The JOURNAL of THE INSTITUTE OF NAVIGATION

lume 3	Number 2	April 1950
Astro-Fix by Con OLIVER C. COL		107
Aerial Magnetic S G. E. ROBERTS	Survey	121
Loxodromic Dista J. E. D. WILLIA	ances on the Spheroid	133
Navigation System D. E. Adams &	ns and Instrument Aids A. M. UTTLEY	141
Radar and Charts A Discussion		156
Some Collisions a C. A. G. NICHO	and Groundings at Sea	166
Improving the Ra	ndar Performance of a Buoy	183
Siting the Radar F. J. WYLIE	Scanner	189
Record		194
Reviews		200
Correspondence		205
Institute Notices		209

THE INSTITUTE OF NAVIGATION

AT THE ROYAL GEOGRAPHICAL SOCIETY

1 KENSINGTON GORE LONDON SW 7

JOHN MURRAY, 50 ALBEMARLE STREET LONDON WI

THE INSTITUTE OF NAVIGATION

OFFICERS AND COUNCIL, 1949-50

President: Sir Robert Watson-Watt, C.B., F.R.S.

Vice-Presidents

Air Commodore C. E. Chilton, C.B.E. Captain G. C. Saul

Chairman of the Technical Committee: R. F. Hansford

Treasurer: F. G. G. Carr

Chairman of the Executive Committee: L. P. Kirwan

Council

Dr. D. E. Adams
Capt. E. Brook Williams, M.M.
Francis Chichester
Captain W. H. Coombs, C.B.E.
Group Captain E. Fennessy, O.B.E.

Commander C. E. N. Frankcom, R.N.R. Commander W. E. May, R.N. D. H. Sadler, O.B.E. Sir Harold Spencer Jones, F.R.S. Captain G. W. Wakeford

The Director of Navigation and Direction, Admiralty, the Director of Navigation, Air Ministry, and the corresponding members in the Ministry of Civil Aviation and the Ministry of Transport will be invited to attend meetings of the Council as ex-officio members.

Executive Secretary: M. W. Richey

Journal of the Institute of Navigation

THE Journal is published quarterly by the Institute and is edited by the Executive Secretary. It contains papers read at meetings of the Institute together with the following discussion. Besides papers in the nature of original scientific contributions to navigation, the Journal will contain a record of current navigational work, reviews of important books, and other matters of concern to those interested in navigation.

The Journal is sent free each quarter to members of the Institute. It is sold to the public at 6 shillings per copy or, by subscription, at 25 shillings per annum, and may be obtained through all booksellers and John Murray, 50 Albemarle Street, London, W.1.

Contributions should be sent addressed to the Editor; it is advisable that diagrams should not be prepared in their final form for publication without prior consultation with the Editor.

Advertisements. Enquiries for space should be addressed to the Editor.

The postal address is:

The Institute of Navigation,

at The Royal Geographical Society,

1 Kensington Gore, London S.W.7.

Telephone: Kensington 5021.

The Institute of Navigation

Form of application for membership

Permanent Address Class of membership for which you wish to be considered* Membership Student Membership Corporate Membership *Delete as necessary Branch of navigation or related science in which you have particular interest Profession or Occupation Professional and/or Academic qualifications Summary of experience Date of Birth "If accepted for membership of the Institute of Navigation, I hereby agree to abide by its Constitution and By-Laws and to advance the objects of the Institute as far as shall be in

Received

my power."

Date

Name in full (including title)
(Please use block letters)

Proposed

Signature

(See note below)

Ele**cte**d

Note.—In the case of applications for Student Membership this form should be countersigned by the Principal of the Educational Establishment at which the applicant is studying.

THE INSTITUTE OF NAVIGATION

THE OBJECT of the Institute is to unite in a scientific body those who are concerned with or who are interested in the science and art of navigation. Membership is not restricted to those who hold professional qualifications but is open to others who wish to further the aims of the Institute.

By co-ordinating the knowledge and achievement of marine and air navigators, scientists and those associated with the development and production of navigational equipment, the work of the Institute is directed towards raising the standard of navigation. In the field of education it is the aim of the Institute to encourage uniformity of practice and, by bringing practical navigators into contact with teachers and research workers, to increase the mutual appreciation of the issues involved.

It will be an object of the Institute to encourage research in navigational equipment and methods.

The activities of the Institute include the holding of meetings to discuss specific problems, the publication of a *Journal* and such other activities as the Council may deem necessary to promote knowledge in navigation and its associated sciences.

By means of an International Committee, the work of the Institute is co-ordinated with that of other Institutes and Societies abroad who are interested in similar problems.

Membership. There are five classes of membership of the Institute:

- (i) Honorary Members, who shall be distinguished persons upon whom the Council may see fit to confer an honorary distinction.
 - (ii) Fellows, who shall be Members-
 - (a) who have held the recognized certificate of proficiency in navigation in the Royal Navy, Royal Air Force, Merchant Navy or Civil Aviation for not less than five years, and who, in the opinion of the Council, have been responsible for a contribution of value to the science of navigation; or
 - (b) who, in the opinion of the Council, have made an outstanding contribution to the science of navigation.
- (iii) Members, who shall be persons over twenty-one years of age who satisfy the Council that they are interested in the advancement of the science of navigation.
- (iv) Student Members, who shall be persons under twenty-five years of age who are studying at one of the universities, colleges or schools recognized by the Institute preparatory to entering on a career as navigator or in other responsible positions closely allied to the science of navigation.
- (v) Corporate Members, who shall be universities, manufacturers, operating companies or other organizations interested directly or indirectly in the science of navigation.

Subscriptions. Every Fellow, Member, Student Member and Corporate Member shall pay an annual subscription in advance, as follows:

Fellow					Two guineas
Member					Two guineas
Student M	emb	er			Half a guinea
Corporate	Men	nber	. •	•	Twenty guineas

By Order of the Council.

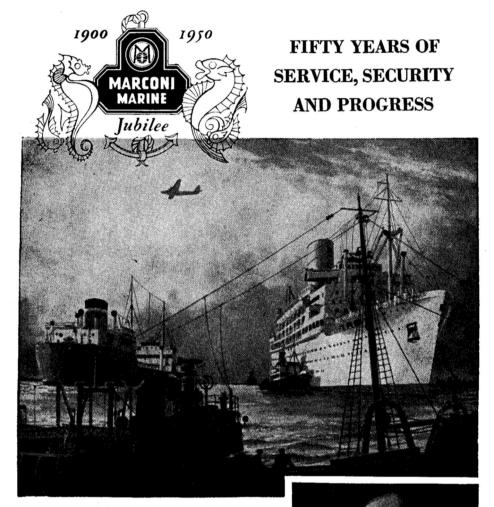
M. W. RICHEY,

Executive Secretary.

"he Institute of Navigation,

at The Royal Geographical Society,

1 Kensington Gore, London, S.W.7



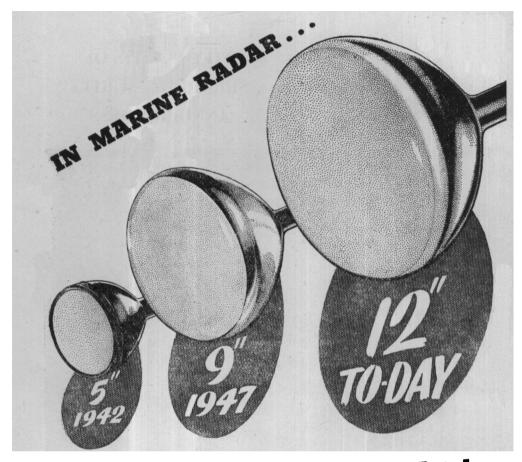
FIFTY YEARS AGO, early in 1900, The Marconi International Marine Communication Company was formed to place Marconi's inventions at the service of shipping. In celebrating its Jubileethis year, the Company remembers with pride its achievements during the past half-century.

Its record has been one of ever-increasing service and leadership in marine wireless. Today ships of every class, sailing every sea, are Marconiequipped, and Marconi service is available at over 200 ports throughout the world.

This is the contribution to the service of shipping made by the Company which first pioneered marine wireless, and which has the proud example of its unique history to inspire it for the future.



Electra House, Victoria Embankment, London, WC2. Telephone: Temple Bar 4321



...the up-to-date set has a 12" P.P.I. tube



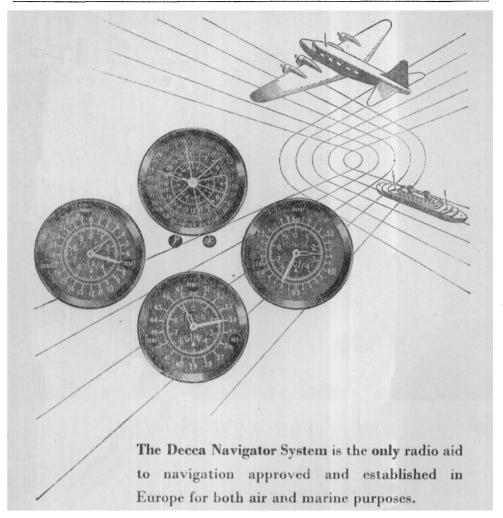
In the excellence of P.P.I display lies the merit of radar as an aid to the navigator. The larger and clearer the picture of surrounding hazards, the more timely can be the avoiding action, the more precise can be the courses shaped.

Achievement by the scientist in the service of the mariner has led in a few short years from 5" diameter P.P.I. to 9" and now, by Kelvin & Hughes, to 12" tube-face display on standard Type Approved Marine Radar equipment.

KELVIN HUGHES

THE TWO GREATEST NAMES IN NAVIGATION

Kelvin & Hughes (Marine) Ltd · 107 Fenchurch Street · London · E.C.3

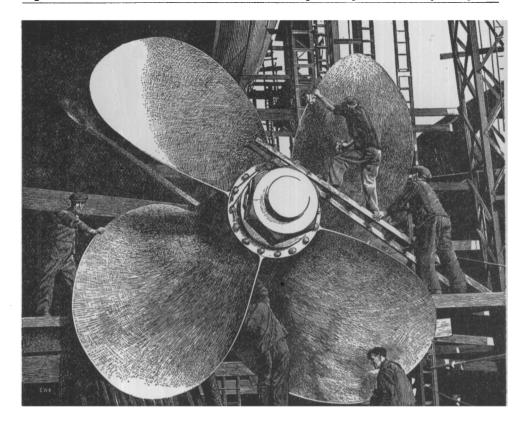


Over more than 500,000 square miles of North-West Europe the Decca Navigator System now aids the safe navigation of more than 850 ships and aircraft. This great aid to navigation is in daily use by ships of all types from the 'Queen Mary' and 'Queen Elizabeth' down to small fishing trawlers of less than 100 tons. The Decca Navigator makes an important contribution to increased safety, reduced operating costs and the maintenance of regular schedules.

Approved and adopted by the Royal Navy

The Decca Navigator System

... the modern radio aid to navigation



RADAR FOR NEW TONNAGE

With the fitting of the propeller, another important stage is reached in the building of a ship. Just as this development is the outcome of searching tests, skilled design, and faithful adherence to a carefully co-ordinated plan, so is the selection and installation of Radar equipment. For three years CMR has provided conclusive proof of its capabilities by giving invaluable service to shipping in all parts of the world. That is why over 250 ships have been fitted with CMR, and why more and more owners are installing it to help safeguard the future of new tonnage.



Companies who have re-ordered Cossor equipment include Ellerman Lines, Anchor Line Limited, General Steam Navigation Co. Ltd., British Railways, Union Castle Line and British Tankers.

SEXTANTS

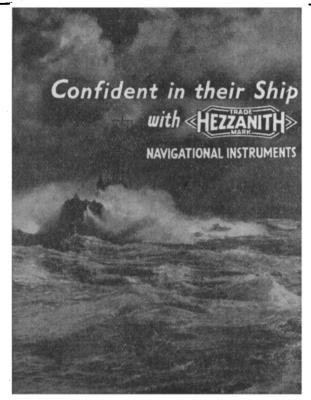
BINOCULARS

TELESCOPES

CHART INSTRUMENTS

CLOCKS,
ANEROIDS

RULES, Etc.



BINNACLES

COMPASSES

STATION POINTERS

SOUNDING MACHINES

AZIMUTHS

TAXIMETERS

Specialists in Meteorological, Temperature Indicating and Recording Instruments

Catalogues will gladly be sent upon request, quote (I.N.J.50)

HEATH & COMPANY

(Incorporated with W. F. Stanley & Co., Limited.)

NEW ELTHAM - LONDON, S.E.9

Phone: ELTHAM 3836.

Cables: "Polaris, Phone, London."

NAVIGATIONAL <



INSTRUMENTS

School of Navigation University College, Southampton

THE SCHOOL is situated in pleasant surroundings at the mouth of the Hamble River over-looking Southampton Water. Residence is available for all classes of students. Classes are held apart from those for Undergraduates studying for degrees, but special instructional facilities are offered by the various faculties of the University College, whilst the College Library is available to all students.

THE SENIOR MARINE DEPARTMENT provides full time and preparatory courses for all grades of Ministry of Transport Certificates, and a special preparatory course in Mathematics and Physics for prospective candidates for the Extra Master's Certificate.

THE SENIOR AIR DEPARTMENT provides full time and preparatory courses for all, or specified, subjects for the Ministry of Civil Aviation Licences. Two Link Trainers are provided for training in SBA, GCA, BABS MK. II, QGH, Radio Range, SCS (ILS) in preparation for the Ministry of Civil Aviation instrument rating.

RADAR OBSERVER COURSES for M.N. Officers are provided, and Ministry of Transport Certificates of Competency are granted to students who have reached a satisfactory standard of proficiency. Refresher Courses of two or three days duration are also provided for both Marine and Air Observers.

GYRO COMPASS COURSES are provided either separately or in connection with other courses.

THE JUNIOR DEPARTMENT provides residential cadet courses of training for boys wishing to enter the Merchant Navy or Civil Aviation as cadets.

Full particulars and conspectuses may be obtained from:

The Director, School of Navigation, Warsash, near Southampton.

The "CIRCUM" SINGLE RING MAGNET



An outstanding

"Sestrel"

advance in compass design

For full information apply to:

HENRY BROWNE & SON, LTD. BARKING — ESSEX

Sales & Service Depot:

71 LEADENHALL STREET, LONDON, E.C.3
Telephones: Sales—AVEnue 6060. Service—AVEnue 2156

BASIL LUBBOCK

THE COLONIAL CLIPPERS

91 illustrations, 30s. net. (per post 30s. 9d.)

HAROLD A. UNDERHILL

MASTING AND RIGGING THE CLIPPER SHIP AND OCEAN CARRIER

Many illustrations, 36s. net. (per post 36s. 9d.)

EDWARD W. HOBBS

HOW TO MAKE OLD TIME SHIP MODELS

Fully illustrated, 15s. net. (per post 15s. 6d.)

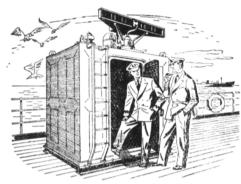
W. B. WHALL

SEA SONGS AND SHANTIES

The most authentic collection. Set to music. (per post 9s.)

Write for Catalogue "N"-Books, Pictures, Prints.

BROWN, SON & FERGUSON, LTD. 52-58, Darnley St., GLASGOW, S.I.



" I prefer BTH Marine Radar

because of the ease of metering"

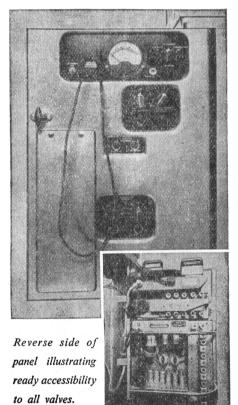
FREEDOM from breakdown is vital at sea; hence BTH Marine Radar Equipment incorporates several unique refinements. For example, facilities are provided so that every valve can be separately "metered" and incipient faults corrected by the Officer in charge easily and quickly.

It takes but 15 minutes to make a complete check, day or night, in fair weather or foul. Operators appreciate the advantages of BTH Radar because of its outstanding merit—a sound seaworthy job.

Other advantages: Compact and sturdy—can be fitted during turn-around period—large scanner for looking round forward obstructions—voltage stabilisation and electronic regulation.

Ask for BTH publication AG772.



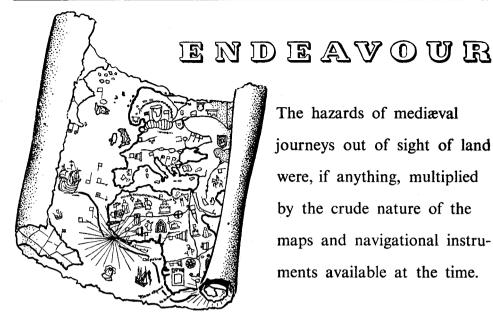


A 4022

BRITISH THOMSON-HOUSTON CO. LTD., RUGBY, ENGLAND

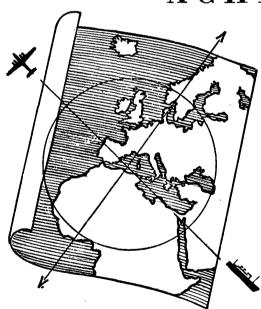
and

DOBBIE McINNES Ltd., 191-3 Broomloan Road, GLASGOW, S.W.1, & 34 Lime Street, LONDON, E.C.3



The hazards of mediæval journeys out of sight of land were, if anything, multiplied by the crude nature of the maps and navigational instruments available at the time.

ACHIEVEMENT



The picture is different today when travel over the world's sea and air highways owes its safety to the reliability of modern navigational instruments and aids. We are proud to reflect that, more often than not, such reliability is the result of Sperry design and workmanship.

SPERRY

Instruments that inspire confidence

