

ZOOLOGY

Pogonophoran Phylogeny

from a Correspondent

THE first international symposium on Pogonophora, which took place in the University of Copenhagen on November 1-3, had as its main topic the evolution and phylogeny of the group, but the discussions covered all aspects of the biology of these enigmatic deep-water benthic invertebrates. The symposium was organised by A. Nørrevang, with financial assistance from the Danish Research Council.

On the first day there were informal discussions and demonstrations of material, including some live animals brought along from the Norwegian fjords by T. Brattegaard (University of Bergen Biological Station). The second day, under the chairmanship of J. B. Kirkegaard (University of Copenhagen), started with some very intriguing ideas of his colleague H. Lemche on the embryology and phylogeny of the main

invertebrate groups. E. B. Cutler (University of Syracuse, Utica) then reviewed the occurrence of supposed protostomian and deuterostomian characters in Pogonophora and suggested that the group should be regarded as related to forms ancestral to both of these major subdivisions of the Eumetazoa. J. van der Land (University of Leiden) and A. Nørrevang reported on the morphology of a newly discovered Atlantic species of *Lamellibrachia* and suggested that this genus might be regarded as a subgroup of the Annelida. M. Webb (University of Durban, Westville) provided a thorough account of the excretory and genital systems of the Pacific species of *Lamellibrachia*, which he preferred to continue to regard as aberrant pogonophores. T. Bakke (University of Bergen Biological Station) briefly described the important early stages in the development of the artificially fertilised egg of *Siboglinum*; the cleavage could not be regarded as either spiral or radial.

At this stage in the session R. Siewing (University of Kiel) read a translation of a letter from A. V. Ivanov (Zoological Institute, USSR Academy of Sciences, Leningrad) regretting that he was prevented from attending, and announcing the discovery of some new facts on gastrulation in *Siboglinum*. E. Southward (Marine Biological Association, Plymouth) discussed the fine structure of the recently-discovered segmented and setate hind-end of *Siboglinum*, and traced its origin from the posterior segment of the larva, comparing the number of annelid characters and more general characters thus revealed. B. L. Gupta (University of Cambridge) and C. Little (University of Bristol) provided a far reaching and comprehensive account of many aspects of the fine structure of Pogonophora in comparison with other invertebrates, and pointed out the pitfalls awaiting the investigator trying to deduce relationships from functional morphology: Gupta finally expressed a doubt that pogonophores are coelomate animals at all. A. J. Southward (Marine Biological Association, Plymouth) summarised what had been found out or deduced about the feeding of these free-living yet gutless animals, and stressed the phylogenetic problems involved in the evolution of an epidermal mechanism of food absorption; he wondered what environmental conditions and selective pressure could lead to the loss of an existing internal digestive system.

Brattegaard then analysed the fauna associated with pogonophores, especially in the fjords; there seemed to be no consistent relationship between a pogonophore species and a single benthic community, though the organic content of the habitat seemed to be important as were abiotic factors such as temperature and particle size of the sediment.

The third day of the meeting, under the chairmanship of C. Nielsen (Marine Biological Laboratory, Elsinore), opened with some ideas of Siewing on phylogeny in relation to embryology and development of the coelomic cavity: the Pogonophora were placed well down the phylogenetic tree, close to the origin of the archicoelomates (Echinodermata and Lophophoria), with the Spiralia (for example, Annelida, Arthropoda) regarded as an offshoot of the main line of development.

At the final dinner, held at the Zoological Museum, Nørrevang was able to read the full abstract of Ivanov's intended paper, just delivered by express post. This confirmed a reassessment of the embryology of the group, no longer regarded as having radial cleavage, and it was suggested that Pogonophora form a separate group of the Eumetazoa, distinct from the Protostomia and Deuterostomia.

INSECTICIDES

Knockdown and Kill

from a Correspondent

NATURAL pyrethrins have been used extensively as insecticides partly because of their toxic properties but principally because of their rapidity of action—effects are observable in minutes against hours for chlorinated hydrocarbons. Doses applied topically cause uncoordination leading to knockdown of flies, mosquitoes and cockroaches. High doses cause death but at lower levels there may be recovery although this is usually prevented by the addition of a synergist such as piperonyl butoxide.

The advent of synthetic pyrethroids has stimulated further study into structure/activity relationships as these substances can occur as optical and geometrical isomers. 'Knockdown' was the subject of a symposium organised by the Biophysical and Physicochemical Panel of the Pesticides Group, Society of Chemical Industry, held on November 23.

P. E. Burt (Rothamsted Experimental Station) discussed the possibility of knockdown and kill being associated with different sites of action; in his view both actions are on the central nervous system and the peripheral nerves are not involved. This view was also taken by M. G. Ford (Portsmouth College of Technology) from a study of doses applied topically on the desert locust. A logarithmic plot of the time of 50% response against weight of applied dose gave linear relationships for kill and knockdown using the synthetic pyrethroids bioallethrin and bioresmethrin.

M. Elliot (Rothamsted Experimental

Station) discussed various synthetic pyrethroids in relation to knockdown and kill. Compounds with good knockdown are usually relatively poor as killing agents but their rapid action is probably due to a higher polarity which facilitates rapid penetration of the insect cuticle. Knockdown can be correlated with polarity, which is related to R_F values measured in appropriate chromatography systems.

J. Lhoste (Procida, Paris) related speed of knockdown of mosquitoes (*Aedes aegypti*) with the stereochemical structure of eight allethrin isomers. Test compounds were applied to a flat 'mosquito' coil of suitable composition, which burns slowly volatilising a substantial proportion of the insecticide. The most active isomer had the same stereochemical configuration as natural pyrethrins. J. C. Wickham (Wellcome Research Laboratories, Berkhamsted) emphasised the need for biological tests in the most realistic conditions possible in the laboratory and particular attention must be given to the size of aerosol droplets, the size of the test chamber and the adjuvant solvents in test against houseflies, mosquitoes and cockroaches; this supplemented Burt's earlier observation that there is a marked difference in effect on applying pyrethrin I in acetone to the ventral and dorsal surfaces of the housefly but no difference when the solvent is dodecane.

Moving away from pyrethroids, N. R. McFarlane (Shell Research) recorded studies on houseflies giving time and dose response curves of a closely related series of oxime carbamates. Using an analogue computer it is possible to construct models relating results to factors such as partition.