

# Journal of THE ROYAL AERONAUTICAL SOCIETY

INCORPORATING THE INSTITUTION OF AERONAUTICAL ENGINEERS AND THE HELICOPTER ASSOCIATION OF GREAT BRITAIN

PUBLISHED MONTHLY AT

4 HAMILTON PLACE, LONDON, W.1

Telephone: Grosvenor 3515-9

Telegrams: Didaskalos, London, W.1.

SUBSCRIPTIONS: £7 10s. 0d. PER ANNUM, PLUS 9s. POSTAGE AND PACKING

SINGLE COPIES: 12s. 6d. PLUS 9d. POSTAGE AND PACKING

VOLUME 66

NOVEMBER 1962

NUMBER 623

## CONTENTS

	PAGE
Notices	LI
The Southern Africa Division—Presentation of the John Scott Award at the Lanchester Memorial Lecture—The Engineering Institutions' Joint Council B.C.A.C. Honorary Officers and Executive Committee—The Role of the Royal Aeronautical Society in the Next Decade—Vibrations and Oscillations in Mechanical Systems—Reliability of Electronic Equipment—Stress Analysis in Structural Engineering—Diary—Luton Branch Lecture on 13th November Postponed: Rotorcraft Section All-Day Meeting 7th December Change of Paper—Exploring the Moon—News of Members—Lecture Summaries.	
Flight Characteristics of the B58 Mach 2 Bomber	B. A. ERICKSON 665
Five Decades of the Aero Engine	F. R. BANKS 672
Advanced Air-Breathing Engines	R. R. JAMISON 683
Space Flight Projects Based on Blue Streak	G. K. C. PARDOE 690
Design Philosophy of Man Powered Aircraft	J. J. SPILLMAN 699
Problems of a Man Powered Rotorcraft	R. GRAVES 707
Research and Development of Rotating Wing Aircraft	W. STEWART 713
Technical Notes	720
A Relaxation Method for the Solution of Four Boom Single Cell Tubes under Torsion with Restrained Warping—G. B. BOLLAND. A Comment on the Approximate Calculation of Eigenvalues for Certain Second-order Linear Differential Equations—w. SQUIRE. Characteristics of an Eigen-system Describing the Elastic Stability of a Thin Cantilever Beam—B. SARAVANOS. The Approximate Elastic Critical Loads of Composite Struts—H. WATERS. Corrections to September and October Journal: Recent German Contributions to Aerodynamics and Flight Dynamics—H. BLENK (p. 626); Imperial College Arc-Heated Wind Tunnel—J. K. HARVEY and P. G. SIMPKINS (p. 639); Five Point Loading Shear Stiffness Test—H. B. HOWARD (p. 591, September).	
The Branches	727
Graduates' and Students' Section	728
The Library	729
REVIEWS: The AGARD Manual on Aeroelasticity, Vol. V—First International Congress on Metallic Corrosion—Gas Power Dynamics—Road to the Stars—Progress in Aeronautical Sciences, Vol. II—Advanced Materials—Who Destroyed the Hindenburg?—The 1962 Aerospace Year Book.	
ADDITIONS TO THE LIBRARY.	REPORTS.

All communications for publication in the JOURNAL should be addressed to the Editor, JOAN BRADBROOKE, A.R.Ae.S.; all communications on general matters affecting the Society should be addressed to the Secretary, A. M. BALLANTYNE, T.D., B.Sc., Ph.D., F.R.Ae.S., Hon.F.C.A.I., F.I.A.S.

None of the papers or paragraphs must be taken as expressing the opinion of the Council of the Royal Aeronautical Society unless otherwise stated.

ADVERTISEMENT OFFICE: Oxford House, 15 Crosswall, London E.C.3. Royal 7768.

PRINTED BY THE LEWES PRESS WIGHTMAN & CO. LTD., LEWES, SUSSEX, ENGLAND, AND PUBLISHED BY THE ROYAL AERONAUTICAL SOCIETY, 4 HAMILTON PLACE, LONDON, W.1, ENGLAND



# The Royal Aeronautical Society

(Founded 1866)

Patron: Her Majesty The Queen

## COUNCIL 1962—1963

### President

B. S. SHENSTONE, M.A.Sc., F.R.Ae.S., F.I.A.S., F.C.A.I.

### President-Elect

PROFESSOR A. R. COLLAR, M.A., D.Sc., F.R.Ae.S., F.I.A.S., F.C.A.I.

### Past-Presidents

PETER G. MASEFIELD, M.A., F.R.Ae.S., Hon.F.I.A.S., M.Inst.T.  
DR. E. S. MOULT, C.B.E., Ph.D., B.Sc., F.R.Ae.S., M.I.Mech.E.  
AIR MARSHAL SIR OWEN JONES, K.B.E., C.B., A.F.C., B.A., D.I.C.,  
F.R.Ae.S., M.I.Mech.E., R.A.F.(retd.)

### Vice-Presidents

H. H. GARDNER, B.Sc., F.R.Ae.S.  
SIR GEORGE GARDNER, K.B.E., C.B., D.Sc., Hon.F.R.Ae.S., M.I.Mech.E.  
A. D. BAXTER, M.Eng., F.R.Ae.S., M.I.Mech.E.

### Ordinary Members

PROFESSOR J. A. J. BENNETT, D.Sc., Ph.D., D.I.C.,  
F.R.Ae.S. (Also Chairman, Rotorcraft Section)  
MAJOR G. P. BULMAN, C.B.E., B.Sc., F.R.Ae.S.  
SIR SYDNEY CAMM, C.B.E., Hon.F.R.Ae.S.  
DR. W. CAWOOD, C.B., C.B.E., Ph.D., B.Sc., F.R.Ae.S.  
SIR ROBERT COCKBURN, K.B.E., C.B., M.Sc., Ph.D.,  
F.R.Ae.S., M.I.E.E.  
E. B. DOVE, A.F.R.Ae.S.  
SIR WILLIAM S. FARREN, Kt., C.B., M.B.E., M.A.,  
D.Sc., F.R.S., Hon.F.R.Ae.S., Hon.F.I.A.S.,  
M.I.Mech.E.  
L. G. FRISE, B.Sc., F.R.Ae.S., A.F.I.A.S.  
SIR ARNOLD HALL, Kt., M.A., F.R.S., F.R.Ae.S.  
DR. W. F. HILTON, Ph.D., D.Sc., A.R.C.S., D.I.C.,  
F.R.Ae.S. (Chairman, Astronautics and Guided  
Flight Section)  
DR. G. S. HISLOP, Ph.D., B.Sc., A.R.C.S.T., F.R.Ae.S.,  
M.I.Mech.E.  
D. KEITH-LUCAS, M.A., F.R.Ae.S., M.I.Mech.E.

J. B. MILLS, A.F.R.Ae.S., A.M.I.E.(Aust.)  
(President, Australian Division)  
M. B. MORGAN, C.B., M.A., F.R.Ae.S.  
N. E. ROWE, C.B.E., B.Sc., D.I.C., Hon.F.R.Ae.S.,  
F.I.A.S., M.I.Mech.E., F.C.G.I., M.Inst.T.  
A. A. RUBBRA, C.B.E., B.Sc., F.R.Ae.S., M.I.Mech.E.  
A. J. SMAILL, A.F.R.Ae.S.  
(President, New Zealand Division)  
PROFESSOR S. SMOLENIEC, Ph.D., M.Sc., D.I.C.,  
A.F.R.Ae.S., A.M.I.Mech.E.  
(President, Southern Africa Division)  
AIR MARSHAL SIR HERBERT D. SPRECKLEY, K.B.E.,  
C.B., F.R.Ae.S., M.I.Mech.E.  
W. H. STEPHENS, C.B., M.Sc., F.R.Ae.S., M.Inst.P.  
DR. E. W. STILL, Ph.D., B.Sc., A.C.G.I., F.R.Ae.S.,  
A.M.I.Mech.E.  
W. G. WILSON, Grad.R.Ae.S.  
(Chairman, Graduates' and Students' Section)  
T. A. WOLSTENHOLME, A.R.Ae.S.

### Officers

Hon. Treasurer: MAJOR G. P. BULMAN, C.B.E., B.Sc., F.R.Ae.S.

Solicitor: L. A. WINGFIELD, M.C., D.F.C., A.R.Ae.S.

Secretary: DR. A. M. BALLANTYNE, T.D., Ph.D., B.Sc., F.R.Ae.S.,  
F.I.A.S., Hon.F.C.A.I.

Note: Under the revised By-Laws, allowed on 11th January 1960, the President of each Division and the Chairman of each Section of the Society is a Member of Council by reason of his office.