

090

BRUCE COULL

P S A M M O N A L I A

Newsletter of the Association of Meiobenthologists

Number 11

November 1970



Editor : JOHN S. GRAY, Wellcome Marine Laboratory,
University of Leeds, Robin Hood's Bay,
Yorkshire, ENGLAND.

This document is not part of the scientific literature
and is not to be cited, abstracted or reprinted as a
published document.

OFFICERS OF THE ASSOCIATION OF MEIOBENTHOLOGISTS

Executive committee :

- Chairman : JOHN S. GRAY, Wellcome Marine Laboratory,
University of Leeds, Robin Hood's Bay,
Yorkshire, England.
- Committee Members : W. DUANE HOPE, Department of Invertebrate
Zoology, Museum of Natural History, Smithsonian
Institution, Washington D.C.20560, U.S.A.
ROBERT P. HIGGINS, Mediterranean Marine Sorting
Center, Khereddine, Tunisia.
DONALD J. ZINN, Department of Zoology,
University of Rhode Island, Kingston, Rhode
Island, 02881, U.S.A.

- Board of Correspondents: PHILIPPE BODIN, Antennes de la S.M.E.
C.R.E.O. Alee des Tamaris 17, La Rochelle,
France ; CLAUD CLAUSEN, Zoological Laboratory,
University of Bergen, Bergen, Norway ;
BRUCE C. COULL, Department of Biology, Clark
University, Worcester, Mass.01610, U.S.A. ;
TOM FENCHEL, Institute of Zoology, University
of Aarhus, DK 8000, Aarhus C, Denmark ;
LILLIANA FORNERIS, Departamento de Zoologia,
Caixa Postal 8105, Sao Paulo, Brazil ;
TAIJI KIKUCHI, Amakusa Marine Biological
Laboratory, Lomioka, Reinhoku-cho, Amakusc,
Kuamoto-ken, Japan ; LELAND W. POLLOCK,
S.E.P., Marine Biological Laboratory,
Woods Hole, Mass.02543, U.S.A. ; JEANNE
RENAUD-MORNANT, Laboratoire de Zoologie,
Museum d'Histoire Naturelle, 57 Rue Cuvier,
Paris V^e, France ; FRANZ RIEMANN, Institut
fur Meeresforschung, Am Handelshafen 12,
285 Bremerhaven, Germany ; PETER SCHMIDT and
WILFRIED WESTHEIDE, II Zoologisches Institut
und Museum der Universitat, Berlinerstrasse 28,
34 Gottingen, Germany ; WOLFGANG STERRER,
Bermuda Biological Station for Research,
St. George's West, Bermuda.

EDITORIAL

Surprisingly, to me at least, the Constitution proposed in issue number 10 has met largely with approval by the membership. Some amendments have been suggested and these proposed changes are set out, following the editorial. I trust everyone will study these changes carefully.

I would like to bring to the attention of the membership some of the important points of the Constitution, upon which the success or failure of the Association depends. Firstly, elections. I hope that a number of you, not yet involved with the organisation of the Association will agree to be proposed for Officers. In order to give the Association a truly dynamic image I would like to see many members volunteering their names. The first elections will be due in the fall of 1971 when two vacancies on the executive committee are due to fall vacant. Please think seriously of likely candidates for these Offices.

Secondly, finances. Although the Association has quite a healthy bank balance at the present time, we are still losing money because people are sending personal cheques for payment of membership dues. The Association loses a high percentage of each cheque cashed. If International Money Orders are used no financial loss is incurred by the Association. The Bylaws do recommend payment in International Money Orders.

Once again may I make a plea for articles, reports, even letters with details of progress on projects for inclusion in Psammonalia. I believe the Association has a bigger role to play than merely acting as a vehicle for disseminating literature citations. Let us try and make Psammonalia a stimulating newsletter rather than letting it lapse into merely a list of references.

As a start in this direction I have written an intentionally provocative article on meiobenthic research. I trust this will be taken in good part and stimulate a dialogue between different viewpoints.

John S. Gray.
Editor.

Proposed Changes to the Draft Constitution of the
Association of Meiobenthologists

The following amendments have been approved by the executive committee and are hereby put before the membership. Any further amendments or comments on the proposed changes must reach the Chairman before DECEMBER 10th 1970.

The final version of the Constitution will be mailed to each member before December 31st 1970, and will be adopted from January 1st 1971.

PROPOSED CHANGES

- Article 4. line 5 insert "as" between "council" and "having"
to read "council as having ... "
- Article 6. line 2 insert "Executive" before "Committee"
to read "Executive Committee"
line 3 change "The Chairman" to "A Chairman"
lines 4, 6, 8 add "Executive" before "Committee"
to read "Executive Committee"
- Article 7. line 1 add "Executive" before "Committee"
- Article 9. heading read "Executive Committee"
- Article 10. Add the following after "retiring Chairman".
"The duties of the Board of Correspondents shall be to provide information for possible inclusion in the Newsletter of the Association and to assist in the organisation of the Association by performing such duties as may be assigned by the Chairman".
- Article 12. line 1 delete "elections of Officers" and insert
"voting" to read "Should voting be necessary .."
last line change "casting" to "deciding"

- Article 14. line 4 add "of the Association" to "any two members"
to read "any two members of the Association"
last line add to " ...'a mail ballot,'" "the votes
to be counted by the Chairman"
- Article 15. line 2 add "of the Association" after "those members"
line 3 add "of the Association" after "any member"
- Bylaw 2. Insert after Membership Rights.
"The Membership Rights of the Association
shall include the receipt of each issue of
the Newsletter of the Association and such
rights as are set out in the Articles of the
Constitution of the Association.

ELECTIONS OF OFFICERS FOR JANUARY 1st 1971

EXECUTIVE COMMITTEE MEMBER 1971-73

Proposed : DR. WILFRIED WESTHEIDE
Proposer : J.S.Gray
Secunder : R.P. Higgins

Biographical details : Dr. Westheide, of the Zoological
Institute, University of Gottingen, Germany, was educated
at the Universities of Gottingen and Freiburg. He
obtained his doctorate under the supervision of Professor
P. Ax for a thesis entitled "The biology of the Inter-
stitial Polychaetes Hesionides and Microphthalmus.
He has served as Scientific Assistant of the Biologische
Anstalt Helgoland and List/Sylt and is at the present time
scientific assistant at Gottingen.

Biographical details (contd.)

He has carried out research in Germany (N. Sea and Baltic), France, Italy and Tunisia and his research interests include the systematics, ecology, morphology and life history of marine annelids. He is married and has a son and a daughter.

Proposer's note :

Dr. Westheide has been a most active member of the Board of Correspondents and has taken a great interest in the Association. It will be a pleasure to welcome him to the Executive Committee.

BOARD OF CORRESPONDENTS

Co-opted members : BRUCE C. COULL, Department of Biology,
Clark University, Worcester, Mass.0610.
LELAND W. POLLOCK, S.E.P., Marine
Biological Laboratory, Woods Hole,
Mass.02543, U.S.A.

Editor's Note : Surprisingly the U.S. was not adequately represented on the Board and it gives me great pleasure to welcome two very active members to it.

FINANCIAL REPORT

	£.	s.	d.
Brought forward	39.	15.	0.
Subscriptions received to 31/10/70	28.	18.	0.
Including cash in hand	<u>3.</u>	<u>14.</u>	<u>3.</u>
Total	<u>72.</u>	<u>7.</u>	<u>3.</u>
Cost of producing Issue No.10	18.	7.	10.
Cost of addressograph	<u>25.</u>	<u>18.</u>	<u>10.</u>
Total	<u>44.</u>	<u>6.</u>	<u>8.</u>
Balance at 31/10/70	<u>£28.</u>	<u>0.</u>	<u>7d.</u>

A few comments seem warranted. The high cost of issue No.10 was due in part to the extra pages and in part to the purchase of extra duplicating paper, which will be used in subsequent issues.

The balance at 31/10/70 is more than adequate for producing issue No.11 and thus at the end of the Association's Financial Year a surplus of approximately £10 should be carried forward. In addition, the Association owns an Addressing Machine, which has taken a substantial amount of money which normally would have contributed to the surplus at the year's end.

NOTICE OF DUES

Attention of members is drawn to Bylaw 1 which asks for dues to be paid IN ADVANCE, i.e. BEFORE JANUARY 1st 1971. Most of you are paid up to the end of 1970, but very few have paid for 1971.

The bylaw also asks for dues to be paid in INTERNATIONAL MONEY ORDERS. Many of you continue to send personal cheques and the Association has lost over £20 in revenue in consequence. Please send dues in International Money Orders available at any Post Office.

KEYS TO MEIOFAUNA

The response to a request for persons willing to prepare keys for the meiofauna, has been gratifying. The following have indicated willingness to cooperate and I publish their names to invite participation in the preparation of keys (to the named person) and to encourage coverage of the remaining taxa. We lack volunteers to higher Turbellaria, Gnathostomulida etc., and we could do with more help on Nematoda and of course, Protozoa. So how about it ?

<u>NAME</u>	<u>KEYS TO FOLLOWING TAXA</u>
COULL, B.C.) WELLS, J.B.)	HARPACTICOIDA
DORJES, J.	ACOELA
D'HONDT, J-L.) HUMMON, W.)	GASTROTRICHA
HIGGINS, R.P.	KINORHYNCHA
LASSERRE, P.	OLIGOCLIAETA
POLLOCK, L.W.) SCHMIDT, P.)	TARDIGRADA
VAN DER LAND, J.	PRIAPULIDA
SALVINI-PLAWEN, L.	CAUDOFOVEATA, SOLENOGASTERS
WARWICK, R.	NEMATODA order ENOPLOIDEA
WESTHEIDE, W.	POLYCHAETA interstitial spp.
ZINN, D.J.	MYSTACOCARIDA

NEWS FROM THE MEMBERS

- LASSERRE, P. "I am going to Duke University Marine Laboratory at Beaufort, N.C. for a year from November 1970, to study the physiological ecology of the meio-benthos".
- HUMMON, W.D. I am supplying (printed later ed.) supplementary citations to my bibliography of the Gastrotricha published in Psammonalia number 8. If anyone wants a complete and up-to-date Gastrotrich bibliography please write to me at Department of Zoology, Ohio University, Athens, Ohio 45701, U.S.A.
- RIEMANN, F. "Under the direction of Prof. S.A.GERLACH an expedition of the German research vessel "Meteor" was conducted in March 1970. The deep sea bottom between Madera and the Iberian peninsular was investigated amongst others and covered quantitative and qualitative studies of meiofauna. Parallel to a programme of DR. THIEL, but using different methods, hard meiofauna were sampled. The nematodes collected by DR. E. RACHOR and cand. I. FREUDENHAMMER are being studied from a systematic and ecological standpoint. The harpacticoids are being studied by cand. BECHER of Kiel. The soft meiofauna was investigated during this expedition by Prof. F. PAPI of Pisa, who found turbellarians at depths of up to 3920m. Dr. G. UHLIG, Helgoland, tested his sea-water ice method of extracting ciliates and other meiofauna, on the deep sea material and got hopeful results. Miss P.SKOOMUN has completed an investigation on the population dynamics of littoral nematodes in the Weser estuary. Dr. F.RIEMANN is continuing studies on supposed primitive genera of nematodes, nematode morphology and ecology of tropical river estuaries. In a recent paper he has called attention to a new interstitial habitat, the interstices of crustacean gill lamellae. The library and filing-card species index to free-living marine nematodes and several limnetic families of Prof. S.A.GERLACH has been recently completed. H.M.Platt of Belfast recently visited us to work on nematode taxonomy using the card index. Dr. S. Lorenzen from Kiel was also a guest in the department".

FENCHEL, T.

A new laboratory of ecology has been established at the University of Aarhus, Denmark this summer. Research is concentrated mainly on the ecology of shallow water sediments. At the present, studies on decomposition of dead organic material, especially structural carbohydrates, in sediments ; on the utilization of detritus by detritus feeders including studies of digestive enzymes and the utilization of bacteria as food ; the ecology of turbellaria, gastrotrichs, rotifers, sipunculids and protozoa ; the distribution of photosynthetic pigments and the penetration of light in sediments and anaerobiosis in interstitial animals. Since there has so far been no tradition for aquatic ecology at the zoology department of the University of Aarhus the library is very incomplete for our purpose and we would therefore be very grateful if individual members and/or institutions would send us reprints on all aspects of aquatic ecology on an exchange basis in future. Address :
Laboratory of Ecology,
Zoological Institute,
University of Aarhus,
DK-8000 Aarhus C.,
Denmark. T1ph. 06130148.

Thank you.

SOYER, J.

"I am happy to say that I passed my doctorate thesis at the University of Paris in April 1970 on the subject "Le meiobenthos du plateau continental de la cote des Alberes. Copepodes Harpacticoides. Les peuplements de Copepodes Harpacticoides-Etude quantitative du Meiobenthos Donnees Autecologiques 341pp.

At the moment I am working on quantitative samples of the Mediterranean deep sea taken in May on "Jean Charcot" at 2000 and 2780 m. The results will be presented at the C.I.E.S.M.M. meeting in Rome.

I am also studying qualitatively the Harpacticoid Copepods of the Mediterranean deep sea based on the samples taken between 2000 and 2780 m."

d'HONDT, J.-L.

"I am moving to North Africa for a year and a half or two years, but as yet have no new address to report."

ZINN, D.J.

"The plans reported for the Second International Conference on meiofauna seem excellent. I would hope that sections on the geographical distributions of meiofauna, meiofaunal evolution and meiofaunal behaviour could be included. What about fresh-water and cave mesosammon too ?"

CONGRATULATIONS

On behalf of the members of the Association I would like to express our congratulations to DR. TOM FENCHEL on his appointment as Professor of Experimental Biology at the University of Aarhus, Denmark.

CHANGES OF ADDRESS

MISS C.M.REEDMAN
Department of Biology
Livingston Coll.,
New Brunswick,
New Jersey 08903,
U.S.A.

J.A.BAKER,
Department of Biology,
University of Houston,
Houston,
TEXAS 77004,
U.S.A.

CHANGES OF ADDRESS

FENCHEL, T.
Institute of Zoology,
University of Aarhus,
DK8000 Aarhus,
Denmark.

HATFIELD, E.B.
R.S.M.A.S.,
10, Rickenbacker Causeway,
Virginia Key,
Miami,
Florida 33134,
U.S.A.

NEW MEMBERS

MCORE, P.G.
Wellcome Marine Lab.,
University of Leeds,
Robin Hood's Bay,
Yorkshire,
England.

Interests :
Algal faunas :
Community analyses :
Marine pollution :

GELDER, S.R.
Department of Zoology,
University of Hull,
Hull,
England.

Interests :
Histochemistry of
digestion in
Turbellaria,
Archiannelida.

MERRIMAN, JEAN
Department of Biology,
University of Pittsburgh,
Pittsburgh,
Penn. 15213,
U.S.A.

Interests :
Kinorhynch phylogeny.

MISCELLANY

1) Psammead
A taxonomist's nightmare
unwound, is sadly, all too
seldom found, More often
than not, It's a Gordian
knot, In which I am
frequently found.

2) Confessions
Meiobenthos, as I must confess,
Taxonomically is quite a mess,
Between all the copepods,
Nemas, mites and ostracods,
I'm often reduced to a guess.

JANET REID.

THE FUTURE OF MEIOFAUNAL RESEARCH

by John Gray

It has been suggested more than once that there should be a journal devoted solely to meiobenthic research. I personally do not believe that we are ready to sustain such a journal. Much of the meiobenthic literature is stereotyped in its scope and few concepts or contributions towards a general understanding of marine biology as a whole, have derived from our researches. Thus, the journal would not appeal to a wide audience and would be a doubtful financial success. I believe, therefore, that in order to make meiofaunal research respected we need to up-date our approaches and get away from a stereotyped research. I hope, through the medium of this Newsletter, new ideas and concepts can be stimulated and I invite comments and criticisms to be levelled at this article.

Taxonomical papers predominate in the literature of meiofaunal research. This is only natural and is likely to continue as new areas are investigated and neglected taxa are studied in depth. Meiofauna offers an exciting research field for the training of taxonomists as new species are constantly being added to the fauna and thus the spur of new knowledge stimulates and encourages. What appears notably lacking in the taxonomical literature on meiofauna are papers dealing with some of the modern approaches such as numerical taxonomy or tabular keys. Perhaps with many taxa, the information is as yet so incomplete that it is not worth spending time on such activities. However, surely these are the areas we should be training people. When computers have such endless potential numerical taxonomic procedures should be foremost in our minds.

In relation to tabular keys, meiofaunal research through Irv. Newell, has contributed one of the fundamental papers. Such keys are so vastly superior to dichotomous keys in encompassing more criteria in species determinations and provide the ideal medium for computer storage of data. Why not try to build on this foundation and produce tabular keys for the meiofauna rather than the now out-dated dichotomous keys ?

The stability of the criteria used in erecting new species of animals is of vital importance to the taxonomist. Yet, apart from the work of Bruno Battaglia almost no genetical research has been conducted on meiofauna. Hardly any meiofaunal species have been cultured and yet by their very existence in the extreme conditions of intertidal beaches they are robust and tolerant to laboratory handling. In being small and having rapid life-cycles they offer excellent potential for genetical studies.

The taxonomist has an additional role to play in helping the ecologist. Whereas the diagnostic features of a new species may involve obscure structures, what will determine species viability in nature will be feeding and reproductive methods. Too often in taxonomical papers there is little ecological information and more rarely are there details of feeding and reproductive data. It is the partition of feeding types and methods that may explain to the ecologist the reasons for the diversity of different habitats.

Whereas the easiest taxa to study have been fairly well described some of the more difficult taxa have been largely neglected. This is particularly distressing when they are of great ecological significance, such as ciliates and nematodes. These two taxa above all others appear to be understaffed by taxonomists. Indeed, ecologists have got to the point where species are called by numbers and not names. So the lack of taxonomists handicaps ecological research. The ecological aspects of meiofaunal research can perhaps be more severely criticized for their approaches than any other research area. Too often the aims of the study were not adequately thought out. The result is that many so-called quantitative papers are only semi-quantitative. The vast literature on sampling methods pioneered in terrestrial ecology has been largely ignored. Sampling programmes for plankton have been extensively studied and being a 3-dimensional ecosystem as is the sediment ecosystem, the plankton literature is apposite for meiofaunal sampling programmes. The paper of Platt, Dickie & Trites on spatial heterogeneity of plankton (cited in the recent literature section) for example, could equally be applied to meiofauna. The sample size and frequency taken by meiofaunal workers may be inappropriate for the beach or animals concerned. Spatial variations have been largely ignored and the general rule still appears to be paired cores taken at intervals on a transect line perpendicular to the sea. Treatment of the data obtained from quantitative work only rarely has been statistically treated. Procedures for analysing quantitative data are well established in terrestrial ecology and could so easily be applied to meiofaunal studies.

Seasonal studies predominate in the ecological literature with samples being taken at regular monthly intervals. Why should we take twelve samples per year rather than four or fifty? Whilst monthly samples may seem to be superficially the most logical approach more information may well come from intensive sampling programmes in the seasons of extreme (i.e. winter and summer or wet and dry). Thus, sampling and counting effort may be more productively employed in spatial rather than temporal studies, e.g. along pollution or salinity gradients. The measurement of innumerable environmental

parameters could often be considerably reduced with critical evaluation of the data. Multivariate analysis techniques offer a useful and statistically valid method of predicting significant and non-significant parameters and could be employed to rationalise data collection.

Of the current concepts being studied in ecology productivity and energy are attracting a lot of interest. Recently McIntyre, Munro & Steel (1970) have reported on the carbon utilization of the meiofauna of a sand-beach in Scotland, and Marshall (1970) has analysed the carbon requirements of meiofaunal and macrofaunal communities in the Long Island Sound region. Such studies require multi-disciplinary teams beyond the capabilities of individual workers. However, productivity studies cover many aspects and the energy budgets of a single meiofaunal species has yet to be completed. Techniques are available for studying respiration (Cartesian diver), measuring reproductive output and ingestion and assimilation efficiency using radio-active tracers (see Hargrave 1970, for an elegant study of assimilation in a sediment-living Amphipod). Thus, individual workers can play an important role in establishing the potential productivity of elements of the meiofaunal ecosystems.

The analysis of complete ecosystems in all its aspects, is the ideal goal of ecologists. One meiofaunal ecosystem which has been analysed in depth is that of the Laminaria holdfast ecosystem by Geoff Moore of this laboratory. Moore has studied the complete community along a pollution gradient and has identified 325 species. Using techniques of association analysis pioneered by terrestrial botanists, he is computing the data and has established faunal groupings susceptible to pollution and turbidity. With the availability of such computing techniques it is to me surprising that more use is not made of them in meiofaunal research.

Similarly, concepts of diversity are being studied in various habitats. What more diverse ecosystem is there than the meiofaunal sediment ecosystem? I believe fundamental ideas are likely to be produced from the meiofauna in relation to the diversity concepts. For example, on the Yorkshire Coast Reinhard Rieger and I found 31 species of Turbellaria with 413 individuals but only 3 species of Harpacticoida comprising 1084 individuals. Thus the Turbellaria are highly diverse whereas the Harpacticoida are not. This diversity is most likely related to partition of feeding types; with the Turbellaria having the greatest variety and hence potential for forming new species. But what do we know of meiofaunal feeding behaviour and preferences? Here is one of the greatest blocks to

ecological research. The trophic requirements and relationships within the meiofaunal ecosystem is immensely complex and yet we know almost nothing of them. Techniques such as the antibody-antigen precipitin test could be used for identifying specific foods, or radio-active tracers used to measure assimilation efficiency of various food sources. Such techniques have yet to be pioneered with the meiofauna, and yet are bound to be productive areas of research.

In the physiological area again there is almost no information. Respiration rates are fundamental to most energy budget and productivity studies and yet few species have been investigated. Those that have been investigated are widely taken for gross generalisations of meiofaunal respiration rates, and these probably do not hold valid for all taxa or geographical areas. Respiration studies apart, physiological aspects of the meiofauna have been neglected. The metabolic processes of these small and rapidly reproducing animals again, could be of great interest in the wider sphere of marine biology. Whilst these are some of the neglected areas of research the most promising lines are likely to be those involving multi-disciplinary teams. With such teams we are likely to be able to unravel the fundamental complexities of the meiofaunal ecosystems. Yet we must show that techniques, ideas and concepts used in meiofaunal research possess imagination and insight if such teams are to be funded adequately. I am not saying that what is new is always best and what is old is not worth doing. But I do feel that we must guard against a stereotyped and introspective approach to meiofaunal research.

11 - November 1970

-16-

A Bibliography of the Marine and Brackish Water Gastrotrichs :
Supplementary Citations supplied by W.D.HUMMON

GENERAL AND REVIEW ARTICLES

AY, P. 1969.
Populationsdynamik,
Lebenszyklen und Fort-
pflanzungsbiologie der
Mikrofauna des Meeres-
sand. Verhandl.
Deutsch. Zool. Ges.
(Innsbruck), 1968 : 66-113.

REMANE, A. 1933.
Verteilung und Organisation
der benthonischen Mikro-
fauna der Kieler Bucht.
Wiss. Meeresunters (Abt.
Kiel), 21 : 161-221.

REMANE, A. 1934.
Die Brackwasserfauna.
Verhandl. Deutsch. Zool.
Ges. (Greifswald). 36 :
34-79.

REMANE, A. 1940.
Einführung in die zoologische
Ökologie der Nord-und Ostsee.
In : G. Grimpe (ed.), Die
Tierwelt der Nord-und Ostsee.
1a.

RUFFO, S. 1961.
Problemi relativi allo studio
della fauna interstiziale
iporreica. Boll. Zool.,
28 : 273-319.

ARTICLES INVOLVING DESIGNATED SPECIES OF GASTROTRICHS : THOSE
INCLUDING DESCRIPTIONS OF NEW SPECIES ARE MARKED WITH AN ASTERISK (*).

BRINCK, P., E. DAHL &
W. WIESER. 1955.
On the littoral subsoil
fauna of the Simrishamn
Beach in Eastern Scanica.
Kungl. Fysiogr. Sällsk.
Lund Forhandl., 25 :
109-129.

DELAMARE DEBOUTTEVILLE, C.
1953. La faune des eaux
souterraines littorales
d'Algerie. Vie et Milieu,
5 : 373-407.

DELAMARE DEBOUTTEVILLE, C.,
S. GERLACH et R. SIEWING. 1954.
Recherches sur la faune des
eaux souterraines littorales
du Golfe de Gascogne-Littoral
des Landes. Vie et Milieu, 5 :
373-407.

DRAGESCO, J. 1960.
Cilies mesopsammiques littor-
aux. Trav. Sta. Biol. Roscoff
(N.S.), 12 : 1-355.

- FRIEDRICH, H. 1963.
Kurze Notizen zur
marinen Fauna der
Aussenweser. Ver-
offentlich. Inst.
Meeresforsch.
Bremerhaven, 8 : 109.
- GERLACH, S. 1955.
Die Tierwelt des
Kustengrundwassers von
San Rossore (Tyrrhenis-
ches Meer). *Physiol.
Compar. Oecol.* (see
Monogr. Biol.), 4 :
54-73.
- GRAY, J.S. & R.M. JOHNSON.
1970. The bacteria
of a sandy beach as an
ecological factor affec-
ting the interstitial
gastrotrich Turbanella
hyalina Schultze. *J. Exp.
Mar. Biol. Ecol.*, 4 :
119-133.
- D'HONDT, J.-L. 1967.
Contribution a la
connaissance des Gastro-
triches marins de la
region d'Arcachon et du
Golfe de Gascogne.
D.Sc. Thesis, Universite
de Bordeaux, 222p.
- D'HONDT, J.-L. 1970.
Inventaire de la faune
marine de Roscoff.
Gastrotriches, Kinor-
hynques, Rotiferes,
Tardigrades. *Ed. Sta.
Biol. Roscoff*, 29pp.
- HUMMON, W.D. 1969.
Distributional ecology
of marine interstitial
Gastrotricha from Woods
Hole, Massachusetts, with
taxonomic comments on pre-
viously described species.
Ph.D. Thesis, University
of Massachusetts, 117 pp.
- JOUIN, C. 1966.
Morphologie et anatomie
comparee de Protodrilus
chaetifer Remane et
Protodrilus symbioticus
Giard ; creation du nou-
veau genre Protodriloides.
Cah. Mar. Biol., 7 : 139-55.
- LANG, K. 1936.
Einige Kleintiere aus dem
Oresund, Lunds Univ.
Arss. (N.F. Aud. 2), 31
(10) : 1-8.
- *RAO, G.C. 1970.
Three new interstitial
gastrotrichs from Andhra
Coast, India. *Cah. Biol.
Mar.*, 11 : 109-120.
- *RAO, G.C. & C. CLAUSEN. 1970.
Planodasys marginalis gen.
et sp. nov. and Planodasyidae
fam. nov. (Gastrotricha
Macrodasyoidea). *Sarsia*,
42 : 73-82.
- *RENAUD-MORNANT, J. 1969.
Urodasys elongatus nov. spec.,
Gastrotriche Macrodasyoide
nouveau de benthos des Tuamotu.
Cah. Biol. Mar., 10 : 383-390.

- RULLIER, F. 1959.
Etude bionomique de
l'Aber de Roscoff.
Trav. Sta. Biol.
Roscoff (N.S.), 11 :
1-350.
- *RUPPERT, E.E. 1970.
On Pseudostomella
Swedmark, 1956 with
descriptions of
P. plumosa nov. spec.;
P. cataphracta nov.
spec., and a form of
P. roscovita
Swedmark, 1956 from
the West Atlantic
Coast. Cah. Biol.
Mar., 11 : 121-143.
- SALVAT, B. et J. RENAUD-
MORNANT. 1969.
Etude ecologique de
macrobenthos et du
microbenthos d'un fond
sableux du Lagon de
Mururoa (Tuamotu-
Polynesie). Cah.
Pacifique, 13 : 159-179.
- SALVINI-PLAWEN, L. 1968.
Zur Kenntnis des
Mesopsammeles der
Nordadria - I :
Die für den Meresteil
neuen Gruppen und
Arten. Thalassia
Jugoslavica, 4 :
11-17.
- SCHMIDT, P. & G. TEUCHERT.
1969. Quantitative
Untersuchungen zur Ökologie
der Gastrotrichen im
Gezeiten-Sandstrand der
Insel Sylt. Marine Biol.,
4 : 4-23.
- *SCHOPFER-STERRER, C. 1969.
Chordodasys riedli, gen.
nov., a Macrodasysoid
Gastrotrich with a chordoid
organ. Cah. Biol. Mar.,
10 : 391-404.
- SCHRCM, H. 1968.
Neue Gastrotrichen aus
der Umgebung von Rovigno
an der Küste West-Istriens.
Thesis, Zoologie Institut,
Universität Wien.
- *THANE-FENCHEL, A. 1970.
Interstitial gastrotrichs
in some South Florida
beaches. Ophelia, 7 :
113-138.

ARTICLES REFERRING TO GASTROTRICHS WITHOUT DESIGNATING SPECIES INVOLVED

- BILIO, M. 1966.
Die aquatische Boden-
fauna von Salzwiesen
der Nord-und Ostsee.
II. Okologische
Faunenanalyse :
Hydrozoa, Nematodes,
Rotatoria, Gastro-
tricha, Nemertini,
Polychaeta, Oligo-
chaeta, Halacaridae,
Ostracoda, Copepoda.
Intern. Revue Ges.
Hydrobiol., 51 :
147-195.
- GERLACH, S.A. 1954.
Das Supralitoral der
sandigen Meereskuesten
als Lebensraum einer
Mikrofauna. Kieler
Meeresforsch., 10 :
121-129.
- GHISELIN, M.T. 1969.
The evolution of
Hermaphroditism among
animals. Quart. Rev.
Biol., 44 : 189-208.
- LALICKER, C.G. &
R.C.MOORE. 1952.
Gastrotricha. In :
R.C.Moore, C.G.
Lalicker & A.G.Fischer.
Invertebrate Fossils,
p.456. McGraw-Hill,
New York.
- MARCUS, E. 1952.
On South American
Malacopoda. Zoologia
(Sao Paulo), 17 :
189-209 ; 4 pl.
- MUUS, B.J. 1967.
The fauna of Danish
estuaries and lagoons.
Meddl. Danmarks Fisk-
Og Havund. (N.S.),
5 (1) : 1-316.
- NOUZAREDE, M. et
J. RENAUD-MORNANT. 1965.
De la representation
graphique des populations
heterogens et de leurs
variations numeriques.
Vie et Milieu, 14 : 423-439.
- FENNAK, R.W. 1942.
Ecology of some copepods
inhabiting intertidal
beaches near Woods Hole,
Massachusetts. Ecology,
23 : 446-456.
- RENAUD, J. 1955.
Sur l'existence et les
caracteres generaux d'une
faune interstitielle des
sables coralliens tropicaux
(Ile de Bimine, Bahamas).
Comp. Rend. Acad. Sci.
(Paris), 241 : 256-257.
- SCHROM, H. 1968.
Zur Kenntnis des Meso-
psammals der Nordadria-
II. Die Sande in der
Umgebung von Rovinj und
ihre Faunenmerkmale.
Thalassia Jugoslavica,
4 : 31-38.

THE MEDITERRANEAN MARINE SORTING CENTER

by R.P.HIGGINS, Director

The Smithsonian Institution in cooperation with the Tunisian Government's Institut National Scientifique et Technique d'Océanographie et de Pêche (INSTOP) established the Mediterranean Marine Sorting Center (MMSC) in 1966. Like the Smithsonian Oceanographic Sorting Center (SOSC) in Washington, D.C., the basic mission of MMSC is the processing of marine biological samples, although MMSC restricts its processing to samples from the Mediterranean Sea and adjacent regions. The activities of the sorting center make it possible to accelerate the rate and improve the efficiency of research in marine systematics and ecology without directly engaging in the research process. While the sorting center provides for greater use of biological data extracted from samples of marine habitats, the research on the samples and specimens is done by the scientists who request MMSC's services.

The MMSC is operated by the Office of Environmental Sciences, the Smithsonian Institution. Financial support is obtained through a grant from the Smithsonian Foreign Currency Program which makes use of United States Public Law 480 funds. No charges are made for MMSC services.

In addition to the processing of biological samples, MMSC has used its facilities and staff to assist UNESCO in the training of technicians and students from the Mediterranean area. MMSC has assisted several laboratories in sampling programs involving field collecting as well as sorting.

In 1970, MMSC was designated to serve as the Biological Centre for the Cooperative Investigations of the Mediterranean (CIM), a program initiated by the Intergovernmental Oceanographic Commission (IOC/UNESCO), the International Commission for Scientific Exploration of the Mediterranean (ICSEM), and the General Fisheries Council for the Mediterranean (GFCM/FAO).

Requests for Processing Service

Inquiries regarding assistance in processing preserved samples of marine benthos (including sediment), macro-algae, plankton, and/or fishes should be addressed to the Director, Mediterranean Marine Sorting Center, Khereddine, Tunisia.

In order to provide the collection's owner or agent with a reply which includes the estimated time required for the processing of his material, inquiries must include :

- 1) the kinds of samples,
- 2) the number of samples and volume of each sample,
- 3) the type of gear used in obtaining the sample,
- 4) the method of sample preservation, and
- 5) a summary of the kinds of data available for the samples in the collection.

Collections accepted for processing may be sent to MMSC either by sea or air cargo at the expense of the owner or agent. If prior arrangements are made with the Director, it is possible for MMSC to pay for air cargo shipments of collections upon their arrival in Tunisia.

When samples are received, preservatives and labels are checked. If necessary, preservatives and containers are replaced and a new preservative resistant label is added. Quantitative samples with standard collecting data are given priority over other samples. Otherwise, samples are processed according to the date received. Plankton samples with a volume larger than 10 mls are split into subsamples until a working 10 ml volume is reached. Whereas all macrobenthic specimens are sorted from bottom sediments, meiobenthos are sorted from a 100 ml split of the sediment and debris which has been passed through a 1 mm sieve. Plankton and benthos are sorted to major taxonomic categories only (about 75 categories each). Macroalgae are sorted to genus and fish to species.

Special processing is possible under certain conditions. In many instances MMSC finds it helpful to invite the owner or agent to be present during the initial phase of the processing of his collection, particularly where special techniques may be desirable. Such visits can be supported by MMSC funds. If funds for supplementary technicians can be provided by a collection's owner or agent, MMSC can train and assign temporary additional personnel to expedite the sorting of any collection or process it in a special manner.

Soon after a collection has been accepted for processing the owner or agent is requested to send MMSC a complete set of collection data and any requests for the return or special distribution of the sorted specimens and/or residues. MMSC does not retain any part of a collection without the owner's permission. Undesignated sorted specimens will be used by MMSC in filling requests for various taxa received from systematics (refer to the following section). Copies of all final processing and collection data will be sent to the owner or agent, all persons designated as recipients of sorted specimens, and all MMSC selected recipients of sorted specimens.

The owner or agent will also receive copies of information concerning the distribution and final identification of any specimens obtained from his samples.

Requests for sorted specimens

The distribution of sorted specimens to systematists who require such material for their research is an important function of the sorting center. Through its program of assistance in processing collections MMSC often can provide uncommon or difficult to obtain kinds of organisms from many geographical areas and from samples taken at various seasons of the year.

By writing the Director, a qualified systematist may obtain a specimen request form. When this form is completed and returned to MMSC copies will be sent to an appropriate advisory committee of recognized specialists who will evaluate the request. If the request is approved, specimens will be sent immediately if they are available and will be sent automatically as they become available from sorted samples.

Recipients of sorted specimens are requested to expedite identifications of the more common taxa and notify MMSC so that it may inform the sample's owner and other recipients of sorted specimens from the same sample. Taxa requiring more extensive study and perhaps new description should receive as prompt attention as possible. It is very important for MMSC to be kept informed of the systematist's progress. Several copies of each publication which involves MMSC sorted specimens should be sent to MMSC for inclusion in its own reprint collection and for distribution to the sample's owner or agent. Both the owner and MMSC should be appropriately cited in such publications.

Duplicate specimens of identified taxa are requested by MMSC who will distribute these as reference specimens to INSTOP and the National Museum of Natural History, Smithsonian Institution.

RECENT LITERATURE

ANTONIUS, A. 1968.
Faunistische Studien am
Roten Meer im Winter
1961/2 Teil IV.
Neue Convolutidae und
eine Bearbeitung des
Verwandtschaftskreises
Convoluta (Turbellaria,
Acoela). Zool. Jb.
Syst. Bd. 95 : 297-394.

AX, P. 1970.
Zur Morphologie von
Arenadiplosoma migrans
n.g.n.sp., einer vagilen
Ascidien-Kolonie aus dem
Mesopsammal der Nordsee
(Tunicata, Ascidiacea).
Z. Morph. Tiere, 66 :
323-336.

BARNETT, P.R.O. 1970.
The life cycles of two
species of Platychelipus
Brady (Harpacticoida)
on an intertidal mudflat.
Int. Rev. ges. Hydrobiol.
55, 169-195.

BIRO, K. 1969.
Eine neue Monhystera-
Art (Nematoda) aus dem
Balaton, Ungarn. - Opusc.
Zool. Bpest. 9 :
255 - 257.

BOGUTA, K.K. 1970.
Novaya turbellariya
Anaperus biaculeatus
sp.n. (Turbellaria Acoela)
iz sublitorali Belogo
morya. Zool. Zh. 49 :
198-209.

BRANDENBURG, J. 1970.
Die Reusenzelle (Cyrtocyte)
des Dinophilus (Archilannelida).
Z. Morph. Tiere 68 : 83-92.

BRUNET, M. 1970.
Turbellariées Schizorhyn-
chidaedes sables infra-
littoraux de la cote
Marseillaise. Cah. Biol.
Mar. 11 : 279-306.

BUCHANAN, J.B. &
LONGBOTTOM, M.R. 1970.
The determination of
organic matter in marine
muds : the effect of the
presence of coal and of the
routine determination of
protein. J. exp. mar. Biol.
Ecol. 5 : 158-169.

BURKOVSKY, I.V. 1969.
Quantitative data on the
distribution of psammo-
philic infusorians
according to depth and
the type of bottom
sediment in the inter-
tidal and sublittoral
zones of Valikaya Salma
(White Sea, Kandalaksha
Bay). Oceanologia Akad.
Nauk. S.S.S.R., 5 :
874-880. Russ. with
Engl. summary.

COTTARELLI, V. 1969.
Una nuova Parastenocaris
di Sardegna (Crustacea,
Cyreopoda, Harpacticoida)
Istituto Lombardo (Rend.
Sci.) B.103 : 255-68.

COTTARELLI, V. 1969.
Un nuovo Crustaceo di
acque interstiziali
Italiane : Psammopsyllus
pasquinni n.sp. (Harpacti-
coida, Cylindropsyllidae).
Istituto Lombardo (Rend.
Sc.) B.103 : 8-21.

COULL, B.C. 1970.
Two new species of
Phyllopodopsyllus
(Copepoda Harpacti-
coida) from Bermuda.
Crustaceana 19 (2).

COULL, B.C. 1970.
Harpacticoid copepods from
Barbados and Jamaica, W.I.
with descriptions of two
new species. Caribb. J.
Sci. 10 (3-4) : 127-33.

COULL, B.C. &
HERMAN, S.S. 1970.
Zoogeography and parallel
level-bottom communities
of the meiobenthic Harpacti-
coida (Crustacea, Copepoda)
of Bermuda. Oecologia 5 (4):
592-99.

DISALVO, L.H. 1969.
Isolation of bacteria from
the corallum of Porites
lobatum (Vaugh) and its
possible significance.
Am. Zool., 9 : 735-740.

✓ DISALVO, L.H. 1969.
On the existence of a
coral reef regenerative
sediment. Pacific
Science, 23 : 129.

EFFORD, I.E. 1969.
Energy transfer in Marion Lake,
British Columbia ; with
reference to fish feeding. RE
Verh. int. Verein. theor.
angew. Limnol. 17 : 104-8.
(Main energy pathways through
sediment discussed. Ed.)

ERNST, W. 1970.
ATP als Indikator
für die Biomasse
mariner Sedimente.
Oecologia 5 (1) :
56-60.

FREUDENHAMMER, F. 1970.
Sphaerolaimus uncinatus
nov. spec. (Nematoda,
Monhysterida) aus der
Tiefsee. -Veroff. Inst.
Meeresforsch. Bremerh.
12 : 455-461.

GIERE, O., 1970.
Untersuchungen zur
Mikrozonierung und
Ökologie mariner
Oligochaeten im Sylter
Watt. Veroff. Inst.
Meeresf. Bremerh. 12 :
491-529.

GANNING, B. &
F. WULFF. 1969.
The effects of bird
droppings on chemical
and biological dynamics
in brackish water rock-
pools. *Oikos*, 20 :
274-286.

GOLOMAN, C.R.,
GERLETTI, M.,
JAVORNICKY, P.,
SANTOZINI, U.M.,
AMEZAGA, E. 1968.
Primary productivity,
bacteria, phyto- and
zooplankton in Lake
Maggiore : correlations
and relationships with
ecological factors.
*Memorie Ist. ital. Idro-
biol.*, 23 : 49-127.
(Computer analyses of
environmental factors
and primary productivity
community diversity etc.
Ed.)

HAOL, G., KOTHBAUER, H.,
PETER, R., SWAWRA, E.
1970. Substratwahlver-
suche mit *Microhedyle*
milaschewitchii Kowalevsky
(Gastropoda, Opisthobranchia,
Acochlidia). *Oecologia*,
4 : 74-82.

HAGERMAN, L. 1970.
The influence of low
salinity on the survival
and spawning of *Elysia*
viridis (Montagu) (Opi-
stobranchia, Sacoglossa).
Sarsia, 42 : 1-6.

HAGERMAN, L. 1970.
The oxygen consumption
of Crangon vulgaris
(Fabricius) (Crustacea,
Natantia) in relation
to salinity. *Ophelia*,
7 : 282-292.

HOPPER, B.E. 1970.
Free-living marine
nematodes from Biscayne
Bay, Florida III.
Uerystominidae :
Pareurystomina bioso-
netlei sp.n. from
Biscayne Bay and
other localities.
Proc. Helminth. Soc.
Washington. 37 (2) :
175-8.

JACOBS, J. 1970.
Multiple determination
of Cyclomorphosis by
environmental factors.
A regression analysis of
Daphnia galeata Sars in
the field. *Oecologia* 5
(2) : 96-126. (Useful
treatment of field data by
regression analysis, could
be applicable to meiofauna.
Ed.).

J.B.JENNINGS und
J.B.COLAM. 1970.
Gut structure, digestive
physiology and food
storage in Pontonema
vulgaris (Nematoda :
Enoplida). *J. Zool.*
Lond. 161 : 211-221.

JOUIN, C. 1970.
Recherches sur les
Archiannelides inter-
stitielles. Systematique,
anatomie et developpement
des Protodrilidae et des
Nerillidae. These.

✓ KHAILOV, K.M. &
BURLAKOVA, Z.P. 1969.
Release of dissolved
organic matter by seaweeds
and distribution of their
total organic production
to inshore communities.
Limnol. Oceanogr. 14 :
521-7. (Of great im-
portance to energy con-
siderations in sediment
ecosystem. see McIntyre,
Munro & Steele, 1970).

KHERA, S. 1969.
^Nematodes from the banks
of still and running waters:
II. Kreisonema nandi n.g.,
n.sp. Kreisoneminae n. sub-
family. Family Leptolaimidae
from India - *Labdev. J. Sci.*
Technol. 7 B (1) : 64-66.

KIRSTEJER, E. 1969.
Nerilla digitata Wieser
(Archiannelida) von
Bimini, Bahamas, B.W.I.
Zool. Anz. 182 314 :
212-216.

KIRSTEUER, E. 1970.
On some species of
Meiobenthos worms
of the class Gnatho-
stomulida from
Barbados, West Indies.
Am. Mus. Novit. 2432 :
1-10.

LAWTON, J.H. &
RICHARDS, J. 1970.
Comparability of
Cartesian Diver,
Gilson, Warburg and
Winkler methods of
measuring the respi-
ratory rates of aquatic
invertebrates in eco-
logical studies.
Oecologia 4 (3) :
319-324.

LEE, J.J., TIETJEN, J.H.,
McENERY, M., STONE, R.J.,
RULLMAN, J. & MULLER, W.A.
1970. Cultivation and
physiological ecology of
members of salt marsh
epiphytic communities.
Helgol. wiss. Meere-
sunters. 20 : 136-56.

Longbottom, M.R. 1970.
The distribution of
Arenicola marina (L)
with particular refer-
ence to the effects of
particle size and
organic matter of
sediments. J. exp.
mar. Biol. Ecol. 2 :
138-157.

MCINTYRE, A.D.,
MUNRO, A.L.S. &
STEELE, J.H. 1970.
Energy flow in a
sand ecosystem 19-31
in J.H. Steele ed.
Marine Food Chains.
Oliver & Boyd,
Edinburgh. 552 pp.

MARSHALL, N. 1970.
Food transfer through
the lower trophic
levels of the benthic
environment. 52-66.
in J.H. Steele ed.
Marine Food Chains.
Oliver & Boyd,
Edinburgh. 552 pp.

MASRY, D. 1970.
Ecological study of
some sandy beaches
along the Israeli Medi-
terranean coast, with a
description of the inter-
stitial Harpacticoids
(Crustacea, Copepoda).
Cah. Biol. Mar. 11,
229-258.

MASRY, D. 1970.
Microcerberus remanei
israelis n. ssp. (Isopoda)
from the Mediterranean
shores of Israel.
Crustaceana (in print).

MASRY, D.,
& POR, F. D. 1970.
A new species and
a new sub-species
of Mystacocarida
(Crust.) from the
Mediterranean shores
of Israel. Isr. Journ.
Zool. 19 (in print).

MENKER, D. 1970.
Lebenszyklus,
Jugendentwicklung
und Geschlechts-
organe von Rhabdo-
molgus ruber
(Holothuroidea :
Apoda). Marine
Biology 6, 167-186.

✓ MEYER, S. P.,
HOPPER, B. E. &
CEFALU. 1970. *nt*
Ecological investi-
gations of the marine
nematode Metonchol-
aimus scissus. -
Marine Biology 6 :
43-47.

MORGAN, E. 1970.
The effect of envi-
ronmental factors on
the distribution of
the amphipod Pecten-
gammarus planicrurus
with particular
reference to grain
size. J. mar. biol.
Ass. U.K. 50 : 769-85.

✓ OLSON, T. A.,
RUEGER, M. E.,
SCOFIELD, J. I.
Flow-through polar-
ographic respiro-
meter for aquatic
animals. Hydro-
biologia 34 : 322-36. *check*

✓ PLATT, T.,
DICKIE, L. N. &
TRITES, R. W. 1970.
Spatial heterogeneity
of phytoplankton in a
near-shore environment.
J. Fish. Res. Bd. 27 :
1453-1473. (Sampling
problems analogous to
meiofaunal sampling.
Ed.)

RACHOR, E. 1970.
Systematische Bemerkungen
zur Familie der Oncholai-
midae (Nematoda Enoplida).
-Veroff. Inst. Meeres-
forsch. Bremerh. 12 :
443-453.

POLLOCK, L. W. 1970.
Batillipes dicrocercus n.sp.,
Stygarctus granulatus and
other tardigrada from
Woods Hole, Massachusetts,
U.S.A. Trans. Amer.
Microsc. Soc. 89 :
38-52.

REID, J.W. 1970.
The summer meio-
benthos of the
Pamlico River estu-
ary, North Carolina,
with particular
reference to the
harpacticoid copepods.
M.S. thesis. North
Carolina State Univ.
54 pp.

REMANE, A. 1969.
Wie erkennt man eine
genuine Brackwasser-
art? Limnologica
7 : 9-21.

RENAUD-MORNANT, J.
1970. Parasty-
garctus sterreri
n.sp., Tardigrade
marin nouveau de
l'Adriatique. Cah.
Biol. Mar. 11,
355-360.

RIEDL, R.J.M. 1970.
Semaegnathia a new
genus of Gnathosto-
mulida from the North
American coast. Int.
Rev. ges. Hydrobiol.
55 : 359-370.

RIEMANN, F. 1970.
Freilebende Nematoden
aus dem Grenzbereich
Meer-Sub-Wasser in
Kolumbien, Sudamerika.
-Veroff. Inst. Meeres-
forsch. Bremerh. 12 :
355-412.

RIEMANN, F. 1970.
Das Kiemenlucken-
system von Krebsen als
Lebensraum der Meiofauna,
mit Beschreibung freile-
bender Nematoden aus
karibischen, amphibisch
lebenden Decapoden.
-Veroff. Inst. Meeres-
forsch. Bremerh. 12 :
413-428.

RIEMAN, F., RACHOR, E.,
und FREUDENHAMMER, I.
1970. Das Seitenorgan
von Halalaimus. Zur
Morphologie eines vermut-
lich sensorischen Organs
von freilebenden Nematoden.
-Veroff. Inst. Meeresforsch.
Bremerh. 12 : 429-441.

✓ RHOADS, D.C. & YOUNG, D.K.
1970. The influence of
deposit-feeding organisms
on sediment stability and
community trophic structure.
J. mar. Res., 28 : 150-178.

SCHILKE, K. 1970.
Zur Morphologie und
Phylogenie der
Schizorhynchia
(Turbellaria, Kalyptorhynchia). Z.
Morph. Tiere 67 :
118-171.

SCHILKE, K. 1970.
Kalyptorhynchia
(Turbellaria) aus
dem Eulitoral der
deutschen Nordsee-
küste. Helg. wiss.
Meeresunters. 21 :
143-265.

Segerstrahle, S.G. 1969.
The competition factor
and the fauna of the
Baltic Sea. Limnologica
7 : 99-111.

Sterrerr, W. 1970.
On some species of Austro-
gnathia, Pterognathia
and Haplognathia nov.
gen. from the North Carol-
ina coast (Gnathostomulida). Int. Rev. ges.
Hydrobiol. 55 : 371-385.

TIETJEN, J.H. 1969.
The ecology of shallow-
water meiofauna in two
New England estuaries.
Oecologia 2 : 251-291.

TIETJEN, J.H. 1969.
Ecology and distribution
of deep-sea meiofauna off
North Carolina. Ann. Zool.
9 : 1134.

TIETJEN, J.H., LEE, J.J.,
RULLMAN, J., GREENGART, A.,
TROMPETER, J. 1970.
Gnotobiotic culture and
physiological ecology of
the marine nematode
Rhabditis marina Bastian.
Limnol. Oceanogr. 15 :
535-43.

TILZER, M. 1970.
Hydrobiology of
Marginal Caves. Part III.
Nerilla marginalis n.sp.
(Polychaeta, Archiannelida)
a recent Immigrant into a
Marginal Cave in Istra
(Yugosl). Int. Rev. ges.
Hydrobiol. 55 : 221-226.

TIMM, R.W. und
MARY T. FRANKLIN. 1969.
Two marine species of
Aphelenchoides.
Nematologica 15 : 370-375.

WESTHEIDE, W.
& BUNKE, D. 1970.
Aelosoma maritimum
nov. spec. die eiste
Salzwasserart aus der
Familie Aedosomatidae
(Annelida : Oligochaeta).
Helgolander wiss.
Meeresunters. 21 :
134-42.

WETZEL, R.G. 1969.
Factors influencing
photosynthesis and
excretion of dissolved
organic matter by
aquatic macrophytes
in hard-water lakes.
Verh. Verein. thepr.
angew. Limnol. 17 :
72-85. (The import-
ance of dissolved
organic matter of
macroalgae as source
of organic carbon for
the sediment ecosystem
affords interesting
parallel. Ed.).

YOUNG, D.K. 1969.
Okadaia elegans, a
tube-boring nudibranch
mollusc from central
and west Pacific.
Am. Zoologist, 9 :
903-907.