

PROCEEDINGS
OF THE
ROYAL SOCIETY OF EDINBURGH

Section A (Mathematical and Physical Sciences)

VOL. LXII]

1946-48

[PART III

CONTENTS

NO.		PAGE
XXV.	Some Continuant Determinants arising in Physics and Chemistry. By D. E. RUTHERFORD, M.A., B.Sc., D.Math., United College, University of St Andrews. <i>(With Four Text-figures)</i>	229 <i>(Issued separately May 8, 1947)</i>
XXVI.	The Universal Integral Invariants of Hamiltonian Systems and Application to the Theory of Canonical Transformations. By HWA-CHUNG LEE, Ph.D. (Edin.), Wuhan University, China. <i>Communicated by</i> Sir EDMUND WHITTAKER, F.R.S.	237 <i>(Issued separately May 8, 1947)</i>
XXVII.	Expansions of Lamé Functions into Series of Legendre Functions. By A. ERDÉLYI, Mathematical Institute, The University, Edinburgh	247 <i>(Issued separately February 25, 1948)</i>
XXVIII.	The Discriminant of a Certain Ternary Quartic. By W. L. EDGE, M.A., Sc.D. (Cantab.), Mathematical Institute, University of Edinburgh	268 <i>(Issued separately February 25, 1948)</i>
XXIX.	On a Problem in Correlated Errors. By A. C. AITKEN, D.Sc., F.R.S., Mathematical Institute, University of Edinburgh	273 <i>(Issued separately February 25, 1948)</i>
XXX.	On Hill's Problems with Complex Parameters and a Real Periodic Function. By M. J. O. STRUTT. <i>Communicated by</i> Sir EDMUND WHITTAKER, F.R.S. <i>(With Five Text-figures)</i>	278 <i>(Issued separately May 12, 1948)</i>
XXXI.	Thermal Diffusion in some Aqueous Solutions. By ARCHIBALD C. DOCHERTY and MOWBRAY RITCHIE, Chemistry Department, University of Edinburgh. <i>(With Five Text-figures)</i>	297 <i>(Issued separately May 12, 1948)</i>

[Continued on page iv of Cover]

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

Price £1, 8s.

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 III
Section A (Mathematical and Physical Sciences)
1946-1948

RUTHERFORD, D. E.—Some Continuant Determinants arising in Physics and Chemistry.
Proc. Roy. Soc. Edin., lxii, A, 1946, 229-236.

Determinants, Continuant.
D. E. RUTHERFORD.
Proc. Roy. Soc. Edin., lxii, A, 1946, 229-236.

LEE, HWA-CHUNG.—The Universal Integral Invariants of Hamiltonian Systems and Application to the Theory of Canonical Transformations.
Proc. Roy. Soc. Edin., lxii, A, 1947, 237-246.

Canonical Transformations: Universal Integral Invariants of Hamiltonian Systems.
HWA-CHUNG LEE.
Proc. Roy. Soc. Edin., lxii, A, 1947, 237-246.

Hamiltonian Systems, Universal Integral Invariants of.
HWA-CHUNG LEE.
Proc. Roy. Soc. Edin., lxii, A, 1947, 237-246.

ERDÉLYI, A.—Expansions of Lamé Functions into Series of Legendre Functions.
Proc. Roy. Soc. Edin., lxii, A, 1946, 247-267.

Lamé Functions, Expansions of, into Series of Legendre Functions.
A. ERDÉLYI.
Proc. Roy. Soc. Edin., lxii, A, 1946, 247-267.

Legendre Functions, Expansions of Lamé Functions into Series of.
A. ERDÉLYI.
Proc. Roy. Soc. Edin., lxii, A, 1946, 247-267.

EDGE, W. L.—The Discriminant of a certain Ternary Quartic.
Proc. Roy. Soc. Edin., lxii, A, 1946, 268-272.

Discriminant of a certain Ternary Quartic.
W. L. EDGE.
Proc. Roy. Soc. Edin., lxii, A, 1946, 268-272.

Ternary Quartic, Discriminant of a certain.
W. L. EDGE.
Proc. Roy. Soc. Edin., lxii, A, 1946, 268-272.

- AITKEN, A. C.**—On a Problem of Correlated Errors.
Proc. Roy. Soc. Edin., lxii, A, 1946, 273–27^t
- Correlated Errors, Distribution of.
A. C. AITKEN.
Proc. Roy. Soc. Edin., lxii, A, 1946, 273–27^t
- Errors, Correlated, Problem in.
A. C. AITKEN.
Proc. Roy. Soc. Edin., lxii, A, 1946, 273–27^t
- STRUTT, M. J. O.**—On Hill's Problems with Complex Parameters and a Real Periodic Function.
Proc. Roy. Soc. Edin., lxii, A, 1946, 278–29^t
- Hill's Problems.
M. J. O. STRUTT.
Proc. Roy. Soc. Edin., lxii, A, 1946, 278–29^t
- DOCHERTY, A. C.**, and **RITCHIE, M.**—Thermal Diffusion in Some Aqueous Solutions.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 297–30^t
- Diffusion, Thermal, in Some Aqueous Solutions.
A. C. DOCHERTY and M. RITCHIE.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 297–30^t
- RITCHIE, M.** See **DOCHERTY, A. C.**, and **RITCHIE, M.**
- RITCHIE, M.**—An Elementary Treatment of Thermal Diffusion in Gaseous and Liquid Systems.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 305–31^t
- Diffusion, Thermal, An Elementary Treatment of Gaseous and Liquid Systems.
M. RITCHIE.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 305–31^t
- MILNE-THOMSON, L. M.**—Applications of Elliptic Functions to Wind Tunnel Interference.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 316–31^t
- Elliptic Functions, Applications to Wind Tunnel Interference.
L. M. MILNE-THOMSON.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 316–31^t
- Wind Tunnel Interference.
L. M. MILNE-THOMSON.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 316–31^t
- WALKER, A. G.**—Foundations of Relativity. Parts I and II.
Proc. Roy. Soc. Edin., lxii, A, 1946, 319–33
- Relativity, Foundations of. Parts I and II.
A. G. WALKER.
Proc. Roy. Soc. Edin., lxii, A, 1946, 319–33

BRADBURN, MARY, COULSON, C. A., and RUSHBROOKE, G. S.—Graphite Crystals and Crystallites: I. Binding Energies in Small Crystal Layers.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 336–349.

Crystals, Graphite: I. Binding Energies in Small Layers.
MARY BRADBURN, C. A. COULSON, and G. S. RUSHBROOKE.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 336–349.

Graphite Crystals and Crystallites: I. Binding Energies in Small Layers.
MARY BRADBURN, C. A. COULSON, and G. S. RUSHBROOKE.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 336–349.

COULSON, C. A. *See* BRADBURN, MARY, COULSON, C. A., and RUSHBROOKE, G. S.

RUSHBROOKE, G. S. *See* BRADBURN, MARY, COULSON, C. A., and RUSHBROOKE, G. S.

COULSON, C. A., and RUSHBROOKE, G. S.—Graphite Crystals and Crystallites: II. Energies of Mobile Electrons in Infinite Strips.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 350–359.

Crystals, Graphite, Energies of Mobile Electrons in Infinite Strips of.
C. A. COULSON and G. S. RUSHBROOKE.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 350–359.

Graphite Crystals and Crystallites, Energies of Mobile Electrons in Infinite Strips of.
C. A. COULSON and G. S. RUSHBROOKE.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 350–359.

RUSHBROOKE, G. S., and COULSON, C. A. *See* COULSON, C. A., and RUSHBROOKE, G. S.

GILLAM, C. M., and COULSON, C. A.—Van der Waals' Force between a Proton and a Hydrogen Atom: II. Excited States.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 360–368.

COULSON, C. A. *See* GILLAM, C. M., and COULSON, C. A.

Hydrogen Atom, Van der Waals' Force between a Proton and: II. Excited States.
C. M. GILLAM and C. A. COULSON.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 360–368.

Van der Waals' Force between Hydrogen Atom and a Proton. II. Excited States.
C. M. GILLAM and C. A. COULSON.
Proc. Roy. Soc. Edin., lxii, A, 1947–48, 360–368.

AITKEN, A. C.—On the Estimation of Many Statistical Parameters.
Proc. Roy. Soc. Edin., lxii, A, 1946, 369–377.

Estimation, Method of Statistical.
A. C. AITKEN.
Proc. Roy. Soc. Edin., lxii, A, 1946, 369–377.

Parameters, Statistical, Estimation of.
A. C. AITKEN.
Proc. Roy. Soc. Edin., lxii, A, 1946, 369–377.

ERDÉLYI, A.—Transformations of Hypergeometric Functions of Two Variables.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 378–385.

Hypergeometric Functions, Transformations of.
A. ERDÉLYI.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 378–385.

Transformations of Hypergeometric Functions of Two Variables.
A. ERDÉLYI.
Proc. Roy. Soc. Edin., lxii, A, 1946–47, 378–385.