

The editors of Psammonalia are very pleased to present with this issue of the Bulletin an up-to-date (to May 15, 1967) Registry of American Psammonologists. It includes a listing of active workers, their interests or specialties, together with suggestions for preserving, culturing, and shipping interstitial fauna. This information was collected in response to the suggestions proffered at the informal organizational meeting of the Psammonologists Society in Washington in late December of last year.

Publication of the Registry was accomplished only because of the generous and able assistance of Dr. Louise Bush in compiling, arranging, and collating the results of the questionnaire, and because of the promptness and completeness of response from the registrants (all 57 of them). For these contributions in thought, time, and effort, Psammonalia is truly grateful. This is the kind of cooperation that makes for the basic usefulness of the listings and provides in turn a practical stepping stone to the open door of communication so essential to progress in psammonology.

The directory is by no means closed. All persons professionally interested in the interstitial biota and its environment not included in this edition of the Registry are strongly encouraged to write to Dr. Robert P. Higgins, Department of Biology, Wake Forest College, Winston Salem, North Carolina 27106 or to Dr. Donald J. Zinn, Department of Zoology, University of Rhode Island, Kingston, Rhode Island 02881 for a questionnaire. Changes in status or address should be sent to Dr. Neil C. Hulings, Supervisor for Meiofauna, Oceanographic Sorting Center, Smithsonian Institution, Washington, D.C. 20560. The directory is designed with sufficient blank space to provide for direct insertion or attachment of additional listings. Future plans for Part III of the Registry include dividing participants by taxonomic and ecological interests and according to present geographical location on the basis of available information. Suggestions for increasing the usefulness of the Registry would be welcomed.

The wishes of the registrants concerning organized attendance annually or semiannually in conjunction with the AAAS and/or the AIBS, whether papers were to be presented or discussions held in separate psammonology sessions at these meetings, and whether it would be more desirable to accomplish this exchange of information at breakfasts, lunches, or dinners rather than at separate sessions indicated little unanimity. A summary of the 21 responses (only 21 of the 57 registrants expressed opinions on these matters) reveals these data:

- Suggest meeting once a year - 9
- Suggest meeting twice a year - 12
- Prefer meeting in conjunction with AIBS/AAAS rather than regionally - 19
- Favor breakfast, lunch, or dinner meetings - 9
- Do not favor breakfast, lunch, or dinner meetings - 2
- Apparently no preference for such meetings compared with usual sessions - 11
- Want sessions at which papers and discussions are presented - 16
- Want sessions at which only discussions are held - 5

With the present division of opinion perhaps it will be most advantageous for psammonologists if their colleagues participating at the AIBS and AAAS meetings advise Dr. Higgins of their intention at the earliest opportunity. This will give him an opportunity to try and arrange, where feasible, confining these papers to a single session with the meeting program chairman.

Because of the inclusion of the Registry, the section on 'Recent Publications' will be omitted from this issue of the Bulletin.

No program for psammonologists has been arranged for the AIBS Meetings this August at College Station, Texas. However, something is in the wind for the AAAS Meetings in December in New York City; there will be more on this in Bulletin No. 4.

The editors would like to make another plea for information and/or notes concerning research and/or recent titles in any area of psammon biology and the interstitial milieu. It is only in proportion to the contributions of our readers that we can make this Bulletin of greatest service to you.

PSAMMONALIA BULLETIN NO. 3

**THE PSAMMONOLOGIST SOCIETY
REGISTRANTS AND FIELDS OF INTEREST**

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Part I

EXCHANGE AND IDENTIFICATION OF SPECIMENS

Key to the symbols used:

- R - request indicated taxon for research
- NR - do not wish material
- I - will identify material on the usual basis of being contacted first and of controlling deposition of types and/or retaining a portion of the sample
- NI - do not wish to identify material
- L - request living material and will assume shipping costs but must be contacted for collecting and shipping instructions
- NL - do not wish living material

PROTOZOA - CILIATA

- Borrer, Arthur C. (research, systematics, ecology)
- NR - "they're generally poorly preserved except by special techniques."
 - I - see preservation methods and noted under NL.
 - NL - except as needed for identification.
- Lippold, Theodore F. (research, physiological ecology)
- R - especially those equipped with myonemes (Order Spirotricha: Family Spirostomidae). Include date, specific location, and any physical and chemical data possible. See under preservation.
 - I - include specific location of specimens. See under preservation.
 - L - include specific location of specimens. See under culture.
- Small, Eugene B. (research, morphology, systematics, ecology)
- R - particularly hymenostome, trichostome, and thigmotrich species (see below under I).
 - I - "preservation methods....are best accomplished by the specialist. Therefore living specimens and/or samples of the biota are often better than preserved materials."
 - L - depends on the size and state of the collection.

PROTOZOA - FORAMINIFERA

Lee, John J. (research, physiological ecology, Protozoa and unicellular Algae, particularly Foraminifera.)

- NR -
- NI? - did not indicate.
- L - see under culture.

COELENTERATA (CNIDARIA)

Hand, Cadet (research, systematics)

- R -
- I -
- NL? - did not indicate.

Lytle, Charles F. (general, research, development, systematics)

- R - see under preservation.
- I - " " "
- L -

PLATYHELMINTHES - TURBELLARIA

Bush, Louise (research, systematics, ecology)

- R - particularly the smaller, marine, free-living species.
- I - see under preservation.
- L - see under culture.

Hawkes, Clifford L. (general, research, ecology)

- NR -
- NI -
- NL -

Jones, E. Ruffin (general)
? - no indications

Swan, Emery F. (teaching, just beginning work with this taxon,
research, ecology)

NR -
NI -
NL -

PLATYHELMINTHES - TURBELLARIA - PALUDICOLA

Chandler, Clay M. (research, ecology, and taxonomy)

R - specimens must be fixed for sectioning as described
under preservation. Would like records of the occurrence
of paludicolous turbellarians or their capsules (cocoons)
in the psammon community.

I - must be fixed as under preservation.
L - see under culture.

RHYNCHOCOEIA (NEMERTEA)

Swan, Emery F. See under Platyhelminthes.

GNATHOSTOMULIDA

Kirsteuer, Ernst (systematics)

R -
NI -
NL? - no indication.

NEMATODA

Hasbrouck, Edward R. (general, systematics, ecology)

- R - see preservation. Chromadorinae.
- I - see under preservation.
- NL -

Hope, William Duane (research, systematics, ecology)

- NR -
- NI - unless it is a small collection (less than 25 specimens)
or contains nematodes of current research interest.
Free-living, marine species. See under preservation.
- NL -

Hopper, Bruce (research, systematics, ecology)

- NR - not until present commitments have been met.
- I - see under preservation. Marine species.
- NL -

Murphy, D. G. (systematics, ecology)

- NR -
- I - see under preservation. Adenophora.
- L -

Tietjen, John H. (research, systematics, ecology, physiology)

- R - currently interested in culturing as many meiofauna groups
as possible.
- I - see under preservation. Primarily interested in nematodes
from salt marshes and shallow estuaries; also in gastro-
triches and polychaetes.
- L - see under culture.

GASTROTRICHA

Friauf, James J. (chiefly systematics and ecology)

- R - Macrodasyoid gastrotriches only. See under preservation.
- I - " " " " " "
- L -

Hawkes, Joyce A. (research, systematics, ecology)

- NR - interest in Macrodasyoidea and Chaetonotoidea.
- NI - at present does not feel qualified. See under preservation and culture.
- NL - see under culture. Is working on culture of Turbanella sp.

Hummon, William D. (biosystematics)

- NR -
- I - see under preservation.
- NL - see under culture.

Tietjen, John H.

See under Nematoda

KINORHYNCEA

Boykin, John C. (anatomy and systematics)

- R -
- I - see under preservation.
- NL -

Czikowsky, Janice L. (general, research, systematics, ecology)

- ? - no indication.

Higgins, Robert P. (systematics, ecology)

- R - see under preservation. Kinorhyncha and Tardigrada.
- I - " " " " " "
- NL -

"PSEUDOCOELOMATES"

Boykin, John C.

General interest in pseudocoelomates. See also under Kinorhyncha.

ANNELIDA - ARCHANNELIDA

Jones, E. Ruffin (general)

? - no indications.

Kirsteuer, Ernst (systematics)

NR -

NI -

L? - no indication.

McCauley, Victor J. E. (research, systematics, ecology)

R - preferably several specimens. Give locality, substrate, etc.
See under preservation.

NI -

NL -

Simon, Joseph L. (systematics, development)

R - see under preservation. Archiannelida, Polychaeta, larvae.

I - " " " " " "

NL -

ANNELIDA - OLIGOCHAETA

McCauley, Victor J. E. (research, systematics, ecology)

See under Archiannelida.

ANNELIDA - POLYCHAETA

Potts, Mary E. (general, ecology, some systematics)

NR -

NI -

L? - no indication.

Simon, Joseph L. (systematics, development, larvae)

See under Archiannelida.

Taylor, John L. (research, systematics, ecology)

R - see under preservation.

I - will make an effort to identify.

NL -

Tietjen, John J. (research, ecology, systematics, physiology)

Interested in culturing. See under Nematoda.

TARDIGRADA

Crowe, John H. (research, physiological ecology, systematics)

R - see under preservation.

I -

L - no indication.

Higgins, Robert P. (systematics, ecology)

See under Kinorhyncha.

McGinty, M. Maxine (systematics, physiology, ecology)

NR -

I? - no indication.

L? - no indication.

Pollack, Leland W. (general, research, systematics, ecology)

NR - have enough. Working on methods of culture.

NI - not yet feel qualified.

NL -

Sawtell, James J. (general, ecology)

NR -

NI - see under preservation.

NL - see under preservation.

ARTHROPODA - ARACHNIDA

- Newell, Irwin M. (research, systematics, general biology)
R - see under preservation. Interstitial mites.
I - " " " " "
L -

ARTHROPODA - OSTRACODA

- Hulings, Neil C. (administration, research, systematics, ecology)
R - depends on locality. See under preservation.
I - see under preservation.
L -

- Williams, Roger B. (general, zoology, systematics)
NR - not at present. As a paleontologist I am interested in
Recent fauna in its clue to the past.
I -
NL -

ARTHROPODA - MYSTACOCARIDA

- Hessler, Robert R. (systematics, morphology, evolution)
R - see under preservation.
I - " " "
NL -
- Zinn, Donald R. (research, systematics, ecology)
R - would appreciate correspondence before specimens are
forwarded. See under preservation.
I - must be contacted first. See under preservation.
L -

ARTHROPODA - COPEPODA

- Coull, Bruce C. (research, ecology of meiofauna of the Bermuda platform)
NR - interested in Harpacticoida.
NI -
NL -
- Zinn, Donald R. (research, systematics, and ecology)
See under Mystacocarida. Same for harpacticoid copepods
and cyclopoid copepods.

ARTHEROPODA - CIRRIPIEDIA

- Ross, Arnold (research, systematics both Recent and fossil)
R - will accept all but parasitic forms (rhizocephalans).
See under preservation.
I - not parasitic forms. See under preservation.
NL -

ARTHEROPODA - AMPHIPODA

Bousfield, Edward L. (research, administration, systematics,
marine ecology)

- R - Talitridae, Gammaridae, Haustoriidae. North America
world-wide. See under preservation.

I - See under preservation.
NL -

Crocker, Robert A. (research, ecology, systematics)

- R - Family Haustoriidae only. See under preservation.

I - for Amphipoda only.- See under preservation.

NL - see under culture.

Dexter, Deborah M. (general, research, ecology, community
structure, population dynamics)

- NR - see under ecology. Interested in hausteriid amphipods.

NI -

NL -

MOLLUSCA

Culliney, John L. (general, research, ecology, geology)

NR - research on the culture of larvae of bivalve molluscs.

NI? - no indication

Russell, Henry D. (systematics, ecology)

R - see under preservation.

I - preferably New England but others also. See under preservation.

NL -

ECTOPROCTA and ENTOPROCTA

Schopf, T. J. M. (research, systematics, biology)

NR -

I - see under preservation

NL -

CHORDATA - PISCES

Dawson, C. E. (systematics, distribution)

R - especially interested in microdesmid fishes but other
burrowing or burrow-inhabiting forms equally welcome.
See under preservation.

I - see under preservation.

NL -

MICROBIOLOGY

Lee, John J. (research, physiological ecology)

NR - interest in unicellular Algae and Protozoa. See under cultures.

NI? - did not indicate.

L - see under culture.

Levandowsky, Mike (general, research, ecology)

NR - interest in Protozoa, Bacteria, Algae. See under culture.

NI -

NL -

ECOLOGY - primary interest in ecology. No special taxon indicated
or taxon indicated in addition as noted.

Sister Bonaventure (general, ecology)

Would like specimens for class work as they are hoping to start
a marine center near the College of New Rochelle.

Brenowitz, Harry (research, ecology)

Culliney, John L. (general, research)

Research is in larval estuarine ecology. See also under Mollusca.

Dexter, Deborah M. (general, research, ecology)

Community structure and population dynamics; sandy beach
community studies. See also under Amphipoda.

Found, Bruce W. (general, ecology)

Kirby-Smith, William W. (general, ecology, physiology)

Kline, Gheretein (research, ecology)

Kritzler, Henry (ecology)

Pennak, Robert W. (general, ecology)

General interest in meiofauna expressed:

Iilg, Paul L. (general)

Schmitt, Waldo L. (general)

Interest in promotion of the study of interstitial faunas.

Would like to see representative sets of named forms deposited in the U.S. National Museum.

Urhammer, Bjorn (general, research)

Interest in reproduction and development.

Wallen, I. E. (administration)

Research on specimen processing. All meiofauna.

Part II

STORAGE AND SHIPMENT OF PSAMMON

by Donald J. Zinn

For storage of psammic specimens it has been found that used empty dental procaine, xylocaine, novocaine, etc., carpules or cartridges are quite serviceable and are ordinarily procurable for the asking from one's dentist who usually discards them after use. These carpules are small glass tubes, 7/8 in. x 9 mm. o.d., with rubber stoppers at each end. One or both stoppers may be removed and absorbent cotton substituted, and the tubes may then be stored in groups in variously-sized, cotton-based, plastic-topped, screw- or snap-cap type jars. Lettering on the tubes may be removed by soaking them in 2% KOH from 1/2 hour to an hour.

Shipping of psammic specimens in these carpules or larger vials may be accomplished by embedding these containers wholly or in part in cellular polystyrene blocks. These should be cut into convenient size with knife or hacksaw and drilled to the required size and length with a cork borer or a machine drill for holes to house individual carpules. The blocks may be labeled with an oil base paint.

Tubes may be purchased from Proco-Sol Chemical Company, 5742 Market Street, Philadelphia, Pennsylvania. Extra rubber stoppers (unwaxed and unlubricated) may be purchased from same source. Styrofoam may be obtained from Star Band Company, Broad and Commerce Streets, Portsmouth, Virginia.

Ref. Yunker, C. E. 1959. An improved method for storage and shipment of small invertebrate specimens. Turttox News 37 (12):294-295.

PRESERVATION AND CULTURE OF ANIMALS

PROTOZOA - CILIATA

Borror, Arthur C.

Preservation: Nissenbaum's method (Science 118:31-32) followed by usual staining methods; "wet silver method" (Corliss, J.O. 1953. Stain Technology 28:97-100)

Culture: "anyone who can answer this one concisely should write it up."

Lippold, Francis Theodore

Preservation: may be necessary to narcotize contractile protozoa before fixing; concentrate by centrifuging, Schaudinn's fluid at 50°C for 5 minutes, add an equal amount of 85% alcohol, recentrifuge, decant fixative, wash several times with 70% alcohol and store in 70% alcohol. See in Humason, G.L. 1962. Animal Tissue Techniques. W.E. Freeman and Company. pp. 384-5. A smear technique good for concentrating before fixation is given in Kudo, Richard R. 1954. Protozoology. Charles C. Thomas. pp. 894-5.

Culture: Brandwein's solution (artificial pond water) buffered to pH 6.8-7.5, add 0.5 grams yolk paste to 500 ml of solution, let stand 1 day before inoculating, incubate at 18-22°C. The decaying body of a small aquarium fish may be added as Spirostomum seems to thrive in decaying fish bodies; or a pinch of raw fish or hamburger might be tried. A spring water hay infusion is also recommended: about 10 grams of hay, several cooked wheat grains, pinch of soil per liter of spring water; keep pH close to neutrality (Schwab, Joseph J. 1963. Biology Teachers Handbook. John Wiley and Sons, Inc.)

Small, Eugene B.

Preservation: Hollande's or Champy's fixative followed by DeFano's preservative (Corliss, J.O. 1953. Stain Technology 28:97-100)

Culture: "methods of culture for psammobiotic ciliates are still unknown in the literature."

PROTOZOA - FORAMINIFERA

Lee, John J.

- Culture: Lee et al. 1966. J. Protozool. 13:659-670.
Lee et al. 1963. Micropaleontol. 9:449-466.

COELENTERATA (CNIDARIA)

Lytle, Charles F.

- Preservation: 10% formalin (Wagstaffe, R. and J.H. Fidler.
1955. The Preservation of Natural History Specimens.
Witherby, London. pp. 18-24

PLATYHELMINTHES - TURBELLARIA

Bush, Louise

- Preservation: any standard fixative for histological work
(Bouin's is satisfactory). Formalin and alcohol can be used.
Large specimens should be narcotized to prevent excess curling.
Culture: no special methods for marine species have been
developed but eggs hatch and animals survive for weeks in
small culture dishes with sea water, appropriate substrates, and
food (mixtures from habitat where species is collected). For
fresh water species see Needham, James G. chmn. 1937. Culture
Methods for Invertebrate Animals (paperback), Dover
Publications. pp. 148-156.

PSAMMONALIA - PAMMUCOLA

Chandler, Clay M.

Preservation: kill with 1% nitric acid, fix in Zenker's fluid (or saturated mercuric chloride with glacial acetic acid added) for 24 hours, wash for 24 hours in H₂O, into 30% alcohol, 70% alcohol and iodine, preserve in 70% alcohol.

Culture: keep in refrigerator at 10°C in spring, lake, or stream water. Feed fresh beef liver once or twice weekly; change water and clean container at each feeding. See Hyman, L.H. in Needham, James G. *chem.* 1937. *Culture Methods for Invertebrate Animals* (paperback), Dover Publications. pp. 154-158.

NEMATODA

Hasbrouck, Edward R.

Preservation: relax in cold at $\pm 5^{\circ}\text{C}$ and preserve with 5% formalin.

Hope, William Duane

Preservation: Relax by formalin vapor exchange method. Fix in 7% commercial formalin in sea water. Avoid fixation in alcohol if at all possible.

Hopper, Bruce

Preservation: heat-relax in oven at 55°C and preserve in 5% formalin.

Culture: little known for marine forms.

Murphy, D. G.

Preservation: a) heat relaxation 48°C to 10 minutes;
b) fixation (sea water) and preservation (fresh water) in neutral formalin (4%).

Tietjen, John H.

Preservation: relaxation at 55°C for 20 minutes; fixation in 5-10% sea water formalin (buffered if possible).

Culture: can easily be maintained in Erlenmeyer flasks with algae and some detritus.

GASTROTRICHA

Friauf, James J.

Preservation: relax carefully in 6% $MgCl_2$ in sea water (dilute sea water containing the gastrotrichs with approximately equal volume of 6% $MgCl_2 \cdot 6H_2O$); leave no longer than absolutely necessary and fix with 10% neutral formalin. Neutral buffered formalin with pH 7.0 may be prepared as follows:

Formalin (37-40% formaldehyde)	100 cc
Sea water (but distilled water may be used)	900 cc
Acid sodium phosphate, monohydrate $NaH_2PO_4 \cdot H_2O$.	4 gm
Anhydrous disodium phosphate Na_2HPO_4	6.5 gm

Culture: "for marine gastrotrichs are not yet well established. However, it is possible to keep many species alive for as long as six weeks merely by allowing them to remain in the original sand collection. I collect about a 2-inch volume of sand in the bottom of a pint canning jar, covered by a 2-inch layer of sea water. The lids may be placed on the jars for transportation to the lab (a period of a day or two if necessary). In the lab the tops are taken off and the water aerated for a time, then the lids are so placed on the jars as to allow oxygen to enter, but not too much evaporation to proceed. The sea water covering the sand should be renewed about once a week. Many other interstitial taxa also keep well this way.

"I have had very good results in culturing some fresh water chaetonoid gastrotrichs in Sonneborn's lettuce infusion." See Needham, James J. chmn. 1937. Culture Methods for Invertebrate Animals. Comstock Publishing Co. p. 121.

Hawkes, Joyce A.

Preservation: for marine or estuarine species narcotize in $MgCl_2$, fix in Bouin's or osmium tetroxide, preserve in 70% alcohol.

Culture: presently working on culture methods for Turbanella sp., an estuarine species from the Chesapeake Bay area.

Hummon, William D.

Preservation: see Zinn, D.J. and I.R. Kneeland.

Trans. Amer. Microscop. Soc. 85:320-321.

Culture: Lepidodermella squammata available from Carolina Biological Supply, Burlington, N.C. and Gladstone, Oregon and from Conn. Valley Biological Supply, Southampton, Mass. For methods see Dougherty, E.C., "Cultivation of Aschelminths, especially Rhabditid Nematodes" in: J.N. Sasser and W.R. Jones. 1960. Nematology. U. of North Carolina Press, Chapel Hill. pp. 297-313.

Tietjen, John E.

Culture: interested in culturing as many meiofauna groups as possible.

KINORHYNCHA

Boykin, John C.

Preservation: 4% formaldehyde (10% formalin) in sea water.

Culture: none known.

Czikowsky, Janice L.

Preservation: 70% ethyl alcohol.

Higgins, Robert P.

Preservation: 5-7% buffered formalin preferred but 70% ethanol is satisfactory.

Culture: no method available.

ANNELIDA

McCauley, Victor J. E.

Preservation: Preferably Bouin's picro-formal fixative:

Picric acid (saturated solution preferably in sea water)	75 parts
Formalin	20 parts
Glacial acetic acid	5 parts

Fix 4-16 hours, wash in 5% ETOH (or treat with lithium carbonate) until all traces of yellow have disappeared.

Simon, Joseph L.

Preservation: relax in 0.15% propylene phenoxytol in sea water for 5 minutes; fix in 10% formalin or Bouin's.

Taylor, John L.

Preservation: cool and slowly kill using 5% formalin; preserve in 70% alcohol.

TARDIGRADA

Crowe, John H.

Preservation: marine forms may be washed out of the sand by the mix and decant method and fixed in ethanol.

Higgins, Robert P.

Preservation: 5% buffered formalin preferred but 70% ethanol is satisfactory.

Culture: primarily for a few marine species and a few on various algal substrates. See

Baumann, H. 1961. Der Lebesablauf von Hypsibius (H.) convergens Urbanowicz (Tardigrada). Zool. Anz. 167:362-381.

_____, 1964. Über den Lebenslauf und die Lebensweise von Milnesium tardigradum Doyère (Tardigrada). Veröff. Überseemus. Bremen 3:161-171.

_____, 1966. Lebenslauf und Lebensweise von Hypsibius (H.) oberhaeuseri Doyère (Tardigrada). Ibidum 3:245-258.

Dougherty, E.C. 1964. Cultivation and nutrition of micro-metazoa. 11. An antarctic strain of the tardigrade Hypsibius arcticus (Murray, 1907) Marcus, 1928. Trans. Am. Microsc. Soc. 83:7-11.

Pollock, Leland W.

Culture: hope to add something here by end of present research.

Sawtell, James J.

Preservation: see Pennak, Robert W., Fresh-Water Invertebrates of the United States, Ronald Press Company, 1953, p. 251.

Culture: also in Pennack, p. 251.

ARTHROPODA - ARACHNIDA

Newell, Irwin M.

Preservation: 65% alcohol.

ARTHROPODA - CRUSTACEA

Bousfield, Edward L.

Preservation: for amphipods 5% formalin, 70% alcohol or 40% isopropyl alcohol.

Crocker, Robert A.

Preservation: 5% formalin buffered with hexamethylenamine (1 lb/gal).

Culture: "I have maintained haustoriid amphipods successfully simply by placing them in finger bowls with a shallow (1/2 inch) sand layer and by changing the sea water every other day. Detrital material from intertidal sand can be used as food. I have successfully brought along 2 broods of Neohaustorius schnitzi in this way."

Hessler, Robert R.

Preservation: alcohol.

Hulings, Neil C.

Preservation: 70% alcohol.

Ross, Arnold

Preservation: 70% ethanol or 34-40% isopropanol.

Zinn, Donald J.

Preservation: 7% formalin or 70% alcohol.

"In making preparation of the parts of interstitial cyclopoids and harpacticoids for study, it is often found that dissections may be made more easily in a drop of glycerin or glycerin jelly on a glass slide (warmed glass slide in the second case). Dissecting needles can be made by mounting No. 12 English needles or "minuten nadeln" in short lengths of slightly tapered glass tubing with DeKhotinsky cement or other hard setting sealing wax. These may be ground either to a very fine point or as a scalpel on a fine carborundum stone. An hour in Fast Green in 70% ethyl alcohol has been used for staining the copepods before dissection. If a few drops of Bouin's fixative is added to the Fast Green the resultant yellowish cast helps in distinguishing the fine setae.

"Permanent mounts may be made either by mounting the appendages in order in Hoyer's fluid or in Monk's syrup-pectin mixture, dried overnight in a 60°C oven, covered with euparal, and topped with a No. 1 15 mm round or square cover slip. After drying the coverslips may be sealed with two layers of colored nail polish, different colors being used for separate taxa.

"In transferring copepods from one solution to another the .5 mm stainless steel loop (Cat. 3710 Transfer Loop by Science Craft, Box 5165 Ballard Station, Seattle, Washington 98107) is often more helpful than a micropipette."

Refs.: Monk, C.R. 1938. An aqueous medium for mounting small objects. Science 88:174.

Monk, C.R. 1941. Marine harpacticoids from California. Trans. Amer. Micros. Soc. 60:76.

MOLLUSCA

Russell, Henry D.

Preservation: 70% alcohol or 10% formaldehyde.

ECTOPROCTA and ENTOPROCTA

Schopf, T. J. M.

Preservation: alcohol.

CHORDATA - PISCES

Dawson, C. E.

Preservation: in 5-10% formalin; if time permits eels and microdesmids should be fixed in an extended or straightened position.

MICROBIOLOGY

Lee, John J.

Culture: a series of articles on the culture of forams:

Lee et al. 1963. Micropaleontol. 9:449-466.

_____. 1966. Jo. of Protozool. 13:659-670.

Levandowsky, Mike

Culture: "the more one dilutes standard biological media
the better."

Part III

ALPHABETICAL LIST OF PARTICIPANTS WITH ADDRESSES

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REVISION

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A future issue will include revisions of Parts I and II.

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