CONTENTS.

VOL. X.

Propositions upon Arithmetical Progressions. By F. Elefanti, Esq. Page 1

On the Electric Properties of Insulating or Non-conducting Bodies.
By Professor Carlo Matteucci of Pisa ......................... 2

On the Synthesis of Acetic Acid. By J. A. Wanklyn, Esq. ....... 4

On the Resistance of Glass Globes and Cylinders to collapse from external pressure, and on the Tensile and Compressive Strength of various kinds of Glass. By William Fairbairn, Esq., C.E., F.R.S., and T. Tate, Esq., F.R.A.S. ........................................ 6

On the Atomic Weight of Graphite. By B. C. Brodie, Esq., F.R.S., Pres. C.S., Professor of Chemistry in the University of Oxford .... 11

On the Alloys.—Part I. The Specific Gravity of Alloys. By A. Matthiessen, Ph.D. .......................................................... 12

On the Anatomy of Victoria Regia.—Part II. By Arthur Henfrey, Esq., F.R.S., F.L.S. &c., Professor of Botany in King’s College, London ............................................................... 14

On the Conductivity of Mercury and Amalgams. By F. Crace-Calvert, Esq., F.R.S., and R. Johnson, Esq. .......................... 14


On certain Sensory Organs in Insects, hitherto undescribed. By J. Braxton Hicks, M.D. Lond., F.L.S. &c. .......................... 25

On Lesions of the Nervous System producing Diabetes. By Frederick W. Pavy, M.D. Lond. &c. ........................................... 27

On the Electrical condition of the Egg of the Common Fowl. By John Davy, M.D., F.R.S. L & E. &c. ............................... 31

On the Mode in which Sonorous Undulations are conducted from the Membrana Tympani to the Labyrinth, in the Human Ear. By Joseph Toynbee, Esq., F.R.S. &c. ........................................ 32

On the Electrical Discharge in vacuo with an Extended Series of the Voltaic Battery. By John P. Gassiot, Esq., F.R.S. .............. 36

Note on the Transmission of Radiant Heat through Gaseous Bodies.
By John Tyndall, Ph.D., F.R.S. &c. ................................. 37

\(a\ 2\)
Photochemical Researches.—Part IV. By Robert W. Bunsen, For. Memb. R.S., and Henry Enfield Roscoe, Ph.D., Professor of Chemistry in Owens College, Manchester ........................................ 39


Remarks on Colour-blindness. By Sir John F. W. Herschel, Bart., F.R.S. .......................................................................................... 72


Annual General Meeting for the Election of Fellows ..................... 95

On the frequent occurrence of Vegetable Parasites in the Hard Structures of Animals. By Professor A. W. Kölliker, of Würzburg .... 95

Researches on the Phosphorus-Bases.—No. VI. Phosphammonium-Compounds. By A. W. Hofmann, LL.D., F.R.S. &c. .......... 100

Notes of Researches on the Poly-Ammonias.—No. VI. New Derivatives of Phenylamine and Ethylamine. By A. W. Hofmann, LL.D., F.R.S. &c. ............................................................ 104

On the Behaviour of the Aldehydes with Acids. By A. Geuther, Esq., and R. Cartmel, Esq. ......................................................... 108

On the Action of Acids on Glycol (Second Notice). By Dr. Maxwell Simpson ............................................................... 114

Experiments on some of the Various Circumstances influencing Cutaneous Absorption. By Augustus Waller, M.D., F.R.S., Professor of Physiology, Queen’s College, Birmingham .............................. 122

On Spontaneous Evaporation. By Benjamin Guy Babington, M.D., F.R.S. &c. ................................................................. 127

On the Application of the Calculus of Probabilities to the results of measures of the Position and Distance of Double Stars. By the Lord Wrottesley, F.R.S. &c. ...................................................... 133

Report of Scientific Researches made during the late Arctic Voyage of the Yacht 'Fox.' By Capt. M’Clintock, R.N. .............. 148

On Recent Theories and Experiments regarding Ice at or near its Melting-point. By Professor James Thomson .................. 152

Anniversary Meeting—Address of the President ................... 160


Supplement to a Paper read February 17, 1859, “On the Influence of White Light, of the different Coloured Rays and of Darkness, on the Development, Growth, and Nutrition of Animals.” By Horace Dobell, M.D. ......................................................... 184


Researches on the Phosphorus-Bases.—No. VII. Triphosphonium-Compounds. By A. W. Hofmann, LL.D., F.R.S. &c. ......................... 189

Note respecting the Circulation of Gasteropodous Mollusca and the supposed Aquiferous Apparatus of the Lamellibranchiata. By F. J. H. Lacaze-Duthiers ............................................. 193

On the Repair of Tendons after their subcutaneous division. By Bernard E. Brodhurst, Esq. ............................................................. 196

On the Curvature of the Indian Arc. By the Venerable John H. Pratt, M.A., Archdeacon of Calcutta .................................................. 197

Comparison of some recently determined Refractive Indices with Theory. By the Rev. Professor Baden Powell, M.A., F.R.S. .... 199

On the Electric Conducting Power of Alloys. By A. Matthiessen, Ph.D. ......................................................................................... 205

On the Specific Gravity of Alloys. By A. Matthiessen, Ph.D. .... 207


Problem on the Divisibility of Numbers. By F. Elefanti, Esq. .... 208

On the Structure of the Chorda Dorsalis of the Plagiostomes and some other Fishes, and on the relation of its proper Sheath to the development of the Vertebrae. By Professor A. Kölliker .... 214

Remarks on the late Storms of October 25–26 and November 1, 1859. By Rear-Admiral FitzRoy, F.R.S. .................................................. 222


On the Forces that produce the great Currents of the Air and of the Ocean. By Thomas Hopkins, Esq. .............................................. 235

On the Movements of Liquid Metals and Electrolytes in the Voltaic Circuit. By George Gore, Esq. .................................................. 235

Abstract of a series of Papers and Notes concerning the Electric Discharge through Rarefied Gases and Vapours. By Professor Plücker, of Bonn, For. Memb. R.S. ...................................................... 256


On Vacua as indicated by the Mercurial Siphon-Gauge and the Electrical Discharge. By J. P. Gassiot, Esq., F.R.S. ......................... 274

On the alteration of the Pitch of Sound by conduction through different Media. By Sydney Ringer, Esq. .......................................... 276
On the frequent occurrence of Phosphate of Lime, in the crystalline form, in Human Urine, and on its pathological importance. By Arthur Hill Hassall, M.D. 281

On the Saccharine Function of the Liver. By George Harley, M.D. 289

Hereditary Transmission of an Epileptiform Affection accidentally produced. By E. Brown-Séquard, M.D., F.R.S. 297

On the Resin of the Ficus rubiginosa, and a new Homologue of Benzyl Alcohol. By Warren De la Rue, Ph.D., F.R.S., and Hugo Müller, Ph.D., F.C.S. 298

Analytical and Synthetical Attempts to ascertain the cause of the differences of Electric Conductivity discovered in Wires of nearly pure Copper. By Professor William Thomson, F.R.S. 300

On a new Method of Substitution; and on the formation of Iodobenzoic, Iodotoluic, and Iodanisic Acids. By P. Griess, Esq. 309

Description of an Instrument combining in one a Maximum and Minimum Mercurial Thermometer, invented by Mr. James Hicks. By Balfour Stewart, Esq. 312

On the Expansion of Metals and Alloys. By F. Crace-Calvert, Esq., F.R.S., and G. Cliff Lowe, Esq. 315

Measurement of the Electrostatic Force produced by a Daniell's Battery. By Professor William Thomson, F.R.S. 319

Measurement of the Electromotive Force required to produce a Spark in Air between parallel metal plates at different distances. By Professor W. Thomson, F.R.S. 326


On some New Volatile Alkaloids given off during Putrefaction. By F. Crace-Calvert, Ph.D., F.R.S. &c. 341

On the Electrical Phenomena which accompany Muscular Contraction. By Professor C. Matteucci 344

An Inquiry into the Muscular Movements resulting from the action of a Galvanic Current upon Nerve. By C. B. Radcliffe, M.D. 347

Letter from Lord Howard de Walden and Seaford, on a recent severe Thunder-storm in Belgium 359

On the Solar-diurnal Variation of the Magnetic Declination at Pekin. By Major-General Edward Sabine, R.A., Treas. and V.P.R.S. 360

Analysis of my Sight, with a view to ascertain the focal power of my eyes for horizontal and for vertical rays, and to determine whether they possess a power of adjustment for different distances. By T. Wharton Jones, Esq., F.R.S. 381

On the Light radiated by heated Bodies. By B. Stewart, Esq. 385

On the Luminous Discharge of Voltaic Batteries, when examined in Carbonic Acid Vacua. By J. P. Gassiot, Esq., F.R.S. 393
On the Theory of Compound Colours, and the Relations of the Colours of the Spectrum. By Professor J. Clerk Maxwell .... 404

On the Insulating Properties of Gutta Percha. By F. Jenkin, Esq. 409

On Scalar and Clinant Algebraical Coordinate Geometry, introducing a new and more general Theory of Analytical Geometry, including the received as a particular case, and explaining 'imaginary points,' 'intersections,' and 'lines.' By Alexander J. Ellis, Esq., B.A., F.C.P.S. ....................................................... 415


On the Equation of Differences for an Equation of any Order, and in particular for the Equations of the Orders Two, Three, Four, and Five. By Arthur Cayley, Esq., F.R.S. .......................... 428

On the Theory of Elliptic Motion. By Arthur Cayley, Esq., F.R.S. 430

On the Application of Electrical Discharges from the Induction Coil to the purposes of Illumination. By J. P. Gassiot, Esq., F.R.S. 432

The Croonian Lecture.—On the Arrangement of the Muscular Fibres of the Ventricular portion of the Heart of the Mammal. By James Pettigrew, Esq. .......................... 433

Note on Regelation. By Michael Faraday, D.C.L., F.R.S. &c. .... 440


On the Effect of the presence of Metals and Metalloids upon the Electric Conductivity of Pure Copper. By A. Matthiessen, Esq., and M. Holzmann, Esq. ........................................ 460

On the relations between the Elastic Force of Aqueous Vapour at ordinary temperatures and its Motive Force in producing Currents of Air in Vertical Tubes. By W. D. Chowne, M.D., F.R.C.P. 461

On the Relation between Boiling-point and Composition in Organic Compounds. By Hermann Kopp, Esq. .................. 463

Account of a remarkable Ice Shower. By Captain Blakiston, R.A. 468


On a new Method of Approximation applicable to Elliptic and Ultr-elliptic Functions. By C. W. Merrifield, Esq. .................. 474

On the Lunar-diurnal Variation of Magnetic Declination at the Magnetic Equator. By John Allan Broun, Esq., F.R.S. .................. 475

Postscript to a Paper "On Compound Colours, and on the Relations of the Colours of the Spectrum." By J. Clerk Maxwell, Esq. .... 484

Report to the Royal Society of the Expedition into the Kingdom of Naples to investigate the circumstances of the Earthquake of the 16th December 1857. By Robert Mallet, Esq., C.E., F.R.S. .... 486

Annual General Meeting for the Election of Fellows. .............. 494
Notes of Researches on the Poly-Ammonias.—No. VIII. Action of Nitrous Acid upon Nitrophenylenediamine. By A. W. Hofmann, LL.D., F.R.S. .............................................. 495

On the Formula investigated by Dr. Brinkley for the general Term in the Development of Lagrange’s Expression for the Summation of Series and for successive Integration. By Sir J. F. W. Herschel, Bart., F.R.S. ........................................ 500


On the Nature of the Light emitted by heated Tourmaline. By Balfour Stewart, Esq., M.A. ................................................. 503

Researches on the Foraminifers.—Fourth and concluding Series. By W. B. Carpenter, M.D., F.R.S. ............................................. 506

Experimental Researches on various questions concerning Sensibility. By E. Brown-Séquard, M.D., F.R.S. ........................................ 510

On Quaternary Cubics. By the Rev. George Salmon ..................... 513


On Isoprene and Caoutchouc. By C. Greville Williams, Esq. ........... 516

On the Thermal Effects of Fluids in Motion—Temperature of Bodies moving in Air. By J. P. Joule, LL.D., F.R.S., and Professor W. Thomson, LL.D., F.R.S. ........................................ 519

On the Distribution of Nerves to the Elementary Fibres of Striped Muscle. By Lionel S. Beale, M.B., F.R.S................................. 519

On the Effects produced by Freezing on the Physiological Properties of Muscles. By Michael Foster, B.A., M.D.............................. 523

On the alleged Sugar-forming Function of the Liver. By Frederick W. Pavy, M.D. ............................................................. 528

A new Ozone-box and Test-ships. By E. J. Lowe, Esq. ................... 531

On the Temperature of the Flowers and Leaves of Plants. By E. J. Lowe, Esq. ................................................................. 534

Reduction and Discussion of the Deviations of the Compass observed on board of all the Iron-built ships and a selection of Wood-built Steam-ships in Her Majesty’s Navy, and the Iron Steam-ship ‘Great Eastern,’ being a Report to the Hydrographer of the Admiralty. By Frederick J. Evans, Esq. .............................................. 538

On the Sources of the Nitrogen of Vegetation; with special reference to the Question whether Plants assimilate free or uncombined Nitrogen. By J. B. Lawes, Esq., F.R.S.; J. H. Gilbert, Ph.D., F.R.S.; and Evan Pugh, Ph.D. .............................................. 544

Observations made with the Polariscope during the ‘Fox’ Arctic Expedition. By David Walker, M.D., Surgeon to the Expedition,—in a Report transmitted by Sir Leopold McClintock ........................................... 558

Notice of ‘The Royal Charter Storm’ in October 1859. By Rear-Admiral Robert FitzRoy, F.R.S. .................................................. 561
Contributions to the History of the Phosphorus-Bases.—Parts I, II. and III. By A. W. Hofmann, LL.D., F.R.S. 568

On Boric Ethide. By Edward Frankland, Ph.D., F.R.S. and B. Duppa, Esq. 568

On Fermat's Theorems of the Polygonal Numbers.—First Communication. By the Right Hon. Sir Frederick Pollock, F.R.S. 571

On Cyanide of Ethylene and Succinic Acid.—Preliminary Notice. By Maxwell Simpson, Ph.D. 574

Results of Researches on the Electric Function of the Torpedo. By Professor Carlo Matteucci, of Pisa 576

Natural History of the Purple of the Ancients. By F. J. H. Lacaze-Duthiers 579

Contributions towards the History of Azobenzol and Benzidine. By P. W. Hofmann, Ph.D. 585

On Bromphenylamine and Chlorphenylamine. By E. T. Mills 589

New Compounds produced by the substitution of Nitrogen for Hydrogen. By P. Griess 591

Contributions towards the History of the Monamines.—No. III. Compound Ammonias by Inverse Substitution. By A. W. Hofmann, LL.D., F.R.S. 594

Notes of Researches on the Poly-Ammonias.—No. IX. Remarks on anomalous Vapour-densities. By A. W. Hofmann, LL.D., F.R.S. 596

Notes of Researches on the Poly-Ammonias.—No. X. On Sulphamidobenzamine, a new base. By A. W. Hofmann, LL.D., F.R.S. 598

Researches on the Phosphorus-Bases.—No. VIII. Oxide of Triethylphosphine. By A. W. Hofmann, LL.D., F.R.S. 603

Researches on the Phosphorus-Bases.—No. IX. Phospharonium Compounds. By A. W. Hofmann, LL.D., F.R.S. 608

Researches on the Phosphorus-Bases.—No. X. Metamorphoses of Bromide of Bromethylated Triethylphosphonium. By A. W. Hofmann, LL.D., F.R.S. 610

Researches on the Phosphorus-Bases.—No. XI. Experiments in the Methyl- and in the Methylene-Series. By A. W. Hofmann, LL.D., F.R.S. 613

Researches on the Phosphorus-Bases.—No. XII. Relations between the Monoatomic and the Polyatomic Bases. By A. W. Hofmann, LL.D., F.R.S. 619

On the Laws of the Phenomena of the larger disturbances of the Magnetic Declination in the Kew Observatory: with notices of the progress of our knowledge regarding the Magnetic Storms. By Major-General Edward Sabine, R.A., Treas. and V.P.R.S. 624

On the Physiological Anatomy of the Lungs. By James Newton Heale, M.D. 645
ERRATA.

Page 181, line 12, for \( \frac{h_2}{h_3} \) \( k \) \] read \( \frac{h_2}{h_1} \) \( k \).

" " for \( h, k_2 \), \( h, k_3 \) \] read \( h, k_1 \), \( h, k_2 \), \( h, k_3 \).

" " 13 for \( \frac{h_2}{k_2} \) \] read \( h, \frac{k_1}{k_2} \).

" last line, for \( \frac{h_2}{k_2}, \frac{h_3}{k_3} \) \] read \( \frac{h_1}{k_1}, \frac{h_2}{k_2}, \frac{h_3}{k_3} \).

Page 182, line 1, for \( \frac{h_2}{k_2} \) \] read \( h, \frac{k_2}{k_3} \).

" 4, for \( h_2, k_2 + dk \) \] read \( h_2, k_2 + dk \).

" 6, ditto \] ditto.

" 8, for \( h_2 \) \] read \( h_1 \).

" 10, do. \] do.

" 14, do. \] do.

" 16, for \( \psi(h_2) \) \] read \( \psi(h_3) \).

Page 196, line 6 from bottom, for "Broadhurst" read "Brodhurst."

Page 197, line 10 from top, for "occasionally weakens the muscle" read "may occasion weakness of the muscle."

Page 324, line 2, for "portable" read "absolute."

Page 327, line 18, after "disc," insert "when touching the metal below."

Note to the Obituary Notice of Mr. Brunel, p. viii, line 16.

The statement that Mr. Brunel designed the Bute Docks at Cardiff, although founded on what the writer had reason to consider good authority, has since been ascertained to be erroneous.