PREFACE

A proton precession magnetometer for recording the intensity of the earth's total magnetic field has been in operation at Ahmedabad since November 1962. In the first part of the thesis, the experimental set-up is described and the observed magnetic field at Ahmedabad is compared with the data obtained from the nearest standard magnetic observatory at Alibag.

In the second part of the thesis, a study is made of the sudden changes (SC, SI, Sfe) in the geomagnetic field at the equatorial stations which were operating during IGY/IGC. The sudden changes in the strength of the equatorial electrojet current in all respects viz. local time, latitude and longitude.

The third part of the thesis deals with lunar tidal variations in the geomagnetic field at the ground at various stations near the magnetic equator viz. Trivandrum, Addis Ababa, Koror, Jarvis, Huancayo and Kodaikanal. The lunar daily variations and lunar monthly variations are evaluated from a large volume of data. The methods of fixed lunar age and fixed solar time are employed for the computations. The conclusions presented from these analysis have a bearing on the dynamo theories which are used to explain solar and luni-solar daily variations. It is

clearly seen that the lunar tidal oscillations in geomagnetic field at the equatorial stations are intimately connected with the electrojet currents and hence of variations in ion density and/or motions of the layer or layers of charged particles responsible for the varia-tions. The situation is complicated as the controlling factors are many. They include, besides the graviational action of both sun and moon, the action of the earth's magnetic field on the ions and electrons, and indirectly on neutral particles which collide with them.

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