

A more complete report on these experiments will be given elsewhere.

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¹ See, for example, Wark, "Principles of Flotation" (Australasian Inst. Min. and Met. Eng., Melbourne, 1938).

² Wark, I. W., *J. Phys. Chem.*, **40**, 661 (1936).

³ Freundlich, H., "Colloid and Capillary Chemistry", 255 (trans. by Hatfield, Methuen, 1926).

⁴ Harkins, W. D., and Boyd, G. E., *J. Amer. Chem. Soc.*, **64**, 1195 (1942).

⁵ Rogers, J., and Sutherland, K. L., *Amer. Inst. Min. and Met. Eng.*, Tech. Pub. No. 2082 (1947).

Abnormalities in the F-Region of the Ionosphere at Calcutta

IONOSPHERIC observations carried out for more than two decades have clearly established the existence of correlation between the variation of electron contents of the different ionospheric layers and solar

activity. It has been found that there is a general increase in the ionization density during the period of maximum sunspot numbers. This general increase, as expected, has also been noticed during the present phase of maximum solar activity in the routine ionospheric observations made at the Wireless Laboratory of the University College of Science, Calcutta. Besides this general increase, however, certain peculiar features of the diurnal variation of the ionization density have also been observed.

Figs. 1-3 depict the monthly mean diurnal variation of Region F' ionization for the months of January 1946 and January 1947 for Madras (lat. 13° N., long. 80° 13' E.), Calcutta (lat. 22° 33' N., long. 88° 21' E.), and Delhi (lat. 28° 35' N., long. 77° 5' E.) respectively. (For Calcutta the curve for 1945 is also given. The curves for Delhi and Madras are drawn from data kindly supplied by All India Radio.) It is at once noticed that there is a general increase of ionization at all the stations. The stations Calcutta and Madras, however, show another peculiar feature which is not noticeable at Delhi or at Slough (Fig. 4). A comparison of Figs. 3 and 4 shows that the general trend of diurnal variation for January 1947 at the two stations is the same and is similar to that for the previous year at Delhi. The trend of variation for the same month for Calcutta and Madras is, however, markedly different. The ionization begins to rise sharply at daybreak and attains nearly the maximum value at about 11 a.m. In the case of normal solar activity, this value is maintained during the whole day and the decrease in ionization begins nearly at sunset. But for the month under consideration (January 1947, phase of maximum solar activity) the peak value is maintained more or less constant not only during the whole day but even up to the evening hours, 9-10 p.m. It is remarkable

that there should be such marked difference in the character of ionization variation for two stations, Calcutta and Delhi, situated at not very different geographic latitudes. The difference in the magnetic dip values at the two stations is, however, comparatively larger, and one is tempted to associate the characteristic difference in ionization variation of the two stations as due to some geomagnetic control of the ionosphere¹, to the existence of which attention was first directed by Appleton².

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¹ Mitra, S. K., *Nature*, **158**, 668 (1946).

² Appleton, E. V., *Nature*, **157**, 691 (1946).

