

SUN SPOTS PREDICT RADIO DISTURBANCE

A. L. Durkee Says They Give Clue to Broadcasting Condi- tions 5 to 6 Years Ahead

DATA COVER 200 YEARS

His Studies Show That Magnetic Interference Follows Peak of Solar Blemishes

From records of solar activity gathered by astronomers in the last 200 years, a rule has been devised that may make it possible to forecast world-wide radio receiving conditions five or six years in advance, according to A. L. Durkee, engineer of the Bell Telephone Laboratories.

Mr. Durkee explained yesterday that each of the 11-year sun-spot cycles, the latest of which will reach its peak some time in 1938 or 1939, has an aftermath called the "magnetic cycle" that may profoundly affect short-wave radio transmission.

In studying the record of eighteen 11-year sun-spot cycles, Mr. Durkee has found that the period of minimum spotting is an indication of the number of spots that will appear during the succeeding peak, a half cycle later. The less activity at a minimum, the less will be the activity at the maximum, he found. With a lag of one to two years, the maximum is followed by a period of magnetic disturbance to radio that corresponds in severity to the degree of sun-spotting.

154 Sun Spots Seen in 1778

"No one knows what would happen to radio," said Mr. Durkee, "if we should experience another sun-spot maximum such as occurred in 1778, when 154 spots were counted by astronomers, or in 1837, with its average of about 138 spots, or in

1870 with 139 spots. Since then, and during the relatively brief history of short-wave radio, the average in any one cycle has never progressed beyond about 104 spots which was in 1917.

"Therefore, we are unable to predict what would happen if the 1778 conditions should recur, as radio has never had such an experience. In 1928, the last peak, only about seventy-nine spots appeared, with the three-year average through the maximum part of the cycle only registering seventy spots. The short waves were then so undeveloped that very few observations were made as to the effect on world-wide channels when spots are most numerous. This new method of forecasting indicates about ninety spots will constitute the average maximum in 1928, 1929 or 1940.

"There is a likelihood that the 154-spot maximum of 1778 may recur some time in the future, or the number may go even higher. It is impossible to predict what actually would happen in such a case. It is certain, however, that it would be a very severe test of short-wave communication."

Mr. Durkee explained that evidence of periodicity of the large-number-of-spot years is meager; that is, they do not seem to recur at constant intervals, hence it is considered impossible to forecast just when they may arrive. It has been found that radio suffers directly from the magnetic fluctuations in about the same proportion to the number of solar blemishes visible. The magnetic wave generally lags a year or two behind the spots, but sometimes occurs at the same time, he said.

"It may be found in 1938 and 1939 that the very short radio waves are relatively free of solar spot influences," he continued. "As the spots increase in number the increased ionization in the upper air creates a more perfect conductor for waves between five and twenty meters, so they gradually become more useful over world-wide distances as the spots grow in number. In this may be found a future hope that the present high efficiency of overseas communication can be maintained."

The coming peak in the present cycle may furnish a clue on which engineers can lay the foundations for further pioneering in the field of short-waves, he said.