

## SEISMOLOGY

# Used Like Radar

Earthquake waves yield information about earth structures buried so deeply that human eyes can never see them.

► AS BRIGHT spots on the radar screen tell observers of the presence of aircraft, ships and other objects impossible to see because of darkness, fog or smoke, so the size and shape of the wriggly curves written by a seismograph instrument when an earthquake occurs yield information about earth structures buried so deeply that human eyes can never see them.

How earthquake waves are used by scientists for probing earth's inner secrets was described by Dr. James B. Macelwane, S.J., director of the Institute of Geophysical Technology in St. Louis, in a lecture before the University of Cincinnati chapter of the Society of the Sigma Xi, the scientists' national honor society.

Earthquake waves change their character and rate of travel according to the density and elasticity of the rock in which they travel, Dr. Macelwane explained. Making use of knowledge that has been accumulated in this field during a couple of generations, and correlating data collected from many seismological observatories, scientists have been able to construct a three-layered earth.

Under the relatively thin crust of surface rocks there is an outer shell or mantle some 600 miles deep, in which the speed of earthquake waves increases rapidly with depth. Under this lies an intermediate shell or inner mantle at least 1,100 miles deep, in which the rate of speed increase with depth is very much slower. Finally, there is a core of dense material, about six-elevenths of the earth's total diameter. This acts on earthquake waves like a spherical lens, focusing those that pass through it into "a bright spot surrounded by a dark band on the opposite side of the earth."

Dr. Macelwane also spoke briefly of the work of seismologists in the practical fields of prospecting for ores and minerals and feeling out the bedrock when engineers are selecting sites for dams, bridges and other massive structures. One favored method is to start small artificial earthquakes with explosive charges, picking up the waves that are reflected off the sides of underground hills and valleys of denser rock. Other geophysical prospecting methods involve the measurement of earth electricity, local variations in the magnetic field, and detection of differences in earth radioactivity.

Dr. Macelwane is president of the Jesuit Seismological Association, which cooperates with the U. S. Coast and Geodetic Survey and Science Service in the rapid determination of earthquake epicenters. At the time of the recent great earthquake in Japan, on the fourth anniversary of Pearl Harbor, this cooperative setup was able to get a close "fix" on the epicenter in less than 24 hours.

*Science News Letter, March 3, 1945*

## ENGINEERING

## New Heaters for Buses May Use Air Conditioning

► ENGINE water will probably not be used to heat the postwar motor coach. This system will be replaced by new air conditioning, W. W. Churchill, of the Washington Motor Coach Company, announced.

Present systems of heating buses frequently do not distribute the heat thor-

oughly and uniformly, and also they permit gas fumes and smoke from cigarette smokers at the rear of the bus to travel the full length of the coach, he said.

"It is my recommendation that air conditioning engineers give consideration to the arrangement of two or more small 'package' air-conditioning units similar to the type used in the average home refrigerator," Mr. Churchill remarked.

These air conditioning units, he pointed out, could be located at several points around the interior of the bus. Should one fail, the bus could be cooled by the other units.

In winter, similar independent heater units could be used to keep the bus warm, he stated.

*Science News Letter, March 3, 1945*

## CHEMISTRY

## Un-Sticking Wheat Starch By Use of Sulfur Dioxide

► FOR a new process for making wheat starch, two U. S. Department of Agriculture chemists, Dr. C. T. Langford and R. L. Slotter, of the Northern Regional Research Laboratory at Peoria, Ill., have been granted patent 2,368,668. Wheat starch has always been troublesome to manufacture because the principal wheat protein, gluten, swells up when wet and forms a sticky, doughy mass, very hard to get rid of. The two chemists have overcome this tendency by adding sulfur dioxide to the processing water. This forms a weak solution of sulfurous acid, which takes the stickiness out of the gluten and releases the starch grains from its grip. Rights in the patent have been assigned royalty-free to the government.

*Science News Letter, March 3, 1945*

The discovery of *anesthesia*, that made painless surgery possible, took place a century ago.

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