AMPHIPOD NEWSLETTER - 5 January 1975

This issue is again printed and distributed by Zoo-Tax in Lund; all correspondence should, however, be directed to my Tromsø address, to avoid unnecessary delays. The postal strike in France caused slight delay in the publication of this issue, bot fortunately both Dr. Charniaux-Cotton and Dr. Roux sent their contributions by express-mail as soon as the strike was over and this has saved the situation. For A.N. 6 I am trying to get an account of the work carried out in Leningrad, as well as further notes on major amphipod collections. Jerry Barnard's essay has been commented on, mostly positively, by a number of colleagues some of whom promised me an official reaction, but the only one actually forthcoming was David Wildish' most interesting and strongly critical open letter, a good basis for further discussion. A further point of discussion will be Ed Bousfield's letter in this issue, though I do not expect much open dissent in this case.

The standard of the bibliography may be below that in earlier numbers; the main reason for this is that the library of the Institute of Biology at Tromsø University has been moved from Tromsø Museum to a new building, making it more complicated for me to keep track of a number of journals. I am thus even more than before dependent upon your help.

The financial situation is not much changed. Some of us contribute very generously, while many others are apparently content with parasitizing on those few. No solution has yet been found for our colleagues from eastern European contries, and they will continue to get the Newsletter free. In Japan, Dr. Akira TANIGUCHI has very kindly offered to act as regional collector for this country during the annual meeting of the Oceanographical Society of Japan this spring, and this seems to be a good idea. Similarly, Les WATLING has offered to coordinate payments for the Atlantic and the Gulf of Mexico portions of the U.S.A. It would be nice to get similar offers for Canada, western U.S.A., India, and Australia/New Zealand.

The deadline for the next Newsletter will be as early as 15. may 1975, to avoid further collisions with printers' holidays in Sweden. Finally I wish all of you a most happy, healthy and amphipod-rich 1975.

Tromsø Museum
9000 Tromsø January 1975

Wim Vader

COMING SYMPOSIUM

3rd International Colloquium on Gammarus and Niphargus, Meeting of Groundwater Ecologists

It is a pleasure for us to inform you, that we have many replies to our circular letters concerning the 3rd International Colloquium on Gammarus and Niphargus and the Meeting of Groundwater Ecologists, which will be held in conjunction from the 22nd to the 26th of September, 1975 in the Limnologische Fluszstation des Max-Planck-Instituts für Limnologie in Schlitz (near Fulda, BRD).

In order to give you a first impression of the topics which might be expected on the program, we can inform you, that most papers will deal with problems on the ecology, systematics, ethology and physiology of Gammarus and Niphargus. Some papers will deal with zoogeography, population dynamics and production biology.

For the meeting of groundwater ecologists it was suggested that papers from natural as well as from artificial biotopes of groundwater organisms should be included in the program. Additional titles on the biology of groundwater organisms are wanted e.g. on Crangonyx, Hadzia-group and others.

Anybody interested in the Symposium who has not yet received the circular letters, is requested to write to the organizing committee.

If you want to present a paper to the Colloquium or the Meeting, please forward the title to one of the undersigned organizers.

S. Husmann (Groundwater) M. Meyering (Gamm. Niph.)
Limnologische Fluszstation, D-6407 Schlitz, BRD.

In a later circular the organizers give the preliminary program as follows.
September 21: Informal meeting
Sept. 22-23: Biology of Gammarus
Sept. 24: Systematics of Gammarus and Niphargus. Excursion
Sept. 25-26: Groundwater ecology. Specialist discussions. The organizers ask to be sent the titles of your contributions by March 1, 1975." Please try to offer an original paper, since we plan to publish all papers presented to both the Colloquium and the Meeting."

(See also John Holsinger's comments on p.15)

STUDIES ON AMPHIPODS AT THE UNIVERSITY OF LYON II

(In A.N. 4 prof. Ginet gave an account of the investigations carried out at the "Laboratoire de Biologie Souterraine". This information is now supplemented by prof. ROUX, who gives a review of the work on Gammarus done by his group.)

Dans notre groupe, les recherches concernant le genre Gammarus peuvent se répartir selon les trois grandes directions ci-dessous.

1) Biogeographie, Systématique et Ecologie de Gammarus (A.L. ROUX.)

a Groupe pulex: le plus étudié jusqu'ici.

- Répartition géographique détaillée en essayant de préciser la position systématique des populations par des expériences d'hybridation au laboratoire (travaux conduits en coordination et en collaboration avec le Laboratoire de Taxonomie de l'Université d'Amsterdam, équipe du Professeur Stock).
- Action de la température sur la croissance et la reproduction. Etude comparative de l'influence des temperatures stables et des températures fluctuantes; (par rapport au dévelopement obtenu à un niveau thermique constant (10° C), les fluctuations de température autour de ce dernier (entre 5° C et 10° C) se traduisent par une accélération du cycle d'intermue).
- Etude préliminaire sur G. pulex pour determiner les seuils de toxicite de certains elements polluants (élévation du seuils en fonction de l'élévation de temperature).(Coll. G. LAMURE).

b Gammarus lacustris: biogéographie dans les Alpes francaises.

c Gammarus roeseli et Echinogammarus berilloni:l'invasion progressive du bassin du Rhône par ces deux espèces est suivie depuis plusieurs années.

2) Ecophysiologie: Metabolisme Respiratoire de Gammarus pulex Gammarus fossarum et Gammarus lacustris (C. ROUX).

- Comparaison des courbes métabolisme/température des 3 espèces placées dans des conditions experimentales différentes: eau calme ou agitée, avec ou sans substrat. Les variations observées peuvent être mises en parallèle avec la repartition écologique et geographique des espèces concernées.

3) Comportement sexuel de Gammarus pulex et G. fossarum. (J. DUCRUET, W.HAMMOUD)

- Mise en evidence des facteurs régissant l'isolement éthologique interspecifique et corrélativement la reconnaissance spécifique pour chaque espèce. Les resultats obtenus jusqu'ici laissent penser que les mâles

déterminaient les caracteristiques des femelles par l' intermediaire d'une ou plusieurs phéromones de contact émises par celles-ci. Les recherches actuelles s'orientent dans deux directions:

- Etude biochimique de l'urine et des secrétions tégumentaires en fonction du sexe et du cycle d'intermue. L'étude porte plus particulièrement sur les lipides.
- Etude du determinisme de l'apparition de la ou des pheromones. Relations existants entre l'attraction sexuelle, l'exuviation et la vitellogénèse (Utilisation d'hormones de synthèse; leurs effets chez les Gammarus).

AMPHIPOD SEXUALITY AND REPRODUCTION

A report on the investigations carried out at the Laboratoire de Sexualité et Reproduction des Invertébrés, Université Pierre et Marie Curie, Tour 32, 4 place Jussieu, 75230 PARIS, Cédex 05, FRANCE and the Laboratoire de Génétique évolutive et de Biométrie, 91 190 GIF sur YVETTE, FRANCE

I - Ovarian Function

In Orchestia gammarellus, ovogenesis has two stages (CHARNIAUX-COTTON 1973)
- Previtellogenesis, which is the entry of the gonies into meiotic prophase as they leave the germinative zone, followed by the first growth of the ovocytes.
- Vitellogenesis, beginning in the ovocytes at the end of first growth; it starts with the intermolt cycle and ends before ecdysis (during the reproduction period).

It has been possible, using colchicine, to demonstrate ovigenous mitoses in the germinative zone of the ovaries in Orchestia gammarellus both during the time of genital repose (winter) and during the period of sexual activity. Vitellogenesis seems to stop in winter, and first growth of the ovocytes seems to be slowed (SOYEZ 1974).

New data on folliculogenesis have been obtained (CHARNIAUX-COTTON 1974) The follicle of the ovocyte in vitellogenesis develops from permanent ovarian tissue. Folliculogenesis takes place only at the beginning of intermolt, probably under the control of ovocytes already in vitellogenesis. After treatment with bisulfan, ovogonies are no longer seen, but the number of follicular cells is undiminished, demonstrating that a mitotic wave is absent in these cells. Juvenile hormone and androgenic hormone block vitellogenesis, but only during folliculogenesis.

II - Vitellogenesis and Intermolt

When females in vitellogenesis are given ecdysterone at stage B or C

the molting phenomena are triggered, exactly as in males and in sexually inactive females, but the cycle becomes blocked at some point in stage D. In this way, therefore, vitellogenesis can run its normal course of 23 days. However, in pubescent females treated several hours after ecdysis (stage A), vitellogenesis does not occur and the pre-molting phenomena follow rapidly. There is no blocking at stage D. The ovocytes grow from 100, to 250 μ, (charging with PAS-positive material), and then stop developing. Folliculogenesis is incomplete. Thus, a low ecdysterone level after ecdysis could function as a trigger for vitellogenesis (BLANCHET & CHARNIAUX-COTTON 1971; BLANCHET 1972).

Removal of the Y-organs stops both molting and vitellogenesis in females. The ovocytes stay blocked at their pre-operative stage for at least thirty days, which suggests that the Y-organs are essential to the process of vitellogenesis (BLANCHET, unpublished).

III- The "Female Specific Protein" or Vitellogenic Protein in Orchestia gammarellus

The presence of a specific protein fraction in the hemolymph of reproducing females of O. gammarellus was first announced by MEUSY, CHARNIAUX-COTTON and CROISILLE in 1969. MEUSY (1972) demonstrated the immunochemical identity of this protein fraction with the main protein component of the yolk. Female specific protein enters the ovocytes during vitellogenesis. Its site of synthesis has not yet been found, but appears to be extra-ovarian.

Female specific protein appears in the hemolymph of young females in O. gammarellus from the 7th or 8th intermolt. After the appearance of this fraction, one or two intermolts generally occur before the first vitellogenesis and laying of eggs (JUNERA 1973/1974) (Thesis, 3rd Cycle)

A comparative study has been made of female specific protein in the hemolymph and in the ovary, using polyacrylamide gel electrophoresis (JUNERA, MEUSY and CROISILLE 1974). Electrophoresis of hemolymph, and of homogenates of ovaries in vitellogenesis, shows three specific bands, designated a, b and c. Bands b and c are also given by hemolymph of isolated females that have not laid (in O. gammarellus, mating is necessary for laying); the constituents b and c probably enter the hemolymph from the yolk in the course of resorption of the ovocytes. The synthesis of female specific protein at various stages of intermolt has been studied in reproducing females (that had laid or had been prevented from doing so) by injection of tritiated leucine and subsequent disc electrophoresis of the hemolymph. Incorporation in the

constituent a was very scant immediately following ecdysis (stages A and B), but increased markedly at the begunning of stage C and remained substantial to the end of intermolt. Radioactivity of the constituent b was consistently very low for both incubation periods tried (6 hours and 11 hours). Constituent c was not studied. (Its Rf was very close to that of bands common to both sexes). Female specific protein synthesis does not occur in females during the period of sexual repose (MEUSY, JUNERA and CROISILLE 1974).

IV- Ultrastructure of the Ovocyte in Orchestia gammarellus

The following processes have been observed in the ovocyte of O. gammarellus (ZERBIB 1973)

1. Development of the granular endoplasmic reticulum to form, first flattened cisternae, then vesicles of ergastoplasm which spread throughout the ooplasm; during previtellogenesis and the beginning of vitellogenesis, marked synthetic activity in the endoplasmic reticulum.

2. Considerable expansion of the peri-ovocyte space, formation of microvillosities(at the end of first growth) and later ovocyte macrovillosities which interpenetrate among the follicular cells (at the beginning of second growth).

3. During vitellogenesis, micropinocytosis of extra-ovocyte substance into the ovocyte, transport deep into the cell by means of microcanaliculi storage as yolk granules and lipid globules.

Information on the chemical composition of the yolk has been obtained. The ergastoplasmic vesicles contain essentially protein. The yolk granules are lipoglycocarotenoprotein, and represent part or all of the female protein fraction of the hemolymph. The lipid globules are triglyceride.

V- Study of ovarian metabolism in Orchestia gammarellus

BERREUR-BONNENFANT and MEUSY (1972) showed a depressive action of androgenic hormone in the proteinic metabolism in the ovary. (They are now working on the mechanism of this inhibition using electrophoresis.

VI-Chemical study of hormonal factors secreted by androgenic glands of Crustacea (BERREUR-BONNENFANT and MEUSY for Biology and FEREZOU, DEVYS and BARBIER for Chemistry 1973)

The study of proteinic metabolism in the ovary allowed them to realize a test of the activity of the androgenic glands.This test is used to separate and to identify hormonal factors produced by the androgenic glands.

VII- Experimental study of evolution and activity of testicular germinative zone in Orchestia gammarellus (BERREUR-BONNENFANT and CARRE-LECUYER 1971)

Several techniques(graft and ablation of organs,organotypic culture) are used to study evolution and activity of testis before sexual differentiation and in adult.

SEX-DETERMINATION, MONOGENY AND INTERSEXUALITY (GINSBURGER-VOGEL)

The sex-ratio abnormalities (monogeny phenomena) and intersexuality in Orchestia gammarellus and Orchestia montagui have been studied. Mating experiments realized from some populations showed the presence of two monogeny phenomena; one is temperature-sensitive and related to intersexuality.

These phenomena are explained by an inversion, total or incomplete, of the sexual phenotype of genetic males, giving females or intersexes. Now the factors responsible or these inversion are being investigated by injection of organs extracts and cytological methods. On the other hand, the influence of these factors on the sexual physiology of males and females is studied.

LISTE DES PUBLICATIONS

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BERREUR-BONNENFANT, J., et MEUSY, J.J., 1972.- Effet inhibiteur des broyats de glandes androgènes sur l'incorporation in vitro de leucine tritiée par les ovaires d'Orchestia gammarella P., Crustacé Amphipode. C.R. Acad. Sci., 275: 1641-1644.

BERREUR-BONNENFANT, J., MEUSY, J.J., FEREZOU, J.P., DEVYS, M., QUESNEAU-THIERRY, A., et BARBIER, M. 1973.- Recherches sur la sécrétion de la glande androgène des Crustacés Malacostracés: purification d'une substance à activité androgène. C.R. Acad. Sci.,

BLANCHET, M.F., et CHARNIAUX-COTTON, H., 1971- Contrôle du déclenchement et de la durée de la période D du cycle de l'intermue par l'ecdystérone, chez le Crustacé Amphipode Orchestia gammarella (Pallas); interaction avec la vitellogénèse. C.R. Acad. Sci., 272: 307-310.

BLANCHET, M.F., 1972.- Effets sur la mue et sur la vitellogénèse de la β- ecdysone introduite aux etapes A et D du cycle d'intermue chez Orchestia gammarella Pallas (Crustace Amphipode). Comparaison avec les effets de la β et de l'α - ecdysone aux autres étapes de l'intermue. C.R. Acad. Sci., 274: 3015-3018.

CHARNIAUX-COTTON, H., 1973.- Description et contrôle de l'ovogénèse chez les Crustacés superieurs. Ann. Biol. Animale, Biochem. Biophys., 13: 21-30.

CHARNIAUX-COTTON, H., 1974.- Données nouvelles concernant la vitellogénèse des Crustacés Malacostracés obtenues chez l'Amphipode Orchestia gammarellus (Pallas): folliculogénèse à partir d'un tissu permanent; action du bisulfan; action inhibitrice de l'hormone juvénile. C.R. Acad. Sci., 279: 563-566.

GINSBURGER-VOGEL, T., 1973.- Determination génétique du sexe, monogénie et intersexualité chez Orchestia gammarella (Crustacé Amphipode Talitridae). Thèse d'Etat, Paris.

JUNERA, H., 1973.- Recherches sur l'apparition de la "fraction proteique femelle dans l'hemolymphe et les modalités de l'établissement de la puberté chez les femelles d'Orchestia gammarella Pallas (Crustacé Amphipode). C.R. Acad. Sci., 277: 1213-1216.

JUNERA, H., MEUSY, J.J., et CROISILLE, Y., 1974.- Etude comparée de la "fraction proteique femelle" dans l'hémolymphe et dans l'ovaire du Crustacé Amphipode Orchestia gammarella Pallas par electrophorèse en gel de polyacrylamide. C.R. Acad. Sci., 278: 655-658.

JUNERA, H., 1974.- La fraction protéique femelle du Crustacé Amphipode Orchestia gammarellus (Pallas): ses variations au cours du développement, sa synthèse chez les femelles pubères et après inversion experimentale du sexe. Thèse 3e cycle. Paris

MEUSY, J.J., CHARNIAUX-COTTON, H., CROISILLE, Y., 1969.- Etude par electrophorèse chez Orchestia gammarella (Pallas) et Orchestia mediterranea Costa (Crustacés Amphipodes) des protéines de l'hémolymphe: comparaison entre les mâles, les femelles et les intersexes. C.R. Acad. Sci., 269: 741-743.

MEUSY, J.J., 1972.- La gametogénèse et la fraction protéique de l'hemolymphe spécifique du sexe femelle chez quelques Crustacés supérieurs: étude descriptive et rôle des glandes androgènes. Thèse d'Etat, Paris.

MEUSY, J.J., JUNERA, H., et CROISILLE, Y., 1974.- Données sur la synthèse de la fraction protéique femelle chez Orchestia gammarella Pallas (Crustacé Amphipode), au cours de l'intermue et chez les femelles en repos sexuel. C.R. Acad. Sci., 279: 587-590.

SOYEZ, D., 1974.- Etude comparée de l'activité previtellogénétique pendant les saisons de repos genital et d'activité sexuelle chez le Crustacé Amphipode Orchestia gammarellus (Pallas). C.R.Acad. Sci., 278: 1867-70.

ZERBIB, C., 1973.- Contribution à l'étude ultrastructurale de l'ovocyte chez le Crustacé Amphipode Orchestia gammarella Pallas. C.R. Acad. Sci, 277: 1209-1213.

(As most of the scientific publications of this group have been in French and thus of somewhat limited access to many of our English-speaking colleagues, it is especially gratifying that Dr. Hélène Charniaux-Cotton and her group have taken the trouble to prepare this essay in English).

H. CHARNIAUX- COTTON

TRANSLATIONS OF AMPHIPOD PAPERS

Under this heading there is a single contribution this time. I should very much wish that those colleagues having at hand translations of some of the great Russian monographs, or e.g. of prof. Ruffo's long series of Italian papers, would send a note about this to the Newsletter, as language-problems are a great stumblingblock especially for those of us working at smaller institutions, where the possibilities for translation often are few and the costs prohibitive.

Recent translations of Russian papers

Richard SHILLAKER

The following Russian papers have been recently translated and are now being held by the British Library Lending Division (British Library, Boston Spa, Wetherby, Yorkshire LS 23 7 BQ).

PYATAKOVA, G.M., 1973. (Some data on the multiplication and fertility of Caspian amphipods)._____Zool. Zhurn. 52: 685-688.

GREZE, I.I., 1973. (Feeding of amphipods in the Black Sea)._____ Trofologiya Vodnykh Zhivotnykh, Moskva: 183-205.

GREZE, I.I., 1963. (Feeding of the amphipod Dexamine spinosa (Mont.) in the Black Sea. _____ Trudy Sevastopol biol. Stn 16:224-240.

GREZE, I.I., 1965. (Feeding habitats of Gammarellus carinatus (Rathke) in the Black Sea)._____ Zool. Zhurn. 44: 855-882.

GREZE, I.I., 1971. (A comparative study of similar and closely related species of Amphipoda in the Mediterranean and Black Seas.)_____ Eksped. issled. v sreditzemnon more v mac, lyule. Kiev 1970.

KARPEVICH, A., 1946. (Food consumption by Pontogammarus maeoticus of the Caspian Sea)._____ Zool. Zhurn 26: 517-522.

OSADCHIKH, V., 1973. (Yearly and seasonal changes in the number of Corophiidae in the North Caspian Sea.)_____ Trudy Ves. N.-I. Inst. Morsk. Ryb. Khoz. I Ocean 80: 104-128.

REQUESTS FOR INFORMATION etc.

Population fluctuations

I now have four years of data on population fluctuations in five species of haustoriids and one lysianassid, members of coastal sand communities in northern New England. These base-line studies should serve to increase our knowledge of the coastal ecosystem, and provide data that are remarkably rare for invertebrate species. I would like to hear from colleagues concerning this subject, especially those with data from habitats with well-known histories, and well-tested sampling design.

Robert A. CROKER

Assistance in solving a technical problem concerning Librarie Jean Hansen

All colleagues who plan to order books or off-prints from the booksellers: Librairie Jean Hansen, 101, rue du Croissant, B- 1060 Brussel, Belgia, can help us. Since February 1972 we have a credit with this antiquarian, which he refuses to refund to us in currency; the amount at the moment is DM 170.- When you have ordered and received a book from Jean Hansen, please do not pay but ask them to deduct the amount of the invoice from our credit. Instead, send the money to Dr. Krapp, Zool. Forschungsinstitutt und Museum A. Koenig, Adenauerallee 150-164, BRD. Thank you very much.

Traudl KRAPP-SCHICKEL

(We should be able to help to solve this queer problem, which originally arose because the book-shop, after an invoice inadvertently had been paid in DM instead of Belgian francs, refused to pay back the difference and instead wrote out a credit-note. W.V.)

POLLUTIONS SURVEYS AND THE PROBLEMS OF ROUTINE IDENTIFICATIONS.

(An open letter)

David WILDISH

I read with great interest the letter of Jerry Barnard in AN-4. In discussion of the problem of routine identifications, he ably puts the point of view of "classical taxonomists". My purpose here is to present an alternate view of this same problem, from my perspective as an "applied biologist" working on environmental problems in estuaries.

The analysis of natural assemblages of plants and animals using species numbers, individual numbers and biomass (community analysis) is one method available for detection and quantification of man-made environmental change. It is one many scientific techniques, from a wide spectrum of classical disciplines, available for this purpose, and is particularly suitable where chemically complex effluents, such as pulp and sewage pollution are involved. An identification strategy for this purpose should be:

A. Rapid
B. Reproducible
C. Computer compatible
D. Information content be high
E. Information redundancy, with respect to the collection purpose, be low.

Strategies available are summarized in Table 1 and indicate relative merits of each method for pollution indication purposes. The method of Cairns et al. (1968) developed for identifying freshwater macrobenthos simply demands the recognition of dissimilar types from individuals pairs randomly removed from the sample. This data generates an index (sequential comparison index or SCI) related to species diversity.

Table 1. Comparison of taxonomic strategem used for identifying benthos as a pollution indicator (1= best; 3= worst case).

	Characteristic					
Source	A	B	C	D	E Time	E Space
"Conventional" taxonomy	3	1	3	1	1	3
Cairns et al. 1968	1	2	1	3	3	1
Wildish and Phillips 1974	2	1	1	2	1	1

Reproducibility of the SCI depends on the ability to repeat it with replicate samples from the same station at the same time. For one observer the method is reasonably reproducible; less so between different observers. The method does not rely on conventional taxonomy

so forfeits additional information potential, such as published work on ecology, and rapidly becomes redundant in time because it is not reproducible in the classical taxonomic sense.

As a compromise of the extreme points of view represented by conventional taxonomy and the SCI, it has been suggested (Wildish and Phillips 1974) that provisionally dissimilar taxa be given a computer compatible number on a card index file card. The file cards can then be used directly for community analysis. Conventional taxonomic names are added (or subtracted) to a master list of number and types as available from experts based on representative material transmitted to them in small, usable quanta.

One of the difficulties faced by non-experts in determining their own material (as suggested by Barnard) is the practical one of using keys, generally based on evolutionary systematics, and designed to demonstrate natural relationships (by comparative morphology, homology, etc.). Using a key of this kind one needs to determine homologous structures between species and symmetry of individuals, an often time-consuming and irrelevant activity in the pollution indication context. Another difficulty for non-experts is that of obtaining type specimens to check identifications. A phenetic taxonomy relying on measurements or counts (and not on homologies or evolutionary systematic conventions) should be developed and may speed up the identification process for non-experts.

In Canada various private agencies, as well as government sponsored groups (Canadian Oceanographic Identification Centre, National Museum of Natural Sciences, Ottawa, Ontario KIA OM8; Environment Canada, Identification Centre, Biological Station, St. Andrews, N.B. EOG 2XO) now undertake to sort and identify collections, obtained for a variety of reasons including for pollution indication purposes. In the future they may play an increasingly more important role and should be able to attract the funds to do so.

References

Cairns, J., et al. 1968. J.Wat. Pollut. Contr. Fed. 40: 1607.

Wildish, D.J., and R.L. Phillips. 1974. Fish. Res. Board Can. Tech. Rep. 450, 31 pp.

NEWS FROM COLLEAGUES

Nicolas J. ALOUF: Je travaille maintenant sur la systématique des Echinogammarus du Liban.

Ed L. BOUSFIELD: I am currently revising the Haustorioidea and Gammaroidea (see elsewhere in this Newsletter) and would much value any assistance in obtaining hard-to-get literature, and representative study material to check important characters that have often been overlooked in original descriptions. I would appeal to amphipod systematists to include descriptions of the condition and location of gills and brood plates, where possible, in primary diagnoses and descriptions.

Robert A. CROKER: For the past seven years, my students and I at New Hampshire have studied intertidal and nearshore subtidal sand communities in northern New England, communities in which haustoriids and lysianassids play an important role (numbers and biomass). We have published on cumaceans (Canad. J. Zool. 51(10), 1973), a summary paper on sand-burrowing amphipods is in press, and contributions on individual species (life cycles, food and feeding, seasonal distribution, tolerances etc.) will follow (Richard HAGER and John SCOTT). We are also examining amphipod population fluctuations and sand community structure over the long-term, and now have four years of data at contrasting habitats. An intensive study of geographic variation in western Atlantic populations of the circum-Atlantic Gammarus oceanicus was completed earlier this year. Work also continues on the talitrid, Orchestia platensis, by Manaf BEHBEHANI from Kuwait.

John R. HOLSINGER: I am currently working on Part II of my three-part revision of the systematics of the subterranean amphipod genus Stygobromus (Gammaridae). Since early June I have completed preliminary drawings and descriptions of 13 species (12 new ones) and hope to finish about 10 more by the end of 1974. Part II will contain descriptions of approximately 24 new species and redescriptions of two other species, all from the Appalachian region of the U.S.A. My work is being supported by a grant from the National Science Foundation. During late July and early August, Dr. David C. CULVER (Dept. of Biological Sciences, Northwestern Univ., Evanston) and I visited 27 caves in southwestern Virginia and eastern Tennessee in search of amphipods and other cavernicolous invertebrates. We had a profitable trip.

I now have three graduate students working in my laboratory on amphipod and isopod research. Steven HETRICK in finishing up a master's thesis on some genetic aspects of Gammarus minus. In addition to looking at chromosome numbers, he has used electrophoresis to determine genetic differences, if any, between cave and spring populations and between different spring populations separated by potential dispersal barriers. His results indicate greater differences between isolated spring populations than between populations in caves and spring that are not isolated by physical barriers. Gary DICKSON has recently started an ecological study of Crangonyx antennatus, a very common species in the caves of the Powell River Valley in southwestern Virginia and eastern Tennessee. His thesis will be concerned with finding differences in morphology and size between stream and drip-pool populations and a comparison of the population dynamics of populations from different kinds of cave habitats. James ESTES is planning to do an ecological study of the cavernicolous isopod Lirceus usdagalun in Lee County, Virginia by comparing size and frequency distributions and dynamics of populations in three different cave streams. During the present academic year (Sept. 1974- May 1975), Estes will also be working as my assistant on the Stygobromus study.

I read with great interest Dr. Jerry L. Barnard's "some thoughts about the future for amphipod taxonomy" in the last issue of the Newsletter. Especially germane was the section on "the problem of routine identifications...," an area in which I find myself faced with approximately the same problems as Jerry. The idea of submitting a collective letter to a widely read journal like Science is a good one, and I, for one, would be willing to participate in such an effort.

I am looking forward to attending the 3rd International Colloquium on Gammarus and Niphargus and the Meeting of Groundwater Ecologists in Schlitz in September 1975. This will be an excellent opportunity for me to see many of my European friends again and also to meet some new ones. During the meeting, I would like to have an informal discussion on the systematic and zoogeographic problems of the Crangonyx and Hadzia groups. I would be willing to lead such a discussion and would like to have some specific thoughts as to what we might profitably discuss.

Donald McLUSKY: Although not now working primarily on amphipods, I still see many Corophium in the course of more general studies on the Forth.

Les WATLING: You might wish to consider using your regional "collectors" as a Board of Correspondents. By this means, the correspondents could contact investigators in their region and put together a short "news" section. This would especially help to publicize the work of graduate students. For an example of this approach, see recent issues of the journal "Micropaleontology". (Comments much appreciated. And could someone in the U.S.A. kindly keep on eye on "Dissertation Abstracts" for the Newsletter ? W.V.)

Renate WEIGMANN: At present I am working on the Hyperiidea of the different Meteor expeditions in the upwelling region off the coast of Northwest Africa (between Cap Blanc and Cap Timiris). I am interested on the taxonomy, on the vertical and horizontal distribution.

Kenneth A. KIMBALL: Since September, 1973, I've had a job concerning zooplankton research in the New England area; my employer is Normandeau Associates, Inc., here in New Hampshire. I'm still working on my thesis on Caribbean hyperiids part-time, and hope to finish it by mid- 1975.

Larry McKINNEY: I am presently engaged in my doctoral work on the zoogeography and taxonomy of benthic gammarid amphipods of the eastern coast of the Gulf of Mexoco.

Eric L. MILLS: From July 1 1974, I'll spend my sabbatical leave at Corpus Christi College and the Dept of History and Philosophy of Science, University of Cambridge. My aim is to finish work on T.R.R. Stebbing by completing a bibliography, which should be submitted for publication within a year. Principally, however, I plan on beginning a biography and bibliography of Canon Alfred Merle Norman, who was very influential in invertebrate zoology during the last half of the 19 th century in Britain. Norman's books are at Cambridge, and some of his letters and all his collections are at the British Museum.

I haven't been doing much work on amphipods recently. In 1970 I collected in Antarctica and late last year in Labrador. The soft-bottom benthos from these areas has been my main interest, and I have been developing some ideas about the relationship between primary production, epifaunal and infaunal feeding, and organic aarbon in the sediments. Epifauna appears to be important in

controlling the carbon reaching the sediments and thus control the biomass of infauna animals.

H.G. PIEPER & W. TEICHMANN have started theses on Gammarus fossarum and G. pulex in the Gammarus-group of Meertinus Meyering. They work primarily with ecophysiological problems.

Traudl KRAPP-SCHICKEL: I have just finished a manuscript on "Different sensibilities in numerical methods of community-analysis" (Marine-biological Institute, Wien, 61 pp, 11 figs), and should like to discuss this topic with colleagues working on the same type of problems. To give an idea of my approach, a summary of the paper is given here. "The aim of this paper is to guide the biologist in the selection of statistical methods suitable for the treatment of data concerning community-analysis. Apart from presenting the pure results of sampling- where one encounters already different procedures in botany and zoology- there are many ways of comparison of samples and sample-groups. The choice of method is determined by the special problem, the need to demonstrate qualitative or quantitative differences, and the time available for a field survey or a laboratory test.

Having compared a series of sample pairs, there are various procedures available for sorting and interpreting the results. Independent of the method of comparison any procedure could be chosen, the decision lies between simple time-saving and more reliable time-consuming methods. It is up to the investigator to judge the most adequate way in each special case. Important procedures are discussed in detail".

ADVANCE CONSULTATION IN AMPHIPOD SYSTEMATICS.

Ed BOUSFIELD

(The following contribution is built up from letters received from Ed Bousfield, with his permission. He planned to write a separate note on the subject, but this has not arrived here in time for inclusion in this issue).

from letter Oct. 24, 1974

I am also hoping to stimulate a system of "advance consultation" by all potential authors of higher taxa. In this system, an author would send a first draft manuscript to at least three taxonomists specializing in the particular family group, requesting their opinion on the validity and logic of the proposals. The author

would emend his paper accordingly and submit to the editor his manuscript accompanied by his colleagues' commentary. This would avoid the "fait accompli" type paper that takes little or no regard of the opinions of important workers in the field, leading to an unstable literature. By pooling brainpower resources in advance of publication, most workers in the group would find the results acceptable, and science would advance more surely. I would appreciate your comments on these matters. (This letter came together with a manuscript revision of the Haustorioidea, encompassing the following family groups: Pontoporeiidae, Urothoidae, Haustoriidae, Platyischnopidae and Phoxocephalidae). (How Bousfield's proposal is meant to function in practice, is best illustrated by a letter sent with an outline of a proposed revision of the Gammaridae s.l., Nov. 24. 1974).

Dear Colleague:

Under separate cover I have sent to you for critical analysis and commentary a copy of a first-draft outline of a proposed revision of gammaroidean amphipods (Gammaridae sens. lat.). This revision is a more complete taxonomic breakdown of the group initiated in the New England amphipod guide book (1973), at the implied request of several major workers (e.g. Holsinger 1974; Karaman 1974 (review), and correspondence).

Whereas colleagues are generally prepared to accept the need for realistic taxonomic refinement of this large, unwieldy, and polyphyletic group, no two workers are likely to have the same concept of its phylogeny or proper taxonomic treatment. To my knowledge, no other group of animals (let alone arthropods) of this size and eurytopicity is restricted to a single family concept, or remains at such a primitive and unsophisticated level of taxonomic refinement. The task of doing so is a formidable one, perhaps realistically beyond the successful capabilities of any one worker. The present draft outline (characterization of family and subgroups are in "skeleton" form only) is based largely on literature analysis of the 800 plus species and 175 genera (to 1974), and examination of representative material of about 50 of the genera. In deriving the present systematic concepts, I have relied mainly on characters of coxal gills, sternal gills, and brood plates, supplemented by those of mouthparts, gnathopods, uropods, telson, etc., more usually used in taxonomic treatment at family and/or superfamily levels. Because of limitations in material, literature, and time available, the

concepts are of uneven quality, and errors and omissions are acknowledged. It is my belief, however, that the overall basis for this revision is sound, and more realistically attempts to recognize the evolutionary history of this rather remarkable group of aquatic arthropods that has occurred during the past 300 (plus) million years, during which continents have come together and broken apart, and virtually every freshwater and marine habitat has been penetrated at one time or other, directly or convergently, by various morphotypes within the group. I am therefore submitting to you and other major workers this outline proposal, imperfect as it is, in order to

1. obtain a concensus on publishable acceptability of a revision of this nature, and
2. if acceptable, to request your assistance in correcting, emending, refining, and "fleshing out" the details necessary to preparation of a final-draft, publishable scientific contribution.

On point 2, I am especially in need of assistance in ascertaining the form and occurrence of gills and brood plates from material in your possession, or material that you would be willing to lend to me for the purpose, since the literature is surprisingly limited in treatment of these characters. In some instances I have been forced to surmise these characters on the basis of what is known or has been personally noted in obviously related species or genera, and may be in error. Presence or absence of gills and brood plates as taxonomic characters must be interpreted intelligently. As they pertain to the respiratory physiology and life cycles of these animals, these characters would ordinarily be considered of primary taxonomic importance. However, within component units of eurytopic groups such as the Talitroidea that occupy a range of different habitats from marine through fresh-water to terrestrial, or that "cline" from production of large number of small eggs to a few very large eggs per brood, a corresponding change in condition and number of gills and brood plates may be observed. The overall marked stability of these characters across the 60 plus recognized gammaridean families, however, is perhaps the strongest justification for their use as a primary tool in working out a phylogenetic classification, via the Henning-Brundin "cladistic* approach.

Your commentary and assistance in refining these concepts would therefore be gratefully received and acknowledged.

In another letter to me Bousfield comments: "Reaction to my suggestion concerning advance circulation of major taxonomic reviews to selected major workers has been generally well received.

I believe a note in the Newsletter on this subject would be useful and would keep other workers better informed of important work in press, and thereby tend to reduce duplication of effort. Surely the scientific information contained in a paper is its primary value; who does the work (all other factors equal) is secondary in inportance. By pooling our brainpower in the taxonomy of this complex and difficult group of animals, the major decisions are likely to be more sound, and give much greater stability to the literature than results from the present" every man for himself" methodology."

LIST OF AMPHIPOD WORKERS (THIRD SUPPLEMENT)

Corrections and changes of address

48. Tony Fincham . New address: 100 Manselton Road, Swansea SA 5 8 PJ Glamorgan, Wales, UK

175 Akira Taniguchi. New address: Laboratory of Oceanography, Faculty of Agriculture. Tohoku University, Sendai 980, Japan

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As I noted in the introduction library facilities at our Museum are now not as good as before, and I am therefore more than ever grateful for references and reprints (to be sent to Tromsø, not to Lund). I have again had invaluable and regular help from Claude de Broyer and Jan Stock, and also Thomas Ginsburger-Vogel and Iraida Greze have sent references. It may be of interest to tell about Stock's technique of helping me: he simply copies up his index cards (10 cards per sheet) four times a year and sends a copy to me. Wish more of you did this. A most valuable contribution to the bibliography has furthermore been given by Richard Shillaker, who sent me 3 references to important unpublished papers on the genus Corophium, viz.

ANDRES, H.F., 1970. Zur Biologie und Ökologie des Amphipoden Corophium volutator Pallas (Corophiidae). _____ Diplom Arbeit (Biologie), Hamburg, 71 pp.

INGLE, R.W., 1969. The crustacean amphipod genus Corophium Latreille; a morphological and taxonomic study. _____ Ph. D. thesis, University of Reading, U.K. (with a wealth of references)

NOBLE, W., 1962. Studies on the life cycle and habitat requirements of the amphipod Corophium volutator Pallas. _____ Unpublished Honours Thesis, University of Aberdeen, U.K.

To this I may, immodestly, add:

VADER, W. & C. CHRISTOPHERSEN, 1972. (An illustrated key to the genus Corophium in Scandinavia, with data on distribution and ecology of the species). _____ Unpublished manuscript, in Norwegian.

Papers in press will no longer be included in the bibliography, as many of you have supported Diana Laubitz' opposal of this practice. I hope you still send notice of your papers in press to me, however, for the "gossip-column"!

Of the forthcoming and just published books mentioned in A.N. 3 and 4, I have now some more information about Dr. Jankowski's book, most kindly furnished by the author himself in a letter. An English review of the book, by Dr. Jiři Lom, has also appeared in Folia Parasitologia 20, 1974, p 292. The correct reference to the book is:

JANKOWSKI, A.W , 1973. Subclass Chonotricha. In series: Fauna of the USSR, Ciliophora, vol. II. fasc. 1 (New series 103: 1-356, 200 figures

in text, 3 schemes, 312 references (Publishing house "Nauka", Leningrad).

"The book appeared April 1973", Jankowski writes," and March 1974 formed the basis for my doctoral dissertation.

The amphipod part is really too large for abstracting. In short, a number of gammaridean, cyamidean and talitrid amphipods were examined for "chonos", and many were found (No chonos were found on the many caprellids and hyperiids examined). Many new genera and species were described from amphipods, and they show both great host-specificity and occur only on specific parts of their host. Multiple infections on single host specimens occur, e.g. on the common Murmansk amphipods Gammarus setosus and Marinogammarus obtusatus.

There are 3 faunas of amphipod/chonotrich complexes: 1 "European" (characterized by spring Heliochonidae on Gammarus and Marino-gammarus)2. "Baikal" (characterized by an explosion of Spirochonidae, with endemic genera, on endemic Gammaridae, and 3."Pacific" (Characterized mainly by the primitive Lobochonidae, and marine Spirochonidae, on Anisogammarus, throughout its range, and on many littoral (not on supralittoral) talitrids) (this part of the monograph is published separately, and now in the press). Cosmopolition elements are the 3 genera of cyamid chonos, and 1 genus on Cheluridae (now being restudied).

The extreme host and site specificity, which is caused by the profound trophont adoptation in the chonos, is of use in host taxonomy and zoogeography. As an example can be mentioned, that the Ampithoe on the Murmansk coast bear only exogemmine chonos (of the genus Heliochona, on the gills), while the morphologically very similar Ampithoe troughout the North Pacific only bear endogemmine chonos (of the genera Isochona, Trichochona, on the pleon setae, or marsupiate chonos). Both populations were here identificd as Ampithoe rubricata, but this I can not believe to be true.

The very extensive chono-material collected made it feasible,for the first time, to trace their interrelations, to restore their phylogram and to compare this with the phylogram of the Crustacea. As a result, I categorically oppose the Californian hypothesis of the origin of the chonos on the Phyllocarida and the parallel evolution with their host during the evolution of the Malacostraca. I believe J.L. Mohr inverted the chono stem-tree, of which then only fragments were known. I firmly believe, and have many data to support this,

that the chonos appeared quite recently on the Amphipoda, which limits their possible geological age from the 300.10^6 years proposed by Mohr to $65-70.10^6$ years. The most primitive genus known, the exogemmine Oenophorachona, appeared from the hypostome ciliate genus Dystenia on the pleopods of Anisogammarus in the North Pacific. The chonos of phyllocarids all belong to the higher marsupiate genera; they appear to be in a period of secondary active divergence. From the Amphipoda the chonos migrated independently to various group of other hosts, even including cetacean copepod parasites, and algae. Meanwhile, their active divergence on amphipods continues.

The book is a complete zoological monograph of the group, with a review of all available chonotrich literature. Its abbreviated "Conspectus" (in English, near 150 typewritten pages) was sent to Adrien Batisse in Paris summer 1973, for possible inclusion in a ciliate volume of the Traité de Zoologie".

Dr. John HOLSINGER's 1972-book "The freshwater amphipod crustaceans (Gammaridae) of North America" (see A.N. 2, p. 38) has proved very difficult to get in Europe. It has to be ordered, and paid beforehand, from the Superintendent of Documents, U.S. Goverment Printing office. The manual presents analytical and illustrated keys to the species (but no diagnoses of the species) and data on type locality, ecology and distribution (with maps). Eight genera are included, i.e. Gammarus (with 9 species), Crangonyx (18), Synurella (4) Apocrangonyx (6), Stygonectes (29), Stygobromus (10), Bactrurus (3), and Allocrangonyx (2). A further Crangonyx species. C. serratus, is added in a later issued sheet of Errata, as follows: 16. Crangonyx serratus.

16. Crangonyx serratus.

Crangonyx serratus (Embody, 1911). Type Locality: Spring-fed railroad pond, about 1.5 miles north of Ashland, Hanover Co., Virginia.

This relatively large species is easily distinguished by the deeply serrate posterior margins of the bases of pereopods 5-7 and the proportionately long telson which is deeply cleft and bears both apical and dorsal spines. Its range extends from Washington, D.C. south along the Coastal Plain to northern Florida. An undescribed but closely related species overlaps in part with C. serratus at the extreme south end of the range and is recorded from Clinch Co., Georgia and Duval and Jefferson cos., Florida. C. serratus is an

inhabitant of small, permanent bodies of water, e.g., pond, streams and drainage ditches. Sexually mature males, 8.0 to 11.0 mm; sexually mature females, 10.0 to 16.0 mm. Ovigerous females are recorded from November to June, with an apparent peak during winter and early spring; juveniles occur during summer and fall. Life cycle of about one year. Depending on size, ovigerous females brood from 42 to 168 eggs per clutch and newly hatched young measure 2.0 mm. This species is often associated with Synurella chamberlaini, Crangonyx richmondensis s. lat. and Crangonyx spp. (gracilis group); it is occasionally found with Gammarus fasciatus and Crangonyx shoemakeri.

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Last minute additions

New subscribers:

247. Sidney S. SLOCUM, Dept of Zoology, Univ. of North Carolina, Chapel Hill, N.C. 27514, U.S.A.

248. N. Zealand Oceanographic Institute, D.S.I.R., P.O Box 8009, Wellington New Zealand.

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JUST, J., 1974. On Palaeogammarus Zaddach, 1864, with a description of a new species from western Baltic amber (Crustacea, Amphipoda, Crangonycidae). _____ Steenstrupia 3: 93-99.

KANEVA-ABADIEVA, V., 1973. (The amphipod fauna of the biocenosis in algal encrustments off the Bulgarian Black Sea coast). _____ Proc. Inst. Oceanogr. Fish. Varna 12: 87-95 (In Bulgarian with English summary. Deals with the amphipod fauna of Cystoseira barbata)

KARAMAN, G.S., 1974. Revision of the family Pardaliscidae with diagnosis of genera, distribution of species and bibliography (43. Contribution to the Knowledge of the Amphipoda). _____ Acta Adriatica 15(7): 1-46. (A revision mainly based on the literature. Two new genera are erected, Caleidoscopsis(type species Pardaliscopsis? copal, further species P.? tikal) and Rhynohalicella (monotypic, type species Halicella halona). Pardisynopia is merged into Halice, and all species of Halicoides (with the possible exception of its type-species, H. anomalus) are removed to Halice. Diagnoses of, and a key to, the genera are provided. The paper is not illustrated).

KARAMAN, G.S., 1974. 57. Contribution to the knowledge of the Amphipoda. Genus Metohia Abs. in Yugoslavia and its relation to the genera Typhlogammarus Schäf. and Accubogammarus n. gen. _____ Poljoprivreda i Šumarstvo, Titograd 20: 43-57. (Metohia Absolon and its only species. M. carinata, are redescribed. Accubogammarus n. gen. is erected for Typhlogammarus algor G. Karaman, 1973, leaving also Typhlogammarus with a single species, T. mrazeki)

KARAMAN, G.S., 1974. 58. Contribution to the knowledge of the Amphipoda. Genus Synurella Wrzes. in Yugoslavia with remarks on its all World known species, their synonymy, bibliography and distribution (fam. Gammaridae). _____ Poljoprivreda i Šumarstvo, Titograd 20: 49-60. (The genus Diasynurella is considered synonymous with Synurella. New taxon: S. intermedia montenigrina n. ssp.)

KARAMAN, G.S. & E. TIBALDI, 1973. Some new Echinogammarus species (Amphipoda Gammaridae) from Italy. _____ Memorie Mus. Civ. Stor. Nat. Verona 20 (1972): 325-344.

KEISER, R.K. & D.V. ALDRICH, 1973. A gradient apparatus for the study of salinity preference of small benthic and free swimming organisms. _____ Contr. mar. Sci. Univ. Texas 17: 153-162.

KITITSYNA, L.A. & M.L. PIDGAIKO, 1974. (Production of Pontogammarus robustoides Grimm in Reservoir- Cooller of the Kurakhovian State Regional Electric Power Station.) _____ Hidrobiol. Zhurn. 10(4): 30-37 (In Russian, with English summary).

KOSLUCHER, D.G. & G. Wayne MARSHALL, 1973. Food habits of some benthic invertebrates in a northern cool-desert stream (Deep Creek, Curlew Valley, Idaho-Utah). _____ Trans. Amer. micr. Soc. 92: 441-452. (i.a. Gammarus lacustris and Hyalella azteca, both classified as herbivores).

KOVALCHUK, T.V., 1974. (On ecology of Pontogammarus crassus (G.O.Sars) in the Kiev Water Storage Basin). _____ Hidrobiol. Zhurn 10(3): 82-84 (in Russian).

LAUBITZ, D.R. & G.S. LEWBEL, 1974. A new species of caprellid (Crustacea: Amphipoda) associated with gorgonian octocorals. _____ Can. J. Zool. 52: 549-551 (Caprella gorgonia from southern California).

LINCOLN, R.J. & D.E. HURLEY, 1974. Scutocyamus parvus, a new genus and species of whalelouse (Amphipoda: Cyamidae) ectoparasitic on the North Atlantic white-beaked dolphin. _____ Bull. Br. Mus. nat. Hist. (Zool) 27: 59-64, Pl. 1.

LINCOLN, R.J. & D.E. HURLEY, 1974. Catalogue of the Whale-lice (Crustacea: Amphipoda: Cyamidae) in the collections of the British Museum (Natural History). _____ Bull. Br. Mus. Nat. Hist. (Zool) 27: 65-72 (not seen).

LOWRY, J.K., 1974. A new species of the amphipod Biancolina from the Sargasso Sea. _____ Trans. am. micr. Soc. 93: 71-78 (not seen).

MAREN, M.J. van, 1974. Répartition et écologie d'Amphipodes (surtout Gammaridés)dans le bassin et l'estuaire de la rivière de Dourduff (Bretagne). _____ Bull. zool. Mus. Univ. Adam 3: 189-209 (not seen).

MATEUS, A., 1974. Description d'une nouvelle espèce d'Echinogammarus (Amphipoda, Gammaridae) du Portugal. _____ Publçs Inst. Zool. "Augusto Nobre" 123: 1-32. (E. villaticus n.sp., closely related to E. aquilifer).

MEYERING, M.P.D., 1974. Quantitative Untersuchungen zur Drift und Aufwanderung von Gammarus fossarum Koch in einem Mittelgebirgsbach._____ Verh. Ges. Ökol., Saarbrücken (1973): 143-147.

MILOVIDOVA, N.Yu., 1974. (Oil effect on some coastal crustaceans of the Black Sea). _____Hidrobiol. Zhurn. 10 (4): 96-100. (in Russian. Deals with ia. Gammarus olivii).

PEARCY, W.G. & J.W. AMBLER, 1974. Food habits of deep-sea macrourid fishes off the Oregon coast. _____ Deep- Sea Res. 21: 745-759.

PINKSTER, Sj., 1973. On members of the presumed Baikal-genus Eulimnogammarus (Crustacea- Amphipoda) in Western Europe. _____ Verh. intern. Verein. Limnol. 18: 1498-1504 (not seen).

RABINDRANATH, P., 1974. Eurystheus dubius nom. nov. pro E. anomalus Rabindranath 1971, preocc. (Amphipoda, Isaeidae). _____ Crustaceana 27: 112.

RUFFO, S., 1974. (Studies on amphipod crustaceans 75. The genus Synurella Wrzesn. in Anatolia, description of a new species, and a reevaluation of Lyurella hyrcana Dersh. (Crustacea Amphipoda Gammaridae)). _____ Memorie Mus. Civ. Stor. Nat. Verona 20 (1972): 389-404 (In Italian, with English summary. First records of Synurella in Anatolia: S. ambulans and S. osellai n.sp., Lyurella hyrcana Derzhavin, 1939, an overlooked taxon, is redescribed on material from Iran: the genus Lyurella is likely to be synonymous with Synurella).

RYGG, B., 1974. Identification of juvenile Baltic gammarids (Crustacea, Amphipoda). _____Ann. zool. fenn. 11: 216-219(A most useful paper, enabling ecologists to identify juvenile specimens of Gammarus duebenii, G. locusta, G. oceanicus, G. salinus and G. zaddachi).

SIVAPRAKASAM, T.E., 1972(?). The organisation and classification of Amphipod Crustacea _____ Proc. zool. Soc. Calcutta 25: 69-81 (not seen)

STOCK, J.H., 1973. Freshwater and brackish water populations in one species of amphipod, Gammarus duebenii. _____ Verh. intern. Verein. Limnol. 18: 1495-1497.

STOCK, J.H., 1974. Redescription de l'amphipode hypogé Niphargus puteanus (Koch in Panzer, 1836), basée sur du matériel topotypique. Bijdr. Dierk. 44: 73-82, Pl. 1.

STOCK, J.H., 1974. The systematics of certain Ponton Caspian Gammaridae (Crustacea, Amphipoda). Mitt. Hamburg. Zool. Mus. Inst. 70: 75-95 (A key to, and revised diagnoses of, the genera of the Dikerogammarus- Pontogammarus complex is provided. Type species are indicated for all units, and all described species are listed. New taxa: Obesogammarus (type species: Gammarus obesus, 7(?9) further species), O. turcarum, Wolgagammarus (monotypic, type species Stenogammarus dzjubani), Compactogammarus (monotypic , type species Niphargoides compactus), Uroniphargoides (monotypic, type-species Niphargoides spinicaudatus), and Paraniphargoides (type-species Niphargoides motasi, 1(2) further species).

SUTCLIFFE, D.W., 1974. On Gammarus from fresh waters in the islands of Orkney and Shetland. Crustaceana 27: 109-111 (G. duebeni and G. lacustris).

TAMURA, H. & K. KOSEKI, 1974. Population study on a terrestrial amphipod, Orchestia platensis japonica (Tattersall), in a temperate forest. Jap. J. Ecol. 24: 123-139.

THORP, V.J. & P.S. LAKE, 1974. Toxicity bioassays of cadmium on selected freshwater invertebrates and the interaction of cadmium and zinc on the freshwater shrimp Paratya tasmaniensis Rich. Austr. J. mar. Freshw. Res. 25: 97-104. (The amphipod Austrochiltonia subtenuis was the most sensitive species among those tested, with a 96 hr. median lethal concentration of 0.04 mg/l).

VADER, W., 1974. (Photis reinhardi in the Netherlands). Levende Nat. 77: 93-96 (In Dutch, with English summary).

VINOGRADOV, G.A., 1973. (The functioning of osmoregulatory systems in freshwater amphipods in water of different salinity). Ekologiya 3:75-84 (In Russian, not seen).

VINOGRADOV, G.A. & V.P. DROBYSHEV, 1973. (Some parameters of osmoregulations and breathing in the freshwater amphipod Gammaracanthus lacustris Sars in the process of salt-water acclimatization). Dokl. Akad. Nauk SSSR 213:956-958 (In Russian, not seen. English summary in Aq. Sci. Fish. Abstr. 4 (7), p. 66).

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ACHUTHANKUTTY, C.T., K.K.C. NAIR & K.S. PURUSHAN, 1973. A shoal of sergestid shrimp Acetes in association with a swarm of gammarid amphipods in the south-west coast of India. _____ Curr. Sci. 42: 840 (not seen).

BELLAN-SANTINI, D. & M. LEDOYER, 1974. Gammariens (Crustacea-Amphipoda) des Îles Kerguelen et Crozet. _____ Tethys 5 (1973): 635-708. (An important paper, with descriptions and illustrations of many species. New taxa: Eusirus tridentatus (This is E. antarcticus sensu Bellan-Santini, 1972, from Terre Adelie. The real E. antarcticus is illustrated in the present paper), Gondogeneia spinicoxa, Schraderia acuticauda, Liljeborgia kerguelenensis, Acontiostoma acutibasalis (an intermediate species between Acontiostoma and Stomacontion), Orchomene morbihanensis, Pseudonesimoides (Lysianassidae), P. cornutilabris, Stegophippsiella (Stegocephalidae), S. pacis, Mesoproboloides spinosus, Antatelson antennatum and A. rostratum)

BRUN, B. & D. DUMAY, 1974. Différences de régime alimentaire entre deux espèces marines de Gammares du groupe locusta (Amphipodes). _____ Crustaceana 27: 255-258 (G. crinicornis and G. subtypicus from localities near Marseille).

CHARNIAUX-COTTON, H., 1974. Données nouvelles concernant la vitellogénèse des Crustacés Malacostracés obtenues chez l'amphipode Orchestia gammarellus (Pallas); folliculogénèse à partir d'un tissu permanent; action du bisulfan; action inhibitrice de l'hormone juvénile _____ C.R. Acad. Sci. Paris 279 D: 563-566.

CHILDRESS, J.J. & M. NYGAARD, 1974. Chemical composition and buoyancy of midwater Crustaceans as function of depth of occurrence off Southern California. _____ Mar. Biol. 27: 225-238. (includes 3 amphipods, viz. Phronima sedentaria, Hyperia galba and Paracallisoma coecus. The lastnamed species is lighter than seawater even at pressures up to 1000 psi, and may "have to swim to stay down").

DAHL, E., 1973. Ecological range of Baltic and North Sea species. _____ Oikos, Suppl. 15: 85-90 (The question whether the low diversity in the ecosystems of the Baltic, in comparison with those of the North Sea and the Transition Area, is to some extent compensated for by a widening of the ecological range of those euryhaline species which from the North Sea penetrate into the Baltic, is posed and discussed with the Amphipoda as an example).

DAHL, E., 1973. Antennal sensory hairs in talitrid amphipods (Crustacea). _____ Sensory hairs from antennulae and antennae of the two species, Orchestia platensis and Talorchestia deshayesii, were studied by means of light microscopy and scanning and transmission electron microscopy) Acta Zool. 54: 161-171.

DENNERT, H.G. & M.J. van MAREN, 1974. Further observations on the migration of Gammarus zaddachi Sexton (Crustacea, Amphipoda) in a French stream. _____ Bull. Zool. Mus. Univ. Adam 3: 157-167. ("A raise in the Cl^- concentration of the medium caused a significant improvement of the survival-rate").

GILIAROV, M.S., O.I. LAGIDZE, S.I. LEVUSHKIN & D.A. TALIKADZE, 1974. (The first species of soil inhabiting gammarid belonging to the genus Niphargus (Amphipoda, Crustacea)). _____ (In Russian, not seen. N. talikadzei sp.n.).

GIRISCH, H.B., J.C. DIELEMAN, G.W.PETERSEN & S. PINKSTER, 1974. The migration of two sympatric gammarid species in a French estuary. _____ Bydr. Dierk. 44: 239-273 (G. zaddachi and G. chevreuxi in the estuary of the river Dourduff, Bretagne).

GRAY, J.S., 1974. Animal-sediment relationships. _____ Oceanogr. mar. Biol. ann. Rev. 12: 223-261 (An important review paper).

GREZE, I.I., 1974. (On some general rules in the production of mass species of amphipods in the Black Sea). _____ Biol. Morja, "Naukova Dymka" Kiev 32: 53-66. (In Russian. The author has tried to draw some general conclusions from her material on the reproduction of 10 mass species of amphipods in the Black Sea. Reproduction most active in spring and autumn. A correlation exists between water temperature and duration of oogenesis and embryogenesis. The proportions of ♂♂ and ♀♀ is about equal in the period of intense reproduction in spring. During the rest of the year the females always outnumber the males in the populations. The most productive species of the 10 investigated were the species of the genus Gammarus s.l.). (Please note that this translation, made in Tromsø, is most unauthorized. W.V.)

GULLIKSEN, B., 1974. Marine investigations at Jan Mayen in 1972. _____ Kong. norske Vidensk.Selsk. Mus., Miscellanea 19: 1-46 (Amphipods pp 24-25. More details in a forthcoming paper by W.Vader).

HOPPENHEIT, M., 1973. Effects on fecundity and fertility of single sub-lethal x-irradiation of Gammarus duebeni females. _____ Int. Atomic Energy Agency Proc. Ser., IAEA- SM 158 (29): 479-486 (not seen).

JÄRVEKULG, A., 1973. Distribution and ecology of local populations of benthic glacial relicts. _____ Oikos, Suppl. 15: 91-97. (i.a. Pontoporeia affinis and P. femorata).

JOSEPH, M.M., 1974. Tidal rhythm in the feeding activity of the intertidal amphipod Hyale hawaiensis (Dana). _____ Proc. Ind. natn Sci. Acad. B 38: 456-461 (not seen).

KACHALOVA, O., 1974. (Peculiarities of species composition of bottom fauna in the southern part of the Gulf of Riga). _____ Pp. 244-257 in: Biology of the Baltic Sea 1, Acad. Sci. Latvian SSR, Inst. Biol. Riga. (in Russian, not seen)

KACHALOVA, O. & G. LAGZDIŅŠ, 1974. (Organisms of the bottom fauna in the southern part of the Gulf of Riga) _____ Pp 258-302 in: Biology of the Baltic Sea 1, Acad. Sci. Latvian SSR, Inst. Biol. Riga (in Russian, not seen).

MARY, R.F. & G. KRISHNAN, 1974. On the nature and role of protein constituents of the cuticle of crustaceans in relation to permeability of the cuticle. _____ Mar. Biol. 25: 299-310.

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MEUSY, J.J., H. JUNERA & Y. CROISILLE, 1974. Données sur le synthèse de la fraction protéique femelle chez Orchestia gammarella Pallas (Crustacé Amphipode), au cours de l'intermue et chez les femelles en repos sexuel. _____ C.R. Acad. Sci. Paris 279 D, 587-590.

MONOD, Th., 1973. Sur quelques Crustacés de Nouvelle-Caledonie. _____ Cah. Pacif. 17: 1-23 (not seen.i.a.(?) Metaprotella sandalensis).

MOORE, I.A. & J.W. MOORE, 1974. Food of shorthorn sculpin, Myoxocephalus scorpius, in the Cumberland Sound area of Baffin Island. _____ J. Fish. Res. Bd Can. 31:355-359 (Shorthorn sculpins captured from June to October 1972 in Cumberland Sound, Baffin Island, fed almost

exclusively on the planktonic amphipods Pseudalibrotus glacialis and Parathemisto libellula. Fish from a neighbouring fjord, on the other hand, ate mainly benthic molluscs.)

MORAND, C., 1974. Contribution à l'étude taxonomique de Niphargus. Note préliminaire à l' étude de la croissance comparée de 2 populations de Niphargus longicaudatus rhenorhodanensis (Amphipoda, Gammaridea). _____ Crustaceana 27: 249-254.

MYERS, A.A., 1974. A first record of the genus Pseudomegamphopus Myers (Crustacea, Amphipoda) from the indo-west Pacific with a redescription of P. jassopsis (K.H. Barnard) comb. nov. _____ _____ Trans. roy. Soc. S.Afr. 41: 195-202 (not seen).

(See p. 38)

RAKUSA-SUSZCZEWSKI, S. & H. DOMINAS, 1974. Chemical composition of the antarctic Amphipoda Paramoera walkeri Stebbing and chromatographic analysis of its lipids. _____ Polsk. Arch. Hydrobiol. 21: 261-268.

RUFFO, S., 1974. (Studies on Crustacea Amphipoda 77. New interstitial amphipods from the coast of south Africa) _____ Atti Ist. Veneto Scienz. Lett. Art. 132: 399-419. (in Italian, not seen).

SCHROEDER, W.W., 1974. Collecting and handling zooplankton and epibenthic organisms underwater. _____ J. mar. Technol. Soc. 8: 40-46 (not seen).

SHYAMASUNDARI, K. & K. Hanumantha RAO, 1974. The occurrence of mucous glands in the appendages of Talorchestia martensii (Weber) and Orchestia platensis Krøyer (Crustacea, Amphipoda). _____ Curr. Sci. 43:122-123 (not seen).

SKET, B., 1974. Niphargus stygius (Schiødte) (Amphipoda, Gammaridae) _____ die Neubeschreibung des Generotypus, Variabilität, Verbreitung und Biologie der Art. I. _____ Biol. vestn. (Ljubljana) 22:91-103.

SOYEZ, D., 1974. Etude comparée de l'activité prévitellogénétique pendant les saisons de repos génital et d'activité sexuelle chez le Crustacé Amphipode Orchestia gammarellus (Pallas). _____ C.R. Acad. Sci. Paris 278 D: 1867-1870.

SPENCER, L.T., 1974. Parasitism of Gammarus lacustris (Crustacea: Amphipoda) by Polymorphus minutus (Acanthocephala) in Colorado. _____ Am. Midl. Nat. 91:505-509.

STEELE, D.H. & V.J. STEELE, 1974. The biology of Gammarus (Crustacea, Amphipoda) in the northwestern Atlantic. 8. Geographic distribution of the northern species. _____ Can. J. Zool. 52:1115-1120 (not seen).

SURYA RAO, K.V., 1974. Intertidal amphipods from the Indian coast. _____ Proc. Ind. natn. Sci. Acad. 38 B (1972): 190-205. (not seen, 132 species in 54 genera are recorded).

SUTCLIFFE, D.W. & T.R. CARRICK, 1973. Studies on mountain streams in the English Lake district. _____ Freshw. Biol. 3:437-462, 543-560, 561-568 (not seen; i.a. on pH and in tolerance of Gammarus pulex).

VASILENKO, S.V., 1974. (Caprellidea (skeleton shrimps) in Russian and neighbouring seas. Order Amphipoda. (families Paracercopidae, Phtisicidae, Caprellidae)) _____ Opred. Faune SSSR 107: 1-288. (in Russian. Another important monograph from the Leningrad group, unfortunately received too late for getting it properly reviewed. New taxa: Pseudocercops armatus, Protellina arctica, Caprella advena, C. parapaulina, C. media, C. lukini, C. eurydactyla, C.excelsa C. zygodonta, C. oxyarthra and C. longicirrata)

VOLOVA, G.N., 1974. (Benthos of saltish water bodies of the South Primorye (the Sea of Japan)). _____ Hidrobiol. Zhurn. 10 (6): 32-37. (Fauna of the brackish lake Talmi (Amph.): Anisogammarus barbatus, A. kygi, A. tiuschovi, Dogielinotus moskvitini and Kamaka kuthae, and some smaller water bodies, in which also A. ochotensis was found).

WILLIAMS, G.E., 1974. New techniques to facilitate hand-picking macrobenthos. _____ Trans. Am. Microsc. Soc. 93: 220-226. (Of many stains tested, a 1:1 mixture of Eosin B and Biebrich Scarlet in a 1: 1000 conc. of 5% formalin was found to be the most appropiate stain because of its unique selective affinity for only animal tissue).

WILLIAMS, W.D., 1974. Freshwater Crustacea. _____ In: W.D. WILLIAMS (ed): Biography and Ecology in Tasmania. Monogr. biol. 25, Junk. The Hague (not seen).

ZINN, D.J., 1974. Orchestia, the Sand Dancer. _____ Maritimes, Univ. Rhode Isl. 18: 15-16 (not seen).

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KARAMAN, G.S., 1974. 59. Contribution to the knowledge of the Amphipoda. Revision of the genus Stygobromus Cope 1872 (fam. Gammaridae) from North America. _____ Glas. Republ. Zavode Zast. Prirode Prir. Muzeja Titograd 7: 97-125 (This paper was apparently prepared independently from Holsinger's Stygobromus-monograph. The author synonymizes the genera Stygonectes and Apocrangonyx with Stygobromus, and expresses the opinion that probably also Synurella and Lyurella will have to be merged into Stygobromus. He gives a synonymy and lists of localities for 44 species, but no diagnoses, key or illustrations)

KARAMAN, G.S., 1974. Crustacea Amphipoda. _____ Catalogus Faunae Jugoslaviae (Ljubljana) 3-3: 1-42. (A most useful catalogue of freshwater amphipods in Yugoslavia, with synonymy, local distribution and bibliography).

KINNER, P., D. MAURER & W. LEATHAM, 1974. Benthic invertebrates in Delaware Bay: animal-sediment relationship of the dominant species_____ Int. Rev. ges. Hydrobiol. 59: 685-701. (Among the dominant species treated in this paper there are 3 amphipods, viz. Ampelisca verrilli, Protohaustorius wigleyi and Trichophoxus epistomus).

KRISHNAN, L. & P.A. JOHN, 1974. Observations on the breeding biology of Melita zeylanica Stebbing, a brackish water amphipod. _____ Hydrobiologica 44: 413-430 (not seen).

MERRETT, N.R. & H.S.J. ROE, 1974. Patterns and selectivity in the feeding of certain mesopelagic fishes._____ Mar. Biol. 28: 115-126 (of the six species of fishes dealt with in this paper, only Lampanyctes cuprarius fed to a large extent (55%) on amphipods, chiefly Phrosina semilunata.)

MOORE, P.G., 1974. The kelp fauna of Northeast Britain. 3. Qualitative and quantitative ordinations, and the utility of a multivariate approach. _____ J. exp. mar. Biol. Ecol. 16: 257-300 (Besides being of great methodological interest, this paper contains a wealth of data on correlations between the distributions of i.a. amphipod species and different environmental factors, i.a. pollution).

MYERS, A.A., 1974. Amphitholina cuniculus (Stebbing), a little-known marine amphipod crustacean new to Ireland _____ Proc. Roy. Irish Acad. 74 B: 463-469 (The animals feed by burrowing

in the stipes of the brown Laminarian alga, Alaria esculenta. They have recently also been discovered in the same habitat in the Irish Sea, Isle of Man).

MYERS, A.A., 1974. Trans. roy. Soc. S.Afr. 41: 195-202. (Listed as not seen on p 3. Lembos jassopis is transferred to the genus Pseudomegamphopus, to which L. chelatus also may belong. The genera Neomegamphopus, Konatopus, Pseudomegamphopus and Maragopsis appear to form a distinct monophyletic assemblage. The phylogenetic significance of the relative development of podomeres is discussed, and taxonomists working on the Corophioidea are urged to utilize as wide a range of characters as possible in determining relationships).

ROE, H.S.J., 1974. Observations on the diurnal vertical migrations of an oceanic animal community. _____ (Based on samples taken off Fuerteventura, Azores, this paper includes data on 13 species of Amphipoda).

SANGER, G.A., 1974. Pelagic amphipod crustaceans from the Southeastern Bering Sea, June 1971. _____ NOAA techn. Rep., NMFS SSRF 680: 1-8 (2 Cyphocaris spp and 12 Hyperiidea)

SEMENOVA, T.N., 1973. (Pelagic amphipods of the genus Vibilia Milne-Edwards (Hyperiidea, Vibiliidae) from the Southeast Pacific). _____ Trudy Inst. Okeanol. 91: 169-177 (In Russian 11 species, among them V.robusta new to the Pacific, and V. gibbosa new to the S. Pacific. Only abstract seen)

WARD, W.W., 1974. Aquarium systems for the maintenance of ctenophores and jellyfish and for the hatching and harvesting of the brine shrimp (Artemia salina) larvae. _____ Chesapeake Sci. 15: 116-118.

Last minute additions

PHILIPS, P.J., 1973. The occurrence of the remarkable scyphozoan, Deepstaria enigmatica, in the Gulf of Mexico and some observations on cnidarian symbionts. _____ Gulf Res. Reports 4:166-168 (Not seen. "Symbiotic relationships with isopods and amphipods, and scyphozoans are discussed").

SWEDMARK, M., Aa. GRANMO & S. KOLLBERG, 1973. Effects of oil dispersants and oil emulsions on marine animals. _____ Water Res. 7: 1649-1672 (Not seen. The toxicities to marine animals of 9 oil dispersants, 3 oil emulsions with Corexit, and a dispersion of Oman crude oil were studied in continuous flow aquarium systems at 96 hr

exposures followed by a recovery period in clean seawater..... Crustaceans were the most resistant to dispersants but very susceptible to oil emulsions.)

DORGELO, J., 1974. Comparative ecophysiology of gammarids (Crustacea: Amphipoda) from marine, brackish and fresh-water habitats, exposed to the influence of salinity temperature combinations 1. Effect on survival. _____ Hydrobiol. Bull. 8: 90-108.

New address.

24. Carlos CHRISTOPHERSEN, Kristiansand Læreskole, 4600 Kristiansand S, Norway.

Last second additions

Our colleague,

Henk G. DENNERT of the Stock-team in Amsterdam will on 5-II-1975 defend his thesis on the subject: " Studies on some European euryhaline gammarids". This thesis consists of a series of papers in scientific periodicals of which the following have not been noted earlier:

GIRISCH, H.B. & H.G. DENNERT, 1975. Simulation experiments on the migrations of Gammarus zaddachi and Gammarus chevreuxi. _____ Bijdr. Dierk. 45: 20-38.

DENNERT, H.G., 1975. The variability of the dimensions of the merus of the fifth periopod in the amphipod Gammarus duebeni Liljeborg, 1852. _____ Bijdr. Dierk. 45: 1-19.

HURLEY, D.E. & R. COOPER, 1974. Preliminary descriptions of a new species of Parawaldeckia (Crustacea Amphipoda: Lysianassidae) from New Zealand (Note). _____ N.Z. Jl mar. Freshw. Res. 8:563-567

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