

CONTENTS

Preface

page v

PART I

SPECTRAL LINE INVESTIGATIONS

PAPER

1. H. C. VAN DE HULST: Studies of the 21-cm. line and their interpretation (<i>Introductory Lecture</i>)	3
2. M. STAHR CARPENTER: 21-cm. observations in Sydney	14
3. F. K. EDMONDSON: Deviations from circular motion and the importance of southern hemisphere 21-cm. observations	19
4. G. WESTERHOUT: Progress report on 21-cm. research by the Netherlands Foundation for Radio Astronomy and the Leiden Observatory	22
5. G. WESTERHOUT: A 21-cm. line survey of the outer parts of the Galaxy	29
6. M. SCHMIDT: The distribution of atomic hydrogen in the inner parts of the Galaxy	37
7. B. J. BOK: Progress report on the project in Radio Astronomy at the G. R. Agassiz station of Harvard Observatory	42
8. T. A. MATTHEWS: Report on 21-cm. observations between $l=60^\circ$ and $l=135^\circ$	48
9. T. K. MENON: A 21-cm. study of the Orion region	56
10. R. S. LAWRENCE: Radio observations of interstellar neutral hydrogen clouds	66
11. H. E. TATEL: 21-cm. meridian plane surveys	67
12. R. D. DAVIES and D. R. W. WILLIAMS: The measurement of the distance of the radio sources	71
13. J. P. HAGEN, A. E. LILLEY and E. F. McCCLAIN: 21-cm. absorption effects	80
14. F. K. EDMONDSON: Comments on McClain's observations of I.A.U. 17S2A	88
15. G. G. GETMANZEV, K. S. STANKEVITCH and V. S. TROITZKY: Detection of the spectral line of deuterium from the centre of the Galaxy on the wave-length of 91.6 cm.	90
16. C. H. TOWNES: Microwave and radio-frequency resonance lines of interest to radio astronomy	92

PART II

POINT SOURCES: INDIVIDUAL STUDY AND
PHYSICAL THEORY

17. R. MINKOWSKI: Optical investigations of radio sources (<i>Introductory Lecture</i>)	<i>page</i> 107
18. J. L. PAWSEY: Current progress in development and results obtained with the 'Mills Cross' at the Radiophysics Laboratory	123
19. J. D. KRAUS, H. C. KO, R. T. NASH and D. V. STOUTENBURG: Recent results in radio astronomy at the Ohio State University	132
20. J. P. HAGEN: Spectra of some radio sources	142
21. R. J. LAMDEN and A. C. B. LOVELL: The low-frequency spectrum of Cygnus A and Cassiopeia A	145
22. H. W. WELLS: Preliminary observations of point sources at 12.5 and 15.5 Mc./s.	148
23. B. F. BURKE and K. L. FRANKLIN: Observations of discrete sources with the 22 Mc./s. Mills Cross	151
24. CH. L. SEEGER: The 400 Mc./s. flux from Cassiopeia A	154
25. V. A. RAZIN and V. M. PLETCHKOV: Intensities of the discrete sources in Cassiopeia, Cygnus and Taurus at λ 3.2 cm.	155
26. CH. L. SEEGER: The radio frequency spectrum of Cassiopeia A: a Symposium summary	156
27. R. C. JENNISON: Intensity distribution across the Cygnus and Cassiopeia sources	159
28. H. P. PALMER: The angular diameter of discrete radio sources	162
29. F. G. SMITH, P. A. O'BRIEN and J. E. BALDWIN: The discrete source of radio waves at the galactic centre	166
30. G. DE VAUCOULEURS and K. V. SHERIDAN: Radio and optical intensity distributions in the Centaurus source (NGC5128)	169
31. J. G. BOLTON and O. B. SLEE: Apparent intensity variations of the radio source Hydra A	174
32. J. L. GREENSTEIN: Theoretical problems of discrete radio sources	179
33. F. T. HADDOCK: Hydrogen emission nebulae as radio sources	192
34. J. H. OORT and T. WALRAVEN: Polarization and the radiating mechanism of the Crab nebula	197
35. I. S. SHKLOVSKY: Optical emission from the Crab nebula in the continuous spectrum	201
36. I. S. SHKLOVSKY: On the nature of the emission from the Galaxy NGC4486	205

PART III

GALACTIC STRUCTURE AND STATISTICAL STUDIES OF POINT SOURCES

37. R. HANBURY BROWN: Galactic radio emission and the distribution of discrete sources (<i>Introductory Lecture</i>)	<i>page</i> 211
38. J. R. SHAKESHAFT: The Cambridge survey of radio sources	218
39. M. RYLE: The spatial distribution of radio stars	221
40. J. L. PAWSEY: Preliminary statistics of discrete sources obtained with the 'Mills Cross'	228
41. J. E. BALDWIN: The spherical component of the galactic radio emission	233
42. A. UNSÖLD: Radio astronomy and the origin of cosmic rays	238
43. I. S. SHKLOVSKY: Some problems of metagalactic radio-emission	241
44. G. DE VAUCOULEURS: Comparison between radio and optical surface brightness distributions in the Magellanic Clouds	244

PART IV

THE QUIET SUN

45. C. W. ALLEN: The quiet and active sun (<i>Introductory Lecture</i>)	253
46. J. P. HAGEN: The structure of the solar chromosphere from centimetre-wave radio observations	263
47. C. H. MAYER, R. M. SLOANAKER and J. P. HAGEN: Observation of the solar eclipse of 30 June 1954 at 9·4 cm. wave-length	269
48. F. T. HADDOCK: The radial brightness distribution of the sun at 9·4 cm.	273
49. RICHARD N. THOMAS and R. G. ATHAY: On the uniformity of the lower chromosphere	279
50. J. L. PAWSEY: Observations of brightness over the disk of the quiet sun at frequencies of 85, 500 and 1400 Mc./s.	284
51. S. F. SMERD and J. P. WILD: Interpretation of solar radio-frequency disk brightness distributions derived from observations with aerials extended in one dimension	290
52. J. FIROR: Brightness distribution of the sun at 1·45 metres	294
53. A. HEWISH: Radio observations of the solar corona at sunspot minimum	298

54. J. TUOMINEN: The ellipticity of the corona at 80 Mc./s. during sunspot minimum 1954	<i>page</i> 302
55. M. LAFFINEUR: Radio observations of the eclipse of 30 June 1954	304
56. T. HATANAKA: Radio observation of the partial solar eclipse, 20 June 1955	307
57. B. M. TCHIKHATCHEV: A survey of Soviet observations of the radio emission from the sun during solar eclipses	311
58. V. V. VITKEVITCH: Results of observations of the scattering of radio waves by the electronic inhomogeneities of the solar corona	313

PART V

THE ACTIVE SUN

59. J. P. WILD: Spectral observations of solar activity at metre wavelengths	321
60. H. W. DODSON: Relation between optical solar features and solar radio emission	327
61. P. SIMON: Sunspots: radio, optical and geomagnetic features	334
62. W. O. ROBERTS: Optical evidences of radiational and corpuscular emission from active solar regions	336
63. M. WALDMEIER: The enhanced radiation from sunspot-regions	340
64. D. H. MENZEL and M. KROOK: On the origin of solar radio noise	342
65. K. O. KIEPENHEUER: On the mechanism of solar outbursts	345
66. L. BIERMANN and R. LÜST: Remarks on the energy of the non-thermal radio-frequency emission	354
67. A. SCHLÜTER: Solar radio emission and the acceleration of magnetic-storm particles	356
68. T. HATANAKA: Polarization of solar radio bursts	358
69. V. V. VITKEVITCH: Disturbed radio emission from the sun as a sum of small monochromatic peaks	363
70. C. DE JAGER and F. VAN 'T VEER: Some properties of solar radio-transients on fast 200 Mc./s. records	366
71. A. D. FOKKER: A peculiar type of scintillation of solar radio radiation	371

PART VI

METEORS AND PLANETS

72. F. L. WHIPPLE: Some problems of meteor astronomy (<i>Introductory Lecture</i>)	<i>page</i> 375
73. J. G. DAVIES: Orbits of sporadic meteors	390
74. I. C. BROWNE, K. BULLOUGH, S. EVANS and T. R. KAISER: The distribution of meteor masses	392
75. B. F. BURKE and K. L. FRANKLIN: Jupiter as a radio source	394
76. C. A. SHAIN: Location on Jupiter of a source of radio noise	397
77. F. LINK: Possible proofs of the lunar atmosphere	400
78. B. ELSMORE: The lunar occultation of a radio star and the derivation of an upper limit for the density of the lunar atmosphere	403
79. V. S. TROITZKY and S. E. KHAIKIN: Radio emission from the moon and the nature of its surface	406
80. I. C. BROWNE and J. V. EVANS: The moon as a scatterer of radio waves	408