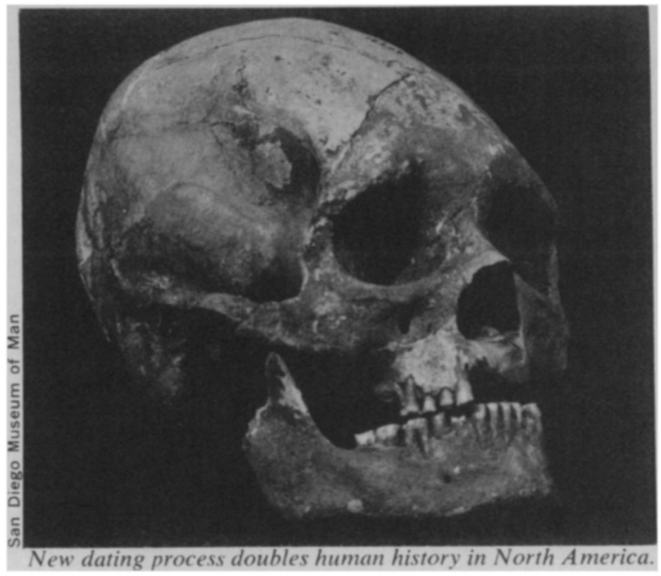
Archaeology: Right in your own back yard

Amino-acid dating technique suggests human habitation of North America almost 50,000 years ago



New dating process doubles human history in North America.

Exciting things are happening in archaeology in Africa, Asia and Europe. Every summer thousands of students, teachers and professional archaeologists pack up their picks and shovels and go half way around the world in search of the secrets of the past. Every fall they come back with bits and pieces of one of the most interesting of all scientific puzzles—the history of the human race. But one whole area of this puzzle has gone almost unworked. Compared to what is going on in other parts of the world, North American archaeology is a relatively unopened field. Things are happening, however, that could awaken interest in the prehistory of America.

Almost two years ago Jeffrey L. Bada, a geochemist at the Scripps Institution of Oceanography in San Diego, described a promising process for dating fossils that could not be dated by the carbon-14 method. The process is based on the fact that amino acids can exist in two mirror-image forms, left- and right-handed or L- and D-isomers. Only the L-isomers are found in living protein, but after an organism dies the amino acids slowly change to the D-form. The process of change, known as racemization, continues until the ratio of left- to right-handed molecules is one to one. This ratio can be measured and the age of an organism can be calculated. And because the racemization process can take hundreds of thousands of years, fossils can be dated that are too old (more than 40,000 years) to be dated by the carbon-14 process.

The amino-acid process has one drawback. The temperature of the environment influences the rate of racemization. The hotter the climate, the faster the rate. But Bada has calibrated for the temperature factor by comparing amino-acid dates with carbon-14 dates from fossils that existed in similar climatic conditions. He has double checked his calculations on specimens from California and East Africa and is now "fine tuning" the accuracy of the technique.

George Carter of Texas A & M University has worked at archaeological sites in the San Diego area and has suggested that humans may have lived there 100,000 years ago. But this age is based on hard-to-date artifacts, not on human fossils. When Carter heard of Bada's dating process, he asked him to use it on some ancient human fossils found in the San Diego area.

Bada, Carter and Roy A. Schroeder of Scripps report in the May 17 SCIENCE that some of the fossils, including an intact skull, are about 48,000 years old. No North American human fossils have been previously dated at that extreme an age. Ancient artifacts have suggested such a date (SN: 5/26/73, p. 337), but 20,000 years is the usually accepted date for humans in America. It was about 20,000 years ago, during the last Ice Age, that sea levels were low enough to make a land bridge of the Bering Strait. If Bada's date is correct, human nomads could have come to America during a previous Ice Age, 70,000 years ago or perhaps even 140,000 years ago. Such dates are much more provocative and exciting to contemplate than a mere 20,000 years. They may even stir some new interest in the study of American antiquity.

The lack of such interest is evidenced by the very skull that is now receiving increased attention. It and other fossils were discovered in the 1920's by Malcolm J. Rogers of the San Diego Museum of Man. They were roughly dated at about 20,000 years by geological methods and then stored away in the museum. They were thought to be anthropologically insignificant.

The tag of "insignificant" has been applied to much North American anthropology and archaeology. This may be due to what Stuart Streuver calls the "King Tut's Tomb image." Streuver, of Northwestern University, is in charge of the excavation of a large site on the Koster farm in southwestern Illinois (SN: 2/2/74, p. 74). He and many others consider the Koster site to be one of the most important ongoing digs in the United States, but he can't even get enough funding to keep the site operating through this summer. Why? The Tut's Tomb image is one reason. Many people, including the philanthropical community, says Streuver, believe that archaeology is important only if it is uncovering golden temples and vast riches. Another reason is that many people believe "the older the better." The Koster site only goes back to about 12,000 years.

Early North American cultures are also taken lightly, says Streuver, because they didn't achieve what is believed to be a high level of civilization. They were unsuccessful cultures. They built no pyramids. Why study them? And to make matters worse, the archaeological community does little in the way of explaining why such cultures should be studied.

Streuver hopes that such attitudes can be changed. Unsuccessful cultures are as important and interesting as successful ones. They contain information that can generate laws and principles of the growth and decay of cultures—past, present and future. But this information will not be uncovered as long as there is nothing more than a superficial interest in American antiquity. A discovery such as that reported by Bada, Schroeder and Carter is important but it may be doubly important if it can light a fire under archaeology in North America. □