

PROCEEDINGS  
OF THE  
ROYAL SOCIETY OF LONDON

SERIES A. MATHEMATICAL AND PHYSICAL SCIENCES

VOL 299

Published by the Royal Society  
6 Carlton House Terrace  
London, S.W. 1

25 July 1967



# CONTENTS

## SERIES A VOLUME 299

No. 1456 13 June 1967

A DISCUSSION ON NONLINEAR THEORY OF WAVE PROPAGATION IN DISPERSIVE SYSTEMS  
ORGANIZED BY M. J. LIGHTHILL, SEC.R.S.

(Plate 1)

	PAGE
Introductory remarks. By M. J. Lighthill, Sec.R.S. . . . .	2
Variational methods and applications to water waves. By G. B. Whitham, F.R.S.	6
<i>Discussion</i> : The adiabatic invariant for wave propagation in a nonuniform moving medium. By C. J. R. Garrett . . . . .	26
Some special cases treated by the Whitham theory. By M. J. Lighthill, Sec.R.S.	28
<i>Discussion</i> : Some results from wave pulse experiments. By J. E. Feir . . . . .	54
Instability of periodic wavetrains in nonlinear dispersive systems. By T. B. Benjamin, F.R.S. . . . .	59
<i>Discussion</i> . By K. Hasselmann . . . . .	76
Nonlinear interactions treated by the methods of theoretical physics (with application to the generation of waves by wind). By K. Hasselmann . . . . .	77
<i>Discussion</i> . By P. G. Saffman . . . . .	101
Theoretical and experimental studies of gravity wave interactions. By O. M. Phillips . . . . .	104
Resonant interactions between planetary waves. By M. S. Longuet-Higgins, F.R.S. and A. E. Gill . . . . .	120
<i>Discussion</i> . By K. Kenyon . . . . .	141
Closing remarks. By M. J. Lighthill, Sec.R.S. . . . .	145

No. 1457 14 June 1967

Generically acyclic complexes and generically perfect ideals. By J. A. Eagon and D. G. Northcott, F.R.S. . . . .	147
Slow oscillations of fluid in a rotating cavity in the presence of a toroidal magnetic field. By K. Stewartson, F.R.S. . . . .	173
On a wavefunction picture for the direct particle theory of gravitation and electromagnetism. By F. Hoyle, F.R.S. and J. V. Narlikar . . . . .	188
Threshold behaviour of electron excitation and polarization functions in helium. By D. W. O. Heddle and R. G. W. Keesing . . . . .	212
The reflexion of a plane shockwave from a heat-conducting wall. By J. F. Clarke . . . . .	221
Optical rectification in ammonium dihydrogen phosphate, potassium dihydrogen phosphate and quartz. By J. F. Ward and G. H. C. New . . . . .	238
On the radiation field of pulse solutions of the wave equation. III. By F. G. Friedlander . . . . .	264
Exact Thomas-Fermi method in perturbation theory. By J. C. Stoddart and N. H. March . . . . .	279
Baire sets that are Borelian subspaces. By Z. Frolík . . . . .	287

	PAGE
No. 1458 11 July 1967	
On the theory of Hertzian fracture. By F. C. Frank, F.R.S. and B. R. Lawn. (Plate 2) . . . . .	291
Partial cone crack formation in a brittle material loaded with a sliding spherical indenter. By B. R. Lawn. (Plate 3) . . . . .	307
The photolysis and pyrolysis of nitromethane and methyl nitrite. By I. M. Napier and R. G. W. Norrish, F.R.S. (Plates 4 to 8) . . . . .	317
The photosynthesis of nitrosoformaldehyde and the identification of its spectrum. By I. M. Napier and R. G. W. Norrish, F.R.S. (Plate 9) . . . . .	337
Triplet state quantum yields for some aromatic hydrocarbons and xanthene dyes in dilute solution. By P. G. Bowers and G. Porter, F.R.S. . . . .	348
A random-walk theory of tarnishing reactions. By J. R. Anderson and I. M. Ritchie . . . . .	354
The effect on a tarnishing reaction of an electric field across the growing product layer. By J. R. Anderson and I. M. Ritchie . . . . .	371
The conduction bands in 6H and 15R silicon carbide. I. Hall effect and infrared Faraday rotation measurements. By B. Ellis and T. S. Moss. (Plate 10) . . . . .	383
The conduction bands in 6H and 15R silicon carbide. II. Absorption measurements. By B. Ellis and T. S. Moss . . . . .	393
No. 1459 25 July 1967	
Second Royal Society Technology Lecture. Electrical transmission of energy: The first hundred years. By P. R. Howard. (Plate 11) . . . . .	405
Self broadening and $f$ -values in the spectrum of neon. By H. G. Kuhn, F.R.S. and E. L. Lewis . . . . .	423
Sorption and surface flow in graphitized carbon membranes. I. The steady state. By R. Ash, R. W. Baker and R. M. Barrer, F.R.S. . . . .	434
Fracture initiation at a sharp notch. By E. Smith . . . . .	455
The yield and fracture behaviour of high-purity iron single crystals at high rates of strain. By J. Harding. (Plates 12 and 13) . . . . .	464
Asymptotic behaviour of velocity profiles in the Prandtl boundary layer theory. By J. Serrin . . . . .	491
Quasi-static crack propagation. By C. Gurney and J. Hunt . . . . .	508
A measurement of the cross-section for detachment of electrons from $H^+$ by electron impact. By D. F. Dance, M. F. A. Harrison and R. D. Rundel . . . . .	525
Index . . . . .	538