

---

# **Fisheries Resources of the Sea and their Management**

---

**David Cushing**

---

The international management of marine fish stocks has become a pressing problem in every part of the world's oceans. The study of fisheries biology has made an increasingly valuable contribution to resource management, as has the science of conservation. This book describes these and other developments. Its aim is to help create a better understanding of the scientific basis of fisheries resource management. £3.50 *Science and Engineering Policy Series*

---

# **The Biology of Free-Living Nematodes**

---

**Warwick L. Nicholas**

---

Nematodes are minute inhabitants of the soil, and of freshwater and marine sediments. This book draws on research in many fields of biology to give a comprehensive account of the free-living species. Chapters are devoted to morphology, physiology, culture and nutrition, biochemistry, cytology, genetics, ecology, taxonomy and methods, and the book quotes more than 550 references. £8.25

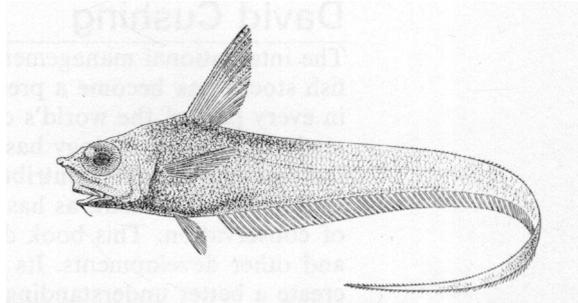
---

# **Oxford University Press**

---

# ***THE SEAS***

**F. S. Russell  
C. M. Yonge**



First published in 1928, this classic work on the world's oceans now appears in a completely revised and up-to-date edition with many new photographs and line drawings. The oceans, covering over two-thirds of the earth's surface, have always fascinated mankind and in this book Sir Frederick Russell, C.B.E., LL.D., F.R.S., and Sir Maurice Yonge, C.B.E., D.Sc., F.R.S., discuss the behaviour of tides, plant and marine life (from plankton to whales), sea fisheries and research, and man's exploitation and cultivation of marine products. **£6.95 net**

**For a free colour leaflet on THE SEAS please write to**

***Frederick Warne & Co Ltd***

**Dept. JMBA 1**

**40 Bedford Square**

**London WC1B 3HE**

# THE MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM

THE ASSOCIATION was founded in 1884 to promote accurate researches leading to the advancement of zoological and botanical science and to an increase in our knowledge of the food, life, conditions and habits of British fishes. The work of the Association is controlled by a Council elected annually by its subscribing members.

Professor T. H. Huxley took the chair at the initial meeting held in the rooms of the Royal Society and was elected the first President. Among those present were Sir John Lubbock (afterwards Lord Avebury), Sir Joseph Hooker, Professor H. N. Moseley, Mr G. J. Romanes, and Sir E. Ray Lankester who, after Professor Huxley, was for many years president of the Association. It was decided to build a laboratory at Plymouth, where a rich and varied fauna is found.

The Plymouth Laboratory was opened in June 1888, and, since that date, considerable additions have been made to the buildings, including a library, lecture-hall, and extensive laboratory accommodation with up to-date equipment. Additional sea-water reservoirs have also been built, and an aquarium, modernized in 1959, opened to the public.

Since its foundation the Association has been supported by subscriptions and donations from private members, universities, learned societies, the Fishmongers' Company and other public bodies. For some time past, however, the main financial support for the work of the Plymouth Laboratory has come from Government funds, and since 1965 the Laboratory has been grant-aided through the Natural Environment Research Council.

The Marine Biological Association, under the direction of its Council, undertakes research in all branches of marine science and the main results are published in this journal. Accounts of the laboratory and aquarium are to be found in Vol. 27 (p. 761), Vol. 39 (p. 391) and Vol. 43 (p. 281), and summaries of the activities and research of the Association are given annually in the Report of the Council in the November issue of the Journal.

The laboratory is open throughout the year and its work is carried out by a fully qualified research staff under the supervision of the Director. The names of the members of the staff will be found on the inner page of the front cover. Accommodation is available for British and foreign scientific workers who wish to carry out independent research in all branches of marine science. Arrangements are made for courses for advanced students, and marine animals and plants are supplied to educational institutions.

Work at sea is undertaken by three research vessels and by a motor boat, and these also collect the specimens required in the laboratory.

## TERMS OF MEMBERSHIP

	£
Annual Members, receiving the Journal . . . per annum	10.00
Annual Members, without the Journal . . . per annum	2.00
Founders . . . . .	100.00
Governors . . . . .	500.00

Members of the Association have the following rights and privileges: they elect annually the Officers and Council; they are entitled to receive the Journal of the Association at a reduced rate; they are admitted to view the laboratory at Plymouth; they have the first claim to rent a place in the laboratory for research, with use of tanks, boats, etc; they have the privilege of occupying a table for one week in each year free of charge; and they have access to the books in the library at Plymouth during working hours.

The Commissioners of Inland Revenue have approved the Association for the purposes of Section 16, Finance Act, 1958, and that the whole of the annual subscription paid by a member who qualifies for relief under the section will be allowable as a deduction from his emoluments assessable to income tax under Schedule E.

All correspondence should be addressed to the Director, The Laboratory, Citadel Hill, Plymouth, PL1 2PB.

## CONTENTS

	PAGE
RUSSELL, G. and FLETCHER, R. L. A numerical taxonomic study of the British Phaeophyta	763
GREEN, J. C. The fine-structure and taxonomy of the haptophycean flagellate <i>Pavlova lutheri</i> (Droop) comb. nov. (= <i>Monochrysis lutheri</i> Droop)	785
SHELTON, R. G. J., SHELTON, P. M. J. and EDWARDS, A. S. Observations with the scanning electron microscope on a filamentous bacterium present on the aesthetasc setae of the brown shrimp <i>Crangon crangon</i> (L.)	795
AL-ADHUB, A. H. Y. and NAYLOR, E. Emergence rhythms and tidal migrations in the brown shrimp <i>Crangon crangon</i> (L.)	801
KAY, D. G. and KNIGHTS, R. D. The macro-invertebrate fauna of the intertidal soft sediments of south east England	811
HISCOCK, K. and HOARE, R. The ecology of sublittoral communities at Abereidly Quarry, Pembrokeshire	833
EAGLE, R. A. Natural fluctuations in a soft bottom benthic community	865
EDWARDS, C. and HARVEY, S. M. The hydroids <i>Clava multicornis</i> and <i>Clava squamata</i>	879
SHEADER, M. Factors influencing change in the phenotype of the planktonic amphipod <i>Parathemisto gaudichaudi</i> (Guerin)	887
OVERSTREET, R. M. and HOCHBERG, F. G. Digenetic trematodes in cephalopods	893
NOTT, J. A. and PARKES, K. R. Calcium accumulation and secretion in the serpulid polychaete <i>Spirorbis spirorbis</i> L. at settlement	911
DANDO, P. R. On the northern rockling <i>Ciliata septentrionalis</i> (Collett) in the Plymouth area	925
WEBB, C. J. Small-scale cultivation of cells and tissues from gobiid teleosts	933
BONE, Q. and CHUBB, A. D. The structure of stretch receptor endings in the fin muscles of rays	939
WESTERNHAGEN, H. VON and DETHLEFSEN, V. Combined effects of cadmium and salinity on development and survival of flounder eggs	945
HERON, A. C. Advantages of heart reversal in pelagic tunicates	959
PINGREE, R. D. The advance and retreat of the thermocline on the continental shelf	965
PINGREE, R. D., PENNYCUICK, L. and BATTIN, G. A. W. A time-varying temperature model of mixing in the English Channel	975
ABSTRACTS OF MEMOIRS	993
BOOK NOTICE	995
REPORT OF THE COUNCIL FOR 1974-5	997
BALANCE SHEET 1974-5	1041

© Copyright by the Marine Biological Association of the U.K. 1975

The subscription price of volume 55, 1975, of the Journal to non-members of the Association is £28.00 net a volume of four parts, post free, or US\$90.00 in U.S.A. and Canada, payable in advance. Subscriptions may be sent to any bookseller or to the London or New York office of Cambridge University Press.

CAMBRIDGE UNIVERSITY PRESS  
BENTLEY HOUSE, 200 EUSTON ROAD, LONDON NW1 2DB  
32 EAST 57TH STREET, NEW YORK, N.Y. 10022

Printed in Great Britain at the University Printing House, Cambridge