PREFACE

The thesis incorporates the results of the following studies:

1. Absorption in the region below the E layer was investigated by vertical pulse soundings with 2.5/2.6 mc/s during the I.G.Y. period. A brief description of the equipment constructed by the author is given. After separating the observed absorption into deviative and non-deviative components the seasonal variation of the non-deviative component was computed. An approximate linear relationship was found between sunspot number and the sub-solar non-deviative absorption.

2. Absorption studies associated with Sudden Ionospheric Disturbances (SID) using field strength measurements of 164 kc/s c.w. transmissions from Tashkent were made by the author and Mr. S.K. Alurkar. Equipment used for recording the field-strength is described in brief. 115 instances of SID effects have been studied. A comparison is made with corresponding short-wave fadeouts and the results are interpreted in terms of changes in the structure of the D region.

3. The attenuation of cosmic radio noise on 25 mc/s was studied during the presence of F scatter. The study of individual instances shows that F-scatter can cause either an increase or a decrease in noise level depending on the position of the galaxy with respect to the zenith. An explanation of the observed
phenomena is offered in terms of increased intensity due to scatter and/or loss of intensity due to scatter depending on the position of the galaxy with respect to the vertical.

4. The results of a true-height analysis of the mean vertical distribution of electron density in low and high sunspot activity years (1954 and 1957-58) are presented. The computations have been made for the months January, April, July and October. The differences observed between 1954 and 1957-58 are discussed in terms of our present knowledge of the tropical ionosphere. For this work, over four thousand ionograms were suitably grouped and P't' curves redrawn. The monthly median P't' profiles were deduced for each season. The '10 point analysis' method of Schmerling and Thomas was employed to reduce the median profiles to true height curves, taking account of the retardation in the lower layers of the ionosphere. The data are presented in the form of isodensity electron levels.

Besides giving significant information regarding the lowest regions of ionization, the present study provides a basic model of the ionosphere at the time and region of peak electron densities.

Countersigned

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