

## GEOPHYSICS

# Earth's Core May Be Solid, With Hydrogen Dissolved

## Study of Earthquake and Experiments With Metals Lead to Conclusion Center Is Metal Occluding Gas

**M**EMBERS of the clergy have long been considered authorities on the state of things below. However, their ideas of brimstone generally had no experimental data to support them.

Newest theory of the nature of the world's core comes from a Jesuit priest, Father Joseph Lynch, of Fordham University. As a physicist and director of the University's Seismograph Observatory, he has accumulated actual laboratory evidence in favor of his concept.

According to Father Lynch, the earth's core is metal in which hydrogen gas is dissolved. Such a solid solution is not as familiar as the usual liquid solution, of salt in water, for instance.

A large amount of knowledge of the inside of the earth has come from study of the travel of various kinds of waves from earthquakes. These are of two kinds. Some are longitudinal or compressional waves, in which the earth particles move forward and backward, in the same line as that in which the wave is going. Sound waves are of this type. The other kind are transverse, or "shear", waves. In these, which travel more slowly, the particles move from side to side. These are more like the waves set up by waving a long string.

The shear waves can only travel through a material that has a certain amount of rigidity, in other words, a solid. Liquids have no rigidity, and hence only the compressional waves go through them. They travel through solids also.

Earthquake experts have found both compressional and shear waves reaching recording instruments through the globe from distant tremors. From their behavior, they have learned that there is a definite core to the earth. About half its diameter—some 4,000 miles.

The compressional waves that enter this core reappear on the other side and travel to their destination, but shear waves that enter it seem to be lost. Hence, it has been supposed that this core is a liquid, an idea supported by a study of the effect of tides, which indicates that the earth's center cannot be very rigid.

In a paper issued by the Seismological

Society of America, Father Lynch calls attention to the fact that some evidence has been found that shear waves do reappear, though in greatly reduced form, after penetrating the core. This, he says, shows that the core has some rigidity and cannot be a liquid.

He performed experiments with the metal palladium, which is similar to platinum, and dissolves hydrogen readily. Its rigidity, he finds, is greatly reduced as more and more of the gas is absorbed, or occluded, as the process is called.

In his experiments he was unable to make the palladium occlude enough hydrogen to make it as slightly rigid as it would theoretically have to be in the

interior of the earth. However, he stated:

"In the core of the earth the enormous pressure would prevent such escape, and hence it is plausible to imagine a metallic core occluding an amount of hydrogen sufficient to reduce the core's rigidity practically to zero. On the basis of the present work, therefore, a solid solution is proposed as representing the state of the earth's core.

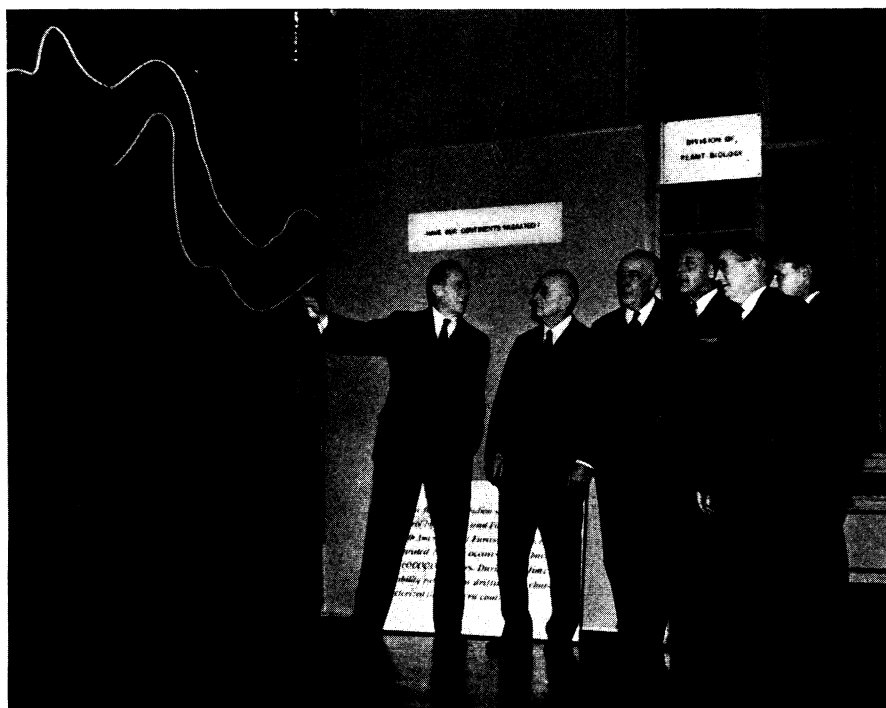
"The gas presumably would be hydrogen; the metal one of the many metals known to occlude hydrogen readily. Such a solid-solution core would have the advantage over a liquid core that it would permit feeble shear waves to pass through, as seismic investigations seem to require. It would have the advantage over a solid core that it would have the low rigidity demanded by tidal action."

*Science News Letter, December 28, 1940*

## MEDICINE

## Doctors Warned to Watch For Pneumonia-Like Disease

**A** NEW respiratory infection, a pneumonia-like disease which cannot be fought with sulfapyridine chemical so



### CONTINENTAL DRIFT

*Prof. Ralph W. Chaney, of the Carnegie Institution of Washington staff, is explaining new evidence against the theory of moving continents at the Institution's annual exhibit. To the right of Prof. Chaney are Trustees W. Cameron Forbes, Frederic A. Delano, James W. Wadsworth, and Roswell Miller. Dr. Vannevar Bush, president of the Carnegie Institution, stands in the foreground at the right. This exhibit was prepared with the cooperation of the Museum of Science and Industry of New York, where it will soon be displayed.*