

# Radio Waves Penetrate Rock

Physics

Radio waves of the frequency used for broadcasting are capable of passing through at least 300 feet of rock, such as limestone and sandstone. This is the conclusion drawn by Dr. A. S. Eve, professor of physics at McGill University, following tests that he made in Mammoth Cave, Kentucky. The experiments were performed in collaboration with D. A. Keys and F. W. Lee, under the joint auspices of the U. S. Bureau of Mines and the Geological Survey of Canada. They are described in a report to *Nature*.

Prof. Eve had made previous experiments in the Mt. Royal tunnel at Montreal. He found that the broadcast waves could be heard throughout the entire three and one-half mile length of the tunnel, but short waves, of about 40 meters' length could not be detected more than a few hundred feet from the tunnel's mouth.

The problem then was to find out how the waves entered the tunnel. One idea was that they penetrated the rock, another was that they came in through the entrance, while a third theory proposed that they were carried along the rails and wires. Prof. Eve believes that all three paths are available, but it was desirable to try the experiment under conditions which would eliminate some of these possibilities.

Mammoth Cave proved an ideal location for such tests, as it contains no wiring or other continuous conductors, and the tortuous passages effectually seal off the entrances.

When a super heterodyne receiver, equipped with a loop aerial, was taken into the cave under Mammoth Dome, words and music were received from Louisville, Nashville and Cincinnati, with 75 feet of rock, mostly sandstone, above. With a 300-foot aerial, coupled to the loop of the set, the

signals were received with 300 feet of rock above.

With longer waves transmitting code the signals were also heard through 300 feet of rock, though the static was too great to permit accurate measurements of intensity. As the waves appeared to travel in a horizontal direction, they apparently passed through the rock, rather than down from above.

Then a coil of wire 100 feet in diameter was laid on the ground above and excited by an oscillating current. These waves were detected 300 feet below. Frequencies of 20 and 30 kilocycles were much louder than those between 40 and 100 kilocycles. Very long waves of half a kilocycle were detected without an amplifier through 900 feet of rock. Such tests as these are important because of the use of similar methods for finding ore deposits.

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## Glozel Alphabet Called Fraud

Archaeology

A new climax has developed in the Glozel affair, the scientific controversy which has set leading archaeologists of Europe by the ears for the last five years.

Pottery, implements and clay tablets unearthed in 1924 by a peasant named Emile Fradin near the hamlet of Glozel a few miles from Vichy, were identified by some authorities as relics of the new stone age, dating back roughly some 10,000 years B. C. Others boldly declared that the whole thing was a fraud and that the so-called relics had been "planted". The tablets were covered with crude hieroglyphics, alleged predecessors of our own alphabet, according to pro-Glozelians, thus antedating the commonly accepted Phoenician origin of the modern alphabet by several thousand years.

Argument waxed high over this and other points of departure from accepted archaeological knowledge brought to an issue by the Glozel finds, and several lawsuits for defamation of character and similar charges ensued as the result of the controversy. To clear one of these charges of fraud, a judge in an arrondissement of Moulins ordered Glozel specimens taken from the Fradin farm to be examined by M. Edmond Bayle, director of the laboratory of legal identification.

After a careful analysis it was found

from the condition of micro-organisms, incorporated in the clay of one of the tablets, that it could never have been baked. Since it had never been baked it could not have survived long in the soil. In fact, one of the pieces, according to a report of the investigation, after being subjected to slow infiltration of water, such as would have taken place on a much larger scale during a long sojourn in the soil, crumbled to pieces in the hands. This is good evidence, the investigators feel, that the relics cannot be more than five or six years old.

To forestall the inevitable storm of protest from Glozel advocates, it has been suggested that all the more active participants on both sides of the question select their own specimens and submit them to a public chemical and microscopic analysis at which both they and their adversaries be present. Then the results must necessarily be accepted as final by both sides once and for all.

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About 10 per cent. of the motor vehicle fatalities occur at railroad grade crossings.

A large number of forceps, probes, and other tools used by surgeons more than 2,000 years ago were found in the ruins of Pompeii.

## Brains Resist Starvation

Physiology

The brain of an animal suffering from a lack of vitamins resists this particular type of starvation more successfully than the rest of the body. This is indicated by experiments reported by Dr. J. Mosonyi of Budapest, speaking before the Thirteenth International Physiological Congress.

Dr. Mosonyi selected three groups of white rats as the subjects of his experiment. He gave one group an ordinary diet, with neither excess nor lack of vitamins. A second group got a ration as near zero in vitamin content as can be devised, while the third received a considerable excess in vitamins.

At the end of the experimental period the brains were weighed. There was no notable difference in the brain weight. This is taken to indicate that an excess of vitamins does not make for any notable increase in total brain size, and that in animals whose bodies are rendered subnormal by vitamin starvation the brains are still able to grow to normal size.

Although the excess-vitamin diet did not benefit the rats' brains quantitatively, it appears to have had some effect on their chemical make-up, for the nitrogen content of the excess-vitamin rats' brains was noticeably higher than that of the brains of their brothers kept on a "normal" diet.

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