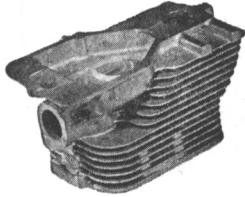


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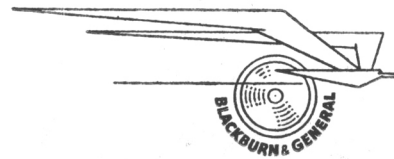
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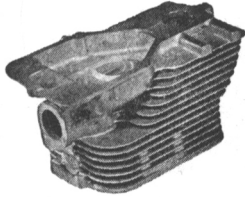
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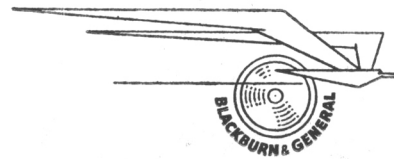
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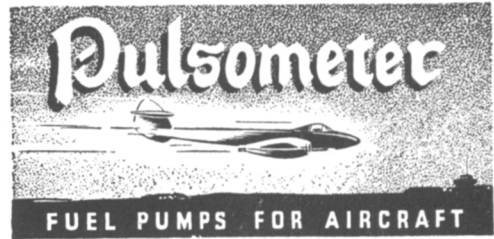
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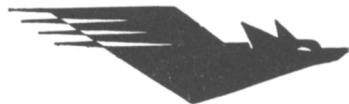


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February 1951

## SOME NOTES ON THE TERMS "g" AND "INERTIA"

By M. C. CAMPION, B.Sc.(Eng.), Grad.R.Ae.S.

### PART IV

*(The previous parts of this paper appeared with the August, October, November and December 1950, and January 1951 issues of the JOURNAL)*

#### IV—Some consequences of the flexibility of the structure

- (i) Parts I to III of this paper described the methods used for determining the inertia factors for any part of a rigid aircraft. The assumption of a rigid structure implies that no part of the structure can deflect relative to any other part, and that a load applied to one part affects every other part.

If the structure cannot be regarded as rigid, then this is no longer true, and a load applied to one part of the aircraft may only affect that part of the structure. If this is so, then the applied load must be "reacted" by the inertia of that part and not by the inertia of the whole aircraft. This implies that the inertia factors (and the accelerations) for that part will be higher than those for a rigid aircraft.

The applied load may act only for a brief time, in which case the inertia loads will tend to be as described in the previous paragraph; but if the time of action is great, the effects will approach those on a rigid aircraft.

- (ii) The time history of the application of the load also has far-reaching effects on a flexible aircraft. If the load is applied slowly, then the structure will deflect until the equilibrium position (corresponding to static loading) is reached.

A load applied suddenly, however, will cause the structure to deflect beyond the position of equilibrium, and it will then oscillate about that position until the damping in the system reduces the oscillations to zero. If the stiffness is very low, the effect will be similar to that of a load suddenly applied to a spring, the maximum deflection being twice the static deflection.

In practice, the effect of the time of application will be between the "static" and "suddenly applied" conditions, and must be examined individually, according to the actual time-history of the load and the actual structural characteristics. The criterion by which the time of application is regarded as "long" or "short" is the natural frequency of the appropriate mode of vibration of the structure.

- (iii) When the time of build-up of the load is equal to the natural frequency, very large deflections can occur, leading to the phenomenon known as "resonance."

As the structure deflects (if it is in the air stream) the aerodynamic loading may change, since the deflection can change the local incidence, and this change of load may cause a rapid oscillation of the structure. If the damping in the system is low, the oscillations will not be suppressed, and "flutter" will result.

Similar oscillations may also occur if there is some pulsating force of a mechanical origin, such as engine vibration or slipstream pulsation. These oscillations may be rapidly damped or may persist, but since they are not the result of the interaction of aerodynamic, elastic and inertia forces only, they are not described as flutter, but as "mechanical vibration."

[P.T.O.]

- (iv) If a certain system of applied aerodynamic loads causes the structure to deflect from its original shape, the incidence of the wing or tailplane will be changed, and this will lead to a modification of the applied loads. This, in turn, causes further deflections, which again modify the loading, and so on, until the position of equilibrium is reached.

This "aeroelastic distortion" can have serious consequences on a high-speed aircraft, since it sometimes leads to a loss of lift on the wing tips (which might cause root-stalling) and to a loss of stability and control.

While the effects of wing deflection are the most marked, fuselage flexibility cannot be ignored. If a down-load occurs on the tailplane, the fuselage will bend in such a direction as to increase the tailplane incidence and therefore reduce the down-load. This means that a given elevator movement will cause a smaller tail load on a flexible aircraft than on a rigid one.

- (v) The procedure for determining the loads in a flexible aircraft must, therefore, be different from that used for a rigid aircraft, and generalised stressing cases, as used in the past, are no longer sufficiently accurate.

In gust cases, high-speed aircraft will have to be examined individually for a series of types of gust, the gradients and durations being specified.

For manoeuvring cases, the effects of a given stick force (or control movement) will have to be studied, the response being calculated for a certain rate of movement of the control surface.

Landing and take-off cases will be treated in a similar manner to the flight cases, the time-history of the undercarriage loads being specified or calculated.

## REFERENCES

Since a paper of this length cannot deal fully with any one aspect of the subject, the following list of references is appended. Many of them contain extensive bibliographies which will be of value to those wishing to pursue the subject further.

### *Journal of the Royal Aeronautical Society*

- August 1946: COLLAR, A. R. The Expanding Domain of Aeroelasticity.  
January 1947: COLLAR, A. R. Aeroelastic Problems at High Speed.  
April 1947: WALKER, P. B. Mechanical Vibration and Aeroelasticity.  
September 1947: PUGSLEY, A. G. The Behaviour of Structures Under Repeated Loads.  
" " TYE, W. Gusts.  
March 1948: HILL, G. T. R. The Nature of the Distortion of Swept-back Wings.  
August 1948: TYE, W. The Influence of Recent Civil Airworthiness Requirements on Aircraft Design.  
June 1949: DUNCAN, W. J. Flutter and Stability.  
December 1949: HARPUR, N. F. The Determination of Vibration Modes.

### *A.R.C. Reports and Memoranda*

- 1155: FRAZER, R. A. and DUNCAN, W. J. The Flutter of Aeroplane Wings.  
1255: FRAZER, R. A. and DUNCAN, W. J. The Flutter of Monoplanes, Biplanes and Tail Units.  
1716: DUNCAN, W. J., COLLAR, A. R. and LYON, H. M. Oscillations of Elastic Blades and Wings in an Airstream.  
1839: PUGSLEY, A. G. A Simplified Theory of Wing Flutter.  
2097: MONTAGNON, P. E., ROBINSON, A. and FAGG, S. V. A Note on the Interpretation of  $V$ - $g$  Records.  
2117: JONES, W. PRICHARD. Aerodynamic Forces on Wings in Non-uniform Motion.  
2121: WILLIAMS, D. and JONES, P. N. Dynamic Loads in Aeroplanes under Given Impulsive Loads with Particular Reference to Landing and Gust Loads on a Large Flying Boat.  
2275: BRYANT, L. W. and GANDY, R. W. G. The Response of an Aeroplane to Application of the Elevators.

M.O.S. Air Publication 970. Design Requirements for Aeroplanes for the R.A.F. and R.N.

A.R.B. British Civil Airworthiness Requirements.



# SECRETARY'S NEWS LETTER

## FOR FEBRUARY 1951

### **THIRD ANGLO-AMERICAN AERONAUTICAL CONFERENCE SEPTEMBER, 1951**

Members are asked to note that the date of the Anglo-American Conference to be held in Brighton has been put back three days and will now be held on 3rd-7th September 1951. Full particulars will be published in the next issue of the Journal.

### **NOMINATION OF CANDIDATES FOR COUNCIL**

The following is an extract from the By-laws:—

“The Twenty-one ordinary members (of the Council) shall be nominated and elected from among the members of the Society. At the date of their election at least ten shall be Fellows, and one at least shall be in each of the following classes: Associate Fellow, Associate and Graduate.

“Of the ordinary members of the Council, that number necessary to create seven vacancies shall retire annually. The retiring members shall be those with the longest service since their last election but they shall be eligible for re-election.

“Nominations of candidates for election to the Council must be received by the Secretary not later than 10th April in each year and shall include statements in writing by the candidates that they are willing to serve. The nomination forms shall be signed by one proposer and two seconders, all of whom shall be Voters.”

Nomination forms may be obtained on application to the Secretary.

### **ELECTION OF FELLOWS**

The attention of members is drawn to the following extract from the By-Laws:—

“Elections to Fellowship will be made annually by the Council and will be announced at the Annual General Meeting of the Society. Nominations will be initiated by the members of the Council or by any four Fellows of the Society: It is the duty of the Council to see that the honour is awarded only to persons who have attained a considerable degree of technical eminence in the profession of aeronautics.”

Nominations initiated by any four Fellows of the Society should be received by the Secretary on or before 15th April 1951 to give sufficient time for the Council to consider them in time for announcement at the Annual General Meeting in May.

**CONTENTS OF FEBRUARY JOURNAL.**

- Aircraft Metallic Materials Under Low Temperature Conditions, Major P. L. Teed, F.R.Ae.S.  
 Rockets and Assisted Take-off, A. V. Cleaver, A.R.Ae.S.  
 The Human Factor in Aircraft Accidents, Group Captain J. A. Newton, A.F.C., A.R.Ae.S.  
 Note on the Distortion Characteristics of Swept and Cranked Wings in Relation to Flutter and other Aeroelastic Phenomena, D. Williams, D.Sc., M.I.Mech.E., A.F.R.Ae.S.

**The Council are particularly anxious to encourage members of the Society to support their own Journal by contributions to it of articles and papers on any aspect of Aeronautics. For that purpose they have set aside £250 a year in the form of premium awards to the authors (members or non-members) of such papers as some reimbursement for the work which has been done by the author. These premium awards are not fixed but vary from five to twenty guineas normally. It is hoped therefore that those members who have written papers on their special subjects will consider their own Journal in the first place.**

**THE AERONAUTICAL QUARTERLY VOLUME II, PART IV**

Part IV, Volume II of "The Aeronautical Quarterly" will be available from the offices of the Society towards the end of February at 7s. 9d. a copy to members of the Society, post-paid, or 10s. 3d. to non-members, post-paid.

*The Contents of Part IV will be:—*

Supersonic Flow Investigations with a "Hydraulic Analogy"	Joseph Black and
Water Channel ... ..	O. P. Mediratta
Contracting Ducts of Finite Length ... ..	L. G. Whitehead,
	L. Y. Wu and
	M. H. L. Waters
The Properties of Crossed Flexure Pivots and the Influence of the Point at which the Strips Cross ... ..	W. H. Wittrick
An Analysis of the Lift on Straight, Yawed and Swept-back Wings ... ..	J. Lockwood Taylor
Index to Volume II.	

**Copies of the rest of Volume II, Parts I, II and III and a few copies of Volume I, Parts I to IV are still available, but members are reminded that a strictly limited edition only of "The Aeronautical Quarterly" is printed and numbers cannot be reprinted in any circumstances. An annual subscription therefore is advisable.**

**NEW YEAR HONOURS**

The following members were included in the New Year's Honours List:—

**ORDER OF MERIT**

Marshal of the Royal Air Force The Rt. Hon. Hugh Viscount Trenchard  
*(Honorary Fellow)*

**G.C.B.**

Air Chief Marshal Sir James Milne Robb *(Associate Fellow)*

**K.C.B.**

H. M. Garner *(Fellow)*

**C.B.E.**

Acting Air Vice-Marshal T. N. McEvoy *(Associate Fellow)*

H. Constant *(Fellow)*

J. E. Serby *(Fellow)*

**M.B.E.**

P. R. Allison *(Associate Fellow)*

J. C. C. Taylor *(Associate)*

A.F.C.

S/Ldr. R. A. Watts (*Associate Fellow*)

### MEMBERS' NEW APPOINTMENTS

C. J. Carter (*Associate Fellow*)—Assistant Director of Instrument Research and Development at the London Headquarters of the Ministry of Supply.

J. H. Forrington (*Associate*)—Works Manager at Anthony Hoists Ltd.

J. A. R. Kay (*Associate*)—Director of A. V. Roe & Co. Ltd.

### LIAISON WITH OTHER SOCIETIES

The following Representatives have recently been appointed by the Council:—

The Educational Policy Committee of the City and Guilds of London Institute—  
Sir Arthur Gouge.

The Engineering Joint Council—Major G. P. Bulman (President of the Society).

The Board of Governors of the College of Aeronautics—Sir A. H. Roy Fedden  
and Dr. H. Roxbee Cox.

It is regretted that in error last month the President, Major G. P. Bulman, was stated to be the Society's representative on The Educational Policy Committee of the City and Guilds of London Institute, whereas the representative of the Society on this Committee is in fact, Sir Arthur Gouge.

### SCHOLARSHIPS AWARDED BY THE SOCIETY

The attention of members is drawn to the following scholarships awarded by the Society:—

*The Royal Aeronautical Society Charter Scholarship.*—A Scholarship, or Scholarships, up to the value of £300 a year can be awarded and these scholarships, in the first instance, will be awarded for a period of one year, although an extension of the Scholarship for a second year will be looked upon favourably by the Council if it is clear that the student and the work would benefit by such an arrangement.

*The Geoffrey de Havilland Memorial Scholarship.*—A Scholarship, or Scholarships, up to the value of approximately £120 a year for a period of one year, although an extension of the Scholarship for a second year will be looked upon favourably by the Council if it is clear that the student and the work would benefit by such an arrangement.

The general regulations for both scholarships are as follows:—

The Scholarships shall be awarded annually, or at such other times as may be decided by the Council, to assist a student wishing to undertake advanced work or study in aeronautics.

The Scholarships will be awarded only to those who can satisfy the Council that they have the necessary qualifications to benefit, and whose proposals for work or further studies are acceptable to the Council. Normally, the work should lead to some higher degree or post-graduate diploma, although this is not essential.

The Council will select from the applicants those whom it considers suitable, and will call such applicants for interview in the offices of the Society before such Board as may be decided by the Society.

Students wishing to apply for the Scholarships should write to the Secretary of the Society not later than 1st June, stating the course they intend to follow, and giving full particulars of their age and the results of any examinations taken by them.

### SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS EDUCATIONAL GRANTS

A number of Educational Grants are awarded by the Society of British Aircraft Constructors to boys between the ages of 16½ and 18, for the assistance of young men who are unable, for financial reasons, to take up a course of education fitting them to become aircraft engineers.

The value of the scholarship will depend upon the circumstances of the holder. The intention of the Society is to supplement the scholarship holder's means (taking into account the payment made by the employer) up to an amount which, in the opinion of the Selection Committee, will be sufficient to enable the holder to maintain himself during his training.

Application forms may be obtained from the Royal Aeronautical Society, 4 Hamilton Place, London, W.1.

## NEWS OF BRANCHES

The President and Secretary visited the Weybridge Branch of the Society on 29th December on the occasion of the Annual Dance of the Branch. The President also visited the Portsmouth Branch on 1st February.

## FOURTH LOUIS BLERIOT LECTURE

The Fourth Louis Bleriot Lecture will be given on Friday, 23rd February 1951 on "Power versus Weight in Aviation" by Monsieur Maurice Roy. The Lecture will be held at 6 p.m. at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1.

## THE "ARCHITECTURE" OF TRANSPORT

An exhibition entitled the "Architecture of Transport" and showing by means of photographs, plans and models, the architect's work in road, rail, water and air transport, will be held from 22nd February to 22nd March 1951 at the Royal Institute of British Architects, 66 Portland Place, W.1.

## LECTURES—SPRING 1951

### MAIN LECTURES

*(At 6 p.m. in the Lecture Hall of the Institution of Civil Engineers, Great George Street, London, S.W.1, unless otherwise stated. Tea will be served at 5.30 p.m.)*

**Thursday, 15th February 1951—AT COVENTRY—**Some Aspects of Flight Research, Handel Davies, M.Sc., F.R.Ae.S.—*at Sibree Hall, at 7.30 p.m.*

**Friday, 23rd February 1951—FOURTH LOUIS BLERIOT LECTURE.** Power versus Weight in Aviation, M. Roy.

**Thursday, 1st March 1951—**Progress Towards Electrical Serviceability, R. H. Woodall, A.F.R.Ae.S., and W. A. Higgs.

**Thursday, 15th March 1951—**Progress Towards Hydraulic Serviceability, H. G. Conway, M.A., M.I.Mech.E., F.R.Ae.S., and R. H. Bound, F.R.Ae.S.

**Thursday, 29th March 1951—**Some Aspects of Modern Naval Aircraft Design, D. L. Hollis Williams, B.Sc., F.R.Ae.S.

**Thursday, 12th April 1951—**Planning and Production Methods as Applied to the Comet, H. Povey, A.F.R.Ae.S.

**Thursday, 26th April 1951—**A DISCUSSION. Air Travel from the Passenger's Point of View.

### SECTION LECTURES

*(At 7 p.m. in the Library of the Royal Aeronautical Society, 4 Hamilton Place, London, W.1, unless otherwise stated.)*

**Tuesday, 13th February 1951—**Derivation and Estimation of Aerodynamic Loads for Stressing Purposes, D. J. Lambert, A.F.R.Ae.S.

**Tuesday, 27th February 1951—**Development in Aircraft Wheels, Tyres and Brakes, J. Wright, F.R.Ae.S.

**Tuesday, 6th March 1951—**Problems of Pilot Ejection Seats, J. Martin, O.B.E.

**Tuesday, 10th April 1951—**Simulators, W. R. Thomas, B.Sc., A.M.I.E.E.



GRADUATES' AND STUDENTS' LECTURE

*(At 7.30 p.m. in the Library of the Royal Aeronautical Society, 4 Hamilton Place,*

*W.1, unless otherwise stated. Visitors are welcome to attend.)*

**Thursday, 8th March 1951**—Practical Design for High  $M_{CRIT.}$ , G. H. Lee, B.Sc., D.I.C., A.R.C.S., F.R.Ae.S.

**BRANCH LECTURES AND NOTICES**

Notices of Branch Lectures and Meetings for inclusion in the Monthly Notices of the Society must be received by the 20th of the preceding month. The Honorary Secretaries of all Branches are asked to inform the Society of their arrangements for meetings so that a complete list of Branch meetings may be given.

**BELFAST BRANCH**

**Tuesday, 27th February 1951**—Aircraft Carriers—Problems Associated with the Operation of Aircraft, J. L. Bartlett.

**Tuesday, 13th March 1951**—Radar—How it Works, B. W. Hodlin, B.Sc.(Hons.).

**Tuesday, 3rd April 1951**—Annual General Meeting.

In the Central Hall, College of Technology, Belfast, at 7 p.m.

**BIRMINGHAM BRANCH**

**Friday, 30th March 1951**—Flying the Brabazon, A. J. Pegg, O.B.E. At the Chamber of Commerce, Birmingham, 7.30 p.m.

**Friday, 27th April 1951**—Annual General Meeting. At White Horse Hotel, Birmingham.

**BRISTOL BRANCH**

**Wednesday, 14th February 1951**—Civil Engineering and Aeronautics, A. G. Pugsley, O.B.E., D.Sc., F.R.Ae.S.

**Tuesday, 27th February 1951**—Human Factors in the Design and Operation of Civil Air Transport Aircraft, Kenneth G. Bergin, M.A., M.D., D.P.H., A.F.R.Ae.S.

**Monday, 12th March 1951**—Junior Members' Papers Competition.

**Wednesday, 4th April 1951**—Power Plant Requirements for Future Aircraft. F. M. Owner, C.B.E., M.Sc., F.R.Ae.S., M.S.A.E.

**Tuesday, 17th April 1951**—Some Notes on Overhaul and Maintenance, C. H. Jackson, B.Sc., A.C.G.I., A.F.R.Ae.S., A.M.I.Mech.E.

**Monday, 30th April 1951**—Annual General Meeting and Film Show.

In the Conference Room, Filton House, The Bristol Aeroplane Co. Ltd. at 6 p.m., unless otherwise stated.

**BROUGH BRANCH**

**Wednesday, 14th February 1951**—A Talk on Aero-Engines, Air Commodore F. R. Banks, C.B., O.B.E., F.R.Ae.S.

**Wednesday, 14th March 1951**—Aircraft Structures, P. B. Walker, M.A., Ph.D., F.R.Ae.S.

In the Lecture Hall, Electricity Showrooms, Ferensway, Hull, at 7.30 p.m. Admission is by ticket only.

COVENTRY BRANCH

**Thursday, 15th February 1951**—25th Anniversary Lecture (Main Lecture of the R.Ae.S.)—Some Aspects of Flight Research, Handel Davies, M.Sc., F.R.Ae.S.—*at Sibree Hall, at 7.30 p.m.*

**Wednesday, 18th April 1951**—Annual General Meeting and Films. In the Wine Lodge Hotel, The Burges, Coventry, at 7.30 p.m.

DERBY BRANCH

**Monday, 12th March 1951**—The Cierva Air Horse, J. S. Shapiro, Dipl. Ing., A.F.R.Ae.S.

**Monday, 2nd April 1951**—The Evolution of the Design of a Jet Engine, A. A. Lombard, A.F.R.Ae.S.

**Monday, 7th May 1951**—Long Range Turbo-Jet Transport, A. E. Russell, B.Sc., F.R.Ae.S.

In the Rolls-Royce Welfare Hall, Nightingale Road, Derby, at 6.15 p.m.

GLASGOW BRANCH

**Thursday, 22nd February 1951**—Thin Walled Structures, Dr. R. M. Kenedi, Ph.D., A.M.I.Mech.E., A.F.R.Ae.S. At Royal Technical College, Glasgow.

**Thursday, 22nd March 1951**—Gas Turbines, L. Haworth, B.Sc., A.M.I.Mech.E. At Rolls-Royce Factory, Hillington, Glasgow.

Meetings will begin at 7.30 p.m.

GLOUCESTER AND CHELTENHAM BRANCH

**Wednesday, 28th February 1951**—Films—at Wheatstone Hall, City Library, Brunswick Road, Cheltenham—at 7.30 p.m.

**Saturday, 3rd March 1951**—*Visit* to De Havilland's, Hatfield.

HALTON BRANCH

**Monday, 19th February 1951**—Films.

**Wednesday, 21st February 1951**—*Visit*—National Physical Laboratory (Provisional).

**Monday, 26th February 1951**—Cabin Air Control, Corporal Apprentice J. H. Ansley.

**Monday, 5th March 1951**—The Case for the Flying Boat, D. Keith-Lucas, F.R.Ae.S.

**Wednesday, 7th March 1951**—*Visit*—Air Trainers Ltd.

**Monday, 12th March 1951**—Aircraft Icing Problems, Corporal Apprentice F. L. Maitland-Titterton and Corporal Apprentice E. Davies.

**Monday, 19th March 1951**—Brains Trust.

At Branch Headquarters, Halton, at 6.45 p.m., unless otherwise stated.

ISLE OF WIGHT BRANCH

**Thursday, 22nd February 1951**—Interplanetary Flight—(The Rocket Engineer's Point of View), A. V. Cleaver, A.R.Ae.S. (This Lecture is complementary to that given on 1st November 1950.)

**Thursday, 8th March 1951**—Methods of Time Keeping, Dr. R. d'E. Atkinson.

**Thursday, 22nd March 1951**—Junior Branch Prize Lecture.

In the Saunders-Roe Sports and Social Club, at 6 p.m.

LEICESTER BRANCH

**Wednesday, 21st February 1951**—Welded Magnesium Aircraft Structures, R. J. Cross.

**Wednesday, 7th March 1951**—The Island Campaign (Coloured Film), W. Courtenay, O.B.E., M.M., A.R.Ae.S.

**Friday, 13th April 1951**—Rockets and Space Travel, J. Humphries, B.Sc., A.M.I.Mech.E., A.F.R.Ae.S.

In Room 104, College of Technology, The Newarques, Leicester, at 7.15 p.m.

LUTON BRANCH

**Wednesday, 7th March 1951**—De-Icing and Anti-Icing Systems, D. Rendel, B.Sc.

**Wednesday, 2nd May 1951**—Plastics in Aircraft, J. Byers.

**Wednesday, 23rd May 1951**—Film Show and Discussion Evening.

At the George Hotel, Luton, at 7.30 p.m.

MANCHESTER BRANCH

**Wednesday, 28th February 1951**—Film: Steelmaking and Usages. (Thos Firth & John Brown Ltd. and Firth-Vickers Stainless Steels Ltd.).

**Thursday, 29th March 1951**—Cabin Air Conditioning, W. M. Widgery, F.R.Ae.S.

In the Reynolds Hall, College of Technology, Manchester, at 7.30 p.m.

PORTSMOUTH BRANCH—FILM PROGRAMME

**Thursday, 15th February 1951**—'Pluto' and 'Welded Structure' (Stewarts & Lloyds and Dorman, Long & Co. Ltd.).

**Thursday, 1st March 1951**—Wood (CFL Films, and Aims of Industry Film).

**Thursday, 15th March 1951**—Casting and Forging Light Alloys (High Duty Alloys).

**Thursday, 29th March 1951**—Annual General Meeting.

At the Apprentices' School, Airspeed Ltd., The Airport, Portsmouth, at 6 p.m.

SOUTHAMPTON BRANCH

**Wednesday, 21st February 1951**—Aircraft Undercarriages, R. C. Cussons, M.A.

**Wednesday, 21st March 1951**—The Further Development of the Brabazon Type, G. P. Hebden, B.Sc., A.F.R.Ae.S.

**Wednesday, 11th April 1951**—Instrumentation for Testing Aircraft and Aero-Engines, C. Jaques (Joint meeting with Southern Branches of Institution of Mechanical Engineers and Institution of Electrical Engineers).

In the Physics Lecture Theatre, University College, at 7 p.m.

WEYBRIDGE BRANCH

**Wednesday, 21st February 1951**—Some Problems of Air Interception, Air Vice-Marshal T. G. Pike, C.B., C.B.E., D.F.C.

**Wednesday, 14th March 1951**—Turbine-Engined Aircraft, G. R. Edwards, M.B.E., B.Sc., F.R.Ae.S., A.M.I.Struct.E.

**Wednesday, 4th April 1951**—Gas Turbines, S. G. Hooker, O.B.E., A.R.C.Sc., B.Sc., D.I.C., D.Phil., F.R.Ae.S., F.R.S.A.

**Wednesday, 18th April 1951**—Junior Prize Lecture, Branch Members.

**Wednesday, 2nd May 1951**—Annual General Meeting and Smoking Concert.

At Vickers-Armstrongs Ltd., Weybridge, at 6 p.m.

**ANNUAL SUBSCRIPTIONS**

Members are reminded that their annual subscriptions became due on 1st January 1951. The rates are:—

	HOME			ABROAD		
	£	s.	d.	£	s.	d.
Fellows ... ..	5	5	0	4	4	0
Associate Fellows ... ..	4	4	0	3	3	0
*Associates ... ..	3	3	0	3	3	0
Graduates (aged under 26) ...	2	2	0	2	2	0
Graduates (aged 26 and over) ...	2	12	6	2	12	6
Students (aged under 21) ...	1	1	0	1	1	0
Students (aged 21 and over) ...	1	11	6	1	11	6
Companions ... ..	3	3	0	3	3	0
Founder Members ... ..	2	2	0	2	2	0

\* Any Associate elected before 1st October 1947 may, if he wishes, elect not to receive the JOURNAL, and in this case his subscription will be reduced by £1 1s. 0d. to £2 2s. 0d.

It will avoid delay and confusion if members, when sending remittances for subscriptions, will state their names clearly and give their addresses and grades of membership.

Remittances should be made payable to the Royal Aeronautical Society.

**ELECTIONS**

The following is a list of new members and transfers of membership of the Society:—

*Associate Fellows*

Frank Harry Bond (from Graduate), Raymond Montrose Brown (from Graduate), Robert Ellis Chapman (from Associate), Charles Leslie Dann, Ernest James Grewcock (from Graduate), Charles Henry Johns (from Associate), Hiram Oliver West, Thomas George Holmes Woolford (from Graduate).

*Associates*

Rex Norman Spurden Burley, John Henry Hotson, Charles Edward Hutt, Ian David Kitson, Ernest Sidney Moore, Alfred Arthur Old, Mathew Alexander Ernest Quinn.

*Graduates*

Robert Edward Finch (from Student), Gordon Robert Parker (from Student), John Michael Ramsden, Peter Travers Ross (from Student), Hitendra Nath Roy, Soli Kaikhushru Sahiar (from Student), Barnes Winstanley Wallis, Jesus Ernest Vargas (from Student).

*Students*

Henry William Groves, Ian Harwood, John Ernest Walford.

**JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY**

It is regretted that with the increasing costs of production it has been found necessary to increase the price of the JOURNAL OF THE SOCIETY.

From January 1951 (Volume LV, Number 481) the price was increased from 7s. 6d. to 10s. 0d. for each number.

**The new rates from January 1951 therefore are:—**

Single Copies: 10s. 3d. each including postage (home or abroad)

Annual Subscription: £6 3s. 0d. including postage (home or abroad)

## JOURNAL BINDING

The prices of binding of Journals are as follows:—

1950 Volume (including packing and postage), 16s. 0d.

Previous Volumes (including packing and postage), 18s. 0d.

Journals, with a note of the name and address of the sender, should be sent direct to The Lewes Press, Friars Walk, Lewes, Sussex, and the remittance to the Secretary at the offices of the Society.

Cases only for unbound 1950 Volumes are available, price 6s. 6d. each. Requests for cases, with remittances, should be sent to the Secretary at the offices of the Society.

## CHANGES OF ADDRESS

To assist in keeping the records of members correct and up to date the Secretary will be glad if all members will notify him as soon as possible of changes of address.

When notifying changes please give the following particulars:—

Name (in block letters).

Grade of membership.

New address (in block letters).

Old address.

Changes of address must be received *before the 15th of the month* in order to be effective for the Journal for the following month.

## ACKNOWLEDGMENT

The Council acknowledge with grateful thanks the return of back numbers of the Journal from A. Dennison Scarlett, Esq., *Associate Fellow*.

## ADDITIONS TO THE LIBRARY

The following have been added to the Library (titles of pamphlets are printed in italics. Books marked \* or \*\* may not be taken out on loan):—

Bakan, D. and E. S. Ewart	Visual Deficiency and Flying Experience Following Flight Training. Civil Aeronautics Administration. 1950.
Bicknell, R.	Air Rescue and Survival. (a paper). Aviation Forum. 1951.
*British Standards Institution	Engineering Drawing Office Practice. B.S.I. 1943.
Casamassa, J. V.	Jet Aircraft Power Systems. McGraw Hill. 1950.
Chalmers, B.	The Structure and Mechanical Properties of Metals. (Volume II of a series of Monographs on Materials published under the authority of the Royal Aeronautical Society). Chapman & Hall. 1951.
Civil Aeronautics Administration	Statistical Handbook of Civil Aviation. U.S. Government Printing Office. 1949.
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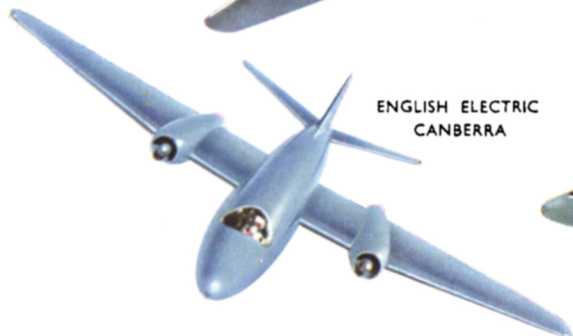
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