

RADIO

# Radio Blackouts Predicted

Huge sunspots are expected to cause occasional radio blackouts during the next year or two. National Bureau of Standards will forecast these.

► BLACKOUT of shortwave broadcasts during the next year or two can frequently be blamed on sunspots huge enough to be visible through smoked glass. This means they will be 50 to 100 times as large as the earth.

Only two or three years ago there were few spots visible on the sun and these were too tiny to be seen without a telescope. The number of pockmarks on the sun has been increasing since then and may reach a maximum late in 1947 or early in 1948. Prolonged, moderate disturbances are frequent during sunspot minimum. Briefer, more erratic storms tend to occur during sunspot maximum. They usually take place a day or two after a large spot passes the sun's meridian.

During the next few years radio forecasts will be more and more influenced by the number and size of sunspots. When no spots are visible during sunspot minimum, on the other hand, the tendency of storms to recur at 27-day intervals is more important in making forecasts.

Shortwave broadcasts may even be disturbed by fading and fluttering. Fading is due to signals coming in out of phase. The signals tend to interfere with each other. Fluttering is caused by scattered transmission. The beam does not follow the great-circle path closely enough.

When an ionosphere storm is in progress, lower frequency must be used as higher ones escape through the ionized layers. On the other hand, more and more of the lower frequencies are absorbed and fail to reach the receiving station. When the frequency band is so reduced at both ends that nothing gets through, radio broadcasts are completely blacked out.

Twice a week the National Bureau of Standards predicts how good reception of shortwave broadcasts from Europe will be. This is based on the number and position of sunspots, condition of the radio reflecting layers, magnetic storms and other data. Twice each hour it issues up-to-the-minute warnings. These are based not only on conditions on the sun and in the ionosphere, but upon how well

shortwave broadcasts here on earth are getting through.

These forecasts are being developed to the point that those listening to a worldwide hook-up will no longer be bothered by having a broadcast from Europe ruined by sputters or by fading out.

In making these long-range and up-to-the-minute forecasts, the National Bureau of Standards uses data supplied by laboratories at Stanford University, Louisiana State University, University of Puerto Rico, Harvard University, the Massachusetts Institute of Technology, and others. In addition, help is received from the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, which is now maintaining observatories in Peru and Australia, and also assembles magnetic data.

The large and increasing amateur-radio fraternity known as "radio hams"

reports on actual transmission conditions. This, fitted in with reports from commercial companies, the Army and Navy, and the laboratories of the National Bureau of Standards, is used in making forecasts. The amateurs in turn use the forecasts to determine at what distances they can operate to best advantage, and whether broadcasts will get through.

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AGRICULTURE

## Bad News About The Pepper Shortage

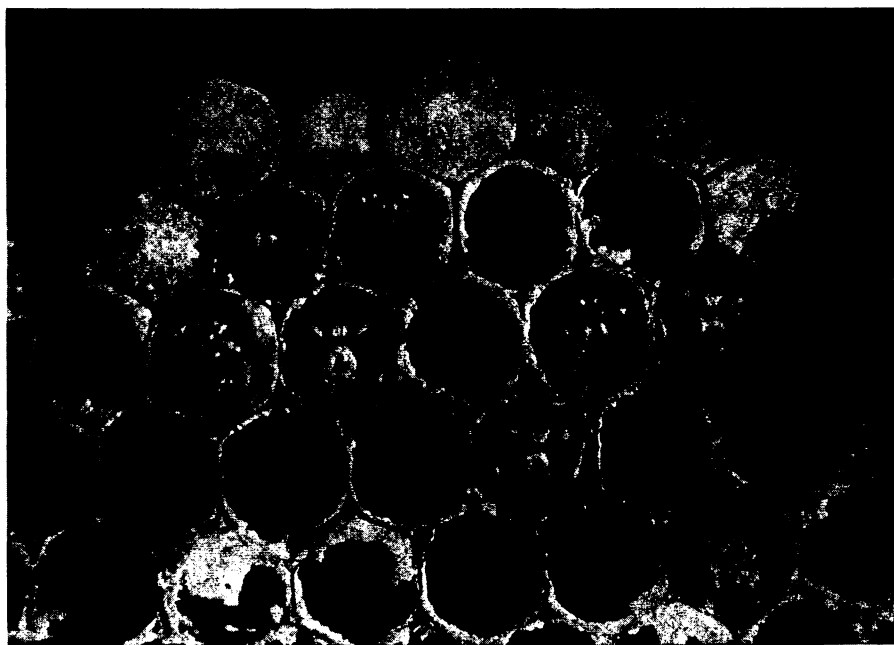
► SOME FACTS on the pepper shortage—and bad news for housewives:

Netherlands sources estimate that it will require three to four years to rehabilitate pepper culture on Bangka Island and Southern Borneo, large pre-war sources of the spice.

Only one-half of one percent, or 100,000 of 20,000,000 pepper trees on Bangka are now standing, while 20% of those in Southern Borneo remain after the war's devastation.

Spice culture in the Moluccas, which were used completely for food production by the Japanese, cannot be restored to prewar levels in less than eight years.

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**GEOMETRY**—Bees are by no means the only insect geometricians. The paper wasps build combs with the same meticulous arrangement of hexagonal cylinders, except they use papier-mache instead of wax. In these snug cells they rear their young with great care. Here the camera of Lynwood M. Chase has caught a group of new-fledged adults, ready to emerge and go to work. Above them the capped cells contain larvae which are not quite as far along in their development.