TRANSACTIONS

OF THE

ROYAL SOCIETY OF EDINBURGH.

TRANSACTIONS

OF THE

ROYAL SOCIETY

0F

EDINBURGH.

VOL. XXIII.

EDINBURGH:

PUBLISHED BY ROBERT GRANT & SON, 82 PRINCES STREET,
AND WILLIAMS & NORGATE, 14 HENRIETTA STREET, COVENT GARDEN, LONDON.

MDCCCLXIV.

PRINTED BY NEILL AND COMPANY, EDINBURGH.

DIRECTIONS TO THE BINDER FOR PLACING THE PLATES IN THIS VOLUME.

Plate I. { II. {	Illustrating Dr John Denis Macdonald's Paper on the Order and Classification of Heteropoda,	20
III. {	Illustrating Mr Wm. Turner's Paper on the Structure of the Chondracan- thus Lophii, with Observations on its Larval Form,	76
IV. {	Illustrating Mr Wm. Turner's Paper on the Structure of Lerneopoda Dalmanni, with Observations on its Larval Form,	88
V. {	Illustrating Mr Edward Sang's Paper on the Deflection of the Plummet due to Solar and Lunar Attraction,	94
VI.	Illustrating Sir David Brewster's Paper on the Existence of Acari between the Laminæ of Mica in Optical Contact,	96
VII.	Illustrating Sir David Brewster's Paper on Certain Vegetable and Mineral Formations in Calareous Spar,	98
VIII.	Illustrating Professor William Thomson's Paper on the Secular Cooling of the Earth,	170
IX.	Illustrating Dr John Denis Macdonald's Paper on the Representative Relationships of the Fixed and Free Tunicata, regarded as two Sub-Classes of equivalent value (figs. 1, 2); on the Zoological Character of the living Clio caudata, as compared with those of Clio borealis given in Systematic Works (fig. 3); and Notes on the Anatomy of the Genus Firola (fig. 4),	192
X.	Illustrating Sir David Brewster's Paper on the Structure and Optical Phenomena of Ancient Decomposed Glass,	204
XII.	Illustrating Sir David Brewster's Observations on the Polarization of the Atmosphere, made in St Andrews,	240
XIII.	Illustrating Professor Allman's Paper on a Pre-brachial Stage in the Development of Comatula, and its importance in relation to certain Aberrant Forms of Extinct Crinoids,	252
XIV. XV. XVI. XVII. XVIII.	Illustrating Dr R. E. Scoresby-Jackson's Paper on the Influence of Weather upon Disease and Mortality,	348
XIX.	Illustrating Sir David Brewster's Description of the Lithoscope, an Instrument for Distinguishing Precious Stones and other Bodies,	424
XX.	Illustrating Professor Kelland's Paper on Superposition,	474
XXI. XXII.	{ Illustrating the Rev. Robert Boog Watson's Paper on the Great Drift Beds with Shells in the South of Arran,	546
XXIII. XXIV. XXV. XXVI. XXVII.	Illustrating Professor Smith's Paper on some points in the Metrology of the Great Pyramid,	706
XXIX.	·	806
VOI.	XXIII. PART III.	

CONTENTS.

PART I. (1861-62.)

PAGE		
1	On the Anatomy and Classification of the Heteropoda. By John Denis Macdonald, R.N., F.R.S., Surgeon of H.M.S. "Icarus." (With two Plates, I., II.),	I.
21	Investigation of an Expression for the Mean Temperature of a Stratum of Soil, in Terms of the Time of Year. By Joseph D. Everett, M.A., Professor of Mathematics, &c., in King's College, Windsor, Nova Scotia,	II.
29	On a Difficulty in the Theory of Rain. By James Dalmahoy, Esq.,	III.
39	On the Pressure Cavities in Topaz, Beryl, and Diamond, and their bearing on Geological Theories. By Sir David Brewster, K.H., D.C.L., F.R.S.,	IV.
45	On the Theory of Numbers. By H. F. Talbot, Esq.,	v.
53	On the Rain-Fall in the Lake District in 1861, with some Observa- tions on the Composition of Rain Water. By John Davy, M.D., F.R.SS. Lond. & Edin.,	VI.
67	. On the Structure of the Chondracanthus Lophii, with Observations on its Larval Form. By Wm. Turner, M.B. (Lond.), F.R.S.E., and H. S. Wilson, M.D., Demonstrators of Anatomy in the University of Edinburgh. (With a Plate, III.),	VII.
77	. On the Structure of Lerneopoda Dalmanni, with Observations on its Larval Form. By Wm. Turner, M.B. (Lond.), F.R.S.E., and H. S. Wilson, M.D., Demonstrators of Anatomy. (With a Plate, IV.),	'III
89	On the Deflection of the Plummet due to Solar and Lunar Attraction. By Edward Sang, Esq. (With a Plate, V.),	IX
~ ~		

	PAGE
X. On the Existence of Acari between the Laminæ of Mica in Optical Contact. By Sir David Brewster, K.H., D.C.L., F.R.S. (With a Plate, VI.),	95
XI. On Certain Vegetable and Mineral Formations in Calcareous Spar. By Sir David Brewster, K.H., D.C.L., F.R.S. (With a Plate, VII.),	97
XII. Memoir of the Life and Writings of Robert Whytt, M.D., Professor of Medicine in the University of Edinburgh from 1747 to 1766. By William Seller, M.D., F.R.S.E., Fellow of the Royal College of Physicians of Edinburgh,	99
XIII. Experimental Inquiry into the Laws of the Conduction of Heat in Bars, and into the Conducting Power of Wrought Iron. By James D. Forbes, LL.D., D.C.L., F.R.S., V.P.R.S. Ed., Corresponding Member of the Institute of France, Principal of the United College of St Salvator and St Leonard, St Andrews, .	133
XIV. On the Density of Steam. By Professor W. J. Macquorn Ran- Kine, C.E., LL.D., F.R.SS. Lond. and Ed., &c.,	147
XV. On the Secular Cooling of the Earth. By Professor William Thomson, LL.D., F.R.S., F.R.S.E. (With a Plate, VIII.)	157
PART II. (1862-63.)	
XVI. On the Representative Relationships of the Fixed and Free Tunicata, regarded as two Sub-Classes of equivalent value; with some General Remarks on their Morphology. By John Denis Macdonald, R.N., F.R.S., Surgeon of H.M.S. "Icarus." Communicated by Professor Maclagan. (With a Plate, IX.),	171
XVII. On the Zoological Characters of the Living Clio caudata, as compared with those of Clio borealis given in Systematic Works. By John Denis Macdonald, R.N., F.R.S., Surgeon of H.M.S. "Icarus." Communicated by Professor Maclagan. (With a Plate, IX. fig. 3),	185

CONTENTS.	XX
XVIII. Notes on the Anatomy of the Genus Firola. By John Denis MacDonald, R.N., F.R.S., Surgeon of H.M.S. "Icarus." Communicated by Professor MacLagan. (With a Plate, IX. fig. 4),	PAGE
XIX. On the Structure and Optical Phenomena of Ancient Decomposed Glass. By Sir David Brewster, K.H., D.C.L., F.R.S., &c. (With two Plates, X., XI.),	193
XX. On the Polarisation of Light by Rough and White Surfaces. By Sir David Brewster, K.H., D.C.L., F.R.S., &c.,	205
XXI. Observations on the Polarisation of the Atmosphere, made at St Andrews in 1841, 1842, 1843, 1844, and 1845. By Sir David Brewster, K.H., D.C.L., F.R.S., &c. (With a Plate, XII.),	211
XXII. On a Pre-Brachial Stage in the Development of Comatula, and its importance in relation to certain Aberrant Forms of Extinct Crinoids. By Professor Allman. (With a Plate, XIII.),	241
XXIII. Some Account of the Recent Progress of Sanskrit Studies. By J. Muir, D.C.L., LL.D.,	253
XXIV. On Fagnani's Theorem. By H. F. Talbot, Esq.,	285
XXV. On the Influence of Weather upon Disease and Mortality. By R. E. Scoresby-Jackson, M.D., F.R.S.E., F.R.C.P., Lecturer on Materia Medica and Therapeutics at Surgeons' Hall, Edinburgh. (With Five Plates, XIVXVIII.),	299
XXVI. On the Anatomical Type of Structure of the Human Umbilical Cord and Placenta. By J. Y. Simpson, M.D., Professor of Medicine and Midwifery in the University of Edinburgh,	34 9
XXVII. On Earth-Currents during Magnetic Calms, and their connection with Magnetic Changes. By Balfour Stewart, M.A., F.R.S.,	355
XXVIII. On the Great Refracting Telescope at Elchies, in Morayshire, and its Powers in Sidereal Observation. By Professor C. Piazzi Smyth,	371
VOL. XXIII. PART III.	

PART III. (1863–64.)

*****		PAGE
XXIX.	Description of the Lithoscope, an Instrument for distinguishing Precious Stones and other bodies. By Sir David Brewster, K.H., F.R.S. (With a Plate, XIX.),	419
XXX.	On the Agrarian Laws of Lycurgus, and one of Mr Grote's Canons of Historical Criticism. By Professor Blackie,	425
XXXI.	On the Limits of our Knowledge respecting the Theory of Parallels. By Professor Kelland,	433
XXXII.	On the Temperature of Certain Hot-Springs in the Pyrenees. By R. E. Scoresby-Jackson, M.D., F.R.C.P.E., Lecturer on Materia Medica and Therapeutics at Surgeons' Hall, Edinburgh,	451
XXXIII.	On Superposition. By the Rev. Philip Kelland, M.A., F.R.S., Professor of Mathematics in the University of Edinburgh. Part II. (Continued from Vol. XXI. p. 273.) (With a Plate, XX.),	471
XXXIV.	On the Variations of the Fertility and Fecundity of Women according to Age. By J. Matthews Duncan, M.D.,	475
XXXV.	On the most Volatile Constituents of American Petroleum. By EDMUND RONALDS, Ph.D.,	491
XXXVI.	On Sun-Spots and their Connection with Planetary Configurations. By Balfour Stewart, M.A., F.R.S.,	499
XXXVII.	On the freezing of the Egg of the Common Fowl. By John Davy, M.D., F.R.SS. Lond. and Ed., &c. (Communicated by Professor Maclagan),	505
XXXVIII.	On the Morphological Relationships of the Molluscoida and Cælenterata, and of their leading Members, inter se. By John Denis Macdonald, R.N., F.R.S., Surgeon of H.M.S. "Icarus,".	515
XXXIX.	On the Great Drift Beds with Shells in the South of Arran. By the Rev. Robert Boog Watson, B.A., F.R.S.E., Hon. Mem. Nat. Ver. Lüneburg. (With two Plates, XXI., XXII.),	523

CONTENTS.	xxiii
XL. On the Principal Deities of the Rigveda. By J. Muir, D.C.L.,	PAGE
LL.D.,	547
XLI. The Law of the Volumes of Aeriforms extended to Dense Bodies. By Rev. J. G. Macvicar, M.A., D.D., Moffat,	<i>5</i> 81
XLII. Biographical Sketch of Adam Ferguson, LL.D., F.R.S.E., Pro- fessor of Moral Philosophy in the University of Edinburgh. By John Small, M.A., Librarian to the University,	599
XLIII. On the Reputed Metrological System of the Great Pyramid. By Professor C. Piazzi Smyth. (With five Plates, XXIIIXXVII.),	667
XLIV. On the Theory of Isomeric Compounds. By Dr A. CRUM BROWN,	707
XLV. On the Theory of Commensurables. By Edward Sang, Esq	721
XLVI. On the Structure and Action of the Auriculo-Ventricular Valves. By James B. Pettigrew, M.D. Communicated by W. Turner, M.B., Demonstrator of Anatomy in the University of Edinburgh,	761
	•
Proceedings of Statutory General Meetings, &c.,	807
List of Members Elected,	814
List of the present Ordinary Members, in the order of their Election,	816
List of Non-Resident and Foreign Members, elected under the Old Laws, .	823
" Honorary Fellows,	823
,, Fellows Deceased, Resigned, and Cancelled, from 1861 to 1864,	825
Public Institutions, &c., entitled to receive the Transactions and Proceedings	000
of the Society,	826
List of Donations continued from Vol. XXII., p. 750,	828
Index,	857