

TRANSACTIONS
OF THE
ROYAL SOCIETY OF EDINBURGH.

TRANSACTIONS
OF THE
ROYAL SOCIETY
OF
EDINBURGH.

VOL. XXXIII.

EDINBURGH:
PUBLISHED BY ROBERT GRANT & SON, 107 PRINCES STREET,
AND WILLIAMS & NORGATE, 14 HENRIETTA STREET, COVENT GARDEN, LONDON.

MCCCCLXXXVIII.

PART I. published . . . May 13, 1887.
PART II. ,, . . . April 30, 1888.
PART III. ,, . . . October 20, 1888.

CONTENTS.

PART I. (1885–86.)

| | PAGE |
|--|------|
| I. <i>The Atomic Weight of Tungsten.</i> By JOHN WADDELL, B.A., D.Sc., | 1 |
| II. <i>On Dew.</i> By JOHN AITKEN, F.R.S.E., | 9 |
| III. <i>On the Foundations of the Kinetic Theory of Gases.</i> By Professor TAIT, Sec. R.S.E., | 65 |
| IV. <i>The Eggs and Larvæ of Teleosteans.</i> By J. T. CUNNINGHAM, B.A., F.R.S.E. (Plates I.–VII.), | 97 |
| V. <i>On the Fructification of some Ferns from the Carboniferous For- mation.</i> By ROBERT KIDSTON, F.R.S.E., F.G.S. (Plates VIII., IX.), | 137 |
| VI. <i>On the Colours of Thin Plates.</i> By the Right Hon. LORD RAYLEIGH, Hon. F.R.S.E. (Plate X.), | 157 |
| VII. <i>On the Electrical Properties of Hydrogenised Palladium.</i> By CARGILL G. KNOTT, D.Sc. (Edin.), F.R.S.E., Professor of Physics, Imperial University, Tokayo, Japan. (Plate XI.), | 171 |
| VIII. <i>The Electrical Resistance of Nickel at High Temperatures.</i> By CARGILL G. KNOTT, D.Sc. (Edin.), F.R.S.E., Professor of Physics, Imperial University, Tokayo, Japan. (Plate XII.), | 187 |
| IX. <i>The Formation of the Germinal Layers in Teleostei.</i> By GEORGE BROOK, F.R.S.E., F.L.S., Lecturer on Comparative Embryology in the University of Edinburgh. (Plates XIII.–XV.), | 199 |

| | PAGE |
|--|------|
| X. <i>On the Structure of Suberites domuncula, Olivi (O. S.), together with a Note on peculiar Capsules found on the Surface of Spongelia.</i> By J. ARTHUR THOMSON, F.R.S.E. (Plates XVI., XVII.), | 241 |
| XI. <i>The Reproductive Organs of Bdellostoma, and a Teleostean Ovary from West Coast of Africa.</i> By J. T. CUNNINGHAM, B.A., F.R.S.E., | 247 |
| PART II. (1886-87.) | |
| XII. <i>On the Foundations of the Kinetic Theory of Gases.</i> II. By Professor TAIT, Sec. R.S.E., | 251 |
| XIII. <i>Tables for facilitating the Computation of Differential Refraction in Position, Angle, and Distance.</i> By the Hon. LORD M'LAREN, F.R.S.E., | 279 |
| XIV. <i>On a Class of Alternating Functions.</i> By THOMAS MUIR, LL.D., F.R.S.E., | 309 |
| XV. <i>Expansion of Functions in terms of Linear, Cylindric, Spherical, and Allied Functions.</i> By P. ALEXANDER, M.A. Communicated by Dr T. MUIR, F.R.S.E., | 313 |
| XVI. <i>On Cases of Instability in Open Structures.</i> By E. SANG, LL.D., F.R.S.E., | 321 |
| XVII. <i>On the Fossil Flora of the Radstock Series of the Somerset and Bristol Coal Field (Upper Coal Measures).</i> Parts I., II. By ROBERT KIDSTON, F.R.S.E., F.G.S. (Plates XVIII.-XXVIII.), | 335 |
| XVIII. <i>A Diatomaceous Deposit from North Tolsta, Lewis.</i> By JOHN RATTRAY, M.A., B.Sc., F.R.S.E., of H.M. "Challenger" Commission, Edinburgh. (Plate XXIX.), | 419 |
| XIX. <i>On the Minute Structure of the Eye in certain Cymothoidæ.</i> By FRANK E. BEDDARD, M.A., F.R.S.E., F.Z.S., Prosector to the Zoological Society, and Lecturer on Biology at Guy's Hospital. (Plate XXX.), | 443 |

| | PAGE |
|--|------|
| XX. <i>Report on the Pennatulida dredged by H.M.S. "Porcupine."</i> By A. MILNES MARSHALL, M.D., D.Sc., M.A., F.R.S., Beyer Professor of Zoology in the Owens College; and G. H. FOWLER, B.A., Ph.D., Berkeley Fellow of the Owens College, Manchester. Communicated by JOHN MURRAY, Esq. (Plates XXXI., XXXII.), | 453 |
| XXI. <i>On the Determination of the Curve, on one of the Coordinate Planes, which forms the Outer Limit of the Positions of the Point of Contact of an Ellipsoid which always touches the three Planes of Reference.</i> By G. PLARR, Docteur ès-sciences. Communi- cated by Professor TAIT, | 465 |
| XXII. <i>On the Partition of Energy between the Translatory and Rotational Motions of a Set of Non-Homogeneous Elastic Spheres.</i> By Professor W. BURNSIDE, | 501 |
| XXIII. <i>A Contribution to our Knowledge of the Physical Properties of Methyl-Alcohol.</i> By W. DITTMAR, F.R.S.S. Lond. & Edin., and CHARLES A. FAWSITT. (Plate XXXIII.), | 509 |
| XXIV. <i>On the Thermal Conductivity of Iron, Copper, and German Silver.</i> By A. CRICHTON MITCHELL, Esq. Communicated, with an Introduction, by Professor TAIT, Sec. R.S.E. (Plates XXXIV., XXXV.), | 535 |
| XXV. <i>Critical Experiments on the Chloroplatinate Method for the De- termination of Potassium, Rubidium, and Ammonium; and a Redetermination of the Atomic Weight of Platinum.</i> By W. DITTMAR, F.R.S.E., and JOHN M'ARTHUR, F.R.S.E., | 561 |

PART III. (1887-88.)

| | |
|---|-----|
| XXVI. <i>The Polychæta Sedentaria of the Firth of Forth.</i> By J. T. CUNNINGHAM, B.A., Fellow of University College, Oxford, F.R.S.E., Superintendent of the Granton Marine Laboratory; and G. A. RAMAGE, Vans Dunlop Scholar in Edinburgh Uni- versity. (Plates XXXVI.-XLVII.), | 635 |
|---|-----|

APPENDIX—

| | PAGE |
|--|------|
| <i>The Council of the Society,</i> | 688 |
| <i>Alphabetical List of the Ordinary Fellows,</i> | 689 |
| <i>List of Honorary Fellows,</i> | 702 |
| <i>List of Ordinary Fellows Elected during Session 1886–87,</i> | 704 |
| <i>Laws of the Society,</i> | 709 |
| <i>The Keith, Makdougall-Brisbane, Neill, and Victoria Jubilee Prizes,</i> | 714 |
| <i>Awards of the Keith, Makdougall-Brisbane, Neill, and Victoria Jubilee Prizes,</i> | 717 |
| <i>Proceedings of Statutory General Meeting,</i> | 721 |
| <i>List of Public Institutions and Individuals entitled to receive Copies of the Transactions and Proceedings,</i> | 725 |
| <i>Index,</i> | 731 |