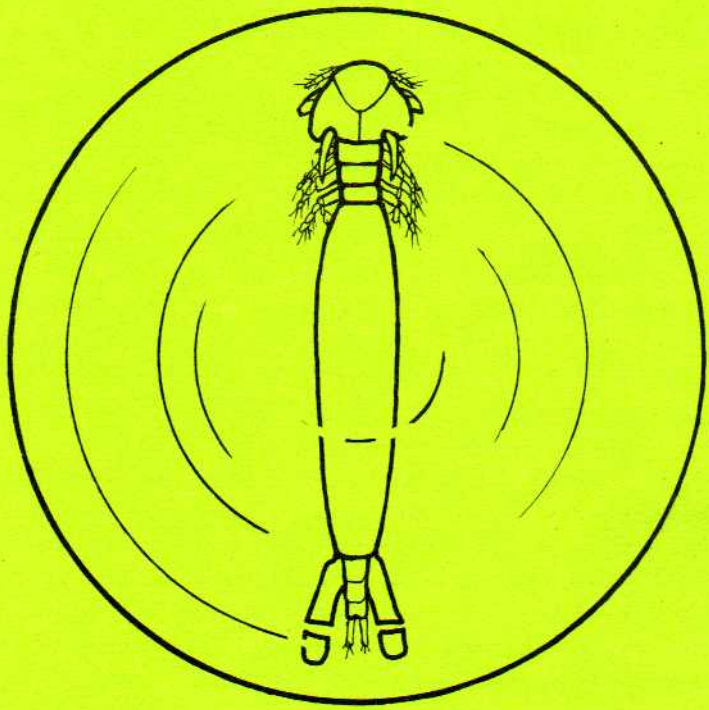
ISSN 0722-5741

MONOCULUS

Copepod Newsletter



Nr. 8

May 1984

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

MONOCULUS

Copepod Newsletter

Number 8 May 1984

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Distributed in North America by: National Museums of Canada (Chang-tai Shih, National Museum of Natural Sciences, Ottawa, Ontario, Canada K1A 0M8).

This issue has been typed by: Angelika Sievers, Fachbereich 7 (Biologie), Universität Oldenburg.

A HAPPY NEW YEAR

Greetings from
K. Furuhashi,
Hakodate, Japan

Sapphirina salpae ♀

Birthdays:

Paul L. Illg (70)
R.V. Melville (70)

Died:

Bernard L.S. Hardy

ｱ means a rat in Japanese letter,
and 1984 is the year of rat in Japan.

Editorial

"Is there a limit to the number of people on the mailing list of MONOCULUS from the financial point of view?" we were asked. There certainly is, we are afraid. The costs for printing and mailing can only be justified by the reprints which are received in exchange for *MONOCULUS*. As someone remarked: *"Any persons who enjoy working on copepods deserve to receive the newsletter, but persons who are only marginally interested in the subject are not necessary the recipients of MONOCULUS."* 538 people are on our mailing list at present. But growth alone is not a sign of success. We shall eventually have to do some pruning and the receipt of reprints will be one of the criteria in the decision where to cut.

Another criterium, obviously, will be the participation in the activities connected with the newsletter. There is a new questionnaire added to this issue. Last year 92 of them have been returned. Will it be more this time? A number of colleagues have contributed to this issue of *MONOCULUS*. We thank Ch. Corkett, A. Fosshagen, F. Hadel, Z. Kabata, J.B.L. Matthews, J. Reid, C.-T. Shih, V. Thatcher. Special thanks are due to Wolfgang Wägele for his helping out with drawings. He works with Kurt at Oldenburg University on Crustacea. He has nothing to do with copepodology, yet didn't hesitate to venture on this field for *MONOCULUS*.

For New Year we received a number of cards wishing us all the best for 1984. One of them is reproduced on the opposite side. H. Kunz even sent us a biscuit showing on its top the relief of a copepod. We thank for these lovely and unusual gifts.

H.K. J. Schminke

P.S. We are often approached for backnumbers of *MONOCULUS*. There are none except for a few copies left of No. 6 and No. 7. Please send a postcard to Kurt Schminke, if you are interested. First come, first served.

Business ssenisuB

1. Bibliography

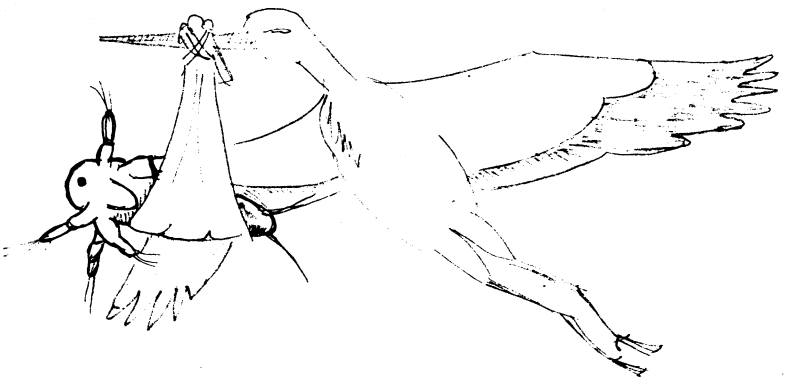
With the Second International Conference on Copepoda approaching we have intensified our efforts to present a computer list of the literature received by the *MONOCULUS*-Library during the last few years. All publications will have been registered and keywords will have been fed for all of them to the computer. The number of reprints received was so great that it was impossible during the time at our disposal for these activities to start already also with entrusting to the computer titles from all the lists of publications which have been delivered to us over the years and which are still being received. There are again a few names of colleagues to be adorned with an asterisk. These are: Elgmork, Gaudy, Hairston, Hart, Haury, Jillet, Morioka, Por.

2. *MONOCULUS*-Library

The number of reprints of recent publications received since the last issue of *MONOCULUS* has dropped considerably as compared with the time before. As a result our list of current literature has slimmed down again visibly. It is our impression that we need another questionnaire to entice you to reveal to us your exact production in 1983. It would be fine, if the success of this campaign from last year could be repeated. So please tear out the questionnaire and sit down immediately and make the necessary statements. Remember what Geoff Boxshall said in the last issue: *The most avidly read sections are the bibliography and the 'current research activities'*. Thank you.

3. *MONOCULUS*-Museum

Something extraordinary has happened. The ice is broken! Through the courtesy of Dr. Joachim Adis Gerd received the first contribution to the *MONOCULUS*-Museum from Brazil on the 22nd of December 1983. It was accompanied by the following letter by Vernon Thatcher from Manaus:



I am sending herewith the following copepods:

on slides:

(1) Ergasilus bryconis Thatcher, 1981
(1) Ergasilus leporinidis Thatcher, 1981
(1) Ergasilus jaraquensis Thatcher & Robertson, 1982
(1) Ergasilus pitalicus Thatcher
(1) Ergasilus callophysus Thatcher & Boeger
(1) Acusicola tucunarense Thatcher
(1) Acusicola lycengraulidis Thatcher & Boeger

in vials:

(19) E. bryconis
(12) E. leporinidis
(10) E. jaraquensis
(3) E. colomesus Thatcher & Boeger
(23) E. hydrolycus Thatcher & Boeger
(5) E. callophysus
(10) Brasergasilus anodus Thatcher & Boeger
(10) B. jaraquensis Thatcher & Boeger
(1) Acusicola lycengraulidis
(6) A. pellonidis Thatcher & Boeger
(10) Vaigamidae; Vaigamus retrobarbatus Thatcher & Robertson

We have held a staff meeting at this laboratory and it was the unanimous decision of the members that you should NOT drink champagne to celebrate the arrival of Brazilian copepods. We feel very strongly that you should celebrate with Brazilian fire-water instead. We therefore send you herewith a bottle of "Pitú" brand cachaca (pronounced Ka-châ-suh). You will be interested to know that "pitú" is the local name of the fresh-water shrimp, Macrobrachium carcinus (L.) - see Holthuis (1952).

Gee, that's a stuff! Gerd and I had a great time. Not that everyone who plans to make a contribution to the *MONOCULUS*-Museum would have from now on to add the appropriate drink but, actually, we wouldn't mind. This would be the start for a bottle museum. There still is ample space on Gerd's shelves. Thank you folks from the Instituto Nacional de Pesquisas da Amazonia!

More material has also been announced. Valeria F. Hadel from Sao Paulo, Brazil, makes the following promise: *I intend also, as soon as possible, to send specimens of the Copepoda Cyclopoida and Harpacticoida, found in the bromeliads, to the MONOCULUS-Museum. I am waiting only for the systematic identification.*

4. *MONOCULUS*-Glossary

J.B.L. Matthews and A. Fosshagen from Blomsterdalen, Norway, summarize their ideas on calanoid terminology as follows:

1. The main body divisions should be Cephalosome, Mesosome, Urosome; cephalosome + mesosome = Prosome. Metasome is an alternative to mesosome, but has unfortunately been too often used, incorrectly, as synonymous with prosome, even by distinguished copepodologists. We recommend the use of these terms for other copepod groups as well, the division between cephalosome and mesosome coming immediately behind the maxillipeds, the division between the mesosome and urosome at the position of the main body articulation. Because the main

divisions of the copepod body are not always homologous with the general arthropod cephalon (head), thorax and body, these terms should not be used except when one is explicitly concerned with comparative crustacean morphology.

2. We prefer 1st and 2nd antenna to antennule and antenna, because it seems misleading to use the diminutive name for the appendage that is by far the larger of the two. 1st and 2nd maxilla are preferable to maxillule and maxilla, again because the 1st is not characteristically smaller than the 2nd, but more importantly because in older (but still standard) literature "maxilla" is used for the 1st maxilla since there were considered to be two pairs of maxillipeds. Using 1st and 2nd for both antennae and maxillae is consistent and is compatible with the widely accepted abbreviations.

3. Use of the word pleopod should be stamped out. It seems to have arisen from a misconception of what P (for Pes) really stands for.

4.a. (Matthews). Use of the word basipodite in the sense recommended by von Vaupel Klein is inconsistent with general carcinological usage, though widespread amongst copepodologists possibly as a result of Giebrecht's promotion of the abbreviations B1 or B2. My understanding of the general terminology relating to a crustacean biramous limb is: proximally, a two-segmented protopodite (cf. Kaestner; Borradaile et al.), the segments called coxopodite (or coxa) and basipodite (or basis) respectively, often abbreviated to B1 and B2 (for obvious reasons P1 and P2 cannot be used though they would be more logical), and sometimes with an undeniable precoxa; distally two rami of which the one nearer to the ventral midline is quite reasonably termed the endopodite and the other the exopodite, conveniently and reasonably abbreviated to Ri and Re respectively, the segments being numbered consecutively starting at the proximal end. Internal and external lobes, e.g. on the maxillae, should be termed endites and exites respectively.

4.b. (Fosshagen). Fosshagen prefers to use the term basipodite instead of protopodite naming the two segments (B1 & B2) coxa

and basis. The term Basipodite is widely used in this sense by copepodologists.

5. Otherwise we concur with von Vaupel Klein's opinions but we would add gnathobase as a useful term to describe the segment bearing the toothed projection on the mandible.

*****

Taking into account the input by a number of colleagues into the discussion on the terminology of body form in copepods C. Corkett and C.-t. Shih come up with the following proposal:

A proposal for a practical nomenclature of the major body divisions and appendages in copepods

Christopher Corkett
Dalhousie University, Halifax, Nova Scotia, Canada, B3H 4J1
Chang-tai Shih
National Museums of Canada, Ottawa, Ontario, Canada, K1A OM8

The primary cause of confusion in copepod morphological terminology is the temptation to make practical descriptions of external body sections reflecting the theoretical origin of various body tagmata. The term cephalothorax, for instance, has been used to designate the body section incorporating the head and the part of the thorax fused with the head; and it has also been used to specify this section and the succeeding free thoracic segments. The term abdomen has been interpreted as the part of the body after the genital segment or complex but others have considered the genital complex a part of the abdomen. We shall not elaborate on the ambiguity in terminology but emphasize the necessity of divorcing practical morphological description from theoretical body segmentation. We shall concentrate on the major body divisions and appendages in the proposal presented below. Hopefully this proposal will form the basis for a discussion in the forthcoming Copepoda Conference and may be expanded to include terms for finer structures. An informal evening gathering for this purpose has

already been arranged. We realize that it is unlikely to have a unified terminology that may be applied to a highly diversified group of animals such as copepods. If you are concerned about the morphological terminology but cannot attend the Conference, please communicate with us your opinion. We will be obliged to make a representation for you.

For practical descriptive purposes we divide a whole copepod body into two major divisions: prosome and urosome. The prosome is the part of body anterior to the body articulation or genital complex in the absence of a body articulation. There are two subdivisions: the cephalosome or the first segment of the prosome, consisting of the head, and part of the thorax fused with the head, and the metasome, including one to five free segments, each usually bearing one pair of legs, but sometimes two. The urosome is the posterior part of the body after the body articulation or starting from the genital complex if an apparent body articulation is absent. In the urosome there are 0-1 segment anterior to and 2-5 segments posterior to the genital complex. The genital complex is also counted as a segment of the urosome. The urosome is terminated by a pair of caudal rami. We recommend not replacing caudal ramus with uropod because there is still no general agreement on the origin of this structure. The term somite is a theoretical unit of the body that may or may not coincide with a segment as it appears on the animal. For instance, the last metasomal segment in calanoids may be the sixth or the fusion of the fifth and sixth thoracic somites.

Genital complex is not a new term and has been used by some contemporary copepodologists (eg, Vervoort, Kabata). It is a neutral term and appropriate for a part of the body which is composed of a number of somites possibly of different origins (ie, thorax and abdomen) and bears, externally and internally, some complicated structures of the reproductive system. We avoid use of terms such as head, thorax, and abdomen because these terms are related to the theoretical tagmata of the animal, and may be difficult to use for descriptive purposes when the theoretical origin of the structure de-

scribed is uncertain. Of course an author, if he or she so wishes, may elaborate on the relationship between the descriptive terms and theoretical ones, eg, the second urosomal segment is the first abdominal somite.

The above proposal of major body divisions in copepods is, in fact, not an innovation. Sars used the terms cephalosome, metasome, and urosome in the Copepoda volumes of his monograph, An Account of the Crustacea of Norway. These terms are frequently used by present-day copepodologists but sometimes the definitions may differ, for instance, prosome is a synonym of cephalosome to some authors. The proposed terminology of body divisions can apply to all free-living copepods as well as some but not all parasitic groups. Kabata in his monograph, Parasitic Copepods of British Fishes, divided the copepod body into these sections: cephalothorax, free thoracic segments, genital complex, and abdomen. The first two of these sections are equivalent to the proposed cephalosome and metasome, and the last two sections combined are the same as the urosome defined here.

We propose these names be used for morphological description of the six pairs of cephalic appendages: first antenna, second antenna, mandible, first maxilla, second maxilla, and maxilliped (first thoracic appendage). These names are widely used in current copepodological literature. In copepods, the first pair of antennae (antennules) are usually much larger in size than the second pair (antennae). When comparing copepod anatomy with that of other crustaceans, the terms antennule and antenna are more appropriate but in morphological description these terms are misleading since they imply a false size relationship between these two appendages. First and second maxillae are preferred over maxillule and maxilla for the same reason and also because in old literature they were sometimes referred to as maxilla and first maxilliped respectively. All appendages after the cephalic appendages are named legs. Several terms have been used for these appendages in the literature, for instance, swimming legs, swimming feet, natatory legs, pereiopods, thoracopods, etc. For practical de-

scriptive purposes, we recommend leg because it is a simple term without too much emphasis on a specific function, eg, swimming.

We are grateful to A. Fosshagen and J.B.L. Matthews of Norway, G. Gardner of Canada, R. Hamond of U.K., K. Hulsemann of F.R. Germany, B. Jones of New Zealand, and J.C. von Vaupel Klein of the Netherlands who have sent us their suggestions. We also thank our colleagues Ian Sutherland and Georges Merinfeld who have read our draft and made constructive comments. The French equivalents and suggested abbreviations of these terms are tabulated below:

Proposed Term	French Equivalent	Abbreviation
Prosome	Prosome	
Cephalosome	Cephalosome	
Metasome	Mêtasome	
First metasomal segment, etc.	Premier segment du mêtasome, etc.	M1, etc.
Urosome	Urosome	
Genital complex	Complexe génital	
Second urosomal segment, etc.	Deuxième segment de l'urosome, etc.	Us2, etc.
Caudal ramus	Furca caudale	
First antenna	Première antenne	A1
Second antenna	Deuxième antenne	A2
Mandible	Mandibule	Md
First maxilla	Première maxille	Mx1
Second maxilla	Deuxième maxille	Mx2
Maxilliped	Maxillipède	Mxp
First leg, etc.	Première patte, etc.	P1, etc.

5. Current research activities

Geoff Boxshall's pioneer jump has not yet had the effect we were hoping for. The only reaction we received was by Valeria F. Hadel from Sao Paulo. She writes: *My research work changed since the first time I received MONOCULUS. I am now studying the relations between species of Copepoda and of Bromeliaceae, the "tank plants", in an ecological station, the "Ecological Station of Jureia", a tropical rain forest area, located in the south of the state of Sao Paulo. This work will be used in order to obtain the degree of master in ecological sciences as*

a thesis in my post-graduation course. I am sending with this letter the bibliographic references that quote the Copepoda in association with plants that store water in tanks. More references in this field are very welcome.

Bibliography:

PICADO, C. 1913. Les Bromeliacées Epiphites Considerées comme Milieu Biologique. Bull. Scient. France et Belg., 47:215-360.

MAGUIRE, Jr. B. 1971. Community Structure of Protozoans and Algae with Particular Emphasis on Recently Colonized Bodies of Water. From: Symposium of the American Microscopical Society. The Structure and Function of Fresh-Water Communities. John Cairns Jr, Ed.

MAGUIRE, Jr. B. 1971. Phytotelmata: Biota and Community Structure Determination in Plant-Held Waters. Ann. Rev. Ecol. Syst., 2:439-464.

BENZING, D.H.; DERR, J.A. & TITUS, J.E. 1972. The Water Chemistry of Microcosms Associated with the Bromeliad Aechmea bracteata. Amer. Midl. Natur. 87:60-70.

FRYER, G. 1980. Acidity and Species Diversity in Freshwater Crustacean Faunas. Freshwater Biol. 10(1):41-45.

LAESSLE, A.M. 1981. A Micro-Limnological Study of Jamaican Bromeliads. Ecology, 42:499-517.

Can anyone help with further references?

Remember what Geoff Boxshall said in the last issue: *The most avidly read sections are the bibliography and the 'current research activities'*. The questionnaire added to this issue gives you the opportunity for a short report on your ongoing research. Don't let the chance pass by to help stimulate communication among copepodologists.

6. Mailing

There are cases where several members of the same institution are receivers of *MONOCULUS*. Air mail rates in Germany are rather high. So we have selected quite arbitrarily one colleague in each of these institutions who receives his copy air mail. We hope he/she will circulate this copy among the others while they have to wait for their copies to arrive by surface mail. We hope nobody minds and we apologize for any possible violation of social hierarchies.

The l e t t e r box

Georges Merinfeld's article in the last issue aroused one commentary so far. Janet Reid from Washington remarks:

Merinfeld's article on proper zoological nomenclature in the recent MONOCULUS was both stimulating and irritating. The latter, because I wrote to the International Trust about 1981 and was told that the 2nd edition of the International Code is no longer available, and that a 3rd edition is being prepared, to be published in 1982. Since then I have heard nothing ... There was not then a copy of the International Code available in Brasilia. When the 3rd edition is published, will there be some funding for dissemination of copies to developing countries whose university libraries' budgets are inadequate to afford extensive purchases of foreign literature?

Computerized search facilities are also not available in developing countries, and the costs of such searches are still prohibitive for most researchers' budgets. I am afraid most of us will have to remain in the 19th century a little longer. I do, however, wholeheartedly agree with Dr. Merinfeld as to the absolute necessity of careful attention to the literature.

Vernon Thatcher from Manaus is teasing us with our letter sent out to recruit new adherents to the *MONOCULUS*-community, among

'living' copepodologists, a letter also reproduced on the back cover of the last issue of *MONOCULUS:*

I have recently received your letter concerning the census of copepodologists and the MONOCULUS newsletter. I am happy to report that we have a group of 7 such persons working feverishly in the Amazon. I have checked my associates and all appear to be "living" - at least they were breathing when last examined. I am therefore enclosing herewith a facsimile card for each person. We would all like to be "active", although we have no time for gymnastics. As some indication of our activity, I will be sending reprints of 4 publications to Dr. Schminke, and we have an additional 10 papers "in press".

B O O K Book review R E V I E W

In the epilogue of his recent little handbook on "The parasitic Copepoda and Branchiura of British freshwater fishes" Geoffrey Fryer remarks: "While the biology of crustacean parasites as a whole, a group whose existence has been known since the time of Aristotle, offers much scope for study, the subject often receives scant treatment in even the parasitological literature. Thus some recent, well-received and otherwise excellent textbooks on parasitic biology do not even mention either parasitic copepods or branchiurans - though the number of existing species of the former group is extremely large - and give no indication of the fact that Crustacea has been one of the most successful of all the major groups of animals in the exploitation of parasitism as defined in the classical manner".

When K. Rohde's book on "Ecology of marine parasites" became available, we asked Z. Kabata to look at it from the point of view of the copepodological content.

Rohde, K. - 1982: Ecology of marine parasites. Queensland Univ. Press, St. Lucia, London, New York. 247 pp.

The author of this small volume (177 pages, excluding adnexa) teaches in the University of New England, Armidale, N.S.W. and is rapidly moving into the foremost ranks of ecological parasitologists. His work on the ecological niches of parasites and the zoogeography of marine parasites has attracted widespread attention among his peers. It is interesting, therefore, to see what he has to say about copepods, how much space and attention he has devoted to this group in his content-packed volume.

With 52 references to copepods, they pop up frequently in the text. Considering that such an eminent parasitologist as the late Clark P. Reid left them out of his textbook altogether, this is a great improvement. However, a copepodologist, as contrasted with a "straight" parasitologist, will not find much to tickle his fancy in this book. Seven of these 52 references are to copepods as hosts, either to parasites or to hyperparasites. There are as many as 11 references to Mytilicola spp., which thus loom inordinately large and assume undue importance.

Copepoda as parasites are dealt with in a single paragraph (22 lines). These lines contain at least one ambiguity, obviously unintentional. Referring to Pennella, Rohde states that it lives "also on whales and cephalopods". What this statement ignores is the fact that the cephalopods are only intermediate, short-term hosts for Pennella, while whales are the definite hosts. Between us copepodologists, I would hate to attempt a summary of parasitic copepods in a 22-line paragraph. The mind boggles. Klaus threw in Cymbasoma to point out the parasitoid mode of life of the monstrillids; he quotes four family names as examples of parasites of invertebrates (we would prefer to call them "associates"). Caligus is used to exemplify fish parasites. Further examples of this mode of live are Pennellidae and Lernaeopodidae. Incidentally, saying that these two families have "many parasitic species", the author implies that they might also have some non-parasitic

ones, clearly an unfortunate and unintentional impression.

Copepods are mentioned by Klaus most frequently in connection with the topic closest to his interest, i.e. distribution on the host. The comments cluster around the niche concept and are used to illustrate the author's thinking about it. Geographic distribution and its determining causes are also mentioned on a number of occasions. Other aspects of copepod biology are less generously represented. Scattered references are made to the behaviour, physiology, removal by cleaner fish and effects on the host.

There are four figures in the text and six plate photographs, the latter not very informative. It may be a personal bias, but I believe that using photographs is often little more than a cop-out. They seldom illustrate adequately what the author wishes us to see.

In all, the volume does not offer a feast to copepodologists. However, let's be fair. This is not a book on copepodology and we should be glad that our beasts figure in it as often as they do. For an ecological parasitologist, on the other hand, it is a volume well worth reading. A book on the biology of parasitic copepods has still to be written. How about it, gentlemen?

Z. Kabata

ANNOUNCEMENTS

Report from the Organizing Committee for the Second International Conference on Copepoda

The Committee has received (up to March 14) 49 abstracts by 44 submissions from authors in 19 countries and all continents. The Committee will accept as many manuscripts as possible. If the number of submissions far exceeds the time available for the contributed papers, the Committee may, however, ask some authors to present a poster instead.

A final programme will be prepared after the deadline (March 31) for abstract submission. Hopefully the final programme and the preprint of abstracts can be sent to pre-registered participants in late June. A tentative schedule is listed below:

August 12 (Sunday)
- Evening — Registration at the Stanton residence of the University of Ottawa

August 13 (Monday)
- Morning — Late registration at the University Centre or Morisset Hall (to be decided). Opening ceremony. Contributed papers.
- Afternoon — Symposium on Morphology and Anatomy
- Evening — Reception sponsored by the National Museum of Natural Sciences at the Victoria Memorial Museum Building.

August 14 (Tuesday)
- Morning — Symposium on Growth, Life History, and Culture.
- Afternoon — Contributed papers.
- Evening — Discussion on copepod terminology.

August 15 (Wednesday)
- Morning — Contributed papers.
- Afternoon — Symposium on Biogeography of Copepoda.
- Evening — Discussion on methods of estimating secondary production in copepods.

August 16 (Thursday)
- Morning — Panel Discussion on Copepoda Phylogeny.
- Afternoon — Contributed papers.
- Evening — Discussion on Copepoda-Literature and Crustacean-Database.

August 17 (Friday)
- Morning — Contributed papers.
- Afternoon — Symposium on Behavioural Ecology.
- Evening — Discussion on Antarctic copepods.

The Committee will arrange a 2-hour boat trip with music on Ottawa River in an evening, probably Wednesday or Thursday. The days assigned for the evening discussion groups listed in the above schedule are not final. Since the evening discussions are informal and intended for a small group of participants, there may be more than one discussion group in each evening. Organizers of the evening discussion groups are asked to in-

form the Committee of their choice of time as soon as possible. The Committee is still prepared to accept suggestions of other evening discussions. The second part of the contributed paper session in the afternoon of August 14 (Tuesday) will be a free discussion session. The free discussion session is designed for participants who do not wish to present a formal paper but want to discuss their research in an open forum with fellow copepodologists. Any person who wishes to participate in this free discussion session is asked to contact the Organizing Committee. This session may not be justified if the response from the participants is insufficient.

All authors of invited papers, contributed papers and posters are reminded to submit a final manuscript by the end of their session. The manuscript should be prepared according to the instructions given in the Announcement and Call for Papers circulated previously. Please contact the Organizing Committee if you have any questions.

Persons who are interested in organizing the Third Conference should contact the Organizing Committee as soon as possible.

C.T. Shih
The Organizing Committee
c/o National Museums of Canada
Ottawa, Ontario
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Methods for estimating production in copepods

Chris Corkett from Halifax makes the following announcement: *Ian McLaren and myself are planning an informal evening discussion on "Methods for estimating production in copepods" at the International Conference in Ottawa. We are preparing a "discussion paper" which we plan to send out by mail to copepodologists coming to the meeting. Perhaps copepodologists who do not plan to attend the meeting and would like a copy of this "discussion paper" could write either to Ian McLaren or myself. Similarly any copepodologist who does not plan to*

attend the meeting but would like to make a submission for inclusion in our discussions should send his written submission to Ian McLaren. We are particularly interested in hearing from copepodologists who have used or developed recent methods for measuring copepod production.

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Slides from Amsterdam

At the "First International Conference on Copepoda" in Amsterdam in 1981 lots of photos have been taken, but not many have had the privilege of seeing them. We would like to arrange a retrospect at the meeting in Ottawa and urge all photographers to bring along to the meeting their treasure of slides taken in Amsterdam so as to enable us to put on a memorable show of this historical gathering. Whoever would like to join us in this endeavour should not hesitate to let us know.

Kurt and Gerd

-.-.-.-.-.-.-

International Symposium on Marine Plankton

Tokai University, Shimizu, Japan

22 July - 1 August, 1984

SCHEDULE OF EVENTS

23 July Monday		Busses will convey participants from the hotel to the conference center and return during the day.
	Morning	REGISTRATION of participants. Welcoming, Keynote and Plenary Speakers.
	Afternoon	SYMPOSIUM I: TOXIC AND NOXIOUS ASPECTS OF MARINE PLANKTON. Chairman: Dr. M. Anraku, Nansei Regional Fisheries Research Laboratory, Hiroshima, Japan. Speakers: Dr. Y. Fukuyo, Univ. of Tokyo; Dr. Y. Oshima, Tohoku Univ.; Dr. F.J.Taylor, Univ. of British Columbia, Canada; Dr. M. Watanabe, Natl. Inst. for Environment; Mr. Y Iwata, Fuyo Data Processing & Systems.
	Evening	Social party for participants & guests at Miho House in Miho Culture Land.
24 July Tuesday	Morning	SYMPOSIUM II: RESPONSES OF PHYTOPLANKTON TO LIGHT OF DIFFERENT SPECTRAL QUALITIES & IRRADIANCE. Chairwoman: Dr. Maria A. Faust, Smithsonian Environmental Research Center, Maryland, USA. Speakers: Dr. A. Hattori,Univ. of Tokyo; Dr. M. Takahashi, Univ. of Tsukuba; Dr. T. Berman, Kinneret Limnological Lab, Israel; Dr. Z. Dubinsky, Bar-Ilan Univ., Israel; Dr. G. Yull Rhee, Environmental Health Inst., NY/USA; Dr. B. W. Meeson, Johns Hopkins Univ. USA.
	Afternoon	CONTRIBUTED PAPER AND POSTER SESSIONS

25 July Wednesday	Morning	SYMPOSIUM III: SPATIAL & TEMPORAL PATTERNS OF DISTRIBUTION OF MARINE PLANKTON. Chairman: Dr. Michael Mullin, Scripps Institution of Oceanography, La Jolla, USA. Speakers: Dr. D. Mackas, Inst. of Ocean Science, Canada; Dr. J. Jillett, Portobello Marine Lab, New Zealand; Dr. R. Le Borgne, O.R.S.T.O.M., New Caledonia.
	Afternoon	CONTRIBUTED PAPER AND POSTER SESSIONS.
26 July Thursday	Morning	SYMPOSIUM IV: MECHANISMS CONTROLLING RECRUITMENT OF LARVAE FROM THE PLANKTON. Chairman: Dr. Daniel E. Morse, Univ. of California, Santa Barbara, USA; Speakers: Dr. D. J. Crisp, Menai Bridge Laboratory, Wales, U.K.; Dr. M. Hadfield, Univ. of Hawaii, USA; Dr. R. R. Colwell, Univ. of Maryland, USA; Dr. M. Nishihara, Univ. of the Ryukyus, Okinawa, Japan.
	Afternoon	Free time for discussions, etc.
		MINI-SYMPOSIUM - I - PARASITES AND DISEASES OF MARINE PLANKTON. Chairman: Dr. Ju-shey Ho, Calif. State Univ., Long Beach, USA. Speakers: Dr. Ho & Dr. P. S. Perkins(Univ. of Calif. Los Angeles, USA); Dr. N. Kaoei Natl. Inst. of Health, Japan; Dr. S. Nagasawa, Univ. of Tokyo; Dr. F. G. Hochberg & Dr. R. R. Seapy, Santa Barbara Museum of Natl. Hist. & Calif. State Univ., Fullerton USA.
26 July (Cont.)		MINI-SYMPOSIUM - II - MICROHETEROTROPHS OF MARINE PLANKTON. Chairman: Dr. Yuri Sorokin, Institute of Oceanology, Gelendzhik, USSR. Speakers: No speakers to report at this time.
27 July Friday	Morning	SYMPOSIUM V: LIFE HISTORY STRATEGIES OF MARINE PLANKTON. Chairman: Dr. Peter Rothlisberg, CSIRO Fisheries, Cleveland, Australia. Speakers: Dr. W. T. Peterson, State Univ. of New York, USA; Dr. T. Ikeda, Antartica Div. Tasmania, Australia; Dr. S. Uye, Hiroshima Univ. Japan; Dr A. Heron, CSIRO Fisheries, Australia.
	Afternoon	CONTRIBUTED PAPER AND POSTER SESSIONS.
28 July Saturday	Morning	SYMPOSIUM V: BIOLOGY OF GELATINOUS MARINE PLANKTON. Chairwoman: Dr. Jennifer Purcell, University of Victoria, Victoria BC, Canada Speakers: Dr. P. Anderson, Whitney Labs, Florida, USA; Dr. M. Yamaguchi, Univ. of the Ryukyus, Okinawa, Japan; Dr. T. Yasuda, Fukui Pref. Fisheries, Obama, Japan: Dr. M. Youngbluth, Harbor Branch Foundation, Florida, USA.
	Afternoon	CONTRIBUTED PAPER AND POSTER SESSIONS
	Evening	Farewell Dinner at the Sunroute Hotel.
29 July	(1)	Transfer by train to Tokyo for departure to point of origin.

The Western Society of Naturalists
Prof. David H. Montgomery, Secretary
Biological Sciences Department
California Polytechnic State University
San Luis Obispo, California 93407 USA
Phone: (805) 546-2406/Telex-658-451

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I. GERMANY, FED. REP.

There are three organizations providing fellowships for foreign students and academics in the Federal Republic of Germany and Berlin (West).

1. *Alexander von Humboldt-Stiftung (AvH)* - *Alexander von Humboldt Foundation*

see information sheet reproduced on next pages

Alexander von Humboldt Foundation

Jean-Paul-Strasse 12 — D-5300 Bonn 2
Federal Republic of Germany
Telephone: (02 28) 8 33-0 — Telex: 8 85 627 — Telegram: humboldtbonn

Information Sheet 1984

I. The Foundation's programme

The Alexander von Humboldt Foundation (AvH) awards fellowships to young, highly qualified scholars of foreign nationality for research projects of their own choice in the Federal Republic of Germany and in Berlin (West).

The research fellowships are offered on a world-wide competitive basis. Scholars of **all** nations and **all** academic disciplines may apply for them. Up to 480 research fellowships are available per year.

Applications are considered by the Selection Committee of the AvH. This committee is composed of approx. 100 German scholars of all disciplines and takes decisions exclusively on the basis of academic merit and achievement. It is not bound by quotas, in respect of either countries or academic disciplines.

Humboldt research fellowships are awarded for specific research projects and for a long-term stay in the Federal Republic of Germany, and **not** for training purposes, and short-term study tours or participation in conferences.

The research project and the German host institute are selected by the research fellows themselves. Details about the project and schedules must be agreed upon between the research fellows and the host institutes.

II. Value and duration of fellowship

Research fellowship rates are between DM 2,400 and 3,200 net monthly. The value of the fellowship is set by the Selection Committee. The AvH research fellowship is not subject to German income tax.

Other expenses covered:

— fellows' travel expenses provided these are not borne by institutions in their home countries;
— grants for family members accompanying fellows to Germany for a minimum period of three months (at present DM 300 per month for the spouse. In conformity with the "Bundeskindergeldgesetz" — children's allowance act —, monthly allowances may be applied for with the local German Labour Offices);
— an initial allowance of DM 200;
— **additional** grants for German language courses of 2 to 4 months at Goethe Institutes in the Federal Republic of Germany **prior** to the actual period of research. The Selection Committee may make these courses compulsory.

Fellowships may be applied for initially for 6 to 12 months; extensions for the successful completion of current research work up to a total period of 24 months can be granted on application.

Up to four months of the period covered by the fellowship may be spent at research institutes in other European countries (up to six months at a German research institute in Europe) if this is essential for the progress of the research work.

III. Application requirements

Applications will be accepted at any time from foreign scholars who

1. hold an academic degree comparable to the **doctorate** (Ph.D., C.Sc. or equivalent) or have attained a comparable academic qualification through research and academic publications;
2. can furnish proof of experience in **independent research** at a non-German university or research institute;
3. should submit, if available, **academic publications** resulting from the above activities;
4. have adequate command of German and/or English:
   — **scholars of arts and humanities** should possess sound German language abilities;
   — **scholars of natural, medical and engineering sciences** have to prove good command of English. Basic knowledge of German is of advantage. The Selection Committee may make a German language course compulsory (cf. II);
5. are not over age 40.

IV. Application documents

Applications must include (either in **German, English,** or **French):**

a) a completed application form (in duplicate);

b) **working facilities**
   — for **scholars in natural, medical and engineering sciences:**
   the German host must have confirmed in writing that he is prepared to provide you with the necessary working facilities and academic sponsorship.
   Please enclose a copy of the invitation.
   — for **scholars in humanities:**
   the German host must have confirmed in writing that he is prepared to act as your academic adviser and to provide expert guidance in connection with your project. This also applies to candidates whose studies will primarily be undertaken in archives and libraries.
   Please enclose a copy of the invitation.

   Applicants who will spend a period of research at two host institutes are requested to state at which institute they wish to spend **most** of their time.

c) a **detailed research plan** (in duplicate) containing full details about the subject, methods, aims and schedules of the envisaged research project. We recommend that this research plan be discussed with the German host institute **before** the application is submitted. The research plan **must** be drawn up by the applicant himself. If the German host has already proposed a subject to you, you are nevertheless requested to submit your **own** detailed version, outlining the subject within the context of your previous work and stating what further results you expect to achieve with the research work envisaged;

d) a separate complete **list of academic publications** (in **chronological** order and in duplicate) containing exact information; i. e. naming all authors (in order of the original publication), title, place and year of publication, and page references. **Please indicate in red** the titles of the reprints or abridged versions enclosed;

e) **publications**
   Our experts read and carefully assess your publications. Your application will be decided upon on the basis of our experts' advice. We therefore ask you to take special notice of the following points: we need reprints of your three or four most important and recent publications, if available in English, French or German. Applicants whose research results are published in other languages are requested to provide detailed summaries of these publications. It is recommended that you pay **particular attention** to summarizing comprehensively (on several pages) these works with respect to the **subjects, methods** and **results.** If you are approaching your doctorate degree or if this was awarded not more than one year ago, the complete manuscript, or a copy of the thesis must be enclosed;

f) a curriculum vitae (typewritten and in duplicate);

g) two or three confidential references of recent date (in a sealed envelope or sent directly to the Foundation) from scholars stating your academic qualification and describing your previous work, including a reference from the head of your present place of work. The references should also indicate to what extent you were concerned with joint publications;

h) a copy (not the original) of the doctoral certificate or the highest academic degree obtained;

i) statement of the applicant's present knowledge of German issued by a university teacher of German philology, or a German language institute;

j) three passport-sized photographs.

The AvH reserves itself the right of requesting additional documents if necessary.

We regret to be unable to bear any costs arising from the application.

V. Application procedure

Applications may be submitted at any time of the year. They may either be forwarded direct to the secretariat of the AvH or through diplomatic or consular missions of the Federal Republic of Germany, or offices of the German Academic Exchange Service (DAAD) abroad.

It is strongly recommended that candidates obtain the **current** issue of the Information Sheet from the Foundation's secretariat!

Consideration of applications takes several months. The Selection Committee of the AvH meets three times a year, usually in March, July and November. The Foundation recommends that the **complete** application should be submitted 5 months before the committee meeting at the latest. The processing of incomplete applications will be considerably delayed.

2. *Deutsche Forschungsgemeinschaft (DFG) - German Research Society*

a) Visiting Professors

The German Research Society may grant financial assistance to visiting professors and other academics at universities of the Federal Republic of Germany including Berlin (West). Applications should be submitted by the German host university. As a rule, such financial assistance is granted only if the visit lasts at least one semester and is designed to promote German research and teaching. The grant is not intended for purposes of individual research.

Direct application by the foreign academic to the DFG is not possible.

b) Programs with foreign scientific organisations

The German Research Society has concluded cooperation agreements with various central research promoting organisations (academies, Research Councils) of European and overseas countries that serve, among other things, to finance joint sponsorship programs (including scholarships). Academics who wish to find out whether such agreements exist and the conditions of sponsorship should contact the appropriate national research promotion organisations in his or her own country.

It is not possible for foreign academics to file applications directly with the DFG.

For further information apply to:

Deutsche Forschungsgemeinschaft (DFG), Kennedyallee 40, D-5300 Bonn 2, Telephone (0228) 885-1

3. *Deutscher Akademischer Austauschdienst (DAAD) - German Academic Exchange Service*

a) Scholarships

The German Academic Exchange Service awards scholarships to qualified foreign students and graduates, generally up to the age of 32, for study or research at any university or research institute in the Federal Republic of Germany.

Scholarships amounting to DM 830, DM 940, and DM 1,400 per month are granted for 10 to 12 months, with a possibility of extension if the scholar can show evidence of satisfactory attainment. The amount of the scholarship depends on the academic qualifications of the applicant and is determined by the DAAD granting committee. Married students accompanied by their spouses will receive additional

allowance of DM 300 per month. In addition, the scholarship includes: travel expenses (for fellows only), a supplementary health and accident insurance policy, a book grant and an initial payment to cover the period of adjustment. In certain cases a clothing allowance is also provided, and where necessary, the costs of a German language course will be paid.

All applications are to be submitted in the country of residence. Information on dates and method of application can be obtained from DAAD offices or the German diplomatic representative abroad.

b) Study visits for foreign academics

The German Academic Exchange Service also offers financial assistance to foreign academics to enable them to undertake visits which, above all, serve the guests' particular field of interest. Such visits may be suggested by German or foreign academic institutions, diplomatic missions of the Federal Republic of Germany, DAAD office abroad.

The DAAD cannot, in general, grant assistance for visits of more than 3 months' duration. The monthly grant instalments total either DM 2,100, DM 2,400, or DM 2,900, depending on the academic status of the applicant. In some cases these amounts may be supplemented by an additional allowance of DM 300 towards the cost of travel within the Federal Republic of Germany. We should draw your attention to the fact that international travel costs will not be paid by the DAAD. In addition, the DAAD offers a wide range of other scholarship schemes for students (undergraduate and graduate) and young academics from European countries.

For further inforamtion apply to:

Deutscher Akademischer Austauschdienst, Kennedyallee 50, D-5300 Bonn 2, Telephone (0228) 8821 or

- Büro Berlin, Steinplatz 2, 1000 Berlin 12, Telephone (030) 310461

DAAD's offices abroad:

German Academic Exchange Service - London Office, 17, Bloomsbury Square, London, WC1A 2LP; Tel.01-4044065

Office Allemand d'Echanges Universitaires - Bureau de Paris, 15, rue de Verneuil, 75007 Paris
- Services d'Information, 20, rue de Verneuil, 75007 Paris - Tél. 261 5857

German Academic Exchange Service - New York Office, Suite 1107, 535, Fifth Avenue, New York, 10017 N.Y.; Tel. 212 599 0464

German Academic Exchange Service - Cairo Office, 6 a, Sharia Ismail Mohamed, Cairo-Zamalek; Tel 650 726

German Academic Exchange Service- New Delhi Office, 176, Golf Links, New Delhi 110003; Tel. 615148

Serviço Alemao de Intercâmbio Acadêmico, Caixa Postal 64-ZC-00, 22.291 Rio de Janeiro-RJ; Tel. 285 2333

German Academic Exchange Service, P.O.Box 14050, Centro House, Westlands, Nairobi; Tel. 74 27 40

German Academic Exchange Service - Tokyo Office, Akasaka 7-5-56, Minato-ku, Tokyo, 107; Tel. 582-5962

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