

## ABSTRACTS OF MEMOIRS

### RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

BONEY, A. D., CORNER, E. D. S. & SPARROW, B. W. P., 1959. The effects of various poisons on the growth and viability of sporelings of the red alga *Plumaria elegans* (Bonnem.) Schm. *Biochem. Pharmacol.*, Vol. 2, pp. 37-49.

Mercury, silver, copper and arsenic are more toxic than the non-metallic inhibitors hydrocyanic, hydrazoic, iodoacetic, fluoroacetic and malonic acids and 2:4-dinitrophenol to sporelings of *Plumaria elegans* in sea water at pH 8.1. Mercury and silver are more toxic than copper and arsenic, and the toxicities of mercury and arsenic are greatly increased when these poisons are used as lipophilic organic compounds (e.g. phenylmercuric chloride and phenarsazine chloride). All heavy metals are less toxic when used in the presence of reduced glutathione.

The toxicities of an homologous series of primary *n*-alkyl-mercuric chlorides increase to a maximum with that of *n*-C<sub>5</sub>H<sub>11</sub>HgCl. Lipoid solubilities based on methyl-oleate: sea-water partition coefficients correlate with appropriate toxicity data for the first three members of the series, but those of *n*-C<sub>4</sub>H<sub>9</sub>HgCl and *n*-C<sub>8</sub>H<sub>17</sub>HgCl increase without any corresponding rise in toxicity. The 'cut-off' in relative toxicities within the homologous series is not found in complementary experiments with crustaceans.

Mercuric iodide is much more toxic than HgCl<sub>2</sub> to *Plumaria* and crustaceans, but whereas various organic compounds of mercury become markedly more toxic to crustaceans when used in the presence of excess KI, their toxicities to *Plumaria* are not increased.

E.D.S.C.

BURSA, A. S., 1959. The genus *Prorocentrum* Ehrenberg. Morphodynamics, Proto-plasmatic Structures and Taxonomy. *Canad. J. Bot.*, Vol. 37, pp. 1-31.

The morphodynamics of *Prorocentrum* have been studied comparatively in cultures and in plankton. Plankton populations show little morphological variation. In cultures a variety of forms, often similar to other species of *Prorocentrum* which have been described from distant seas, are found. Morphological variation in *Prorocentrum* species depends upon various life phases, individual features of the clones, and various types of cysts. Formation of the morphological aberrants is also affected by ageing of cultures. All protoplasmatic structures, including the cell membrane, possess their own particular features, changing in course of life cycle. Since both physiological and morphodynamic metabolisms are inseparable in their activities, it is useful to complete taxonomic diagnoses with physiological observations. Five new species are described: *Prorocentrum cordiformis*, *P. pomoides*, *P. pyrenoideum*, *P. redfieldi* and *P. levantinoideum*. Morphodynamics in *P. micans* and *P. scutellum* was also studied. Most observations were made *in vivo*. Specific morphological differences in form and structure of protoplasmatic organelles were demonstrated in each species concerned. An attempt was made also to base taxonomic diagnoses upon the apical tooth, trichocysts, and membrane structure.

A.S.B.

CARLISLE, DAVID B., 1959. On the neurosecretory system of the brain and associated structures in *Sipunculus nudus*, with a note on the cuticle. *Gunma J. med. Sci., Maebashi*, Vol. 8, pp. 183-94.

In *Sipunculus nudus* a pair of dorsally situated postero-lateral groups of neurosecretory cells in the brain contain each about thirty large cells. The axons run forward to the unpaired sensory organ, a cavity in the brain connected to the mouth region by a ciliated canal. Here the axons make abrupt loops among the sensory cells of this organ and then run into the finger organs, where they terminate in typical neurohaemal endings, vertical to the blood space surrounding the organs. These club-shaped endings are filled with a secretion which has staining properties different from those of the material found more proximally in the axons and cells. The likeness of this system to the hypothalamo-hypophysial system of vertebrates and to the major endocrine systems of crustaceans and insects is emphasized.

The cuticle consists of protein with no trace of chitin or mucopolysaccharides.

D.B.C.

CARLISLE, D. B. & ELLIS, PEGGY E. 1959. La persistance des glandes ventrales céphaliques chez les Criquets solitaires. *C.R. Acad. Sci., Paris*, T. 249, pp. 1059-60.

The ventral glands of locusts, which are homologous to the prothoracic glands of Lepidoptera and probably to the Y-organs of crustacea, normally disappear in the adult insect. In locusts in the solitary phase, however, they may persist in a functional condition.

D.B.C.

COOPER, L. H. N., 1957. Some chemical and physical factors controlling the biological productivity of temperate and tropical oceanic waters. *Proc. 8th Pac. Sci. Cong.* 1953, Vol. IIIA (received by the author 1959).

Differences in conditions of productivity in tropical and temperate latitudes were discussed. A pattern for observation and experiment in tropical seas was proposed. Much of the material in the paper has now only historic interest.

L.H.N.C.

CORNER, E. D. S., 1959. The poisoning of *Maia squinado* (Herbst) by certain compounds of mercury. *Biochem. Pharmacol.*, Vol. 2, pp. 121-32

When *Maia* is immersed in sea water containing added  $\text{HgCl}_2$ , the concentration of the poison in the blood eventually rises above that in the external medium; the concentration in the antennary glands above that in the blood; and the animals excrete small but increasing amounts of mercury in the urine. Most of the poison present in the blood is attached to protein and the concentration of mercury in the blood remains constant for several weeks after poisoned animals are returned to the sea. Mercury also concentrates in various other body tissues, and very large amounts are found on the gills. Similar results are obtained when the poison is administered to the animals by injection. When, however, the poison used is  $n\text{-C}_5\text{H}_{11}\text{HgCl}$ , although mercury again concentrates at the gills and in various internal organs, the amount detected in the blood is very small and none is found in the urine.

When the animals are immersed for progressively longer times in sea water containing added  $\text{HgCl}_2$ , or are injected with increasing amounts of the poison, the total quantity of amino-N in the urine increases, although that in the blood remains constant. The urine : blood ratio of amino-N also rises when the animals are poisoned with  $n\text{-C}_5\text{H}_{11}\text{HgCl}$

although, in this case, the level of amino N in the blood rises as well as that in the urine. Animals poisoned with  $\text{HgCl}_2$  and then returned to the sea show an abnormally high urine: blood ratio of amino-N several weeks later. By contrast, poisoning with  $\text{HgCl}_2$  has no effect on the urine: blood ratio of total sulphate.

E.D.S.C.

LOWENSTEIN, O. & WERSÄLL, J., 1959. A functional interpretation of the electron-microscopic structure of the sensory hairs in the cristae of the elasmobranch *Raja clavata* in terms of directional sensitivity. *Nature, Lond.*, Vol. 184, pp. 1807-8.

An electronmicroscopic study of the sensory epithelia in the ampullae of the semi-circular canals of the labyrinth of *Raja clavata* showed that the hair processes of the sensory cells are compound structures consisting of a number of protoplasmatic filaments, one of which has the typical electron-microscopic structure of the kinocilium, namely nine peripheral plus two central longitudinal fibrillae. This kinocilium is always found on one and the same side of the hair process in a given sensory epithelium and is placed on that side of the sensory hair process which faces in the direction in which the hair process is deflected on excitatory cupula displacement. It appears that this arrangement may be of fundamental functional significance.

O.L.

POTTS, W. T. W., 1959. The sodium fluxes in the muscle fibres of a marine and a freshwater lamellibranch. *J. exp. Biol.*, Vol. 26, pp. 676-89.

The efflux of  $^{24}\text{Na}$  from the isolated ventricles of *Mytilus* and *Anodonta* has been measured at  $15^\circ\text{C}$  and at  $5^\circ\text{C}$ . The efflux of sodium in each case is divisible into an extracellular and an intracellular portion except at  $15^\circ\text{C}$  in *Anodonta* where the two portions are not clearly distinguishable. The mean rate constant for the efflux of sodium from *Mytilus* ventricle is  $2.44\text{ h}^{-1}$  at  $5^\circ\text{C}$  and  $5.6\text{ h}^{-1}$  at  $15^\circ\text{C}$ . The mean rate constant for *Anodonta* ventricle at  $5^\circ\text{C}$  is  $4.6\text{ h}^{-1}$ . The efflux of sodium from the muscle fibres of *Mytilus* ventricle averages  $12 \times 10^{-6}\text{ mm/cm}^2/\text{sec}$  at  $5^\circ\text{C}$  and  $27 \times 10^{-6}\text{ mm/cm}^2/\text{sec}$  at  $15^\circ\text{C}$ . For *Anodonta* at  $5^\circ\text{C}$  it averages  $3.1 \times 10^{-6}\text{ mm/cm}^2/\text{sec}$ . If the efflux is maintained entirely by an active process then the energy required for the extrusion is  $0.26\text{ cal/g/h}$  at  $5^\circ\text{C}$  and  $0.63\text{ cal/g/h}$  at  $15^\circ\text{C}$  for *Mytilus* muscle and  $0.046\text{ cal/g/h}$  at  $5^\circ\text{C}$  by *Anodonta*.

W.T.W.P.

WICKSTEAD, J., 1960. A new record of *Mytilicola intestinalis* Steuer, a parasitic copepod of mussels. *Nature, Lond.*, Vol. 185, p. 258.

Two mature female *Mytilicola intestinalis* Steuer, 7.0 and 8.5 mm long, were recorded from a locality much removed from the limits of their accepted distribution. They were taken free in the plankton in the northern Malacca Strait area,  $7^\circ 12' \text{N}$ ,  $97^\circ 12' \text{E}$ . After various considerations, no satisfactory explanation could be given for their capture at such a place in such a manner.

J.W.

WICKSTEAD, J. H. & BONE, Q., 1959. Ecology of acraniate larvae. *Nature, Lond.*, Vol. 184, pp. 1849-51.

Several species of acraniate larvae were obtained during a survey of the Indo-Malayan plankton made by the Singapore Regional Fisheries Research Station. Larvae of *Branchiostoma belcheri* Gray were found at a permanent station in the Singapore Strait from mid-October to January. They showed diurnal vertical migratory movements, remaining on the sea-bottom during the day, and rising to the surface at dusk.

Examination of the gut-contents showed that feeding probably only takes place at the bottom. It is suggested that light intensity is the actuating stimulus for the migration (salinity and temperature variations being insignificant), and that it serves both to distribute the species and to enable the larvae to avoid the attacks of nocturnal bottom-feeding predators.

Larvae of *Branchiostoma malayana* Webb, and larvae of the 'amphioxides' type (but belonging to the Branchiostomidae) were obtained at another station, on the surface, at night. This station was over deep water, and examination of the gut contents showed that the larvae fed in mid-water, hence these species are probably truly pelagic, and never live near the bottom. At a third station, 'amphioxides' larvae of *Asymmetron lucayanum* Andrews were collected, which confirms the identification of *Amphioxides pelagicus* Gunther as the larva of *Asymmetron lucayanum*. Q.B.

## BOOK REVIEW

### DIE WESTKÜSTE SÜDAMERIKAS IM BEREICH DES PERU-STROMS

BY E. SCHWEIGGER

Heidelberg-München: Keyserische Verlagsbuchhandlung GmbH, 1959.

This comprehensive work has been written by a German who has spent thirty years studying the Peru current and its manifold influence on the neighbouring land, sea and air. Its greatest value may be as a critical digest of an enormous literature about the west coast, published in periodicals with limited circulation and mostly in Spanish. The task the author set himself was great and many chapters, naturally, do not cut deep. The author's personal interest has been in oceanography, entirely from a descriptive angle. The methods of dynamic oceanography have not been used. 'El Nino', the perturbation of the Peru current which brings death to myriads of fish and sea birds, is examined at length. It seems that much confusion surrounds the term and anyone wishing to use it would be wise to consult this book to find out what it means. The style is friendly and discursive. Anyone in search of a worth-while problem for study may find one on every page.

L.H.N.C.