THE ROYAL SOCIETY OF EDINBURGH



PROCEEDINGS

Section B (Biology)

(Proceedings of the Second International Congress on the History of Oceanography—2)

PUBLISHED BY THE ROYAL SOCIETY OF EDINBURGH 22 GEORGE STREET, EDINBURGH EH2 2PQ Price: £6 \$21.00

1972

THE ROYAL SOCIETY OF EDINBURGH

22 GEORGE STREET, EDINBURGH EH2 2PO

NOTES ON THE PREPARATION OF PAPERS FOR THE TRANSACTIONS AND PROCEEDINGS OF THE SOCIETY

A PAPER by a non-Fellow must be communicated by a Fellow or Honarary Fellow of the Society. The communicator should satisfy himself that the paper is suitable for presentation to the Society.

A paper by more than one author must be submitted with a statement, signed by each author, to the effect that the paper in its entirety is approved by the joint authors, and naming the author who will be responsible for the correction of proofs.

In view of the high cost of publication, authors must write their papers as concisely as possible, and avoid excess of illustrations. The MS. must be easily legible, preferably type-written on one side of quarto or foolscap paper, and with pages numbered throughout. It must be in its final form for printing. Authors are advised to retain copies of their papers as the Society cannot accept responsibility for safe custody.

Every paper must be accompanied by a synopsis, in general not exceeding 200 words, which will be printed in small type at the beginning of the paper, immediately after the title. The synposis will not necessarily replace a 'Summary of Conclusions' which, if required, will be printed in ordinary type at the end of the paper.

In the case of a long paper a table of contents should be supplied. References to plates, etc., should be inserted in the MS. where required. Positions for the insertion of illustrations appearing in the text should be indicated. Names of genera and species should be in italics. Footnotes should be avoided where possible.

Additions to a paper after it has been finally passed for printing will, if accepted by the Council, be treated and dated as separate communications, and may, or may not, be printed immediately after the original paper.

References to Literature cited in the text should be listed at the end of a paper. They should be arranged alphabetically under the authors' names, with titles of journals abridged as given in the World List of Scientific Periodicals, except that in periodicals with English titles the ordinary English use of capital letters should be followed, e.g. Proc. Linn. Soc. Titles of papers, if inserted, should be quoted exactly. The undernoted are examples:

AITKEN, A. C., 1946. 'On the estimation of many statistical parameters', *Proc. Roy. Soc. Edinb.*, A., 63, 369-377.

GUTHRIE, D., 1945. A History of Medicine. London. ROGERS, G. L., 1952. Proc. Roy. Soc. Edinb., A, 63, 193-221.

References in the text should be made by quoting the name of the author and year of publication, thus: (Rogers 1952) or (Guthrie 1945), adding the page when necessary. When two or more papers, published by the same author in any one year, are listed, each paper should be distinguished by a small letter a, b, etc., placed after the date, thus: (Rogers 1952a). All references should be carefully checked before the paper is submitted.

Illustrations. These should preferably be line drawings (shaded by dotting, hatching, etc., if necessary). Alternatively wash drawings or photographs, which are usually reproduced as plates, may be accepted. All illustrations must be in a form suitable for reproduction.

Line drawings should be made with indian ink on white Bristol board. Lines or dots, etc., used for shading, should be firm and black and no washes or colour should be used. Areas where lines, stipples, etc., are to be added by the engraver should be marked *lightly* in *blue pencil*, and the type of shading indicated.

Wash drawings should be shaded in monochrome (black or sepia), and drawn on white paper or white Bristol board.

All drawings, should, where possible, allow of reduction to about two-thirds the linear dimensions, and the amount of the reduction should be considered, during drafting, with regard to the size and strength of shading, lettering, lines, etc. Drawings should be submitted, if possible, flat, not rolled.

Continued on page iii of cover

PROCEEDINGS

OF

THE ROYAL SOCIETY OF EDINBURGH

Section B (Biology)

VOL. 73

1971-1972

PUBLISHED BY
THE ROYAL SOCIETY OF EDINBURGH
22 GEORGE STREET
EDINBURGH EH2 2PQ

1972

The Congress was organised under the auspices of the Royal Societies of London and Edinburgh, the City and University of Edinburgh and the Challenger Society.

The thanks of the Congress are due to The Carnegie Trust for the Universities of Scotland for a special grant towards the cost of the illustrations which appear in this volume.

SECOND INTERNATIONAL CONGRESS ON THE HISTORY OF OCEANOGRAPHY

CHALLENGER EXPEDITION CENTENARY

EDINBURGH, SEPTEMBER 12 TO 20, 1972

Proceedings—2

Honorary President
H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH

Programme Convener
SIR GEORGE DEACON, F.R.S.

Editorial Supervision

WM. H. RUTHERFORD, F.C.I.S.

Asst. Secretary and Librarian, The Royal Society of Edinburgh

CONTENTS

NO.		PAGE
	Navigation and Cartography Convener: Rear Admiral G. S. RITCHIE	
1		
1	Navigation and Hydrography, Oceanography's Eyes. By D. W. WATERS .	1
2	The History of Tidal Predictions in the United Kingdom before the Twentieth Century. By J. R. Rossiter, D.Sc., Institute of Coastal Oceanography and Tides, Birkenhead	
3	On the History of Recording Tide Gauges. By Wolfgang Matthäus, Institut für Meereskunde, Warnemünde	25
4	The Beginnings of Topo-hydrographic Activities of the United States Navy Department in Exploration of the Arctic prior to 1870 as reflected in the Official Records in the National Archives in Washington, D.C. By HERMAN R. Friis, Chief, Centre for Polar Archives, The National Archives, Washington, D.C.	35
5	The Lead by the Dutch in World Charting in the Seventeenth and first half of the Eighteenth Century. By C. KOEMAN, University of Utrecht	45
6	On the Beginnings of the Oldest Descriptions and Sea-charts by Seamen from North-West Europe. By A. LANG	53
7	Atlantic Winds and Ocean Currents in Portuguese Nautical Documents of the Sixteenth Century. By A. Teixeira da Mota	59
8	Gradić's Treatise on the Direction of a Boat with a Rudder. By ŽARKO DADIĆ	69
9	Hydrographic Charting and Oceanography on the West Coast of Canada from the Eighteenth Century to the Present Day. By ROBERT W. SANDILANDS, Marine Sciences Branch, Department of the Environment, Victoria, B.C.	75
10	The Challenger Expedition and Australian Science. By D. F. Branagan, Department of Geology and Geophysics, University of Sydney	85
	Health and Survival at Sea Convener: Surgeon Rear Admiral Stanley Miles	
11	Shipwreck and Survival. By Surgeon Rear Admiral STANLEY MILES, C.B., M.Sc., M.D., F.R.C.P., F.R.C.S., University of Manchester	97
12	Fishery Support Ships. By Tom DINSDALE, M.B., F.F.A.R.C.S., and ROBERT WEDEN SCOTT, O.B.E., M.D., D.P.H., Medical Officers to the Fishery Support Ships Orsino and Miranda	103
13	100 Years of Underwater Escape. By Surgeon Commander E. E. P. BARNARD	113
14	Thermal Balance in Divers. By Surgeon Captain J. S. P. RAWLINS, O.B.E., R.N.	123
15	The Provision of Potable Water by Solar Distillation. By Andrew Porteous, B.Sc., M.Eng., D.Eng., C.Eng., M.A.S.M.E., M.I.Chem.E., M.I.Mech.E., The Open University	133
	Deep-Sea Biology—Life in the Deep Oceans Convener: Dr J. A. Allen	
16	Habitat Selection and Animal Distribution in the Sea: the Evolution of a Concept. By P. S. Meadows and J. I. Campbell, Department of Zoology, University of Glasgow	145

Contents vii

NO.		PAGE
17	The Exploration of Submarine Canyons and their Benthic Faunal Assemblages. By GILBERT T. ROWE	159
18	Ecology and Zoogeography of some Polychaeta representative of the Abyssal Pacific. By Dr R. YA. LEVENSTEIN, P.P. Shirshov Institute of Oceanology, USSR Academy of Sciences	171
19	Deep-Sea Faunal Zonation of Benthos along the Beaufort-Bermuda Transect in the North-western Atlantic. By ROBERT Y. GEORGE and ROBERT J. MENZIES, Department of Oceanography, Florida State University.	183
20	Hydrostatic Pressure—Temperature effects on Deep-sea Colonisation. By ROBERT J. MENZIES and ROBERT Y. GEORGE, Department of Oceanography, Florida State University	195
21	The Transport of Organic Carbon to Organisms living in the Deep Oceans. By ROBERT O. FOURNIER, Department of Oceanography, Dalhousie University	203
22	Planktonic Oceanic Ostracods—Historical, Present and Future. By M. V. ANGEL, National Institute of Oceanography, Wormley, Godalming, Surrey	213
23	Some Developments in the Study of Luminescent Marine Animals. By Peter J. Herring, National Institute of Oceanography, Wormley, Godalming, Surrey	229
	-	
	Life in the Upper Layers Convener: Dr J. H. Fraser	
24	Quantitative Investigations in Marine Biology. By RONALD CURRIE, Dunstaffnage Marine Research Laboratory, Oban	239
25	The History and State of the Study of Medusae and Hydroids. By C. Edwards, Dunstaffnage Marine Research Laboratory, Oban	247
26	History of Research into the Food and Feeding of Euphausiids. By TAKAHISA NEMOTO, Ocean Research Institute, University of Tokyo	259
27	History of Investigations on Plankton in the Norwegian Sea and the Main Results of Soviet Investigations. By E. A. PAVSHTIKS and A. F. TIMOKHINA	267
28	Ninety Years' High-pressure Research. By H. Flügel, Institut für Meereskunde an der Universität Kiel, Germany	279
29	The Pressure Sensitivity of Marine Invertebrates—a résumé after 25 years. By Elfed Morgan, Department of Zoology and Comparative Physiology, University of Birmingham	287
30	Observations on the Vertical Distribution of the Genus Acanthephyra (Crustacea: Decapoda) in the eastern North Atlantic, with particular reference to Species of the 'purpurea' Group. By P. FOXTON, National Institute of Oceanography, Wormley, Godalming, Surrey	301
31	A Historical Consideration of the Siphonophores. By Mary P. Winson .	315
	Disharta Danasah	
	Fisheries Research Convener: Dr C. E. Lucas	
32	Science and Sea Fisheries. By G. L. KESTEVEN	325
33	Fishing Industry in Ancient Egypt. By A. A. ALEEM, D.Sc., Department of Oceanography, University of Alexandria	333
34	The Role of the Royal Dublin Society (established in 1731) in Fisheries Research and Development. By ARTHUR E. J. WENT, D.Sc., M.R.I.A.	345

viii	Contents

NO.		PAGE
35	The History of the International Council for the Exploration of the Sea. By ARTHUR E. J. WENT, D.Sc., M.R.I.A., President of the Council, 1966-69.	351
36	A History of Some of the International Fisheries Commissions. By D. H. Cushing	361
37	Historical Development of Fisheries Oceanography in Japan. By MICHITAKA UDA, College of Marine Science and Technology, Tokai University	391
38	The Development of Fishery Research in Norway in the Nineteenth and Twentieth Centuries in the light of the History of the Fisheries. By T. Solhaug, The Norwegian School of Economics and Business Administration, Bergen, and G. Saetersdal, Institute of Marine Research, Bergen	399
3 9	Development of Soviet Sea-bed Research in relation to Fishery Problems. By D. E. Gershanovich, All-Union Research Institute of Marine Fisheries and Oceanography (VNIRO), Moscow	413
40	Atlantic Salmon in the Sea. By K. A. PYEFINCH, DAFS Freshwater Fisheries Laboratory, Pitlochry	423
41	Development of Acoustic Techniques in Norway for Fisheries Research and Commercial Fishing. By OLAV DRAGESUND and LARS MIDTTUN, Institute of Marine Research, Bergen	429