

The Journal of
**THE ROYAL
AERONAUTICAL
SOCIETY**



CONTENTS

JULY 1951

PROGRESS TOWARDS ELECTRICAL SERVICEABILITY

*R. H. WOODALL, M.I.E.E., A.F.R.Ae.S., and
V. A. HIGGS, B.Sc., A.M.I.E.E., A.F.R.Ae.S.*

PROGRESS TOWARDS HYDRAULIC SERVICEABILITY

*R. H. BOUND, F.R.Ae.S., and
H. G. CONWAY, M.A., M.I.Mech.E., F.R.Ae.S.*

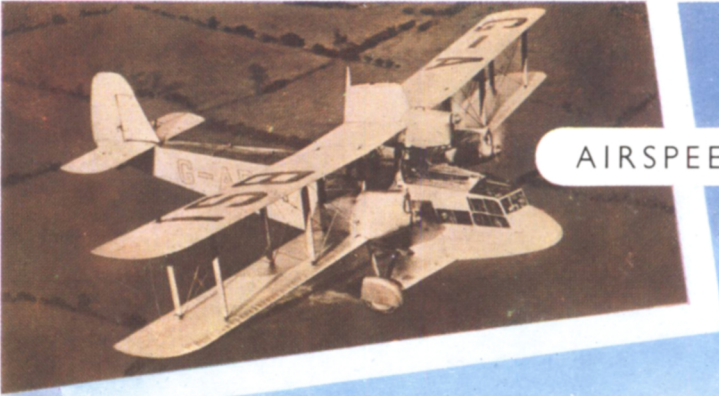
THE 1951 GARDEN PARTY

REVIEWS

CORRESPONDENCE

LONDON

ROYAL AERONAUTICAL SOCIETY, 4 HAMILTON PLACE, W.1



AIRSPEED FERRY 1932

BACKGROUND OF EXPERIENCE



AIRSPEED AMBASSADOR

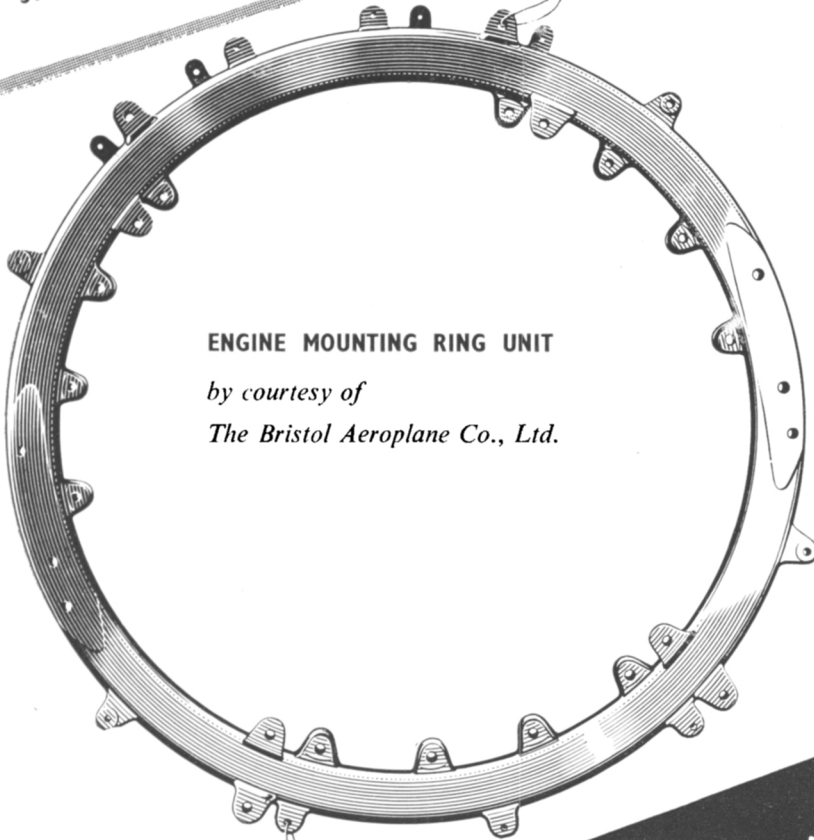


DOWTY *Equipped*
then - and now

DOWTY EQUIPMENT LIMITED · CHELTENHAM

ACCLES & POLLOCK

APPLY THEIR SKILLS ON
SPECIAL TUBE FABRICATIONS



ENGINE MOUNTING RING UNIT

by courtesy of

The Bristol Aeroplane Co., Ltd.

Rigidly!

ACCLES & POLLOCK LTD · OLDBURY · BIRMINGHAM

MAKERS AND MANIPULATORS OF SEAMLESS TUBES, IN STAINLESS AND OTHER STEELS. A  COMPANY

TBW/45

FESTIVAL OF BRITAIN—1951—Power and Production Building



SELECTED FOR THE SINGLE EXHIBIT
REPRESENTING AN OUTSTANDING
BRITISH RESEARCH ACHIEVEMENT IN
THE NON-FERROUS METALS INDUSTRY

Elektron" magnesium casting alloys containing zirconium and rare earth metals, highly resistant to creep at elevated temperatures, under service conditions up to 250°C., have been selected for the single exhibit representing an outstanding British research and development achievement in the non-ferrous metals industry. The results of this research made available to the aircraft industry, at a critical phase in the development of jet and propeller turbine engines, ultra-light alloys possessing remarkably improved properties at the high running temperatures of modern engines, thus solving one of the designer's main problems and helping British aero engine constructors to achieve a leading position in the aircraft turbine engine field. Britain pioneered these alloys and they are now being cast under licence in the U.S.A., Canada, Australia, Sweder, Switzerland and Holland.



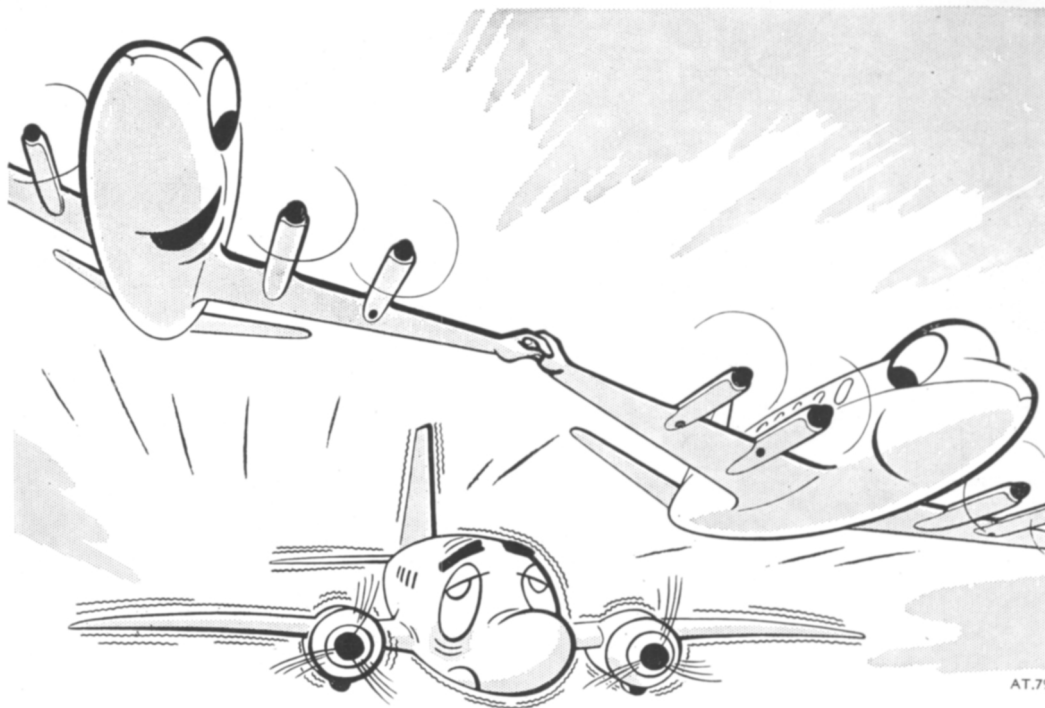
CLIFTON JUNCTION, MANCHESTER · LONDON OFFICE: BATH HOUSE, 82 PICCADILLY, W.1

LUCAS

*design and manufacture
fuel systems and combustion
equipment for gas turbine
engines used throughout
the world*



JOSEPH LUCAS (GAS TURBINE EQUIPMENT) LTD.,
BIRMINGHAM & BURNLEY, ENGLAND
Springfield 3232 and Burnley 5051



The Airline that went ahead with to-day's TURBOPROPOSITION

You buy a clear two-years lead in air transportation with the Viscount. This aircraft, powered by Rolls-Royce "Dart" turboprops, brings four-engine safety for the first time to short and medium ranges. It will take off on any three engines, and fly or "stack" on two. The turboprops are so free from vibration that serviceability is really outstanding — and extends to both air-frame and accessories.

Check also:—

The Viscount is the world's first turboprop airliner. The Viscount has already carried fare-paying passengers. The Viscount is already in quantity production for British European Airways. The Viscount, for extra safety, flies on kerosene.

These hard facts are by no means the whole story. But they are enough to tell any operator that this is an aircraft which will cause passengers to say "Book me on the Viscount".



VICKERS-ARMSTRONGS LIMITED, AIRCRAFT DIVISION, WEYBRIDGE, SURREY

Do you know your airfields?



11

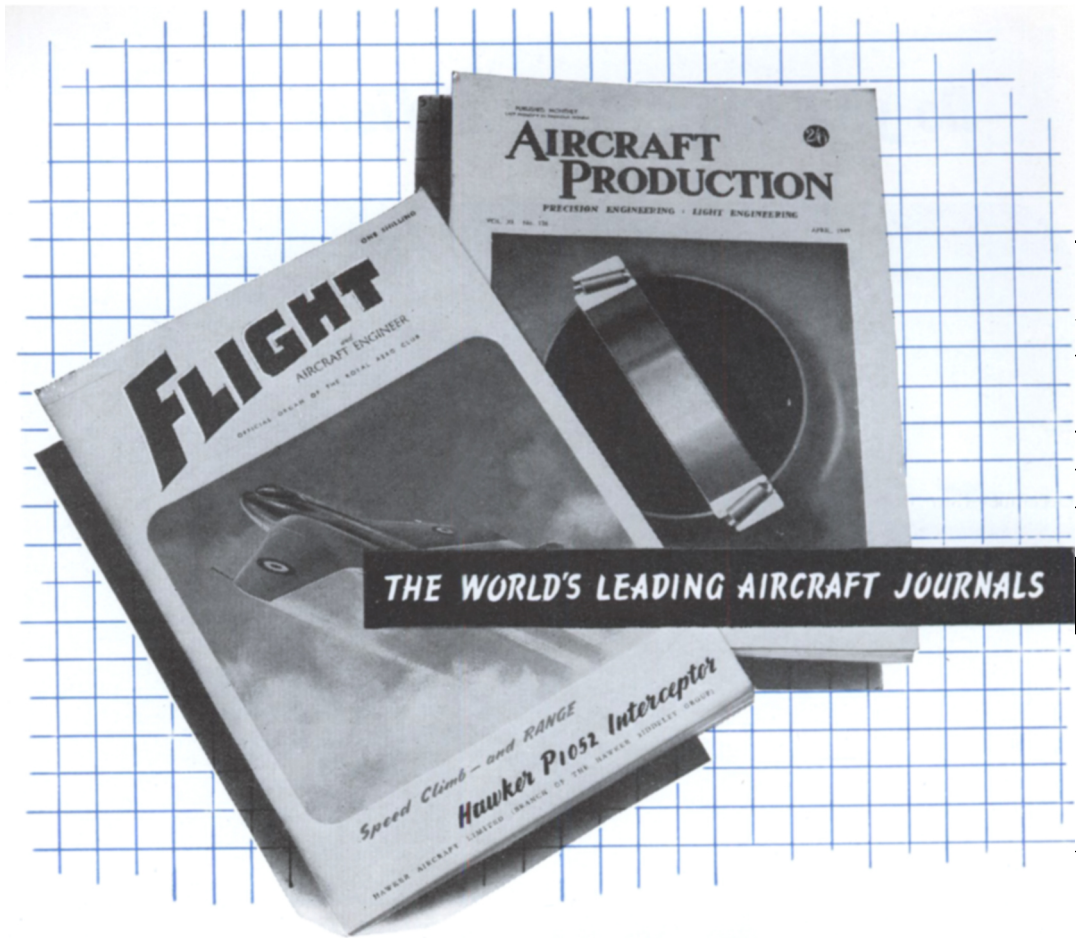
Recognize this airfield? It's No. 11 in this series of puzzle photographs. You'll find the answer below on the right. ★

As you join the circuit it's a pleasant feeling to know that the crews of the Aircraft Servicing Vehicles of the Shell and BP Aviation Service are waiting on the tarmac below, ready to attend swiftly and cheerfully to your needs—whether you're flying for an international airline, for a charter company or for your own private enjoyment.

Shell and BP Aviation Service

*Shell-Mex and B.P. Ltd., Shell-Mex House, Strand, W.C.2.
Distributors in the U.K. for the Shell and
Anglo-Iranian Oil Groups.*

★Eastleigh



WORLD-WIDE AUTHORITIES

ON EVERY ASPECT OF AVIATION—CIVIL AND MILITARY

FLIGHT Aviation's branches are today so numerous that the specialist who has to keep fully in touch with other people's progress must have up-to-the-minute information on every phase of technical research, development, equipment and operation. He will find it each week in **FLIGHT**—reliable, critically annotated and well illustrated news of the world's military, commercial and private aviation activities.

Thursdays 1s.
Annual subscription £3 1s.

AIRCRAFT PRODUCTION

in aircraft manufacture, as in design, the demands made upon the engineer are severe and often unprecedented. Continuous development of production methods is needed and an intimate knowledge of what is required is essential. Such knowledge can be obtained from the detailed practical articles published regularly in **AIRCRAFT PRODUCTION**, the only specialist journal in its field.

Monthly 2s. 6d.
Annual subscription £1 13s.



ILIFFE AND SONS LIMITED, DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

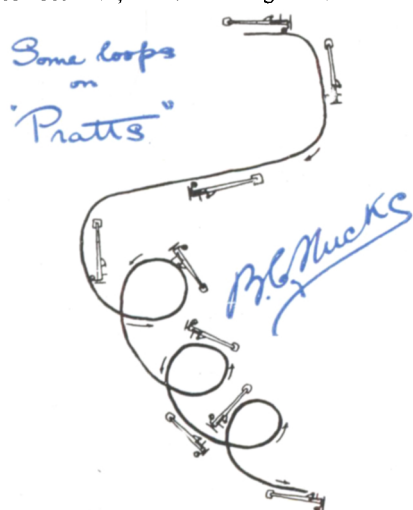
It pays to say . . .

WHEN fame and fortune rewarded the flyers of Kitty Hawk, Wilbur and Orville kept their heads. The Wright Brothers were singularly and dually unimpressed, John Dos Passos has told us, "by the upholstery and the braid and the gold medals and the parades of plush horses." They remained humble mechanics; they serviced their machines with their own hands—"even to filling the gasoline tank."

Wise men.

In those days even the ESSO service (yes, the Wrights used the products of ESSO's forebears) was somewhat sketchy and . . . well, a trifle gimcrack. But that was 1903.

Remember pre-1914 Hendon? B. C. Hucks? Below is his own diagram of loops done on Pratts—ESSO's godparents in Great Britain—reproduced from an advertisement in "The Aeroplane" of December 18th, 1913. Bunting a Blériot! Ugh!!



Now turn to the twenties and thirties.

Giant strides? Yes and no. Croydon was then Britain's one and only international airport, and the refuelling service at Croydon consisted of two men, a dog and a battery of the familiar road-side petrol pumps. At smaller aerodromes the two-gallon tin and funnel was still the standard refuelling equipment. The day of *intensive* development had not yet arrived.

But *extensively* there was much ado. New airfields were appearing every week. The Hinklers, Scotts and Blacks, Earharts, Lindberghs, Kingsford Smiths were touching down here, there and anywhere; and wherever they landed they expected to find fuel ready and waiting. Yes, the refuellers beat the flyers to Conakry, Ouagadougou, Yoff, Zinder, Usumbura, Windhoek, Ratmalana, Kai Tak, Dum Dum, Kuching, Lakunai, Darwin, Garbutt . . . They had to; *had* to.

And it wasn't always easy. Isn't even now. In the Sahara fuel reaches the landing-grounds by camel; in the South Seas it goes in by tank-landing craft; elsewhere it's supplied by pack-horse, by



raft, tanker, barge, tank-car, pipe-line. And not just any old fuel, for even in the remotest airfields air superintendents have a habit of specifying "80" or "100/130" or "108/135" or "115/145", and it's ESSO's job to see that they get it.

It's a biggish job.

Now jump to 1951. The scene: London Airport. Our two men and a dog have become a team of thirty expert refuellers (and a dog) armed with four 3,300-gallon tankers and a new 4,000-gallon unit capable of delivering the goods at more than 300 gallons a minute any time day or night. Petrol plus oil, water-methanol, de-icing fluid, plus . . .

Refuelling in complete safety at top speed—everywhere. That's 1951. Prestwick: twenty minutes scheduled for a re-fill of 2-3,000 gallons. Shannon: 10,283,561 gallons of ESSO piped into 4,883 airliners in one year (eighty per cent. of all aircraft using the airport!). Gander . . . Goose Bay . . . Elmdon, Renfrew, Jersey, Speke, Bovingdon, Croydon, Northolt, Ringway . . . everywhere, it pays to say ESSO.

Last year's deliveries of ESSO aviation fuels to international airlines reached the respectable total of 193,537,134 gallons—enough petrol to push an average British car round the equator 148,875 times, as if you didn't know!

During the Berlin Airlift ESSO supplied 65,000 gallons daily, enough fuel . . . never mind, let's skip it.

It is no secret that ESSO's world-wide service is the product of long experience and indefatigable research—experience won the hard way and paid for by the confidence and co-operation of the pioneers, and research by the boys in the not-so-small back rooms of ESSO's £5,000,000 a year laboratories.

Experience and research of this order add up to something bigger than service—*tradition*. And the ESSO tradition is one good reason why at all times and in all places it pays to say . . .



FOR ALL PETROLEUM PRODUCTS

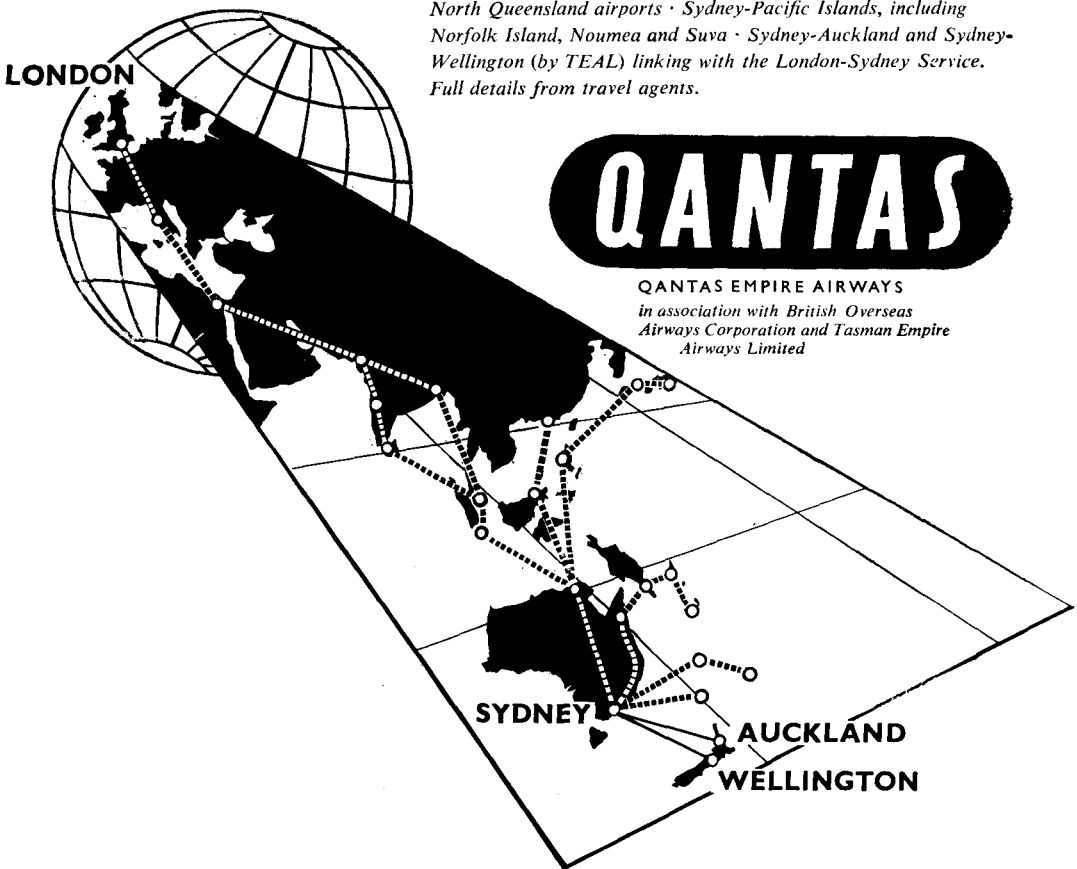
ESSO PETROLEUM COMPANY, LIMITED, 36 QUEEN ANNE'S GATE, LONDON

Linking England with sixteen Countries...

AUSTRALIA'S INTERNATIONAL AIRLINE

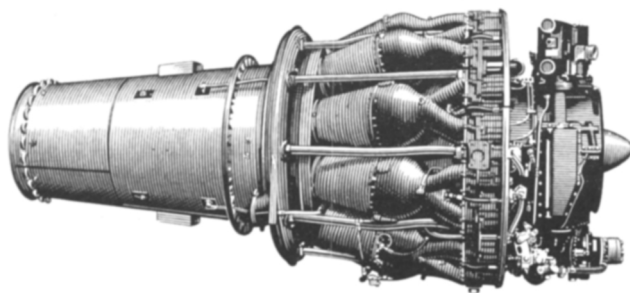
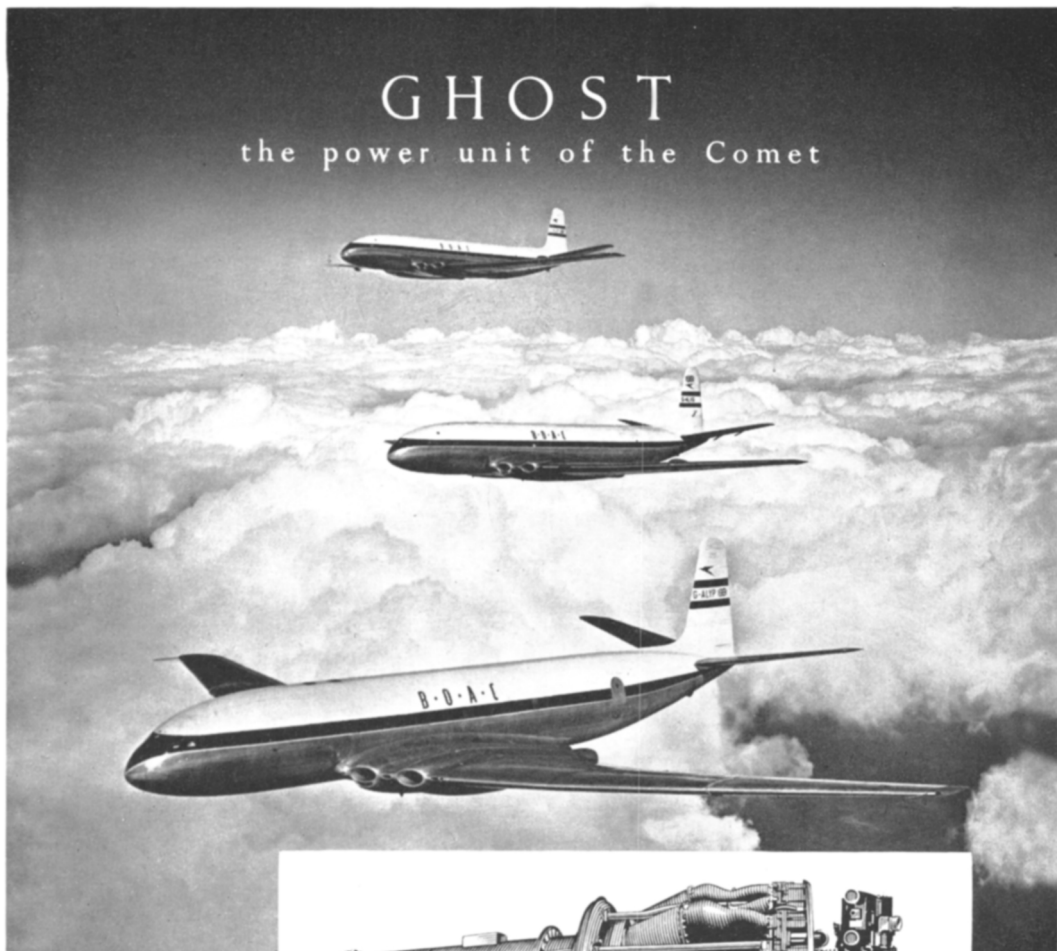
In meeting today's requirements of trade and travel by air to the East, Australia, and the Pacific, Qantas provides a valuable international service—qualified by the experience of 30 years. Services covering over 30,000 miles of unduplicated air routes include—London-Sydney via Rome, Cairo, Karachi, Calcutta (alternatively via Bombay and Colombo), Singapore, Darwin, Sydney—in parallel with B.O.A.C.

Sydney-Hong Kong, via Labuan (North Borneo) · Sydney-Tokyo, via Manila · Sydney-New Guinea, New Britain and Solomon Islands, via North Queensland airports · Sydney-Pacific Islands, including Norfolk Island, Noumea and Suva · Sydney-Auckland and Sydney-Wellington (by TEAL) linking with the London-Sydney Service. Full details from travel agents.



GHOST

the power unit of the Comet



Inheriting a decade of development experience in centrifugal gas turbines: the Ghost is a proved engine. It is the first turbine to be type-approved by the Air Registration Board for civil use, while vastly expanding production from six entirely separate production units managed by the de Havilland Engine Company and its licencees in Western Europe sets the seal of recognition on its military excellence

DE HAVILLAND

DE HAVILLAND ENGINE CO. LTD., EDGWARE, MIDDLESEX, ENGLAND

LODGE

AVIATION SPARKING PLUGS

*serve leading
airlines of the world*

B.E.A., B.O.A.C., Aer Lingus, Aerolineas Argentinas, Air India, "Alitalia", Australian National Airways, Braathen's South American Airways, British West Indian Airways, Central African Airways, Danish Airlines, Malayan Airways, New Zealand National Airways, Norwegian Airlines, Pakistan Aviation, Sabena, South African Airways, Swedish Air Lines, Tasman Empire Airways, Trans Australia Airlines, Trans-Canada Air Lines.

THESE FAMOUS ENGINE MAKERS FIT LODGE:

Alvis, Armstrong-Siddeley, Bristol, De Havilland, Rolls-Royce.

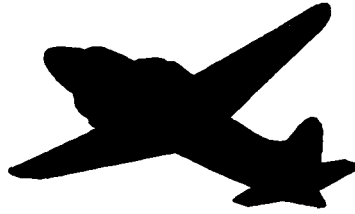
**THE WORLD'S LARGEST CIVIL AIRLINER
IS FITTED WITH LODGE:**

The Bristol "Brabazon"
uses 288 Lodge Plugs.



LODGE SPARKING PLUGS - THE EXPERTS' CHOICE

British made throughout by LODGE PLUGS LTD., RUGBY



By far the easiest and most comfortable way of



crossing the frontiers of European countries is



to fly over them by BEA ; and arrive where



you want, when you want.

fly BEA

B R I T I S H E U R O P E A N A I R W A Y S

CHAPMAN & HALL

MONOGRAPHS ON MATERIALS
Published under the authority of
THE ROYAL AERONAUTICAL SOCIETY

First titles

THE PROPERTIES OF METALLIC MATERIALS AT LOW TEMPERATURES

by P. LITHERLAND TEED, F.R.AE.S.

Demy 8vo 232 pages 8 Figures 21s. net (Published 28th April 1950)

THE STRUCTURE AND MECHANICAL PROPERTIES OF METALS

by BRUCE CHALMERS, D.SC., F.INST.P.

Demy 8vo 132 pages 89 Figures 18s. net (Published 18th January 1951)

ADHESIVES FOR WOOD

by R. A. G. KNIGHT, B.SC., M.I.MECH.E.

Demy 8vo 256 pages 19 Figures 6 Plates 22s. 6d. net (In the Press)

Other Titles in Preparation

37 ESSEX STREET, LONDON, W.C.2

PITMAN

Bennett's Complete Air Navigator

By Air Vice-Marshal D. C. T. Bennett, C.B., C.B.E., D.S.O., F.R.Ae.S., F.R.Met.S. Fifth Edition. 25/- net.
"Every good navigator should have this work available for reference."—*AEROPLANE*.

Rapid Navigation Tables

By W. Myerscough and W. Hamilton. Second Edition. 17/6 net.
"Both quicker and simpler than anything I have yet seen."—*AEROPLANE*.

The Performance of Civil Aircraft

By F. B. Baker, M.A., A.F.R.Ae.S. An up-to-date book for civil pilots and aircrews; also of considerable interest to everyone concerned with air transportation. 109 illustrations. 35/- net.

Displacement Pumps and Motors

By R. Hadekel, B.Sc., A.C.G.I., A.F.R.Ae.S., A.M.I.Mech.E., Consulting Engineer. Examines the theoretical basis of the various mechanisms and the constructional problems involved, and describes their practical applications. 177 illustrations. 25/- net.

Engineering Design

By J. E. Taylor, M.Sc.Tech., A.M.I.Mech.E., and J. S. Wrigley, M.Sc., A.M.I.Mech.E. A well-known work for Degree and professional students. Third Edition. 18/- net.

PITMAN - Parker Street - Kingsway - London WC2

THE AERONAUTICAL QUARTERLY

Volume III MAY 1951 Part I

CONTENTS

The Symmetric Vibrations of Aircraft *R. W. Traill-Nash*

Aircrews at Supersonic Forward Speeds *J. C. Burns*

Pohlhausen's Method for Three-dimensional Laminar Boundary Layers *J. C. Cooke*

Supersonic Flow Past Bodies of Revolution with Thin Wings of Small Aspect Ratio *P. M. Stocker*

Normal Elliptic Functions—A Review

LONDON
ROYAL AERONAUTICAL SOCIETY
4 HAMILTON PLACE W1

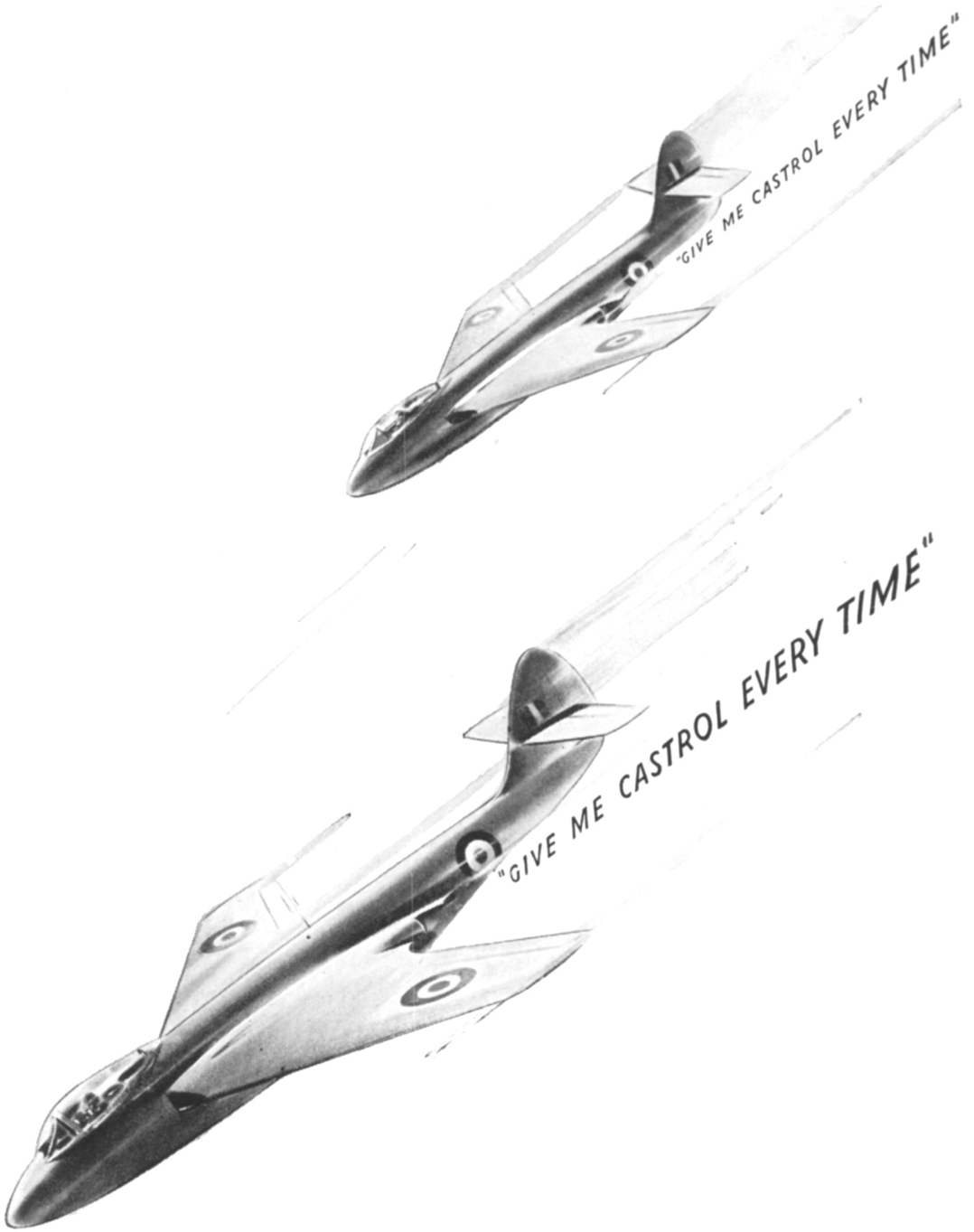
10/-

FAIREY 17 *ARMSTRONG SIDDELEY 'DOUBLE MAMBA'*
TWIN-ENGINE · ANTI-SUBMARINE CARRIER-OPERATED



Chosen for service in the **ROYAL NAVY**

THE FAIREY AVIATION COMPANY LIMITED, HAYES, MIDDLESEX, ENGLAND



C A S T R O L I S R E C O M M E N D E D B Y H A W K E R A I R C R A F T L I M I T E D

ROTAX

*have a wider experience
than any other company
in the design,
development and manufacture
of electrical generating systems
and equipment for aircraft*



ROTAX LIMITED · WILLESDEN JUNCTION · LONDON, N.W.10 · ENGLAND
ROTAX AUSTRALIA PTY. LTD., · BOUVERIE STREET, · MELBOURNE · N.3
ROTAX CANADA LIMITED · MONTREAL AIRPORT · DORVAL · P.Q.

HAWKER SIDDELEY

*Within the framework of
this great organisation each
individual company operates
as a completely separate entity,
controlling its own affairs en-
tirely—but by pooling its experi-
ence and resources, each company
has behind it the combined strength
of the Group — unmatched facilities
for design, research and production.*

Group

LEADERS OF AN INDUSTRY



ARMSTRONG SIDDELEY MOTORS LTD
SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LTD
GLOSTER AIRCRAFT CO. LTD · A. W. HAWKSLEY LTD
HAWKER AIRCRAFT LTD · HIGH DUTY ALLOYS LTD
A. V. ROE & CO. LTD · A. V. ROE CANADA LTD
AIR SERVICE TRAINING LTD

The Hawker Siddeley Group Ltd. 18 St. James's Square, S.W.1. Telephone: Whitehall 2064.