ARCHAEOLOGY

An American "Iron Age"?

Iron objects found in prehistoric sites in this country have raised the question did America have iron before Columbus?

➤ DID pre-Columbian "First Families" of Virginia and Ohio know how to smelt iron and make nails, horseshoes and tools of iron?

The controversial question of Viking discovery and penetration of America is raised anew by chemical, spectrographic and metallographic study of iron objects found in prehistoric sites near Clarkesville, Va., and in the mounds near Columbus, Ohio.

Composition of the iron, the method of carburizing the outer surface, as well as the way of forming the implements make some experts feel sure that they are not of modern manufacture.

Interested in determining just how ancient these iron objects may be is Capt. A. H. Mallery, Washington industrial engineer, who has devoted a large share of his time for many years to the pursuit of his hobby, which is tracing evidence for Viking and perhaps even earlier cultures in America before the time of Columbus.

Capt. Mallery, who has skippered ships in northern waters, has collected specimens of ancient iron from Greenland, Labrador, Newfoundland, as well as from Virginia and from the Ohio mounds.

Samples of this material have been sent by Capt. Mallery to the National Bureau of Standards and to Battelle Memorial Institute, Columbus, Ohio, for metallurgical study. Experts at both the National Bureau of Standards and at Battelle have found that the specimens are definitely not modern, although it is difficult to assign a precise date to them because no articles of comparable antiquity of known date are available for comparison.

Dr. George A. Ellinger of the National Bureau of Standards believes the specimens found in the Ohio mounds to be definitely pre-colonial. Dr. A. M. Hall, of Battelle, found that a shovel from Ohio that he tested was not modern; it could be of colonial times or it could be older. A mineral coating formed on the surface of the tool as result of the soil in which it lay buried could account for its having been preserved for a great length of time, Dr. J. C. De Haven, of Battelle, said.

The Virginia site was found when archaeologists of the River Basin Surveys of the Smithsonian Institution combed over the area in southern Virginia and northern North Carolina to salvage any possible archaeological remains before the area should be flooded by the Buggs Island Reservoir and dam.

Stone points were found there that were made by a Folsom culture people. These points were like those found in the western part of the United States and believed to be 10,000 years old.

In the same area there were found scattered over considerable land, bits of iron, nails, horseshoes, hinge fragments and occasional tools. One specimen from this find was submitted by the Smithsonian to Dr. Ellinger for evaluation. Detailed study revealed that it was not made within the last 200 years.

Early history of the region does not reveal any mention of a colonial iron furnace or smelter there, the report states.

Later, Capt. Mallery, digging on the same site, unearthed an ancient iron furnace of a design which he says was like one found in Belgium that dates back to the time of the Romans. In the Virginia furnace he found slag and about 40 pounds of iron fragments which he found to be similar to those found in and near the Folsom sites by J. V. Howe, gunsmith who lives on the site, in connection with the Smithsonian study.

Analysis of the slag, Capt. Mallery reports, shows a 60% iron content, pointing to the antiquity of the methods used. Modern and colonial slag contains less than one half of one per cent of unrecovered iron, he says.

Capt. Mallery has compared the nails found on the Virginia Folsom site with iron nails dug up at the old Jamestown colonial settlement. They differ markedly in shape, he reports. On the other hand he finds them markedly like the rivets used by Vikings for holding together the oak planks forming the hulls of their boats. They are of a soft iron that could be hammered cold because hot iron would set fire to the wood and make the rivet loose. Similar nails, he says, were recovered from the so-called Oseberg ship which is dated at 600 A.D.

The finding of this ancient iron opens up the whole question of whether America did have an "Iron Age" before the Spanish and English colonists brought iron tools and weapons with them to the New World. Archaeologists have long believed that iron was unknown on this continent in pre-Columbian days.

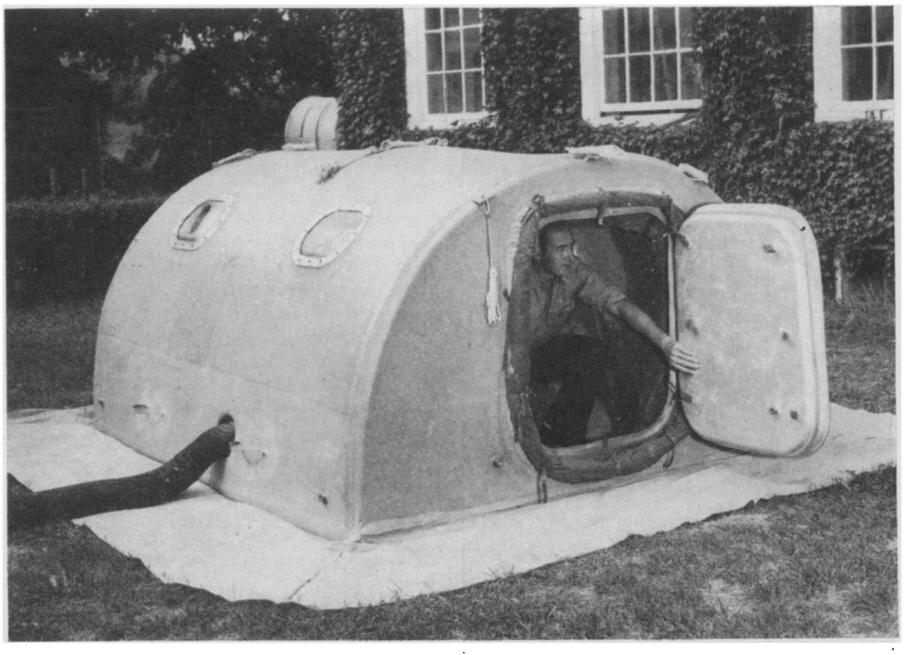
Science News Letter, November 12, 1949

ENGINEERING

Air Pressure, Not Braces, Support Quonset Hut

➤ A FOUR-MAN quonset hut, for use by stranded airmen in the Arctic, is made of cotton fabric, has no frame but can be put up with a hand air pump, it was revealed at Wright-Patterson Air Force Base, Dayton, Ohio. It is a development of the Air Force in conjunction with the U. S. Rubber Company.

The structure has no internal braces. It is supported in upright position by air pressure on the inside. Some 1.5 pounds pressure is all that is needed. It is made



QUONSET FOR ARCTIC—This shelter for stranded airmen unfolds from a compact bundle when blown up with a simple hand pump.

of inch-thick, two-layer cotton fabric coated with a low-temperature Neoprene compound that will withstand extreme cold. The dead-air space between the two layers provides the insulation.

Science News Letter, November 12, 1949

NUCLEAR PHYSICS

Meson Predictor Nobelist

➤ THE 1949 Nobel Prize winner in physics, Dr. Hideki Yukawa, predicts that there may be many more elementary particles similar to the meson which he won fame by predicting. The Japanese physicist predicted an elementary particle 200 to 400 times as heavy as the electron in 1934, three years before it was found in experiments with cosmic rays.

Dr. Yukawa also predicts that these heavier "tau mesons" will be 800 to 1000 times as heavy as the electron, but will be extremely hard to detect experimentally because they live only one one-hundred-billionth of a second.

The original meson was predicted in 1934 as a means of explaining the attraction between protons and neutrons in the nucleus of atoms. When the predicted particle, with a mass 285 times the mass of the electron, was discovered in 1937, one of the names suggested for it was "yukon" in honor of Dr. Yukawa. "Meson", the name finally selected, was chosen because the particle is medium weight, heavier than the electron but lighter than the proton.

It was early suspected that the meson was more than one particle, and this suspicion was confirmed in 1947 by the discovery in cosmic rays of a slightly heavier meson 315 times heavier than the electron. It was called the pi meson. Pi mesons act as the binding force in the nucleus, as Dr. Yukawa originally predicted, and they decay into the lighter mu mesons, which were discovered in cosmic rays earlier, in 1937.

Pi and mu mesons have either positive or negative charges. There is also evidence for a neutral meson with a mass close to that of the pi meson.

At the present time, this extremely active branch of theoretical physics suffers from too many possible mesons. All may be predicted from different variations of the theory which Dr. Yukawa helped to develop, but physicists cannot yet say which theory is the right one. It will be very difficult to find the whole family of these elusive particles by experiments alone because most of the heavier mesons, if they do exist, must decay too quickly to be observed by any of the methods now in use.

Science News Letter, November 12, 1949

DR. HIDEKI YUKAWA

CHEMISTRY-PHYSICS

Low Temperature Study

➤ THE lowest temperatures ever reached by man, less than one one-hundreth of a degree above absolute zero, corresponding to 459.6 below zero on the Fahrenheit scale, are due to the researches for which Dr. William F. Giauque of the University of California won the 1949 Nobel prize for chemistry.

DR. WILLIAM F. GIAUQUE

One of the world's pioneers in low temperature research, Dr. Giauque proposed over 20 years ago the method of cooling below the temperature of liquid helium that uses what is known as the "adiabatic demagnetization of paramagnetic salts."

Dr. Giauque is planning a laboratory at the University of California which will contain the most powerful magnet in the world. For extending his low temperature researches, under the sponsorship of the Atomic Energy Commission and the Office of Naval Research, he hopes to build a one-hundred thousand gauss magnet. A gauss is a unit of magnetic attraction.

Before the award of the Nobel prize to Dr. Giauque, the University of California had earmarked half a million dollars for construction of the building in which the low temperature laboratory will be housed.

The most powerful magnet now in existence is a 40,000 gauss magnet at Leiden, in Holland. It was there that the first low temperature experiments were conducted about 40 years ago, including a test during which an electrical current was made to flow unimpeded for hours.

This persistent current experiment—a sort of "perpetual motion"—has also been startlingly demonstrated by R. B. Scott at the National Bureau of Standards. Cooling a lead saucer to about four degrees above absolute zero, a bar magnet is brought close to the saucer. This sets up an electric current in the lead which resists the further movement of the bar magnet toward the saucer. The magnet then floats above the saucer, literally suspended by nothing, like the legendary Mohammed's coffin.

So far no practical application of this achievement has been developed, but it is considered of great interest in understanding the properties of matter at very low temperatures. Some engineers have visualized transmission of electrical power with little loss over wires if they could be cooled down to the very low superconducting temperatures, which are far below ordinary frigid temperatures.

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CHEMISTRY

$25,000 Prize Announced For New Facts on Sugar

➤ ONE of the largest prizes of the scientific world, $25,000, will be awarded again next year in recognition of new knowledge about sugar or other carbohydrates, Dr. Harlow Shapley, chairman of the National Science Fund of the National Academy of Sciences in Washington, has announced.

The 1950 grand prize of the Sugar Research Foundation Inc., will be open for entries until Feb. 1. Scientific studies of sugar in living processes, as a food and as industrial raw materials, are being stimulated by the award. Four previous prizes annually have been given.

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