

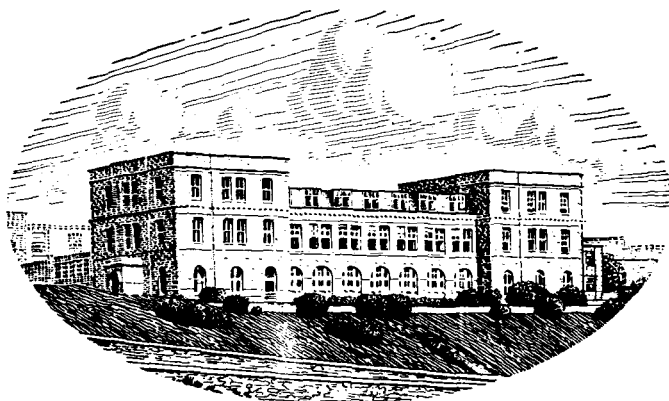
**JOURNAL OF THE
MARINE BIOLOGICAL ASSOCIATION
OF THE UNITED KINGDOM**

Published by the Press Syndicate of the University of Cambridge
The Pitt Building, Trumpington Street, Cambridge CB2 1RP
32 East 57th Street, New York, NY 10022, USA

© Copyright Marine Biological Association of the U.K.

Printed in Great Britain at the
University Press, Cambridge

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



THE PLYMOUTH LABORATORY

VOLUME 59

1980

**CAMBRIDGE UNIVERSITY PRESS
CAMBRIDGE
LONDON NEW YORK NEW ROCHELLE
MELBOURNE SYDNEY**

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 59

Number 1, pp. 1–257, 28 February 1979
 Number 2, pp. 259–533, 28 June 1979
 Number 3, pp. 535–809, 12 September 1979
 Number 4, pp. 811–1079, 30 November 1979

	PAGE
Report of the Council for 1978–79	1033
Income and Expenditure Account and Balance Sheet	1075
ANDERSON, M. R., SPINDLER, M., BÉ, A. W. H. and HEMLEBEN, Ch.	
Trophic activity of planktonic foraminifera	791
BAKKE, T., <i>see</i> SOUTHWARD <i>et al.</i>	133
BARNETT, B. E.	
A laboratory study of predation by the dog-whelk <i>Nucella lapillus</i> on the barnacles <i>Elminius modestus</i> and <i>Balanus balanoides</i>	299
BARNETT, B. E. and CRISP, D. J.	
Laboratory studies of gregarious settlement in <i>Balanus balanoides</i> and <i>Elminius modestus</i> in relation to competition between these species	581
BARNETT, B. E., EDWARDS, S. C. and CRISP, D. J.	
A field study of settlement behaviour in <i>Balanus balanoides</i> and <i>Elminius modestus</i> (Cirripedia: Crustacea) in relation to competition between them	575
BÉ, A. W. H., <i>see</i> ANDERSON <i>et al.</i>	791
BELL, M. V., KELLY, K. F. and SARGENT, J. R.	
Sodium orthovanadate, a powerful vasoconstrictor in the gills of the common eel, <i>Anguilla anguilla</i>	429
<i>See also</i> KELLY <i>et al.</i>	859
BINYON, J.	
<i>Branchiostoma lanceolatum</i> – a freshwater reject?	61
BLAKE, R. W.	
The swimming of the mandarin fish <i>Synchropus picturatus</i> (Callionyiidae: Teleostei)	421
BLAXTER, J. H. S., DENTON, E. J. and GRAY, J. A. B.	
The herring swimbladder as a gas reservoir for the acoustico-lateralis system	1
<i>See also</i> DENTON, GRAY and BLAXTER	27
BONE, Q., GORSKI, G. and PULSFORD, A. L.	
On the structure and behaviour of <i>Fritillaria</i> (Tunicata: Larvacea)	399
BONE, Q. and RYAN, K. P.	
The Langerhans receptor of <i>Oikopleura</i> (Tunicata: Larvacea)	69
BONNETT, R., HEAD, E. J. and HERRING, P. J.	
Porphyrin pigments of some deep-sea medusae	565
BRATTEGARD, T., <i>see</i> SOUTHWARD <i>et al.</i>	133

	PAGE
BRYAN, G. W. and GIBBS, P. E.	
Zinc—a major inorganic component of nereid polychaete jaws	969
BUDIMAN, A., <i>see</i> GRUFFYDD, BUDIMAN and NOTT	597
BURNHAM, R. J. P., <i>see</i> COLLIER, BURNHAM and HERRING	489
BUTLER, E. I., KNOX, S and LIDDICOAT, M. I.	
The relationship between inorganic and organic nutrients in sea water	239
CAIN, R. B., <i>see</i> WALTERS <i>et al.</i>	553
CANDIA CARNEVALI, M. D. and FERRAGUTI, M.	
Structure and ultrastructure of muscles in the priapulid <i>Halicryptus spinulosus</i> : functional and phylogenetic remarks	737
CARTER, M. A. and THORP, C. H.	
The reproduction of <i>Actinia equina</i> L. var. <i>mesembryanthemum</i>	989
CAWTHORNE, D. F.	
A comparative study of the closure responses of some cirripede species exposed to falling seawater concentrations	811
CHRETIENNOT-DINET, M.-J., <i>see</i> HIBBERD and CHRETIENNOT-DINET	179
CLARKE, M. R., DENTON, E. J. and GILPIN-BROWN, J. B.	
On the use of ammonium for buoyancy in squids	259
COLLIER, A. F., BURNHAM, R. J. P. and HERRING, P. J.	
A system for the collection of comparative emission spectra suitable for shipboard use	489
CORBIN, P. G.	
The seasonal abundance of four species of Stauromedusae (Coelenterata: Scyphomedusae) at Plymouth	385
CORNER, E. D. S.	
<i>See</i> O'HARA, GASKELL and CORNER	331
<i>See</i> WALTERS <i>et al.</i>	553
CRISP, D. J.	
<i>See</i> BARNETT and CRISP	581
<i>See</i> BARNETT, EDWARDS and CRISP	575
<i>See</i> DANDO, SOUTHWARD and CRISP	307
CRUMP, R. G., <i>see</i> EMSON and CRUMP	77
DANDO, P. R., SOUTHWARD, A. J. and CRISP, D. J.	
Enzyme variation in <i>Chthamalus stellatus</i> and <i>Chthamalus montagui</i> (Crustacea: Cirripedia): evidence for the presence of <i>C. montagui</i> in the Adriatic	307
DAVENPORT, J.	
The isolation response of mussels (<i>Mytilus edulis</i> L.) exposed to falling sea-water concentrations	123
DAVENPORT, J., VAHL, O. and LÖNNING, S.	
Cold resistance in the eggs of the capelin <i>Mallotus villosus</i>	443

DAVIES, A. G. and SLEEP, J. A. Inhibition of carbon fixation as a function of zinc uptake in natural phytoplankton assemblages	937
DENTON, E. J., GRAY, J. A. B. and BLAXTER, J. H. S. The mechanics of the clupeid acoustico-lateralis system: frequency responses	27
See also BLAXTER, DENTON and GRAY	1
See also CLARKE, DENTON and GILPIN-BROWN	259
DIGBY, P. S. B. Reducing activity and the formation of base in the coralline algae: an electrochemical model	455
DUNCAN, J. A. R., see GORDON and DUNCAN	413
EDWARDS, P., see SEELIGER and EDWARDS	227
EDWARDS, S. C., see BARNETT, EDWARDS and CRISP	575
EMSON, R. H. and CRUMP, R. G. Description of a new species of <i>Asterina</i> (Asteroidea), with an account of its ecology	77
FEBVRE-CHEVALIER, C., see FEBVRE and FEBVRE-CHEVALIER	215
FEBVRE, J. and FEBVRE-CHEVALIER, C. Ultrastructural study of zooxanthellae of three species of Acantharia (Protozoa: Actinopoda), with details of their taxonomic position in the Prymnesiales (Prymnesiophyceae, Hibberd, 1976)	215
FEIGENBAUM, D. Predation on chaetognaths by typhloscolecid polychaetes: one explanation for headless specimens.	631
FERRAGUTI, M., see CANDIA CARNEVALI and FERRAGUTI	737
FINDLAY, I., see McVEAN and FINDLAY	341
FISH, J. D. and MILLS, A. The reproductive biology of <i>Corophium volutator</i> and <i>C. arenarium</i> (Crustacea: Amphipoda)	355
FORD, M. P., see RAINBOW, FORD and HEPPLEWHITE	591
GAGE, J. D. Mode of life and behaviour of <i>Montacuta phascolionis</i> , a bivalve commensal with the sipunculid <i>Phascolion strombi</i>	635
GALLENI, L. and PUCCINELLI, I. The karyology of the genus <i>Procerodes</i> (Tricladida: Maricola) in British waters	961
GARBARY, D. Patterns of cell elongation in some <i>Audouinella</i> spp. (Acrochaetiaceae: Rhodophyta)	951
GASHOUT, S. E. and ORMOND, R. F. G. Evidence for parthenogenetic reproduction in the sea anemone <i>Actinia equina</i> L.	975
GASKELL, S. J., see O'HARA, GASKELL and CORNER	331

	PAGE
GEORGE, S. G., <i>see</i> PIRIE and GEORGE	819
GIBBS, P. E., <i>see</i> BRYAN and GIBBS	969
GILPIN-BROWN, J. B., <i>see</i> CLARKE, DENTON and GILPIN-BROWN	259
GORDON, J. D. M. and DUNCAN, J. A. R. Some notes on the biology of the snake blenny, <i>Lumpenus lampretæformis</i> on the west coast of Scotland	413
GORSKI, G., <i>see</i> BONE, GORSKI and PULSFORD	399
GRAHAME, J., <i>see</i> HICKS and GRAHAME	321
GRAY, J. A. B. and DENTON, E. J. The mechanics of the clupeid acoustico-lateralis system: low frequency measurements	11
<i>See also</i> BLAXTER, DENTON and GRAY	1
<i>See also</i> DENTON, GRAY and BLAXTER	27
GRIFFITHS, D. K., <i>see</i> PINGREE and GRIFFITHS	497
GRUFFYDD, L.I.D., BUDIMAN, A. and NOTT, J. A. The ultrastructure of the byssus and the byssus glands in <i>Chlamys varia</i> L. (Lamelli- branchia)	597
<i>See also</i> THORBURN and GRUFFYDD	1003
HEAD, E. J., <i>see</i> BONNETT, HEAD and HERRING	565
HEMLEBEN, Ch., <i>see</i> ANDERSON <i>et al.</i>	791
HEPPLEWHITE, I., <i>see</i> RAINBOW, FORD and HEPPLEWHITE	591
HERRING, P. J. <i>See</i> BONNETT, HEAD and HERRING	565
<i>See</i> COLLIER, BURNHAM and HERRING	489
HIBBERD, D. J. and CHRETIENNOT-DINET, M.-J. The ultrastructure and taxonomy of <i>Rhizochromulina marina</i> gen. et sp. nov., an amoeboid marine chrysophyte	179
HICKS, G. R. F. and GRAHAME, J. Mucus production and its role in the feeding behaviour of <i>Diarthrodes nobilis</i> (Copepoda: Harpacticoida)	321
HIDU, H., <i>see</i> LUTZ and HIDU	111
HIGGINS, I. J., <i>see</i> WALTERS <i>et al.</i>	553
HOPKIN, S. P. and NOTT, J. A. Some observations on concentrically structured, intracellular granules in the hepatopan- creas of the shore crab <i>Carcinus maenas</i> (L.)	867
HUGHES, R. G. The dispersal and dispersion of some epizoites of the hydroid <i>Nemertesia antennina</i> (L.)	879
ICELY, J. D. and NOTT, J. A. The general morphology and fine structure of the antennary gland of <i>Corophium volutator</i> (Amphipoda: Crustacea)	745

	PAGE
JACCARINI, V. and SCHEMBRI, P. J.	
The proboscis ciliation of the echiuran <i>Bonellia viridis</i>	377
JAMES, J. L., <i>see</i> JONES, JONES and JAMES	373
JONES, A. M.	
Structure and Growth of a high-level population of <i>Cerastoderma edule</i> (Lamellibranchiata)	277
JONES, A. M., JONES, Y. M. and JAMES, J. L.	
The incidence of the nemertine <i>Malacobdella grossa</i> in the bivalve <i>Cerastoderma edule</i> in Shetland	373
JONES, Y. M., <i>see</i> JONES, JONES and JAMES	373
KELLEY, D.	
Bass population and movements on the west coast of the U.K.	889
KELLY, K. F., PIRIE, B. J. S., BELL, M. V. and SARGENT, J. R.	
A light microscopic study of the action of sodium orthovanadate on the gills of fresh-water and sea-water eels (<i>Anguilla anguilla</i> L.)	859
<i>See also</i> BELL, KELLY and SARGENT	429
KENT, R. M. L.	
The influence of heavy infestations of <i>Polydora ciliata</i> on the flesh content of <i>Mytilus edulis</i>	289
KNOX, S., <i>see</i> BUTLER, KNOX and LIDDICOAT	239
LIDDICOAT, M. I., <i>see</i> BUTLER, KNOX and LIDDICOAT	239
LOEBLICH, A. R., III and SHERLEY, J. L.	
Observations on the theca of the motile phase of free-living and symbiotic isolates of <i>Zooxanthella microadriatica</i> (Freudenthal) comb. nov.	195
<i>See also</i> SCHMIDT and LOEBLICH	479
LÖNNING, S., <i>see</i> DAVENPORT, VAHL and LÖNNING	443
LOWE, D. M. and MOORE, M. N.	
The cytochemical distributions of zinc (Zn II) and iron (Fe III) in the common mussel, <i>Mytilus edulis</i> , and their relationship with lysosomes	851
LUTZ, R. A. and HIDU, H.	
Hinge morphogenesis in the shells of larval and early post-larval mussels (<i>Mytilus edulis</i> L. and <i>Modiolus modiolus</i> (L.))	111
MCVEAN, A. and FINDLAY, I.	
The incidence of autotomy in an estuarine population of the crab <i>Carcinus maenas</i>	341
MADDOCK, L., <i>see</i> PINGREE and MADDOCK	699
MANN, R.	
Some biochemical and physiological aspects of growth and gametogenesis in <i>Crassostrea gigas</i> and <i>Ostrea edulis</i> grown at sustained elevated temperatures	95
MANTON, I. and OATES, K.	
Further observations on choanoflagellates in the genus <i>Calliakantha</i> Leadbeater, with special reference to <i>C. multispina</i> sp. nov. from South Africa and Britain	207

	PAGE
MANUEL, R. L.	
Some new records of Anthozoa from British waters	393
MILLS, A., <i>see</i> FISH and MILLS	355
MILNER, N. J.	
Zinc concentrations in juvenile flatfish	761
MOORE, C. G.	
The zonation of psammolittoral harpacticoid copepods around the Isle of Man	711
The identification of faunal gradients and associations of meiobenthic copepods by multivariate analyses.	725
Analysis of the associations of meiobenthic Copepoda of the Irish Sea	831
MOORE, M. N., <i>see</i> LOWE and MOORE	851
NOTT, J. A.	
<i>See</i> GRUFFYDD, BUDIMAN and NOTT	597
<i>See</i> HOPKIN and NOTT	867
<i>See</i> ICELY and NOTT	745
OATES, K., <i>see</i> MANTON and OATES	207
O'HARA, S. C. M., GASKELL, S. J. and CORNER, E. D. S.	
On the nutrition and metabolism of zooplankton. XIII. Further studies of steroids in <i>Calanus</i>	331
ORMOND, R. F. G., <i>see</i> GASHOUT and ORMOND	975
OTTAWAY, E. M. and SIMKISS, K.	
A comparison of traditional and novel ways of estimating growth rates from scales of natural populations of young bass (<i>Dicentrarchus labrax</i>)	49
PINGREE, R. D.	
Baroclinic eddies bordering the Celtic Sea in late summer	689
PINGREE, R. D. and GRIFFITHS, D. K.	
Sand transport paths around the British Isles resulting from M_2 and M_4 tidal interactions	497
PINGREE, R. D. and MADDOCK, L.	
Tidal flow around an island with a regularly sloping bottom topography.	699
PIRIE, B. J. S. and GEORGE, S. G.	
Ultrastructure of the heart and excretory system of <i>Mytilus edulis</i> (L.)	819
<i>See also</i> Kelly <i>et al.</i>	859
POMPONI, S. A.	
Ultrastructure of cells associated with excavation of calcium carbonate substrates by boring sponges	777
Cytochemical studies of acid phosphatase in etching cells of boring sponges	785
PUCCINELLI, I., <i>see</i> GALLENi and PUCCINELLI	961
PULSFORD, A. L., <i>see</i> BONE, GORSKI and PULSFORD	399
RAINBOW, P. S., FORD, M. P. and HEPPLERWHITE, I.	
Absence of gregarious settling behaviour by female cypris larvae of British parasitic rhizocephalan barnacles	591

	PAGE
RIGLER, F. H.	
The export of phosphorus from Dartmoor catchments: a model to explain variations of phosphorus concentrations in streamwater	659
ROSS, D. M.	
A behaviour pattern in <i>Pagurus bernhardus</i> L. towards its symbiotic actinian <i>Calliactis parasitica</i> (Couch)	623
ROSS, L. G.	
The permeability to oxygen and the guanine content of the swimbladder of a physoclist fish, <i>Pollachius virens</i>	437
RYAN, K. P., <i>see</i> BONE and RYAN	69
SARGENT, J. R.	
<i>See</i> BELL, KELLY and SARGENT	429
<i>See</i> KELLY <i>et al.</i>	859
SCHEMBRI, P. J., <i>see</i> JACCARINI and SCHEMBRI	377
SCHMIDT, R. J. and LOEBLICH, A. R., III	
Distribution of paralytic shellfish poison among Pyrrhophyta	479
SCHWEDER, T.	
Patterns of spermatophore distribution in <i>Euchaeta norvegica</i> : a further analysis	369
SEELIGER, U. and EDWARDS, P.	
Fate of biologically accumulated copper in growing and decomposing thalli of two benthic red marine algae	227
SHERLEY, J. L., <i>see</i> LOEBLICH and SHERLEY	195
SIMKISS, K., <i>see</i> OTTAWAY and SIMKISS	49
SLEEP, J. A., <i>see</i> DAVIES and SLEEP	937
SOUTHWARD, A. J., SOUTHWARD, E. C., BRATTEGARD, T. and BAKKE, T.	
Further experiments on the value of dissolved organic matter as food for <i>Siboglinum fiordicum</i> (Pogonophora)	133
<i>See also</i> DANDO, SOUTHWARD and CRISP	307
SOUTHWARD, E. C., <i>see</i> SOUTHWARD <i>et al.</i>	133
SPINDLER, M., <i>see</i> ANDERSON <i>et al.</i>	791
TAYLOR, A. C. and VENN, T. J.	
Seasonal variation in weight and biochemical composition of the tissues of the queen scallop, <i>Chlamys opercularis</i> , from the Clyde Sea area	605
THORBURN, I. W. and GRUFFYDD, LI.D.	
Studies of the behaviour of the scallop <i>Chlamys opercularis</i> (L.) and its shell in flowing sea water	1003
THORP, C. H., <i>see</i> CARTER and THORP	989
TURNER, M. F.	
Nutrition of some marine microalgae with special reference to vitamin requirements and utilization of nitrogen and carbon sources	535

	PAGE
VAHL, O., <i>see</i> DAVENPORT, VAHL and LÖNNING	443
VENN, T. J., <i>see</i> TAYLOR and VENN	605
WALTERS, J. M., CAIN, R. B., HIGGINS, I. J. and CORNER, E. D. S. Cell-free benzo[a]pyrene hydroxylase activity in marine zooplankton	553
WARREN, L. M. <i>Mediomastus fragilis</i> Rasmussen (Polychaeta: Capitellidae), a species newly recorded from British waters	757
WILSON, J. B. The distribution of the coral <i>Lophelia pertusa</i> (L.) [<i>L. prolifera</i> (Pallas)] in the north-east Atlantic	149
'Patch' development of the deep-water coral <i>Lophelia pertusa</i> (L.) on Rockall Bank	165

SHORT NOTES

BOALCH, G. T. The dinoflagellate bloom on the coast of south west England, August–September 1978.	515
BONEY, A. D. Long-term observations on the intertidal lichen <i>Lichina pygmaea</i> Ag.	801
FORSTER, G. R. Mortality of the bottom fauna and fish in St Austell Bay and neighbouring areas	517
GRIFFITHS, A. B., DENNIS, R. and POTTS, G. W. Mortality associated with a phytoplankton bloom off Penzance in Mounts Bay	520
LE FÈVRE, J. On the hypothesis of a relationship between dinoflagellate blooms and the 'Amoco-Cadiz' oil spill	525
METTAM, C. A northern outpost of <i>Convoluta roscoffensis</i> in South Wales	251
WIDDOWS, J., MOORE, M. N., LOWE, D. M. and SALKELD, P. N. Some effects of a dinoflagellate bloom (<i>Gyrodinium aureolum</i>) on the mussel, <i>Mytilus</i> <i>edulis</i>	522
WRIGHT, W. G. and LINDBERG, D. R. A non-fatal method of sex determination for patellacean gastropods	803

ABSTRACTS OF MEMOIRS

RECORDING WORK AT THE PLYMOUTH LABORATORY

BONE, Q. and CHUBB, A. D., 1978. The histochemical demonstration of myofibrillar ATPase in elasmobranch muscle	805
BONE, Q., KICENIUK, J. and JONES, D. R., 1978. On the role of different fibre types in fish myotomes at intermediate swimming speeds	1027

	PAGE
BONE, Q. and MACKIE, G. O., 1977. Ciliary arrest potentials, locomotion and skin impulses in <i>Doliolum</i> (Tunicata: Thaliacea)	805
BONE, Q. and RYAN, K. P., 1978. Cupular sense organs in <i>Ciona</i> (Tunicata: Ascidiacea) .	805
BRIDGES, C. R., BICUDO, J. E. P. W. and LYKKEBOE, G., 1979. Oxygen content measurement in blood containing haemocyanin	805
BUTLER, E. I., 1979. Nutrient balance in the Western English Channel	1027
CARLSON, A. D., PICHON, Y. and TREHERNE, J. E., 1978. Effects of osmotic stress on the electrical activities of the giant axon of a marine osmoconformer, <i>Sabella penicillus</i> .	529
CLARKE, M. R., 1979. The head of the sperm whale	1027
COOPER, L. H. N., 1977. An hypothesis of a continuous ice dam between Greenland and Scotland during the Quaternary	253
CORNER, E. D. S., 1978. Pollution studies with marine plankton. Part I. Petroleum hydrocarbons and related compounds	1027
DAVIES, A. G., 1978. Pollution studies with marine plankton. Part II. Heavy metals .	1027
DAVIES, A. G., 1978. Uptake of micronutrients and toxic metals	805
DICKSON, A. G. and RILEY, J. P., 1979. The estimation of acid dissociation constants in sea-water media from potentiometric titrations with strong base. I. The ionic product of water - K_w	1028
DICKSON, A. G. and RILEY, J. P., 1979. The estimation of acid dissociation constants in sea-water media from potentiometric titrations with strong base. II. The dissociation of phosphoric acid	1028
FINDLAY, I. and McVEAN, A., 1977. The nervous control of limb autotomy in the hermit crab <i>Pagurus bernhardus</i> (L.) and the role of the cuticular stress detector, CSD_1 . . .	253
FLOOD, P. R., 1978. Filter characteristics of appendicularian food catching nets . . .	253
FRETTER, V. and MANLY, R., 1977. The settlement and early benthic life of <i>Littorina neritoides</i> (L.) at Wembury, S. Devon	253
GIBBS, P. E., 1978. Macrofauna of the intertidal sand flats on low wooded islands, northern Great Barrier Reef	806
GILBERT, S. H., 1978. Tension and heat production during isometric contractions and shortening in the anterior byssus retractor muscle of <i>Mytilus edulis</i>	529
HARRIS, R. P., 1977. Some aspects of the biology of the harpacticoid copepod, <i>Scottolana canadensis</i> (Willey), maintained in laboratory culture	254
HOLLIGAN, P. M., 1978. Patchiness in subsurface phytoplankton populations on the north-west European continental shelf	1028
HOLLIGAN, P. M., PINGREE, R. D., PUGH, P. R. and MARDELL, G. T., 1978. The hydrography and plankton of the eastern English Channel in March 1976	1029
HOLME, N. A. and PROBERT, P. K., 1978. Disposal of solid waste in the marine environment with particular reference to the china clay industry	254
KIMURA, J. E. and MEVES, H., 1979. The effect of temperature on the asymmetrical charge movement in squid giant axons	1029

	PAGE
MACKIE, G. O. and BONE, Q., 1978. Luminescence and associated effector activity in <i>Pyrosoma</i> (Tunicata: Pyrosomida)	529
MADDOCK, R. G. and NICOL, J. A. C., 1978. Studies on the eyes of <i>Hydrolagus</i> (Pisces: Chimaeridae)	806
MEVES, H., 1977. Activation, inactivation, and chemical blockage of the gating current in squid giant axons	1029
MEVES, H., 1978. Inactivation of the sodium permeability in squid giant nerve fibres	254
NICOL, J. A. C., 1978. Studies on the eye of the stingaree <i>Dasyatis sabina</i> , with notes on other selachians. I. Eye dimensions, cornea, pupil and lens	806
OGURI, M., 1978. Histochemical observations on the interrenal gland and liver of European spotted dogfish	529
OTT, F. S., HARRIS, R. P. and O'HARA, S. C. M., 1978. Acute and sublethal toxicity of naphthalene and three methylated derivatives to the estuarine copepod, <i>Eurytemora affinis</i>	254
PAUL, D. H., ROBERTS, B. L. and RYAN, K. P., 1977. Comparisons between the lateral-line lobes of the dogfish and the cerebellum: an ultrastructural study	255
PINGREE, R. D. and GRIFFITHS, D. K., 1978. Tidal fronts on the shelf seas around the British Isles	806
PINGREE, R. D., HOLLIGAN, P. M. and MARDELL, G. T., 1979. Phytoplankton growth and cyclonic eddies	1030
PINGREE, R. D., HOLLIGAN, P. M. and MARDELL, G. T., 1978. The effects of vertical stability on phytoplankton distributions in the summer on the northwest European shelf	807
PINGREE, R. D. and MADDOCK, L., 1978. The M_4 tide in the English Channel derived from a non-linear numerical model of the M_2 tide	255
RUDY, B., 1978. Slow inactivation of the sodium conductance in squid giant axons	807
SOUTHWARD, A. J. and NEWMAN, W. A., 1977. Aspects of the ecology and biogeography of the intertidal and shallow-water balanomorph Cirripedia of the Caribbean and adjacent sea-areas	1030
SOUTHWARD, E. C., 1977. A new species of <i>Hyalinoecia</i> (Polychaeta: Eunicidae) from deep water in the Bay of Biscay	255
SOUTHWARD, E. C., 1975. Pogonophora	255
STODDART, D. R., MCCLEAN, R. F., SCOFFIN, T. P. and GIBBS, P. E., 1978. Forty-five years of change on low wooded islands, Great Barrier Reef	807
TREHERNE, J. E. and PICHON, Y., 1978. Long-term adaptations of <i>Sabella</i> giant axons to hyposmotic stress	530
WHITFIELD, M. and TURNER, D. R., 1979. Water-rock partition coefficients and the composition of sea water and river water	1030
ZAMMIT, V. A., BEIS, I. and NEWSHOLME, E. A., 1978. Maximum activities and effects of fructose biphosphate on pyruvate kinase from muscles of vertebrates and invertebrates in relation to the control of glycolysis	530

	PAGE
ZAMMIT, V. A. & NEWSHOLME, E. A., 1978. Properties of pyruvate kinase and phosphoenolpyruvate carboxykinase in relation to the direction and regulation of phosphoenolpyruvate metabolism in muscles of the frog and marine invertebrates	530

BOOK NOTICES

<i>Progress in Underwater Science</i> . Edited by J. C. GAMBLE and R. A. YORKE	257
<i>Introductory Phycology</i> . By F. R. TRAINOR	257
<i>Estuarine Transport Processes</i> . Edited by B. KJERFVE.	533
<i>Fish Pathology</i> . Edited by R. J. ROBERTS	533
<i>Marine Ecology: a Comprehensive, Integrated Treatise on Life in Oceans and Coastal Waters</i> , volume IV. <i>Dynamics</i> . Edited by O. KINNE	533
<i>Marine Natural Products: Chemical and Biological Perspectives</i> , volume I. Edited by P. J. SCHEUER	533
<i>Handbook of Phycological Methods: Physiological and Biochemical Methods</i> . Edited by J. A. HELLEBUST and J. S. CRAIGIE	809
<i>Mechanisms of Osmoregulation in Animals: Maintenance of Cell Volume</i> . Edited by R. GILLES	809
<i>Topics in Antibiotic Chemistry</i> , volume 2. <i>Antibiotics from Marine Organisms, Oligosaccharides, Anthracyclines and their Biological Receptors</i> . Edited by P. G. SAMMES	809
<i>Advances in Oceanography</i> . Edited by H. CHARNOCK and G. DEACON	1031
<i>The Edible Crab: and its Fishery in British Waters</i> . By E. EDWARDS	1031
<i>Marine Organisms: Genetics, Ecology, and Evolution</i> . Edited by B. BATTAGLIA and J. A. BEARDMORE	1031
<i>Spatial Pattern in Plankton Communities</i> . Edited by J. H. STEELE	1031
<i>Upwelling Ecosystems</i> . Edited by R. BOJE and M. TOMCZAK	1031

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

CAWTHORNE, D. F. A comparative study of the closure responses of some cirripede species exposed to falling seawater concentrations	811
PIRIE, B. J. S. and GEORGE, S. G. Ultrastructure of the heart and excretory system of <i>Mytilus edulis</i> (L.).	819
MOORE, C. G. Analysis of the associations of meiobenthic Copepoda of the Irish Sea.	831
LOWE, D. M. and MOORE, M. N. The cytochemical distributions of zinc (Zn II) and iron (Fe III) in the common mussel, <i>Mytilus edulis</i> , and their relationship with lysosomes .	851
KELLY, K. F., PIRIE, B. J. S., BELL, M. V. and SARGENT, J. R. A light microscopic study of the action of sodium orthovanadate on the gills of fresh-water and sea-water eels (<i>Anguilla anguilla</i> L.).	859
HOPKIN, S. P. and NOTT, J. A. Some observations on concentrically structured, intracellular granules in the hepatopancreas of the shore crab <i>Carcinus maenas</i> (L.)	867
HUGHES, R. G. The dispersal and dispersion of some epizoots of the hydroid <i>Nemertesia antennina</i> (L.)	879
KELLEY, D. Bass populations and movements on the west coast of the U.K.	889
DAVIES, A. G. and SLEEP, J. A. Inhibition of carbon fixation as a function of zinc uptake in natural phytoplankton assemblages	937
GARBARY, D. Patterns of cell elongation in some <i>Audouinella</i> spp. (Acrochaetiaceae: Rhodophyta)	951
GALLENI, L. and PUCCINELLI, I. The karyology of the genus <i>Procerodes</i> (Tricladida: Maricola) in British waters	961
BRYAN, G. W. and GIBBS, P. E. Zinc - a major inorganic component of nereid polychaete jaws	969
GASHOUT, S. E. and ORMOND, R. F. G. Evidence for parthenogenetic reproduction in the sea anemone <i>Actinia equina</i> L.	975
CARTER, M. A. and THORP, C. H. The reproduction of <i>Actinia equina</i> L. var. <i>mesembryanthemum</i>	989
THORBURN, I. W. and GRUFFYDD, Ll. D. Studies of the behaviour of the scallop <i>Chlamys opercularis</i> (L.) and its shell in flowing sea water	1003
ANNOUNCEMENTS	1025
ABSTRACTS OF MEMOIRS	1027
BOOK NOTICES	1031
REPORT OF THE COUNCIL FOR 1978-79	1033
BALANCE SHEET 1978-79	1075

© Copyright by the Marine Biological Association of the U.K. 1979

The subscription price of volume 59, 1979 of the Journal to non-members of the Association is £54.00 net a volume of four parts, post free, or US \$132.50 in U.S.A. and Canada, payable in advance. Single parts cost £16.00 (US \$40.00 in U.S.A. and Canada) plus postage. Subscriptions may be sent to any bookseller or to Cambridge University Press, P.O. Box 110, Cambridge CB2 3RL, or in the U.S.A. and Canada, to Cambridge University Press, 32 East 57th Street, New York, NY 10022.

CAMBRIDGE UNIVERSITY PRESS

THE PITT BUILDING, TRUMPINGTON STREET, CAMBRIDGE CB2 1RP

32 EAST 57TH STREET, NEW YORK, N.Y. 10022

Printed in Great Britain at the University Press, Cambridge