

The JOURNAL of NAVIGATION

VOL. 29, NO. 3

JULY

1976

Statistics of Collisions at Sea CAPTAIN A. N. COCKCROFT	215
Automatic Plotting Radars	232
I—A Comparison of Facilities on Computer Based Radars K. D. JONES	232
II—Results of the Study C. S. PERKINS	238
III—Commentary J. A. BUTT	245
The Early History of Great Circle Sailing C. H. COTTER	254
The Dover Strait Information Service: Recent Progress CAPTAIN R. K. EMDEN	263
A Marine Electrical Analog-type Dead Reckoning Computer R. N. B. GATEHOUSE	270
Optoelectronic Displays DR. BRIAN ELLIS	276

FORUM

A Note on Short-method Tables D. H. SADLER	290
Automatic Radar Plotters: the Importance of the Future Position Control CAPTAIN F. J. WYLIE	292
Using a Hand-held Calculator for Ship's Position Comparison T. R. MEADEN	296
Error Distribution in Navigation O. D. ANDERSON	298
The Concept of <i>Jacobrad</i>	301
Record	304
Review	305

THE ROYAL INSTITUTE OF NAVIGATION
AT THE ROYAL GEOGRAPHICAL SOCIETY
1 KENSINGTON GORE LONDON SW7 2AT

SCOTTISH ACADEMIC PRESS LTD., 33 MONTGOMERY STREET, EDINBURGH EH7 5JX

PRICE TWO POUNDS FIFTY (£2.50)

THE ROYAL INSTITUTE OF NAVIGATION

Patron

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

OFFICERS AND COUNCIL 1975-6

President

Sir Edward Fennessy, C.B.E.

Vice-Presidents

Captain B. J. Calvert

Mrs. Mary Pera

Honorary Treasurer

Lieut-Comdr. R. B. Richardson

Chairman of the Technical Committee

Captain R. Maybourn

Chairman of the Membership and Fellowship Committee

Captain C. H. Cotter

Other Members of Council

Prof. A. N. Black

Rear Admiral D. W. Haslam, O.B.E.

A. H. Jessell

Dr. J. F. Kemp

S. Ratcliffe

Group Captain H. L. Sheppard, R.A.F.

F. S. Stringer

Captain R. J. Turner

Captain A. J. R. Tyrrell

Lieut.-Comdr. D. W. Waters

Director M. W. Richey, M.B.E.

Secretary D. Nicolson

The Journal of Navigation

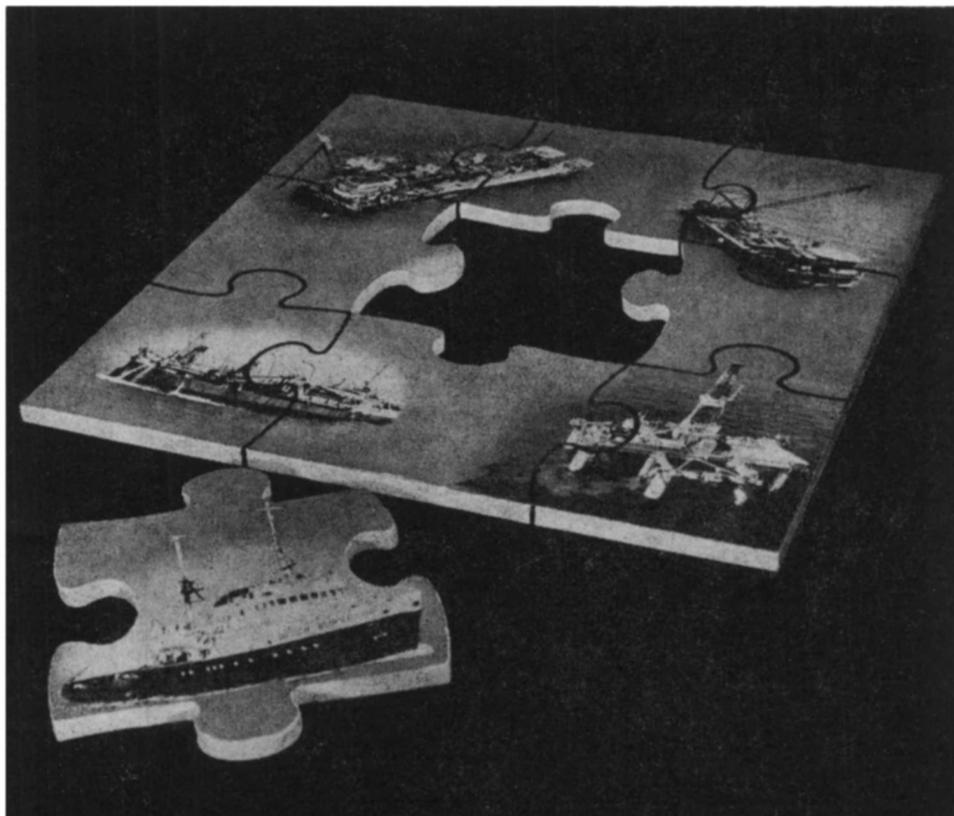
THE *Journal* is published quarterly by the Institute and is edited by M. W. RICHEY. It contains original papers contributing to the science of navigation, including those presented at meetings of the Institute together with the ensuing discussion. In addition the *Journal* includes a record of current 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. Crown Copyright may be reserved.

The *Journal* is issued free to all members of the Institute. It is sold to the public at two pounds fifty per copy or, by subscription, at ten pounds fifty per annum (post free) and may be obtained through all booksellers and Scottish Academic Press Ltd., 33 Montgomery Street, Edinburgh EH7 5JX. Back numbers dated two years prior to the current volume may be obtained from William Dawson & Sons, Ltd., (Back Issues Department), Cannon House, Folkestone, Kent.

Enquiries for advertising space should be addressed to the Institute offices.

The postal address of the Institute is The Royal Institute of Navigation, at The Royal Geographical Society, 1 Kensington Gore, London SW7 2AT. (Telephone: 01-589 5021).

Volumes of the *Journal* can be bound for three pounds seventy five including postage. The parts should be sent, together with the appropriate remittance, to Fowler-Wilson Bookbinders, Unit 4, Middlefield Industrial Estate, Sandy, Beds.



We're great at putting everything in its proper place—precisely.

Because positioning is our business. And because we've been doing it for a long time now. For over 30 years, we have been steadily developing and improving electronic positioning aids.

Today, as the Decca Survey Group of companies, we are strategically stationed to provide a comprehensive survey service anywhere on demand. Precisely positioning rigs and platforms in the search for oil and minerals offshore. Undertaking the vital survey work associated with dredging and port and harbour maintenance and

development. And surveying the routes for pipes and cables in the seas and oceans of the world.

We have the most experienced personnel. The most comprehensively fitted vessels. And the most advanced electronic equipment—including acoustic and satellite positioning aids.

Whenever you need precise positioning services, you need us. The Decca Survey Group. In positioning, we're *precisely* the people who matter.



THE INTERNATIONAL HYDROGRAPHIC REVIEW

160 pages (approx), 18×27 cm. Price 50 French francs.

Among the papers of navigational interest in the number of
July 1976 are :

- Sight reduction—by tables or by celestial navigation computer?
(S. KOTLARIĆ)
- A new station pointer—the HP 65 (J. B. DIXON)
- The use of Hi-Fix in Indian waters (A. G. MORAES)

PUBLISHED BY THE

INTERNATIONAL HYDROGRAPHIC BUREAU

Avenue Président J. F. Kennedy, Monte-Carlo, Monaco

The Bureau also publishes monthly

THE INTERNATIONAL HYDROGRAPHIC BULLETIN

A bi-lingual journal—English and French—giving news of hydrographic activities worldwide. Lists in detail all new charts published by Member States of the International Hydrographic Organization, and contains an extensive monthly bibliography on Oceanography, Navigation, etc.

Approx. 30 pages, 21×30 cm

Yearly subscription : 60 French Francs

Individual issue : 6 French Francs

USEFUL BOOKS ON NAVIGATION

NICHOLLS'S CONCISE GUIDE VOL. I

Revised by H. H. Brown, D.S.C., R.D. Extra Master

£8.00

Per post £8.65

NICHOLLS'S CONCISE GUIDE VOL. II

Revised by H. H. Brown, D.S.C., R.D. Extra Master

£8.60

Per post £9.25

THE ART OF ASTRONOMICAL NAVIGATION

By S. M. Burton, Master Mariner

£3.00

Per post £3.35

A HISTORY OF THE PRACTICE OF NAVIGATION

By Comdr. J. B. Hewson

£3.00

Per post £3.65

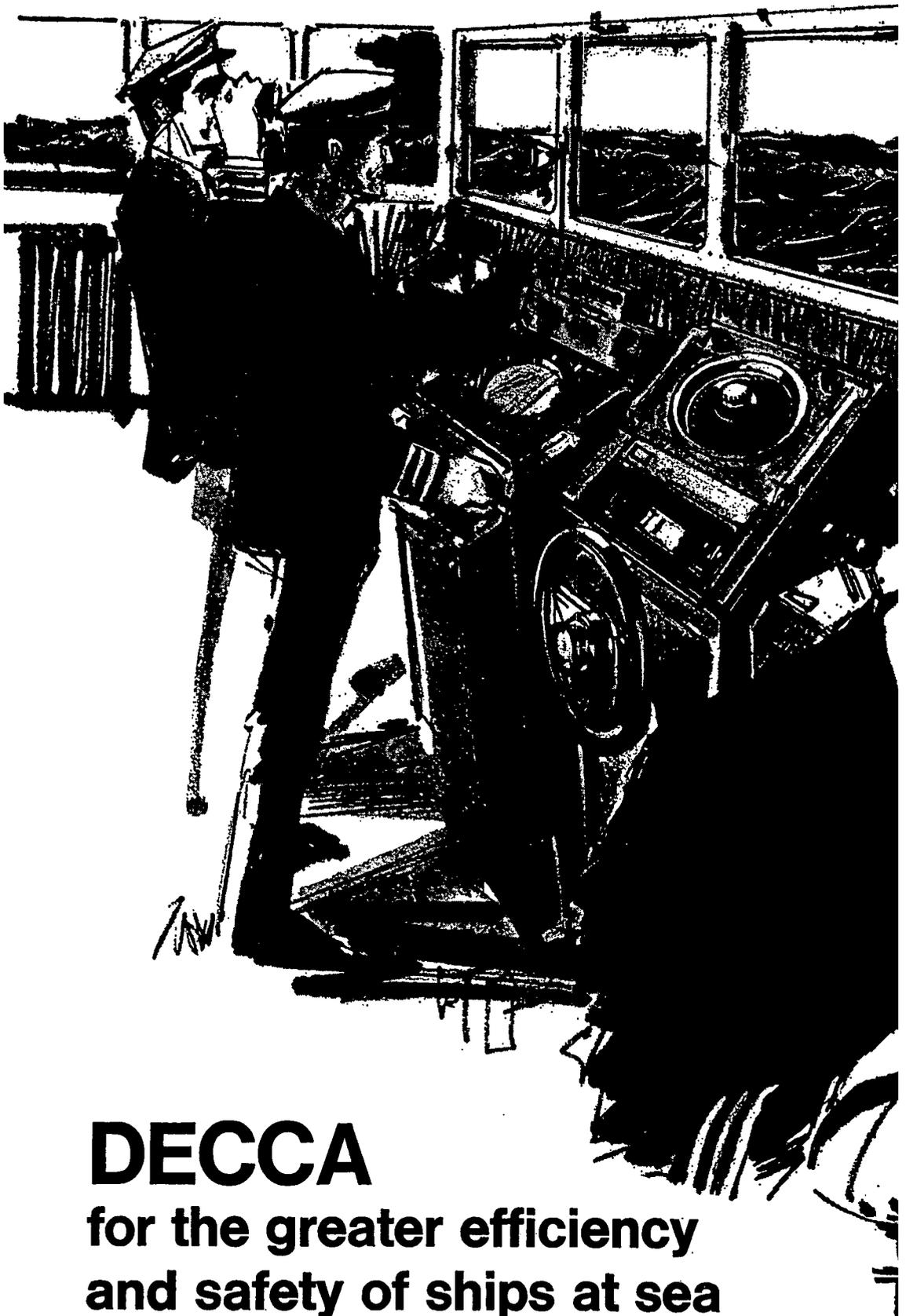
PRACTICAL NAVIGATION FOR SECOND MATES

Revised by A. Frost, Master Mariner

£4.20

Per post £4.50

BROWN, SON & FERGUSON, LTD.,
52 DARNLEY STREET, GLASGOW, G41 2SG



DECCA

for the greater efficiency
and safety of ships at sea

THE DECCA NAVIGATOR COMPANY LIMITED. DECCA RADAR LIMITED. LONDON



“The need for automatic synchronisation is clear . . . An automatically synchronised receiver is mandatory under these conditions and highly preferred under all conditions.” (C.I.R.M. Report No. 85/75)

Marconi Marine's ALPHA OMEGA with fully automatic synchronisation

Alone among Omega receivers, Marconi Marine's Alpha Omega provides four essential features that 'economy' receivers don't provide – four essentials for safe, reliable and accurate navigation.

- 1** Fully automatic synchronisation to the Omega format on switch-on. No manual alignment is necessary.
- 2** Automatic and continuous tracking of *all* Omega transmissions within range, allowing instant selection and display of the maximum possible number of LOPs.
- 3** Two-frequency operation providing automatic, continuous check on lane count.
- 4** Individual propagation corrections easily fed in, and total correction automatically calculated and applied. No arithmetic needed.



Please ask for details of **ALPHA OMEGA** – the high-accuracy, high-reliability Omega receiver from Marconi Marine.

Marconi Marine navigation

The Marconi International Marine Co. Ltd.,
Chelmsford, Essex, England.
Tel: (0245) 61701 Telex: 99228. A GEC-Marconi Electronics Company



'Predictor II' doesn't just see –

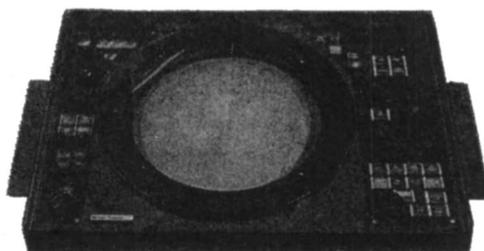


it remembers and computes

A computer memory enables 'Predictor II' to store complete radar pictures for periods up to six minutes, even when operating as a conventional radar. When you press the button, 'Predictor II' recalls successive *past* radar situations, plotting with infallible accuracy the true or relative tracks followed by every target on the screen up to the present instant.

If you decide to alter course or speed and propose your alteration to 'Predictor II', it will instantly compute the new triangle of velocities for every target on the screen, and display the *impending* radar situation *before* you alter.

'Predictor II' has all the advanced facilities of earlier 'Predictors' – and the latest developments in computer circuit technology.



'PREDICTOR II'
the most advanced
marine radar in the world.

Marconi Marine radar

The Marconi International Marine Co. Ltd.
Chelmsford Essex England

Tel (0245) 61701 Telex 99228 • A GEC-Marconi Electronics Company



‘NAVIGATION’

NAVIGATION (Paris), the quarterly Journal of the French Institute of Navigation, is available to Members of the Institute at the preferential subscription rate of £7.00 per annum. The April 1976 issue contains the following papers

- I. *LES NOUVEAUTES TECHNIQUES*
 La navigation aérienne intégrée des années 1980 par G. COLIN & J. B. RIGAUDIAS (Air-France)
 Anti-collision aérienne: Situation & perspective par R. CUCHET (Sté Crouzet)
 Systèmes spécialisés de navigation par J. C. JOGUET (LMT)
 Role de l'ILM dans l'atterrissage tout temps par J. P. DUPONT (STNA)
 La station OMEGA de la Réunion par V. de GABIOLLE
 Surveillance & identification: Systèmes DABS & ADSEL par F. I. PRUVOT (S.E.C.R.E.)
- II. *CHRONIQUE DU NAVIGANT*—
 Radar à mouvement vrai contre radar relatif par P. HUGON
 Conclusions du Groupe de travail de l'IFN sur l'organisation du trafic maritime dans les passages resserrés et particulièrement dans le Pas de Calais
- III. *L'HISTOIRE & LA NAVIGATION*—
 Plaidoyer pour un vocabulaire international de navigation par P. SIZAIRE
 Les distances lumaires au XVIII^e siècle par P. HUGON
 Éléments de navigation Phénicienne par J. DEMERLIAC
- IV. *INFORMATIONS* V. *CHRONIQUE DES LIVRES & DES REVUES*

ROYAL GEOGRAPHICAL SOCIETY

NEW MAP

Mount Everest Region

Scale 1:100 000 Size 73 × 64 cm

Price £5.00

Printed in eight colours. Compiled and drawn by G. S. Holland,
in the Society's Drawing Office, from latest available information.

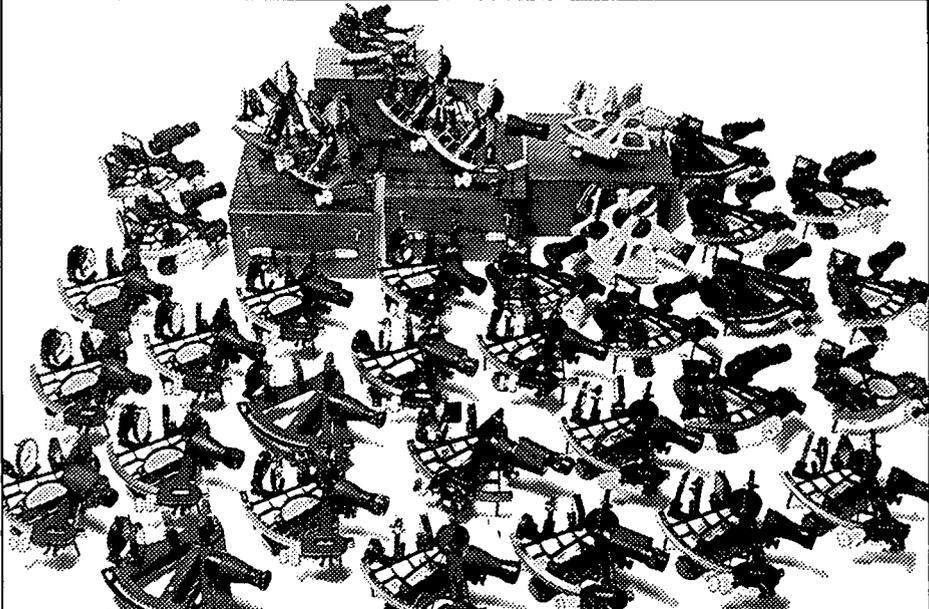
From

PUBLICATIONS DEPARTMENT, R.G.S.,
1 KENSINGTON GORE, LONDON SW7 2AR

SEXTANTS FROM THE WORLD'S GREAT INSTRUMENT MAKERS

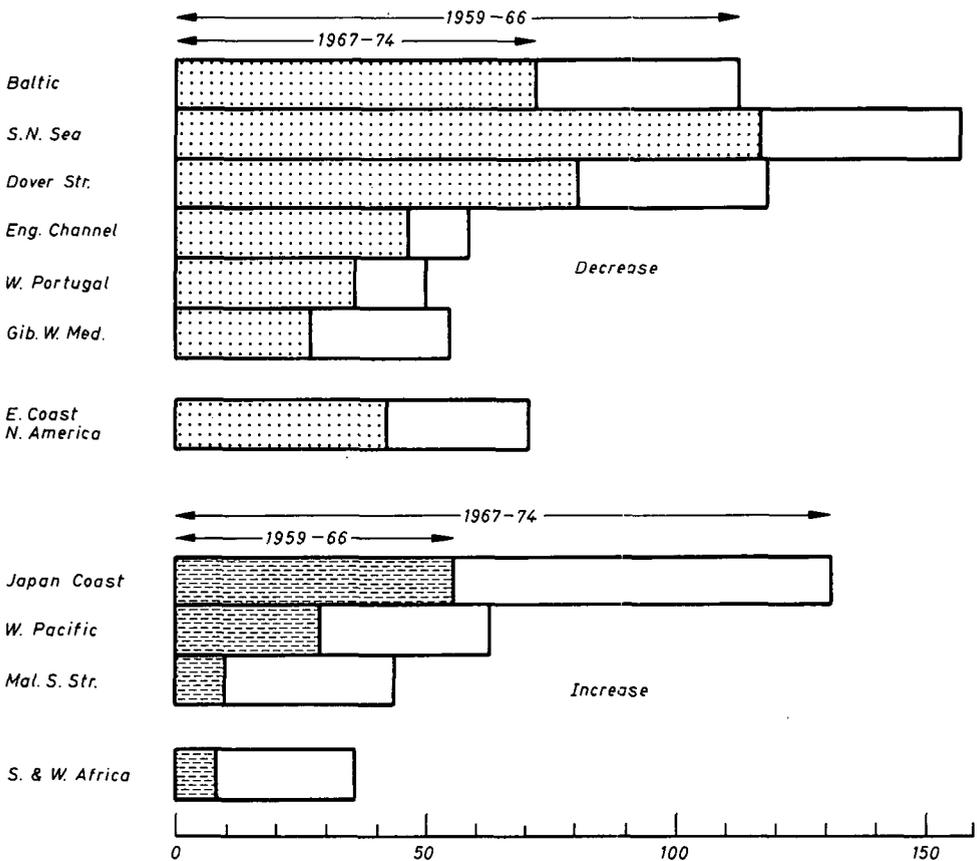
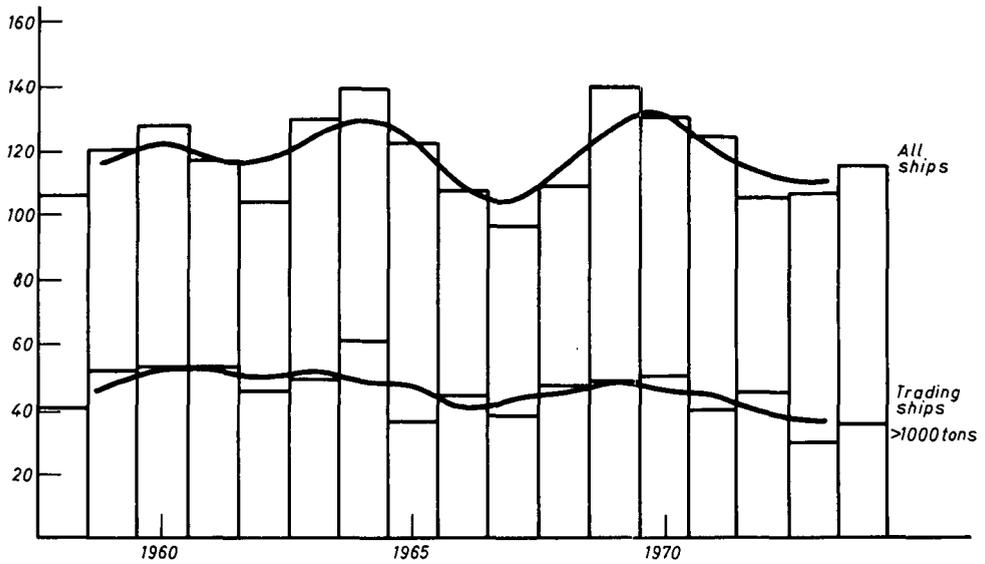
At Potters you can choose from a range of sextants second to none—Heath—Cooke—Zeiss—C.Plath—Toizaki—Cassens & Plath—for the last three names we are the sole U.K. sales concessionaires—then there are Ebbco for young

navigators and yachtsmen—older sextants which we have recertified—we will re-certify your present sextant or buy it against a new one at a good price. When you are choosing a sextant make sure to visit Potters where you really have a choice...



J.D. POTTER LTD

The Pure Navigators. Established 1830 145 Minories, London EC3N 1NH. Tel: 01-709 9076 (5 lines)
Cables: Adcharts London EC3. Telex: 887386. 24 hour Telephone service.



COLLISIONS AT SEA. Above, annual totals world-wide 1958-74; below, regions showing a significant decrease or increase. A paper on the statistics of collisions at sea by A. N. Cockcroft is printed on p. 215.