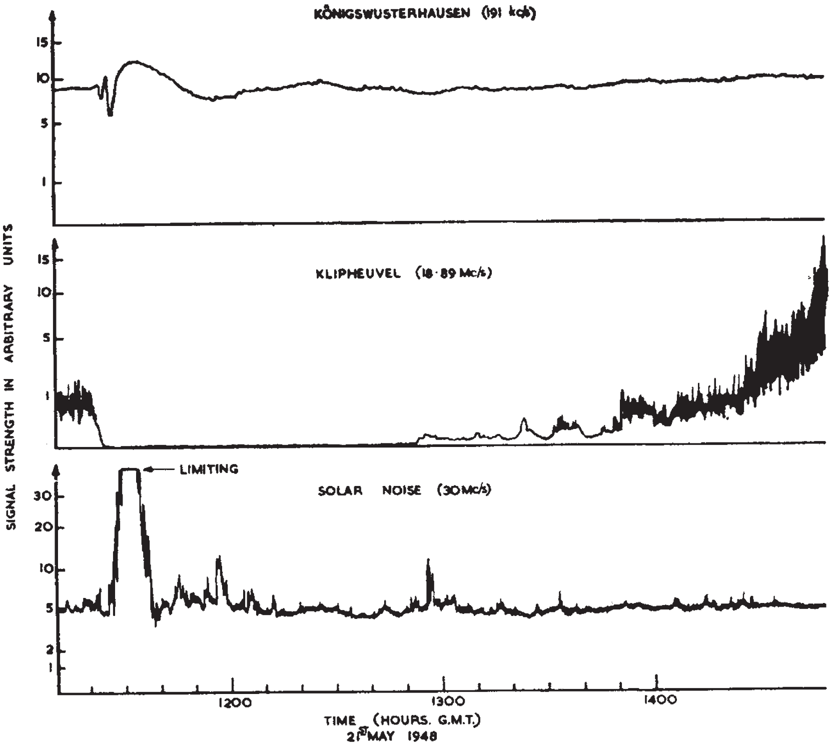

Records of signal strength of Königswusterhausen, Klipheuvel and solar noise

normal height of 80 km. is assumed. The return to normal conditions seems to be complete by the end of the high-frequency fade-out at about 1400 G.M.T.

Physically, this effect may be explained by the increase in ionization density producing a well-defined lower boundary on the reflecting region which, travelling rapidly downwards, reduces the equivalent height of reflexion and also decreases the length of the path of the wave through the lower absorbing levels.

It is to be noted that the start of the low-frequency anomaly and of the high-frequency fade-out occurs some five minutes before the burst of solar noise.

The work referred to above was carried out as part of the programme of the Radio Research Board, and this letter is published by permission of the Department of Scientific and Industrial Research.

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Aug. 4.

[1] "A Brilliant Solar Flare, 21st May 1948", *Observatory*, 68, 191 (1948). (Two letters, from H. Barton and H. W. Newton.)

Ionosphere and Weather

FOR some ten years, at the Zi Ka Wei Observatory, in Shanghai, China, we have been using, with exceptional success, a new technique in our weather forecasting. This method is based on an as yet unexplained correlation between the usual ionosphere echoes (E, F and F_2) and the future movement or behaviour of the three main air masses, which make the weather all over the world: polar, maritime and tropical, or equatorial, as some people call it. Our results have already been published in the *Bulletin of the Meteorological Society of America*, in 1946, and in a paper sent to the last Pacific Science Congress held in New Zealand last February.

We found, in 1939, in Zi Ka Wei that by pulsing on the mean critical frequency for the E-layer at our station (6 Mc.), any day of the year, after sunrise and before sunset, we could forecast what type of air mass would make the weather over an area of 400 km. around Shanghai. For example, we found that when we had an E-echo, the maritime (Pacific Ocean) air mass would either stay over us, if it was already there, or it would come over us, if at the time of pulsing another type of air mass was covering our regions. When we obtained an F-echo, the polar (Siberian) air mass would make the weather, while an F_2-echo meant the arrival of the tropical air, or its staying if already there. Knowing by this technique the type of air mass due to make the weather, we could forecast its future characteristics, dry or damp, overcast or clear, windy or calm, good or bad visibility, high or low temperatures, etc.

In frontal weather conditions, no echoes are obtained; that kind of weather would then continue for the next twenty-four hours.

When a typhoon had been located, on the weather map, at about 200 miles distance, an E-echo would show that the maritime air mass would bring the cyclone dangerously close to us. An F-echo would show that no danger was threatening the Shanghai area, since the typhoon would recurve.

We have tried this new technique in Hong-Kong, with the generous help of Mr. S. P. Heywood, director of the Royal Observatory, during the last typhoon season and have obtained results just as good as those mentioned for Shanghai.

It would be very interesting to see if also in Britain such a weather forecasting technique would yield the same results. All that is required is a self-oscillating radio circuit, with an output of about 100 watts. The pulsing should be obtained by using a special grid leak, namely, a very good 0·01-μF. fixed condenser with a 2-MΩ fixed resistor in parallel. Any good communications receiver, without the usual transformer output, connected to an ordinary cathode-ray oscillograph, would show the ionospheric echoes.

Weather maps to be consulted should be drawn according to the types of air masses and not to show only the high- or low-pressure values. The values of these pressures do not show the kind of weather prevailing in these high or low areas.

If two different echoes show in the screen of the oscillograph, most attention should be given to the more dominant type.

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