

PROCEEDINGS  
OF THE  
ROYAL SOCIETY OF LONDON

SERIES A. MATHEMATICAL AND PHYSICAL SCIENCES

VOL 219

LONDON

Published for the Royal Society by the  
Cambridge University Press  
Bentley House, N.W. 1

7 October 1953

*Printed in Great Britain at the University Press, Cambridge*  
*(Brooke Crutchley, University Printer)*  
*and published by the Cambridge University Press*  
*Cambridge, and Bentley House, London*  
*Agents for Canada, India, and Pakistan: Macmillan*

## CONTENTS

### SERIES A VOLUME 219

No. 1136 11 August 1953

	PAGE
The spontaneous magnetization of alloys. I. Copper nickel alloys. By D. J. Oliver and W. Sucksmith, F.R.S. . . . .	1
The configuration of the polypeptide chain in small peptides such as gramicidin S. By N. B. Abbott and E. J. Ambrose. (Plate 1) . . . . .	17
Sorption of gases and vapours by potassium benzene sulphonate. By R. M. Barrer, J. Drake and T. V. Whittam . . . . .	32
The theory of electronic conduction in polar semi-conductors. By D. J. Howarth and E. H. Sondheimer . . . . .	53
The phase transition in superconductors. II. Phase propagation above the critical field. By T. E. Faber . . . . .	75
The continuous absorption of light in alkali-metal vapours. By R. W. Ditchburn, P. J. Jutsum and G. V. Marr . . . . .	89
The application of variational methods to atomic scattering problems. III. The elastic scattering of electrons by helium atoms. By B. L. Moiseiwitsch . . . . .	102
Quantum field theory of bound states. III. Bound states in strong interaction. By R. J. Eden and G. Rickayzen . . . . .	109
The ultra-violet absorption spectra of some gaseous alkali-metal halides and the dissociation energy of fluorine. By R. F. Barrow and A. D. Caunt . . . . .	120

No. 1137 25 August 1953

The Forest Products Research Laboratory. (Plates 2 and 3.) By F. Y. Henderson . . . . .	141
On the mathematics of exchange processes in fixed columns. I. Mathematical solutions and asymptotic expansions. By S. Goldstein, F.R.S. . . . .	151
On the mathematics of exchange processes in fixed columns. II. The equilibrium theory as the limit of the kinetic theory. By S. Goldstein, F.R.S. . . . .	171
Dispersion of soluble matter in solvent flowing slowly through a tube. By Sir Geoffrey Taylor, F.R.S. . . . .	186
The stability of gaseous lithium hydroxide at high temperatures and its relation with the hydroxyl concentration of flame gases. By H. Smith and T. M. Sugden . . . . .	204
Gravity measurements in North America with the Cambridge pendulum apparatus. By G. D. Garland . . . . .	215
On the forces acting on a circular cylinder set obliquely in a uniform stream at low values of Reynolds number. By S. Tomotika, T. Aoi and H. Yosinobu . . . . .	233
The carbon-dioxide-nitrous-oxide system in the critical region. By D. Cook . . . . .	245
Quantum hydrodynamics and the theory of liquid helium. By J. M. Ziman . . . . .	257
The nature of mercury—carbon bonds in mercury alkyl radicals. By B. G. Gowenlock, J. C. Polanyi and E. Warhurst . . . . .	270

No. 1138 22 September 1953

	PAGE
On the concentration of certain elements at the earth's surface. By H. C. Urey, For.Mem.R.S. . . . .	281
Production of mesons and the localization of field energy. By H. J. Bhabha, F.R.S. . . . .	293
The persistence of crystal axes in a thermal transformation. By S. W. Kennedy, A. R. Ubbelohde, F.R.S. and I. Woodward. (Plate 4) . . . . .	303
The photolysis of acetaldehyde, diacetyl and acetone at high intensity. By M. A. Khan, R. G. W. Norrish, F.R.S. and G. Porter . . . . .	312
Yield points in brass crystals. By G. W. Ardley and A. H. Cottrell . . . . .	328
Studies of the variations in bond dissociation energies of aromatic compounds. I. Mono-bromo-aryles. By M. Ladacki and M. Szwarc . . . . .	341
Studies of the variations in bond dissociation energies of aromatic compounds. II. Substituted bromobenzenes. By M. Szwarc and D. Williams . . . . .	353
Statistical mechanics of interacting dipoles. By J. A. Barker . . . . .	367
Thermo-electricity at low temperatures. I. The 'ideal' metals: sodium, potassium, copper. By D. K. C. MacDonald and W. B. Pearson . . . . .	373
The magnetic properties of certain rare-earth ethyl sulphates. By R. J. Elliott and K. W. H. Stevens . . . . .	387
Deviations from the principle of corresponding states. By D. Cook and J. S. Rowlinson . . . . .	405

No. 1139 7 October 1953

Forbidden transitions in the palladium I spectrum. By A. G. Shenstone, F.R.S. (Plate 5) . . . . .	419
Note on wind drift in a channel in the presence of tidal currents. By K. F. Bowden . . . . .	426
Reflexions from irregularities in the ionosphere. By G. H. Munro . . . . .	447
Some magnetic properties of metals. VI. Surface corrections to the Landau diamagnetism and the de Hass—van Alphen effect. By R. B. Dingle . . . . .	463
The flow law of ice from measurements in glacier tunnels, laboratory experiments and the Jungfraufirn borehole experiment. By J. F. Nye . . . . .	477
Ultrasonic dispersion in halo-methane vapours. By P. G. T. Fogg, P. A. Hanks and J. D. Lambert . . . . .	490
The possibility of comparing line standards of length photographically. By A. H. Cook . . . . .	500
Quantum field theory of bound states. IV. Relativistic theory of the excited states of hydrogen. By R. J. Eden . . . . .	516
Paramagnetic resonance in palladium and platinum group compounds. By J. H. E. Griffiths, J. Owen and I. M. Ward . . . . .	526
On the magnetic properties of covalent $XY_6$ complexes. By K. W. H. Stevens. . . . .	542
Index . . . . .	556