

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

BRYAN, G. W., 1964. The accumulation of radio-caesium by marine and brackish water invertebrates. *Proc. Symp. Nuclear Detonations mar. Radioactivity, Norweg. Defense Res. Estab.*, ed. by S. H. Small, pp. 85-93.

Laboratory experiments on the absorption by marine invertebrates of radio-caesium dissolved in sea water are discussed in relation to the potassium concentration of the animal, body size, temperature, and the inactive caesium and potassium concentrations of sea water. The smaller amount of information on the absorption by marine invertebrates of radio-caesium from food is then considered, and the laboratory findings compared with the results of field studies. It is concluded that information from laboratory experiments and field surveys should make possible reasonable predictions about the contamination of marine invertebrates if the level of activity in the sea water in particular environments is known or can be estimated.

G. W. B.

CLARKE, M. R., 1964. Young stages of *Lepidoteuthis grimaldi* (Cephalopoda, Decapoda). *Proc. malac. Soc. Lond.*, Vol. 36, pp. 69-78.

Two specimens of the 'scaled' squid *Lepidoteuthis grimaldi* are described. Changes associated with growth are discussed and the mantle wall structure is described with details of the 'papillae' of the juveniles and the 'scales' of the adults.

M. R. C.

CURRY, D., HERSEY, J. B., MARTINI, E. & WHITTARD, W. F., 1965. The geology of the western approaches of the English Channel. II. Geological interpretation aided by boomer and sparker records. *Phil. Trans. R. Soc. B.*, Vol. 248, pp. 315-51.

A geological map of about 1700 sq. miles of the sea-bed south of the Cornish coast between Bolt Head and Fowey was prepared by coring and dredging for rock samples; a boomer-sparker survey was then selected in relation to the supposed geology to fix more precisely the geological boundaries and to ascertain the geological structure of the rocks underlying the sea-bed, in this case to a depth of about 400 ft.

The acoustic apparatus is described; the records are interpreted according to mathematical analysis and the probable limits of inaccuracy assessed.

Rock samples are described lithologically and the microfossils identified in all productive cases to give the stratigraphical ages. In some samples radiometric determinations have been made of the ages of the metamorphism of 'gneisses' and slates. All contacts are unconformable between the following major divisions: Metamorphic Complex, ? Devonian, New Red Sandstone, Upper Cretaceous, Eocene; the base of the Lias is unknown but these rocks form an inlier and are unconformably surrounded by the Upper Cretaceous. Pre-Santonian, Campanian, Lower and Upper Maestrichtian are recognized; Danian appears conformable to the Maestrichtian but is included in the Tertiary although it is unconformably succeeded by Eocene; there is presumptive evidence of ?Oligocene in one cored sample.

True-scale sections drawn along the course of the ship using corrected apparent dips and applying different velocities to different rock-types gave the following approximate thicknesses: New Red Sandstone, 3100 ft.; Lower Jurassic, greater than

640 ft. (base not seen); Upper Cretaceous, 1225 ft., comprising Pre-Santonian 75 ft., Santonian 175 ft., Campanian 375 ft., Maestrichtian 600 ft.; Danian, 375 ft., Eocene, greater than 430 ft. (top not seen).

In this particular combined experiment the boomer-sparker equipment has proved invaluable in correcting geological boundaries, in determining geological structure which with present coring methods at sea is almost impossible to detect, and in providing reasonably reliable figures of the thickness of major stratigraphical divisions. These two geological and geophysical investigations are mutually complementary and, with much greater energy output than was used in 1960, the promise is great for the determination of geological structure many thousands of feet below the sea-bed.

W.F.W.

MARTIN A. L., 1964. The alimentary canal of *Marinogammarus obtusatus* (Crustacea, Amphipoda). *Proc. zool. Soc. Lond.*, Vol. 143, pp. 525-44.

The functional morphology of the alimentary canal of *Marinogammarus obtusatus* Dahl is described, with particular reference to the proventriculus and the digestive gland. The proventriculus is a device (1) for the mastication of food, (2) for retaining it while it is being broken up and acted upon by enzymes, and (3) in which provision must be made to convey enzymes forward into the cardiac region and digested food backwards to the digestive gland. Finally, there must be a valvular device to direct undigested food past the ducts leading to the digestive gland and into the intestine.

The proventriculus of *M. obtusatus* is compared with that of mysids and isopods and it is concluded that modifications of the fore-gut in various malacostracan groups are likely to be adaptations to differences in food and feeding habits.

There is no clear functional distinction between the so-called secretory and reserve cells of the digestive gland, both of which secrete enzymes, absorb and store food.

A. L. M.

PILGRIM, R., 1964. Observations on the anatomy of *Squilla mantis* Latr. (Crustacea, Stomatopoda). *Pubbl. staz. zool. Napoli*, Vol. 34, pp. 9-42.

The skeleton of the trunk is described with particular emphasis on the internal aspect. Giesbrecht's earlier account is shown to be inadequate or incorrect in some details and alternative interpretations are offered as to the serial homology of some structures. The dorsal axial muscles are mostly segmentally arranged, especially in the abdomen, but some of the larger muscles show a tendency to form a functional continuum over several segments in a fashion resembling that in Decapoda. They are mostly extensor muscles, but some appear to subserve adduction-abduction movements. In the thorax the segmental arrangement of the deeper, larger muscles is profoundly modified in relation to the very modified skeletal anatomy of that region. Small muscles serving stretch receptor function still preserve a segmental arrangement. The central nervous system and particularly the major ganglionic roots are described in detail and a comparison of the distribution of the branches of these roots shows that, although there are three roots to each segmental ganglion, these are not homologous with the three roots of Decapoda. Stretch receptor organs were found to exist in one more (anterior) segment than had previously been described, so that *Squilla* possesses these organs in the same number of segments as in Decapoda. In contrast to the latter, *Squilla* has only one N-cell (the most anterior organ), the remainder all possessing receptor muscles.

R. P.

SOUTHWARD, A. J., 1964. Limpet grazing and the control of vegetation on rocky shores. In CRISP, D. J. (ed.): *Grazing in Terrestrial and Marine Environments*, pp. 265-73. The British Ecological Society, Symposium Number Four. Oxford: Blackwell Scientific Publications.

The common limpet (*Patella vulgata*) uses a rasping radula to scrape algal food from the rocks. The effects of this feeding have been studied by removal of limpets from marked areas and by following the fate of the subsequent growths of vegetation for several years. Laboratory observations have also been made on the rate of feeding on algal films on aquarium glass and on the movements of the feeding limpet. The results suggest that a cyclic relationship exists between limpets and the algae on the shore; the point at which the cycle is temporarily stabilized is influenced by other factors, of which wave-action is the most important.

Limpets (and other gastropods) remove rock particles when feeding and contribute significantly to erosion of rocky shores.

A. J. S.

SOUTHWARD, A., 1964. The relationship between temperature and rhythmic cirral activity in some Cirripedia considered in connexion with their geographical distribution. *Helgoländer wiss. Meeresunters.*, Bd. 10, pp. 391-403.

Barnacles can tolerate quite a wide range of temperature without being killed, but are fully active only within relatively narrow limits; these limits appear to be most important in determining the fitness of a species to its distribution and the extent of competition between species. In experiments carried out during the last ten years on a variety of species from European and American habitats activity has been measured as rate of rhythmic beating of the cirri, a temperature-dependent process which is an index to general metabolic rate. It has been possible to show the existence of subspecies or physiological varieties in some apparently widespread species, and to confirm or deny previous assumptions made on morphological grounds as to the validity of species or other taxa. In a few widespread species little latitudinal or temperature adaptation was found compared with differences related to tide-level, habitat and age. The results are taken to emphasize the importance of physiological data in taxonomy as well as the need for systematic exactness in physiology.

A. J. S.

SPENCER, C. P., 1964. The estimation of phytoplankton pigments. *J. Cons. perm. int. Explor. Mer.*, Vol. 28, No. 3, pp. 327-34.

A long-term comparison of the performance of millipore and glass-fibre filter papers for collecting natural populations of marine phytoplankton organisms prior to pigment analysis has shown that, especially during blooms of centric diatoms, collection by millipore filters frequently causes significantly lower results than collection on glass-fibre filters. These effects seem to be caused by the material of the millipore filter, which when dissolved or dispersed in the acetone affects the efficiency of extraction of the pigments.

On the other hand, there is some evidence that when large amounts of small phytoplankton organisms are present losses can occur if glass-fibre papers are used. In these cases the use of membrane filters which are insoluble in acetone is advocated. When populations do not include significant proportions of the smallest forms, however, the use of glass-fibre filter papers is satisfactory and convenient.

C. P. S.

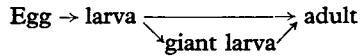
WICKSTEAD, J. H., 1964. Acraniate larvae from the Zanzibar area of the Indian Ocean. *J. Linn. Soc. (Zool.)*, Vol. 45, pp. 191-9.

Four acraniates were recorded: a single adult *Asymmetron cultellus*, larvae of this species, *Amphioxides pelagicus* var. *stenurus* and *Am. valdiviae*. Larval identification is discussed, myotome and gill-slit counts are figured and a statistical analysis of the dorsal fin length/total length and post-anal length/total length relationships shown. The adult of *Am. pelagicus* var. *stenurus* is suggested as being *Asymmetron lucayanum*, that of *Am. valdiviae*, *As. parvum*. The distribution of these three larval species in the Indian Ocean is discussed, the conclusion being that all three will be found in the general area of the East Indies and northern Australian waters, Chagos Archipelago, Seychelles, Zanzibar, Laccadives and Ceylon. Distribution will be by the surface current systems carrying the larvae across and around the northern Indian Ocean.

J. H. W.

WICKSTEAD, J. H., 1964. On the status of the 'amphioxides' larva. *J. Linn. Soc. (Zool.)*, Vol. 45, pp. 201-7.

The relationship of the amphioxides larva with the amphioxus larva is discussed. The hypothesis suggested is that: (1) there is no longer a valid reason for maintaining the term 'amphioxides type' larva; (2) what were considered to be amphioxides larvae come within that category of planktonic animals known as giant larvae; (3) acraniate development is according to the sequence



the capacity for developing into a giant larva being present in all species; (4) both branchiostomids and asymmetrontids have the same form of small larva, differences being apparent only in giant larvae which possess gonads; (5) adults developed from giant larvae will differ slightly from adults developed from small larvae due to the development in the giant larvae of adaptations for a prolonged pelagic existence, e.g. a slight increase in the post-anal myotome number. *Branchiostoma nigeriense* and *B. takoradii* are suggested as examples of this.

J. H. W.