

TRANSACTIONS

OF THE

ROYAL SOCIETY OF EDINBURGH.

VOL. XVI. PART V., FOR THE SESSION 1848–1849.

CONTENTS.

XXXIV.— <i>A Biographical Notice of the late THOMAS CHALMERS, D.D. & LL.D.</i> By the Very Reverend E. B. RAMSAY, M.A., F.R.S.E.,	PAGE 497
XXXV.— <i>On the Theory of Rolling Curves.</i> By Mr JAMES CLERK MAXWELL. Communicated by Professor KELLAND,	519
XXXVI.— <i>An Account of CARNOT'S Theory of the Motive Power of Heat; with Numerical Results deduced from REGNAULT'S Experiments on Steam.</i> By WILLIAM THOMSON, Professor of Natural Philosophy in the University of Glasgow,	541
XXXVII.— <i>Theoretical Considerations on the Effect of Pressure in Lowering the Freezing Point of Water.</i> By JAMES THOMSON, Esq., of Glasgow. Communicated by Professor WILLIAM THOMSON,	575
XXXVIII.— <i>On the Gradual Production of Luminous Impressions on the Eye, and other Phenomena of Vision.</i> (With a Plate.) By WILLIAM SWAN, F.R.S.E.,	581
<i>Proceedings at Extraordinary Meetings, &c.,</i>	605
<i>Index,</i>	649

TRANSACTIONS
OF THE
ROYAL SOCIETY
OF
EDINBURGH.

VOL. XVI.

EDINBURGH :
PUBLISHED BY ROBERT GRANT & SON, 82 PRINCE'S STREET ; AND
WILLIAMS & NORGATE, 14 HENRIETTA STREET,
COVENT GARDEN, LONDON.

MDCCCXLIX.

PRINTED BY NEILL AND COMPANY, EDINBURGH.

TRANSACTIONS

OF THE

ROYAL SOCIETY OF EDINBURGH.

CONTENTS.

PART I.

	PAGE
I. <i>On a Possible Explanation of the Adaptation of the Eye to Distinct Vision at Different Distances.</i> By JAMES D. FORBES, Esq., F.R.SS. L. & E., Corresponding Member of the Institute of France, and Professor of Natural Philosophy in the University of Edinburgh,	1
II. <i>On the Modification of the Doubly Refracting and Physical Structure of Topaz, by Elastic Forces emanating from Minute Cavities.</i> By Sir DAVID BREWSTER, K.H., D.C.L., F.R.S., and V.P.R.S., Edinburgh,	7
III. <i>On the Existence of Crystals with different Primitive Forms and Physical Properties in the Cavities of Minerals; with additional Observations on the New Fluids in which they occur.</i> (With a Plate.) By Sir DAVID BREWSTER, K.H., LL.D., F.R.S., and V.P.R.S., Edin.,	11
IV. <i>Account of Experiments upon the Force of the Waves of the Atlantic and German Oceans.</i> By THOMAS STEVENSON, Esq., Civil Engineer, Edinburgh. Communicated by DAVID STEVENSON, Esq.,	23
V. <i>On the Geology of Cockburnlaw, and the adjoining District, in Berwickshire.</i> (With a Map and Sections.) By WILLIAM STEVENSON, Dunse. Communicated by DAVID MILNE, Esq.,	33
VI. <i>On the Extraction of pure Phosphoric Acid from Bones, and on a new and anomalous Phosphate of Magnesia.</i> By WILLIAM GREGORY, M.D., F.R.S.E., Professor of Chemistry in the University of Edinburgh,	47
VII. <i>Miscellaneous Observations on Blood and Milk.</i> By JOHN DAVY, M.D., F.R.SS. London and Edinburgh, Inspector-General of Army Hospitals, L.R.,	53

- VIII. *On the Advantages to be derived from the Use of Metallic Reflectors for Sextants and other Reflecting Instruments; and on Methods of directly determining the Errors in Mirrors and Sun-Shades used in Reflecting Instruments.* By JOHN ADIE, Esq., 61
- IX. *On the Balance Magnetometer, and its Temperature Correction.* By J. A. BROUN, Esq. Communicated by Sir T. M. BRISBANE, Bart., 67
- X. *On WOLLASTON'S Argument from the Limitation of the Atmosphere, as to the Finite Divisibility of Matter.* By GEORGE WILSON, M.D., Lecturer on Chemistry, 79

PART II.

- XI. *On the Sums of the Digits of Numbers.* By the Right Reverend Bishop TERROT, 87
- XII. *Results of the Makerstoun Observations, No. I. On the Relation of the Variations of the Horizontal Intensity of the Earth's Magnetism to the Solar and Lunar Periods.* (With Two Plates.) By J. A. BROUN, Esq. Communicated by Sir T. M. BRISBANE, Bart., 99
- XIII. *On the Decomposition and Dispersion of Light within Solid and Fluid Bodies.* (With a Plate.) By Sir DAVID BREWSTER, K.H., D.C.L., F.R.S., and V.P.R.S., Edin., 111
- XIV. *On the Constitution and Properties of Picoline, a new Organic Base from Coal-Tar.* By THOMAS ANDERSON, M.D., 123
- XV. *Results of the Makerstoun Observations, No. II. On the Relation of the Variations of the Vertical Component of the Earth's Magnetic Intensity to the Solar and Lunar Periods.* (With a Plate.) By J. ALLAN BROUN, Esq., Director of General Sir T. M. BRISBANE'S Magnetical and Meteorological Observatory. Communicated by Sir T. M. BRISBANE, Bart., 137
- XVI. *On the Solubility of Fluoride of Calcium in Water, and its relation to the occurrence of Fluoride in Minerals, and in Recent and Fossil Plants and Animals.* By GEORGE WILSON, M.D., 145

	PAGE
XVII. <i>Observations on the Principle of Vital Affinity, as illustrated by recent discoveries in Organic Chemistry.</i> By WILLIAM PULTENEY ALISON, M.D., F.R.S.E., Professor of the Practice of Medicine in the University of Edinburgh,	165
XVIII. <i>Account of some Experiments on the Temperature of the Earth at different Depths, and in different Soils, near Edinburgh.</i> (With Four Plates.) By JAMES D. FORBES, Esq., F.R.S., Sec. R.S. Ed., &c. Corresponding Member of the Institute of France, and Professor of Natural Philosophy in the University of Edinburgh,	189

PART III.

XIX. <i>On a Formula representing the Mean Height of the Barometer at the Level of the Sea.</i> By Professor HANSTEEN of Christiana, in a Letter addressed to Professor FORBES, Secretary of the Royal Society of Edinburgh,	237
XX. <i>On General Differentiation.</i> Part III. By The Rev. P. KELLAND, M.A., F.R.SS. L. & E., F.C.P.S., late Fellow of Queen's College, Cambridge, Professor of Mathematics, &c., in the University of Edinburgh,	241
XXI. <i>Observations on the Principle of Vital Affinity, as illustrated by recent discoveries in Organic Chemistry.</i> By WILLIAM PULTENEY ALISON, M.D., F.R.S.E., Professor of the Practice of Medicine in the University of Edinburgh. Part II.	305
XXII. <i>An Attempt to Elucidate and Apply the Principles of Goniometry, as published by Mr WARREN, in his Treatise on the Square Roots of Negative Quantities.</i> By The Right Rev. Bishop TERROT,	345
XXIII. <i>On the Reaction of Natural Waters with Soluble Lead Salts.</i> By ARTHUR CONNELL, Esq., F.R.S.E., Professor of Chemistry in the University of St Andrews,	357
XXIV. <i>On certain Products of Decomposition of the Fixed Oils in contact with Sulphur.</i> By THOMAS ANDERSON, Esq., M.D., F.R.S.E., Lecturer on Chemistry, Edinburgh,	363

	PAGE
XXV. <i>Experiments on the Ordinary Refraction of Iceland Spar.</i> By WILLIAM SWAN, Esq. Communicated by Professor KELLAND,	375
XXVI. <i>Observations on the Temperature of the Ground at Trevandrum, in India, from May 1842 to December 1845.</i> By JOHN CALDECOTT, Esq., Astronomer to the Rajah of Travancore. Communicated in a Letter to Professor J. D. FORBES,	379
XXVII. <i>On the Parallel Roads of Lochaber, with Remarks on the Change of Relative Levels of Sea and Land in Scotland, and on the Detrital Deposits in that Country.</i> (With a Plate.) By DAVID MILNE, Esq.,	395

PART IV.

XXVIII. <i>Memoir of Dr THOMAS CHARLES HOPE, late Professor of Chemistry in the University of Edinburgh.</i> By THOMAS STEWART TRAILL, M.D.	419
XXIX. <i>On the Colouring Matter of the Morinda citrifolia.</i> By THOMAS ANDERSON, M.D.,	435
XXX. <i>Notice of the Orbit of the Binary Star α Centauri, as recently determined by Captain W. S. JACOB, Bombay Engineers.</i> By Professor C. PIAZZI SMYTH,	445
XXXI. <i>An Attempt to Improve the present Methods of Determining the Strength and Direction of the Wind at Sea.</i> (With a Plate.) By Professor C. PIAZZI SMYTH,	455
XXXII. <i>On the Products of the Destructive Distillation of Animal Substances.</i> Part I. By THOMAS ANDERSON, M.D.,	463
XXXIII. <i>On the Action of the Dry Gases on Organic Colouring Matter, and its relation to the Theory of Bleaching.</i> By GEORGE WILSON, M.D.,	475

PART V.

	PAGE
XXXIV. <i>A Biographical Notice of the late THOMAS CHALMERS, D.D. & LL.D.</i> By the Very Reverend E. B. RAMSAY, M.A., F.R.S.E.,	497
XXXV. <i>On the Theory of Rolling Curves.</i> By Mr JAMES CLERK MAXWELL. Communicated by the Rev. Professor KELLAND,	519
XXXVI. <i>An account of CARNOT'S Theory of the Motive Power of Heat ; with Numerical Results deduced from REGNAULT'S Experiments on Steam.</i> By WILLIAM THOMSON, Professor of Natural Philosophy in the University of Glasgow,	541
XXXVII. <i>Theoretical Considerations on the Effect of Pressure in Lowering the Freezing Point of Water.</i> By James THOMSON, Esq., of Glasgow. Communicated by Professor WILLIAM THOMSON,	575
XXXVIII. <i>On the Gradual Production of Luminous Impressions on the Eye, and other Phenomena of Vision.</i> (With a Plate.) By WILLIAM SWAN, Esq.,	581
<i>Proceedings at Extraordinary Meetings, &c.</i>	605
<i>List of the present Ordinary Members, in the order of their Election,</i>	614
<i>List of Non-Resident and Foreign Members, elected under the Old Laws,</i>	621
<i>List of Honorary Fellows,</i>	621
<i>List of Fellows Deceased, Resigned, and Cancelled, from 1844 to 1849,</i>	623
<i>List of Donations, continued from Vol. XV., p. 722,</i>	625
<i>Index,</i>	649