

PROCEEDINGS

OF THE

ROYAL SOCIETY OF LONDON

SERIES A

CONTAINING PAPERS OF A MATHEMATICAL AND
PHYSICAL CHARACTER.

VOL. LXXXIX.

LONDON:

PRINTED FOR THE ROYAL SOCIETY AND SOLD BY
HARRISON AND SONS, ST. MARTIN'S LANE,
PRINTERS IN ORDINARY TO HIS MAJESTY.

MARCH, 1914.

PROCEEDINGS

ROYAL SOCIETY OF LONDON

THE LONDON SOCIETY OF MATHEMATICS AND
PHYSICS

LONDON:

HARRISON AND SONS, PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE.

1857

1857

HARRISON AND SONS, PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE.

CONTENTS.



SERIES A. VOL. LXXXIX.

No. A 607.—August 1, 1913.

	PAGE
BAKERIAN LECTURE :—Rays of Positive Electricity. By Prof. Sir J. J. Thomson, O.M., F.R.S. (Plates 1-3)	1
The Magnetic Materials in Claywares. By Arthur Hopwood. Communicated by Prof. H. B. Dixon, F.R.S.	21
On the Force Exerted on a Magnetic Particle by a Varying Electric Field. By J. G. Leathem, M.A., D.Sc., Fellow of St. John's College, Cambridge. Communicated by Sir J. Larmor, F.R.S.	31
On the Luminosity Curve of a Colour-blind Observer. By W. Watson, D.Sc., F.R.S., with an Appendix by Dr. F. W. Edridge-Green	36
Phosphorescence of Mercury Vapour after Removal of the Exciting Light. By F. S. Phillips. Communicated by the Hon. R. J. Strutt, F.R.S. (Plate 4) ...	39
The Fluctuation in the Ionisation due to γ -Rays. By P. W. Burbidge, M.Sc., Government Research and Jacob Joseph Scholar, Victoria College, Wellington, New Zealand. Communicated by Sir J. Larmor, F.R.S.....	45
The Sublimation of Metals at Low Pressure. By G. W. C. Kaye, B.A., D.Sc., and Donald Ewen, M.Sc. Communicated by Dr. R. T. Glazebrook, F.R.S. (Plate 5)	58
A Peculiar Form of Low Potential Discharge in the Highest Vacua. By the Hon. R. J. Strutt, F.R.S., Professor of Physics, Imperial College of Science, South Kensington	68

No. A 608.—August 19, 1913.

On the Efficiency of Selenium as a Detector of Light. By E. E. Fournier d'Albe, D.Sc. (Birm.). Communicated by Prof. J. H. Poynting, F.R.S.....	75
Experiments on the Flow of Viscous Fluids through Orifices. By G. F. Davidson, B.E. (Sydney), B.A. (Cantab.), 1851 Exhibition Research Scholar. Communicated by Prof. B. Hopkinson, F.R.S.	91
On the Electric Effect of Rotating a Magnetic Insulator in a Magnetic Field. By Marjorie Wilson, B.A., M.Sc., and H. A. Wilson, D.Sc., F.R.S., Professor of Physics, Rice Institute, Houston, Texas, U.S.A.	99
On the Displacements of the Particles and their Paths in some Cases of Two-dimensional Motion of a Frictionless Liquid. By W. B. Morton, M.A., Professor of Physics, Queen's University of Belfast. Communicated by Sir J. Larmor, Sec. R.S.	106

	PAGE
A Critical Study of Spectral Series. Part III.—The Atomic Weight Term and its Import in the Constitution of Spectra. By W. M. Hicks, F.R.S. (Abstract)	125
A Band Spectrum attributed to Carbon Monosulphide. By L. C. Martin, A.R.C.Sc., B.Sc., Research Student Imperial College of Science and Technology, South Kensington. Communicated by A. Fowler, F.R.S. (Plate 6)	127
New Series of Lines in the Spark Spectrum of Magnesium. By A. Fowler, F.R.S., Assistant Professor of Physics, Imperial College of Science and Technology, South Kensington	133
Additional Triplets and other Series Lines in the Spectrum of Magnesium. By A. Fowler, F.R.S., Assistant Professor of Physics, Imperial College of Science and Technology, South Kensington, and W. H. Reynolds, B.Sc., Research Student. (Plate 7)	137
A New Band Spectrum Associated with Helium. By W. E. Curtis, B.Sc., A.R.C.S., D.I.C., Demonstrator of Astrophysics at the Imperial College of Science, South Kensington. Communicated by A. Fowler, F.R.S. (Plate 8)	146

No. A 609.—August 27, 1913.

On Trigonometrical Series whose Cesàro Partial Summations Oscillate Finitely. By W. H. Young, Sc.D., F.R.S., Professor of Mathematics in the University of Liverpool	150
Atomic Specific Heats between the Boiling Points of Liquid Nitrogen and Hydrogen. I.—The Mean Atomic Specific Heats at 50° Absolute of the Elements a Periodic Function of the Atomic Weights. By Prof. Sir James Dewar, F.R.S.	158
The Thermal Effects produced by Heating and Cooling Palladium in Hydrogen. By J. H. Andrew, M.Sc., Research Fellow and Demonstrator of Metallurgy, The University, Manchester, and 'A. Holt, M.A., D.Sc., Reader in Physical Chemistry, The University, Liverpool. Communicated by Dr. G. T. Beilby, F.R.S.	170
Spectroscopic Investigations in Connection with the Active Modification of Nitrogen. III.—Spectra developed by the Tetrachlorides of Silicon and Titanium. By W. Jevons, A.R.C.Sc., B.Sc., Assistant Demonstrator of Astrophysics, Imperial College of Science and Technology, South Kensington. Communicated by A. Fowler, F.R.S. (Plate 9)	187
On the Passage of Waves through Fine Slits in Thin Opaque Screens. By Lord Rayleigh, O.M., F.R.S.	194
Experiments on the Temperature Coefficient of a Kew Collimator Magnet. By G. A. Shakespear, M.A., D.Sc. Communicated by Prof. J. H. Poynting, F.R.S.	220

No. A 610.—September 22, 1913.

A Case of Abnormal Trichromatic Colour Vision due to a Shift in the Spectrum of the Green-Sensation Curve. By Sir W. de W. Abney, K.C.B., F.R.S., and W. Watson, D.Sc., F.R.S.	232
---	-----

	PAGE
The Reflection of X-rays by Crystals. (II.) By W. H. Bragg, M.A., F.R.S., Cavendish Professor of Physics in the University of Leeds	246
The Structure of Some Crystals as Indicated by their Diffraction of X-rays. By W. L. Bragg, B.A. Communicated by Prof. W. H. Bragg, F.R.S. (Plate 10)	248
The Structure of the Diamond. By W. H. Bragg, M.A., F.R.S., Cavendish Professor of Physics in the University of Leeds, and W. L. Bragg, B.A., Trinity College, Cambridge	277
Morphological Studies in the Benzene Series. IV.—The Crystalline Form of Sulphonates in Relation to their Molecular Structure. By E. H. Rodd, B.Sc., Salters' Company's Research Fellow, City and Guilds College. Communicated by Prof. H. E. Armstrong, F.R.S.	292

No. A 611.—November 1, 1913.

The Energy of Röntgen Rays. By R. T. Beatty, M.A., D.Sc., Emmanuel College, Clerk Maxwell Student of the University, Cambridge. Communicated by Prof. Sir J. J. Thomson, F.R.S.....	314
The Relation between the Crystal Symmetry of the Simpler Organic Compounds and their Molecular Constitution.—Part II. By Walter Wahl, Ph.D. Com- municated by Sir James Dewar, F.R.S.	327
Note on Electric Discharge Phenomena in Rotating Silica Bulbs. By the Hon. R. J. Strutt, M.A., Sc.D., F.R.S., Professor of Physics, Imperial College of Science, South Kensington	340
The Origin of Thermal Ionisation from Carbon. By J. N. Pring, D.Sc. Communi- cated by Prof. E. Rutherford, F.R.S.	344
On the Refraction and Dispersion of Gaseous Nitrogen Peroxide. By Clive Cuthbertson, Fellow of University College, London, and Maude Cuthbertson. Communicated by Alfred W. Porter, F.R.S.	361

No. A 612.—January 1, 1914.

On the Diffraction of Light by Particles Comparable with the Wave-length. By B. A. Keen, B.Sc., Physics Research Scholar, and Alfred W. Porter, F.R.S., Fellow of University College, University of London.....	370
On an Inversion Point for Liquid Carbon Dioxide in Regard to the Joule-Thomson Effect. By Alfred W. Porter, F.R.S.	377
The Diurnal Variation of Terrestrial Magnetism. By George W. Walker, A.R.C.Sc., M.A., F.R.S., formerly Fellow of Trinity College, Cambridge.....	379
A Suggestion as to the Origin of Black Body Radiation. By George W. Walker, A.R.C.Sc., M.A., F.R.S., formerly Fellow of Trinity College, Cambridge.....	393
The Mathematical Representation of a Light Pulse. By R. A. Houstoun, M.A., Ph.D., D.Sc., Lecturer on Physical Optics in the University of Glasgow. Communicated by Prof. A. Gray, F.R.S.	399

	PAGE
Note on the Colour of Zircons, and its Radioactive Origin. By the Hon. R. J. Strutt, M.A., Sc.D., F.R.S., Professor of Physics, Imperial College, South Kensington	405
Intermittent Vision. By A. Mallock, F.R.S.	407
A Method of Measuring the Pressure Produced in the Detonation of High Explosives or by the Impact of Bullets. By Bertram Hopkinson, F.R.S. (Abstract)	411
The Selective Absorption of Ketones. By Prof. George Gerald Henderson, D.Sc., LL.D., and Isidor Morris Heilbron, Ph.D. Communicated by Dr. G. T. Beilby, F.R.S.	414
Egyptian Blue. By A. P. Laurie, D.Sc., F.R.S.E., W. F. P. McLintock, B.Sc., and F. D. Miles, B.Sc., A.R.C.S. Communicated by Sir A. H. Church, K.C.V.O., F.R.S.	418
The Influence of the Constituents of the Crystal on the Form of the Spectrum in the X-ray Spectrometer. By W. H. Bragg, M.A., F.R.S., Cavendish Professor of Physics in the University of Leeds	430
A Simple Form of Micro-Balance for Determining the Densities of Small Quantities of Gases. By F. W. Aston, B.A., B.Sc., A.I.C., Trinity College, Cambridge. Communicated by Prof. Sir J. J. Thomson, O.M., F.R.S.	439
On a Second Spectrum of Neon. By Thomas Ralph Merton, B.Sc. (Oxon.). Communicated by Prof. G. D. Liveing, F.R.S., and Sir J. Dewar, F.R.S.	447

No. A 613.—February 2, 1914.

Address of the President, Sir Archibald Geikie, K.C.B., at the Anniversary Meeting on December 1, 1913.....	451
The Analysis of Crystals by the X-ray Spectrometer. By W. Lawrence Bragg, B.A. Communicated by Prof. W. H. Bragg, F.R.S.....	468
Ship Resistance: The Wave-making Properties of Certain Travelling Pressure Disturbances. By T. H. Havelock, M.A., D.Sc., Armstrong College, Newcastle-on-Tyne. Communicated by Sir J. Larmor, F.R.S.	489
Attempts to Observe the Production of Neon or Helium by Electric Discharge. By the Hon. R. J. Strutt, M.A., Sc.D., F.R.S., Professor of Physics, Imperial College, South Kensington	499
The Positive Ions from Hot Metals. By O. W. Richardson, M.A., D.Sc., F.R.S., Professor of Physics, Princeton University	507

No. A 614.—March 2, 1914.

Absolute Measurements of a Resistance by a Method based on that of Lorenz. By F. E. Smith, A.R.C.Sc. Communicated by R. T. Glazebrook, M.A., F.R.S. (Abstract)	525
Elastic Hysteresis in Steel. By F. E. Rowett (Whitworth Scholar), Research Student of the University of Cambridge. Communicated by Prof. B. Hopkinson, F.R.S.	528

	PAGE
Studies in Brownian Movement. I.—On the Brownian Movement of the Spores of Bacteria. By John H. Shaxby, B.Sc., and E. Emrys-Roberts, M.D. Communicated by Principal E. H. Griffiths, F.R.S.	544
The Transmission of Cathode Rays through Matter. By R. Whiddington, M.A., D.Sc., Fellow of St. John's College, Cambridge. Communicated by Prof. Sir J. J. Thomson, O.M., F.R.S.	554
The Variation with Temperature of the Specific Heat of Sodium in the Solid and the Liquid State; also a Determination of its Latent Heat of Fusion. By Ezer Griffiths, B.Sc., Fellow of the University of Wales. Communicated by Dr. E. H. Griffiths, F.R.S.	561
The X-ray Spectra given by Crystals of Sulphur and Quartz. By W. H. Bragg, M.A., F.R.S., Cavendish Professor of Physics in the University of Leeds	575
On Natural Radiation from a Gas. By George Green, D.Sc., Lecturer on Natural Philosophy in the University of Glasgow. Communicated by Prof. A. Gray, F.R.S.	581
On the Temperature Variation of the Photo-elastic Effect in Strained Glass. By L. N. G. Filon, M.A., D.Sc., F.R.S., Goldsmid Professor of Applied Mathematics and Mechanics in the University of London	587
Transparence or Translucence of the Surface Film produced in Polishing Metals. By G. T. Beilby, F.R.S. (Plate 11)	593

OBITUARY NOTICES OF FELLOWS DECEASED.

Sir George Howard Darwin; Sir William White; Samuel Roberts; John Milne; James Gordon MacGregor	i—xxviii
Index	xxix
