

PROCEEDINGS
OF THE
ROYAL SOCIETY OF EDINBURGH

Section A (Mathematical and Physical Sciences)

VOL. LXII]

1943-44

[PART I

CONTENTS

NO.	PAGE
I. The Future of Synthetic Plastics. By Professor H. W. MELVILLE, F.R.S. (<i>Bruce-Preller Lecture delivered March 1, 1943</i>)	I
(Issued separately November 17, 1943.)	
II. The Fundamental Concepts of Natural Philosophy. By Professor E. A. MILNE, M.B.E., F.R.S. (<i>James Scott Lecture delivered on May 3, 1943</i>)	10
(Issued separately November 17, 1943.)	
III. On the Matrix Representation of Complex Symbols. By D. E. RUTHERFORD, M.A., B.Sc., D.Math., United College, University of St Andrews	25
(Issued separately November 17, 1943.)	
IV. A Note on Karl Pearson's Selection Formulae. By D. N. LAWLEY, B.A., Moray House, University of Edinburgh. <i>Communicated by</i> Professor GODFREY H. THOMSON, D.C.L., D.Sc., Ph.D.	28
(Issued separately November 17, 1943.)	
V. On Whittaker's Solution of Laplace's Equation. By E. T. COPSON, University College, Dundee, in the University of St Andrews	31
(Issued separately March 7, 1944.)	

[Continued on page iv of Cover

PUBLISHED BY
OLIVER & BOYD
EDINBURGH: TWEEDDALE COURT
LONDON: 98 GREAT RUSSELL STREET, W.C.1

Price 17s.

ROYAL SOCIETY OF EDINBURGH
22, 24. GEORGE STREET, EDINBURGH, 2

THE PREPARATION FOR PUBLICATION OF PAPERS IN
THE TRANSACTIONS AND IN THE PROCEEDINGS
(SECTIONS "A" AND "B") OF THE SOCIETY

IN view of the national necessity for exercising the strictest economy in paper and the high cost of publication, authors of papers are requested to write their communications in as concise a form as possible and to avoid excess of tables and illustrations.

An author is advised to retain a copy of his paper, as the Society cannot undertake any responsibility in relation to the custody of papers entrusted to it. The MS. must be easily legible, preferably typewritten on one side of quarto or foolscap paper and with pages numbered. *It must be absolutely in its final form for printing.* A short summary of the important points in the paper should be given. A table of contents (for a long paper), references to plates, etc., must be in their proper places, and positions indicated for the insertion of illustrations that are to appear in the text. Names of genera and species should be in italics. Footnotes should be avoided.

Additions to a paper after it has been finally handed in for publication will, if accepted by the Council, be treated and dated as separate communications, and may, or may not, be printed immediately after the original paper.

References to literature should be placed at the end of the paper, alphabetically arranged, under authors' names, with abridged titles of journals, thus:—

SANDEMAN, I., 1929. "The Fulcher Bands of Hydrogen," *Proc. Roy. Soc. Edin.*, XLIX, 48–64.

WHITTAKER, E. T., and ROBINSON, G., 1923. *A Short Course in Interpolation*, London.

Titles of papers should be quoted exactly, and all references to literature should be carefully checked by the authors before submitting the paper. References to literature in the text should be made by quoting the author's name and the year of publication thus (Sandeman, 1929) or (Whittaker and Robinson, 1923), and adding the page when necessary.

All illustrations must be in a form immediately suitable for reproduction, preferably of a size to permit reduction to about two-thirds the linear dimensions of the original, and should be capable of reproduction by photographic processes. Drawings and diagrams to be reproduced as line blocks should be made with fixed Indian ink, preferably on fine white bristol board, free from folds or creases; smooth clean lines or sharp dots, but no washes or colours, should be used. Graphs should be on a squared paper ruled in *faint blue* lines, unless the lines are to be brought out. If the illustrations are on a large scale to be afterwards reduced by photography, any lettering must be on a corresponding scale.

[Continued on page iii of Cover]

INDEX SLIP

PROC. R.S.E., VOL. LXII, PART I
Section A (Mathematical and Physical Sciences)

- MELVILLE, H. W.—The Future of Synthetic Plastics. (Bruce-Preller Address.)
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 1–9.
- Plastics, Synthetic.
H. W. MELVILLE.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 1–9.
- Synthetic Plastics, The Future of.
H. W. MELVILLE.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 1–9.
- MILNE, E. A.—The Fundamental Concepts of Natural Philosophy. (James Scott Address.)
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 10–24.
- Philosophy, Natural, The Fundamental Concepts of.
E. A. MILNE.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 10–24.
- RUTHERFORD, D. E.—On the Matrix Representation of Complex Symbols.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 25–27.
- Representation of Complex Symbols.
D. E. RUTHERFORD.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 25–27.
- Symbols, Complex, Matrix Representation of.
D. E. RUTHERFORD.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 25–27.
- LAWLEY, D. N.—A Note on Karl Pearson's Selection Formulae.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 28–30.
- Selection, Karl Pearson's Formulae for.
D. N. LAWLEY.
Proc. Roy. Soc. Edin., vol. lxii, A, 1943, pp. 28–30.
- COPSON, E. T.—On Whittaker's Solution of Laplace's Equation.
Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 31–36.
- Laplace's Equation, Whittaker's Solution of.
E. T. COPSON.
Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 31–36.
- Whittaker's Solution of Laplace's Equation.
E. T. COPSON.
Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 31–36.

DUNCANSON, W. E., and COULSON, C. A.—Atomic Wave Functions for Ground States of Elements *Li* to *Ne*.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 37–39.

Atoms, Wave Functions for Ground States of Atoms *Li* to *Ne*.

W. E. DUNCANSON and C. A. COULSON.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 37–39.

COULSON, C. A., and DUNCANSON, W. E.—Atomic Wave Functions for Ground States of Elements *Li* to *Ne*.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 37–39.

Wave Functions, Ground States of Atoms *Li* to *Ne*.

W. E. DUNCANSON and C. A. COULSON.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 37–39.

BORN, M., and PENG, H. W.—Quantum Mechanics of Fields. I. Pure Fields.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 40–57.

PENG, H. W., and BORN, M.—Quantum Mechanics of Fields. I. Pure Fields.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 40–57.

Quantum Mechanics of Fields. I. Pure Fields.

M. BORN and H. W. PENG.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 40–57.

HOUSTOUN, R. A.—A Measurement of the Velocity of Light in Water.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 58–63.

Light, a Measurement of the Velocity of, in Water.

R. A. HOUSTOUN.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 58–63.

Velocity of Light in Water, a Measurement of.

R. A. HOUSTOUN.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 58–63.

RUSE, H. S.—On the Line-Geometry of the Riemann Tensor.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 64–73.

Geometry, Line-, of the Riemann Tensor.

H. S. RUSE.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 64–73.

Riemann Tensor, Line-Geometry of.

H. S. RUSE.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 64–73.

LAWLEY, D. N.—The Factorial Analysis of Multiple Item Tests.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 74–82.

Factorial Analysis of Multiple Item Tests.

D. N. LAWLEY.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 74–82.

Tests, Multiple Item, The Factorial Analysis of.

D. N. LAWLEY.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 74-82.

EDGE, W. L.—The Identification of Klein's Quartic.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 83-91.

Klein's Quartic, Identification of.

W. L. EDGE.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 83-91.

BORN, M., and PENG, H. W. —Quantum Mechanics of Fields. II. Statistics of Pure Fields.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 92-102.

Apeiron, Definition of, and Statistics.

M. BORN and H. W. PENG.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 92-102.

PENG, H. W., and BORN, M.—Quantum Mechanics of Fields. II. Statistics of Pure Fields.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 42-102.

Quantum Mechanics of Fields. II. Statistics of Pure Fields.

M. BORN and H. W. PENG.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 92-102.

EGGLETON, P., and KERMACK, W. O.—A Problem in the Random Distribution of Particles.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 103-115.

KERMACK, W. O., and EGGLETON, P.—A Problem in the Random Distribution of Particles.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 103-115.

Random Distribution of Particles.

W. O. KERMACK and P. EGGLETON.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 103-115.

Distribution of Particles, Random.

W. O. KERMACK and P. EGGLETON.

Proc. Roy. Soc. Edin., vol. lxii, A, 1944, pp. 103-115.