

# How Sunspots Affect Your Radio Reception

WHEN your short-wave reception hasn't been up to standard, have you blamed your set? If so, you may have blamed the wrong cause, for it is possible that sunspots were responsible. Sir Edward Appleton, Secretary of the Department of Industrial and Scientific Research and one of Britain's most distinguished scientists, has worked for twenty years on radio research. He is the discoverer of the ionised atmospheric layer that now bears his name, and makes round-the-world radio communication possible. The following article on sunspots and radio reception is a précis of a talk by Sir Edward for the BBC's Pacific Service:

A FEW years ago I often used to take a piece of smoked glass and look through it at the sun. The glass was just an ordinary piece found in the garden shed, and it was smoked by holding it on the top of a candle flame for about half a minute. I used the smoked glass partly to protect my eyes, and partly to allow me to look steadily at the sun without blinking.

About four or five years ago this was an interesting experiment because I could often see spots on the sun's surface without the aid of a telescope. At the present time sunspots are rare, for we are nearing the period of what is called "sunspot minimum," the period of maximum having occurred in 1937. Big sunspots did, however, occur very occasionally until a year ago.

Sunspots have been objects of great interest for hundreds of years. It was Galileo who first noticed that a particular

spot moved across the sun's disc and was then lost to view and afterwards appeared again, showing that the sun itself was rotating. In the nineteenth century Schwabe made the outstanding discovery of what we call the sunspot cycle, when he found that sunspots were not equally large and numerous at all times, but that they varied in a cycle of about eleven years in duration.

## A Profound Influence

Lots of people have tried to find a connection between the events on the earth and the sunspot cycle. It has been suggested, for example, that the sunspot cycle controls the growth of trees, the depth of lakes in Africa, and the weather. I believe that someone has even gone so far as to suggest that trade cycles run parallel with sunspot cycles. I'm afraid my opinion on these matters is not of any value. But what I am sure about is that sunspots have a profound influence on radio transmission. When there are spots on the sun we are likely to get disturbances in the reflecting layers of the upper atmosphere which often interfere seriously with our Empire broadcasting by short waves.

The sunspot of February and March, 1942, gave quite typical effects, which were examined in detail by British scientists. It gave rise to the two types of radio disturbances we've now learned to recognise. First, there was the violent luminous activity near the spot on February 28, which coincided exactly with a radio fade-out lasting for about eight hours. This was followed about a day later by a large magnetic storm which caused disturbances particularly marked in polar regions.

The time interval between the two disturbances is now thought to have a very definite significance. We believe that during the period when the sunspot is active, both ultra-violet light and flying atoms are shot out into space. The ultra-violet light takes only about eight minutes to reach the earth, and is responsible for the first of the two fade-outs. The flying atoms don't move so fast, and it's not till a day later that they reach the earth's atmosphere and cause magnetic and other disturbances, including displays of the northern lights.

At the present time sunspots are not frequent, and when they occur they are not large. I think, therefore, that we may look forward to a year or two of better radio conditions than we've had over the last six years. But when the period of sunspot minimum is over we expect that sunspots will again become more numerous. The maximum will be reached in 1948, and then, I'm afraid, for a year or two you must be prepared for occasional trouble.

## After The War

A CABLE message from London this month reported that, while describing an experiment with an important bearing on long-distance radio broadcasting, Sir Edward Appleton said, in a lecture to the Institute of Electrical Engineers: "It is now certain that the range of short-wave lengths available for long-distance radio broadcasting increases very substantially with solar activity. Therefore, it will certainly be necessary that an international allocation of such wave-lengths after the war should take into account the variations during the sunspot cycle indicated by these new results."

(Continued from previous page)

ness in the days of their suffering, and the aged, tranquillity in the time of their sunset. I have met many men and women who have spoken to me of their sons who are fighting in far-off skies and distant deserts. Some have told me with dry eyes of those 'whom they have loved long since and lost awhile.' And as they have spoken to me I too have remembered what the world of free men will never forget—Greece and Crete and Libya and Tunisia and the River Plate and Guadalcanal. I know you are proud of New Zealand. Nearly every New Zealander I meet tells me he is, and I do not wonder. You don't need my praises, of course, but I offer them humbly, for it seems to me that you are proud of New Zealand for the right reasons and they are among the greatest reasons in the world.



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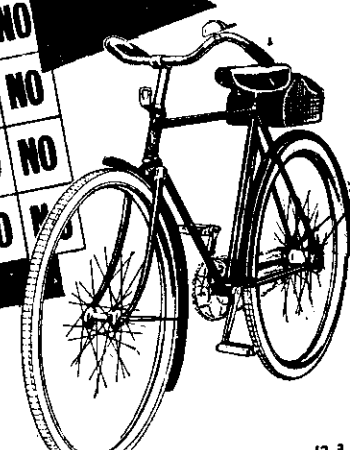
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