

GEOPHYSICS

Electric Apparatus Probes Secrets of Earth's Interior

Invention Promises to Aid in Location of Valuable Ores And to Assist Mine Operator and Construction Engineer

DELVING into the secrets of the earth 2,000 feet down has been accomplished by means of electricity. An apparatus, invented by Oliver H. Gish of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, works from the surface, but has made great masses of deeply hidden material reveal something of their nature. The possibility of locating valuable ores by this means is strongly indicated, while information necessary to the mine operator and construction engineer may be thus secured.

With the new apparatus, which has been recently patented, a current is passed through a portion of the earth's crust. The difference in electrical pressure between two selected points affected by this current is then measured. From it can be calculated the resistance of the earth at that point. As the resistance of geological formations varies widely, an index to their characters is obtained.

The inventor, Mr. Gish, and his associate, W. J. Rooney, have conducted field experiments with this apparatus. The original tests were made at four sites around Washington. Extensive earth-resistivity surveys have been made with this apparatus by Mr. Rooney on the sites of the Watheroo Observatory in western Australia, the Huancayo Observatory in Peru, and the Tucson Observatory in Arizona, and by Messrs. Gish and Rooney at the site of the Ebro Observatory in Spain.

Used by Institutions

Outstanding scientific institutions using apparatus constructed after the department's design include the U. S. Bureau of Mines, U. S. Geological Survey, the Michigan College of Mining and Technology, the Massachusetts Institute of Technology, and the Imperial Geophysical Experimental Survey of Australia. The experimental work so far done with this apparatus indicates that in addition to its use as a tool for the location of mineral deposits and for some aspects of engineering, it

will make possible more general investigations in geophysics involving the structure of the earth's crust.

Since the technical publication by the Institution of the first information describing this apparatus, the essential features have also come to be used rather extensively by a number of commercial prospecting organizations.

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MEDICINE

Forerunners of Cancer In Digestive Tract Named

EIGHT CONDITIONS of injury or degeneration which occur in the digestive tract before the development of cancer were listed by Prof. Matthew J. Stewart of the University of Leeds in a series of lectures delivered before the Royal College of Physicians in London and just reported in the *Lancet*, British medical publication.

"At the present time it is probably true to say that the most hopeful side of cancer research is that concerned with the demonstration of local causative factors, and the recognition and prevention of precancerous lesions of one kind or another," Prof. Stewart declared at the beginning of his first lecture.

"Unfortunately, it is to the more superficial forms of malignant disease, a very small fraction of the whole, that this principally applies."

Conditions of the digestive tract that may develop into cancer are not so definitely known as precancerous conditions elsewhere in the body, Prof. Stewart pointed out, nor are the opportunities so good for preventing cancer of the digestive tract.

In one year there were 56,896 deaths from cancer in England and Wales, according to the official figures he quoted. Of these, over half in men and nearly half in women were referable to the digestive tract.

Prof. Stewart divided the chief precancerous conditions into three groups. The first consisted of chronic inflamma-

tory conditions, such as sores due to burns and chemical caustics; cirrhosis of the liver; certain diseased conditions of the gallbladder; chronic stomach ulcer; chronic inflammation of the stomach; chronic duodenal ulcer; and three conditions less well known to the layman, diverticulitis, hemochromatosis and leucoplakia. The second group consisted of simple tumors which may be forerunners of cancer. The third group consisted of sores or injuries due to animal parasites.

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MINE SAFETY

Little Coal Dust Needed To Spread Mine Explosion

TESTS have now determined just how little coal dust the air needs to spread the flame produced in a mine explosion. At the experiment station of the U. S. Bureau of Mines at Pittsburgh, investigations by G. S. Rice and H. P. Greenwald showed that the lower limit of inflammability lies between .032 and .08 ounces of dust per cubic foot of air.

A special gallery was used to conduct the tests. Pittsburgh coal dust passed through a 200-mesh sieve was equally divided between the floor of the gallery and the shelves overhead and on the sides. The source of ignition was a gas explosion which raised the dust in clouds. Measurements were taken as to how far the flame traveled with different concentrations of dust.

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NATURAL MAGNET

Huge 400-pound lodestone on exhibition at Field Museum of Natural History. Its powerful magnetic influence is illustrated by the nails and other objects. It comes from the Wasatch Mountains in Utah.