

**JOURNAL OF THE  
MARINE BIOLOGICAL ASSOCIATION  
OF THE UNITED KINGDOM**



**THE PLYMOUTH LABORATORY**

**VOLUME 45, No. 3**  
*(issued October 1965, and completing Volume 45)*

**CAMBRIDGE**  
**AT THE UNIVERSITY PRESS**  
**1965**

*Price Eighty shillings net*

**(U.S.A. \$13.50)**

*Annual Subscription for Volume (of three parts); £11 (U.S.A. \$35.00)*

# MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM

## PATRON

H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, F.R.S.

## OFFICERS AND COUNCIL

*President:* Prof. C. F. A. PANTIN, Sc.D., D.Sc., Dr Univ., F.R.S.

### *Vice-Presidents*

The Earl of IVEAGH, K.G., C.B., C.M.G., F.R.S.	Prof. Sir JAMES GRAY, Kt., C.B.E., M.C., Sc.D., LL.D., F.R.S.
Prof. A. V. HILL, C.H., O.B.E., Sc.D., LL.D., F.R.S.	G. M. GRAHAM, C.M.G., O.B.E.
Sir EDWARD J. SALISBURY, Kt., C.B.E., D.Sc., LL.D., F.R.S.	Prof. Sir ALISTER C. HARDY, Kt., D.Sc., F.R.S.
Major E. G. CHRISTIE-MILLER	C. M. YONGE, C.B.E., D.Sc., F.R.S.
	Rear Admiral E. G. IRVING, C.B., O.B.E.

### *Honorary Members*

Dr H. B. BIGELOW	Dr A. C. REDFIELD
E. H. E. HAVELOCK, C.B., C.B.E.	Prof. G. THORSON, D.Phil.
Prof. Sir ALISTER C. HARDY, Kt., D.Sc., F.R.S.	C. M. YONGE, C.B.E., D.Sc., F.R.S.
Dr A. G. HUNTSMAN	Prof. L. A. ZENKOVITCH
Prof. HANS PETERSSON, For. Mem. R.S.	

## COUNCIL

### **Elected Members**

H. A. COLE, D.Sc.	Rear Admiral E. G. IRVING, C.B., O.B.E.
Prof. D. J. CRISP, Ph.D.	Prof. E. W. KNIGHT-JONES, Ph.D.
R. I. CURRIE	Prof. O. E. LOWENSTEIN, D.Sc., F.R.S.
Prof. G. E. FOGG, Ph.D., F.R.S.	C. H. MORTIMER, Dr.phil., D.Sc., F.R.S.
Dr F. C. FRASER, C.B.E., D.Sc.	N. TEBBLE
R. S. GLOVER	Prof. W. F. WHITTARD, D.Sc., F.R.S.
M. N. HILL, Ph.D., F.R.S.	C. M. YONGE, C.B.E., D.Sc., F.R.S.
Prof. A. L. HODGKIN, Sc.D., F.R.S.	

### **Governors**

W. C. TAME (Ministry of Agriculture, Fisheries and Food)	S. SMITH, Ph.D. (Cambridge University)
The Worshipful Company of Fishmongers: The Prime Warden	EDWARD HINDLE, Sc.D., F.R.S. (British Association)
Sir EDWARD CHADWYCK-HEALEY, Bt., M.C.	Prof. G. P. WELLS, Sc.D., F.R.S. (Zoological Society)
Col. Sir JOHN G. CAREW POLE, Bt., D.S.O., T.D.	Prof. Sir JAMES GRAY, Kt., C.B.E., M.C., Sc.D., LL.D., F.R.S. (Royal Society)
Prof. Sir ALISTER C. HARDY, Kt., D.Sc., F.R.S. (Oxford University)	Prof. A. V. HILL, C.H., O.B.E., Sc.D., LL.D., F.R.S. (Physiological Society)

*Hon. Treasurer:* Sir EDWARD CHADWYCK-HEALEY, Bt., M.C., The Mill House,  
Hook, Basingstoke, Hants.

*Secretary:* J. E. SMITH, Sc.D., F.R.S., The Laboratory, Citadel Hill, Plymouth, Devon

## SCIENTIFIC STAFF

*Director:* J. E. SMITH, Sc.D., F.I.Biol., F.R.S.

D. P. WILSON, D.Sc., F.I.Biol., F.R.P.S. ( <i>Zoologist</i> )	F. A. J. ARMSTRONG, F.R.I.C. ( <i>Chemist</i> )
L. H. N. COOPER, D.Sc., F.R.I.C., F.G.S., F.I.Biol., F.R.S. ( <i>Chemist</i> )	E. D. S. CORNER, M.Sc., Ph.D. ( <i>Biochemist</i> )
G. M. SPOONER, M.B.E., M.A., F.R.E.S. ( <i>Zoologist</i> )	A. J. SOUTHWARD, D.Sc., Ph.D. ( <i>Zoologist</i> )
MARY W. PARKE, D.Sc., Ph.D., F.L.S., F.I.Biol. ( <i>Botanist</i> )	T. I. SHAW, M.A., Ph.D. ( <i>Physiologist</i> )
P. G. CORBIN, B.A. ( <i>Zoologist</i> )	J. V. HOWARTH, B.Sc. ( <i>Physiologist</i> )
J. A. C. NICOL, D.Sc., M.A., D.Phil. ( <i>Experimental Zoologist</i> )	Q. BONE, M.A., D. Phil. ( <i>Zoologist</i> )
N. A. HOLME, M.A. ( <i>Zoologist</i> )	G. T. BOALCH, B.Sc., Ph.D. ( <i>Botanist</i> )
G. R. FORSTER, B.Sc. ( <i>Zoologist</i> )	G. W. BRYAN, B.Sc., Ph.D. ( <i>Zoologist</i> )
	A. G. DAVIES, B.Sc., Ph.D. ( <i>Special Appointment: Physical Chemist</i> )

J. H. WICKSTEAD, B.Sc., Ph.D., Ministry of Overseas Development (*Zoologist*)  
Prof. E. J. DENTON, Sc.D., B.A., B.Sc., Ph.D., F.I.Biol., F.R.S. (*Physiologist*),  
Royal Society Research Professor of Bristol University

October 1965

# The Journal of General Microbiology

Editors: B. C. J. G. KNIGHT and A. F. B. STANDFAST

*Contents of Volume 40, No. 3, September 1965*

- L. K. Dunican and H. W. Seeley, Jun.** Extracellular polysaccharide synthesis by members of the genus *Lactobacillus*: conditions for formation and accumulation.
- T. H. Melville.** A study of the overall similarity of certain Actinomycetes mainly of oral origin.
- M. Shilo and B. Bruff.** Lysis of gram-negative bacteria by host-independent ectoparasitic *Bdellovibrio bacteriovorus* isolates.
- W. B. Moore.** Separation, characteristics and minimal amino-acid requirements of six variants derived from a strain of *Bacillus cereus*.
- R. G. Mitchell and S. K. R. Clarke.** An *Alcaligenes* species with distinctive properties isolated from human sources.
- L. M. Evison and A. H. Rose.** A comparative study on the biochemical bases of the maximum temperatures for growth of three psychrophilic micro-organisms.
- I. Sasaki and G. Bertani.** Growth abnormalities in Hfr derivatives of *Escherichia coli* strain C.
- J. Kleczkowska.** Mutations in symbiotic effectiveness in *Rhizobium trifolii* caused by transforming DNA and other agents.
- T. S. Theodore and A. L. Schade.** Carbohydrate metabolism of iron-rich and iron-poor *Staphylococcus aureus*.
- R. Wilsenach and M. Kessel.** On the function and structure of the septal pore of *Polyporus rugulosus*.
- R. Wilsenach and M. Kessel.** The role of lomasomes in wall formation in *Penicillium vermiculatum*.
- A. S. Jones, J. R. Tittensor and R. T. Walker.** The chemical composition of the nucleic acids and other macromolecular constituents of *Mycoplasma mycoides* var. *capri*.
- B. M. Lund.** A comparison by the use of gel electrophoresis of soluble protein components and enzymes of some group D streptococci.
- A. B. Rajadhyaksha and S. Srinivasa Rao.** The role of phage in the transduction of the toxinogenic factor in *Corynebacterium diphtheriae*.
- D. S. Ingram and N. F. Robertson.** Interaction between *Phytophthora infestans* and tissue cultures of *Solanum tuberosum*.

*The subscription rate is 80s. net per volume of 3 parts, single parts 35s. each, plus postage. Three volumes will be issued each year. Orders should be sent to*

**CAMBRIDGE UNIVERSITY PRESS**

**BENTLEY HOUSE, 200 EUSTON ROAD, LONDON, N.W. 1**

# THE JOURNAL OF ECOLOGY

EDITOR: P. GREIG-SMITH

VOL. 53, No. 2

JULY 1965

- David Lack. Evolutionary ecology.
- F. Oldfield. Problems of mid-Post-glacial pollen zonation in part of north-west England.
- P. Holgate. Some new tests of randomness.
- A. A. Abd El Rahman and K. H. Batanouny. Transpiration of desert plants under different environmental conditions.
- J. L. Harper, J. T. Williams and G. R. Sagar. The behaviour of seeds in soil. I. The heterogeneity of soil surfaces and its role in determining the establishment of plants from seed.
- J. H. Tallis and H. J. B. Birks. The past and present distribution of *Scheuchzeria palustris* L. in Europe.
- H. J. B. Birks. Pollen analytical investigations at Holcroft Moss, Lancashire, and Lindow Moss, Cheshire.
- C. Hackett. Ecological aspects of the nutrition of *Deschampsia flexuosa* (L.) Trin. II. The effects of Al, Ca, Fe, K, Mn, N, P and pH on the growth of seedlings and established plants.
- H. A. I. Madgwick. The weights and nutrient compositions of understorey species in an ashwood.
- H. C. Duthie. A study of the distribution and periodicity of some algae in a bog pool.
- H. C. Duthie. Some observations on the algae of Llyn Ogwen, North Wales.
- S. B. Chapman. The ecology of Coom Rigg Moss, Northumberland. III. Some water relations of the bog system.
- R. Gittins. Multivariate approaches to a limestone grassland community. I. A stand ordination.
- R. Gittins. Multivariate approaches to a limestone grassland community. II. A direct species ordination.
- R. Gittins. Multivariate approaches to a limestone grassland community. III. A comparative study of ordination and association-analysis.
- D. T. Clarkson. Calcium uptake by calcicole and calcifuge species in the genus *Agrostis* L.
- R. B. Ivimey-Cook. The vegetation of solution cups in the limestone of the Burren, Co. Clare.
- J. K. Marshall. *Corynephorus canescens* (L.) P. Beauv. as a model for the *Ammophila* problem.
- P. Greig-Smith and M. J. Chadwick. Data on pattern within plant communities. III. *Acacia-Capparis* semi-desert scrub in the Sudan.
- R. T. Coupland and R. E. Johnson. Rooting characteristics of native grassland species in Saskatchewan.
- J. H. Tallis. Studies on Southern Pennine peats. IV. Evidence of recent erosion.
- D. J. Anderson. Classification and ordination in vegetation science: controversy over a non-existent problem?
- BIOLOGICAL FLORA OF THE BRITISH ISLES  
P. Bannister. *Erica cinerea* L.

*The Subscription price per volume of 3 parts is 130s. net, single parts 50s. net*

**BLACKWELL SCIENTIFIC PUBLICATIONS LTD.**

24-25 BROAD STREET · OXFORD

# THE JOURNAL OF ANIMAL ECOLOGY

VOL. 34, No. 3

EDITORS: O. W. RICHARDS and J. B. CRAGG

OCTOBER 1965

- C. B. Kensler and D. J. Crisp. The colonization of artificial crevices by marine invertebrates.
- I. H. J. Lyster. The salinity tolerance of polychaete larvae.
- A. Milne, R. Laughlin and R. E. Coggins. The 1955 and 1959 population crashes in the leatherjacket, *Tipula paludosa* Meigen, in Northumberland.
- M. V. Brian, J. Hibble and D. J. Stradling. Ant pattern and density in a southern English heath.
- W. A. Sands. Termite distribution in man-modified habitats in West Africa, with special reference to species segregation in the genus *Trinervitermes* (Isoptera, Termitidae, Nasutitermitinae).
- J. M. Nelson. A seasonal study of aerial insects close to a moorland stream.
- T. R. E. Southwood and J. W. Siddon. The temperature beneath insect emergence traps of various types.
- R. Hewson. Population changes in the mountain hare, *Lepus timidus* L.
- C. M. Perrins. Population fluctuations and clutch-size in the great tit, *Parus major* L.
- H. N. Southern, R. Carrick and W. G. Potter. The natural history of a population of guillemots (*Uria aalge* Pont.).
- Ll. D. Gruffydd. The population biology of *Chaetogaster limnaei limnaei* and *Chaetogaster limnaei vaghini* (Oligochaeta).
- T. T. Macan. Predation as a factor in the ecology of water bugs.
- Kitty Paviour-Smith. Some factors affecting numbers of the fungus beetle *Tetratoma fungorum* F.
- D. Welch. A change in the upper altitudinal limit of *Coleophora alticolella* Zell. (Lep.).
- Efed Morgan. The activity rhythm of the amphipod *Corophium volutator* (Pallas) and its possible relationship to changes in hydrostatic pressure associated with the tides.
- Reviews: Abstracts.

*Subscription price 126s. per volume of three parts (single parts 50s. each)*

**BLACKWELL SCIENTIFIC PUBLICATIONS LTD.**

24-25 BROAD STREET · OXFORD

# PROCEEDINGS OF THE MALACOLOGICAL SOCIETY OF LONDON

Vol. 36, Part 5, August 1965

£1 5s. net, or \$4

## CONTENTS

- W. J. Rees.** The aerial dispersal of Mollusca (Presidential address).  
**A. D. Berrie.** On the life cycle of *Lymnaea stagnalis* (L.) in the West of Scotland.  
**M. R. Warburg.** On the water economy of some Australian land-snails.  
**Kenneth R. H. Read.** *Littorina littorea* L. without shell.  
**J. E. Fitch.** A relatively unexploited population of Pismo clams, *Tivela stultorum* (Mawe, 1823) (Veneridae).  
**Anne Hurst.** The feeding habits of *Nassarius vibex* (Say).  
**M. R. Clarke.** Large light organs on the dorsal surfaces of the squids *Ommastrephes peropus*, '*Symplectoteuthis oualaniensis*' and '*Dosidicus gigas*'.

Annual subscription (three parts) 60s. (\$10) post free.

BLACKWELL SCIENTIFIC PUBLICATIONS LTD.

24-25 Broad St., Oxford

# THE QUARTERLY JOURNAL OF MICROSCOPICAL SCIENCE

JOINT EDITORS:

A. V. GRIMSTONE, M.A., PH.D.

H. G. CALLAN, D.Sc.

After full discussion with the Board of Directors of the Company of Biologists it has been decided to make a gradual change in the scope of this Journal. It is the Editors' intention to transform the Quarterly Journal of Microscopical Science into a journal of cytology and of the study of organic fine structure. The subject-matter of the journal will continue to be varied, since we interpret the word cytology in the widest sense.

Subscription Price per Volume of 4 Parts £4. 4s.

Single Parts 30s. net (postage extra)

OXFORD UNIVERSITY PRESS

Amen House, Warwick Square, London, E.C. 4

# THE JOURNAL OF EXPERIMENTAL BIOLOGY

Edited by SIR VINCENT WIGGLESWORTH and J. A. RAMSAY

Vol. 43, No. 1

30s. net

August 1965

- COURTNEY, W. A. M. and NEWELL, R. C. Ciliary activity and oxygen uptake in *Branchiostoma lanceolatum* (Pallas).
- TREHERNE, J. E. and SMITH, D. S. The penetration of acetylcholine into the central nervous tissues of an insect (*Periplaneta americana* L.).
- LITTLE, C. Osmotic and ionic regulation in the prosobranch gastropod mollusc, *Viviparus viviparus* Linn.
- LITTLE, C. The formation of urine by the prosobranch gastropod mollusc *Viviparus viviparus* Linn.
- MAYNARD, D. M. and COHEN, M. J. The function of a heteromorph antennule in a spiny lobster, *Panulirus argus*.
- MAYNARD, D. M. The occurrence and functional characteristics of heteromorph antennules in an experimental population of spiny lobsters, *Panulirus argus*.
- HARRIS, A. J. Eye movements of the dogfish *Squalus acanthias* L.
- ALEXANDER, R. MCN. The lift produced by the heterocercal tails of Selachii.
- EWING, A. and HOYLE, G. Neuronal mechanisms underlying control of sound production in a cricket: *Acheta domesticus*.
- BROKAW, C. J. Non-sinusoidal bending waves of sperm flagella.
- SMITH, L. S. and DAVIS, J. C. Haemodynamics in *Tresus nuttallii* and certain other bivalves.
- CATE, J. TEN. Automatic activity of the locomotor centres of the lumbar cord in lizards.
- PARRY, D. A. The signal generated by an insect in a spider's web.

Subscription, 60s. per volume of 3 parts, 2 volumes a year. Single parts 30s. net

Orders may be placed through your bookseller or direct with the

Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1

FULL PARTICULARS OF THE

## JOURNALS

PUBLISHED BY THE

CAMBRIDGE UNIVERSITY PRESS

MAY BE HAD FROM

THE MANAGER, CAMBRIDGE UNIVERSITY PRESS

BENTLEY HOUSE, 200 EUSTON ROAD

LONDON, N.W. 1