

The JOURNAL of NAVIGATION

VOL. 38, NO. 2

MAY

1985

Nevil Maskelyne, the Nautical Almanac, and G.M.T.	159
Eva G. R. Taylor Lecture by DEREK HOWSE	
Inuit Navigation, Empirical Reasoning and Survival	178
COLIN IRWIN	
Astronomical Background to the International Meridian Conference of 1884	191
D. H. SADLER AND G. A. WILKINS	
Charting Background to the 1884 Conference	200
DAVID HASLAM	
The International Prime Meridian Conference, Washington, October 1984	203
S. R. MALIN	
Developments of Time Systems since 1884	207
J. D. H. PILKINGTON	
Astronomical Navigation Since 1884	209
A. E. FANNING	
The Terrestrial Coordinate System and International Earth-rotation Services	216
G. A. WILKINS	
Random Air Traffic Generation for Computer Models	218
J. L. GOODWIN AND R. L. FORD	
Effects of Measurement Errors in Estimating the Probability of Vertical Overlap	234
SAKAE NAGAOKA	
The Evolving Law of the Sea	244
STEVEN HAINES	
Fuel Consumption in Container Ships on the North Atlantic	258
R. MOTTE AND C. A. LAURENCE	
The Reliability of Surface Current Observations	266
G. E. VENENDAAL	
Weather Routing of Ships for the Northern Oceans	274
R. MOTTE	
Windward Passage	283
MICHAEL RICHEY	
Forum	293
Reviews	300
Record	303

THE ROYAL INSTITUTE OF NAVIGATION
CAMBRIDGE UNIVERSITY PRESS

THE ROYAL INSTITUTE OF NAVIGATION

Patron

HRH THE PRINCE PHILIP DUKE OF EDINBURGH, KG, KT, OM

OFFICERS AND COUNCIL 1984-5

President

J. E. D. Williams

Vice Presidents

Professor J. F. Kemp

J. H. Beattie

Treasurer

G. A. B. King, CBE

Chairman of the Technical Committee

M. G. Pearson

Chairman of the Membership & Fellowship Committee

Commander A. E. Fanning, MBE, DSC, RN

Other Members of Council

W. F. Blanchard

Wing Commander D. W. Broughton,

MBE, RAF

C. St. J. H. Daniel

Lieutenant Commander A. G. Dyer,

MBE, RN

Wing Commander E. E. Eatwell, RAF

Captain L. W. J. Fifield

E. A. Green

Air Commodore D. F. H. Grocott, CBE,

AFC, RAF

D. W. Newson

Captain D. G. Ross

Director Rear Admiral R. M. Burgoyne, CB

THE JOURNAL OF NAVIGATION

The *Journal* is published three times a year by Cambridge University Press and is edited by M. W. Richey. It contains original papers contributing to the science of navigation, including those presented at the 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* (ISSN 0020-3009) is issued free to all Members of the Institute. The subscription price to non-members for Volume 38, 1985, is £40 (USA and Canada US \$95.00) post free; single parts are available at £15 (USA and Canada US \$35) plus postage. Orders, which must be accompanied by payment, may be sent to any bookseller or subscription agent or direct to the publishers, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, or in the USA and Canada to Cambridge University Press, 32 East 57th Street, New York, NY 10022. Back volumes are also available from the Publishers at £27 each.

Enquiries for advertising space should be addressed to Cambridge University Press at the address given above.

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).

© 1985 The Royal Institute of Navigation



Institute Notice Board

SUBSCRIPTIONS

Members will appreciate that the Institute is critically dependent on the income from subscriptions. These are due on 1 July and prompt payment is very much appreciated. As this notice goes to press, a large number of subscriptions are still outstanding. Annual invoices are not despatched as this would incur great expense. If payment has slipped your mind please send off your £23 as soon as possible. The postal bill for reminders has been heavy this year.

The Institute is not liable to income tax and the Inland Revenue will refund to the Institute any income tax that has already been paid on annual contributions, provided they are paid under four-year covenant. By agreeing to subscribe in this way Members can give great help to the Institute, at very little trouble and no expense to themselves. The payment of subscriptions by Direct Debit is also most helpful and can be arranged.

THE OFFICERS AND COUNCIL

The Officers and the Council are elected annually from among Members of the Institute by ballot at the Annual General Meeting (By-law 24). Any two Members may nominate any Member or Members either for Office or ordinary service on the Council. The list of persons so nominated must be delivered to the Director before 14 April. In recent years few such nominations have been received and the President and Council are anxious that this trend should end and that in future there will be competition for election. Nominations should be in accordance with By-law 28.

ANNUAL COMPETITION

The scope of the annual competition has been expanded and is now very wide. It is for young people (under 23) interested in navigation. Any purposeful activity that includes movement from one place to another – potholing, climbing, sailing, flying, walking – requires navigation and anyone who takes part in these activities is already a navigator. But all forms of navigation qualify – from say, bird navigation, or how Columbus discovered America to navigating to the Moon.

All competitors are invited to a special prize-giving meeting at the end of the year which includes talks by eminent navigators. Prizes in the past have included binoculars, a round trip in a warship or a merchant ship and a flight in Concorde.

The closing date for entries is 1 October 1985 and entry forms are available from the Institute. It would be very much appreciated if Members gave as wide publicity as possible to this competition.

THE INSTITUTE TIE

The Institute tie, which displays the Arctic tern in white on a dark blue terylene background, may be obtained from the Secretariat. When ordering please enclose £6, which includes postage, and say whether you prefer the version with a single large bird under the knot or the 'all-over' small bird design.

FELLOWSHIP

Whilst the closing date for nominations for Fellowship is 15 April each year, it would be most helpful if those who wish to make nominations sent in the form as early as possible. It would also be very much appreciated if the form were completed in detail with particular reference to By-law 2 and Appendix 1 to the By-laws. Council is most anxious that no candidates are overlooked and warmly welcomes nominations from Fellows.

FIFTH IAIN CONGRESS

The Fifth International Congress of the International Association of Institutes of Navigation will be held in Tokyo on 1–5 October 1985. Further information and registration forms are available from the Institute.

Theme. The theme of the Congress is *Navigation and Environment*, on different aspects of which some forty papers will be presented on behalf of the nine Member Institutes of IAIN. The papers will be presented in English and cover air, marine and space navigation.

Registration. The fee is 18 000 yen for Members of the cooperating institutes, 27 000 yen for others (20 000 and 30 000 respectively after 30 June 1985). Registration forms from the Institute.

Accommodation. Three hotels near the Congress Hall have been selected, with approximate prices in US dollars of 25,50 and 70–100. The Japan Travel Bureau Inc. will handle booking. The address is 1-13-1 Nihombashi Chuo-Ku, Tokyo 103.

NAV 85 – LAND NAVIGATION AND LOCATION FOR MOBILE APPLICATIONS

This Conference, to be held at York from 9 to 11 September 1985, will address the rapidly growing potential for vehicle users of all types to know the precise location of their vehicles at all times and over very large areas of operation. Further details may be obtained from the Conference Unit, Sisa Ltd, Chislehurst, Kent BR7 5EH or from the Director.

THE ANNUAL GENERAL MEETING AND RECEPTION

The Annual General Meeting and Reception for 1985 will be held in the House of the Royal Geographical Society at 16.30 on Wednesday 23 October. The title of the Presidential Address will be 'The Province of Air Navigation'.

SOCIETY FOR NAUTICAL RESEARCH

The 1985 programme of the Society includes the following visit, to which members of the R.I.N. are cordially invited: Thursday 16 May, visit to the Historic Ships Collection, St Katharine's Dock, E1 9AT. Gather at the Dock at 15.30. A visit to the Cruising Association will follow at 17.30. Tickets at £1 are available from

Lt Cdr Lawrence Phillips, RNR,
Hon. Secretary, the Society for Nautical Research
2 Drake's Drive,
Northwood,
Middlesex
HA6 2SL.



Nevil Maskelyne, DD, FRS, fifth Astronomer Royal. Drawing in black and red chalks, on blue paper, attributed to John Russell, probably drawn about 1778, in the possession of Mrs. H. C. Arnold-Forster. (Photo: National Maritime Museum)