



## CONTENTS

	<b>PAGE</b>
<b>1 FOREWORD</b>	
B. LANDMARK, Chairman, COSPAR Panel on Polar Cap Experiments . . . . .	vii
<b>2 INTRODUCTION (OPENING LECTURE)</b>	
R. L. F. BOYD: Space research in polar regions . . . . .	1
<b>3 IONOSPHERIC OBSERVATIONS</b>	
G. C. REID: The important atmospheric processes in the D region . . . . .	15
<b>3.1 PROBE EXPERIMENTS</b>	
A. P. WILLMORE: Probe techniques . . . . .	21
W. PFISTER, J. C. ULWICK and R. E. MCINERNEY: Direct satellite probe measurements of ionospheric irregularities in the polar cap . . . . .	33
T. R. KAISER: Low frequency propagation and probe experiments . . . . .	43
Discussion on probe experiments . . . . .	53
<b>3.2 PROPAGATION EXPERIMENTS</b>	
J. BÜCHAU, K. G. JACOBS, P. KAISER, K. RAWER and B. REINISCH: Simultaneous measurement of ionospheric plasma density by three different methods . . . . .	55
M. JESPERSEN, J. K. OLESEN and B. LANDMARK: Electron density and collision frequency observation from a rocket experiment during an auroral absorption event . . . . .	63
Discussion on propagation experiments . . . . .	69
<b>4 PARTICLE OBSERVATIONS</b>	
C-G. FÄLTHAMMAR: Some aspects of particles and fields in the magnetosphere . . . . .	71
<b>4.1 ROCKET AND SATELLITE OBSERVATIONS</b>	
B. MÆHLUM: Methods and results of particle observations . . . . .	103
B. J. O'BRIEN: Comments on measurements of particle precipitation with the Injun satellites . . . . .	113
J. R. BURROWS, I. B. MCDIARMID and MARGARET D. WILSON: Solar flare particles in September 1963 . . . . .	119
W. RIEDLER: An electron-proton spectrometer for rockets using solid state detectors . . . . .	137
G. SKOVLI: A $\beta$ -spectrometer for measurement of low-energy electrons associated with auroral phenomena . . . . .	147

B. HULTQVIST: Some comments on electrostatic analysers	153
F. SØRAAS and B. TRUMPY: Measurement of charged particles in the auroral zone, Andøya, Norway . . . . .	159
Discussion on rocket and satellite observations . . . . .	165
<b>4.2 INDIRECT OBSERVATIONS OF PARTICLES</b>	
G. PFOTZER: Balloon measurements of solar protons and auroral X-rays . . . . .	167
G. LANGE-HESSE: A network to test the reliability of V.L.F.-phase recordings on transpolar propagation paths to be used as a method to indicate the precipitation of solar cosmic ray particles in polar cap regions .	205
Discussion on indirect observations of particles . . . . .	211
<b>5 ATMOSPHERIC PHENOMENA ASSOCIATED WITH ENERGETIC PARTICLES</b>	
A. OMHOLT: Optical effects of particles . . . . .	213
G. C. REID: Ionospheric effects of particles . . . . .	221
D. BROOKS and T. R. KAISER: The development of the radio-aurora . . . . .	233
A. EGELAND, J. AARONS and W. BARRON: Enhanced electromagnetic radiation between 500 and 1000 c/s in the auroral zone . . . . .	239
J. ORTNER and W. RIEDLER: On the longitudinal extent of auroral ionization . . . . .	247
H. J. A. CHIVERS and J. K. HARGREAVES: The use of multiple antennas in studies of absorption at conjugate points . . . . .	257
A. J. MASLEY, A. D. GOEDEKE and G. W. ADAMS: Recent solar cosmic ray events . . . . .	265
B. HULTQVIST: The height of auroral absorption obtained from satellite observations . . . . .	275
R. DALZIEL: Some particular problems in the polar ionosphere and their possible resolution by rocket and satellite experiments . . . . .	285
Discussion on atmospheric phenomena associated with energetic particles . . . . .	297
<b>6 SOLAR PHENOMENA ASSOCIATED WITH ENERGETIC PARTICLES</b>	
C. DE JAGER: Observations of solar particles in interplanetary space . . . . .	299
Discussion on solar particles . . . . .	313
<b>7 GENERAL DISCUSSION</b>	. . . . .
	315

