regarded with suspicion by some linguists.

In 2003 Dr. Atkinson and Russell Gray, another biologist at the University of Auckland, reconstructed the tree of Indo-European languages with a DNA tree-drawing method called Bayesian phylogeny. The tree indicated that Indo-European was much older than historical linguists had estimated and hence favored the theory that the language family had diversified with the spread of agriculture some 10,000 years ago, not with a military invasion by steppe people some 6,000 years ago, the idea favored by most historical linguists.

“We’re uneasy about mathematical modeling that we don’t understand juxtaposed to philological modeling that we do understand,” Brian D. Joseph, a linguist at Ohio State University, said about the Indo-European tree. But he thinks that linguists may be more willing to accept Dr. Atkinson’s new article because it does not conflict with any established area of linguistic scholarship.

“I think we ought to take this seriously, although there are some who will dismiss it out of hand,” Dr. Joseph said.

Another linguist, Donald A. Ringe of the University of Pennsylvania, said, “It’s too early to tell if Atkinson’s idea is correct, but if so, it’s one of the most interesting articles in historical linguistics that I’ve seen in a decade.”

Dr. Atkinson's finding fits with other evidence about the origins of language. The Bushmen of the Kalahari Desert belong to one of the earliest branches of the genetic tree based on human mitochondrial DNA. Their languages belong to a family known as Khoisan and include many click sounds, which seem to be a very ancient feature of language. And they live in southern Africa, which Dr. Atkinson's calculations point to as the origin of language. But whether Khoisan is closest to some ancestral form of language "is not something my method can speak to," Dr. Atkinson said.

His study was prompted by a recent finding that the number of phonemes in a language increases with the number of people who speak it. This gave him the idea that phoneme diversity would increase as a population grew, but would fall again when a small group split off and migrated away from the parent group.

Such a continual budding process, which is the way the first modern humans expanded around the world, is known to produce what biologists call a serial founder effect. Each time a smaller group moves away, there is a reduction in its genetic diversity. The reduction in phonemic diversity over increasing distances from Africa, as seen by Dr. Atkinson, parallels the reduction in genetic diversity already recorded by biologists.

For either kind of reduction in diversity to occur, the population budding process must be rapid, or diversity will build up again. This implies that the human expansion out of Africa was very rapid at each stage. The acquisition of modern language, or the technology it made possible, may have prompted the expansion, Dr. Atkinson said.

"What's so remarkable about this work is that it shows language doesn't change all that fast — it retains a signal of its ancestry over tens of thousands of years," said Mark Pagel, a biologist at the University of Reading in England who advised Dr. Atkinson.

Dr. Pagel sees language as central to human expansion across the globe.

"Language was our secret weapon, and as soon we got language we became a really dangerous species," he said.

In the wake of modern human expansion, archaic human species like the Neanderthals were wiped out and large species of game, fossil evidence shows, fell into extinction on every continent shortly after the arrival of modern humans.

A version of this article appears in print on , Section A, Page 1 of the New York edition with the headline: Phonetic Clues Hint Language Is Africa-Born