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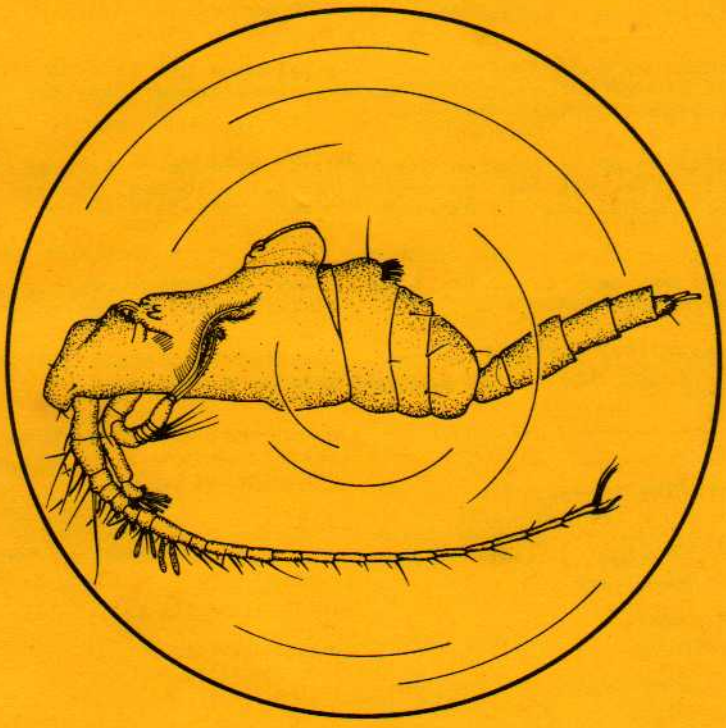
MONOCULUS

Copepod Newsletter



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bis

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MONOCULUS

Copepod Newsletter

Number 22 June 1991

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

Birthdays this year:

80 J.P. Harding
80 K.J. Purasjoki
75 A.G. Humes
70 R.V. Gotto
65 J. Bresciani
65 F. Evans
65 E.H. Grainger
65 K.T. Petkovski

Died:
W. Noodt
(February 1991)

Deadline for the next issue of MONOCULUS: 1st November 1991

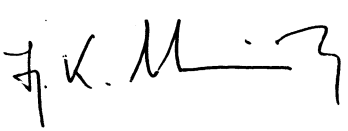
Editorial

We enter a new era with this issue. For the first time the newsletter is distributed only to members of the World Association of Copepodologists (WAC). Whereas the newsletter was mailed to 651 persons before, the new number of recipients is 380. So many paying members of WAC is a great satisfaction. We had feared that the decision at Karuizawa (Japan) to restrict distribution of the newsletter to members of the Association would have more drastic consequences. Copepod news will now reach a less extensive public but one for that matter that is more devoted and not a bit indifferent.

It turns out that the contributions to this issue have more to do with systematics than with other aspects of copepodology. But what are editors to do when others don't raise issues, don't have memorable birthdays or die, don't write important books or make other contributions? That again we don't have enough space to publish all that has been submitted is due to the efforts of R. Hamond, K. Hülsemann, and J.C. van Vaupel Klein who helped with articles and to those of W.A. Boeger, M. Pottek and B. Schumacher who helped with drawings. We thank all of them for these efforts. Publication of Ito's list of publications and of an index of MONOCULUS has to be postponed. This issue has been typed for the first time by Elke Feeken and we had a new computer which had to be tamed. This would not have been possible without the patient help by Holger Winkler who demonstrated again and again that human brains are more clever computers.

At the end of last year both of us received several postcards also containing congratulations on the reunification of Germany. We are very grateful for these signs of sympathy.

Again we were not able to make this issue of the newsletter an early one, but the newsletter makes good reading during the holidays.



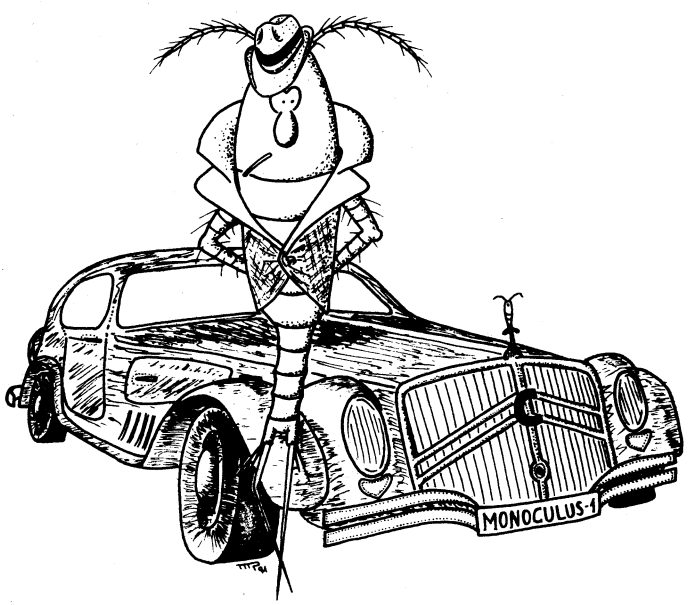
THE WORLD ASSOCIATION OF COPEPODOLOGISTS

WAC WAC ..... WAC WAC

WAC - TREASURER'S REPORT 1989/1990

1. The financial situation

	01.01. - 31.12.1989	01.01. - 31.12.1990
Balance forward	**7.807,82 DM**	**10.624,77 DM**
Deposits	3.385,71 DM	6.048,33 DM
Interests	193,44 DM	315,93 DM
Total	3.579,15 DM	6.364,26 DM
Expenses		
Support of MONOCULUS	673,20 DM	690,23 DM
Account dues	89,00 DM	156,00 DM
Total	2.816,95 DM	5.518,03 DM
Balance	**10.624,77 DM**	**16.142,80 DM**



2. Membership dues paid during the Fourth International Conference on Copepoda, Karuizawa, Japan.

Membership dues	248.188 YEN x 0,011196 DM =		2.778,71 DM
Membership dues in Canadian $	20 $ x 1,31 DM =		26,20 DM
Donations	8.000 YEN x 0,011196 DM =		89,57 DM
Total			2.894,48 DM

3. General remarks

A reminder has been sent to 96 members who had not paid their dues for 1989 or even years earlier than that. A flood of checks has been the result, but 68 % of these 96 persons are still in arrears. 44 members still have to pay their dues since 1989, 9 since 1988 and 13 since 1987!

All these are in great danger of losing their membership. During the meeting of the officers and executive council of the WAC at Karuizawa last year it has been decided to automatically exclude from membership and mailing list of MONOCULUS all those who are two years or more in arrears with their dues. Deadline is the 31st of September. This means membership of all those who are in arrears since 1989 or before will cease at the 31st of September 1991. Therefore, attention, check your address lable to make sure when you have paid last!

4. New Candidate Members since the Fourth International Conference on Copepoda, Karuizawa, Japan.

WAC is still growing, we are now 378 members, of which 27 are candidate members and 69 are members the dues of which have been waived.

Argentina: Menu-Marque **Belgium:** Demeulenaere **Canada:** Galbraith, McQueen, Sprules **F.R. Germany:** Arlt, Brenning, Einsle, Morales, Rolke, Sach, Steib **Italy:** Ianora **Japan:** Hirota **Netherlands:** Fransz **Switzerland:** Moeschler **USA:** Brownell, Cressey, Dam, Williamson, Youngbluth.

A complete WAC-member list was printed in MONOCULUS 21.

5. Mailing

Looking at the address label you will find some additional information. This is to remind you of your status in relation to WAC and when to pay the next dues:

86-95	= WAC member, dues paid including printed year
W	= membership dues waived
NM	= new member, dues paid including 91
NM91	= new member, no dues paid including 91
CM	= candidate member
CM91	= candidate member, dues paid including 91

THE WORLD ASSOCIATION OF COPEPODOLOGISTS

NAME

The name of the association shall be The World Association of Copepodologists, hereinafter referred to as the WAC.

PURPOSE

The general objective of the WAC shall be the promotion and support of interest in all aspects of research on Copepoda.

BY-LAWS

Article 1: Membership

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 members of the Association. The nomination is sent to the Executive Council for approval. The

approval of the Council confers on the applicant the status of a candidate member. A list of candidate members shall be presented by the Executive Council to the membership during the business meeting of the WAC, to be ratified or rejected by its quorum (defined for the purpose of this statute as at least 30 active members in addition to the officers of the Council). Candidates not so approved will be informed by the General Secretary in writing. Should the period between a membership application and the next business meeting exceed three years, the approval of candidates will be carried out by mail.

Article 2: Governing body

The governing body of the WAC shall be the quorum of membership assembled at business meeting during periodic symposia. Should such meetings be impossible, the membership shall exercise its authority by mail ballot, organized by the Executive Council.

Article 3: Officers

The officers of the WAC shall be: a President, a Vice-President, a General Secretary, Treasurer, a Local Secretary and up to four Members, comprising the Executive Council. The term of office of all officers will be coincident with the interval between two successive meetings of the WAC. At each meeting half of the slate of officers shall be replaced. The Local Secretary will not be an elected officer, but be appointed by the Executive Council. All officers of the Executive shall be eligible for re-elections. The first slate of officers shall be appointed by the Founder-President. The first meeting shall elect a new President, General Secretary, Treasurer and two Council Members, to stagger the terms of office and to ensure the continuity of the Executive Council.

Article 4: Executive Council

The Executive Council shall determine general policy on the basis of input from the membership and shall conduct the business affairs of the WAC. The Executive Council is chaired by the president of the WAC. In his absence, the Council is chaired by the Vice-President and in his absence by the General Secretary.

Article 5: The Treasurer
The Treasurer shall keep the financial records of the WAC and shall present an annual report at the end of each calendar year to be included in the first issue of the newsletter of the succeeding year.

Article 6A: The Local Secretary
The Local Secretary shall be appointed by the Executive Council during the WAC meeting from among members living in the locality designated as the venue for the next meeting. The Local Secretary shall take a leading role in organizing that meeting, in close cooperation with the President and the Executive Council.

Article 6B: The General Secretary
The General Secretary shall prepare applications for membership and assist the President in running the WAC.

Article 7: Nominations
Nominations for any office, with the exception of that of the Local Secretary, may me made in writing by any two members of the WAC not later than six months in advance of an election. The Executive Council must ascertain that each candidate is willing to stand for office and serve if elected. Additional nominations may be made by a Nomination Committee appointed by the Executive Council and during business meetings of the WAC.

Article 8: Elections
Elections shall be conducted by direct ballot at the business meetings of the WAC. Should the interval between meetings exceed five years, the Executive Council shall arrange a mail ballot elections. In that case the Executive Council shall mail ballots to the membership in an issue of the newsletter before October 1 in the election year. A brief biographical sketch of each candidate shall accompany the ballots. The Executive Council shall appoint a scrutinizing committee of three to count and record votes received by November 1. The candidates receiving the greatest number of votes shall be elected. When the vote

results in a tie, the Executive Council shall vote to resolve it. Should a tie still persist, the President shall have the casting vote.

Article 9: Finance
The expenses of the WAC shall be paid from the funds of the WAC, within the limits of its budget. The capital and income of the WAC shall be devoted solely to the furtherance of the objectives of the WAC, as stated in its constitution.

Article 10: Dues
The annual dues shall be fixed by the Executive Council. They shall be payable in the currency used by the treasury of the WAC or by International Money Order in advance before January 1 to the Treasurer. Due may be paid two years in advance. At the discretion of the Executive Council, dues of some members may be waived or reduced.

Article 11: Newsletter
The WAC shall publish a newsletter called MONOCULUS. This newsletter shall be published at least once a year. The responsibility for its publication shall devolve upon an Editor, appointed by the Executive Council for a period equal to the interval between successive meetings. The Editor may be one of the officers of the Executive Council and shall be eligible for re-election.

Article 12: Meetings
The WAC shall sponsor an international symposium every three years, if possible. The purpose of these conferences shall be the promotion of the Association's objectives. They will also provide a platform for the conduct of the Association's business, including nomination and election of officers, adoption of by-laws and amendment of the constitution and/or by-laws. All business decisions shall be taken by the vote of the membership quorum. Financial responsibility for the conferences shall rest with the local organizers.

Article 13: Amendments
The constitution and by-laws of the WAC can be amended only by two-thirds majority of members in good standing present at a business meeting or voting in a mail ballot. Amendments may be proposed by any two members in writing to the General Secretary for appropriate transmission to the membership.

Article 14: Dissolution
In the event that WAC is dissolved for any reason, the surplus funds remaining after payment of debts and liabilities shall be transferred to some institution or organization approved by the Executive Council that has objectives similar to those of the WAC. Any outstanding liabilities at dissolution shall be shared equally among the members.

WOLFRAM NOODT
1927 - 1991

There was a long queue at the entrance of the University church on the campus of Kiel University. Inside all seats were finally taken when organ music opened the funeral service for Wolfram Noodt who had died at hospital on the 17th of February 1991.

He had been very popular among students because of his open-mindedness, his impartiality, his support for them in University committees where they themselves have only a minority status. He has always had time also for their personal problems. They came even from other faculties to talk to him and seek his advice and help. He has been active in the peace movement Pax Optima Rerum at Kiel University where together with about 15 other professors from different faculties he has organized lectures on political issues in connection with peace activities. He also was an active member in the congregation of the University church. His seminars together with philosophers and representatives of the other natural sciences on evolutionary problems won him a wide audience. He was among the first to discuss and propagate the ideas of the Club of Rome at the university and as a member of the "Politischer Club" (Political Club), an international forum

at Berlin, he was engaged in discussions on the future and welfare of mankind. He travelled a lot giving public lectures on a wide variety of topics.

He served as an active member in a great number of University committees where he tried to contribute to the introduction of more democracy. Until his death he chaired a group seeking to establish a chair for Tropical Ecology, a field of research badly neglected in Germany. In this activity he profited from his experiences acquired while travelling widely in tropical countries himself. He had connections and friends all around the world. No wonder that no seat stayed empty in the church.

There were several speakers at the funeral service and through a recital of some of his poems even Noodt himself was to be heard. The pastor passed in review stages of his life. He was born in Fürstenwalde near Berlin on the 29th of June 1927. With 16 he

had to do military service and returned from British internment in 1945. He began to study zoology, botany, geology, oceanography, anthropology and physics at Kiel University where in 1953 he received his PhD under the supervision of Adolf Remane.

The next year he was a visiting scientist at the University of El Salvador pursuing biocoenotic studies of marine and freshwater Crustacea. He travelled in Guatemala and Honduras. In 1955/56 he was marine biological advisor for the Ministry of Agriculture in Lima/Peru. During this time he studied the fauna along the Peruvian coast and also travelled inland. He returned to Kiel via the Amazon basin and became a research assistant at the University. In 1958 he was called again to South America where this time he was to build up an ecology section at the Zoology Department of the State University of Santiago/Chile. Two years later he became professor at the Zoology Department of Valdivia University. He travelled widely during this time through Chile, Peru, Bolivia, Argentina, Paraguay, and Brasil taking samples of groundwater fauna.

In 1961 he returned to Kiel to resume his job as a research assistant and was accorded a D.Sc. in 1964. Since 1969 he was an Assistant Professor of Zoology at Kiel University. He continued to travel but his absence from home now did not last longer than a few months. He returned to South America several times but also went to India, the United States, Tunesia, Portugal, and Finland. In the early 80ies he began to turn gradually away from own original scientific work and devoted more and more time to his graduate and PhD students.

Prof. S.A. Gerlach as a friend and fellow scientist gave a summary of Noodt's contribution to science. He was a taxonomist and ecologist. He worked on two groups of Crustacea: harpacticoid copepods and Bathynellacea (Syncarida), but also published a few papers on mystacocarids and interstitial amphipods. He began with studying marine harpacticoids and their biocoenotic relationships. From the very beginning there was an emphasis on interstitial species both marine and freshwater. Most of the descriptive work dealt with freshwater species, in

particular of the genus Parastenocaris of which Noodt has named 50 species. The later harpacticoid work was devoted to an ecological characterization of the members of this group.

His work on Bathynellacea included the first modern revision of the Syncarida as a whole. This work became the basis and a stimulus for all future work. With the breakthrough of plate tectonics and the reconsideration of animal distribution patterns Noodt was the first to recognize the potential of the groundwater fauna to contribute to a reconstruction of former intercontinental land connections. The discussions of his papers revolved around questions of phylogeny, zoogeography and ecology of the groups he had studied.

Noodt had an impressive number of PhD students (more than 50) who worked on a wide variety of topics and often far away from home mainly in the field of marine benthic ecology. There was a tradition to be held up in this field at the Zoology Department at Kiel after Remane's retirement and Noodt was the only one left to carry on with it. But among his PhD students there also were - particulary in the early cohorts - several who studied Crustacea like he did with emphasis on questions of phylogeny, ecology, and zoogeography, and when the long funeral procession formed behind his coffin on the cemetery scattered among the crowd there also were those who by now have their own reputation in carcinology circles: Anger (decapod larvae), Schriever (Copepoda), Sieg (Tanaidacea), Wägele (Isopoda), and yours truly.

H.K.S.

Publications on Copepoda

1952 - Subterrane Copepoden aus Norddeutschland. Zool.Anz. 148 (11-12): 331-343, fig. 1-47.

1952 - Marine Harpacticiden (Cop.) aus dem eulitoralen Sandstrand der Insel Sylt. Abh.mat.-nat.Kl. Akad.Wiss.Mainz, 1953 (3): 105-142, fig. 1-99.

1952 - Neue unterirdische Copepoden aus Schleswig-Holstein. Faunist.Mitt.Norddeutschland 1 (1): 2-3

1952 - Bemerkenswerte neue Copepoden von der deutschen Ostseeküste. Faunist.Mitt.Norddeutschland 1(2): 10-11.

1953 - Bemerkenswerte Copepoda Harpacticoidea aus dem Eulitoral der deutschen Meeresküste. Zool.Anz. 151 (1-2): 6-26, fig. 1-43.

1953 - Entomostracen aus dem Litoral und dem Küstengrundwasser des Finnischen Meeresbusens. Acta Zool.Fenn. 72: 1-12.

1954 - Copepoda Harpacticoidea aus dem limnischen Mesopsammal der Türkei. Istanbul Ueniv. fen Fak. Hidrobiol. (B), 2: 27-40, pl. 1-3.

1954 - Copepoda Harpacticoidea von der chilenischen Meeresküste. Kieler Meeresforsch. 10 (2): 247-252, fig. 1-34.

1955 - Eine neue Parastenocaris (Copepoda Harpacticoidea) als Vertreterin limnischen Mesposammons aus Südamerika. Arch.Hydrobiol. 50 (1): 76-81, fig. 1-7.

1955 - Sandstrand-Copepoden von der schwedischen Ostküste. Smärre undersökninger över Öresund,17. Kungl.Fysiogr. Sällsk.Lund Förhandl. 24 (19): 1-8, Fig 1-11

1955 - Limnisch-subterrane Harpacticoiden (Crust.Cop) aus Norditalien. Zool.Anz. 154 (3-4): 78-85, fig. 1-23.

1955 - Marmara denizi Harpacticoid'leri (Crust.Cop.). Marine Harpacticoiden (Crust.Cop.) aus dem Marmara Meer. Istanbul Ueniv. fen Fak. Mecmuasi (B) 20 (1-2): 49-94, fig. 1-103.

1955 - Copepoda Harpacticoidea von Teneriffa (Kanarische Inseln). Zool.Anz. 195 (9-10): 200-220, fig. 1-32.

1955 - Harpacticiden (Crust.Cop.) aus dem Sandstrand der französischen Biscaya-Küste. Kieler Meeresforsch. 11 (1): 86-109, fig. 1-113.

1955 - Die Verbreitung des Genus Parastenocaris, ein Beispiel einer subterranen Crustaceen-Gruppe. Zool.Anz. Suppl. 18: 429-435.

1955 - Harpacticides (Crust. Cop.) psammiques de la cote sud-ouest de la France. Vie Milieu 6: 151-153.

1956 - Attheyella (Chappuisiella) aliena n.sp., ein Copepode tropischer Verwandtschaft aus Phytothelmen des Göttinger Gewächshauses. Gewäss.Abwäss. 14: 62-69, fig. 1-15.

1956 - Verzeichnis der im Eulitoral der schleswig-holsteinischen Küsten angetroffenen Copepoda Harpacticoidea. Schr.naturw.Ver.Schlesw.-Holst. 28 (1): 42-64.

1957 - Zur Ökologie der Harpacticoidea (Crust. Cop.) des Eulitorals der deutschen Meeresküste und der angrenzenden Brackgewässer. Z.Morph.Ökol.Tiere 46: 149-242,fig. 1-13.

1957 - Zur Kenntnis von Nitocra reducta Schäfer (Copepoda Harpacticoidea). Zool.Anz. 159 (7-8): 179-184, fig. 1-8.

1958 - Die Copepoda Harpacticoidea des Brandungsstrandes von Teneriffa (Kanarische Inseln). Abh.math.-nat.Kl., Akad.Wiss.Mainz, 1958 (2): 53-116. fig. 1-213.

1958 - Pseudocyclops gohari n.sp. aus dem Eulitoral des Roten Meeres (Copepoda Calanoida). Zool.Anz. 161 (5-6): 150-157, fig. 1-14.

1958 - Horsiella brevicornis (Douwe), un copepodo eurihalino (Crustaceo) en la orilla arenosa del Lago de Ilopango (El Salvador). Comun.Inst.Trop.Invest.cient.San Salvador 7 (1-2): 65-69, pl. 1.

1958 - Schizopera pratensis n.sp. von Salzwiesen der deutschen Meeresküste (Crustacea, Copepoda). Kieler Meeresforsch. 14 (2): 223-225, fig. 1-19.

1962 - Investigaciones sobre crustaceos subterraneos en al región neotropical. Actas Trab. I. Congr.sud-amer. Zool., La Plata 1959. 1: 123-124.

1962 - Limnisch-subterrane Copepoden der Gattung Parastenocaris Kessler aus Mittelamerika. Beitr.neotrop.Fauna 2 (3): 223-248, fig.1-91.

1963 - Subterrane Crustaceen der zentralen Neotropis. Zur Frage mariner Relikte im Bereich des Rio Paraguay-Parana-Amazonas-Systems. Zool.Anz. 171 (1-4): 114-147, fig. 1-162, Tab. 1.

1964 - Copepoda Harpacticoidea aus dem Litoral des Roten Meeres. Kieler Meeresforsch. 20, Sonderheft: 128-154, pl. 1-17.

1965 - Crustacea subterranea aus Argentinien. Beitr.neotrop.Fauna 4 (2): 84-129, fig. 1-215.

1968 - Deuten die Verbreitungsbilder reliktärer Grundwasser-Crustaceen alte Kontinentzusammenhänge an? Naturw. Rundsch., Stuttgart. 21 (11): 470-476.

1969 - Die Grundwasserfauna Südamerikas. In: Fittkau, E.J. et al. (Hrsg.): Biogeography and ecology in South America, 2. - Monographiae biol. 19: 659-684, fig. 1-8.

1969 - Substratspezifität bei Brackwasser-Copepoden. Limnologica, Berlin. 7 (1): 139-145, fig. 1.

1970 - Zur Ökologie der Copepoda Harpacticoidea des Küstengebietes von Tvärminne (Finnland). Acta Zool.Fenn. 128: 1-35, fig. 1-3.

1971 - Ecology of the Copepoda.In: Hulings, N.C. (ed.): Proceedings of the first internatinal conference on meiofauna. - Smithson.Contr.Zool. 76: 97-102, fig. 1.

1971 - Die Bathynellacea Chiles (Crustacea Syncarida). Gewäss. Abwäss. 50/51: 41-65, fig. 1-11.

1972 - Drei neue Parastenocaris aus Kolumbien (Crustacea-Copepoda). 1. Mitteilung über kolumbianische Grundwasser-Crustaceen. Stud.neotrop.Fauna 7 (1): 101-112, fig. 1-50

1972 - Brasilianische Grundwasser-Crustacea, 1. Studien an den Gattungen Parastenocaris Kessler und Forficatocaris Jakobi aus der Serra do Mar von Sao Paulo (Copepoda-Harpacticoidea). Crustaceana 23 (1): 76-99, fig. 1-141.

1973 - Artenreichtum und Monardsches Prinzip bei Crustaceen des Limnopsammons der Neotropis. Amazoniana 4 (3): 255-261.

1974 - Anpassung an interstitielle Bedingungen: Ein Faktor in der Evolution Höherer Taxa der Crustacea? Faun.Ökol.Mitt. 4: 445-452, fig. 1.

1969 - NOODT,W. & GALHANO, M.H.: Studien an Crustacea subterranea (Isopoda, Syncarida, Copepoda) aus dem Norden Portugals. Anais Fac.Cienc.Porto 52 (1-4): 201-267, fig. 1-27.

1953 - NOODT,W. & PURASJOKI,K.J.: Schizopera ornata n.sp., ein neuer Copepode aus Brackwasserbiotopen der deutschen und finnischen Ostseeküste. Commentat.biol. 13 (16): 1-10, fig. 1-22.

1975 - EBERT,S. & NOODT,W.: Canthocamptidae aus Limnopsammon in Chile (Copepoda Harpacticoidea). Gewäss.Abwäss. 57/58: 121-140, fig. 1-60.

1968 - KULHAVY,V. & NOODT,W.: Über Copepoden (Crustacea) aus dem limnischen Mesopsammal Islands. Gewäss.Abwäss. 46: 50-61, fig. 1-5, Tab. 1-5.

1975 - SCHEIBEL,W. & NOODT,W.: Population densities and characteristics of meibenthos in different substrates in the Kiel Bay. Merentutkimuslait.Julk.(=Havsforskningsinstitutes Skrifter). 239: 173-178, fig. 1-2, Tab. 1.

1966 - UHLIG,G. & NOODT,W.: Tisbe helgolandica n.sp. aus dem Seewasser-Freibad Helgoland (Crustacea, Copepoda). Kieler Meeresforsch. 22 (1): 133-137, fig. 1-8.

Geoffrey A. Boxshall Rony Huys

Interviewing copepodologists

"But thou, O Daniel, shut up the words, and seal the book, even to the time of the end; many shall run to and fro, and knowledge shall be increased (Daniel 12,4)". In his caricature of scientific conferences Erwin Chargaff was reminded of this enigmatic verse of one of the enigmatic books of the Bible when trying to characterize the helpless eagerness with which modern scientists hasten from one conference to the next in order to obtain fresh knowledge and new insight from sources unfit for their provision. The same pidgin, the same cocktails, the same ten minutes of automatic recital are only one side. This interview deals with the other.

Our book came out of the conference in London. Participants will remember that talk in two parts defying all prescribed time limits in which a young colleague presented a new phylogenetic scheme for harpacticoid copepods. What was allowed during the conference, was impossible in print. Rony Huys had to shorten the article he had submitted for publication. Geoff Boxshall as

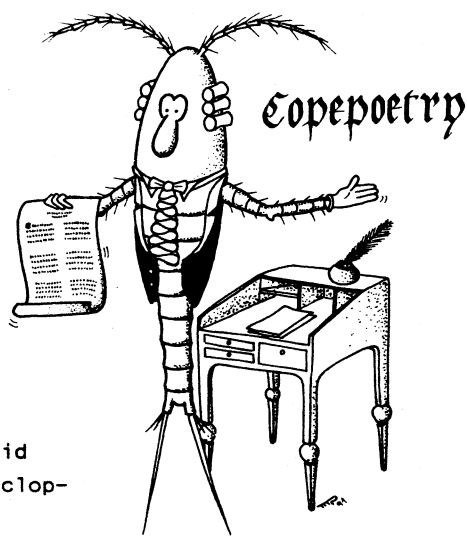
one of the editors suggested to split off the phylogenetic part from establishing the new order Gelyelloida. The new order appeared in print, the rest became a common project of the two confined not only to the harpacticoids but taking into consideration the Copepoda as a whole. The result was presented in Japan.

It became an interconference activity using up completely our personal time. For both of us it was not the major project. We had other things to do at the same time but these were less fascinating. It turned out to be a genuine collaboration . Our different backgrounds, our different experiences were complementary. We corrected each other. While at the start we felt Gent and London to ly widely apart, these seemed to come closer and closer together as time went by, only a few miles from one another with a bit of water in between, until finally we discovered that we are neighbours with the English Channel as the fence. They met four times a year. Twice Rony went to London, twice Geoff travelled to Gent and between the trips contact was maintained through expensive telephone calls.

Our first own cladogram was based on the same characters as had been used before. All the information we could extract from the literature allowed a modification of existing systems, not more. There was a lack of details and we soon discovered that we had to start from scratch. Our first attempt relied on the female genital system. That of the platycopioids had never been described. By studying it the first drawings were made for the book. The analysis of the female genital system, however, didn't lead anywhere, so they turned to the first antenna.

We started with detailed observations of the setation of the antennules. Giesbrecht had done this already. So we knew that it could provide a lot of information. We checked the antennules in all orders and in this were very successful. We finally could homologise the segments in both sexes and the geniculation of the male antennules. This enabled us to split the platycopioids from the rest. This success triggered a detailed comparison of other appendages.

The most exciting discovery was that the endopodite of the second maxilla and of the second antenna were primitively 4-segmented rather than 3-segmented as had always been thought. The endopodite of the second maxilla is very condensed with many setae and seemed very unpromissing. We felt it was too difficult to examine accurately, but finally it turned out to be one of the most informative characters in determining relationships. It yielded an apomorphy for the Calanoida, one for the Podoplea, and a synapomorphy for the Cyclopoida and Gelyelloida. *One of the driving forces to go into all that detail was the discovery of the paraphyly of the Gymnoplea. We felt we had to make our scheme robust enough to survive criticism and make people swallow the loss of the Gymnoplea. There is a lot of inertia in taxonomy. People still use outdated classification. Take for instance the persistence of Notodelphyoida.*



For Rony the greatest excitement was his discovery of the homology of geniculation. For Geoff the most exciting outcome was how conservative the whole range of copepods are. *Fancy, a common setation pattern can be identified in pelagic calanoids, interstitial harpacticoids, and sponge-inhabiting siphonostomes. That was the key to it all. It hits you that it goes down to a particular seta.* Geoff was also greatly surprised when Rony showed him that an interstitial paramesochrid and independently an interstitial cyclopinid both had an additional pseudosomite in front of the genital somite.

To do all this work a lot of material had to be examined. Was this easily available ? *We have generously been provided with specimens by several colleagues. Our regular conferences are crucial in this respect. That's where we have made our contacts. Without them things would have been more difficult. It is*

absolutely important to deposite type specimens in museums, but in recognized museums that are prepared to lend them. Museum specimens alone, however, would not have been enough. Their project was a child of the conference in London and its growth and welfare did depend on the cooperation and benevolence of many a fellow copepodologist. It was obvious in the interview how grateful Geoff and Rony were for all the help they had received.

The time was ripe for a new system, wasn't it ? *We guess so, after 70-80 years with the Sarsian system it was ripe for a number of reasons. Some important new taxa have been discovered recently, particularly in anchihaline caves. The musculature work by Geoff has provided a system of homology for identifying limb segments. A lot of new schemes have recently been proposed, but all have used the same characters without providing new information.*

Let us talk about your book. *It has four chapters. The first is an introduction to copepods, their importance, abundance and diversity. It includes an easy reference guide to terminology. The second is a systematic and descriptive account of the characters of every order which enabled us to produce a diagnosis for each order. It contains the basic raw data and includes the majority of the drawings, 200 full-page plates of line drawings and 50 plates with SEM photos. Chapter three deals with the evolutionary trends that are apparent throughout the whole of Copepoda in body structure and appendage form. Chapter four gives a résumé of existing phylogenies, a description of our character sets and presents our new phylogenetic scheme. There also is a glossary which cross-references terms from the different fields of copepodology.*

Thinking about what I have heard and seen at Karuizawa about Rony's and Geoff's work a remark comes to my mind that Stephen Jay Gould once made after he had explained a new phylogenetic scheme proposed by others for a particular animal group. About this scheme he said: "It achieves that lovely optimal level of scientific originality - conservative enough to win our

allegiance but replete with surprises to spark our fascination." Did anyone miss that special offer by The Ray Society to subscribe to COPEPOD EVOLUTION for a special prepublication concessionary price ?

H. K. S.

The l e t t e r box

W.A. BOEGER (Itacuruca, Brasil) has moved again and is still fascinated by marine parasitic copepods:

I have been "slow" about publishing lately since I moved from Manaus to Rio. I have, however, received a couple of grants and my lab is starting to look like a real lab now. I guess I am still in business with copepods, but I am equally interested in other ectoparasites of fish (especially Monogenoidea).
Right now I am like a blind man, touching this new environment, the ocean. If I did like parasitic copepods before, then I like them even more now that I see these amazingly diverse marine forms. I have a Master's student working on the seasonal variation (if there is any) of parasitic copepods of a small fish, locally called the "king fish" (Xeneomelaniris brasiliensis) - there are about 5 different species on it. Another predoctoral student is working on the copepods of Mugil spp. I am still fooling around with ergasilids of piranhas (Serrasalmidae) but will have a nice collection of elasmobranch's copepods soon.

F. EVANS (North Shields, U.K.) has retired from "Porcupine Newsletter" and work, but not from copepods:

I have to tell you that I am now retired..... You may be interested to know that in my retirement I intend to continue to work on the biological observations made by merchant ships in their meteorological logbooks, observations that extend back for about 150 years.

E.H. GRAINGER (Ste-Anne de Bellevue, Canada) bids farewell to WAC:

I am discontinuing as of now my membership in the WAC in view of my imminent retirement. A member since the beginning, I've shared with the majority the benefits provided by the few of you who have kept the organization the vital one it is. A special accomplishment surely has been the production of "MONOCULUS", unique and incomparable. May the association flourish in the future as it has in the past.

K.A. GRESTY (London, U.K.) has moved and is involved in new programmes:

Since the start of the year I have been working with Geoff Boxshall at the British Museum (Natural History) as a Junior Research Fellow. This post is for 3 years research with the Great Britain - Sasakawa Foundation, also involving K. Nagazawa and S. Urawa. At present, I'm working on the pre-oral spine of Argulus japonicus (a freshwater, branchiuran parasite of fish) to establish (amongst other things) what part this 'poison' spine plays in the feeding of the parasite. I will also be working on the digestive system of the Salmon Louse, Lepeophtheirus salmonis, towards the end of my appointment at the museum.

OFFER AND REQUEST CORNER

We are currently compiling a checklist of the parasitic Copepoda of the African continent, both marine and freshwater. This work was prompted by the fact that much of what is known about Africa was done a very long time ago and was in some cases inaccurate. Africa seems to have been rather neglected in recent years. We would very much appreciate it if anyone with unpublished records or material from Africa would contact us. We would also like to correspond with anyone with an interest in African parasitic copepods.

Kindly write to: Dr. W. Oldewage, Department of Zoology, Rand Afrikaans University, P.O. Box 524, Johannesburg 2000 South Africa

First European Crustacean Conference
Première Conférence Européenne sur les Crustacés

Paris, 31 août - 5 septembre 1992

This conference held in Europa will welcome anyone in the world having interest in Crustacea. The program will focus on : 1) Systematics, Phylogeny, 2) Aquaculture, Fisheries, 3) Ecology, Ecotoxicology, 4) Nutrition, Metabolism, 5) Endocrinology, Neurobiology. Final program will include lectures by invited speakers, selected oral communications and poster presentations and free communications.
The conference is organized by: Muséum National d' Histoire Naturelle, Ecole Normale Supérieure, Université Pierre et Marie Curie (Paris VI).
It associates : XII "Réunion des Carcinologistes de Langue Française",
V Colloquium Crustacea Decapoda Mediterranea, II Workshop on Biology of Stomatopoda, VI meeting of the "Groupe d' Etudes et de Réflexion sur l' Evolution des Crustacés", la III "Réunion annuelle du groupe d' astacologie de la Société Française de Limnologie".

Information may be obtained from "Secrétariat de la Première Conférence Européenne sur les Crustacés," c/o. D. Defaye, Laboratoire de Zoologie (Arthropodes / Crustacés), Muséum National d' Histoire Naturelle, 61 rue Buffon, F-75005 PARIS, France.

Télécopie (Fax) : 33 (1) 40 79 34 84; Télex : MUSNAHN 202641 F; CRUSTACE AT FRMNHN 11.BITNET;
Tél. : 33 (1) 40 79 30 98 (P. Noël & Répondeur) ou 33 (1) 40 79 35 70 (D. Defaye).

G.BOXSHALL (London) makes the following suggestion as regards the meeting in Paris:

If there is sufficient interest amongst WAC members it should be possible to organize one or more sessions on copepods at the Paris meeting. If any WAC members are interested in such a session, or have suggestions for particular themes, please contact Geoff Boxshall (The Natural History Museum, London SW7 5BD, U.K.) who is prepared to act as co-ordinator.

Report on Work in Progress and Projects in the former Laboratory of Dr. A. Fleminger, Scripps Institution of Oceanography

Dr. A. Fleminger passed away in January 1988 in the midst of active copepod research (MONOCULUS 16:2-6; 17:22-26). The following listing of uncompleted projects in which he was chiefly engaged is a shortened version of a report that was prepared for the Director, Marine Life Research Group, Prof. M.M. Mullin, with the support of the Abraham Fleminger Memorial Fund. Omitted are projects for the completion of which commitments have been made, and notes on ring books, folders, drawings, and the like. Abe Fleminger's extensive collections of sorted and identified copepods are the result of enormous labor over a long period of time. Most specimens are stored in glycerine on microscopic slides. It is hoped that the one or the other project can be completed in the spirit of Abe Fleminger.

Work in progress and projects of Abe are concerned with evolution and determination of possible causes and approximate times of speciation events in the marine enviroment. Calanoida copepods as objects of study were used because certain groups occur in abundance in surface waters and upper water layers permitting their collection in numbers sufficient for analysis as populations. Reconstruction of phylogenies in the absence of a fossil record was to be pursued under consideration of sea level changes closing and opening passage ways, climate expanding and restricting or abolishing suitable habitats, and resulting ocean circulation systems setting the stage for reproductive isolation and allowing, over time, genetic changes to take place.

Research focused on two calanoid copepod families representing two different kinds of distributions. One is the family Pontellidae; its species live in warm, usually neritic, water with narrow ranges and exhibit a luxuriant variety of modifications of secondary sexual characters. The other is the family Calanidae; its members are predominantly found in cool and cold, broadly neritic waters, but morphological differences between species are small.

These investigations led also to related subjects as: Other copepod taxa in continental shelf areas, e.g., the family Tortanidae; comparison of species pairs of various genera living in different oceans, e.g., Temora, Centropages; morphology and phylogeny of related families, e.g., the family Megacalanidae, formerly included in the Calanidae; comparative morphology of the female genital segment in calanid as well as non-calanid lineages.

The basis for such studies is definite identification and characterization of the populations, or species, respectively, and their ranges. Traditionally, morphological characters are used. Especially sexually modified structures in adults readily distinguish most copepod taxa. These structures are utilized in mating, and their species specificity suggests that they are part of a premating isolating barrier.

Please, send inquiries to: Dr. E. Brinton
Marine Life Research Group, A-001
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, California 92093
U. S. A.

Work in Progress and Projects of A. Fleminger

1) Family Megacalanidae
   Morphology of species and genera; phylogeny

2) Family Calanidae
   Provisional title, variously: Calanid revision, Calanid lineages and phylogeny, Cladistic analysis of the family Calanidae, A revision of calanid genera and their phylogenetic relationships
   Calanidae perforation patterns, measurements (see also genera Calanoides, Undinula and Cosmocalanus, Calanus)
   Calanid character states
   Calanid mandible
   Calanid A1 denticles
   Calanid female genital segment morphology
   Genus Calanoides. Title: Systematics and spatial

distribution in Calanoides; Systematics, biogeography and phylogenetics in Calanoides

Genera Undinula and Cosmocalanus (formerly included in Undinula). Systematics, distribution, phylogeny

Genus Calanus. Title: The genus Calanus in the Pacific Ocean, especially biogeography and character divergence in the pacificus group

3. Family Pontellidae
Distribution of American pontellids: Labidocera, Pontella, Pontellopsis
Pontellids in Indo-Malayan region (or Indo-West Pacific, or Austral-Asia): diversity, distribution, phylogeny, new species, regional key to species
Comparative evolution of Pontellidae in Americas and Austral-Asia
Species-area curves: Labidocera, Pontella, Pontellopsis
Copulation in pontellids, spermatophore attachment
Pontellid characters: trunk segments, swimming legs, cephalic appendages; differences in morphology, range and circulation systems in context of geographical speciation model

Genus Labidocera.
Habitat differences between Labidocera jollae and darwinii species groups
Spatial relationships among congeneric planktonic copepods: co-occurrence in Labidocera; Labidocera introgression, hybridization
Differences between species in morphology, range, and circulation system; speciation
Labidocera pavo Complex

Genus Pontellina
Geographical distribution and speciation: Pontellina story II or Pontellina paradigm. Abundance, affinities
Distribution of Pontelina used in elaboration on food patch

model for distribution: vertical and horizontal patchiness of copepods and copepod food; respiration; abiotic environmental factors influencing species distribution: pressure, temperature, salinity

Genus Pontella
Review, new species. Apparent species groups and complexes based on sexually modified characters and lense development of rostrum (34 known species + 19 presumed new). Evolutionary success of Pontella in absence of Labidocera jollae and darwinii groups

Genus Pontellopsis
Review, including 3 new species

4. Comparison of Calanidae and Pontellidae
Diversity; habitat; distribution; abundance; role in ecosystem; mating systems: morphology and function, pontellid copulation, spermatophore attachment, spermatophore counts; divergence and evolutionary trends

5. Family Tortanidae
Review, distribution

6. Speciation in copepods
Allopatry and divergence; nature of divergences; barriers: age of barriers, effectiveness of barriers; potential for hybridization; frequency of intermingling, routes for intermingling
Divergence between ocean systems in populations inhabiting separate ocean systems. Centropages furcatus s.l., C. violaceus s.l. Family Temoridae: Temora velificata - stylifera and T. furcata - discaudata as pairs of cohabiting species. T. turbinata co-occurs with velificata and stylifera in Atlantic and with furcata and discaudata in West Pacific and Indian Ocean; turbinata did not cross East Pacific barrier -
Divergence within an ocean system. Forms of Labidocera cervi, L. scotti, L. aestiva, L. lubbocki

7. Grenadiers and the microdistribution of zooplankton
   Title: Selective predation on calanoid copepods by juvenile pelagic-stage macrourid fish

8. Theoretical/biological distribution of copepods
   Evidence of and location of biological barriers in the sea
   Punta Eugenia as a faunal barrier
   Physical confluence of oceans: location of interruptions of biological signifiance
   Reduction in the apparent extent of cosmopolitanism among epiplanktonic calanoids
   Global continental shelf areas
   Upwelling communities
   Zoogeography and paleoceanography
   Character displacement - speciation
   Copepod phylogeny - speciation

9. SEM survey of Calanoid copepods
   Most advanced projects
   2a) Calanid lineages and phylogeny
   2b) Systematics, biogeography and phylogenetics in Calanoides
   3) Pontellina distribution and speciation.

Kuni Hulsemann (Biologische Anstalt Helgoland, Hamburg)

MODEL DESCRIPTION Reactions **MODEL DESCRIPTION**

I would like to discuss, with particular reference to harpacticoids and other, more or less unmodified copepods, the following points raised by Dr. Frank Ferrari in MONOCULUS no. 20, pp.24 to 28:

(1). I agree entirely with his paragraph 1 as far as p.25 line 5, ending "... species and other taxa." ; however, he then draws from these premises a conclusion precisely opposite to any that I would recommend, for the following reasons:
(1a). The author may not have kept any representative specimens, nor have lodged any in a museum; moreover, museum specimens may deteriorate or be no longer accounted for.
(1b). Some authors are notorious for failing to answer letters, or for refusing to lend material.
(1c). The socalled representative series may in fact embody more than one species (see below).
(1d). The diagnosis of an alleged new species may, if using a series as in 1c above, be founded inadvertently either on the entire female of one species and the entire male of another (giving what I call a composite false species), or upon the amalgamated details of two specimens, of the same sex but of different species, of which one provided the drawing-subjects of (say) the abdomen and several of the limbs, and the other the remaining limbs, yielding a mosaic false-species. In really bad cases one may envisage a false-species whose sexes were composite and at least one sex of which was mosaic as well !

(1e). It is not enough to merely state that a given feature is exactly alike in two different species; the feature in question must be illustrated in each species on a scale large enough to show any difference if it exists, or to demonstrate its definite absence if it does not exist, and in either case to establish with certainty that it was not merely overlooked, or even missing when it should have been present. In this connection the ever increasing use of Nomarski's differential interference-contrast (usually referred to simply by the name of its inventor), and of phase-contrast, reveal so much new or misinterpreted detail, even in species hitherto regarded as well known, that there is really nothing for it but to give complete new figures and descriptions of, eventually, every species, in order to abolish the deficient work of previous authors, in effect by superseding them. All this is borne out by Dr. Ferrari's next paragraph (no. 2, on the lower half of p.25), from " in the immediate future..." to "...descriptions which differentiate these species." All this may well make the work of the taxonomist harder than formerly, but whoever said that firstclass work in any field of endeavour was easy ? Perhaps the most sharply defined condemnation of the rubbish written and drawn by so many previous authors is when a subsequent author discovers a useful character that his predecessors could perfectly well have seen in the same species but simply did not bother to figure; in other words, one's attempts to get the best out of the older work are hindered at every turn by sins of omission rather than of commission (although the latter also occur), and therefore mopping up the messes left by older authors may well help more towards attaining a complete taxonomy than the mere accumulation of descriptions and figures of new species, important though that is.

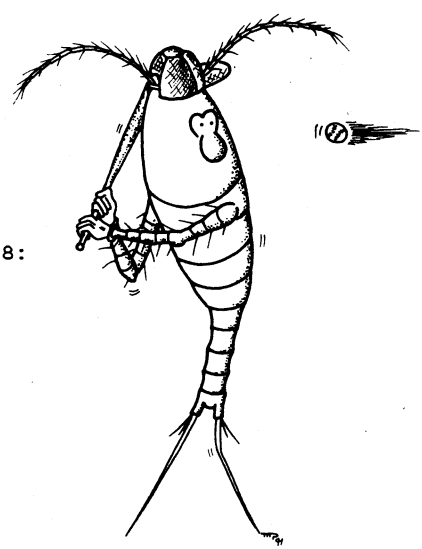
(2). Ferrari's pp.26 and 27. The exposition of unanalysed illustrative detail is NOT being confused with understanding variability in nature (which in any case is extremely small in most species of harpacticoid), but precedes it, and (if properly carried out) lays the foundations for it. As above, what we must really guard against is the failure to illustrate detail at all; however, once it has been illustrated satisfactorily, it

provides a starting-place from which progress may be made in any suitable direction. An illustration of a structure is taxonomically useful only insofar as (a) it conveys the same truths about that structure to all who see it in isolation or (preferably) compare it directly with the structure itself, and (b) conveys those truths in respect of as much as possible of the details of that structure, using the most appropriately revealing method of microscopy (bright field, phase-contrast, interference-contrast, or whatever); in a word, drawings of a structure must be not only complete but fully commensurate, and this applies with equal force to entire animals as well as to all their parts.

(3). To describe the marvellously drawn wealth of minute detail in Rony Huys's figures as unanalysable is to miss the whole point of modern taxonomic endeavour; those details (and the same kinds of details in, for instance, Lang (1965) and my 1988 paper, which should have been published in 1987 but was delayed for reasons unknown to me) are fully worthy of the analysis they will receive when suitable methods have been evolved, even if they do not exist now, and furthermore, it is just those details which may not have been analysed, codified, or even named, but which nevertheless catch the eye time and again, that lead the observer to an even more rapid identification of a specimen than by wading laboriously through the existing keys (which, however, he should always do if the slightest doubt subsists, in order not only to confirm the identity of his specimen but to support the validity of the unanalysed detail). In this connection my 1988 paper tried not merely (a) to be an identification guide for the taxa in it, but (b) to help authors in other countries (notably Australia's nearest neighbours on all sides, in every one of which the existing taxonomy is founded on extremely inadequate descriptions and figures) to elucidate the relationships of their canthocamptids to mine; (c) to show other authors what is required of them, in order that one day every canthocamptid (and, better still, every species of harpacticoid) should have a published description and set of figures of the highest degree of completeness and commensurability, leading (by means of cladistics, or even by some hitherto undiscovered

method of analysis) to the revision of all those taxa, halfway down p. 1027 of my 1988 paper, whose present taxonomy is still so unsatisfactory; and (d) to introduce new terms for hitherto unnamed structures and new ways of expressing the relationships between structures (as on pp. 1029 to 1041) as the essential first step towards the analysis of hitherto unassessed detail as mentioned in the preceding paragraph.

(4). Miscellaneous points, using Ferrari's page numbers:
(4a). Of the points on his p. 26, (2) and (3) have already been dealt with. To point (1) the answer should be Yes, unless the given structure (such as a small limb) was liable to drift out of line in a freshly-made permanent mount and, in doing so, particularly if very small (such as a mouthpart), be turned over so as to lie on what was its upper surface when mounted, or come to be entangled with another limb. Details on how to minimise these undesirable happenings will be given elsewhere, but for the present it is enough to recommend that drawings should not be made from a permanent mount (made as in Hamond, 1969) that is less than about a week old. At the other end of their lives, similar permanent mounts tend to overclear and go optically "flat" after about 10 or 15 years, both the reason and the cure for this being as yet unknown, leaving no recourse except to draw the specimen while the slide is still at its best, including all observable detail, even at the risk of incurring Dr. Ferrari's censure.



(4b). On the points on his pp.27 and 28:
(b1). "Living fossils" is rather an inappropriate name for mosaics and composites, which I prefer to call "false- species" or pseudospecies".
(b2). In his point 1 the primary challenge is no more important than the redescriptions of known species to present-day standards (see above).
(b3). It should be obvious by now

that I entirely disagree with his point 2, because merely differential descriptions are the curse of harpacticoid taxonomy (owing to what they leave out!). Only a complete set of drawings for each sex of each species concerned will provide the hard evidence necessary to support an otherwise meaningless assertion of similarity; the similarity must be shown, not just written about. The question also arises, similar to what? to some obscure figure like an underprivileged postagestamp by a long-dead author of a discarded specimen ? In this modern era, can any taxonomist remotely worthy of the name so much as pretend to be doing his job, if he compares his own specimen to such a figure without giving a superbly clear and detailed figure of what he himself has seen? If he does give such a figure, he is absolved, and it will in turn be accepted as the taxonomic yardstick by later workers, even when all attempts to identify the "postage-stamp" have at last been given up in despair. Really, the only sensible answer to Dr. Ferrari's points 2 and 3 is that each of them requires exactly the same amount of detail, namely the maximum possible.
(b4). As to his point 5, depositing specimens in serveral museums may greatly increase the chance of their not all being conspecific (see above); for his point 6, see below. Once the conspecificity of a given female and a given male had been established, I found that it was usually quite safe to designate them as the holotype and allotype respectively; and other conspecifics in the same sample were designated as paratypes 1,2,3 etc. if female or A,B,C,etc. if male.

(5). Descriptive formalism, the model description, and the morphological checklist.
To Dr. Ferrari (the middle paragraph of his p.27, and point 6 on p. 28) "descriptive formalism" appears to be a fixed Procrustean concept within which all descriptions must be confined; on the contrary, I see it as a flexible framework of concepts and abbreviations, capable of any rearrangement (including expansion or contraction) to meet actual contingencies (such as the analysis of hitherto unanalysable data) as they arise, irrespective of the form in which they arise. To use an aeronautical simile, he designs his aircraft to fit into a pre-

existing hangar, wheras I design the hangar on a modular pattern so as to be enlarged, contracted, or otherwise altered to fit any aircraft (past, present, or future) irrespective of size or shape. One of the prime components of descriptive formalism is the setal formula, of which a large number are found in Lang (1948) and in almost all subsequent papers in which harpacticoids are described, or redescribed wholly or in part; the most successful derivative of the notion of descriptive formalism is the set of tabular keys by Wells (1976), and both they and the setal formulae have the great advantage that new data can be added and misleading data removed (or untrustworthy data indicated as such in some way, if they cannot be removed), with the minimum of disturbance to the rest of the table of formulae or the tabular key in question.

However, genuine descriptive formalism goes further, to comprise a codified system of abbreviations for every part of the animal that lends itself to this kind of treatment. Hamond (1988) and Huys (1988) have proposed numbering systems for the setae of the caudal ramus (= furcal ramus); the former is to be preferred because of being founded on what appears to be the least modified arrangement, found in many families, whereas that of Huys is founded solely on the Paramesochridae which contains many taxa with highly aberrant furcal structures, although he has extended it to various other families subsequently. The points I wish to make here are that (a) the furcal setae presented a hithero unexploited morphological system, ripe for codification, and (b) the arrival of a code (whichever one is used) enables one to homologise the setae on different forms of furcal rami and thence know where to look for missing setae (is a certain seta genuinely absent, or present but overlooked because of being extremely small, or concealed among a lot of spinules, or both?). Here, as in so many other fine details, searching is best performed on a specimen mounted in Reyne's or a similar medium (as in Hamond, 1969), using highpower Nomarski optics. My 1988 paper also contains the first steps towards codifying the more easily understood types of abdominal spinulation (which, as I hope to show in future papers, are extremely useful in certain families or genera) and towards naming, even if not yet codifying, smaller integumental

structures; but the precise codification of the parts of the female genital system remains to be achieved, having been hitherto ignored because of its intrinsic difficulty and low taxonomic priority, although it varies strikingly between different families. At the moment, therefore, we are faced with a paradox; no definitive all-embracing model description is either possible or desirable until all observable details have been named and codified; but on the other hand the underlying thrust of all the best modern taxonomic practice is towards description showing model-like tendencies.

If Dr. Ferrari and his sympathisers have got this far, I hope that they will rethink their reasons for leaving out any observable detail; can they <u>really</u> be so certain that it will never be either needed or analysed? As to the absolutely fatuous remark in the middle paragraph of p.27, there are no "high priests" to "sanctify" anything in this field; all we have are taxonomists working with every means at their disposal to see that everything observable is assessed and then used as far as it is taxonomically useable, and especially that nothing is overlooked. This brings me to my final point, which is that, in between the tabulated characters and the ideal of a model description, I see developing the concept of a morphological checklist for the whole of a harpacticoid, including all its limbs and other bits; such lists, compiled for both sexes of every species, would furnish the basis against which anyone describing or redescribing a species, or investigating its variability, or performing cladistic or similar studies, could check his findings to make sure that nothing of importance had been left out. Such a checklist would have the modular flexibility described at the beginning of this section, and modified versions of it could be prepared at any time for studying the harpacticoids of just one area or supraspecific taxon.

R. Hamond (Morston Holt, U.K.)

THE 'IDEAL' DESCRIPTION

For an idea of how I see an 'ideal' description of a type-species, I refer to my 1982 redescription of the female of Euchirella messinensis (Zool. Verh., Leiden, 198). Of course, all parts dealing with general calanoid morphology should be skipped, while, depending upon the specific anatomy of a given genus, adaptations will be necessary and obvious. But, it is merely the amount of detail that I would like to draw attention to. Everything has been described, and (as far as I can imagine) nothing has been left to guess. As a matter of fact, I hope to publish a similar treatise on the female of the type-species of Pseudochirella in the course of 1991. Depending on the state of knowledge in the (sub-) family concerned, various details might also be referred to existing descriptions in combination with actual figures.

However, I see no place in general purpose descriptions of accurate accounts of the structures of the oral field or, in general, of any sternal structures of calanoids. The study of such features will have to remain, in most cases, confined to specific, separate studies for special purposes.

The same goes for integumental organs (i.e., perforation patterns, pore signatures). The study of these requires too elaborate techniques to be included in standard descriptions, even of type-species. So, they may be left out of general descriptions, with an exception perhaps for large, obvious hair-sensilla but, when mentioning these, authors should be careful to state whether they report only coincidental observations made during routine checks or that they have exhaustively checked all body-parts for similar sensilla. The reader should know if only conspicuous structures are being mentioned or the structures reported constitute the complete integumental complement. Integumental structures are not always routinely observed

either. So, maybe it would be a good idea to state (similar to, e.g., "restricted synonymy") the presence of "conspicuous integumental organs and structures" under a conform heading. The user then will be warned that the account given is likely not to be exhaustive.

Then, returning to the description of 'congeners', I thus arrive at the following 'minimal list' of features that are to be found in every 'description' that deserves to be acknowledged as such:

MINIMAL LIST

1. **General**

The description s.s. should always be preceded by

a. A (full or restriced) synonymy, if relevant, of course.

b. Material examined. This should always be stated with proper locality data, collection or identification numbers, proper mention of stage and/or sex, numbers of specimens, and including an enumeration of

c. slide preparations made, along with the specimen-idenification numbers, and, of course,

d. a statement of type-specimens designated, along with collection numbers, the site of lodging, etc.

e. Somewhere in the rest of the paper, a concise reference to observation techniques should be made.

f. Finally, exact mention of the specimens upon which the description has been based (not necessarily the same as material examined) forms an indispensable part of a correct description.

2. **Body**

a. There should be a general characterization of the shape and nature of the body (e.g., elongate or compressed, delicate or robust, etc.).

b. As regards measurements, the total length (in mm., including also the range observed) will suffice, as other dimensions may be taken from the figures, yet

c. the relative lengths of cephalothorax and urosome (as.... + ...= 100) should be given as well as

d. an indication of the relative length of the A1 (up to where it reaches on the body, c.q., by which segments it overreaches the body), when completely streched backwards.

e. Two figures are both necessary and sufficient to figure the body as a whole: a dorsal and a left lateral view. I think it is very unwise to miss the opportunity to figure any copepod in its full eidonomy, so I strongly advocate that every author should give such pictures. These figures, then, should not be smaller than, say, 7 cm. in print (longitudinal axis) as an absolute minimum: too much detail will be lost if smaller. They should clearly figure the general shape of the body and especially of the borderlines of the various somites of the cephalothorax, as these will not be repeated elsewhere. The dorsal aspect needs to show no appendages (with the exception perhaps of the A1 on one or both sides, depending on the possible presence of asymmetry) but it should figure the full complement of furcal bristles. The left lateral view does not necessarily show the furcal bristles, but this aspect should figure the A1 in situ, i.e., the left appendage, fully streched backwards, and with its complement of larger setae. Next, the left Mxp should be drawn along with the sites of attachment, i.e., the basalmost segments, of the left swimming legs P1-4 plus the complete pair of P5, if relevant (e.g., in males). There seems to be a general habit of only presenting a side-view of males but I would object to that: while it may certainly suffice for many species, as a general principle one should always consider the possibility to figure a dorsal view as well.

In order to prepare a good drawing, one does not have to be an artist: I am certainly no artist myself, but my drawings are always both clear and detailed and drawn with firm lines. Many of us know the trick: original drawings are at least 3 times the final size in print and they are thus reduced to 33%. Anyone applying this technique can prepare a drawing that looks like an artist's with the aid of a modern drawing stage or even with an old-fashioned camera lucida. But let's go on with the minimum list:

3. **Cephalothorax**

a. The general shape of the CTh should be described, along with its composition, i.e., an enumeration of free or partly free somites including an indication of the degree of fusion of not (completely) free borderlines. Moreover, the relative lengths of these parts should be mentioned as fractions of 100. Unless specific, amongst which asymmetrical, structures are met with, the description of the somites can be very brief (though special attention is often due to the posterior region, i.e., Th4 and 5, in the female).

b. The rostrum and frontal organ ought to be described in somewhat more detail, especially the rostrum, as this represents not infrequently a diagnostic feature at either the generic or the specific level.

c. A separate figure should be given of the rostrum (not under 1 cm) in an appropriate view (depending upon the nature of its structure). For the remaining features of the CTh the overall figures of the body will generally suffice.

d. If relevant, special ornamentation like a crest or a cephalic spine and/or caudal spines or tubercles, etc., should be described separately and sufficiently, accurately in text as well as in figures.

4. **Urosome**

a. The general shape and composition of the urosome has to be mentioned along with an indication of the relative lengths of its components, again as fractions of 100. In females, the exact shape of the Gnsom should be described rather exhaustively, while in both sexes the presence or absence of asymmetrical structures needs to be stated explicitly. Though the structures of the genital operculum in females may be of value, I do not think incorporation of these in a standard description could be de manded, as their proper observation requires SEM-techniques. Although these are by now widely available, I still think description of a calanoid should be possible adequately by resorting to light microscopy only.

b. This is also the place to describe the spermatophore in concise, general terms, along with measurements (length and width and relative length of the stalk), and including a brief characterization of the site(s) of attachment on the female body and/or the way of carrying by the male in his P5. If relevant, the presence of an egg-sac (which size, i.e., approximate number of eggs specified), has also to be reported here.

c. Concise but adequate characterization of the remaining somites and of the furcal rami should follow here. The setal armature of the rami has to be properly characterized.

d. A dorsal and a lateral figure of the urosome should be presented as a minimum (not under 5 cm as the longitudinal dimension), while it will be necessary to give also the 'other' lateral view of the urosome (or, at least, of the Gnsom) in females with asymmetry in those parts. In females, moreover, the position of the (filled) seminal receptacles should be indicated, but only if the author feels that he or she has properly determined their position (which is not always as easy as it may seem) : a noncommittal indication may be misleading and is better omitted at all. In the

details of the urosome, the furcal setae should only be figured as stubs, as their full length has been shown in the overall figures of the body already.

5. **Antennulae**

a. The composition of the antennules (number of segments,(degree of) possible fusions, relative lengths of articles as fractions of 100) should be stated, along with

b. a description of the armature of setae and/or aesthetascs of every segment.

c. In cases of asymmetry of left and right A1, the structures concerned require separate mentioning while, of course, any other specific structures should be described adequately as well.

d. I think the overall picture of the A1 contained in the left lateral view of the body, will suffice in general to describe the relative lengths of the large setae. So, the A1 requires one separate (detail) figure only, in order to account for t he shapes of its segments and the shapes and sizes of its smaller setae and aesthetascs. Such a figure will generally be too large to be presented in one whole, as the A1 generally is too long. Thus, it should be figured in two to four parts, depending upon the format of the publication. It should preferably give an outer lateral view of the left appendage.

6. **Setae and spines in general**

I think it is appropriate here to devote a few lines to the description of setae and spines in general. The dimensions of these structures will mostly be apparent from the figures, whereas the fact whether or not particular setae are smooth, or setulose ('plumose'), or spinulose, or serrate, or (bi-) pectinate should be stated as well in the text as also be apparent from the figures. As regards figuring the armature of a seta or spine an indication will do: figuring all setules etc., would be an exaggeration. A dashed line representing the gross circumference of the ornamentation with only a short but representative stretch filled in, will give a sufficiently realistic idea of density, relative dimensions of the substructures, and of their extension along the circumference of the supporting structure. The degree of flexibility c.q. stiffness should be characterized in words, however. Mention of the actual presence and site of fracture planes and/or joints is

interesting but, in my opinion, quite voluntarily and not required for the purposes of a standard description.

7. **Remaining appendages**

The remaining appendages (A2 - P5) should invariably be depicted in at least two figures: either a medial and a lateral or a posterior, and an anterior view, possibly completed by one or more details as necessary. The only exception is the corpus mandibulae, of which either a dorsal or a ventral view will suffice in general. If only one figure is presented of any of the other parts, the account is simply incomplete. This habit will prevent the descriptive text from becoming unnecessary long, as not everthing will have to be mentioned in text explicitly: reference to the figure in question will often suffice (and a good figure may be more informative than several pages of text). On the other hand, the author is forced by figuring both aspects to observe every detail properly: in descriptive biology drawing forms an adequate means of proper observation. As regards the amount of detail needed, I favour the idea of presenting in one of the views the full complement of setae and/or spines in order to document their full lengths; in the remaining view, the indication of the usual stubs will suffice. Next, any structures requiring the presentation of a detail should be given such a figure, since the overall figures may be too small for that purpose. For these overall figures, I advocate a minimum size of 5 cm along the length axis of the appendage when in print, excluding the setae or spines.

8. **Antennae**

a. As regards the A2, composition, i.e., number and relative lengths of the segments, fusions, if any, relative length of the rami, and a concise but adequate description of the setal armature will usually suffice, along with

b. the two figures as indicated above: a medial and a lateral view, both of the same, adequate size.

9. **Mandibulae**

a. A general characteristic of the corpus mandibulae is required, along with

b. a rather detailed account of the composition of the masticatory edge as well as

c. the composition and armature of the palp.

d. A single figure of the corpus will do, along with an anterior and a posterior view of the gnathal edge, and the two complementary figures of the palpus.

e. Any asymmetry should be adequately described.

The mouthparts (Md up to and including the Mxp) of non-feeding males may be described more briefly than stated in the present account, yet I should stress that the text and figures be informative: general remarks like "strongly reduced" are completely worthless. Though it might not seem rewarding even 'shapeless' segments do have a certain shape, which deserves to be described and figured properly, albeit in one or a few short sentences that characterize their morphology. I advocate the same set of figures as for the females (though mostly without the necessity to add details to the two basic figures).

10. **Maxillulae**

a. This appendage is small and complex, but its exact composition is often of paramount importance for the taxonomic status of calanoid species. Therefore, it demands an extra effort in describing which will, however, prove most rewarding. The composition of the basal segments, i.e., their structure of inner and outer lobes, has to be stated in detail, along with a proper description of the rami. The relative sizes of the various lobes, in particular, should be stated clearly. Also,

b. the complete setal armature deserves a description in sufficient detail, but without exaggeration. Yet, the number and site of insertion of the setae and spines constitute important data, as do just as well the details of their armature: the reader has to be able to assess the relative development of all setal structures.

c. The chaetotaxy (i.e., brushes of hairs and/or spinules inserting directly on the segmental integument) may be important for future investigations, but at present a full account of situation and composition (number, shape of elements, sizes, etc.) cannot be demanded for a standard description, unless, of course, very conspicuous structures are at issue. Thus, only the more obvious elements may be mentioned, provided they are accompanied by a statement that the account is unlikely to be exhaustive.

d. Two figures should be given at least for this appendage: an anterior and a posterior view, one of which with the full setal complement and including an indication of the armature of each seta. In many species, however, this full setal complement will have to be presented in two or more figures, as the compressed nature of the Mxl will otherwise yield a messy picture in which nothing can be discerned anymore: authors should never hesitate to prepare an extra drawing here, if required.

11. **Maxillae**

a. General shape, relative size and composition of this appendage should all be described adequately, along with

b. an adequate account of the setal armature and of

c. possible rows or patches of spinules, again according to their extension and composition.

d. Again, the usual two figures, an antero-lateral and a postero-medial view, to be completed by details as necessary.

e. Differences in this particular mouthpart tend to be substantial over the Calanoida, and describing specialized structures may be required not infrequently.

12. **Maxillipedes**

a. A general characterization of size (relative to body size) and (in situ) shape is necessary here, as large differences exist as to the morphology of these appendages as well, and because the Mxp is often one of the more conspicuous in situ characteristics of many species of calanoids.

b. Then, the composition of the Mxp, i.e., the number of segments and of their relative length, should be stated, as well as

c. the setal armature of each segment separately.

d. Special attention is often due to situation, extension, and composition of rows and/or patches of spinules.

e. Though in this case a single figure might be sufficient, I'd prefer all the same to figure also the other side: even if in a somewhat smaller picture, I like to be able of judging both aspects myself, in print.

13. **The swimming legs P1-P4**

a. Relative sizes of all four pairs of legs should be given, preferable in a table, and both in- and excluding the terminal spines of the Re. In the same or in another table the compositon (number of segments) of each ramus should be stated.

b. For all legs goes, that details of the morphology of the segments as well as of the setal c.q. spinular armature, of situation and extension of brushes of hairs, of site, exten sion, and composition of patches or rows of spinules, etc., etc., are to be described concisely but accurately. Moreover,

c. each leg should be figured in both anterior and posterior aspect, while in one of these the full setal complement has to be presented.

d. Although in most calanoids the morphology of the intercoxal plates is not very spectacular, I'd recommend figuring this plate in either one figure of each pair of legs.

14. **First swimming legs**

a. A detailed account of the morphology of the Ri should complete the description of this leg: size and shape of the antero-lateral tubercle, and of its ornamentation, etc., etc., accompanied by one or more detailed figures.

15. **Second swimming legs**

a. This leg should again be described accurately, just like P1, as the descriptions of P3 and P4 will refer back to the account on P2.

b. Especially the number of lateral teeth on the serrate lateral edge of Re (cf. 3) should be mentioned exactly, while the

c. morphology of the Ri should be granted the attention it deserves.

16. **Third swimming legs**

a. This description may be brief, as most details can be referred back to the general account of the swimming legs c.q. to the description of P2. This goes the more for the

17. **Fourth swimming legs**

a. the description of which will primarily be confined to pointing out differences with P3 only. Next, however,

b. it may be necessary to describe special structures on the posterior face of this leg, due to its position immediately anteriad of the genital region.

18. **Fifth legs**

a. If present, the fifth legs usually require a rather elaborate treatise, as the (often asymmetrical) modifications as a result of specialisations related to specific functions in the reproductive process yield many diagnostic characters. In many species it is sufficient to look at the overall body shape and prepare a slide of P5 alone, in order to arrive at an adequate identification of the species the specimen belongs to. Thus, in both males and females the exact structure of P5 needs to be described in text as well as

b. in at least two figures of the complete pair of legs (from different aspects, of course, usually anterior and posterior). The intricacy of structures involved will, moreover, not infrequently demand that such overall pictures are completed by one or more details.

c. If relevant, an idea should be given of the use of the male's legs in the copulation process, i.e., of which structures are there for grasping the female and which serve in transferring the spermatophore.

19. **Etymology**

No description of a new species is complete without a statement about the derivation of the specific and of a characterization of its ecology, as far as the available data will allow.

20. **Biogeography, ecology, etc.**

If possible, brief mention should be made of the horizontal and vertical distribution of the species and of a characterization of its ecology, as far as the available data will allow.

21. **Discussion**

a. Authors should never abstain from discussing the taxonomic status of a new species as well as of (a justification of) its place in the genus (or family) it is being ascribed to.

b. Differences with related species should be pointed out, whereas

c. in case of larger genera of species-groups if may be necessary to present a key to the identification of the species of that particular group.

Now, should the above discourage you to present a description of a calanoid again? Or, quite contrarily so, are you inclined never to use one of my descriptions any more? No! Neither! No, because most good descriptions come very close to these proposed standards already! Just never again skip the mouthparts when making a set of slide preparations. And next start making larger drawings, in which you will be forced to draw details really detailed because otherwise large parts of the drawings will be plain blank! And then have these reduced to 33% for printing. And take a good look at the drawings when telling in text what the morphology of the species is all about. That's all!

Preparing a useful description, be it of a calanoid or another copepod, is not too difficult: every copepodologist with some experience can do it. But it requires PATIENCE and SCRUTINY, as well as some SKILL in preparing the slides: in other words: it requires SELF-DISCIPLINE and that is, admittedly, often difficult. Not in the least when you are eager to publish and your shelf is moaning under the weight of so many other new species waiting to be described. However, in science more than in any other aspect of life, it goes that YOU'D RATHER DO SOMETHING GOOD OR DON'T DO IT AT ALL. And then it is worth the effort: if you act as required, your colleagues will laureate you. But if you'd be after a cheap success by producing descriptions the "quick and dirty" way, you may find yourself slipping on their criticsm when attending COPEPODA V in Baltimore in 1993!

The time required to prepare a good description needs to be no restriction: once you know the species is new and you have determined the genus (often the largest part of the task), you make drawings in pencil and have them inked by the staff-artist of your institute. This procedure will allow you to prepare a complete set in five days (the slides took only one or two

hours). Then you prepare the text and have your secretary type it on her PC. Once such a description is on floppy or harddisc, the description of the very next species may be prepared by merely changing details as necessary in that text.

Well, this has been a long story after all. I must admit that. Having produced the above thoughts, I cannot help feeling slightly disappointed when rereading my own previous descriptions. Thus, I shall reshape my latest description, that of Euchirella lisettae in Crustaceana 57 (2) of 1989, according to my own, above.-mentioned standards, and I shall present it to you in one of the forthcoming issues of MONOCULUS that is, if the editors will allow me!

J. Carel von Vaupel Klein (Leyden University, The Netherlands)

Business ssenisuB

1. MONOCULUS Library / Bibliography:

There still is activity in the Library although the bibliography project has come to an official end at the close of the last year. Our greatest concern for the moment is that reprints of the latest publications on copepods don't arrive at the library anymore. Whereas the journals outside the room where the MONOCULUS Library is housed in the main university library abound with articles on copepods, only a small fraction of them reaches us from their authors even though these are recipients of the newsletter. Please don't forget the MONOCULUS-Library on your mailing list and make sure that reprints of your latest publications are deposited there.

2. Mailing

There has been some complaint about mailing of the newsletter in North America. As this issue is likely to interest a wider public it seems appropriate to elucidate the background.

Frank Ferrari wrote the following note to Kurt Schminke and sent

a copy to Chang-tai Shih: *I just discovered that Tom Bowman and Jan Reid received their MONOCULUS Directory 6 weeks ago. I have not received mine yet. The same situation applies with exasperating regularity to my regular issues. Do you think it is possible to set up another category of membership of North American copepodologists who could have a copy air-mailed directly from Oldenburg. I would be quite willing to pay the extra cost.*

Chang-tai Shih replied i.a.: *I always redeliver copies of MONOCULUS to North American colleagues within three days after receiving them from Oldenburg by air parcel. There were a couple of times the staff at the Library of Oldenburg University forgot to send the parcel to me. The last instance was No. 19 which contained call for papers and other matters for the Fourth Conference. I had been waiting for that issue for a long time and became suspicious and wrote to Kurt. Once the library staff sent me the parcel by surface mail.*

The original set up of having me to redeliver MONOCULUS to North American copepologists is mainly financial. In the beginning we did not have an association and all expanses (not to mention time) of producing MONOCULUS were dependent on what Kurt and Gerd Schriever could get from their institutions. In the First Conference in Amsterdam they told me that it was a heavy burden to them to send MONOCULUS by air mail to people outside Europe. I offered to redeliver MONOCULUS in North America if they can send all copies to me by air parcel and in fact I offered that my institution will pay the printing and air freight for these

copies. By 1987, the printing and shipping (from Oldenburg) costs have been paid from my own research budget but the Museum is still paying for the postage for sending MONOCULUS to North American copepodologists. If Kurt directly handles North American delivery, the WAC will have an additional cost of close to Can$1000 per issue, that is about US$3 per WAC member per year.

There is an ease in this situation now since the number of recipients of the newsletter has been almost halved by the restriction of the distribution of it to WAC members. Despite this it will be necessary to discuss this issue at the next international meeting.

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1989

CRESSEY, R. & H.B. CRESSEY - 1989: A new species of Orbitacolax (Copepoda: Bomololochidae) and redescriptions of two additional species. Can.J.Zool. 67: 2902-2909

ELMORK, K. & J.A. EIE - 1989: Two- and three-year life cycles in the planktonic Copepoda Cyclops scutifer in two high mountain lakes. Holarct.Ecol. 12: 60-69

FERRARI, I. G. COLOMBO, & E. STELLA - 1989: Analisi di comunita' zooplanctoniche in stagni destinati a pescicoltura in Provincia di Modena. Atti Dell'8° Congresso A.I.O.L. Pallanza : 375-381

HUMES, A.G. - 1989: A new poecilostomatoid copepod (Erebonasteridae) from deep-sea cold seeps at the West Florida escarpment. Hydrobiologia 175: 175-182

ROUCH, R., M. BAKALOWICZ, A. MANGIN & D. D'HULST - 1989: Sur les caractéristiques chimiques du sous-écoulement d'un ruisseau des Pyrénées, Annls Limnol. 25 (1): 3-16

1990

BODIOU, J.Y., D. DELILLE & L. TITO DE MORAIS - 1990: Influence of organic matter and climatic factors on the harpacticoid copepod (Crustacea) population from the well sorted fine sands of Banyuls Bay. Helgoländer Meeresunters. 44: 265-274

BOEGER, W.A. & V.E. THATCHER - 1990: Prehendorastrus n.g. (Poecilostomatoida, Ergasilidae) with description of two new species from the gill rakers of Hypophthalmus spp. (Teleostei, Siluriformes) from the Brazilian Amazon. Syst.Parasitol. 17: 133-141

CASTEL, J. & J. VEIGA - 1990: Distribution and retention of the copepod Eurytemora affinis hirundoides in a turbid estuary. Mar.Biol. 107: 119-128

CHISHOLM, L.A. & J.C. ROFF - 1990: Size-weight relationships and biomass of tropical neritic copepods off Kingston, Jamaica. Mar.Biol. 106: 71-77

CHISHOLM, L.A. & J.C. ROFF - 1990: Abundances, growth rates, and production of tropical neritic copepods off Kingston, Jamaica. Mar.Biol. 106: 79-89

DAHMS, H.-U. - 1990: Naupliar development of Harpacticoida (Crustacea, Copepoda) and its signifiance for phylogenetic systematics. Microfauna Marina 6: 169-272

DEETS, G.B. & M. DOJIRI - 1990: Dissonus pastinum n.sp. (Siphonostomatoida: Dissonidae), a copepod parasitic on a horn shark from Japan. Beaufortia 41 (8): 49-54

ELGMORK, K., G. HALVORSEN, J.A. EIE & A. LANGELAND - 1990: Coexistence with similar life cycles in two species of freshwater copepods (Crustacea). Hydrobiologia 208: 187-199

FERRARI, F.D. - 1990: Antonio Frederico Campaner (1945-1989). J.Crust.Biol. 10 (3): 560-562

FIERS, F. - 1990: Zoogeography of the laophontid genus Afrolaophonte (Copepoda, Harpacticoida), with description of A. stocki n. sp. from Guadeloupe. Beaufortia 41 (9): 55-65

FIERS, F. - 1990: Abscondicola humesi n. gen. from the gill chambers of land crabs and the definition of the Cancrincolidae n. fam. (Copepoda, Harpacticoida). Bull.Inst.Roy.Sci.Nat. Belgique (Biol) 60: 69-103

FIERS, F. & Ph. RUTLEDGE - 1990: Harpacticoid copepods associated with Spartina alterniflora culms from the marshes of Cocodrie, Louisiana (Crustacea, Copepoda) Bull.Inst.Roy. Sci.Nat. Belgique (Biol) 60: 105-125

GEE, J.M. & J.W. FLEEGER - 1990: Haloschizopera apprisea, a new species of harpacticoid copepod from Alaska, and some observations on sexual dimorphism in the family Diosaccidae. Trans.Am.Microsc.Soc. 109 (3): 282-299

GEE, J.M. & R. HUYS - 1990: The rediscovery of Danielssenia intermedia Wells 1965 (Copepoda, Harpacticoida): a missing link between 'danielsseniid' genera and Paranannopus Lang 1936 (Paranannopidae). J.Nat.Hist. 24: 1549-1571

HO, J.-S. - 1990: Phylogenetic analysis of copepod orders. J.Crust.Biol. 10 (3): 528-536

HO, J.-S. & I.-H. KIM - 1990: Sabelliphylid copepods (Poecilostomatoida) associated with holothurians from Phuket, Thailand. Phuket mar.biol.Cent.Res. 54: 3-31

HO, J-S. & I.-H. KIM - 1990: Ostrincola breviseti n.sp., a copepod parasite of an oyster from Penang, Malaysia. Beaufortia 41 (13): 91-95

HUMES, A.G. - 1990: Synopsis of lichomolgid copepods (Poecilostomatoida) associated with soft corals (Alcyonacea) in the tropical Indo-Pacific. Zool.Verh. 266: 1-201

HUMES, A.G. - 1990: Aphotopontius probolus, sp. nov., and records of other siphonostomatoid copepods from deep-sea vents in the eastern Pacific. Scient.Mar. 54 (2): 145-154

HUMES, A.G. - 1990: Lichomolgid copepods of the genus Schedomolgus (Poecilostomatoida) associated with the scleractinian coral Acropora cymbicyathus (Brook) in New Caledonia. Beaufortia 41 (17): 121-127

JENSEN, K.R. - 1990: Splanchnotrophus elysiae n.sp. (Copepoda; Splanchnotrophidae) found parasitizing in the sacoglossan opisthobranch Elysia australis (Quoy and Gaimard, 1832). In: WELLS, F.E., D.I. WALKER, H. KIRKMAN & R. LETHBRIDGE (eds.), Proc.Third Int.Mar.Biol.Workshop: The Marine Flora of Albany, Western Australia. Western Australian Museum, Perth, vol. 1: 292-296

McALICE, B.J. & W.L. COFFIN - 1990: First records of Tegastes falcatus (Norman, 1868) and T. nanus Sars, 1904 (Copeoda: Harpacticoida) from the east coast of the United States and a redescription of T. nanus. J.Crust.Biol. 10 (4): 703-707

MIELKE, W. - 1990: Zausodes septimus Lang, 1965 und Enhydrosoma pericoense nov. spec., zwei benthische Ruderfußkrebse (Crustacea, Copepoda) aus dem Eulitoral von Panamá Microfauna Marina 6: 139-156

MIELKE, W. - 1990: A Parastenhelia species from Bahía Lapataia, Ushuaia, Tierra del Fuego (Argentina). Microfauna Marina 6: 157-167

PETERSON, W. & H.G. DAM - 1990: The influence of copepod "swimmers" on pigment fluxes in brine-filled vs. ambient seawater-filled sediment traps. Limnol. Oceanogr. 35 (2) : 448-455

RADZIEJEWSKA, T. & I. DRZYCIMSKI - 1990: Dynamics of meiobenthic communities in a eutrophic and polluted estuary. Limnologica 20 (1): 83-88

RAMA DEVI, C. & Y. RANGA REDDY - 1990: Larval stages of Neodiaptomus lindbergi Brehm, 1953 (Copepoda, Calanoida). Hydrobiologia 206: 99-114

RIEPER-KIRCHNER, M. - 1990: Macroalgal decomposition: laboratory studies with particular regard to microorganisms and meiofauna. Helgoländer Meeresunters. 44: 397-410

ROUCH, R. - 1990: Deux nouvelles Parastenocaris (Copépodes, Harpacticoides) des Pyrénées. Annls Limnol. 26 (1): 19-28

SCHMINKE, H.K. & J. NOTENBOOM - 1990: Parastenocarididae (Copepoda, Harpacticoida) from The Netherlands. Bijdr.Dierk. 60 (3/4): 299-304

SCHULZ, K. - 1990: Pterochirella tuerkayi, new genus, new species, an unusual copepod from the deep Gulf of Aden (Indian Ocean). Mitt.hamb.zool.Mus.Inst. 87: 181-189

VALDEZ, J.A.Z. & J.W. REID - 1990: A new species of Leptocaris (Crustacea, Copepoda, Harpacticoida) from inland waters of Mexico. An.Inst.Cienc.del Mar y Limnol.Univ.Nal.Auton.Mexico, 17 (1): 47-54

1991

BODIN, P. - 1991: Perturbations in the reproduction cycle of some harpacticoid copepod species further to the Amoco Cadiz oil spill. Hydrobiologia 209: 245-257

CRESSEY, R. - 1991: Parasitic copepods from the Gulf of Mexico and Caribbean Sea, III: Caligus. Smithson.Contr.Zool. 497: 1-53

DAM, H.G. & W.T. PETERSON - 1991: In situ feeding behavior of the copepod Temora longicornis: effects of seasonal changes in chlorophyll size fractions and female size. Mar.Ecol.Prog.Ser. 71: 113-123

DAM, H.G., W.T. PETERSON & A. OKUBO - 1991: A simple mathematical analysis of the limitations to inferring feeding behavior of zooplankton from gut content. Mar.Ecol.Prog.Ser. 69: 41-45

DUDLEY, P.L. & P.L. ILLG - 1991: Marine Flora and Fauna of the Eastern United States. Copepoda, Cyclopoida: Archinotodelphyidae, Notodelphyidae, and Ascidicolidae. NOAA Technical Rep. NMFS 96: 1-39

HO, J.-S. - 1991: Redescription of Chondracanthus zei Delaroche (Copepoda, Poecilostomatoida) parasitic on Zeus faber L. in the Sea of Japan, with a preliminary review of the genus. Rep.Sado Mar.Biol.Stat., Niigata Univ. 21: 49-79

HUYS, R. - 1991: Tantulocarida (Crustacea: Maxillopoda): A new taxon from the temporary meiobenthos. P.S.Z.N.I. Mar.Ecol. 12 (1): 1-34

KAWABATA, K. - 1991: Ontogenetic changes in copepod behaviour: an ambush cyclopoid predator and a calanoid prey. J. Plankton Res. 13 (1): 27-34

MARCOGLIESE, D.J. - 1991: Seasonal occurrence of Lernaea cyprinacea on fishes in Belews Lake, North Carolina. J.Parasitol. 77 (2),: 326-327

NAGASAWA, K., J. BRESCIANI & J. LÜTZEN - 1991: Ischnochitonika japonica, new species (Copepoda), a parasite on Ischnochiton (Ischnoradsia) hakodadensis (Pilsbry) (Polyplacophora: Ischnochitonidae) from the Sea of Japan. J.Crust.Biol. 11 (2): 315-321

PETERSON, W. P. TISELIUS & T. KIØRBOE - 1991: Copepod egg production, moulting and growth rates, and secondary production, in the Skagerrak in August 1988. J.Plankton Res. 13 (1): 131-154

SCHNACK-SCHIEL, S.B., W. HAGEN & E. MIZDALSKI - 1991: Seasonal comparison of Calanoides acutus and Calanus propinquus (Copepoda: Calanoida) in the southeastern Weddell Sea, Antarctica. Mar.Ecol.Prog.Ser. 70: 17-27

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