

GEOPHYSICS

Earth's Core Metallic Sponge, Suggests Fordham Seismologist

EARTH'S heavy core as a great metallic sponge filled with hydrogen gas is the latest picture of the mind of science to envision what the center of the earth is like. Rev. Joseph Lynch, noted seismologist of Fordham University, advances this new hypothesis.

The speed of transmission and the reflection and bending of earthquake waves, says Father Lynch, are about the only ways by which science can conjecture on the nature of the core of the earth deep below the outer solid crust.

With samples naturally unattainable, scientists must work backward in their deductions. They ask, points out Father Lynch, "what known conditions must the state of the earth's core satisfy?"

For one thing the earth has a density averaging about 5.5, or five and a half times as heavy as water per unit volume. But the density of the crust of the earth is only 4.2, so that the core requires something—liquid, solid or gas—whose density is close to the value 12. Iron, nickel and other heavy metals have previously been suggested to explain this high density, says Father Lynch.

But a study of the way earthquake waves travel through the earth shows evidence which demands other properties besides mere heaviness. Tidal phenomena require that the rigidity of the core be appreciably less than that of the crust on whose surface man builds cities that earthquakes occasionally destroy.

In addition the core must have the property of absorbing a special type of wave motion called shear waves, for it is observed that while compressional waves easily pass through the core, there are few known cases where the shear

waves come out, once they are inside.

Experiments in his laboratory, indicates Father Lynch, show that when the metal element palladium is packed, or occluded, with hydrogen gas to several times its own volume, its properties begin to approach those comparable with what is observed in the earth.

Father Lynch disclaims the idea that he believes the center of the earth to be made of palladium (its value is about \$18 an ounce). He merely used the rare metal as a convenient experimental sponge for "holding" the hydrogen.

The findings are suggestive, however, of the metallic sponge hypothesis on the nature of the earth's core. Experiments are now under way to study the effect of the absorbed hydrogen on the elastic properties of the material. When known these properties can be correlated with those observed in the earth and additional confirmation or rejection of the hypothesis will then be possible.

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BIOLOGY

Goes to Brazilian Tropics To Shock Electric Eels

WHAT happens to an electric eel when another electric eel hands it a dose of its own medicine?

This is one of the questions being taken to the Brazilian tropics by Dr. Richard T. Cox of the New York University physics department, who is leaving soon for an extended research visit in Para, Brazil, near the mouth of the Amazon, a favored haunt of the "shocking" elongate fish whose ability to generate and discharge paralyzing "jolts" of electricity is one of the classic riddles of biophysics.

Among the pieces of apparatus which Dr. Cox is taking with him is one calculated to deliver electrical discharges like those of the eel itself. His plan is to put his eel into contact with the device, "give it the works," and then make a careful scientific record of the fish's reaction.

Even more intimate studies of the electric eel's internal power plant and its workings are planned by Dr. Cox. He plans to block off various parts of

the eel's system of electric organs, either by sectioning nerves or with anesthetics, and thus to make analytic studies which have never been possible under aquarium conditions.

A prime part of Dr. Cox's research apparatus will be the cathode ray oscillograph, a relatively new instrument which has proved a most powerful tool in the hands of physicists and engineers studying the nature and rates of sudden electrical discharges. Modern apparatus of this kind has never been used in electric-eel studies, he says.

One reason why Dr. Cox is going to the tropics where the eels are, instead of having the eels brought to him, is that these peculiar fish do not survive the voyage north at all well, so that it is better economy for him to go where they are plentiful and where he can consequently afford to use up a few without constantly having to keep an anxious eye on a diminishing supply in a tank.

Dr. Cox will have with him his wife, Mrs. Shelby Shackelford Cox, as artist and general assistant, and a biologist, Robert S. Mathews, graduate student at Columbia University.

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TELEVISION A Guide for the Amateur

By S. A. Moseley and H. McKay

TELEVISION is a subject of the greatest general interest today. It will be one of the great sources of public entertainment tomorrow. Just as radio, a few years ago, emerged from the scientist's laboratory to be the object of enthusiastic investigation by the amateur, so television is now emerging. Although regular broadcasts are now being made in New York and London, many difficulties are still being worked out, and amateurs, provided with the groundwork, can help.

Television, by Moseley and McKay, provides this groundwork. With an excellent glossary of television terms and many illuminating illustrations, it brings you up to date on the history of this fascinating subject, the most recent developments and most modern equipment, and the possibilities of the future.

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