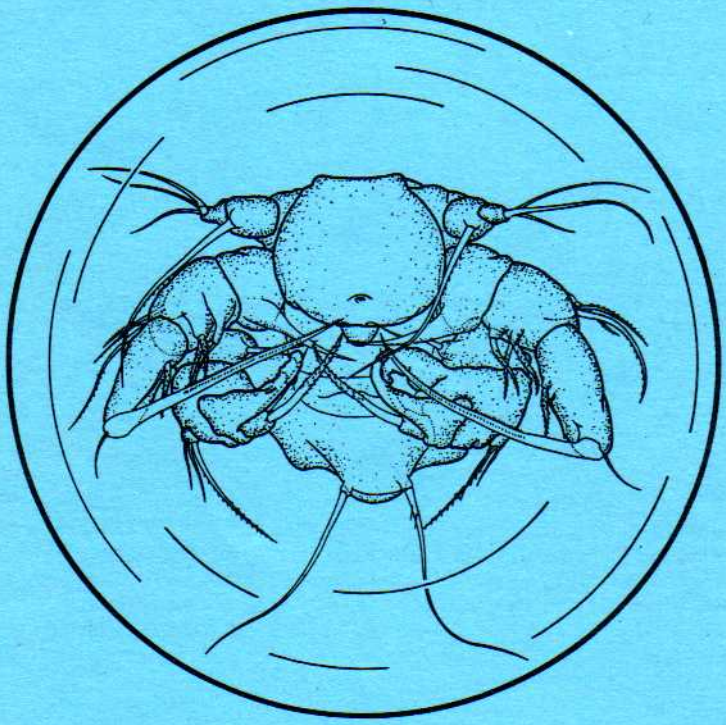
ISSN 0722-5741

MONOCULUS

Copepod Newsletter



Nr. 25 March 1993

bis

Bibliotheks- und Informationssystem der Universität Oldenburg
North American Edition distributed by National Museums of Canada

MONOCULUS

Copepod Newsletter

Number 25 March 1993

Edited by: H. Kurt Schminke, Fachbereich 7 (Biologie), Universität Oldenburg, Postfach 2503, D-2900 Oldenburg, Germany. Gerd Schriever, Institut für Hydrobiologie und Fischereiwissenschaft, Universität Hamburg, Zeiseweg 9, D-2000 Hamburg 50, Germany. Hans-Uwe Dahms, c/o Department of Biology, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

Cover by: M. Pottek, Oldenburg.

Produced by: H. Kurt Schminke and Bibliotheks- und Informationssystem (BIS) der Universität Oldenburg, Ammerländer Heerstr. 67/99, D-2900 Oldenburg, Germany.

Distributed in North America by: National Museums of Canada (Chang-tai Shih, National Museum of Natural Sciences, Zoology Divison, P.O. Box 3434, Station D, Ottawa, Ontario, Canada K1A 6P4).

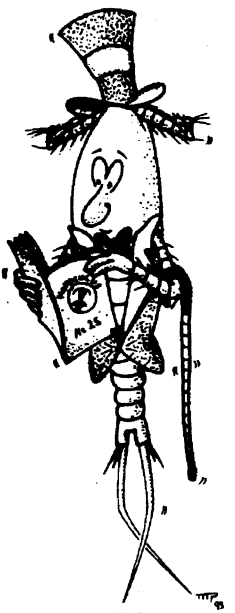
This issue has been typed by: Elke Feeken, Arbeitsgruppe Zoomorphologie, Fachbereich 7 (Biologie), Universität Oldenburg.

Deadline for the next issue of MONOCULUS: 1st October 1993

Editorial

With MONOCULUS 21 we celebrated the tenth birthday of our newsletter. This time we can celebrate its 25th issue. For this occasion we asked Dov Por to whose initiative back in 1980 we owe our beginnings, to look back and to comment on the newsletter, the conferences and the WAC. We also asked Frank Ferrari, the most productive contributor to the newsletter, to do the same. Read what they have to say.

You will have noticed that we have started experimenting with the computer in order to change the layout of the newsletter. We meant to present MONOCULUS in a new dress because we were told its actual outfit is rather old-fashioned. We have spared you the shock for this time because the inside is not finished yet. What we have done is replacing the portraits by photos because it has always been a tricky job to make drawings from the photos we had been given. Too often the faces on them were so small that the artist had more to guess than to portray. Accordingly the results have not always been satisfactory and even though there has never been overt protest we know that some victims did not look forward to the next issue of the newsletter without concern. Thanks to Klaus Kohlhage's computer skills future victims will have nothing to fear this respect.



The next conference approaches. Its organizers try to make our mouths water with a couple of contributions. Tom Bowman gives a historical account of copepod research at one of the host institutions of the conference, Janet Reid introduces the University of Maryland at Baltimore and its surroundings, and Frank Ferrari discloses parts of the programme. Who can resist? Hurry to your travel agent! The flights to Baltimore are almost booked out.

We also publish the financial statement for the Fourth International Conference on Copepoda in Karuizawa (Japan). It is our fault that it appears so late. We forgot to inlcude it last time and apologize for this omission. Apart from additional sales of the Proceedings there have been no changes since the end of February 1992. Shin-ichi Uye remarked that due to excess of printing costs for the Proceedings over previous estimates they had been in red, but thanks to donations from the members of the Plankton Society of Japan and Japanese authors of the Proceedings and to sales of the Proceedings the balance finally turned into black at the end of February 1992.

Twenty five issues of MONOCULUS, the first twenty one free of charge. This would not have been possible without help. The first to be thanked is Chang-tai Shih who contributed to the costs and mails the newsletter in North America. For India the same role has recently been taken over by M. Madhupratap. We have to thank Elke Feeken who replaces Angelika Sievers at the computer, and we have to thank Arjun Jagota at the University Library at Oldenburg who takes care that the manuscript is transformed into hundreds of printed issues.

The present issue owes its great variety of contributions to R. Böttger-Schnack, T. Bowman, G. Fava, F. Ferrari, M. Grygier, D. Por, J. Reid, S.-i. Uye, C. von Vaupel Klein, and, of course, to M. Pottek. We hope you recognize our old friend Coco, now matured to Mr. McSilliped.

Feelings and conlcusions about MONOCULUS, The Copepod Conferences and WAC

I am pleased to say that MONOCULUS is an unmitigated success. It is lively and extremely useful, if not necessary, for everybody in the field. It fulfils its role of bibliographic updating, serves (lately) as a very good vehicle for cross-information between the young researchers, and most of all, is a newsletter with a social touch, a vehicle which maintains friendship within our small community. The artistic outlay and the drawings, are small masterpieces, which would deserve, one day, to be published as a seperate album. My only criticism refers to the issue of the "perfect" descriptions. It is sound policy to promote good and trustworthy descriptions, but not an elitism. We are in fact discouraging young people, who do not have the time or the means or the talents, to deal with copepod taxonomy at the level of the presented models. Many of them are so much taken up by the worries of survival, that they will not have the time to spend on such detailed descriptions, as much as we would want them to do. While we need good descriptions, we need first of all to deal with the real business: to catch up with the description of the myriads of undescribed taxa. But you know my opinion on this: I voiced it already in London.

The conferences, in my view are somewhat lagging. True, that I did not attend the last conference. But, as I see it also from the preparations of the Baltimore meeting, there is no "backbone" to the conferences. We have to emphasize the broad-scoped, integrative discussions, like for instance, copepod genetics, feeding strategies, development, maxillopod relations, biogeography, aquaculture, not to speak of the permanent issue of the phylogeny and of the broad revisions. These "central" subjects should be covered by invited speakers. Instead, the conferences run the risk of turning into a stage for occasional papers only.

As to WAC, it seems to me that the whole organization is dormant. It would have much to do in the field of representing us "outside", like in ICSU, or in other International forums. It could approach funding agencies in order to obtain stipendia for young people, it could use the different channels to help Eastern European colleagues, etc.

In conclusion, it would be good to set aside a discussion on these "jubilee" issues at the next Conference.

F.D. Por, Jerusalem (Israel)

The Next Twenty-five Numbers and the Next Twenty-five Years

In its first number (October 1980), MONOCULUS outlined its responsibility; serving as a means of contact and as a forum for discussions of issues among copepodologists. Initially there were questions about a newsletter devoted specifically to copepods (MONOCULUS # 1, editorial). However, a concensus emerged about the study of copepods, called copepodology, which includes scientific disciplines that contribute to knowledge about copepod biology. Scientists who study any aspect of copepod biology comprise a community of copepodologists. Later MONOCULUS became the official newsletter of the World Association of Copepodologists (WAC) upon the latter's establishment at the 2nd International Conference on Copepoda in Ottawa, Canada. MONOCULUS's association with WAC is formally stated in WAC's bylaws (MONOCULUS # 11).

Over the last 12 years MONOCULUS has fulfilled its responsibility. By serving as a forum for discussions of ongoing research topics and of contemporary issues, it has defined copepodology. It also has identified copepodologists, historically through essays about scientists who have contributed to copepodology, and by listing authors of contemporary published research that contributes to copepodology.

This listing of published research papers is of critical interest to copepodologists. Research papers about copepods can be found in an increasing number of international journals. Managing this information has become a daunting task. There are too many tables of contents, abstracts, and articles to be easily assimilated. MONOCULUS provides a valuable information management service by printing authors, titles, and sources of all articles which are sent to the MONOCULUS Library.

MONOCULUS discovered that soliciting reports from copepodologists about research in progress is much more challenging. Because MONOCULUS is not a part of the published literature, many scientists are reluctant to present details about their research. Too many details may stimulate an early publication by competing laboratories so that research in progress is preempted and the priority for ideas lost. As a result, reports about research in progress are usually simple lists of general topics and have not had the stimulatory effect of initiating communication among copepodologists. This difficulty aside, through its service of information exchange and management MONOCULUS has defined copepodology and become a critical network for a community called copepodologists.

What then should MONOCULUS do or do differently in the next 25 numbers and the next 25 years? It is worth reiterating Dov Por's point (MONOCULUS # 1; quoted in the editorial); MONOCULUS should not became a journal of

copepodology. The number of scientific journals and other regular outlets for scientific research is over 40,000. Library acquisition budgets are strained under this load, and librarians from different institutions are now beginning to coordinate efforts to control costs for journal subscriptions. In this environment new journals will face a precarious existence.

What should MONOCULUS continue to do? Clearly work on the indentity of copepodologists should continue and it should be as inclusive as possible in keeping with the original concept. Interviews, short biographical and historical sketches should be solicited and printed whenever possible.

MONOCULUS also should continue its basic function of managing information. Compiling relevant literature, entering that information into the MONOCULUS database, and making that information available in different formats should be a high priority. In addition as personal computers become more common, a new challenge awaits MONOCULUS's information management skills; cataloging copepod databases.

The development of personal computers has made available to scientists very powerful electronic machines. Complex computing tasks which a few years ago were done on a large, mainframe computer with its attendant staff now can be done in an office. In the not-too-distant future, a copepodologist may spend as much time choosing a personal computer as choosing optical equipment.

The availability of sophisticated software programs has followed development of personal computers; database programs which compare and contrast items have become very useful. The ease with which a database can be generated on a personal computer will ensure rapid growth of databases about copepods. With these databases questions can be answered which never before could have been asked, and questions asked that never before could have been imagined. These new answers and new questions will suggest new research directions for copepodologists.

However, duplication of keystrokes will become a problem when dozens of copepodologists begin building dozens of different and independent databases. For example, in my laboratory I have a database in progress which is projected to comprise 2,500 records of the names of the genera of copepods, the authors of each name, and date of publication. Now suppose another copepodologist wishes to create a database about copepod genera. She/he could try to assemble all the literature sources which I have here at the Wilson Copepod Library and then keystroke each generic name; OR she/he could write to me and ask that I make my list of genera available in a format compatible with her/his database program. But how would that copepodologist know to write

to me? If a description of my database files were recorded at a central facility like the MONOCULUS Library, that exchange of information could be initiated easily. What about the responsibilities of MONOCULUS's readers? Should they change over the next 25 numbers and the next 25 years? YES! Clearly continued participation by a broad base of readers/contributors is **the key** to a strong newsletter like MONOCULUS. Readers will have to continue sending their reprints to the MONOCOLUS Library in a timely fashion if the Literature Section is to remain useful. Those readers interested in writing essays about various aspects of copepodology must be willing to contribute text to MONOCULUS. For example, I particularly would enjoy reading essays on early ecological research or early behavioral research on copepods. Finally readers should try to respond with more detailed information to requests by MONOCULUS about ongoing research projects. MONOCULUS should emphasize that open communication may lead to cooperation more often than competition, and that laboratories with related interests might build on each others work to the benefit of all parties. The issue of priority should be addressed if a section on research in progress is to be useful. Perhaps an informal understanding can be reached within the community so that if an individual feels that his/her research idea was preempted as a result of a contribution to a research in progress report, MONOCULUS will serve as an open forum to redress the grievence.

Over the last 12 plus years, MONOCULUS has played an invaluable role in defining copepodology and identifying copepodologists. MONOCULUS is now the nexus of that community. In the next 25 numbers and the next 25 years its relationships with its readers/contributors will continue to evolve, resulting in a better informed and more knowledgeable community of scientists.

F.D. Ferrari, Washington (U.S.A.)

Plaire et instruire

We are soon to come together for the fifth time. We are united by a group of organisms even though everyone looks at it from a different angle and overlooks a different portion of it. This is what makes these conferences so stimulating and attractive: planktologists, physiologists, systematists, ecologists, ethologists, parasitologists, aquaculturists mingle and become copepodologists. We have long since started to practise what E.O. Wilson visualizes as a future development.

In his article "The coming pluralization of biology and the stewardship of systematics" (BioScience 39: 242-245, 1989) he says: *" It is my impression that a thematic shift in biology has begun to occur... The principal division of labor will change from the present philosophical stress on levels of biological organization to more emphasis on taxonomic groups of organisms... The result will be a pluralization of biology and the return of the expert naturalist to a position of leadership in biological research. By pluralization I mean the increased esteem and growth of studies of particular groups of organisms for their own sake... The word fundamental will be applied not just to broad generalizations but also to important discoveries about individual taxa, even if the information cannot be readily applied to other taxa... As biologists increasingly commit themselves to particular groups of organisms, they seem destined to converge toward a common language and methodology."*

It is true, systematists have taken the lead in building up the MONOCULUS-community (Por, Stock, Kabata, Shih, Humes to name but a few) and they will continue to play an important role but, in my opinion, it is time the others became more active, e.g. as officers of the WAC or as contributors to the newsletter. In the past, the newsletter has had two main controversial discussions, one on morphological terminology, the other on quality of descriptions. Aren't there any controversial issues in the other fields of copepodology to be ventilated on the informal level of the newsletter? It is my impression that copepodologists don't make best use of the possibilities they have created themselves.

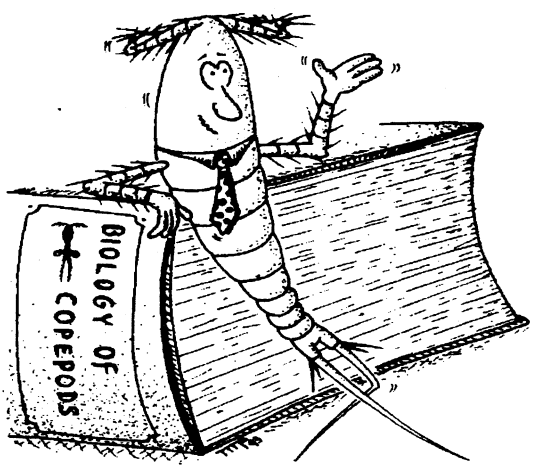
This applies to the newsletter, it applies to their society WAC (Dov Por is right!), it also applies to their two libraries: the WILSON-Library and the MONOCULUS-Library. I can only speak for the latter. In cases where requests have been precisely formulated, the MONOCULUS-Library has been able to help quickly, even with recent literature often from obscure journals. I therefore regret that the number of those is diminishing constantly who loyally donate their reprints to it. Science is a matter of communication and if we are to converge more and more to that unity that E.O. Wilson predicts, don't underestimate the usefulness of a functioning infrastructure!

On the scientific side, I feel, the integration of copepodology could considerably be accelerated if we knew more about the achievements and advances in the different fields. There is a lack of reviews. Frank Ferrari is right, we don't need a journal, but we definitely need something like "Advances in Copepodology" to appear regularly every 2 or 3 years. Let me just give a few examples that happen to come to my mind: "Biology of cyclopoids", Copepod nutrition", "Vertical migration in copepods", "Morphological adaptations to parasitism", "Biology of Tisbidae", "Copepod genetics", "Diapause in copepods" etc. There is truly no lack of topics and even though so much is known, many of us are ignorant. If we are to converge to a common language we had better know from each other what is talked about in the different fields.

"Advances in Copepodology" could have a not unwanted side effect. So far, the benefits for members of the WAC are restricted to the newsletter. These benefits could be expanded by offering "Advances of Copepodology" to members of the Society to a special price.

Reviews, obviously, are no task for the newsletter. MONOCULUS will continue on a lower, more personal level and, hopefully, will also continue according to the precept that Nicolas Boileau, the theorist of the classical period in French literature, had formulated for the classical French drama: plaire et instruire (please and instruct).

H.K.S.



5th INTERNATIONAL CONFERENCE ON COPEPODA

Preparations for the 5th International Conference on Copepoda are moving along. The following Platform Sessions have been scheduled:

Monday, June 7 -	GENETICS, PHYLOGENY;
Tuesday, June 8 -	MORPHOLOGY, CYCLOPID-MOSQUITO INTERACTIONS;
Wednesday, June 9 -	ACARTIA;
Thursday, June 10 -	REPRODUCTIVE BIOLOGY, VERTICAL DISTRIBUTION, SEASONAL CHANGE;
Friday, June 11 -	HORIZONTAL DISTRIBUTION, FEEDING, BEHAVIOR.

Poster Sections (Tuesday afternoon and evening will be devoted to posters) are on related subjects in the following areas:
MORPHOLOGY, REPRODUCTIVE BIOLOGY, SEASONAL CHANGE, HORIZONTAL DISTRIBUTION, FEEDING.

In addition I would be interested in hearing from MONOCULUS readers who will attend the conference and might be interested in an informal discussion about "how many species of copepods remain to be discovered?" This is a favorite topic of mine because it should bring together taxonomists interested in describing animals new to science and ecologists interested in describing new habitats. The input of ecologists is particularly important in aquatic environments where, I suspect, many new habitats with their new copepods remain to be discovered.

The best time for this discussion appears to be Wednesday night. Earlier that evening at the Maxilliped Lecture in Washington, D.C., Dr. Arthur G. Humes will discuss how many species of copepods are known. Perhaps after we return to campus those copepodologists interested in the question of new discoveries could gather for a discussion. Please let me know by fax 301.238.3361; phone 301.238.3797, mail Invertebrate Zoology/MSC, National Museum of Natural History, Smithsonian Institution Washington, D.C. 20560, U.S.A.; or in person, early in the conference if you are interested in contributing to this topic.

F.D. Ferrari, Wahington (U.S.A.)

Copepodology at the Smithsonian Institution

The British mineralogist and chemist, James Smithson (1765-1829) in his will left his estate to his nephew, specifying that if the latter died without heirs, as he did in 1835, the property was to go to the United States of America to found at Washington, DC, the Smithsonian Institution for the "increase and diffusion of Knowledge among men". After years of arguments about what the nature of the Institution should be, and even whether the United States should demean itself by accepting the bequest, the United States Congress passed an Act of Establishment in 1846 authorizing the Smithsonian Institution, to be governed by a Board of Regents composed of the Chief Justice of the Supreme Court, the Vice President, 3 senators, 3 members of the House, and 8 citizens. Congress also directed that a building be erected to house a museum, study-collections of scientific materials, a chemical laboratory, a library, an art gallery, and lecture rooms. This building, now commonly referred to as "the castle", was completed in 1857, and the specimens in the "National Cabinet of Curiosities" then housed in the Patent Office Building (now the National Building Museum) were transferred to the new Smithsonian Building. These included specimens from the U.S. Exploring Expedition, 1838-1842 (Wilkes Expedition), but unfortunately most of the copepods from that expedition, including the copepods described by James Dwight Dana, were aboard the Sloop of War Peacock when it was wrecked at the mouth of the Columbia River in 1841, and I have not been able to find any U.S. Exploring Expedition Copepoda in our collections.

The earliest publications on Copepoda by a Smithsonian biologist were 3 by Richard Rathbun (1852-1918) in 1884, 1886, and 1887 in which 8 new species and many more known species were described. That Rathbun's 8 species are still valid indicates the quality of his work. Rathbun then became engaged in administrative duties that prevented him from continuing taxonomic studies. He was succeeded in the Department of Marine Invertebrates in 1886 by his younger sister, Mary Jane Rathbun (1860-1943) and also James E. Benedict in 1889, both specialists in the Decapoda. Miss Rathbun, however, included in her 1905 list of the Crustacea of New England 76 species of Copepoda and 7 of Argulus.

The Smithsonian did not have a copepodologist per se on its staff until 1944, but for many years Charles Branch Wilson (1861-1941), State Teachers College, Westfield, Massachusetts, served as Scientific Collaborator. The majority of his works were published in the 2 now discontinued series, Proceedings and Bulletin of the United States National Museum. C.B. Wilson's work on Copepoda received the strong encouragement of Waldo L. Schmitt, who joined the staff in 1915 and became Head Curator of Biology in 1946. Dr. Wilson's fine library of copepod literature and his card files on authors and species were bequeathed to the Museum. These materials formed the nucleus of the ever-expanding C.B. Wilson Copepod Library of the Division of Crustacea, now a public resource for copepodologists.

In 1944 Mildred Stratton Wilson (no relation to C.B. Wilson), who had been studying Copepoda at the Museum since 1938, was appointed Assistant Curator, a position that she held until 1946, when she moved to Alaska with her husband. From 1946 until her death in 1973 she held the honorary titles of "Collaborator" and later "Research Associate". In her studies carried out in Alaska she received strong encouragement and support from the Museum. A sensitive biography of Mrs Wilson, including a list of her publications, was published by David M. Damkaer in Journal of Crustacean Biology 8 (1): 131-146.

In 1947 Paul L. Illg was appointed Associate Curator, a position he held until he left in 1952 to accept a position at the University of Washington. Illg's research centered on copepods associated with ascidians, the former Notodelphyoida, but he also produced a number of significant publications on other groups of Copepoda.

Two years after Illg left the Museum, I joined the staff of the Division of Marine Invertebrates. My copepod studies have been mainly on the Calanoida, with occasional forays into other groups. I retired in 1991 and continue as Curator Emeritus with several projects on copepods and other crustaceans (see Monoculus 17: 10-21).

In 1965 Roger F. Cressey was added to the staff of the Division of Crustacea, giving us expertise in Copepoda parasitizing fishes. In addition to his numerous publications in these copepods, Dr. Cressey has produced important works on the Branchiura and on the lizard fishes. Dr. Cressey retired in 1991, and continues his research as Curator Emeritus.

When the Smithsonian Oceanographic Sorting Center was discontinued in May 1992, Frank D. Ferrari, who had been Supervisor of the Zooplankton Section since 1974, was transferred as Curator to the Division of Crustacea where he is now responsible for the copepod collection. Dr. Ferrari's widespread interests in the Copepoda include taxonomy of the Oithonidae, asymmetry in Pleuromamma, mating behaviour, and patterns of development of leg

segmentation.

Since the 1960's, we have had a number of visitors in more or less temporary residence in the Division of Crustacea, working on various projects involving Copepoda. Some of them are listed here in approximate chronological order of their visits, together with their projects: Richard U. Gooding (copepods associated with sea urchins), Byron F. Morris (Attheyella associated with crayfishes), Gayle A. Heron (postnaupliar development of Antarctic Clausocalanus and Ctenocalanus), M. Saraswathy (Gaussia), Janet M. Bradford (Acartia, subgenus Acartiura), David M. Damkaer (Arctic Spinocalanidae), Douglas J. Barr (Pseudocyclopidae), Masahiro Dojiri (copepod parasites of fishes), and L. Amelia Vega-Pérez (Ctenocalanus).

For the last 10 years we have been fortunate to have as resident Research Associate (and for 1 year as senior Postdoctoral Fellow) Janet W. Reid, specializing in taxonomy, ecology, and biogeography of American freshwater Copepoda. Dr. Reid has made major improvements in our collections of these species and has also given much time to the Wilson Library.

T. Chad Walter joined the Department of Invertebrate Zoology in 1988 following 3 years at the Smithsonian Oceanographic Sorting Center working on Antartic Copepoda. In addition to publishing important works on the systematics of the Pseudodiaptomidae, Chad has donated much help to the Wilson Library.

The Smithsonian's copepod collection includes specimens preserved in 70% ethanol and specimens or parts of specimens mounted on slides. The slide collection in the Division of Crustacea is arranged by USNM catalog numbers, and there is no way to count quickly the number of slides of copepods. The catalogued samples in ethanol occupy more than 650 square feet (60+ m^2) of shelf space, and the catalog cards take up about 190 inches (almost 5 m) of drawer space. From this it is estimated that there are about 19,000 lots of catalogued copepods. The catalog is computerized, and printouts of each order can be made.

The collection also includes many uncatalogued samples, some unsorted, some identified, some not identified. These include important collections from Dwight Marsh, Stillman Wright, Mildred S. Wilson, Georgiana Deevey, and George D. Grice. Eventually the collections will be catalogued, but at present we lack the personnel required to undertake this important task.

Thomas E. Bowman, Washington (U.S.A.)

UMBC and Baltimore

UMBC (University of Maryland Baltimore County) is housed in modern facilities on a large suburban campus in the town of Catonsville, southwest of Baltimore City. The campus is a 15-minute drive from downtown Baltimore and is easily reachable from Baltimore-Washington International Airport (BWI), 5 miles (9 km) southeast. UMBC, founded in 1966, offers 28 undergraduate and 88 postgraduate degree programs in the liberal arts and sciences for 10,000 students. The campus buildings are compactly arranged with ample perimeter parking. The residence halls and the Faculty Dining Hall, where conference participants will eat, are situated within easy walking distance of the Ballroom and lecture halls where platform and poster presentations are scheduled. The residence halls offer double rooms with shared baths between pairs of rooms; a few single rooms are available. Some campus recreational facilities including jogging trails and tennis courts will be accessible to participants. There are no restaurants within walking distance of the campus. For individuals with their own vehicles, Ellicott City is about a 20 minutes' drive and has several good restaurants in the old town center. Daily mean high/low temperatures in June are 83/62 °F (28/17 °C), with an average 10 days of rain (usually showers) during the month.

Conference participants should plan to stay either on the UMBC campus or at the Sheraton International Hotel at BWI, where a block of rooms has been reserved. Information on prices and registration at the Sheraton will be provided in the 3rd Circular. Downtown Baltimore has a plethora of hotels, but the city center and UMBC are linked only by public buses which are slow and often delayed in heavy city traffic. Private taxis are available.

Baltimore City developed early as a major industrial center, port and railhead, where immigrants from many countries contributed to the city's tremendous diversity. This rich ethnic heritage may be sampled in the Lexington Market and Little Italy. The Inner Harbor in the old port area now offers water taxis, museums and ships to visit, the National Aquarium, the Maryland Science Center, and Harborplace with shopping galleries and restaurants. Baltimoreans have contributed notably to American culture in the areas of music (the national anthem, *The Star Spangled Banner* was written at Fort McHenry; a longstanding jazz tradition, including Eubie Blake; the Baltimore Opera and Symphony Orchestra), literature (Edgar Allan Poe), sports (Babe Ruth and the country's newest baseball park at Camden Yards), and science (Johns Hopkins and other distinguished research universities).

The local area abounds in sites of cultural, historical and natural interest within an easy day's drive from UMBC. Washington, D. C. is the home of the Smithsonian Institution and major federal government facilities. The City of Annapolis on the Chesapeake Bay has a yacht harbor and the U. S. Naval Academy near its well-preserved colonial center. A sense of the central importance of the Bay in the economics and culture of the region may be gained from visits to the many smaller towns and nature preserves around this world's largest estuary. The rich farmland of southern Pennsylvania supports the Amish and other traditional farmers who maintain a distinctive local culture and cuisine.

Access to UMBC: Conference participants traveling by air are *strongly urged* to plan to arrive at Baltimore-Washington International Airport. The Organizing Committee will provide transportation between BWI and UMBC on 6, 11 and 12 June for individuals who request this on their registration forms. If you must arrive at Washington National Airport (in downtown Washington) or Dulles International Airport (in Virginia, 40 miles/65 km southwest of Baltimore), plan to rent an automobile (cost about $35/day). Access other than by auto from Washington National Airport is best effected by taking the Metro subway or a taxi to Washington's Union Station, then an Amtrak train to downtown Baltimore, then a taxi or bus to UMBC (total cost about $30). From Dulles International Airport to BWI, the direct inter-airport shuttle costs $85; or, take a taxi or an express bus to Union Station, then an Amtrak train to Baltimore and taxi or bus to UMBC (total cost about $45; time, 4+ hr). Drivers coming from the north leave Interstate Highway 695 (Baltimore Beltway) at exit 12C-Wilkins Avenue and continue 1/2 mile (1 km) to the UMBC entrance on the left; from the south, take I-95 to exit 47B-Route 166, follow Route 166 toward Catonsville and follow signs to UMBC.

Financial statement for the Fourth International Conference on Copepoda

We are happy to announce that the financial statement for the Fourth International Conference on Copepoda is all right. Due to excess of the printing cost for the proceedings, we have been in red. Thanks to donation from the members of the Plankton Society of Japan and Japanese authors of the proceedings and sales of the proceedings, our balance eventually turned into the black at the end of February.

FOURTH INTERNATIONAL CONFERENCE ON COPEPODA

Financial statement as at 29 February, 1992

INCOME	(Japanese yen)
Registration fees	2,870,200
Grant from the Commemorative Association for the Japan World Exposition (1970)	2,000,000
Donation from 3rd Conference	231,500
Donation from the other organizations and companies	4,630,066
Donation from Japanese authors of proceedings	118,000
Donation from the members of the Plankton Society of Japan	919,250
Sales of proceedings	668,705
Bank interest	37,292
Total	11,475,013

Expenditure

Publication of proceedings	4,500,000
Printing of abstract	272,558
Speakers' expenses	3,769,200
Secretorial/postage	1,223,230
Honorarium	660,517
Social events	815,989
Donation to 5th Conference	200,000
Miscellaneous	23,032
Total	11,464,526

Further sales of proceedings will be donated to the Plankton Society of Japan.

The Organizing Committee of the Fourth International Conference on Copepoda: Dr. Sadami Kadota (chairman) Dr. Shin-ichi Uye (secretary), Dr. Shuhei Nishida (local arrangements).

7070707070707070 BIRTHDAY 70707070707070

Bruno Battaglia Bruno Battaglia

Interviewing copepodologists

I met professor Battaglia in 1963 for the first time. He was a highly esteemed Professor at Padova University, and I was a young student with a bold dream: to become a scientist. I knocked at the door of his study being in a blue funk, and my dream broke at once into tiny pieces: I was summoned to justify my writing of a pamphlet against the "old fashioned" teaching of Zoology.

And now I am again in his office, sitting in front of him, after thirty years spent together with our common love: Tisbe.

Q. Happy birthday professor! Our first meeting just flashed into my mind. Do you remember it too?

R. *Thank you very much for the "Happy birthday" distinguished colleague Giancarlo, but I am so busy that I almost forgot about it! I must however admit that it is a pleasure to recall together with you the first steps of a fascinating scientific adventure.*

Q-1. You never explained to me how it happened you fell in love with Tisbe reticulata, your first "sweetheart", as it were.

R-1. *This happened long ago, in the early fifties, when I was working at the Zoological Station in Naples. Searching for some organisms suitable for evolutionary studies in the sea, I found a tiny, beautiful copepod, which could be reared and cross-bred in the laboratory. Almost simultaneously and*

independently, Charles Bocquet in Roscoff found the same species, named it Tisbe reticulata, and in a brilliant way worked out the genetic basis of its extraordinary colour polymorphism. I felt that this feature might have an adaptive nature, but it was not so simple to provide an adequate demonstration. First of all, it was necessary to learn more genetics, especially in its population aspects. At the International Congress of Genetics in Bellagio (1953), I delivered a note on the possible adaptive meaning of the colour polymorphism in another harpacticoid copepod, namely Porcellidium. Theodosius Dobzhansky and Ernst Mayr, who attended that meeting, encouraged me to develop the adaptive hypothesis. Tisbe proved a much more suitable material for this purpose. From 1955 to 1958, Dobzhansky gave me the opportunity to work with him, first in Brazil and later at Columbia University in New York. The research material was Drosophila. I could thus develop the conceptual and methodological tools necessary for solving the numerous problems posed by Tisbe. In 1956, returning to Padova, I tried to utilise this creature as a possible Drosophila of the sea, and, to a large extent, quite successfully. It was then that I could demonstrate the selective nature of polychromatism in T.reticulata. It was a fundamental step in the birth of "marine genetics".

Q-2. Some colleagues assert you "invented" the marine Drosophila. Do you believe the comparison is appropriate?

R-2. *I think I have, at least in part, answered this question. Tisbe could be considered a sort of marine Drosophila, though with some limits, such as for instance the lack of giant chromosomes.*

Q-3. I think that several Tisbe species might become good models to test several ecological and evolutionary hypotheses. Do you agree?

R-3. *Yes. Tisbe, and perhaps even better Tigriopus, the harpacticoid inhabiting rock-pools, are excellent models to understand the mechanisms of speciation in the sea. Our finding of phenomena of "intraspecific relative incompatibility" has permitted to detect events of speciation "in fieri" and to relate some of them to ecological factors. Moreover, by means of such an approach, we were able to reveal the existence of an impressive number of sibling species. In the marine realm, many more species are still to be described in addition to those already known.*

Q-4. The present days' fashion is molecular biology. Do you think Tisbe is a good material for this approach?

R-4. *The utilization of electrophoretic techniques has considerably helped to disclose a number of biochemical polymorphisms under genetic control. Their possible selective meaning is still an open problem. A more adequate approach, both for ecogenetic purposes and for the assessment of phylogenetic relationships, might be in the study of mitochondrial DNA or of*

other molecular features now under investigation.

Q-5. Is there any suggestion you might give to a young copepodologist?

R-5. *A suggestion I would give to a young copepodologist is not to neglect the traditional taxonomy. Whatever organization level he may be interested in while studying a copepod, the basic step consists in the correct identification of species. This is particularly essential when working, as I am doing now, in areas like the Antarctic Ocean or, more in general, in marine "transition zones" such as brackish lagoons, fronts, convergencies, et cetera. In these areas you can in fact detect and understand new mechanisms of adaption to environmental stress and, often also mechanisms of species diversification.*

G. Fava, Pagnacco (Italy)

Kuni Hulsemann Kuni Hulsemann

Interviewing copepodologists

Dr. Kuni Hulsemann has retired from her position in the Taxonomische Arbeitsgruppe at the Biologische Anstalt Helgoland in October 1992. R. Böttger-Schnack talked with her about her life.

B-S: Mrs. Hulsemann, you are a well-known taxonomist of calanoid copepods. Can you tell us how your scientific career has started? Where did you study?

H: *I studied at the University of Munich. During my studies I developed interest in ornithology. I spent two years as a postdoc at the Ornithological Station Helgoland in Wilhelmshaven. Subject was the behaviour of the Common Gull,*

which is breeding mainly around the Baltic Sea. I spent some time in Heiligenhafen, where a large colony of these birds is located, and one breeding season on the island of Mellum in the North Sea.

B-S: During your study, who was the teacher who interested you most?

H: *It was mainly the zoologist Prof. W. Jacobs. He studied the behaviour of grasshoppers. He also led field trips to get to know bird-songs in early spring. I participated regularly; this was one of the stimulating experiences. It was natural to me to be a field ornithologist and to work out in the field. Interest in knowledge of and respect for nature was also instilled by my parents. My mother had grown up in the country and not only knew the flowers in the garden but many wildflowers, weeds and all trees by name.*

B-S: But you became a marine biologist, what were the reasons for your change from birds to plankton?

H: *After the two years of research on the Common gull I was married. At the time my husband was with a geophysical company making exploration for oil and salt domes at changing locations. The most his party stayed in one place was 3 months. I was moving about with him to various places between Schleswig-Holstein and southern France for more than three years. In 1958 my husband received a Fulbright travel grant to join Prof. K.O. Emery at the University of Southern California at Los Angeles in a marine geological project (a field that had always been his love). We crossed the Atlantic on a freighter. The project provided only for a part time position. That was very little money for two persons who also wanted to see something of the country. Eventually, Ken Emery arranged for me, after six months as library clerk, to meet Prof. J.L. Mohr of the Biology Department. This was a time of upswing of support for the Sciences. John Mohr had applied for and was granted funds for a project to analyze collections from recent expeditions to the Arctic Ocean. Meanwhile, however, his candidates had accepted other offers. I gladly took the opportunity to join his team. During the next three years I worked on these plankton and benthos collections, especially on Radiolaria, Pelecypoda and Bryozoa.*
In 1962 Ken Emery asked my husband if he would go with him to the Woods Hole Oceanographic Institution. We then moved to the East Coast of the Continent (Massachusetts). When I inquired at WHOI about putting my knowledge and ability to good use, Dr. G.D. Grice offered me to work with him on Copepoda. When I accepted I told him that I knew next to nothing about copepods. Even though, as a student, I had taken a marine plankton course in List/Sylt and limnological courses given by Prof. Jacobs and the botanist Prof. F. Gessner. Their teaching was very stimulating and relayed their enthusiasm. My previous experience with other taxonomic groups was the basis for this start with the copepods, and George Grice was very well able to introduce me into his field.

B-S: How long did you work together with George Grice?

H: *For about 6 years we worked on the taxonomy of mostly bathypelagic calanoids from various expeditions in the Atlantic and Indian Oceans. Then my husband moved to San Diego, California, to set up and head a West Coast laboratory for the United States Navy, and I accompanied him.*

B-S: How did George Grice react to your departure?

H: *He wished me good luck. He also phoned Dr. A. Fleminger at Scripps Institution of Oceanography, La Jolla (I did not know about it) telling him about my transfer ("Kuni is going to San Diego, watch out for her"). At San Diego we bought a house and I took my time to buy furniture and get settled. We liked the area around San Diego very much. When I eventually made an appointment with A. Fleminger, I was surprised to learn that he was awaiting my phone call. It still took a while until his proposal providing for my salary was granted. From then on until 1977 I worked together with A. Fleminger on calanoid copepods.*

B-S: Did you also work on other groups of copepods?

H: *No, I think there was only one species,* Megapontius gigas *(a siphonostomatoid, which was synonymized with* Hyalopontius typicus *Sars by Boxshall, 1979), but that was more incidental, because it was to me a strange looking animal and relatively large. Another species was the misophrioid* Benthomisophria cornuta.

B-S: How did you get along with the American way of life in general? Was it easy for you or did you experience difficulties?

H: *We adopted what we found good or appropriate and we did not adopt little things which we preferred otherwise. So I recall that we did not like the bread, because it was so spongy. To us, bread ought to have substance and not just be a tasteless substrate to hold the sausage or cheese. Therefore, in every town we tried to find a "German home bakery", which sold bread we liked. But with concern to other things the differences were not big. Most people we met were very friendly to us. Usually Americans are very open and not complicated.*

B-S: At Scripps you co-worked with A. Fleminger on the systematics of the calanoid copepod genus *Pontellina*. What was most important for you during that study?

H: *Well, it is difficult to find highlights. The direction of my studies shifted more towards the historical background, the age of the species and their relationships. It is not only a record of the present which we find in an assembly*

of species in a sample or in a suite of samples, but also the result of the past. For instance, we used currents or movements of continents to explain present-day distributions of species. Palaeontologists found out that copepods are a very old group. Unfortunately, chitin does not fossilize. Thus, our study was a detour or a different approach to be able to say something about the relative age of the species. These ideas came basically from A. Fleminger and I found them very stimulating. Abe only used the copepods for his goal because they occur in great numbers. He selected species of decent size usually living in warm surface waters. The pontellids are prominent representatives of such species; in addition, they show strong interspecific morphological differences and restricted geographical ranges.

B-S: You also worked on Calanus?

H: *Yes, we had in mind a world wide study of Calanus. But eventually we found that it was so much work that we had to break it up into chapters as that of the helgolandicus group in the North Atlantic. I had in mind to complete the southern Calanus in the Antarctic and South American and South African region. We had difficulties receiving enough specimens for statistical analyses. These were needed because the morphological differences were so small. We used suites of characters to differentiate between populations. It was very time consuming to take all these measurements, find promising combinations and do the calculations.*

B-S: Being involved in a major research programme and cooperation with A. Fleminger, what made you return to Germany?

H: *(laughing). Well, my husband found a position here. I stayed on in the United States for another year because we did not know whether or not it would continue. I followed him in 1977 when I was offered the position to head the Taxonomische Arbeitsgruppe at the Biologische Anstalt Helgoland, Hamburg.*

B-S: What was your field of research within the taxonomy group?

H: *I was to work on copepods from expeditions of German research vessels. When I came here, there were no samples for me to work on. I learned that the collections are more or less in the hands of those investigators who had collected them. I tried to find plankton samples somebody was then, not serveral years hence, willing to share; that took quite a while. Later, I also collected plankton samples myself. In 1979 I participated in the "Meteor"-Expedition to the equatorial Atlantic. Besides with taxonomy I concerned myself with species abundances, frequency of occurrence, geographical distribution and life history of calanoid copepod species.*

B-S: In total you have described in co-authorship with others the vast number

of 66 copepod species. Which one was your favourite?

H: *Oh well, maybe it was* Foxtonia, *because it was the first one. It came from a collection I worked on with George Grice but we singled it out and made a seperate description of it because it was so different. And perhaps* Megapontius *(see above) because it was also so different.*

B-S: And which of your publications has been the most interesting one for yourself?

H: *That is difficult to answer. Because at the time when I am involved I find each subject interesting. But I think I enjoyed the one with the development of* Drepanopus *most, because it included several aspects: A comparison to other genera, the pore patterns and distributional aspects. So, it was not just a plain description of developmental stages. I like to view my studies within the whole field of biology, also showing others that there is a relationship between what I am doing and what they are doing, even if our work has to be limited to chapters or mere aspects. However, we should not lose sight that these are part of the whole nature. Therefore, I consider myself a biologist; taxonomy is just a special aspect. This is a label because my position in the Biologische Anstalt was for 15 years that of a member of the taxonomy group.*

I don't have a real goal, a life goal: Let's say I want to explore such and such. More modestly, I want to contribute to the knowledge; some people think they have to prove themselves or to prove to others what they are worth. That aspect is not really in me nor in my work. I do it. Sometimes you get tired of doing something. But I think I have always been motivated by my interest in the field and in the subject, so, I suppose, I was in the lucky position not to consider my job as a drag. I always found interesting aspects in what I pursued. So I think I derived from my work enough interest and pleasure and from modest success satisfaction.

R. Böttger-Schnack, Kiel, Germany

P.S. Three copepod species have been named after Kuni Hülsemann. These are:

Euaugaptilus hulsemannae Matthews, 1972
Hyalopontius hulsemannae Boxshall, 1979
and *Kunihulsea arabica* Schulz, 1992.

The first two species are very large, measuring 7 and 5 mm in length, respectively, whereas the third one is extremely small (0,4 mm). Can this size range not be taken as a paradigm of the wide scope Kuni Hülsemann has covered with her work?

R. B-S

OFFER AND REQUEST CORNER

"At COPEPODA II in Ottawa, 1984, I have seen a photograph of a copepod (I think it was Euchirella venusta) having just produced a "net" of mucus threads in front of itself. As I am currently examining the details of the production of the composing jets of mucus, I would be much obliged for a copy of that photograph or for any information with regard to the whereabouts of the person who made it or kept it."

Kindly write to: J. Carel von Vaupel Klein, Division of Systematic Zoology, c/o National Museum of Natural History P. O. Box 9517, NL-2300 RA Leiden, The Netherlands.

Sphaerothylacus is a notodelphyid copepod, not a parasitic cirripede.

Sphaerothylacus polycarpae Sluiter, 1884 is a parasite that was found in three out of four specimens in the type lot of the tunicate Polycarpa cryptocarpa from Billiton Island, Indonesia. The 6-8 spherical parasites in each host were 0.5-2.5 mm across and were attached to the outer side of the branchial sac by a short peduncle with supposed roots that follow the main vessels. The spherical structure was interpreted as a mantle with a tiny aperture, surrounding a main body whose internal organs were described in detail. Eggs were found attachted to the inner mantle wall and two naupliar stages were noted.

Throughout most of the description, Sluiter (1884) compared this parasite to the Suctoria, now known as Rhizocephala, all of which are parasites of crustaceans, though he admitted some differences, such as the lack of frontolateral horns in the nauplii. He dismissed isopod or copepod affinities, entertained a relationship to the phyllopods (i.e., branchiopods) or cirripedes, and finally settled upon the idea that Spaerothylacus was a reduced lepadid barnacle not related to the "suctorians".

This last point has been misunderstood by later authors, who have assumed that Sluiter considered his parasite a rhizocephalan. Giard (1891) considered Sphaerothylacus a missing link between the Ascothoracida and Rhizocephala. Newman et al. (1969) assumed that this parasite was really a notodelphyid copepod, and the purpose of this note is to announce proof that this idea is correct.

The proof came in two stages. First Monniot (1987) announced new specimens

of Sphaerothylacus from Polycarpa cryptocarpa in New Caledonia, and that this problematic parasite was in fact a deformed notodelphyid copepod. The latter part of the announcement was based on my findings and was slightly premature. In 1985 Dr. Monniot had sent me the parasites under the impression that Sphaerothylacus was a rhizocephalan-like animal. But I dissected two of the larger specimens and found that they were galls containing a copepod at least superficially similar to Prophioseides ampullacea Ooishi, 1972. Dr. Ooishi examined the specimens in 1988 and confirmed that they were notodelphyiids, but not P. ampullacea. One undissected copepod from this lot and one shrivelled specimen on an SEM stub remain in my possession, as well as four undissected galls. Despite Monniot's pronouncement, there was as yet no firm proof that these copepods represented the same kind of parasite as the original specimens of S. polycarpae. The original description could not easily be reconciled with copepod anatomy, after all.

The second step of the proof involved a search for type specimens. Sluiter's specimens of S. polycarpae are not now to be found in Leiden nor in the Institute for Taxonomic Zoology in Amsterdam, but the host tunicates are housed in the latter museum. I borrowed them in 1988 and found that pieces of branchial sac, presumably bearing parasites, had been cut away. But two tiny spheres remained attached, one having been cut in half. I could not confirm that these were galls containing copepods, but nonetheless had them deposited in the crustacean collection in Amsterdam as possible syntypes of S. polycarpae (ZMA Co. 102913 and ZMA Co. 102914). In 1990 Dr. T. Nishikawa reexamined these tunicates at my request in an effort to resolve some taxonomic difficulties in the genus Polycarpa. He found yet another gall, O.8 mm wide, in the lectotype specimen of Polycarpa cryptocarpa. I dissected this and found a notodelphyid copepod similar to Monniot's inside, which completes the proof that Sphaerothylacus is a copepod, not a cirripede. Monniot's (1987) announcement was thus correct, but it is not yet certain that his and Sluiter's copepods belong to the same species. The specimen found by Nishikawa has also been deposited in Amsterdam (ZMA Co. 102915) as a syntype of S. polycarpae (it is likely that Sluiter did not see it, but we must give him the benefit of the doubt), with the intention that it eventually be described in detail and named the lectotype of the species. The thorax was heavily damaged in dissection, but the cephalic region is intact.

The entire Sphaerothylacus story is more involved. It includes histological study of additional specimens found by Monniot in 1990, my discovery of morphologically similar notodelphyid copepods from Polycarpa pigmentata in the Queensland Museum that do not make galls but live as endoparasites in the vessels of the branchial sac, the confused taxonomy of the host genus, and other facets. I would be very interested to hear from any specialist on notodelphyids or other parasitic copepods who might be interested in collaborating on the detailed redescription of Sphaerothylacus as a copepod an in ascertaining its precise systematic status in the Notodelphyidae.

REFERENCES

Giard, A. 1891. Observations sur les notes précédentes. Bull. Biol. Fr. Belg. 23: 96-99.

Monniot, C. 1987. Ascidies de Nouvelle-Calédonie. II. Les genres Polycarpa et Polyandrocarpa. Bull. Mus. Natn. Hist. Nat., Paris (4) 9A (2): 275-310.

Newman, W.A., V.A. Zullo & T.H. Withers. 1969. Cirripedia. In, R.C. Moore (ed.), Treatise on Invertebrate Paleontology, R (Arthropoda 4), 1: R206-R295.

Ooishi, S. 1972. Notodelphyid copepods associated with compound ascidians in Akkeshi Bay, Japan. Publ. Seto Mar. Biol. Lab. 19 (5): 303-325.

Sluiter, C.P. 1884. Über einen in Ascidien schmarotzenden Wurzelkrebs. Natuurk. Tijdschr. Nederl. Ind. 43: 201-224, 1 Plate.

Mark J. Grygier, Sesoko Marine Science Center, University of the Ryukyus, Sesoko 3422, Motobu-cho, Okinawa 905-02, Japan

Current research activities

Keiichi Kawabata, Kanazawa, Japan:

I am studying the ecology of copepods and began to learn their taxonomy. As a graduate student I investigated the ecology of zooplankters in Lake Biwa, the largest lake in Japan. Three species of copepods dominate the zooplankton community of the lake, and consequently I became a copepodologist. As for taxonomy I had Mesocyclops-problems in Lake Biwa.

Getting a job I moved to Kanazawa and changed my study field to lake Kahoku-gata. Many species of copepods are distributed in the lake, and I was forced to study taxonomy before ecology.

(Trivial addition to the `Preliminary list of copepodologists in Japan, MONOCULUS 20: 15-17', I was born in 1959, that is, I am young!)

Alvaro Morales-Ramirez, Kiel, Germany:

My early research field was the ecology of the zooplankton communities in

coral reefs. I have investigated the composition, distribution and seasonality of the zooplankton at Cahuita coral reef, Limon, Costa Rica. This work formed a part of my M.Sc. thesis, which I conduted at the Marine Science and Limnology Research Center, University of Costa Rica.

Now I am working on my Ph.D. at the Department of Marine Planktology at Marine Science Institute in Kiel, Germany under the supervision of Prof. Dr. J. Lenz. My investigation forms a part of the "Joint Global Ocean Flux Study", an international research effort aimed at investigating the role of the oceans in global turnover processes. I am studing the vertical and regional distribution and dynamics of the Mesozooplankton, specially copepods, in the North Atlantic. I am also investigating the role and potential contribution of the copepods to the vertical particle flux and its control on the phytoplankton population during a spring bloom, depending on size class. I am analysing aspects like biomass, organic matter, carbon contents, systematic composition and abundance. I am employing the multivariable technique to analyse the development and structure of the copepod community.

Eduardo Suárez Morales, Chetumal, Mexico:

My approach to copepods is and has to be diverse, since only a few Mexican scientists have a sound or marginal interest in Copepoda. Unfortunately, my administrative duties have prevented me from doing more for the group, but I always spare time enough to publish something.

My work with Copepoda includes faunistic inventories of pelagic copepods (mainly Calanoida) in areas where this group has not been studied sufficiently, as the oceanic waters of the southern Gulf of Mexico, or the coastal zone of the Yucatan Peninsula, including the Yucatan Channel. Since this particular area is strongly influenced by upwelling systems, I have tried to relate the abundance, distribution and diversity of local pelagic copepod populations, with the effect of the emerged waters. Species as *Nannocalanus minor*, *Temora stylifera* and *Eucalanus pileatus* are overwhelmingly abundant in upwelling areas. In the same area, some strictly bathypelagic copepods occurred, apparently transported vertically by the upwelling.

I could also study the copepod fauna of embayments along the coastal area of the eastern Yucatan Penisula. Serveral species of *Acartia, Labidocera* and *Corycaeus* were dominant. In the same area I found at least four new species of Monstrilloida, which are about to be published (Crustaceana, Bull. Mar. Sci.). This group has attracted me and I would like to go further in their study.

THE WORLD ASSOCIATION OF COPEPODOLOGISTS
WAC WAC ..... WAC WAC

WAC - TREASURER's REPORT 1991/92

1. The financial situation

	01.01. - 31.12.1991	01.01. - 31.12.1992
Balance forward	**16.142,80 DM**	**17.101,91 DM**
Deposits	2.796,28 DM	1.317,00 DM
Interests	1.088,21 DM	1.265,50 DM
Total	3.884, 49 DM	2.582,50 DM
Expenses		
Transfer to US $-account/Conference	2.000,00 DM	2.977,00 DM
Support of MONOCULUS 91/92	804,38 DM	668,20 DM
Account dues	121,00 DM	121,00 DM
Total	2,925,38 DM	3.766,20 DM
Balance	**17.101,91 DM**	**15.918,21 DM**

2. Development of the US-$-account at the Bell Savings Bank

Date	Description	Amount	Balance
12-31-91	Ending balance 91		1.437,02
01-25-92	Credit Curr. Exch	33.16	
	Credit Curr. Exch	8.53	
	Credit interest	5.06	1.483,77

Date	Description	Amount	Balance
02-25-92	Deposit check	46,00	
	Credit-interest	4,33	1.534,10
03-25-92	Credit interest	4,20	1.538,30
04-26-92	Deposit check	90,00	1.628,30
	Credit interest	4,76	1.633,06
05-25-92	Credit interest	4,47	1.637,53
05-28-92	Deposit check	319,00	1.956,53
05-28-92	Deposit check	169,00	2.125,53
06-05-92	Credit curr. Exch.	9,88	2.135,41
06-25-92	Credit interest	6,10	2.141,51
07-14-92	Deposit check	54,00	2.195,51
07-21-92	Deposit check	45,00	2.240,51
07-25-92	Credit interest	5,52	2.246,03
07-30-92	Credit interest	,51	2.246,54

The US account was closed shortly after the bank had been sold in May 1992 and the new management had closed the foreign account department. My attempts to have an account opened in the United States with the help of American colleagues has failed. I had hoped that we would have this new account until the end of 1992. I therefore kept 8 unendorsed checks of a total amount of US $ 2.395.54 which will now have to be endorsed on our German account. This will be done in early 1993. The account will then consist of DM 15.918,21 plus the equivalent of US $ 2.395,54 which will amount roughly to 20.000 DM.

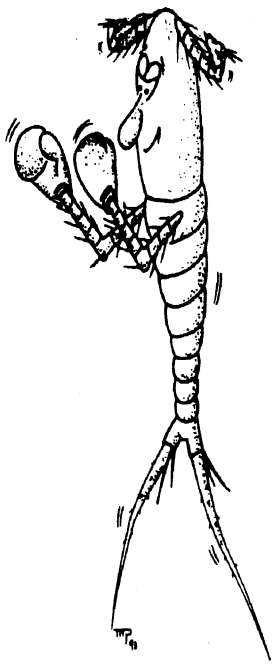
3. Comment on the financial situation

The total financial situation of WAC looks much better than it actually is. Several members have paid their dues well in advance. This can be seen from the development of the deposits since 1990. Deposits in 1990 were 6.048,33 DM, in 1991: about 3.200,- DM in 1992: about 2.800,- DM.

We thank all those who have made generous donations to the WAC.
These help to support those 71 members whose dues have been waived.

4. Danger to lose MONOCULUS - Watch the label

Recently, someone sent his dues remarking: "*I would hate to find myself at the sharp point of Dr. Schminke's pen, as do those who lag behind in fulfilling their obligation to WAC*". If everybody would feel the same we would be spared reminding another lot of members that they are on the brink of losing their membership and MONOCULUS at the same time. Those who are in arrears with their dues for more than two years had better pay them directly to me or at the Baltimore Conference at the latest.



Those to be on the alert are:

Arcos, Arinardi, Baars, Bell, Belmonte, Boileau, Bradford, Bron, Brownell, Chapman, Elmgren, Escribano, Fukuchi, Galassi, Green, Greene, Gustavson, Harding, Hopkins, Iishi, Jayarajan, Jones, Kimmerer, Kioerboe, Kurbjeweit, Landry, Locke, Lonsdale, Marcus, Meenakshikunjamma, Michel, Mizushima, Monniot, Moreira, Oh, Ohman, Othman, Pesce, Poulet, Razouls, Rippingale, Rouch, Roy, Schaber, Seguin, Sevigny, Stearns, Steib, Stephen, Thompson, Tiemann, West, Wyngaard, Yokouchi.

5. Candidate members

Applications for membership must be nominated by two active or founder members of the Association, those who have completed this application process are known as candidate members. The following list will be presented during the business meeting of the WAC at the Baltimore conference:

Maria Auxiliardora Amado, Sao Paulo, Brasil
Günther Arlt, Rostock, Germany
Genuario Belmonte, Lecce, Italy
Mark Boileau, Guelph, Canada
Zdenek Brandl, Ceske Budejovice, Czech Republic
Ann Bucklin, Woods Hole, USA
Wen-Been Chang, Taipeh, Taiwan
Mercedes Barrena Conradi, Puerto Real, Spain
Hans Dam, Groton, USA
B. Demeulenaere, Brussels, Belgium
Luca van Duren, Haren, The Netherlands
Ulrich Einsle, Konstanz, Germany
John Fornshell, Alexandria, USA
H. Georg Fransz, Abdemburg, The Netherlands
Santiago Gaviria, Santa Fee de Bogota, Columbia
Raymond Gaudy, Marseille, France
Mark Grygier, Silver Springs, USA
Reiichiro Hirota, Kumamoto, Japan
Sakurai Hisae, Tokyo, Japan
Barbara Hosfeld, Oldenburg, Germany
Adrianna Ianora, Naples, Italy
P. Jayarajan, Kerala, India
Elena Kolesnikova, Sevastopol, Ukraina
Wonchoel Lee, Seoul, Korea
Ching-Long Lin, Chiayi, Taiwan
Glenn Longley, San Marcos, USA
Pablo Jose Gonzales Lopez, Sevilla, Spain
Guilhermo Lotufo, Sao Paulo, Brasil
Brian Marcotte, Auburn, USA
Elena Markhaseva, St. Petersburg, Russia
Pedro Martinez Arbizu, Oldenburg, Germany
Donald McQueen, Toronto, Canada
Silvina Menu-Marque, Buenos Aires, Argentina
Cornelia Metz, Bremerhaven, Germany
Alvaro Morales, Kiel, Germany
Gloria Moreira, Sao Paulo, Brasil
Bong-Choel Oh, Tokyo, Japan
Annemarie Oldewage, Johannesburg, South Africa
Elizabeth Pavlova, Sevastopol, Ukraina
Irina Yu Prusova, Sevastopol, Ukraina
Larry S. Roberts, Homestead, USA
Manfred Rolke, Hamburg, Germany
Günter Sach, Kiel, Germany
Nabuhiro Saito, Shizuoka, Japan
Ludmila Sazhina, Sevastopol, Ukraina
W. Gary, Sprules, Mississauga, Canada
Stephan Stancyk, Columbia, USA
Karl Steib, Oftersheim, Germany
Fabio Stoch, Trieste, Italy
Rudi Strickler, Milwaukee, USA
Igor Yu Tamoykin, Sevastopol, Ukraina
David Thistle, Tallahassee, USA
Kai Vopel, Rostock, Germany
Dieter Walossek, Bonn, Germany
Craig Williamson, Bethlehem, USA
Marsh Youngbluth, Walpole, USA

REVIEW

Ax, P., 1987. The phylogenetic system - the systematization of organisms on the basis of their phylogenesis. Pp. xiii, 1-340, figs. 1-89. John Wiley & Sons, New York. Hardcover. ISBN 0-471-90754-5.

Though not specifically meant for copepodologists, this book of Ax is a fine and remarkably complete work, handbook and texbook in one, on all essential aspects of phylogenetic systematics: a field in which various of us are active, and something many others will be interested in. The original German edition was published in 1984, whereas the English translation is of 1987. The latter one has, however, been adapted (at least in part) according to the literature of the intermediary period 1983/84 to 1985/86.

Ax has analyzed all primary concepts of cladistic theory to the very core, and he has provided them with water-tight definitions, either existing or new: "homology", "species", "monophyly", "character", "(syn-)apomorphy", "convergence", "out-group comparison", "parsimony", etc., etc. He has an admirable way of explaining everything with the famous German precision: exact and clear, with supreme didactic skill, and each time supporting his to-the-point expositions with well-chosen, relevant examples. Despite the evident, meticulous care with which the author has selected his material, small errors or omissions are inevitable: e.g., Rana esculenta, the hybrid of Rana ridibunda and R. lessone is not fertile as such (p. 16), but only by crossing-back with one of the parent species.

Yet, one is also faced with Ax's rather arbitrary views upon (the necessity of) introducing new terminology. "Trichotomy" instead of "tritomy" simply is a linguistic error, but "systematization" for "classification" does look a kind of artificial. "Monophylum" as a new term for "monophyletic taxon" is not really a nuisance, but it certainly is no spectacular novelty, either. Definitely annoying is, in my opinion, replacing the simple and useful term "cladogram" by "diagram of phylogenetic relationship". The same is true for "phylogenesis" instead of "cladogenesis": the former may have priority, but as (a) the Code has no connection with biological terms, and (b) "cladogenesis" has been widely in use for decades already, the actual need for this switch is bound to remain obscure. Finally, the author's rejection of the phrase "the natural system", based solely on the observation that the term has been (and is being) used so often in different meanings or in an improper context, does not give the impression of a very strong argument.

In addition, the critical reader will meet with various inconsistencies, which are, however, to be ascribed for the better part to wide-spread current flaws in the theory of phylogenetic systematics. A few examples may serve to profilate this remark:

First, the species has been characterisized phenomenologically as an individual, without any consideration of recent papers positively defying this status (e.g., Nelson, 1985; cf. also Von Vaupel Klein, 1987): a case in which the current trend in cladistics has been followed a bit too easy.

Secondly, presenting the, indeed very fashionable, "evolutionary species concept" as the summit of species definitions has been supported correctly. In order to illustrate the alleged inadequacy of Mayr's "biological species definition", viz., Ax precisely cites only those papers in which the concept has been inadequately phrased (i.e., Mayr, 1969, 1975, 1982) but (very conveniently) skips those where a fully adequate version of the biological species definition can be found (Mayr, 1940, 1942, 1963). Bock (1979) has been cited to demonstrate that the biological species concept would be non-(or: two-) dimensional: but both Ax and Bock (as well as other proponents of the evolutionary definition) do not seem to visualize that the existence of a reproductive community, which the biological species concept describes, implies that there are parents and offspring, and that there will be grandchildren later on. Reproduction takes time, and this implicitly does add the third (time-) dimension to the classical, Mayrian concept.

Finally, following Willmann (1983, 1985) Ax theorizes that ancestors never can survive the birth of daughter species in additive speciation events. This attitude certainly is defendable, as far as the reconstruction of phylogenetic history as such can be performed independently of evolutionary theory, which implies, viz., that adopting the invariable extinction of an ancestral form as a methodological principle is not unwarranted. Yet, the opportunity of establishing the so desperately needed link with paleontology has been missed: quite a pity in view of the ongoing debate about Punctuated Equilibria and Phyletic Gradualism, in which survival of the parent is (or: should be) an important issue. Strangely, also, the author does not incorporate the useful term "pseudoextinction" (e.g., Stanley, 1979), for the non-surviving ancestral species giving rise to (two) new daughter species, into his vocabulary.

Notwithstanding the above critical remarks, however, Ax's book represents a valuable contribution to phylogenetic systematics, and it definitely deserves to be widely recognized as such. The taxonomists among us will find a useful compilation of current theory, while students and non-taxonomists will discover a sound piece of work, explaining in a remarkably calm and well-considered

way all relevant aspects of the theoretical framework of modern taxonomy. Indeed, a highly recommended book.

J. C. von Vaupel Klein

Bock, W. J., 1979. Bull. Carnegie Mus. nat. Hist., 13: 20-69.

Mayr, E., 1940. Am. Natural., 74: 249-278.
-------, 1942. Systematics and the origin of species from a viewpoint of a zoologist. Columbia Univ. Press, New York.
-------, 1963. Animal species and evolution. Belknap Press, Cambridge, Mass.
-------, 1969. Principles of systematic zoology. McGraw-Hill, New York.
-------, 1975. Grundlagen er zoologischen Systematik. P. Parey, Hamburg.
-------,1982. The growth of biological thought - diversity, evolution, and inheritance. Harvard Univ. Press, Cambridge, Mass.

Nelson, G. J., 1985. Cladistics, 1 (4): 386-389.

Stanley, S. M., 1979. Macroevolution - pattern and process. Freeman, San Francisco.

Vaupel Klein, J.C. von, 1987. Pp. 159-172 in: P. Hovenkamp et al., eds. Systematics and evolution: a matter of diversity. Utrecht Univ. Press, Utrecht.

Willmann, R., 1983. Z. zool. Syst. Evol.forsch., 21: 241-249.
----------, 1985. Die Art in Raum und Zeit. Das Artkonzept in der Biologie und Paläontologie. P. Parey, Berlin.

PLANKTIC/PLANKTONIC, NEKTIC/NEKTONIC, BENTHIC/BENTHONIC

A friend of mine, G. Haass (Kiel), recently brought to my attention a note by C. Emiliani (J. Paleont. 65 (2): 329, 1991) on terminology that, I suspect, could interest some of the readers of MONOCULUS. Emiliani writes: "Planktic derives from πλαγτός, meaning *floating around*; *nektic* derives from νήκτος, meaning *swimming*; and *benthic* derives from βένθος, meaning *the deep*. The proper derivations from these Greek words are *planktic, nektic, and benthic*, in analogy with a host of other derivations (laic from λάος, people; *-algic* from –άλγος for pain; -philic from –φίλος , friend; *logic* from λόγος , word; *-phobic* from –φόβος, fear; *cholic* from χόλος , wrath; *tonic* from τόνος, tone; *epic* from ἔπος; etc.). In the scientific literature one frequently encounters *planktonic* (for plaktic), *nektonic* (for nektic), and *benthonic* (for benthic). These derivations are incorrect. Only when the Greek word ends in - ων the proper adjective ending is *-onic* (*demonic* from δαίμων, god; *mnemonic* from μνήμων, mindful; *chthonic* from χθών, countryside; *laconic* from Λάκων; etc.).

As to ἤλεκτρον, the Greek word for amber that makes a spark when rubbed with cloth, the proper derivation is electric, not electronic. Unfortunately, the word *electronic* (pertaining to electrons, considered as particles or waves) has come to have a meaning quite different from that of the word *electric* (pertaining to electricity, considered as a fluid). We are therefore stuck with this inappropriate derivation.

In deference to the Greeks who did so much to get the western civilization going, I recommend that the terms *planktic*, *nektic*, and *benthic* be adhered to as appropriate derivations from the corresponding Greek terms".

How stylistically adaptable are copepodologists engaged in the study of planktic species?

H.K.S.

....ture-literature-literature-literature-literature-litera....

BOOK

BAYLY, I.A.E. - 1992: The non-marine Centropagidae (Copepoda: Calanoida) of the World, SPB Academic Publishing bv

1990

BOWMAN, Th.E. - 1990: Groundwater crustaceans of Spain, 13 (Copepoda Calanoida). Bijdr. Dierk. 60 (3/4): 293-298.

MARCOGLIESE, D.J. & D.K. CONE - 1990: Do brook charr (*Salvelinus fontinalis*) from insular Newfoundland have different parasites than their mainland counterparts? Can. J. Zool. 69: 809-811.

VILELA, M.H. & M.A.M. SAMPAYO - 1990: Estudos de plancton num viveiro fertilizado para crescimento de pos-larvas de Penaeus japonicus bate na Ria Formosa. Relat. Téc. Cient. INIP, Lisboa: (34) 1990: 1-29.

1991

BOWMAN, Th.E. - 1991: *Epischura fluviatilis* Herrick, 1883 (Copepoda: Calanoida: Temoridae), first report from South Carolina, with notes on sexual dimorphism in the caudal rami and its possible role in mating. J. Crust. Biol. 11 (3): 460-462.

BAYLY, I.A.E. & E.J. MALY - 1991: Correspondence: Copepod conundrums. Reply to Jefferson T. Turner. J. Biogeogr. 18: 468-469.

FERRARI, I., A. FARABEGOLI, A., PUGNETTI & E. STELLA - 1991: The occurrence of a calanoid Australasian species, *Boeckella triarticulata* (Thomson), in fish ponds of Northern Italy. Verh. Internat. Verein. Limnol. 24: 2822-2827.

FAVA, G. & C. FUSARI - 1991: Variations of life-history traits in marine and lagoon populations of the copepod *Tisbe holothuriae* Humes, grown under different salinities. In: COLOMBO, G. et.al. (eds.), Marine eutrophication and population dynamics, Proc. 25th EMBS: 169-173.

GOTTO, R.V. - 1991: Some aspects of host- and mate-finding in the symbiotic copepods of invertebrates. Bull. Plankton Soc., Japan, Spec. Vol: 19-23.

REID, J.W. - 1991: *Diacyclops albus* n.sp. and *Parastenocaris palmerae* n.sp. (Crustacea: Copepoda) from the meiofauna of a stream bed in Virginia, U.S.A. Can. J. Zool. 69: 2893-2902.

TURNER, J.T., - 1991: Correspondence: Copepod conundrums. Biogeography of Australasian freshwater centropagid copepods: vicariance or dispersal? J. Biogeogr. 18: 467-468.

1992

ACHUTHANKUTTY, C.T., S.R. SREEKUMARAN NAIR, VIJAYALAKSHMI R. NAIR, G. PADMAVATI & M. MADHUPRATAP - 1992: Microdistribution of zooplankton in the neustonic realm of the eastern Arabian Sea during southwest monsoon. In: DESAI, B.N. (ed.), Oceanography in the Indian Ocean, p. 177-189. Oxford & IBH, New Delhi.

CHECKLEY Jr.,D.M., S. UYE, M.J. DAGG, M.M. MULLIN, M. OMORI, T. ONBÉ & M.-y. ZHU - 1992: Diel variation of the zooplankton and its environment at neritic stations in the Inland Sea of Japan and the north-west Gulf of Mexico. J. Plankton Res. 14 (1): 1-40

CHECKLEY Jr.,D.M., M.J. DAGG & S.-i. UYE - 1992: Feeding, excretion and egg production by individuals and populations of the marine, planktonic copepods, *Acartia* spp. and *Centropages furcatus*. J. Plankton Res. 14 (1): 71-96.

CORDELL, J.R., C.A. MORGAN & C.A. SIMENSTAD - 1992: Occurrence of the Asian calanoid copepod *Pseudodiaptomus inopinus* in the zooplankton of the Columbia River estuary. J. Crust. Biol. 12 (2): 260-269.

DAHMS, H.-U. - 1992: Importance of zoosystematic research as demonstrated by the Antarctic meiofauna. Verh. Dtsch. Zool. Ges. 85 (2): 277-284.

DAHMS, H.-U. - 1992: Die Naupliusentwicklung der Süßwassercopepoden. Mikrokosmos 81 (9): 276-281.

DAHMS, H.-U. - 1992: Peltidiidae (Copepoda, Harpacticoida) from the Weddell Sea (Antarctica). Zool. Scr. 21 (2): 181-195.

DAHMS, H.-U. & C.H. FERNANDO - 1992: Naupliar development of *Mesocyclops aequatorialis similis* and *Thermocyclops consimilis* (Copepoda: Cyclopoida) from Lake Awasa, a tropical rift valley lake in Ethopia. Can. J. Zool. 70: 2283-2297.

DAHMS, H.-U. & M. POTTEK - 1992: *Metahuntemannia* Smirnov, 1946 and *Talpina* gen. nov. (Copepoda, Harpacticoida) from the deep-sea of the high Antarctic Weddell Sea with a description of eight new species. Microfauna Marina 7: 7-78.

DAHMS, H.-U. & H.K. SCHMINKE - 1992: Sea ice inhabiting Harpcticoida (Crustacea, Copepoda) of the Weddell Sea (Antarctica). Bull. Inst. Roy. Sci. Nat. Belgique, Biol. 62: 91-123.

DUCHOVNAY, A., J.W. REID & A. McINTOSH - 1992: *Thermocyclops crassus* (Crustacea: Copepoda) present in North America: a new record from Lake Champlain. J.Great Lakes Res. 18 (3): 415-419.

FIERS, F. - 1992: *Metis reducta* n.sp. and *Laubiera tercera* n.sp. (Harpacticoida, Metidae) from the southern coast of Papua New Guinea. Belg. J. Zool. 122 (1): 37-51.

FIERS, F. - 1992: A redescription of *Hemilaophonte janinae* Jakubisiak (Copepoda, Harpaticoida) a laophontid living in the gill chambers of the Common Spider Crab. Belg. J. Zool. 122 (2): 211-222.

GOSWAI, S.C., S.N. GAJBHIYE & G. PADMAVATI - 1992: Distribution of *Pleuromamma* (Copepoda: Metridiidae) along a north-south transect in the Indian Ocean. In: DESAI, B.N. (ed.), Oceanography of the Indian Ocean, p. 157-166, Oxford & IBH, New Delhi.

HERMAN, R.L. & H.-U. DAHMS - 1992: Meiofauna communities along a depth transect off Halley Bay (Weddell Sea-Antarctica). Polar Biol. 12: 313-320.

HO, J.-S. - 1992: Phylogenetic analysis of the Myicolidae, a family of poecilostome copepods chiefly parasitic in marine bivalve mollusks. Acta Zool. Taiwanica 3 (2): 67-77.

HO, J.-S. & W.J. WARDLE - 1992: *Pholadicola intestinalis*, new genus and species, a clausidiid copepod parasitic in a deep- burrowing clam from Texas. Bull. Mar. Sci. 51 (1): 37-44.

HO, J.-S., P. JAYARAJAN & S. RADHAKRISHNAN - 1992: Copepods of the family Ergasilidae (Poecilostomatoida) parasitic on coastal fishes of Kerala, India. J. Nat. Hist. 26: 1227-1241.

HUANG, C., S. UYE & T. ONBÉ - 1992: Ontogenetic diel vertical migration of the planktonic copepod *Calanus sinicus* in the Inland Sea of Japan. II. Late fall and early spring. Mar. Biol. 113: 391-400.

HUYS, R., S. OHTSUKA, G.A. BOXSHALL & T. ITO - 1992: *Itoitantulus misophricola* gen. et sp. nov.: first record of Tantulocarida (Crustacea: Maxillopoda) in the North Pacific region. Zool. Sci. 9: 875-886.

ISHIDA, T. - 1992: *Bryocamptus pacificus*, a new harpacticoid copepod

(Crustacea) from Japan and the neighbouring areas. Bull. Biogeogr. Soc. Japan, 47 (8): 77-81.

KIM, I.-H. - 1992: *Herrmannella hoonsooi*, a new species of Copepoda (Poecilostomatoida, Sabelliphilidae) associated with a bivalve from Korea. Korean J. Syst. Zool., Special Issue 3: 77-84.

KIM, I.-H. - 1992: Two species of Copepoda (Poecilostomatoida, Siphonostomatoida) associated with Asteroida in Korea. Korean J. Syst. Zool. 8 (1): 57-68.

KIM, I.-H. & J.-S. HO - 1992: Copepodid stages of *Hemicyclops ctenidis* Ho and Kim, 1990 (Clausidiidae), a poecilostomatoid copepod associated with a polychaete. J. Crust. Biol.12 (4): 631-646.

LINDLEY, J.A. - 1992: Resistant eggs of the Centropagoidea (Copepoda: Calanoida): A possible predadaptation to colonization of inland waters. J. Crust. Biol. 12 (3): 368-371.

MADHUPRATAP, M. & P. HARIDAS - 1992: New species of *Pseudodiaptomus* (Copepoda: Calanoida) from the salt pans of the Gulf of Kutch, India and a comment on its speciation. J. Plankton Res. 14 (4): 555-562.

MADHUPRATAP, M., P. HARIDAS, N. RAMAIAH & C.T. ACHUTHANKUTTY - 1992: Zooplankton of the southwest coast of India: abundance, composition, temporal and spatial variability in 1987. In: DESAI, B.N. (ed.), Oceanography of the Indian Ocean, p. 99-112, Oxford & IBH, New Delhi.

MARCOGLIESE, D.J. - 1992: Metazoan parasites of sticklebacks on Sable Island, Northwest Atlantic Ocean: biogeographic considerations. J. Fish Biol. 41: 399-407.

MARCOGLIESE, D.J. & G.W. ESCH - 1992: Alterations of vertical distribution and migration of zooplankton in relation to temperature. Am. Midl. Nat.

128: 139-155.

MARCOGLIESE, D.J., G.W. ESCH & R.V. DIMOCK JR.- 1992: Alterations in zooplankton community structure after selenium-induced replacement of a fish community: a natural whole-lake experiment. Hydrobiologia 242: 19-32.

MIELKE, W. - 1992: Description of some benthic Copepoda from Chile and a discussion on the relationships of *Paraschizopera* and *Schizopera* (Diosaccidae). Microfauna Marina 7: 79-100.

MIELKE, W. - 1992: Six representatives of the Tetragonicipitidae (Copepoda) from Costa Rica. Microfauna Marina 7: 101-146.

OHTSUKA, S. - 1992: *Tortanus (Acutanus) angularis*, new subgenus and new species (Copepoda: Calanoida), from the Caribbean Sea, with remarks on the subgenera in the genus *Tortanus*. Proc. Biol. Soc. Wash. 105 (2): 255-267.

OHTSUKA, S. - 1992: Calanoid copepods collected from the nearbottom in Tanabe Bay on the Pacific coast of the middle Honshu, Japan. IV. Pseudocyclopiidae. Publ. Seto Mar. Biol. Lab. 35 (4/5): 295-301.

OHTSUKA, S, R. HUYS, G.A. BOXSHALL & T. ITO - 1992: *Misophriopsis okinawensis* sp.nov. (Crustacea: Copepoda) from hyperbenthic waters off Okinawa, South Japan, with definitions of related genera *Misophria* Boeck, 1864 and *Stygomisophria* gen.nov. Zool. Sci. 9: 859-874.

OHTSUKA, S., Y.H. YOON & Y. ENDO - 1992: Taxonomic studies on brackish copepods in Korean waters. I Redescription of *Tortanus dextrilobatus* Chen and Zhang, 1965 from Korean waters, with remarks on zoogeography of the subgenus *Eutortanus*. J. Ocean. Soc. Korea, 27 (2): 112-122.

RAYNER, N.A. - 1992: Revision of the freshwater diaptomid genus *Lovenula*

(Crustacea, Copepoda) in Africa. Ann. S. Afr. Mus. 101 (9): 297-332.

REID, J.W. - 1992: Copepoda (Crustacea) from fresh waters of the Florida Everglades, U.S.A., with a description of *Eucyclops conrowae* n.sp. Trans. Am. Microsc. Soc. 111 (3): 229-254.

REID, J.W. - 1992: *Acanthocyclops pennaki* n.sp. (Copepoda: Cyclopoida) from the hyporheic zone of the South Platte River, Colorado, U.S.A. Trans. Am. Microsc. Soc. 111 (4): 269-277.

REID, J.W. - 1992: Redescription of *Diacyclops nearcticus* (Kiefer, 1934) and description of four similar new congeners from North America, with comments on *D. crassicaudis* (G.O. Sars, 1863) and *D. crassicaudis* var. *brachycercus* (Kiefer, 1927) (Crustacea: Copepoda). Can. J. Zool. 70: 1445-1469.

REID, J.W. & B.H. KAY - 1992: *Mesocyclops guangxiensis*, new species, and new records of four congeners (Crustacea: Copepoda: Cyclopidae) from China, Laos, and Vietnam. Proc. Biol. Soc. Wash. 105 (2): 331-342.

SÄRKKÄ, J. - 1992: Effects of eutrophication and organic loading on the occurrence of profundal harpacticoids in a lake in southern Finland. Environ. Monit. Assessm. 21: 211-223.

SCHRIEVER, G., H. BLUHM, A. BOETIUS, C. BOROWSKI, C. BUSSAU & H. THIEL - 1992: Discol - Precautionary large scale environmental impact studies for future polymetallic nodule mining from the deep sea.In: MANANA, R. (ed.), The Mining Outlook. Proc. 15th World Mining Congress, Madrid 2: 1311-1319.

SCHULZ, K. - 1992: *Kunihulsea arabica*, a new genus and species of calanoid copepod from the Arabian Sea. Mitt. hamb. zool. Mus. Inst. 89: 175-180.

SREEKUMARAN NAIR, S.R., V.P. DEVASSY & M: MADHUPRATAP - 1992: Blooms of phytoplankton along the west coast of India associated with nutrient enrichment and the response of zooplankton. Science of the Total Environment, Suppl. 1992: 819-828, Elsevier Science Publishers B.V., Amsterdam.

TANIMURA, A. - 1992: Postembryonic development of *Paralabidocera antarctica* (I.C. Thompson) (Copepoda, Calanoida) from the fast ice near Syowa Station, Antarctica. Hydrobiologia 245: 109-128.

UYE, S-i. & N. SHIBUNO - 1992: Reproductive biology of the planktonic copepod *Paracalanus* sp. in the Inland Sea of Japan. J. Plankton Res. 14 (3): 343-358.

UYE, S-i., T. YAMAOKA & T. FUJISAWA - 1992: Are tidal fronts good recruitment areas for herbivorous copepods? Fish. Oceanogr. 1 (3): 216-226.

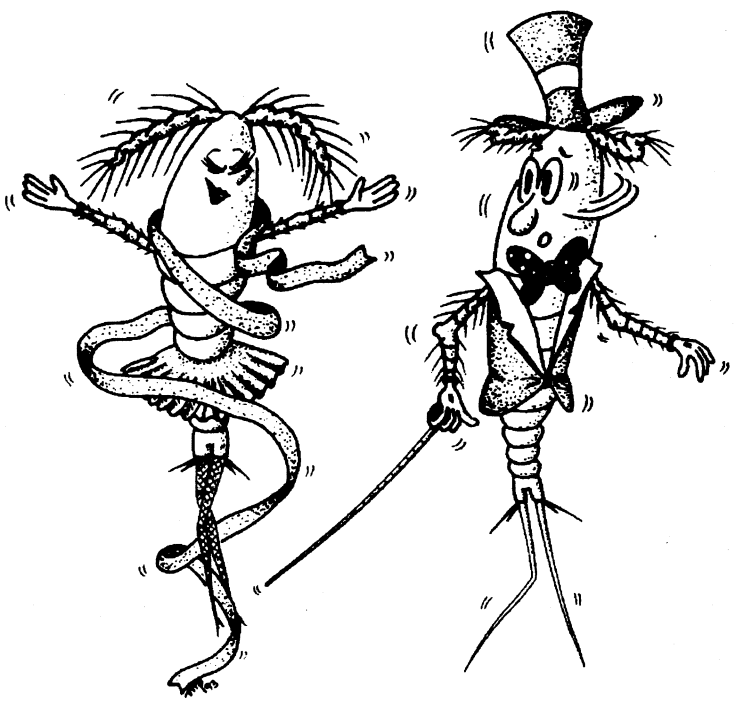
VEGA-PEREZ, L.A. & T.E. BOWMAN - 1992: Description of the pelagic copepod, *Ctenocalanus heronae* Vega-Perez and Bowman, from off Sao Paulo, Brazil (Calanoida: Clausocalanidae). Proc. Biol. Soc. Wash. 105 (1): 97-101.

VILELA, M.H. - 1992: Mass culture and nutritional quality of the marine copepod *Tigriopus brevicornis* Müller. Bol. Inst. Nac. Invest. Pescas, Lisboa 17: 49-63.

1993

DAHMS, H.-U. & C.H. FERNANDO - 1993: Naupliar development of *Mesocyclops* cf. *thermocyclopoides* Harada, 1931 and *Thermocyclops decipiens* (Kiefer, 1929) (Copepoda: Cyclopoida) from Beira Lake, Sri Lanka. J. Plankton Res. 15 (1): 9-26.

MARIN, V.H. & S.B. SCHNACK-SCHIEL - 1993: The occurrence of *Rhincalanus gigas*, *Calanoides acutus*, and *Calanus propinquus* (Copepoda: Calanoida) in late May in the area of the Antarctic Peninsula. Polar Biol. 13: 35-40.



DIRECTORY OF COPEPODOLOGISTS

HISAE, SAKURAI

4-7-38 Fijimi-cho
Higashimuayama
Tokyo 189

JAPAN

JAYARAJAN, P.

Department of
Aquatic Biology & Fisheries
University of Kerala
Trivandrum 695007

INDIA

MENU-MARQUE, SILVINA Dr.

Arcos 3848
1429 Buenos Aires

ARGENTINA

METZ, CORNELIA

Alfred-Wegener-Institut
für Polar- und
Meeres- forschung
Columbusstr.

D-W-2850 Bremerhaven

GERMANY

PRUSOVA, IRINA YU Dr.

The Institute of Biology
of the Southern Seas
Plankton Department
2 Nakhimov Avenue
335000 Sevastopol

UKRAINA

TAMOYKIN, IGOR Dr.

The Institute of Biology
of the Southern Seas
Plankton Department
2 Nakhimov Avenue
335000 Sevastopol

UKRAINA

VOPEL, KAI

Universität Rostock
Fachbereich Biologie
Freiligrathstr. 7/8
D-O-2500 Rostock

GERMANY

Change of address

CHOW-FRASER, PATRICIA Dr.

McMaster University
Department of Biology
1280 Main Street West
Hamilton, Ontario

CANADA L8S 4K1

FAVA, GIANCARLO Prof.

Università di Udine
Dipartimento di Scienze
della Produzione Animale
Via S. Mauro 2
I-33010 Pagnacco (Ud).

ITALY

FLÖßNER, DIETRICH Dr.

KAI e.V. - WIP
Institut für Ökologie
AG Limnologie
Beutenbergstr. 11
D-O-6900 Jena

GERMANY

KAWABATA, KEIICHI Dr.

Department of Biology
Faculty of Education
Kanazawa University
Kakuma-machi
Kanazawa, 920-11

JAPAN

KUKERT, H. Dr.

Alfred-Wegener-Institut
für Polar- und Meeresforschung
Columbusstr.
D-W-2850 Bremerhaven

GERMANY

MARCOTTE, BRIAN Dr.

S.A.I. Foundation
49 Lake Street
Auburn, ME 04210

USA

OHTSUKA, SUSUMI

Fisheries Laboratory
Hiroshima University
1294 Takehara-cho,
Takehara
Hiroshima 725

JAPAN

VUORINEN, ILPPO Dr.

Archipelago Sea Research
Institute
University of Turku
SF-20500 Turku

FINLAND

President:
Dr. A.G. Humes
BUMP
Marine Biological Laboratory
Woods Hole, Mass. 02543
U.S.A.

Vicepresident:
Dr. G.A. Boxshall
British Museum (Nat. Hist.)
Cromwell Road
London SW7 5BD
England

General Secretary:
Dr. C.J. Corkett
Biology Department
Dalhousie University
Halifax, Nova Scotia
Canada B3H 4J1

Treasurer:
Dr. G. Schriever
Institut für Hydrobiologie
und Fischereiwissenschaft
Universität Hamburg
Zeiseweg 9
D-W- 2000 Hamburg 50
Germany

Local Secretary
Fifth Conference on Copepoda:

Dr. B.P. Bradley
Department of Biological Sciences
University of Maryland
Baltimore, Maryland 21228
U.S.A.

Executive Council:
Dr. S.-i. Uye (Japan)
Dr. J.-s. Ho (U.S.A.)
Dr. J.G. Greenwood (Australia)
Dr. F.D. Ferrari (U.S.A.)

Membership of the WAC:
Any person interested in any aspect of the study of Copepoda is eligible for membership of the WAC. Applicants for membership must be nominated by two active members of the Association. Those interested in becoming a member of the WAC write to the General Secretary for application form and other information.

Dues:
Dues are payable by all members (active and candidate members). It is possible to ask to have the dues waived or reduced by writing to the President and giving reasons. Dues are at 8,00 US $ (or 13,00 DM) per annum and may be paid on the account No. 72 33 190, Commerzbank Kiel, Germany (mark "WAC, c/o Dr. G. Schriever"). Europeans may send their personal euro-cheques in German Marks. Americans and Canadians should send their personal cheques, while all others should use international money orders or bank drafts in US $. Those who want to pay by postal money order may use the account No 346508-303, Postgiroamt Hannover, Germany (mark "c/o Dr. H.K. Schminke"). Dues may also be paid in person at WAC conferences.

Newsletter:
All members receive the newsletter MONOCULUS which appears at least once a year.

MONOCULUS-Library:
This library is meant to help with literature problems. At present it contains about 12.000 documents (books and reprints, either original or copied). **To keep the library up-to-date everyone is asked to regularly send reprints of his/her publications to it**. In case of literature problems write to the library and ask for having articles copied. This service has to be paid for when the request amounts to more than a certain number of pages. Send your reprints and address your request to: MONOCLUS-Library, c/o Dr. H.K. Schminke, Fachbereich 7 (Biologie), Universität Oldenburg, Postfach 2503, D-W- 2900 Oldenburg, Germany.