

PROCEEDINGS
OF THE
ROYAL SOCIETY OF EDINBURGH

PROCEEDINGS
OF
THE ROYAL SOCIETY
OF EDINBURGH

VOL. LIX

1938-1939

EDINBURGH
PRINTED BY NEILL AND COMPANY, LIMITED
MCMXL

CONTENTS

	PAGE
1. The Molecular Spectra of the Hydrogen Isotopes. I. Application of the Rotating Vibrator Model to the States of D_2 . By Ian Sandeman, D.Sc., Late Carnegie Research Scholar in the University of St Andrews. Issued separately December 12, 1938,	1
2. The Establishment of the Trichromatic Theory of Colour Vision. By Professor W. Peddie, D.Sc., University College, Dundee. Issued separately December 26, 1938,	15
3. Importance of Dialysis in the Study of Colloids. V. Colloidal Gold. VI. Colloidal Vanadium Pentoxide. By B. N. Desai, B.A., LL.B., M.Sc., Ph.D., D.Sc., P. M. Barve, M.Sc., and Y. S. Paranjpe, M.Sc. (From the Physical Chemistry Laboratory, Wilson College, Bombay, 7, India.) Issued separately December 26, 1938,	22
4. Some Eocene Ostracoda from North-West India. By Mary H. Latham, M.A., Assistant in Geology, Glasgow University. <i>Communicated by</i> Lieut.-Colonel L. M. Davies, M.A., F.G.S. (With Fifteen Text-figures.) Issued separately December 26, 1938,	38
*5. Solution in Multiple Series of a Type of Generalised Hypergeometric Equation. By Professor T. M. MacRobert, D.Sc. Issued separately April 12, 1939,	49
6. Investigation of Visual Threshold Values. By Mrs E. M. Beattie. <i>Communicated by</i> Professor W. Peddie, D.Sc., University College, Dundee. (With Five Text-figures.) Issued separately April 12, 1939,	55
*7. The Fertility of Scottish Married Women, with Special Reference to the Period 1926-1935. By R. S. Barclay, B.Sc., and W. O. Kermack, D.Sc., LL.D. (From the Laboratory of the Royal College of Physicians, Edinburgh.) (With Two Figures and Thirteen Tables.) Issued separately April 12, 1939,	62
8. Lunar Atmospheric Pressure Variations at Glasgow. By R. A. Robb, M.A., D.Sc., and T. R. Tannahill, M.A., B.Sc. Issued separately May 1, 1939,	81
*9. Sources of Variation in Human Birth Weights. By H. P. Donald, Ph.D.(Edin.), Institute of Animal Genetics, University of Edinburgh. (With Three Graphs.) Issued separately May 1, 1939,	91
10. On the Invariance of Quantized Field Equations. By K. Fuchs, Ph.D., University of Edinburgh. <i>Communicated by</i> Professor Max Born, Hon. D.Sc. Issued separately May 18, 1939,	109

	PAGE
11. The Relation between Mathematics and Physics. By Professor P. A. M. Dirac, F.R.S. <i>Communicated to the Royal Society of Edinburgh on presentation of the James Scott Prize, February 6, 1939. Issued separately May 20, 1939,</i>	122
12. The Molecular Spectra of the Hydrogen Isotopes. II. The Assumption of a Common Potential Function for the Isotopic States. By Ian Sandeman, D.Sc., late Carnegie Research Scholar in the University of St Andrews. <i>Issued separately May 20, 1939,</i>	130
13. Expressions for Generalised Hypergeometric Functions in Multiple Series. By Professor T. M. MacRobert, D.Sc. <i>Issued separately May 20, 1939,</i> .	141
14. Studies on Reproduction in the Albino Mouse. II. Contributions on the Maturation of the Sperm Cells. By Hugo Merton (Heidelberg). <i>Communicated by Professor F. A. E. Crew, M.D., D.Sc. (With Two Text-figures.) Issued separately May 26, 1939,</i>	145
15. On Non-Associative Combinations. By I. M. H. Etherington, B.A.(Oxon), Ph.D.(Edin.), Mathematical Institute, University of Edinburgh. <i>Issued separately June 27, 1939,</i>	153
*16. Cytogenetical Analysis of the Chromosomes in the Pig. By Professor F. A. E. Crew, M.D., D.Sc., and P. C. Koller, Ph.D., D.Sc., Institute of Animal Genetics, University of Edinburgh. (With One Plate and Eleven Text-figures.) <i>Issued separately June 27, 1939,</i>	163
*17. Relations between the Elliptic Cylinder Functions. By E. L. Ince, D.Sc. <i>Issued separately June 28, 1939,</i>	176
18. Tests of Significance of the Differences between Regression Coefficients derived from Two Sets of Correlated Variates. By F. Yates, Sc.D., Rothamsted Experimental Station. <i>Communicated by A. C. Aitken, D.Sc., F.R.S. Issued separately August 10, 1939,</i>	184
19. On the Reciprocation of Certain Matrices. By A. R. Collar, B.A., B.Sc., Aerodynamics Department, the National Physical Laboratory. <i>Communicated by Dr A. C. Aitken, F.R.S. Issued separately August 7, 1939,</i> .	195
20. Studies on Reproduction in the Albino Mouse. III. The Duration of Life of Spermatozoa in the Female Reproductive Tract. By Hugo Merton, Institute of Animal Genetics, Edinburgh. <i>Communicated by Professor F. A. E. Crew, F.R.S. (With Two Tables and Two Figures.) Issued separately September 14, 1939,</i>	207
21. Reciprocity and the Number 137. Part I. By Professor Max Born, F.R.S., University of Edinburgh. <i>Issued separately September 14, 1939,</i> . . .	219
22. Integration of a Certain System of Linear Partial Differential Equations of Hypergeometric Type. By A. Erdélyi, Mathematical Institute, University of Edinburgh. <i>Communicated by Professor E. T. Whittaker, F.R.S. Issued separately September 28, 1939,</i>	224

	PAGE
23. Genetic Algebras. By I. M. H. Etherington, B.A.(Oxon), Ph.D.(Edin.), Mathematical Institute, University of Edinburgh. Issued separately November 9, 1939,	242
OBITUARY NOTICES: Henry Edward Armstrong; George Barger; Sir James Barr; Harvey (Williams) Cushing; Sir Frank Watson Dyson; Sir Frederick T. G. Hobday; James Gall Inglis; Henry Halcro Johnston; Walter John Mabbott; Tarak Nath Majumdar; Sir Robert Ludwig Mond; John Murdoch Murray; The Very Rev. William Paterson Paterson; Sir Robert William Philip; Thomas Stephenson; David Waters Sutherland; Arthur Logan Turner; Alexander G. Wallace; Robert Wallace; Edmund Beecher Wilson; Sir Robert Patrick Wright,	259
APPENDIX—	
Proceedings of the Statutory General Meeting, October 1938,	291
Proceedings of the Ordinary Meetings, Session 1938–1939,	294
Proceedings of the Statutory General Meeting, October 1939,	299
The Keith, Makdougall-Brisbane, Neill, Gunning Victoria Jubilee, James Scott, Bruce, and David Anderson-Berry Prizes, and the Bruce-Preller Lecture Fund,	302
Awards	306
Accounts of the Society, Session 1938–1939,	309
Voluntary Contributors under Law VI (end of para. 3),	315
The Council of the Society at October 23, 1939,	316
Fellows of the Society at October 23, 1939,	317
Honorary Fellows of the Society at October 23, 1939,	346
Changes in Fellowship during Session 1938–1939,	349
Fellows of the Society elected during Session 1938–1939,	349
Laws of the Society,	350
Additions to the Library—Presentations, etc.—1938–1939,	358
Index,	365
Index, under Authors' Names, of Papers published in <i>Transactions</i> ,	368

* The thanks of the Society are due to the Carnegie Trust for the Universities of Scotland for grants towards the costs of the illustrations, tables, etc., in these papers.