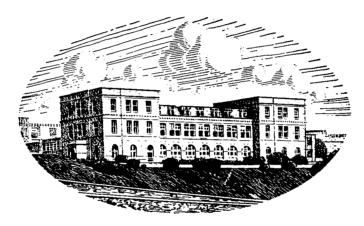
JOURNAL OF THE MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM

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.

JOURNAL OF THE MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM

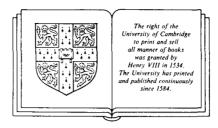


THE PLYMOUTH LABORATORY

VOLUME 66

1986

CAMBRIDGE UNIVERSITY PRESS CAMBRIDGE LONDON NEW YORK NEW ROCHELLE MELBOURNE SYDNEY



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 10 Stamford Road Oakleigh, Melbourne 3166 Australia

© Copyright Marine Biological Association of the U.K. 1986 Printed in Great Britain at the University Press, Cambridge

Number 1, pp. 1–268, 12 February 1986
Number 2, pp. 269–529, 1 May 1986
Number 3, pp. 531–766, 1 August 1986
Number 4, pp. 767–1020, 18 November 1986

											PAGE
Report of the Council for 198586	•	•	•	•	•	•	•	•	•	٠	971
Income and Expenditure Account and Balance Sheet	•	•		•		•	•	•			1015
AIKEN, J., see ROBINSON, AIKEN and HUNT	•					•					201
Akpan, E. B.											
Depth distribution of endolithic algae from the F subdivision of the photic zone	irth	of C	lyde:	imp	licatio	ons fo	or de	lineat	ion a	nd	269
AL-KADHOMIY, N. K., see HUGHES and AL-KADHOMIN	Y.					•					671
AL-MOHANNA, S. Y. and NOTT, J. A.											
B-cells and digestion in the hepatopancreas of Pena	ieus s	emisu	lcatu	s (Cr	istace	a: D	ecapo	da)			403
BARRETT, R. L., see Southward et al											415
BERNARD, R. T. F., see HODGSON and BERNARD .											385
Boyle, P. R.											
A descriptive ecology of Eledone cirrhosa (Mollusca	: Cej	phalo	poda) in S	cotti	sh wa	ters	•			855
BOYLE, P. R., GRISLEY, M. S. and ROBERTSON, G.											
Crustacea in the diet of Eledone cirrhosa (Mollusca:	Ceph	alopo	oda) o	leteri	ninec	l by s	erolog	gical 1	netho	ods	867
BRACE, R. C. and QUICKE, D. L. J.											
Dynamics of colonization by the beadlet anemone,	Actin	nia eq	uina	•	•	•		•	•		21
Seasonal changes in dispersion within an aggregation of the role of intraspecific aggression	of th	e ane	mon	e, Act	inia e	quina	, with	a rea	pprai	isal	49
BRACHI, R., see BUCHANAN et al.											659
BRYAN, G. W. and GIBBS, P. E.											
Occurrence, composition and function of intracellul of nephtyid polychaetes (Annelida)	ar cal	lcium	pho:	sphat	e gran	ules	in the	e mus	culati	ure	343
BRYAN, G. W., GIBBS, P. E., HUMMERSTONE, L. G. ar	nd Bu	JRT, (3. R.)						
The decline of the gastropod Nucella lapillus aroun tributyltin from antifouling paints.	id son	uth-w	vest I	Engla:	nd: e	viden	ce foi	the	effect	of	611
BRYAN, G. W., HUMMERSTONE, L. G. and WARD, E.											
Zinc regulation in the lobster Homarus gammarus: in excretion	nport	tance	of di	fferer	it pati	hway:	s of at	osorp	tion a	ınd	175
BUCHANAN, J. B., BRACHI, R., CHRISTIE, G. and MOO.	re, J.	. J.									
An analysis of a stable period in the Northumberlan	nd be	enthic	: fau	na – 1	973-4	30.					659
BUCHANAN, J. B. and MOORE, J. J.											
A broad review of variability and persistence in the	Nor	thum	berla	und b	enthi	c faur	1a – 1	971–8	35.		641
BULLOCK, A. M., PHILLIPS, S. E., GORDON, J. D. M.	and l	Robei	rts, I	R. J.							
Sarcotaces sp., a parasitic copepod infection in two	deep	-sea f	ishes	, Lep	dion	eques	and (Coelor	hynci	hus	0
occa	•	•	•	•	•	•	•	·	•	•	835

BURT, G. R., see BRYAN et al.	раде . б11
CALDERON-PEREZ, J. A. Occurrence of nematode parasites in <i>Calocaris macandreae</i> (Crustacea: Decapoda) from an Irish S	Sea
population	. 293
CHILD, C. A. and HARBISON, G. R. A parasitic association between a pycnogonid and a scyphomedusa in midwater	. 113
Christie, G., see Buchanan et al.	. 659
CLARIDGE, P. N., POTTER, I. C. and HARDISTY, M. W.	. 0)9
Seasonal changes in movements, abundance, size composition and diversity of the fish fauna of t Severn Estuary	he . 229
CLARKE, M. R., PASCOE, P. L. and MADDOCK, L.	
Influence of 70 watt electric lights on the capture of fish by otter trawl off Plymouth	. 711
See also Martin and Clarke	. 779
See also SWINNEY, CLARKE and MADDOCK	. 483
CLAVIER, J. and RICHARD, O.	
Growth of juvenile Haliotis tuberculata (Mollusca: Gastropoda) in their natural environment .	· 497
COLMAN, J. G., TYLER, P. A. and GAGE, J. D.	
Larval development of deep-sea gastropods (Prosobranchia: Neogastropoda) from the Rock Trough .	all . 951
CORNER, E. D. S., see NEAL et al	. 1
COSTELLO, M. J., see MYERS and COSTELLO	. 75
CRADDOCK, J. E., see JANSSEN, HARBISON and CRADDOCK	. 825
DANDO, P. R. and SOUTHWARD, A. J.	2
Chemoautotrophy in bivalve molluses of the genus <i>Thyasira</i>	. 915
See also Southward et al.	. 415
DAVENPORT, J. and KJØRSVIK, E.	
Buoyancy in the lumpsucker Cyclopterus lumpus	. 159
DAVENPORT, J. and STENE, A.	
Freezing resistance, temperature and salinity tolerance in eggs, larvae and adults of capelin, Mallo	tus
villosus, from Balsfjord	. 145
Dawson, W. A.	
Changes in Western mackerel (Scomber scombrus) spawning stock composition during the spawning season	ing . 367
DIXON, D. R. and FLAVELL, N.	
A comparative study of the chromosomes of Mytilus edulis and Mytilus galloprovincialis .	. 219
EGLINTON, G., see NEAL et al.	. 1
FENCHEL, T. and PATTERSON, D. J.	
Percolomonas cosmopolitus (Ruinen) n. gen., a new type of filter feeding flagellate from mar plankton	ine . 465
FLAVELL, N., see DIXON and FLAVELL	. 219
FORTIER, L., see HARRIS, FORTIER and YOUNG	. 845
GAGE, J. D., see COLMAN, TYLER and GAGE	. 951
Gibbs, P. E.	
The taxonomy of some little-known Sipuncula from the north-east Atlantic region including n records .	ew . 335
	555

GIBBS, P. E. and BRYAN, G. W.												
Reproductive failure in populations of the do tributyltin from antifouling paints .	g-whe	lk, N	ucella	lapil	lus, c	aused	by in	npose	x ind.	uced	by	767
See also BRYAN and GIBBS												343
See also BRYAN et al.	•	•		•	•	•		•		•		611
GORDON, J. D. M., see BULLOCK et al.		•										835
GRISLEY, M. S., see BOYLE, GRISLEY and ROBER	RTSON											867
GUSTAFSON, R. G., Ó FOIGHIL, D. and REID, R Early ontogeny of the bivalve Cardiomya pec			pente	r, 180	65)							943
HARBISON, G. R.												
See CHILD and HARBISON												113
See JANSSEN, HARBISON and CRADDOCK .				•	•							825
See PUGH and HARBISON	•	•		•		•				•		695
HARDISTY, M. W., see CLARIDGE, POTTER and H	HARDI	STY		•			•	•				229
HARRIS, J. E., see HART, WRATHMELL and HAR	RIS											721
HARRIS, R. P., FORTIER, L. and YOUNG, R. K.												
A large-volume pump system for studies of conditions	f the v	vertica	al dis	tribu	tion (of fisł	ı larv	ae ur	ıder c	open :	sea	845
HART, S., WRATHMELL, A. and HARRIS, J. E. Gut associated lymphoid tissue in the dogfis	h Sev	liorhi	nus ca	micul	أونو	ight r	nicro	sconi	c stuć	łv		721
HARTLEY, B.			140 00		u . u .	. <u></u> .		beopr	o ocua	.y .	•	/21
A check-list of the freshwater, brackish and	marin	e diat	oms c	of the	Briti	ch Iel	es an	d adi	oining	g coas	atal	
waters				, i inc					•			531
HENSEY, M. P., see RYAN et al												731
HODGSON, A. N. and BERNARD, R. T. F.												
Observations on the ultrastructure of the spe England	ermato	zoon	of tw	o my	tilids	from	the s	outh	-west	coast	of	385
HUGHES, G. M. and AL-KADHOMIY, N. K.												
Gill morphometry of the mudskipper, Boleo	phthal	lmus l	oddai	rti								671
Hummerstone, L. G.												
See BRYAN, HUMMERSTONE and WARD .												175
See Bryan et al.	•	•	•	•	•	•	•	•	•	•		611
Hunt, H. G.												
See Robinson, Aiken and Hunt	•	•	•		•	•	•	•	•	•		201
See ROBINSON and HUNT	·	•	•	•	•	·	•	•	•	•	•	791
JANSSEN, J., HARBISON, G. R. and CRADDOCK,	J. E.											
Hatchetfishes hold horizontal attitudes durir	ıg diaş	gonal	desce	ents	·	•	·	·	•	•	•	825
JONES, M. B. and SMALDON, G.												
On the genus Holophryxus (Isopoda: Epicar the female of Holophryxus acanthephyrae	idea),	with	descr	iptio	n of t	he m	ale ar	nd rea	lescri	ption	. of	303
KEARN, G. C., see WHITTINGTON and KEARN		•			•	•		•		•	•	93
Kelley, D.												
Bass nurseries on the west coast of the U.K.				•				•			•	439
KJØRSVIK, E., see DAVENPORT and KJØRSVIK												159
KNIGHT-JONES, E. W., see THORP, KNIGHT-JO	NES an	id Kn	IGHT	-Joni	ES.							881

viii

KNIGHT-JONES, P., see THORP, KNIGHT-JONES and KNIGHT-JONES	PAGE . 881
Le Mao, P.	
Feeding relationships between the benthic infauna and the dominant benthic fish of the Rance Estuar (France)	y . 391
LING, R., see Southward et al.	. 415
LIPINSKI, M. Methods for the validation of squid age from statoliths	. 505
MADDOCK, L. See Clarke, Pascoe and Maddock See Swinney, Clarke and Maddock	. 711 . 483
MARSHALL, N. J. Structure and general distribution of free neuromasts in the black goby, <i>Gobius niger</i>	. 323
MARTIN, A. R. and CLARKE, M. R. The diet of sperm whales (<i>Physeter macrocephalus</i>) captured between Iceland and Greenland .	. 779
MAUCHLINE, J. The biology of the deep-sea species of Mysidacea (Crustacea) of the Rockall Trough	. 803
Moore, J. J. See Buchanan and Moore See Buchanan et al.	. 641 . 659
MUIRHEAD, A., TYLER, P. A. and THURSTON, M. H. Reproductive biology and growth of the genus <i>Epizoanthus</i> (Zoanthidea) from the north-east Atlanti	
MYERS, A. A. and COSTELLO, M. J. The amphipod sibling pair <i>Leucothoe lilljeborgi</i> and <i>L. incisa</i> in British and Irish waters	. 75
 NEAL, A. C., PRAHL, F. G., EGLINTON, G., O'HARA, S. C. M. and CORNER, E. D. S. Lipid changes during a planktonic feeding sequence involving unicellular algae, <i>Elminius</i> nauplii an adult <i>Calanus</i>. 	
NEAVE, D. A. The development of the lateral line system in plaice (<i>Pleuronectes platessa</i>) and turbot (<i>Scophthalmu maximus</i>)	us . 683
NOTT, J. A., see AL-MOHANNA and NOTT	. 403
Ó CÉIDIGH, P., see TULLY and Ó CÉIDIGH	. 931
O'HARA, S. C. M., see NEAL et al.	. 1
Ó FOIGHIL, D., see GUSTAFSON, Ó FOIGHIL and REID	. 943
PASCOE, P. L. Fish otoliths from the stomach of a thresher shark, <i>Alopias vulpinus</i>	· 315 · 319 · 711
PATTERSON, D. J., see FENCHEL and PATTERSON	
PHILLIPS, S. E., see BULLOCK et al.	. 465 . 835
POTTER, I. C., see CLARIDGE, POTTER and HARDISTY	. 229
Prahl, F. G., see NEAL et al. . <th< td=""><td>. 1</td></th<>	. 1
PUGH, P. R. and HARBISON, G. R. New observations on a rare physonect siphonophore, Lychnagalma utricularia (Claus, 1879) .	. 695

ix
PAGE

Quicke, D. L. J.													
See BRACE and QUICKE	• •	•	•		•	•	•	•	•	•	•		21
See BRACE and QUICKE	•••	·	•	•	•	·	•	•	•	•	•	•	49
REID, R. G. B., see GUSTAFSON, Ó FOIG	GHIL and	Reid	•	•	•		•	٠	•	•	•		943
RICHARD, O., see CLAVIER and RICHARI	D.	•	•	•		•		•	•	•			497
ROBERTS, S. J., see BULLOCK et al.	• •	•	•	•	•	•	•		•	•	•		835
ROBERTSON, G., see BOYLE, GRISLEY an	id Rober	STON	•	•	•	•	•	•	•	•	•	•	867
ROBINSON, G. A., AIKEN, J. and HUNT, H. G.													
Synoptic surveys of the western hydrography .	English 	Chan:	nel.	The	relati	ionshi	ps	betwe	en	plankt	on a	ind	201
ROBINSON, G. A. and HUNT, H. G.													
Continuous plankton records: annua 1958–83	al fluctua	tions o	of the	e plan	kton	in th	e we	stern	Eng	glish C	Chanr	ıel,	791
RODEN, C. M., see RYAN et al.													731
RODHOUSE, P. G., see RYAN et al													731
RYAN, T. H., RODHOUSE, P. G., RODEN	ч, С. М. :	and H	ENSEY	r, M.	P.								
Zooplankton fauna of Killary Harbo	ur: the s	easona	l cyc	le of a	abund	lance						•	731
SHELLEY, C., see WILSON and SHELLEY	· .				•				•		•		119
SMALDON, G., see JONES and SMALDON	• •												303
Southward, A. J., Southward, E. C.,	, Dando,	P. R.,	, Bar	RETT,	R. L	. and	Lin	G, R.					
Chemoautotrophic function of bacte	rial symt	oionts	in sm	all Po	ogono	phor	a				•		415
See also DANDO and SOUTHWARD				•									915
Southward, E. C.													
Gill symbionts in thyasirids and othe	er bivalve	e moll	uscs	•	•	•	•	•	•	•		•	889
See also SOUTHWARD et al.	• •	•	•	•	•	•	•	•	•	•	•	•	415
STENE, A., see DAVENPORT and STENE	• •	•		•			•	•	·	•		•	145
SWINNEY, G. N., CLARKE, M. R. and M.	MADDOCK	., L.											
Influence of an electric light on the o	capture o	f deep	-sea i	fish ir	1 Bisc	ay	•	•	•	•	•	•	483
THORP, C. H., KNIGHT-JONES, P. and	Knight-	Jones,	E. V	♥.									
New records of tubeworms establish	ed in Bri	tish ha	arbou	irs	•	•	·	•	·	•	•	·	881
THURSTON, M. H., see MUIRHEAD, TYL	ER and T	THURS1	ON	•	•	•	•	•	•	•	•	•	131
TULLY, O. and Ó CÉIDIGH, P.													
The ecology of <i>Idotea</i> species (Isopo Galway Bay (west of Ireland)	da) and (Gamma	irus l	ocusto	a (Am	iphipo	oda) •	on su	rfac	e drift	weed	in	931
Tyler, P. A.							·						
See COLMAN, TYLER and GAGE .		•	•	·	·	•	•	•	•	•	·	•	951
See MUIRHEAD, TYLER and THURSTO	N .	·	•	•	·	•	•	•	·	•	·	•	131
WALLACE, P. D.													
A note on the seasonal change in fat Sea					-	-		ig in t	he i	orthe		ish	71
WARD, E., see BRYAN, HUMMERSTONE a	nd Warr) .	•	•	•	•	•	•	•	•	·		175
Webb , C. J.													
Karyology of Pomatoschistus microps	(Teleost	ei: Go	bioid	ei)	•	•	•	•	•	•	•		259

PAGE

Webb , С. М.
Post-larval development of the tellinacean bivalves Abra alba, Tellina fabula and Donax vittatus (Mollusca: Bivalvia), with reference to the late larva
Wheeler, A.
The occurrence of Seriola rivoliana (Osteichthyes: Perciformes: Carangidae) on the British coast
WHITTINGTON, I. D. and KEARN, G. C.
Rhythmical hatching and oncomiracidial behaviour in the hexabothriid monogenean Rajonchocotyle emarginata from the gills of Raja spp
WILSON, J. G. and SHELLEY, C.
The distribution of <i>Nucula turgida</i> (Bivalvia: Protobranchia) from Dublin Bay, Ireland, and the effect of sediment organic content
WRATHMELL, A., see HART, WRATHMELL and HARRIS
Wright, D. A.
Trace metal uptake and sodium regulation in Gammarus marinus from metal polluted estuaries in England
Yankson, K.
Observations on byssus systems in the spat of Cerastoderma glaucum and C. edule
YOUNG, R. K., see HARRIS, FORTIER and YOUNG

CORRIGENDA

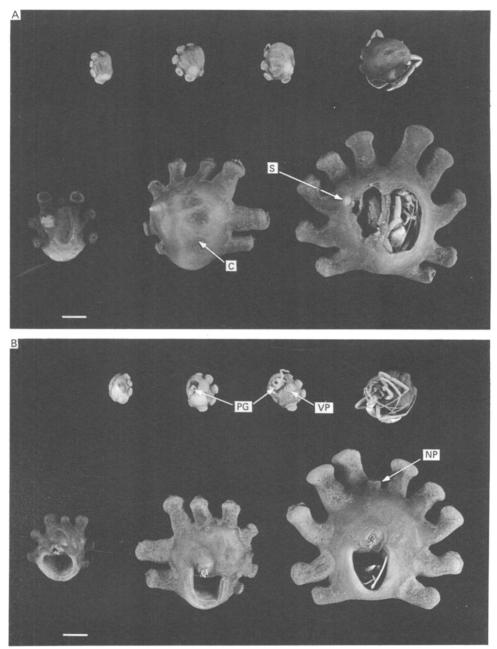
Page 51	7, Table	2, colum	n 2, line	1, for	9.991	read	9991.

Page 517, Table 2, column 2, line 2, for 9.991 read 9991.

Page 517, Table 2, column 2, line 3, for 29.973 read 29973.

х

CORRIGENDA



The above figure is a replacement for Fig. 4 of the paper by Muirhead, Tyler and Thurston which was first presented on page 138 of Volume 66, part 1. The figure does not differ in content but reveals some of the detail which was absent in the original printing.

SUBJECT INDEX

Behaviour

Dispersion behaviour of cockle spat, 277-292 Larval behaviour of gill parasites, 93-111 Swimming attitude in hatchetfish, 825-833

Biochemistry

Bacterial chemoautotrophy in Pogonophora, 415-437 Fat content of herrings, 71-74 Planktonic dietary lipid changes, 1-14

Breeding, Rearing and Fecundity

Gametogenesis in Epizoanthus spp., 131-143

Comparative Anatomy

Bivalve shell development, 749-761 Free neuromasts of the black goby, 323-333 Lateral line system in flatfish, 683-693 Morphometry of the mudskipper gill, 671-682

Development, Growth and Maturation

Bivalve shell development, 749-761 Early development in bivalve embryo, 943-950 Growth and maturation of *Epizoanthus* spp., 131-143 Growth of O-group bass on nursery grounds,

- 439-464 Haliotis tuberculata in natural environment,
- 497-503

Larval development in gastropods, 951-965

Ecology and Distribution

Actinia equina, low shore colony, 21-47

- Annual cycle of zooplankton in Killary Harbour, 731-748
- Annual fluctuation of plankton in English Channel, 791–802
- Bathymetric zonation of endolithic algae, 269-275
- Crustacean populations of drifting seaweed, 931-942
- Dispersion within Actinia population, 49-70

Eledone cirrhosa off Scotland, 855-865

- Long-term study of benthic fauna, 641-670
- Mysids of the Rockall Trough, 803-824
- Nucula turgida in Dublin Bay, 119-130
- Seriola rivoliana, Almaco jack, in British waters, 15-19
- Tubeworms in British harbours, 881-888

Feeding and Nutrition

- Bacterial symbiosis in bivalves, 889-929
- Bacterial symbiosis in Pogonophora, 415-437
- Diet of Eledone cirrhosa, 867-879
- Fish feeding in the Rance Estuary, 391-401
- Fish otoliths in stomach of a thresher shark, 315-317
- Lipids in planktonic nutrition, 1-14
- Sperm whale stomach contents, 779-790
- Stomach contents from two dolphins, 319-322

Genetics

Karyological analysis of Mytilus spp., 219–228 Karyological study of Pomatochistus microps, 259–266

New Species

Percolomonas cosmopolitus gen. et sp.nov., 465-482

Parasitology

Copepod parasitic on deep-sea fish, 835-843 Hatching in gill parasites of ray, 93-111 Nematodes parasitic on *Calocaris macandreae*, 293-301 Parasitic isopods of the genus *Holophryxus*, 303-314 Pycnogonid parasitic on medusa, 113-117

Phycology

Bathymetric zonation of endolithic algae, 269–275 Check-list of British diatoms, 531–610

Physical Oceanography

Hydrographic and planktonic surveys in English Channel, 201–218

Physiology and Experimental Biology

Buoyancy components in lumpsucker, 159-174 Hatching stimulus in gill parasites, 93-111 Imposex in dog-whelks induced by organic tin, 611-640 Role of B-cells in decapod digestion, 403-414 Temperature and salinity tolerance of capelin, 145-157 Trace metal uptake by *Gammarus marinus*, 83-92 Zinc regulation in lobsters, 179-199

Pollution Studies

Gammarus in metal polluted estuaries, 83–92 Imposex in dog-whelks induced by organic tin, 611–640, 767–777 Zinc regulation in lobsters, 179–199

Population Studies

Bass stocks on nursery grounds, 439-464 Colonization dynamics of Actinia equina, 21-47 Dispersion within Actinia equina population, 49-70 Fish and prey species of the Rance Estuary, 391-401 Fish in the Severn Estuary, 229-258

Long-term study of benthic fauna, 641–670 Mysids of the Rockall Trough, 803–824 Western mackerel spawning stock, 367–383

Structure and Histology

B-cells in the decapod hepatopancreas, 403-414 Bivalve gills, ultrastructure, 889-914 Byssus system of cockle spat, 277-292 Intramuscular calcium deposits in *Nephtys*, 343-365

INDEX

Lymphoid tissue of dogfish gut, 721-729 Sperm ultrastructure of Mytilus spp., 385-390 Ultrastructure of Percolomonas cosmopolitus, 465-482

Taxonomy and Life History

.

Amphipod sibling species, 75–82 Check-list of British diatoms, 531–610 Deep-water Sipunculae of the north-east Atlantic, 335–341 Holophryxus acanthephyrae, 303-314 Karyological analysis of Mytilus spp., 219-228 Lychnagalma utricularia, a physonect siphonophore, 695-710 Sperm ultrastructure of Mytilus spp., 385-390

Technique and Methodology

Ageing of squid by statoliths, 505–526 Larval sampling by ship-borne pump, 845–854 Trawling with electric lights, 483–493, 711–720

,

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, 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

C

Annual Members, receiving the Journal								per	r ann	um	15.00
Annual Members, without the Journal							per	r ann	um	3.00	
Founders											100.00
Governors											500.00

Annual subscriptions become due on 1 January.

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 subscriptions 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.

JOURNAL OF THE MARINE BIOLOGICAL ASSOCIATION

Vol. 66 No. 1

CONTENTS

	PAGE
NEAL, A. C., PRAHL, F. G., EGLINTON, G., O'HARA, S. C. M. and CORNER, E. D. S. Lipid changes during a planktonic feeding sequence involving unicellular algae, <i>Elminius</i> nauplii and adult <i>Calanus</i>	1
WHEELER, A. The occurrence of Seriola rivoliana (Osteichthyes: Perciformes: Carangidae) on the British coast	15
BRACE, R. C. and QUICKE, D. L. J. Dynamics of colonization by the beadlet anemome, Actinia equina	21
BRACE, R. C. and QUICKE, D. L. J. Seasonal changes in dispersion within an aggregation of the anemone, <i>Actinia equina</i> , with a reappraisal of the role of intraspecific aggression	49
WALLACE, P. D. A note on the seasonal change in fat content of the autumn-spawning herring in the northern Irish Sea	71
MYERS, A. A. and COSTELLO, M. J. The amphipod sibling pair Leucothoe lilljeborgi and L. incisa in British and Irish waters	75
WRIGHT, D. A. Trace metal uptake and sodium regulation in <i>Gammarus marinus</i> from metal polluted estuaries in England	83
WHITTINGTON, I. D. and KEARN, G. C. Rhythmical hatching and oncomiracidial behaviour in the hexabothriid monogenean Rajonchocotyle emarginata from the	
gills of <i>Raja</i> spp	93 113
WILSON, J. G. and SHELLEY, C. The distribution of <i>Nucula turgida</i> (Bivalvia: Protobranchia) from Dublin Bay, Ireland, and the effect of sediment organic content	119
MUIRHEAD, A., TYLER, P. A. and THURSTON, M. H. Reproductive biology and growth of the genus Epizoanthus (Zoanthidea) from the north-east Atlantic	131
DAVENPORT, J. and STENE, A. Freezing resistance, temperature and salinity tolerance in eggs, larvae and adults of capelin, <i>Mallotus villosus</i> , from Balsford	145
DAVENPORT, J. and KJØRSVIK, E. Buoyancy in the lumpsucker Cyclopterus lumpus	159
BRYAN, G. W., HUMMERSTONE, L. G. and WARD, E. Zinc regulation in the lobster Homarus gammarus importance of different pathways of absorption and excretion.	175
ROBINSON, G. A., AIKEN, J. and HUNT, H. G. Synoptic surveys of the western English Channel. The relationships between plankton and hydrography	201
DIXON, D. R. and FLAVELL, N. A comparative study of the chromosomes of Mytilus edulis and Mytilus galloprovincialis	219
CLARIDGE, P. N., POTTER, I. C. and HARDISTY, M. W. Seasonal changes in movements,	
abundance, size composition and diversity of the fish fauna of the Severn Estuary .	229
WEBB, C. J. Karyology of <i>Pomatoschistus microps</i> (Teleostei: Gobioidei)	259 267
	207

© Copyright by the Marine Biological Association of the UK 1986

The subscription price of volume 66, 1986, of the Journal to non-members of the Association is $\pounds_{105,00}$ net a volume of four parts, post free, or US \$240.00 in USA and Canada, payable in advance. Single parts cost $\pounds_{27,00}$ (US \$70.00 in USA and Canada) plus postage. Subscriptions may be sent to any bookseller or to Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, or in USA and Canada, to Cambridge University Press, 32 East 57th Street, New York, 10022. All orders must be accompanied by payment.

CAMBRIDGE UNIVERSITY PRESS

THE PITT BUILDING, TRUMPINGTON STREET, CAMBRIDGE CB2 1 RP

32 EAST 57TH STREET, NEW YORK, NY 10022, USA

10 STAMFORD ROAD, OAKLEIGH, MELBOURNE 3166, AUSTRALIA

Printed in Great Britain by the University Press, Cambridge