ARCHAEOLOGY

Soil Chemicals Tell Site Age

Geochemical method for dating sites too old for radiocarbon determination is suggested. Based on man's enrichment of soil chemicals by garbage and other refuse.

➤ A NEW geochemical method for dating sites occupied by man in the ancient past has been suggested by scientists in Baltimore, Md., as useful for remains so old as to be beyond the 25,000-year limit of radiocarbon dating.

This method is based on the fact that wherever man makes his home, he enriches the soil through his garbage and other refuse with greater proportions of such chemicals as copper, zinc, tin, lead, gold, manganese and, of course, phosphorus and nitrogen. Thus the site of human occupation is richer in such minerals than unoccupied sites of similar geological character.

With the passage of time the difference tends to dissipate and the chemical makeup of the soil is more like that of neighboring unoccupied areas. Unfortunately, the dissipation does not occur at a regular rate but varies with such factors as the original character of the soil, topography and climate, so it is not possible to ascribe any pin-point dating to a particular site with this geochemical method.

Scientists do hope to be able to use it, however, to find out whether a particular prehistoric campsite is only 1,000 years old, is 10,000 years old or even 100,000. Trial of the method indicates that it shows up a difference of only 1,000 years between two sites from 1,000 to 3,000 years old.

The despised trash heap onto which man for many ages has dumped his gnawed bones, broken dishes, worn-out tools and other refuse has always been a treasure horde for archaeologists. The archaeologist calls such a dump a "midden."

Now the midden promises to have new usefulness. Chemical analysis of its composition may serve to check the archaeologist's own way of dating through study of the design of tools, patterns of pottery, evidence of the people's occupations and so on.

First test of the new method is reported in SCIENCE (July 4) by Dr. V. P. Sokoloff and Dr. G. F. Carter, of the Isaiah Bowman School of Geography, Johns Hopkins University.

Study was made of two sites in Florida for which dates had already been found on the basis of the design of pottery fragments. One site was 1,000 to 2,000 years old; the other 2,000 to 3,000 years old.

Extractable copper in the subsoil midden materials, it was found, is significantly higher in both than in non-occupied sites, but in the older site the concentration is much more like that of the comparison soil.

"It is shown conclusively," the report states, "that, in Florida, a period of 1,000 or 2,000 years is not enough to bring the distribution of trace minerals in a midden around to that in a comparable undisturbed site."

Further work is needed to test their method and "the problem is posed rather than solved in this preliminary investigation," the scientists conclude.

Science News Letter, July 19, 1952

ENGINEERING

Tire Tests Tell The Best Buys

➤ SCIENTISTS AT the National Bureau of Standards are helping the government buy better automobile and truck tires by improving ways of predicting tire performance.

The whole program is designed to save the United States money. The life of a tire made by one manufacturer may be 12,000 miles. A similar tire made by a different company may last 41,000 miles.

Under the direction of Dr. R. D. Stiehler, the scientists have improved their power-loss, carcass and tread tests that disclose the tire's weaknesses.

The power-loss test shows how much engine power is absorbed by the tire and turned into heat. Sometimes the tires become hotter than the temperature at which they were vulcanized. When that happens, deterioration sets in rapidly.

The carcass test measures fatigue resistance of the tire. It has been found that tires with high power-loss generally have poor fatigue resistance, and that tires made with cotton cords deteriorate much faster than those made with rayon or other synthetic fibers.

The tread test reveals the wearing qualities of different treads. Among other things, it shows whether small cuts in the tread will grow rapidly to serious proportions.

In addition to causing tires to become hot, power-loss also runs up gasoline bills. Heat generated in tires represents energy developed by the motor that otherwise would go into moving the automobile.

Since most passenger cars have a surplus of power, the problem there is not serious. But when trucks and especially tractor-trailers have as many as 18 tires, the wasted engine power is particularly noticeable. It may mean shifting gears on a hill.

Power loss is influenced by both composition and design of the tire. Because of the power-loss increase when synthetic rubber is substituted for natural rubber, large truck and bus tires at present must be made largely of natural rubber. However, elastic types of synthetic rubber currently are being sought after that will have lower power-loss.

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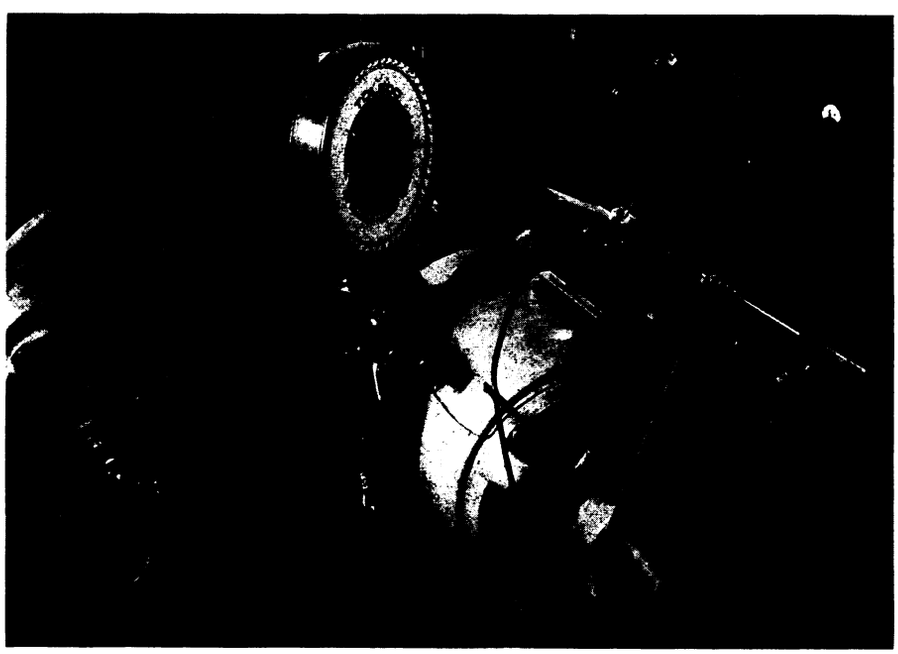

TIRE POWER LOSS TEST—The tire under test at the National Bureau of Standards' dynamometer installation is contained in the temperature-controlled enclosure in the background. The dynamometer at the right measures the power required to drive the tire while the one on the left measures the power transmitted by the tire to a steel drum.