The JOURNAL of THE INSTITUTE OF NAVIGATION

ol. x, no. 3 July	1957
The Accuracy of Astronomical Observations at Sea A Working Party Report	223
Some Organizational Aspects of the International Geophysical Year Sir Archibald Day	249
The Problem of Aircraft Separation over the Atlantic C. S. Durst	254
Route Analysis and Flight Planning with Isotachs P. G. Powell	264
'The Haven Finding Art' M. W. Richey	271
The Presentation of Radar Information for Collision Avoidance A. L. P. MILWRIGHT	277
Position Reporting for Advisory Air Routes J. L. COWAN	284
Landing Forecasts for London Airport J. D. Proctor	291
FORUM	
An Inertial Drift Meter	300
Reviews	301
Record	303

THE INSTITUTE OF NAVIGATION

AT THE ROYAL GEOGRAPHICAL SOCIETY

1 KENSINGTON GORE LONDON SW7

JOHN MURRAY (PUBLISHERS) LTD., 50 ALBEMARLE STREET, LONDON wi

PRICE TEN SHILLINGS

THE INSTITUTE OF NAVIGATION

Patron

H.R.H. THE DUKE OF EDINBURGH, K.G., K.T.

Captain A. M. A. Majendie

Vice-Presidents

Rear-Admiral K. St. B. Collins, o.B.E., D.S.C.

Dr. G. E. R. Deacon, C.B.E., F.R.S.

Chairman of the Technical Committee

Wing Commander E. W. Anderson, O.B.E., D.F.C., A.F.C.

Chairman of the Membership and Fellowship Committee Captain R. W. Ravenhill, C.B.E., D.S.C., R.N.(ret.).

Captain W. Baillie, M.V.O., O.B.E.

Mr. C. S. Durst, O.B.E.

Mr. W. L. S. Harrison

Mr. J. B. Parker Captain G. C. Saul

Group Capt. D. C. McKinley, D.F.C., A.F.C. Mr. J. Vivian, D.S.O., D.F.C. Air Vice-Marshal J. W. F. Merer, c.B. Capt. C. J. Wynne-Edwards, D.S.C., R.N.

The directors of navigation at the Admiralty, the Air Ministry and the Ministry of Transport and Civil Aviation are invited to attend meetings of the Council as ex-officio members.

Executive Secretary: M. W. Richey. Assistant Secretary: Miss L. M. A. Tower

The Journal of the Institute of Navigation

THE Journal is published quarterly by the Institute and is edited by the Executive Secretary. It contains original papers contributing to the science of navigation, including those presented at meetings of the Institute together with the ensuing discussion. In addition the Journal includes a record of current navigational work, reviews of important books, and other matters of concern to those interested in navigation. The views expressed in the Journal are not necessarily those of the Institute, or of any organization or department to which the authors may belong.

The Journal is free to all members of the Institute. It is sold to the public at ten shillings per copy or, by subscription, at forty-one shillings per annum (post free) and may be obtained through all booksellers and John Murray (Publishers) Ltd., 50 Albemarle Street, London W1.

Contributions, which are welcomed from both members and non-members, should be addressed to the Editor.

Enquiries for advertising space should be addressed to the Institute offices. The postal address of the Institute is:

> The Institute of Navigation, at The Royal Geographical Society, I Kensington Gore, London SW7.

Telephone: Kensington 5021.



The fighting efficiency of a modern warship is very much dependent upon the successful integration of the many radar devices into the ship's armament control system, with the minimum amount of mutual interference between separate radar elements and the radar and radio installations.

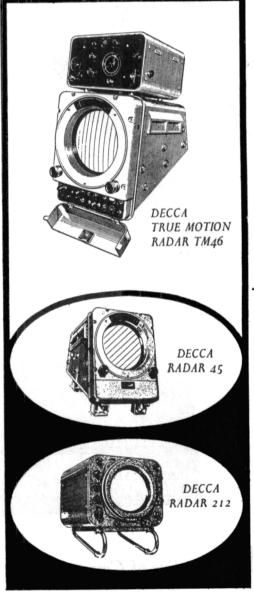
The Marconi Company has had very considerable experience in engineering complete radio and radar systems including air warning, combined air/surface tactical warning, primary and secondary fire control and pilotage radar.

SYSTEM PLANNERS. ELECTRONIC ENGINEERS. DESIGNERS AND MANUFACTURERS OF AERONAUTICAL, BROADCASTING. COMMUNICATION AND MARITIME RADIO EQUIPMENT. TELEVISION EQUIPMENT. RADAR AND NAVIGATIONAL AIDS

MARCONI *Lifeline of Communication

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED, CHELMSFORD, ESSEX

Decca Radar first and foremost



first with

True Motion

With the introduction of True Motion—the greatest single advance towards safer navigation since the inception of radar—Decca have provided the mariner with instantaneous, continuous and unambiguous information concerning the true course and speed of all targets within radar coverage. Although it was only quite recently made available, True Motion has already established itself, having received widespread acceptance by leading shipping companies throughout the world.

foremost in marine radar

Decca is already established as the leading supplier of marine radar in the world—and is going from strength to strength. The great support enjoyed by Decca Radar is directly attributable to the long and careful programme of development and research, the results of which are embodied in the production of this series of equipment.

The available types of Decca Radar form a range which covers the complete radar needs of any type of vessel afloat. Every installation is backed by world-wide Decca Radar service.

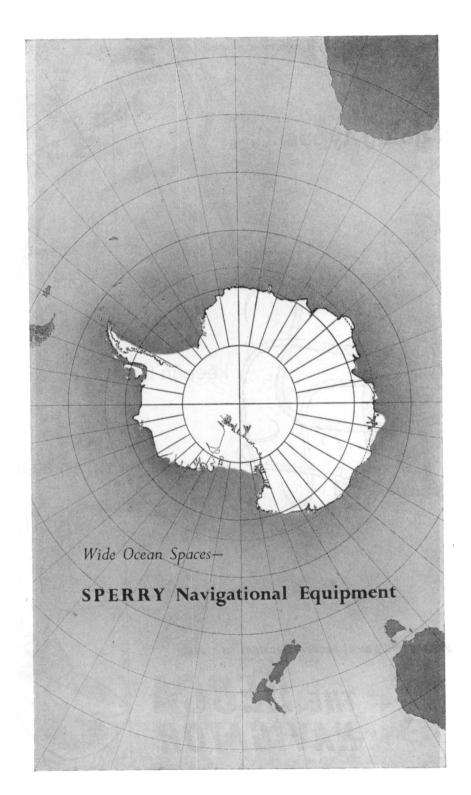
DECCA RADAR

DECCA RADAR LIMITED

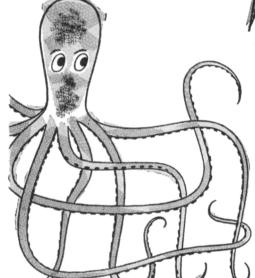
LONDON · ENGLAND











who see the point,

keep in touch,

and have a grip on affairs



THE **DECCA**NAVIGATOR





NAVIGATIONAL INSTRUMENTS

The "HEZZANITH" Patent MARK VII

PROJECTOR BINNACLE AND COMPASS

By means of a series of optical elements an enlarged erect image of a portion of the card covering an arc of 40° in length is produced on a ground glass screen which is viewed in an adjustable plane mirror.

All stray light is effectively screened, and there is a completely unobstructed view of the card from above, permitting the normal use of an azimuth instrument by day or night.

Send for our special Projector Binnacle Leaflet (NJ.57).

HEATH & COMPANY

(Incorporated with W. F. Stanley & Co. Ltd.)

NEW ELTHAM - LONDON, S.E.

Phone: ELTHAM 3836

Cables: "Polaris, Souphone, London"

RANGEFINDERS



ANNIESLAND, GLASGOW, W.3

London: 15 Victoria Street, S.W.I



NOTWITHSTANDING modern scientific attainment there are RISKS at Sea and in the Air and notably on terra-firma.

The obvious and appropriate Company for the insurance of the property and liabilities of all professional and amateur Navigators is the "Navigators and General".

Founded in 1921 under the chairmanship of the late Admiral Sir John Franklin Parry, K.C.B., we specialize in the insurance requirements of all who are or were connected with the sea. We have added interest in their insurance problems in that the majority of our executive staff served, at one time, in the Royal or Merchant Navy. We offer impeccable security and are renowned for prompt and generous settlement of claims.

Fire, Accident, Marine

Classes of business transacted include: Personal Effects (Ashore, Afloat, Airborne)

Navigator's Indemnity (Sea and Air)

Consult your Broker or write for particulars:

THE NAVIGATORS AND GENERAL INSURANCE CO. LTD. 15/16 CULLUM STREET, LONDON, E.C.3

Phone: MANsion 2121 Grams: Avigatinsu Fen London

Old book—NEW LOOK HE ART OF ASTRONOMICAL NAVIGATION by S. M. BURTON being the modernized version of the old favourite A MANUAL OF MODERN NAVIGATION BROWN, SON & FERGUSON, Ltd. Price **18/6**

52-58, DARNLEY STREET, GLASGOW, S.I

THE MATHEMATICAL PRACTITIONERS OF TUDOR AND STUART ENGLAND

E. G. R. TAYLOR

In his Foreword to this book, the Astronomer Royal writes: 'Professor Taylor has given a fascinating account of these mathematical practitioners and of the development of ideas, methods and instruments from Tudor times to early in the eighteenth century, which forms a valuable contribution to a little-known epoch in the history of navigation and surveying.'

'The Institute of Navigation is to be congratulated on having sponsored this valuable book.' Journal of the Royal Naval Scientific Service.

'An important contribution to the history of scientific progress in England, and in particular to the history of navigation.' The Geographical Journal.

'Members of the Institute of Navigation have reason to congratulate themselves upon their happy choice of an author.' Journal of the Franklin Institute (U.S.A.).

'This is a most important and interesting book.' The Nautical Magazine.

CAMBRIDGE UNIVERSITY PRESS

for the Institute of Navigation

Demy 8vo. 442 pages, illustrated. Price 55s. net (45s. to Members).

THE USE OF RADAR AT SEA

'Whatever happens the book will remain a milestone on the road of radar in its relation to shipping.' Hansa (Hamburg).

'It should find a place in the chart-room bookcase of every radar-fitted vessel and in the private reference library of every navigator.' Journal of the Honourable Company of Master Mariners.

'The wording is so clear and simple that it gives the reader confidence.'
International Hydrographic Bulletin.

'One of the finest books on the subject.' Navigation (Los Angeles).

'There can be no doubt that a copy placed on board any radar-fitted ship would pay dividends.' Shipping World.

'An excellent handbook for the navigator.' Navigation (Paris).

'Undoubtedly as a textbook the work stands alone.' Merchant Navy Journal.

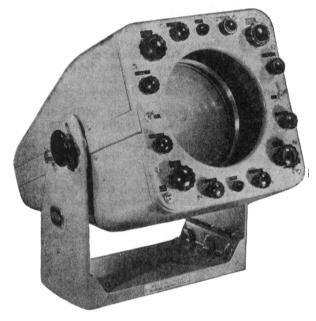
HOLLIS & CARTER

for the Institute of Navigation

Royal 8vo. 270 pages, illustrated. Price 30s. net.

NEW END RADAR DISPLAY UNIT

COMPACT ADAPTABLE DEPENDABLE



The Display Unit of the Kelvin Hughes Type 14 Marine Radar is a compact and lightweight assembly measuring only 12 in. square on the face and with an overall length, front to back, of less than 24 in. It weighs only 47 lb. and is supplied complete with mounting bracket suitable for fitting to a deck pedestal, table or bracket; or, if preferred, directly on to a deckhead or bulkhead. The angle of view is readily adjustable and the Display Screen is recessed to provide a permanent visor. Dependability is assured by the application of printed circuit techniques and the use throughout of high quality components operating well within their safety limits.

The equipment provides five range scales: \(\frac{1}{2}\)-3 miles (continuously adjustable), 6 miles, 12 miles, 24 miles, and 48 miles. Presentation is by means of a 9-in. diameter metal-backed fluoride high brilliance C.R.T. with pre-set electrostatic focusing. Independent push-button monitoring controls are provided for transmitter and receiver.

MARINE RADAR TYPE 14

LOW COST · HIGH PERFORMANCE · COMPACT AND LIGHTWEIGHT UNITS

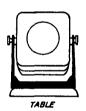
KELVIN HUGHES

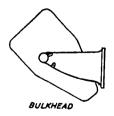
THE TWO GREATEST NAMES IN NAVIGATION

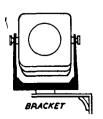
KELVIN & HUGHES (MARINE) LIMITED, 99 Fenchurch Street, London, EC3











TGA KHM.78F.