GEOPHYSICS

Quake Waves Can Measure Rotation of Earth's Core

Would Confirm Theory That Core Is Liquid Under High Pressure, Which Would Lag Behind Outer Layers

DOES the central mass of the earth spin less rapidly on its axis than the outer crust? Earthquake waves may help us find out, suggested Archie Blake, U. S. Coast and Geodetic Survey seismologist, at the meeting of the American Geophysical Union in Washington.

The core of the earth is now regarded by scientists as a liquid under high pressure; a honey-cored golf ball might serve as a rough model. Liquids in a rotating container tend to lag behind the walls that confine them. This can be demonstrated on a small but exaggerated scale by setting a goldfish bowl full of water on an old-fashioned piano stool and giving it a spin. It is possible that the viscous liquid core of the earth may behave in somewhat the same fashion, although the lag would of course be relatively far less, and detectable only by the most delicate instrumental means.

These means would consist of special vertical types of seismographs, able to record the deflection of earthquake waves passing into and out of the lagging liquid earth-core on their way through the earth. Until recently such seismographs have been very costly, hence very few, and these few not particularly advantageously distributed over the earth. Now, however, the cost of good vertical seismographs is less and their number is increasing, so that data may at last be obtained bearing on this rather important question of what goes on deep under our feet.

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Low-Cost Seismograph

ONE SUCH vertical seismograph, now under test by workers of the Jesuit Seismological Association, was described before the Geophysical Union by Rev. James B. Macelwane, S. J., of St. Louis University. It is the invention of William Sprengnether, a skilled instrument maker of St. Louis. It has the double advantage of being very sensitive and not costing much.

Essentially, the Sprengnether vertical seismograph consists of a pair of flat coils of copper wire around an iron armature, suspended by a spiral spring and free to move in the field of a powerful alnico magnet. When vertical waves from a distant earthquake cause the suspended coils to jiggle up and down slightly, the magnetic field produces a slight electric current in the coils.

This current, passed through a sensitive galvanometer, causes its mirror to swing back and forth, deflecting a beam of light from a small electric lamp. This dancing light beam writes the record of the earthquake waves on a piece of photographic paper.

Father Macelwane also reviewed the history of earthquake study in this country. Twenty years ago, he said, there was hardly a really first-class seismological observatory in the United States, and very few that would rate in the second class. Now there are a number of stations definitely of the first rank, and a considerably larger number in the second class that are equipped to do effective work. Young men are conducting graduate studies in seismology, not only for the study of earthquakes but for economic application of the technique in such tasks as prospecting for oil and minerals and sounding to find bedrock for bridge and dam foundations.

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Measures Water Vapor

A NEW apparatus for measuring air humidity, inexpensive to build and operate, yet accurate in its results, was described before the American Geophysical Union by Dr. C. W. Thornthwaite of the U. S. Soil Conservation Service.

Ordinary hygrometers used for measuring the amount of water vapor in the air (something every weather-man has to know) depend on the stretching and contracting of hair as it becomes moist and dries out. Human hair is commonly employed for this purpose—blonde preferred. But even the best of blonde hair is fickle, and hair hygrometers tend to become inaccurate in a relatively short time.

Better technique is to pump air through some absorbing chemical which will take the water out of it. Increase in the weight of the chemical shows how much water it has taken out of the air. However, methods of this sort have hitherto been both cumbersome and delicate—better adapted for laboratory than for field use.

Dr. Thornthwaite has developed a new device that can be used in the field. It employs an ordinary, good-sized hypodermic syringe as an air pump, driving it with a tiny motor that will run for months on end on a dry-cell battery. The air is pumped through a bent tube containing alumina, which is the intermediate stage between bauxite and aluminum in the manufacture of that important white metal. A sufficiently sensitive chemical balance completes the equipment.

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Frequent at Equinoxes

IF YOU want to see a good display of the northern lights—the "aurora borealis"—you are most likely to do so in September and March. In latitudes 45 to 60 degrees, as measured from the earth's magnetic poles and equator, which includes a large part of the United States, such displays occur most frequently at the equinoxes, Dr. C. W. Gartlein, of Cornell University, told the American Geophysical Union meeting.

His studies, made with the assistance of the National Geographic Society, also indicate that the magnetic storms which are often associated with the aurorae, occur most often at these times of year as well.

He said that both the storms and aurorae are subject to a cycle of eleven years, like the spots on the sun, but the peak of the storms and lights comes after that of the spots.

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The United States has more miles of *railway* than all South America, Asia, Africa, and Australia together.

At various stages of its life, the Atlantic *salmon* bears the following names: egg, sac fry, advanced fry, fingerling, parr, smolt, grilse, adult salmon and (when dying) kelt.

Replacing white paint, permanent *traffic lines* of yellow vitrified brick are being set into some New York streets.

The British Royal Botanical Gardens at *Kew* have suffered considerable damage from air raids.