

New Series.—Vol. XV., No. 1—issued February, 1928.

[Price Twelve Shillings and Sixpence, net.]

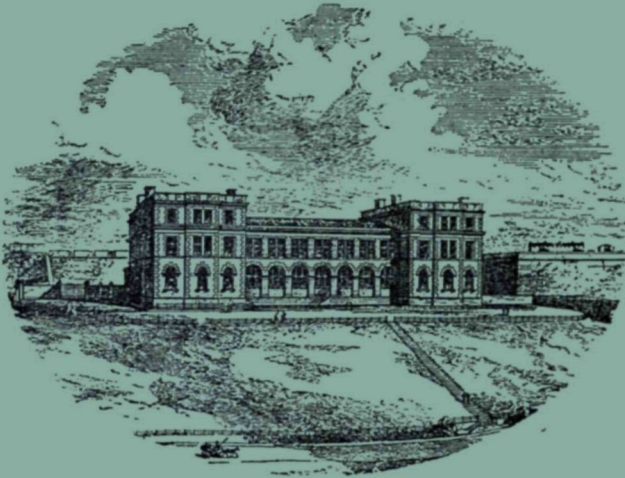
Journal

OF THE

MARINE BIOLOGICAL ASSOCIATION

OF

THE UNITED KINGDOM.



THE PLYMOUTH LABORATORY.

PLYMOUTH:

PRINTED FOR THE MARINE BIOLOGICAL ASSOCIATION AT THE MAYFLOWER PRESS
BY W. BRENDON & SON, LTD.,

AND

PUBLISHED BY THE ASSOCIATION AT ITS OFFICES ON THE CITADEL HILL.

SENT FREE BY POST TO ALL MEMBERS OF THE MARINE BIOLOGICAL ASSOCIATION:
ANNUAL SUBSCRIPTION FOR MEMBERSHIP, ONE GUINEA.

AGENTS IN LONDON: MESSRS. DULAU & CO., LTD., 32, OLD BOND STREET, PICCADILLY, W. 1.

PATRON.
HIS MAJESTY THE KING.

OFFICERS AND COUNCIL.

President.

Sir E. RAY LANKESTER, K.C.B., LL.D., F.R.S.

Vice-Presidents.

The Duke of BEDFORD, K.G.
The Earl of STRADBROKE, K.C.M.G.,
C.B., C.V.O.
The Earl of BALFOUR, K.G., F.R.S.
Viscount ASTOR.
Lord MONTAGU OF BEAULIEU.
Lord St. LEVAN, C.B., C.V.O.
The Right Hon. Sir ARTHUR GRIFFITH
BOSCAWEN.

The Right Hon. Sir AUSTEN CHAMBER-
LAIN, K.G., M.P.
Sir W. B. HARDY, F.R.S.
The Right Hon. Sir ARTHUR STEEL-
MAITLAND, Bart., M.P.
GEORGE EVANS, Esq.
Sir NICHOLAS WATERHOUSE, K.B.E.
Prof. W. C. McINTOSH, F.R.S.
G. A. BOULENGER, Esq., F.R.S.
J. O. BORLEY, Esq., O.B.E.

COUNCIL.

Elected Members.

Col. Sir HENRY F. BOWLES, Bart.
W. T. CALMAN, Esq., D.Sc., F.R.S.
Prof. H. GRAHAM CANNON, D.Sc.
A. H. CHURCH, Esq., D.Sc., F.R.S.
H. H. DALE, Esq., C.B.E., M.D.,
F.R.S.
Prof. J. C. DRUMMOND, D.Sc.
Prof. W. GARSTANG, D.Sc.

Prof. E. S. GOODRICH, F.R.S.
Prof. S. J. HICKSON, D.Sc., F.R.S.
Prof. A. V. HILL, Sc.D., F.R.S.
C. TATE REGAN, Esq., F.R.S.
E. S. RUSSELL, Esq., D.Sc.
J. M. TABOR, Esq.
Prof. W. M. TATTERSALL.
Prof. D. M. S. WATSON, F.R.S.

Governors.

G. P. BIDDER, Esq., Sc.D.
E. T. BROWNE, Esq.
GEORGE EVANS, Esq.
H. G. MAURICE, Esq., C.B. (Ministry
of Agriculture and Fisheries).
NIGEL O. WALKER, Esq. (Prime
Warden of the Fishmongers'
Company).
W. T. BRAND, Esq. (Fishmongers'
Company).
LOTHIAN D. NICHOLSON, Esq. (Fish-
mongers' Company).

Prof. G. C. BOURNE, D.Sc., F.R.S.
(Oxford University).
J. GRAY, Esq. (Cambridge Univer-
sity).
P. CHALMERS MITCHELL, Esq., C.B.E.,
D.Sc., F.R.S. (British Association).
Prof. E. W. MACBRIDE, D.Sc., F.R.S.
(Zoological Society).
Sir SIDNEY HARMER, K.B.E., F.R.S.
(Royal Society).

Chairman of Council.

Prof. E. W. MACBRIDE, D.Sc., F.R.S.

Hon. Treasurer.

GEORGE EVANS, Esq., 1 Wood Street, London, E.C.2

Secretary.

E. J. ALLEN, Esq., D.Sc., F.R.S., The Laboratory, Citadel Hill, Plymouth.

SCIENTIFIC STAFF.

Director: E. J. ALLEN, Esq., D.Sc., F.R.S.

Head of Department of General Physiology: W. R. G. ATKINS, Esq., Sc.D., F.I.C., F.R.S.

Chief Naturalist: J. H. ORTON, Esq., D.Sc.

Naturalists.

E. FORD, Esq., A.R.C.Sc.
Miss M. V. LÉBOUR, D.Sc.

Physiologist.

C. F. A. PANTIN, Esq., M.A.
Director's Research Assistant.
Mrs. E. W. SEXTON, F.L.S.

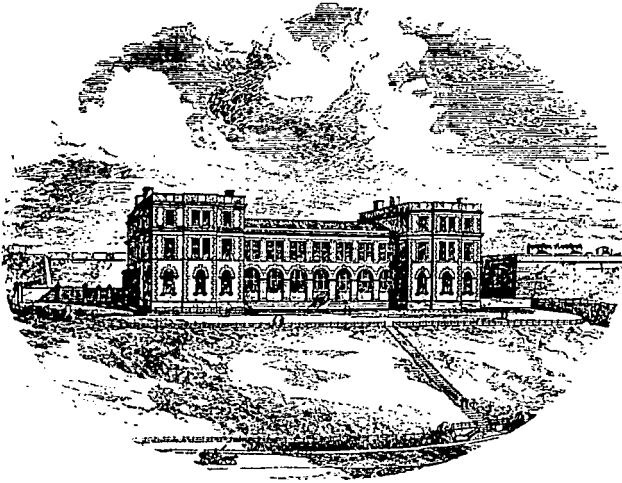
*Hydrographical and Administrative
Assistant.*

H. W. HARVEY, Esq., M.A.

Assistant Naturalist.

F. S. RUSSELL, Esq., D.Sc., D.F.C., B.A.

Journal
OF THE
MARINE BIOLOGICAL ASSOCIATION
OF
THE UNITED KINGDOM.



VOLUME XV (N.S.).
1928.

PLYMOUTH:
PUBLISHED BY THE ASSOCIATION.

The Council of the Marine Biological Association wish it to be understood that they do not accept responsibility for the accuracy of statements published in this Journal, excepting when those statements are contained in an official report of the Council.

CONTENTS OF VOLUME XV.

(NEW SERIES.)

	PAGE
<hr/>	
Report of the Council—	
1927	713
Balance Sheet—	
1927-8	726
List of Annual Subscriptions paid during the Year :	
1st April, 1927 to 31st March, 1928	728
List of Donations to the Building Extension Fund	731
List of Publications Recording the Results of Researches carried out under the Auspices of the Marine Biological Association of the United Kingdom in their Laboratory at Plymouth or on the North Sea Coast from 1886-1927	753
<hr/>	
ALLEN, E. J., AND HARVEY, H. W.	
The Laboratory of the Marine Biological Association at Plymouth	735
AMIRTHALINGAM, C.	
On Lunar Periodicity in Reproduction of <i>Pecten opercularis</i> near Plymouth in 1927-28	605
ATKINS, W. R. G.	
Seasonal Variations in the Phosphate and Silicate Content of Sea Water during 1926 and 1927 in relation to the Phytoplankton Crop	191
The Preservation of Fishing Nets by Treatment with Copper Soaps and other Substances	219
<i>See also</i> POOLE, H. H.	
BERRILL, N. J.	
Regeneration in the Polychæt <i>Chaetopterus variopedatus</i>	151
The Identification and Validity of Certain Species of Ascidiæ	159
The Ascidian Fauna of the Plymouth Area	177
BRUCE, J. R.	
Physical Factors on the Sandy Beach. Part I. Tidal, Climatic, and Edaphic	535
Physical Factors on the Sandy Beach. Part II. Chemical Changes—Carbon Dioxide Concentration and Sulphides	553
BULL, H. O.	
The Relationship between State of Maturity and Chemical Composition of the Whiting, <i>Gadus merlangus</i> L.	207
Studies on Conditioned Responses in Fishes. Part I.	485
CARLGRÉN, O., AND STEPHENSON, T. A.	
The British Edwardsiæ	1

CONTENTS OF VOLUME XV.

FORD, E.	PAGE
Herring Investigations at Plymouth. I. Methods of Collection and Treatment of Data	237
Herring Investigations at Plymouth. II. The Average Number of Vertebrae for Herrings from the English Channel and South-East Coast of Ireland	267
Herring Investigations at Plymouth. III. The Plymouth Winter Fishery during the Seasons 1924-25, 1925-26, and 1926-27	279
Herring Investigations at Plymouth. IV. The growth of Young Herrings in the Neighbourhood of Plymouth	305
FROST, W. E.	
The Nauplius Larva of <i>Anelasma squalicola</i> (Lovén)	125
HARVEY, H. W.	
Nitrate in the Sea. II.	183
<i>See also</i> ALLEN, E. J.	
KUNKEL, B. W., AND ROBERTSON, J. A.	
Contributions to the Study of Relative Growth in <i>Gammarus chevreuxi</i>	655
LEBOUR, M. V.	
Studies of the Plymouth Brachyura. II. The Larval Stages of <i>Ebalia</i> and <i>Pinnotheres</i>	109
MACDONALD, R.	
The Life-History of <i>Thysanoessa raschii</i>	57
MARSHALL, S. M., AND ORR, A. P.	
The Photosynthesis of Diatom Cultures in the Sea	321
ORTON, J. H.	
On Rhythmic Periods in Shell-Growth in <i>O. edulis</i> , with a Note on Fattening	365
Observations on <i>Patella vulgata</i> . Part I. Sex-Phenomena, Breeding and Shell-Growth	851
Observations on <i>Patella vulgata</i> . Part II. Rate of Growth of Shell	863
POOLE, H. H., AND ATKINS, W. R. G.	
Further Photo-Electric Measurements of the Penetration of Light into Sea-Water	455
RUSSELL, F. S.	
The Vertical Distribution of Marine Macroplankton, VI. Further Observations on Diurnal Changes	81
A Net for Catching Plankton near the Bottom	105
The Vertical Distribution of Marine Macroplankton. VII. Observations on the Behaviour of <i>Calanus finmarchicus</i>	429
The Vertical Distribution of Marine Macroplankton. VIII. Further Observations on the Diurnal Behaviour of the Pelagic Young of Teleostean Fishes in the Plymouth Area	829
SEXTON, E. W.	
On the Rearing and Breeding of <i>Gammarus</i> in Laboratory Conditions	33
STEPHEN, A. C.	
Notes on the Biology of <i>Tellina tenuis</i> da Costa	683
WILSON, D. P.	
The Post-Larval Development of <i>Loimia medusa</i> Sav.	129
The Larvæ of <i>Polydora ciliata</i> Johnston and <i>Polydora hoplura</i> Claparède	567

CONTENTS OF VOLUME XV.

	PAGE
YONGE, C. M.	
The Absorption of Glucose by <i>Ostrea edulis</i>	643
ABSTRACTS OF MEMOIRS RECORDING WORK DONE AT THE PLYMOUTH LABORATORY.	
Structure of Pearls. By C. Amirthalingam	703
The Soluble Silicate Content of Soils. By W. R. G. Atkins	703
The Control of the Beat of the Fan Segments in <i>Chelopterus variopedatus</i> . By N. J. Berrill	704
Echinochrome. By R. K. Cannan	704
On the Feeding Mechanism of <i>Nebalia bipes</i> . By H. Graham Cannon	704
On the Feeding Mechanism of a Mysid Crustacean, <i>Hemimysis lamornei</i> . By H. Graham Cannon and S. M. Manton	705
Myothermic Observations on the Dogfish. By A. V. Hill	706
Fatigue, Retention of Action Current and Recovery in Crustacean Nerve. By A. Levin	706
The Viscous-Elastic Properties of Muscle. By A. Levin and J. Wyman	707
A Study of the Fertilisation Membrane in the Echinoderms. By A. D. Hobson	708
Contribution to the Study of <i>Gromia oviformis</i> Dujardin. By M. W. Jepps	708
A Note on Hæmerythrin. By G. F. Marrian	709
The Vertical Distribution of Plankton in the Sea. By F. S. Russell	710
New Mutations in <i>Gammarus chevreuxi</i> Sexton. By E. W. Sexton and A. R. Clark	710
Inheritance in <i>Gammarus chevreuxi</i> Sexton. By E. W. Sexton and C. F. A. Pantin	711
A Revised Classification of the Tetracyllidean Cestoda, with Descriptions of some Phyllobothriidæ from Plymouth. By W. N. F. Woodland	711
On <i>Dinobothrium septaria</i> van Beneden 1889, and <i>Parabothrium bulbiferum</i> Nybelin, 1922. By W. N. F. Woodland	712
Formation of Calcareous Tubes round the Siphons of Teredo. By C. M. Yonge	712
The Absence of a Cellulase in Limnoria. By C. M. Yonge	712
Obituary—	
ARTHUR EVERETT SHIPLEY	361
WALTER CAMPBELL DE MORGAN	362