

CONTENTS

<i>Preface</i>	v
<i>Acknowledgments</i>	vii
I. The Neutral Atmosphere	
1.1 Atmospheric Nomenclature	1
1.2 The Hydrostatic Equations of Atmospheric Structure	5
1.3 The Heat Balance in the Thermosphere	11
1.4 Dissociation and Diffusive Separation	19
1.5 The Exosphere	22
1.6 Atmospheric Dynamics	25
1.7 Atmospheric Tides	34
1.8 Experimental Techniques	40
II. Ionospheric Measurements	
2.1 Introduction	47
2.2 Vertical Incidence Sounding	50
2.3 Ground-Based Radio Investigation of the Lower Ionosphere	60
2.4 Propagation Experiments Using Rockets and Satellites.	70
2.5 Direct Measurements Using Rockets and Satellites	78
2.6 Incoherent Scatter	82
III. Photochemical Processes in the Ionosphere	
3.1 The Balance of Ionization	87
3.2 The Basic Theory of Photoionization	89
3.3 Production of the Ionospheric Layers.	98
3.4 Loss Reactions	105
3.5 Chemistry of the D Region.	109
3.6 Chemistry of the E and F1 Regions	113
3.7 Airglow and the Ionosphere	121

IV. Transport Processes in the Ionosphere	
4.1 The Transport Term in the Continuity Equation	126
4.2 Electrical Conductivity	132
4.3 Plasma Diffusion	142
4.4 Solving the Continuity Equation	149
4.5 Diffusion between the Ionosphere and Protonosphere	157
V. Morphology of the Ionosphere	
5.1 The D Region	160
5.2 The E and F1 Layers	165
5.3 F-Region Rates	168
5.4 F-Region Anomalies	175
5.5 The Topside Ionosphere	186
VI. Some Ionospheric Phenomena	
6.1 Solar Flare Effects	190
6.2 Eclipse Phenomena	193
6.3 Sporadic E	199
6.4 Ionospheric Irregularities	204
6.5 Electron and Ion Temperatures	213
VII. Geomagnetism and the Ionosphere	
7.1 Introduction	221
7.2 Representation of the Main Geomagnetic Field	222
7.3 Variations of the Geomagnetic Field	225
7.4 Dynamo Theory	233
7.5 The Magnetosphere	241
VIII. Storms and Their Ionospheric Effects	
8.1 Synopsis of Storm Effects	252
8.2 Storm Current Systems	258
8.3 Storm Effects in the Lower Ionosphere	261
8.4 Storm Effects in the F Region	264
<i>List of Principal Symbols</i>	271
<i>References</i>	275
<i>Author Index</i>	311
<i>Subject Index</i>	320

