## The JOURNAL of THE INSTITUTE OF NAVIGATION

Vol. XIV, NO. 4	October	1961
A Comparison of Two S E. S. Calvert	ystems for Avoiding Collision	379
Marine Radars for Large F. J. Wylie	e Ships	402
The Earliest Original Eng A. Ruddock	glish Seaman's Rutter and Pilot's Chart	409
Distribution of Jet Strea the Mediterranean, A. F. Crossley	ms in the North Atlantic, Europe and 1957–8	432
The Admiralty Chart—II A Discussion		446
The Characteristic Phase L. Oudet	s of Marine Lights	466
	FORUM	
The Cocked Hat		473
The Polaroid Procedure f	or Photographing Radar Screens	476
Record		480
Reviews		504

### THE INSTITUTE OF NAVIGATION AT THE ROYAL GEOGRAPHICAL SOCIETY I KENSINGTON GORE LONDON SW7

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

PRICE FIFTEEN SHILLINGS

The Journal of the Institute of Navigation,

### THE INSTITUTE OF NAVIGATION

Patron

H.R.H. PRINCE PHILIP DUKE OF EDINBURGH, K.G., K.T.

OFFICERS AND COUNCIL 1960-61

resident

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

Vice-Presidents

Air Marshal Sir Edward Chilton, к.в.е., с.в. Captain F. J. Wylie, к.N.(ret.)

Hon. Treasurer: Commander P. C. H. Clissold, R.D., R.N.R.(ret.)

Chairman of the Technical Committee Dr. D. E. Adams

Chairman of the Membership and Fellowship Committee Captain A. J. R. Tyrrell

Other Members of the Council

Captain R. C. Alabaster, D.S.O., D.F.C.

Mr C E Deal

mi. G. L. DUCK

Captain M. E. Butler Bowdon, O.B.E., R.N. Air Commodore D. C. McKinley, C.B.E., D.F.C., A.F.C. Lieut. Commander R. B. Michell, D.S.C., R.N.(ret.) Mr. E. W. Pike Captain G. S. Ritchie, D.S.C., R.N. Mr. G. Wikkenhauser, M.B.E. Mr. J. E. D. Williams

The Hon. Mr. Justice Hewson, R.D., R.N.R.

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

Executive Secretary: M. W. Richey

### 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 fifteen shillings per copy or, by subscription, at sixty-two 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, 1 Kensington Gore, London SW7.

### Marine Cartography in Britain

A History of the Sea Chart to 1855

by

### A. H. W. ROBINSON

Lecturer in Geography in the University of Leicester

Foreword by Vice-Admiral Sir JOHN EDGELL, F.R.S.

The book traces the development of charting the coastal waters of the British Isles from modest beginnings in the early years of the reign of Henry VIII to the completion of Sir Francis Beaufort's grandiose scheme of marine surveying in the mid-nineteenth century, a scheme which provided the first complete set of accurate charts. The important part played by charts in English maritime history is discussed. Another aspect given prominence is the quest for new techniques in hydrographic surveying. The large number of half-tone illustrations include many early manuscript charts found in the collections of the Admiralty and British Museum. The chart of the East Anglian coast by the Tudor hydrographer, Richard Polter, forms a double-page coloured frontispiece. Almost two thousand charts and surveys are listed in the appendices and they have been arranged in relation to the themes discussed in the text.

Sir John Edgell writes: "It has long been my hope that some enthusiast would find time to write the saga of the Old Masters of Hydrography who between the sixteenth and nineteenth centuries began the charting of the seas which surround the British Isles, and now, Dr Robinson has done just that and has produced a book which cannot fail to be a joy to all those interested in the progress of cartography and in the skill and determination of those who undertook the arduous task of surveying the coasts, harbours and roadsteads of these islands.... I hope that this book will be widely read for it is full of information, the illustrations are excellent and it tells the story of a little known group of men whose devotion to their calling laid the foundations of the Hydrographic Department of the Admiralty of the present day".

Demy 4to. 180 pp. Coloured frontispiece, 42 plates, 31 line drawings. £5 5s. net (£4 4s. net before publication)

### Published by LEICESTER UNIVERSITY PRESS

### CONTENTS

#### THE EARLY MANUSCRIPT CHARTS OF THE SIXTEENTH CENTURY

The influence of the Italian, Dutch and French sailing directions and coastal views—The needs of defence and the cartographic achievements of the military engineers—Plans for harbour improvement—The earliest true hydrographers—The first printed charts.

#### SEA ATLASES

Dutch atlases and their English derivatives—The formation of the English cartographic houses—Greenvile Collins's marine survey of the British coasts and the contemporary surveys of John Adair—Pepys's criticism of English hydrographic efforts and the need for a more scientific foundation.

### THE DEVELOPMENT OF AN ACCURATE MARINE SURVEY TECHNIQUE

The running traverse method of coastal delineation—Instrumental invention and development; the sextants of Hooke, Newton and Hadley—Halley's contribution to the theory of marine survey—The *Marine Surveyor* of Henry de Saumarez—Murdoch Mackenzie (Senior) and the invention of the station pointer.

#### THE ROLE OF THE AMATEUR HYDROGRAPHER IN THE EIGHTEENTH CENTURY

The sketch surveys of Trinity House Pilots and Custom House Officials— Expansion of trade and schemes for harbour improvement—The frustration of the private surveyor as exemplified by Lewis Morris and his survey of the coast of Wales—Available standards of accuracy.

#### THE HYDROGRAPHIC CONTRIBUTION OF THE MILITARY ENGINEER

Coastal defence; the harbour plans of the principal naval bases—Co-operation between hydrographic surveyor and military engineer—The need for more systematic surveying.

#### THE BIRTH OF OFFICIAL HYDROGRAPHY

The office of Head Maritime Surveyor to the Admiralty—The founding of the Hydrographic Office—Dalrymple's term of office as Hydrographer and his subsequent dismissal—William Bligh as a hydrographic surveyor.

#### THE PRIVATE CHART PUBLISHERS

The organization of the cartographic houses—Family businesses—Content and style of the private chart—Publishing firms engaged in chart production— The decline of the privately produced chart.

#### THE GRAND SURVEY OF THE BRITISH ISLES

The establishment of an independent surveying service—Co-operation with the Ordnance Survey—Sir Francis Beaufort's term of office as Hydrographer and his scheme for an accurate large-scale survey of the British Seas.

- Appendix A Additional biographical notes on some of the sixteenth-century surveyors and chart-makers.
- Appendices B-L Carto-bibliography of marine surveys and charts in the principal collections of the British Isles.

Notes on the plate illustrations. Index.

### ORDER FORM

\*

### Marine Cartography in Britain A History of the Sea Chart to 1855

### To: The Secretary, Leicester University Press, The University, Leicester, England

Please send me ......... of "MARINE CARTOGRAPHY IN BRITAIN". I enclose a remittance to cover the pre-publication price of  $\pounds 4$  4s.\* ( $\pounds 5$  5s. after publication).

Name

Address

Date

\* Cheques should be made payable to "The University of Leicester".

### Published by

### LEICESTER UNIVERSITY PRESS

Orders may be placed with any bookseller or sent to the Secretary, Leicester University Press, The University, Leicester, England.



You take a lot for granted when you travel by sea: catering to gratify your every whim; amenities that no hotel and few resorts can offer; a perfection of service born of centuries of calm, unhurried efficiency; and Marconi Marine.

Marconi Marine is everywhere. It is the radar scanner keeping tireless watch at the masthead; the direction-finder swinging silently from beacon to beacon; the dance music, the Test Match commentary, the crisp, clear announcement at boat stations; the ship's newspaper; the telegram from Mum; the phone call to Wembley or Wanganui — half a world away; and the click in the bottom — the little click that only fishes hear—as Marconi echometers probe the seabed, measuring the depth of ocean and estuary.

Britain's finest ships rely on Marconi Marine for communications equipment and radio aids to navigation. And Britain's ships are safe—the safest in the world.



### **MARCONI MARINE**

maintain expert service facilities in all principal ports of the world

THE MARCONI INTERNATIONAL MARINE COMMUNICATION COMPANY LTD. ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2. Telephone : COVent Garden 1234



Is your ship, womanlike, a mystery to her master? Does she respond to your command? Can 'you trust her to follow where you lead? Too much to ask? No, Sir, not now! Her mysteries can be solved, response accurately tabled—confidence increased. In speed and manoeuvring trials, for instance, you can discover the complete capabilities of your ship. You can know the best combination of engine and rudder movements for the shortest stopping distance, have turning circle data at various speeds and monitor the ship's periodical deterioration in performance. You can conduct speed trials in open waters without the visibility restrictions involved in accuration of any monitor the solution of the shortest stopping distance.

in conventional measured-mile tests. You can know what is a 'moderate speed'. This information—and much more—can be tabled and presented in diagrammatic form. Facts emerge—with the Decca system for speed and manoeuvring trials.



THE DECCA NAVIGATOR COMPANY LIMITED LONDON



In matters of FLIGHT CONTROL

and

SYSTEMS ENGINEERING

# SMITHS

is a name to look

up to



Kelvin House, Wembley Park Drive, Wembley, Middlesex. Wembley 8888, Grams: Airspeed, Wembley. Telex 25366

# RED SKY IN THE MORNING



Yesterday's weather lore gives way to today's weather logic – Cossor CR 353 Meteorological Radar meets the need for long range, high-accuracy windfinding and cloud observation equipment. Its ability to track balloon-carried reflectors through local rain, plus reliable working efficiency in all weather conditions, make it suitable for use anywhere in the world.

CR 353 Radar is inexpensive, easily maintained and can be operated with a minimum of staff. Where only the windfinding equipment is required, it can be obtained separately at a lower cost.

### METEOROLOGICAL RADAR

For full details about this advanced meteorological radar system, please write to:-



RADAR AND ELECTRONICS LIMITED

### THE MOST COMPREHENSIVE RANGE OF MARINE RADAR IN THE WORLD

X-BAND



SERIES

Eleven radars with a choice of performance, size and price more exactly suited to the individual needs of every class of ship than ever before.

- High power 75 kW, medium power 20 kW, moderate power 10 kW.
- Large 16 inch display, medium 12 inch display, small 9 inch display.
- Large 10 ft. aerial, medium 6 ft. aerial, small 4 ft. aerial.
- 7 relative motion radars.
- 4 true motion radars.
- Ranges from \$ to 60 N.M.

• For the first time in any marine radar —INTERSCAN.

### S-BAND



The new TM-S 2400 is a revolutionary 10 cm radar of the highest quality and performance.

- High data rate-20 r.p.m.aerial rotation.
- 16 inch master display with integral true motion.
- Rapid range and bearing measurement by Interscan.
- Daylight viewing of P.P.I.
- 60 mile range scale.
- Range and bearing markers to 60 miles.
- 5 P.P.I. presentations.
- Performance monitors.
- High power 75 kW transceiver.







Cars are thankful for every tankful of Super Shell with I.C.A. (and engines are grateful when they're Multigrade-ful)



Page viii

MARK XX FOR EVERY TYPE OF VESSEL XX MARK XX FOR EVERY TY



AD TRUE XX MASTER AND REPEATERS READ TRUE XX MASTER AND ERS BUILT IN XX TWO REPEATERS BUILT IN XX TWO REPEATERS



CONTROLS BUILT IN XX TRANSMISSION BUILT IN XX LOW MAINTENANCE CE BUILTIN XX HALF A CENTURY'S EXPERIENCE BUILT IN XX CONTROL



ACCURATE RELIABLE DURABLE PRACTICAL COMPACT

### SPERRY

Gyroscope Company Limited

Great West Road, Brentford, Middx

https://doi.org/10.1019/50579433500019330 Published online by Cambridge University Press Cables: Sperigyco, London



### PILOTAGE in Congested Channels

By superimposing an image of the P.P.I. on a large scale chart, at the scale of the chart, the Unit gives an almost instantaneous fix of the ship's position and provides a continuous fix on other ships, etc. It increases considerably the accuracy of navigation ordinarily obtained by radar, particularly where True Motion equipment has been installed.

### **BARR & STROUD LTD.** ANNIESLAND, GLASGOW, W.3. Kinnaird House, I Pall Mall East, S.W.I



### What have they in common...?

The name of KELVIN HUGHES is a link between the 18th century Brigantine HMS Bounty and the minesweeper of today. Early records of KELVIN HUGHES refer to the sale of navigational instruments to Captain Bligh of the Bounty in 1780. Now, the Admiralty has adopted **KELVIN HUGHES Unit Radar** Type 14/12 for use in smaller ships of the Royal Navy. Versatility, high performance and reliability are outstanding features of the KELVIN HUGHES Unit Radar system, which can be adapted to the operational needs of all vessels, large or small.



S. Smith & Sons (England) Ltd KELVIN HUGHES DIVISION



Phone: Royal 8741 Grams: Marinst London https://doi.org/10.1017/S0373463300019330 Published online by Cambridge University Press



An article reporting the discovery of two documents of considerable interest in the history of navigation in England appears on p. 409. The Sailing Directions and Chart in question are for the areas shown. Frontispiece. Zeegat van Texel and the Entrance to the Zuider Zee, 1585. (Reproduced from Wagenaer's Spieghel der Zeevaerdt.)