

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

ATKINS, D., 1958. A new species and genus of Kraussinidae (Brachiopoda) with a note on feeding. *Proc. zool. Soc. Lond.*, Vol. 131, pp. 559-81.

A new species and genus, *Pumilus antiquatus*, of kraussinid brachiopod from shallow water, Lyttelton, New Zealand, is characterized by the possession of a schizolophous lophophore in the adult, supported by both divergent lamellae and spicules: the shell is smooth, less than 5 mm long and strongly sulcate. The gonad is hermaphrodite.

Pumilus is placed in the Kraussinidae for the following reasons: (1) the brachial skeleton resembles that of immature *Kraussina rubra*; (2) the presence of spicules in the lophophore; (3) similar arrangement of muscles to that in *Megerlia*.

The ciliary feeding mechanism is briefly described.

D.A.

BONE, Q., 1958. Synaptic relations in the atrial nervous system of amphioxus. *Quart. J. micr. Sci.*, Vol. 99, pp. 243-61.

The system of nerve-cells upon the gut and diverticulum of amphioxus (*Branchiostoma*) is described in detail; degeneration experiments were performed showing that these cells connect with the central nervous system by their own axons, running in the dorsal root nerves. Special attention is paid to the problems of the multi-nucleate nerve cells in the plexus, and to the possibility of asynaptic connexion between neighbouring nerve cells. No sheath cells have been observed upon the peripheral nerve fibres, either within the atrial plexus or upon the dorsal root nerve bundles.

It is suggested that the atrial system of nerve cells arises in ontogeny by emigration of cell bodies from the central nervous system; evidence is put forward supporting this suggestion.

The relation of the amphioxus visceral plexus to similar plexuses in craniates is discussed, and it is concluded that the system is not homologous with the enteric systems of nerve cells in the vertebrates.

Q.B.

BRUNET, P. C. J. & CARLISLE, D. B., 1958: Chitin in Pogonophora. *Nature, Lond.*, Vol. 182, p. 1689.

The tubes of three species of *Siboglinum* and of one species of *Zenkevitchiana* consist of protein and chitin as determined by the chitosan iodine test. Acid hydrolysis of the tubes yields about 10 amino acids and D-glucosamine, while enzymic degradation yields N-acetyl-D-glucosamine.

No trace of glucose was found in the hydrolysates, thus discounting the suggestion that the tubes consisted of cellulose.

D.B.C.

HILL, A. V. & HOWARTH, J. V., 1958. The initial heat production of stimulated nerve. *Proc. roy. Soc., B*, Vol. 149, pp. 167-75.

The work described was an extension of research previously done at the Plymouth Laboratory (Abstract in this *Journal*, Vol. 37, p. 807). In this it was shown that a single impulse in a crab's nerve at 0° C. is accompanied by a brief heat production followed

immediately by an absorption of heat. The present paper shows records of heat production during repetitive stimulation at different frequencies at 0° C. With 5 shocks/s the diphasic character of the heat production was very clearly shown. With 10 shocks/s the instruments were too slow to show it. At all frequencies the experimental records were identical with the corresponding curves calculated from a knowledge of the deflection produced by a single impulse. Above 12° C. the instrument could not resolve the diphasic heat production at any frequency.

Similar experiments were made at University College London using medullated nerve of the frog. There was no evidence of diphasic character in the heat production, but this could be due to the instruments being too slow to detect it. Analysis of records for repetitive stimulation at higher frequency located the 'initial heat' within 0.04 s of the stimulus.

J.V.H.

POTTS, W. T. W., 1958. The inorganic and amino-acid composition of some lamellibranch muscles. *J. exp. Biol.*, Vol. 35, pp. 749-64.

The sodium, potassium, and chloride content and the inulin spaces of a number of lamellibranch muscles have been measured and the intracellular concentrations of the ions calculated. The muscles examined were the large striated part and the slowest part of *Pecten* adductor, the fast and slow parts of *Mytilus* adductor and the anterior byssus retractor of *Mytilus*, the fast and slow parts of *Anodonta* adductors, and the ventricles of *Mytilus* and *Anodonta*.

The fast striated portion of *Pecten* adductor is similar in ionic composition to other striated muscles or to nerve. The intracellular concentrations of sodium and chloride are low and the potassium and chloride ions are approximately in Donnan equilibrium with the blood. The slower muscles contain much greater quantities of sodium and chloride ions and the potassium and chloride ions are not in Donnan equilibrium with the blood. The divergence from the equilibrium condition is greatest in the slowest muscles. The possible significance of these results is discussed and it is concluded that it is probable that both the potassium and the sodium ions are actively transported in the slow muscles of lamellibranch.

Analyses have also been made of the phosphate compounds and free amino acids in *Mytilus* and *Anodonta* muscles. *Anodonta* muscles contain about half the concentration of phosphate compounds that *Mytilus* muscles contain but only about 4% as much amino acids.

Mytilus muscles adapt to a 50% fall in blood concentration in part by osmotic swelling of the cells, in part by the loss of free amino acids. *Anodonta* muscles adapt to an increased concentration by the shrinkage of the muscle fibres, an increase in the sodium and chloride concentration in the cells and by an increase in the free amino acid content of the cells. In both *Mytilus* and *Anodonta* the potassium and phosphate content per cell remains relatively constant during osmotic changes.

W.T.W.P.