P R E F A C E

Since the discovery of the layers reflecting electromagnetic waves in the earth's high atmosphere, their physical characteristics such as virtual heights and critical frequencies have been extensively investigated. Ionospheric absorption and scattering of radio waves have received much less attention, particularly in low latitudes. Radio noise from the galaxy serves as a convenient source outside the earth's atmosphere for studying the changes in the ionosphere.

The thesis embodies the results of the author's work on the design and construction of a 25 Mc/s cosmic radio noise recording equipment at the Physical Research Laboratory, Ahmedabad, its maintenance for a period of two years, the tabulation and analysis of the data and discussion of the data collected during the period March 1957 to December 1959.

It has been found convenient to divide the total attenuation into two components: (i) A daytime symmetrical component around the local noon and (ii) A non-symmetrical component which does not obey (cos X)^n law.

The seasonal and diurnal variations in each case have been discussed, and comparison is made with similar observations made at other places. The absorptions at Ahmedabad are much larger than in middle latitudes and the dependence
on electron densities in the F₂-region definite and large. Electron-ion collisions in the F₂-region appear to have larger effect on the absorption than the collisions of electrons with neutral atoms and molecules in the D and E regions.

The sudden cosmic noise absorptions (SCNA's) associated with solar flares from February 1956 to August 1960 have been tabulated and briefly discussed.

During magnetic storms, the F₂-layer gets very much disturbed and the amount of F-scatter substantially reduced. "Cosmic-noise" measurements provide a valuable means of studying ionospheric disturbances associated with geomagnetic storms. The study has provided new information about the variations of cosmic radio noise at a station, situated near the peak of F₂ critical frequency, and the relationship of the cosmic radio noise absorption with electron densities in the F₂-region including the effect of magnetic storms.

The author was mainly responsible for the constructing and maintaining the cosmic-noise equipment and the scaling, computation and analysis of the cosmic-noise data throughout the period under investigation.

Countersigned

[Signature]

[Date]