

surgeon is not dangerous. It is done under local anesthetic and the patient usually need not stay in the hospital more than three days.

Dr. Haynes advises this operation for these one-sided headaches when conservative treatment, such as by drugs, X-rays and traction on the neck, fail

to give relief. Patients sometimes have headaches after the operation, but in such cases medicines, sometimes ordinary headache remedies, relieve the pain.

In a series of 47 patients the operation gave relief in 87%. Conservative treatment brought relief in only 32% of 25 patients.

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the wires which are in your radio. Tiny tubes are soldered to the flat surface. Small batteries such as are used in hearing aids supply the power for the sub-miniature station.

But the engineer is even more proud of one of his larger models, a vest-pocket transmitter and receiver which is a duplicate of one Dr. Brunetti presented to President Truman.

If you are looking forward to the day when you will be able to get one of these tiny radios, the National Bureau of Standards has good news for you. A recent survey revealed that more than 65 manufacturers have already begun to use printed circuit techniques in some of their products. So far, these flat, smaller circuits are not finding their way into many radios, but many manufacturers are working on this problem.

At least one hearing aid is now using the printed circuits and plans for two-way personal radios have been announced. When the latter gets on the market, they may find some unique uses. Dr. Brunetti showed the radio engineering group how a large store might use the midget transmitters for a routine inventory. One clerk could count the stock, broadcasting the figures to an office where they would be recorded and tabulated. The idea for this use of the tiny radios came to the Bureau of Standards from an executive of a large chain store.

The Bureau worked on printed circuits for the wartime proximity fuze. Since the war Dr. Brunetti and his staff have shown how these circuits can be used in industry and perhaps one day in your own pocket or handbag.

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ASTRONOMY-GEOGRAPHY

Solar Eclipse to Help Accurate Mapping of Earth

► THE shape and size of the earth will be determined with greater accuracy than ever before when the moon comes between the earth and the sun on May 8-9.

A multiple expedition to Burma, Siam, China, Japan, Korea and the Aleutian Islands, all along the path of the eclipse, is being planned by the National Geographic Society. Simultaneous observations to be made at these points will aid in making better maps of the earth.

Because the path of the eclipse crosses the International Date Line in mid-

RADIO-ASTRONOMY

Cosmic Static Jams Radio

► RADIO noises broadcast from the sun and stars cause picture jumpiness and streaking to appear on television, and can drown out FM broadcasting stations, Grote Reber, radio physicist at the National Bureau of Standards, declared.

Mr. Reber discussed cosmic radio sounds as the guest of Watson Davis, director of Science Service, on the Adventures in Science program heard over the Columbia network.

"Cosmic noise from the Milky Way is undoubtedly one of the major factors limiting the distance that FM and television can transmit," said Mr. Reber.

Cosmic static also affects other high frequency equipment such as certain types of radar and aircraft safety instruments. He added that this static doesn't affect the ordinary radio in our homes. This is because the lower frequencies of the cosmic noise which would disturb the standard broadcast band cannot reach the surface of the earth through the ionosphere, an upper layer of the earth's atmosphere.

"Cosmic static begins to interfere on frequencies above 15 megacycles, and begins to slope off above 100 megacycles," Mr. Reber explained. "However, it is at this point that solar static starts to come in."

Static from the stars was first noticed and picked up in 1932, and this was when Mr. Reber began his own study on this subject. In his home town in Illinois, he set up his equipment. A big saucer, 30 feet in diameter, captured the signals from outer space, where they were absorbed by a drum, then transmitted down to a meter which registered the intensity of received radiation. It looked like a giant mushroom, Mr. Reber recalled.

"People there got so used to seeing my equipment that I could always spot strangers in town by the fact that they'd stop to take a look," Mr. Reber said.

He added to the equipment, using

his own money, and worked in the quiet hours of the night when there was less disturbance from passing automobiles.

The project became too big to handle alone, and with the rush to higher frequencies, the results began to have real practical importance. Mr. Reber joined the staff of the Bureau of Standards. His equipment was moved to Virginia and will receive broadcasts from the Milky Way. A set of German Giant Wurzburgs, a radar brought back from Germany, receives broadcasts from the sun.

Next steps are to attempt to pin-point the sources of the two types of static and to study their frequencies and variations. Mr. Reber believes there is the possibility that these radio noises could be used to make an analysis of outer space.

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RADIO

Broadcasting Unit Is Size of Fifty-Cent Piece

► LATEST version of the business tycoon who started "on a shoestring" may be the radio station owner of the future who starts on a half dollar. The "half-dollar radio station" was demonstrated to the local section of the Institute of Radio Engineers in Washington by Dr. Cleo Brunetti, engineer at the National Bureau of Standards.

Dr. Brunetti is the man who carries a whole "network" of radio broadcasting transmitters around in his pockets. He built a radio transmitter which fits conveniently in an empty lipstick container. His "calling card radio" is on a thin plastic card the size of a calling card. And the half-dollar broadcasting unit is on a square which would barely cover a 50-cent piece.

The thin plastic square measures one and one-quarter inches each way. Flat painted lines form the circuits instead of

Pacific, it will occur on two days. Instead of being a total eclipse, it will be an annular one with the moon appearing slightly smaller than the sun and thus at maximum being surrounded by a narrow ring of light.

The exact time when the moon's edge first touches the sun, when the ring of light first shows around the moon, when the ring disappears as the moon moves on and when the edges of the sun and moon part company, all four will be accurately clocked. These contacts will come at different times at the various observing stations along the eclipse path.

The difference in time of contacts as measured at any two stations makes it possible to calculate with great accuracy the distance between these two stations, and to locate their relative positions on the earth's surface with an

error of not more than 150 feet. This helps determine very exactly the shape and size of the earth.

Measurements of the times of contact of the sun and moon will be made by photographing the eclipse on 35-millimeter sound motion picture film. The one-per-second ticks of a chronometer, checked for accuracy with radio time signals, will be recorded on the sound track. A comparison of the eclipse contact pictures with the time marks on the sound track alongside them will permanently record the exact moment of the contacts.

The U. S. Army's Map Service, Engineers and Signal Corps, the Navy, Air Force, Bureau of Standards, Coast and Geodetic Survey and State Department are cooperating with the Society in the project.

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RADIOACTIVE FROGS—Visitors to the Atomic Energy exhibit at the Museum of Science and Industry in Chicago have the privilege of operating a detector probe which turns on blue, green and red lights as the "hot" or radioactive frogs are approached. This dramatizes for the layman the use of radioactive substances employed as "tracers" in the fields of biology and preventive medicine.

MEDICINE

Conflict Root of Illness

Patient described as filibustering in the doctor's office in an unconscious attempt to hide the root of his illness, which is body's reaction to mental conflict.

► **FILIBUSTERING** is a medical symptom, says Dr. Andrew D. Hart, of the University of Virginia School of Medicine.

The filibustering he described is that done by patients in doctors' offices, not the Senatorial variety.

He lists it with other symptoms of psychosomatic illness in a report to the *Journal of the American Medical Association* (Jan. 24).

The patient who filibusters is doing it in an unconscious attempt to keep the doctor from finding out what is really causing the illness. Dr. Hart gives as an example a 50-year-old woman confined to a wheel chair with deforming arthritis, or rheumatism. For the five years she had been rheumatic, she successfully resisted efforts to start proper treatment of her symptoms.

Each time she saw the doctor, she took up the entire time with an exhaustive account of her numerous symptoms and feelings, or would get onto discussions of politics and what her family and friends were like and what they said. Every time the doctor tried to steer the interview back to what things in her life or personality might account for the arthritis the patient got off onto another

subject and did some more filibustering.

Patients with stomach ulcers, heart disease, overweight and headaches may do the same thing, if their physical symptoms and illness are psychosomatic. The psychosomatic illness, Dr. Hart explains, is the body's reaction to mental conflict so severe that it has to be repressed. Unconsciously the patient feels that even painful, disabling physical symptoms are not as bad as the conflict of feelings he is repressing. So, though he consciously wants to feel better, he unconsciously resists efforts to get at the cause of his troubles.

Procrastination in seeking treatment, self-treatment, "medical shopping," sabotage of treatment and patronizing medical cults are other symptoms Dr. Hart says will help diagnose psychosomatic illness.

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MEDICINE

New Test for Pregnancy Utilizes Common Frogs

► **MALE** frogs of the commonest American species can now be used as test animals in detecting early pregnancy in women. They will be used in place

of the much more costly tropical frogs and toads recently recommended and the mice used in the first technique of the kind to be described, known as the Ascheim-Zondek test.

The new test is described by a Columbus physician, Dr. P. B. Wiltberger, and Prof. D. F. Miller of the Ohio State University, in *Science*, (Feb. 20). A small quantity of urine from the patient is injected into the body of a male leopard frog. If she is pregnant, the frog begins to discharge his male sex cells in from two to four hours.

For the sake of certainty, Dr. Wiltberger recommends the use of two or more frogs for each test. This does not involve any appreciable extra expense, partly because the frogs are so abundant and easy to obtain in the first place, partly because the same frogs can be used again and again, with four- to five-day intervals between tests.

The leopard frog is the species known to zoologists as *Rana pipiens*. It is the first animal students are given to dissect in beginning zoology courses.

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