

THE  
AERONAUTICAL JOURNAL  
VOL.—LXX

THE ROYAL AERONAUTICAL SOCIETY

# *The Journal of the Royal Aeronautical Society*

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

## **VOLUME LXX**

**JANUARY - DECEMBER 1966**

Edited for the Council of The Royal Aeronautical Society

by

Joan Bradbrooke, ARAS

Printed by the Lewes Press Wightman and Co. Ltd., Friars Walk, Lewes, Sussex  
and Published by the Royal Aeronautical Society, 4 Hamilton Place, London W.1

# 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 W1

Telephone: Grosvenor 3515-9      Telegrams: Didaskalos, London, W1

Subscriptions: £10 10s. 0d. per annum, post free      Single Copies: 17s. 6d.

Advertisements only: J. W. Williams, DFC, Magazine Advertising Ltd, 36-38 Whitefriars St., London, EC4.      Fleet Street 7539

VOLUME 70

OCTOBER 1966

NUMBER 670

## CONTENTS

	Page
Notices	LXIX
Miss F. E. Barwood—Colloquium on “Is Constant Frequency Power Generation Worthwhile?”—Honour Awarded to a Member—Elections—Zonta International Earhart Fellowships—Royal Aeronautical Society’s Stand at the Farnborough Air Display—Diary—Gold Medal for Applied Research in Rheology—Symposium on Structural Stability and Optimisation—Associate Fellowship Examinations—News of Members—Other Meetings—Lecture Summaries.	
The Branches	LXXIII
Graduates’ and Students’ Section	LXXIV
Influences on the Development of Aviation	<i>H.R.H. The Prince Philip, Duke of Edinburgh</i> 893
Propulsion for Space Flight	<i>S. K. Hoffman</i> 901
The Heavy Assault Transport Helicopter	<i>R. B. Lightfoot</i> 914
Applications of the Vapour Core Pump to Aero Engine Fuel Systems	<i>S. R. Tyler</i> 923
A Young Man’s View of the Aerospace Profession	<i>H. M. Fincher</i> 936
A Career in the Aerospace Industry	<i>P. D. Ewins</i> 944
Technical Notes	948
A Suggestion for Compressible Flow Graphs for Use in Subsonic Flow— <i>L. J. S. Bradbury</i> . Shear Stiffness of Sandwich Panels: A Review of Test Methods— <i>M. E. Grayley</i> . A Three-Component, Strain-Gauged Sting Balance for Use in Small Low-Speed Wind Tunnels— <i>J. A. C. Marsden</i> . Receptance Methods in the Iterative Solution of Torsional Vibration Problems— <i>S. Mahalingam</i> . Circumferential Asymmetry in Axial Flow Compressors— <i>M. D. C. Doyle and J. H. Horlock</i> . Some Formulae for Deflection and Volumetric Displacement of a Flat Circular Plate— <i>J. Skorecki</i> .	
The Library	959
Reviews:—The Powerless Ones: Gliding in Peace and War—An Introduction to the Longitudinal Static Stability of Low Speed Aircraft—Rolls of Rolls-Royce—Space Materials Handbook—Human Spatial Orientation—Mecanique—Carburation—British Flying-Boats and Amphibians, 1909-1952.	
Additions to the Library	Reports

All communications for publication in the JOURNAL should be addressed to the Editor, JOAN BRADBROOKE, MBE, ARAS; all communications on general matters affecting the Society should be addressed to the Secretary, A. M. BALLANTYNE, OBE, TD, BSc, PhD, CEng, FRAeS, HonFCASI, FAIAA—at 4 HAMILTON PLACE, LONDON, W1.

Reproduction in whole or in part of any of the papers and contributions published in this Journal is not permitted without the written consent of the Royal Aeronautical Society.

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

# The Royal Aeronautical Society

FOUNDED 1866

INCORPORATED BY ROYAL CHARTER 1949

Patron: HER MAJESTY THE QUEEN

## COUNCIL

*Honorary President:* H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, KG (*Hon Fellow*)

*President:* A. D. BAXTER, MEng, CEng, FRAeS

*President-Elect:* M. B. MORGAN, CB, MA, CEng, FRAeS

*Vice-Presidents:*

PROFESSOR D. KEITH-LUCAS, MA, CEng, FRAeS  
AIR COMMODORE F. R. BANKS, CB, OBE, CEng, CGIA, HonFAIAA, FRAeS, RAF (retd)  
PROFESSOR J. A. J. BENNETT, DSc, PhD, CEng, FAIAA, FRAeS  
(*Also Chairman, Rotorcraft Section*)

*Past-Presidents:*

PROFESSOR A. R. COLLAR, CBE, MA, DSc, CEng, FRS, FAIAA, FCASI, FRAeS  
H. H. GARDNER, BSc, CEng, FRAeS  
SIR GEORGE GARDNER, KBE, CB, HonDSc, CEng, HonFRAeS

*Members:*

MAJOR G. P. BULMAN, CBE, BSc, CEng, FRAeS  
H. CAPLAN, DCAe, CEng, AFRAeS  
SIR WALTER CAWOOD, KBE, CB, BSc, PhD, FRAeS  
A. V. CLEAVER, OBE, CEng, AFAIAA, FRAeS  
SIR ROBERT COCKBURN, KBE, CB, MSc, PhD, CEng, FRAeS  
S. D. DAVIES, BSc (Eng), CEng, FRAeS  
DR. W. F. HILTON, DSc, DIC, CEng, AFAIAA, FRAeS  
DR. G. S. HISLOP, BSc, ARCST, CEng, FRAeS  
D. B. HUDSON, BSc, BE, CEng, FRAeS (*President of the Australian Division*)  
B. P. LAIGHT, MSc, CEng, FRAeS  
A. A. LOMBARD, CEng, FRAeS  
P. G. MASEFIELD, MA, CEng, HonFAIAA, FRAeS  
G. C. B. MITCHELL (*Student*), (*Chairman, Graduates' and Students' Section*)  
AIR COMMODORE J. R. MORGAN, OBE, BSc (Eng), CEng, FRAeS, RAF (retd)  
DR. E. S. MOULT, CBE, BSc, CEng, FRAeS  
W. N. NEAT, CEng, FRAeS (*Chairman, Astronautics and Guided Flight Section*)  
CAPTAIN J. ORBELL, MBE, AFRAeS (*President of the Rhodesia Division*)  
F. W. PAGE, CBE, MA, CEng, FRAeS  
COMMANDANT F. W. PARNELL, AFRAeS  
(*President of the Southern Africa Division*)  
PROFESSOR E. J. RICHARDS, OBE, MA, DSc, CEng, FRAeS  
G. T. WANSBROUGH-WHITE, ARAeS  
K. G. WILKINSON, BSc, DIC, ACGI, CEng, FRAeS  
J. E. D. WILLIAMS, BSc, FRAeS  
GROUP CAPTAIN W. G. WOODWARD, OBE, BE, CEng, FRAeS, RNZAF  
(*President of the New Zealand Division*)

*Officers:*

Hon. Treasurer: MAJOR G. P. BULMAN, CBE, BSc, CEng, FRAeS  
Solicitor: L. A. WINGFIELD, MC, DFC (*Hon Companion*)  
Secretary: DR. A. M. BALLANTYNE, OBE, TD, BSc, CEng, FAIAA, HonFCASI, FRAeS

**Note:** The President of each Division and the Chairman of each Section of the Society is a Member of Council by reason of his office.

OCTOBER 1966