

## Radiocarbon Dates

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Radiocarbon datings of objects taken from the famous La Brea Tar Pits have been made at the University of California's Scripps Institution of Oceanography.

Dated were some of the tar itself, a piece of a tree trunk, and a man-made object--a wooden dart point--all submitted by Hildegard Howard, Chief Curator of Science at the Los Angeles County Museum.

The results show that the tar is more than 28,000 years old, older than the carbon 14 technique can measure. The tree was preserved by the erupting tar about 14,000 years ago, toward the end of the Ice Age, when sabre-toothed tigers and other giant mammals now extinct prowled the moist, cool plains of Los Angeles. The dart point was fashioned about 2,500 years before the birth of Christ.

The La Jolla Radiocarbon Laboratory, in which the work was performed, is directed by Hans E. Suess, Professor of Geochemistry. Its work is supported in part by the Atomic Energy Commission, the National Science Foundation, and the University of California's Water Resources Center.

The carbon 14 method was developed several years ago by Willard F. Libby, now a Professor of Chemistry at the University of California, Los Angeles. It consists of measuring the amount of radioactive carbon--carbon 14--in a sample as compared to ordinary carbon. Carbon 14 occurs naturally in small quantities in the air we breathe and is taken in by all plants and animals. It decays into ordinary carbon. The rate of decay is known. Thus by measuring the proportions of the two isotopes, it is possible to "date" objects containing carbon. The technique has proved a powerful tool for the study of past climates and civilizations.

Among the samples tested at Scripps were several from primitive Indian villages or camp sites along the California and Baja California coasts. They help both to date Indian cultures and to draw a picture of what the weather was like in the past. Other samples came from near the Salton Sea, where only a few hundred years ago a vast fresh-water lake covered much of the Imperial Valley. A few samples from other regions in North America have also been dated.

For several years Carl L. Hubbs, Professor of Marine Biology at Scripps, has conducted a study of shells and charcoal from middens along the California and Baja California coasts. The Indians ate abalone and other shellfish. Fortunately for archaeologists, they threw aside the shells to form middens. From these same middens come fragments of charcoal from ancient campfires, as well as shells.

Both charcoal and shells can be dated by carbon 14 methods. The shells offer still other keys to the past. For one thing, Hubbs can identify the species of animals and compare them with those found in the same nearby seas today. It frequently happens that the Indians ate shellfish no longer found in that area, but only in the cooler seas hundreds of miles to the north. Another clue to the past is offered by the ratios of the amounts of two kinds of oxygen in the shells. These, oxygen 16--ordinary oxygen--and oxygen 18, vary according to the temperature of the waters in which the shells were formed. Thus the temperature patterns of the coastal waters in the past can be drawn and from this the land temperatures inferred.

From such evidence, and from other indications, Hubbs has determined that a prolonged "cold spell" hit the Southwest about 800 A.D., and lasted perhaps ten centuries before the coming of the Spaniards. The sea was cooler, the weather rainier. There was water enough to support thousands of roving Indians in a region where only a handful of humans can live today. Rain fell throughout the year instead of seasonally.