

ARCHAEOLOGY-NUCLEAR PHYSICS

# New Age for American Man

**A radiocarbon calendar for the past 20,000 years devised by Libby and Arnold shows by the dating of woven rope sandals the oldest evidence for man in America.**

► **WOVEN** rope sandals found in a lava-covered Oregon cave become the oldest articles associated with man in the Americas as the result of the radiocarbon atomic calendar presented to National Academy of Sciences recently by Dr. Willard F. Libby and Dr. James R. Arnold of the University of Chicago's Institute of Nuclear Studies.

These sandals are approximately 9,000 years old. The ancient Americans who wove them and wore them become the oldest proved inhabitants of this continent, dating back to 7000 B.C. This probably antedates the oldest agricultural village in Iraq, which the radiocarbon dating of shells found there, also reported, show to be at least of the period 5000 B.C.

The greatest upset in American antiquity resulting from the radiocarbon dating is in the age of charcoal from a fire-pit presumably associated with Folsom man, to whom ages of from 10,000 to 20,000 years had been assigned. Dr. Libby's very sensitive Geiger-type counter showed the "surprisingly young" average age of about 4,300 years.

This makes the Folsom inhabitants actually more recent than people who built fires in Frontenac and Lamoka regions of New York State about 5,000 years ago, by the radiocarbon dating. The oldest Indian mounds in Kentucky have about this same age, as shown by analysis of shells and deer antlers. These are the oldest evidence of human beings in eastern America.

The method of radiocarbon dating is based upon the determination of the amount of radiocarbon or carbon 14 in the organic material being tested. This radioactive carbon is created in the upper atmosphere when cosmic rays strike the hearts or nuclei of nitrogen atoms. Some of this carbon reaches earth and is absorbed through food and water by plants and animals during their lifetime.

The radioactivity is lost at a constant rate, half of it disappearing in 5,568 years with a possible error of 30 years in this half-life of C 14. The amount of radiocarbon in the organic remains thus provides an index to the date that they were formed. The method is accurate to within approximately a hundred years. All but a minute amount of radiocarbon is gone after 25,000 years and the Libby method can not date objects beyond that span.

Some 300 organic objects were selected about a year and a half ago by a committee of experts as most significant for dating and Dr. Libby reports now on 159 of these.

In each case a minimum of an ounce of material is necessary. Refined methods of chemical separation are needed to obtain the radiocarbon which is counted over a period of 48 hours.

The Ice Age of the U. S. Middle West was more recent than generally estimated by geologists. Instead of being 20,000 years ago, the radiocarbon evidence shows that it was 12,000 years ago. The glacial epoch was apparently contemporaneous in Europe, for samples from Ireland, England and Germany agree closely with the Wisconsin dating of the final phase of the ice cap.

Man's first proven existence in North America was 10,000 years ago, shortly after the glaciers receded. These first known humans were in Oregon and Nevada, and there is no evidence of man on the east coast until 5,000 years later.

The giant sloth lived in Gypsum Cave, Las Vegas, Nev., about 10,500 years ago, as analysis of its dung shows. Presumably man there was contemporaneous.

A fishweir unearched three years ago in Boylston Street, Boston, is believed to be about 5,000 years old, contemporaneous with the record-age discoveries in New York State and Kentucky, judging by analyses of the peat underlying and the wood overlying it.

Wood from Egyptian tombs, a funeral ship and a mummy case gave age figures in general agreement with the dates from the historical records 2,000 to 4,000 years ago. Other tests show that in 4,000 B.C. Egypt had a simple village and agricultural culture. By 3,000 B.C. it had its first dynasty and only 300 years later the first pyramid building began.

Mexico was inhabited at least 7,000 years ago by people who produced crude carvings. The famous Pyramid of the Sun near Mexico City is dated by Dr. Libby at 300 B.C. The temples of Monte Alban at Oaxaca in southern Mexico are dated to 600 B.C.

Burned bones of giant sloths, horses and the camel-like guanaco which were associated with human bones and artifacts in Chile at the tip of South America were dated as about 8,500 years old. These are the most ancient of the human samples from South America and contemporaneous with the Gypsum cave culture in North America.

Crater Lake in Oregon is dated as 6,500 years ago by an analysis of remains of trees killed by flowing lava from the volcanic explosion that created it.



**SMOG SAMPLER**—The improved electrostatic sampler is used to trap all types of dusts, fumes and smoke in atmosphere. The instrument will be an important tool for investigation of air pollution causes by health officials and industrial hygienists. (See Next Page.)

Charcoal from the famous Lascaux cave in the Dordogne, France, which has remarkable paintings made by early man in Europe is dated as about 15,000 years old.

All of Dr. Libby's dates are given in

detail with the findings of individual samples and their averages, each with a probable error that runs several hundred years in most cases.

Science News Letter, October 14, 1950

## CHEMISTRY

# Cheaper Sulfuric Acid

➤ AN EASIER, cheaper way of making sulfuric acid, extensively used in vast quantities for many industrial processes, is promised by a new method revealed in New York by the Chemical Construction Corporation.

Some 10,000,000 tons of the acid are used each year in the United States. The fertilizer industry is the largest consumer but hundreds of other manufacturing processes are dependent upon it. Sulfuric acid is a very active chemical compound composed of sulfur, hydrogen and oxygen.

The new way to make this acid is said by the developers to eliminate seven major items of equipment used in present processes. The new design is much simpler than the conventional contact process and represents a saving of about 25% of the present capital cost of an erected, medium-sized acid plant in this country.

In the manufacture of sulfuric acid, sulfur dioxide, obtained by the combustion of sulfur or roasting a sulfide, is converted into sulfur trioxide. A catalyst is used to aid the chemical reaction. The catalytic oxidation in the new process is carried out in four successive stages. Temperature control is effected by admitting cold air between these stages.

Sulfur trioxide absorbed in and chemically united with water becomes sulfuric acid. At one stage in the new process the sulfur compound is in the form of a fine mist. This is used to enrich weak acid in a venturi tube. Turbulent currents in the mist mix the materials and hurry their combination. Large amounts of heat given

off by the combining chemicals evaporate the excess water. Acid up to 95% strength can be achieved economically by the new method.

Science News Letter, October 14, 1950

## CHEMISTRY

# Collector Determines Air Pollution

➤ DANGEROUS substances in the air, such as those sometimes found near certain manufacturing plants, can be easily collected for analysis with a new device developed in Pittsburgh by Mine Safety Appliances Company. It is usable also in mines and highway tunnels where air pollution often exists.

It is a timely development now that the public is awakened to the dangers that may come from air pollution from modern manufacturing methods. The smog tragedy at Donora, Pa., which took 21 lives, greatly hurried this awakening. Among the first users of this new sampling equipment were the men of the U. S. Public Health Service who reported their investigations of the Donora air conditions a year ago.

This device utilizes what scientists know as electrostatic precipitation. Air passing through a sampling tube is bombarded by electrons from an ionizing electrode. All particles in the air are given a negative electric charge by the electrons. Then they are attracted to a positively grounded aluminum collecting tube. In the laboratory the particles are removed and analyzed.

The sampling head of this equipment, weighing only four pounds, is self-contained and resembles a small hair-dryer. In the head is a blower that provides a constant flow of three cubic feet of air per minute. The head also contains the ionizing electrode and the aluminum collecting tube which fits around the electrode. Power is by cable from an electric outlet or portable generator. The current is rectified through a voltage doubling circuit using two electronic tubes.

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# Question Box

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