PHYSICS

Instrument Measures Height Of Radio Reflecting Layers

➤ RADIO broadcasts will come through more clearly because of a new instrument that helps select the best radio frequencies to use for broadcasts. It shows automatically what is happening to the invisible layers of the earth's upper atmosphere. It is this series of ionized layers, 50 to 250 miles above sea level, that bounces radio waves back to the earth and enables us to hear distant broadcasts.

Several months in advance the National Bureau of Standards predicts the best radio frequency for large radio companies and radio "hams" to use in getting messages through to listeners at distant points. When there is little ionization, only a narrow band of frequencies can be used successfully.

Radio waves come through most clearly when the upper atmosphere, or ionosphere, contains a large number of electrons knocked out of atoms.

The recorder shows the height of the echoing layer by measuring the time it takes for a radio signal to be bounced back. Within seven and a half seconds it can determine the lowest and highest layers of the ionosphere that will return a signal. This information helps make up-to-the-minute forecasts on how well shortwave broadcasts will get through.

Plans have been made to install these instruments in the Bureau's many ionosphere stations operated throughout the world. One is now working at the ionospheric research station at Sterling, Va., busily collecting the information needed for radio forecasting. The first model was developed by the Bureau's Central Radio Propagation Laboratory in time to study how last summer's eclipse affected radio propagation.

An innovation in this model is the incorporation of a motion picture camera in the apparatus. Here curves showing what is happening to the ionized layers of the sky are recorded on motion picture film. By rapidly projecting this series on a screen, radio experts get a good idea of what is happening to the invisible reflecting layers.

This improved recorder promises to aid us in determining how best to get radio mesages through. It will also tell us more about radiations from the sun and physical conditions of the earth's outer atmosphere.

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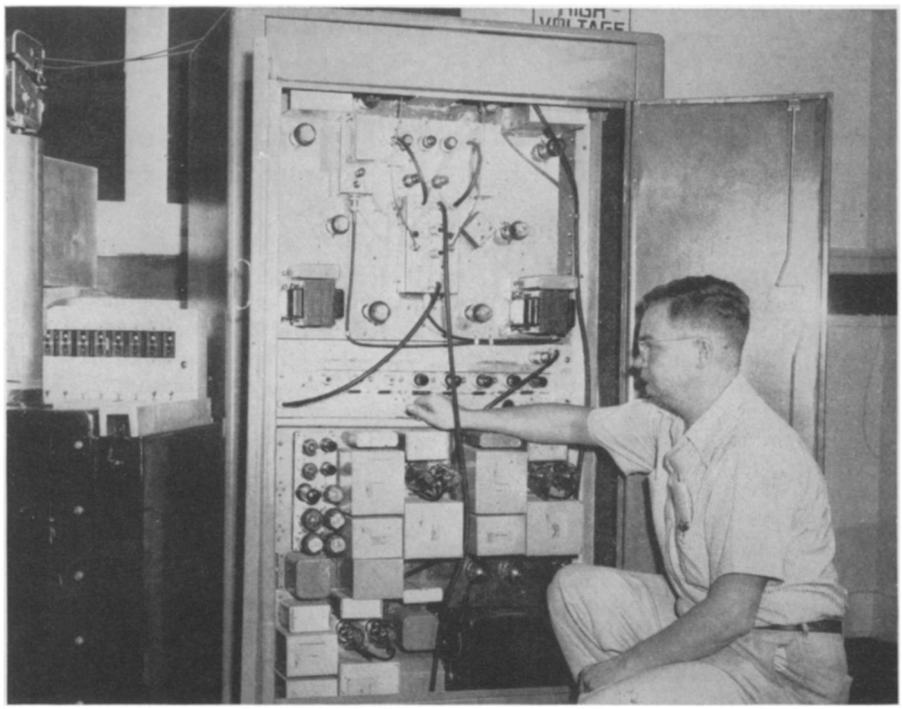

BETTER RECEPTION—This new instrument registers automatically the height of invisible layers of the earth's upper atmosphere, which are responsible for distant broadcasts getting through by bouncing radio waves back to the earth. It is possible with this instrument to predict best radio frequencies for broadcasts.

BIOLOGY-AAAS

Body Collects Radiocarbon

Beeswax and wood charcoal show just about the same radioactivity found in new methane occurring in sewage, confirming theory.

➤ YOU have radioactive carbon in you. You will continue to have it even after you die, and if there is anything left of your remains 5,000 years from now, the radiocarbon in them will still be able to make a Geiger counter tick.

Experiments proving that all living things are collectors of radioactive carbon, C14, were described by Prof. Willard F. Libby of the University of Chicago. The work was done by a group of research workers, under the joint auspices of the Institute for Nuclear Studies at the University and the Houdry Process Corporation.

Theoretical considerations pointed to the probability that radioactive carbon is produced in the upper atmosphere through cosmic-ray bombardment, and then is concentrated in living plants and animals. Such carbon has a measured half-life of 5,000 years.

Following a first demonstration of its actual presence in methane produced by bacteria in sewage, Prof. Libby and his associates have now proven its existence in beeswax and wood charcoal. These substances show just about the same radioactivity as is put forth by the sewage methane. As a check, methane from petroleum was tested, and found quite devoid of radioactivity. Although petroleum had an ultimate source in living creatures, they have been dead so long that all their radioactive carbon atoms have "died", too.

One possible application of this new discovery, Prof. Libby said, is the more accurate determination of the age of recent geologic deposits. If they are less than 40,000 years old, the traces of radiocarbon can be measured to calculate their age.

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