ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

Nitrogenous Excretion of Amphipods and Isopods

By E. I. B. Dresel and V. Moyle

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The nitrogen excretion of eleven species of amphipods and isopods, including marine, fresh-water and terrestrial forms, has been studied. All species are essentially ammonotelic, since more than 50% of the total soluble non-protein nitrogen of the excreta was present in the form of ammonia throughout. The level of nitrogen excretion is appreciably lower in the terrestrial species than in any of the others, indicating that, in this group, adaptation to terrestrial conditions has been attended by a general suppression of nitrogen metabolism rather than by a transformation to other, less toxic products.

Some 5–10% of the total soluble non-protein nitrogen was present as urea in the case of the fresh-water amphipod, *Gammarus pulex*, and as uric acid in the terrestrial isopods as well as the fresh-water isopod, *Asellus aquaticus*. It is suggested that these minor excretory components might originate from purines as a result of the loss of one or more uricolytic enzymes. In association with the excretion of uric acid some retention of this compound usually occurs, and it was found that the amount so stored in the terrestrial species parallels the degree of morphological and physiological adaptation to terrestrial conditions. The greatest accumulation of uric acid was, however, observed in the fresh-water species, *A. aquaticus*, and although such a storage cannot necessarily be taken as evidence for a partially uricogenic metabolism, this possibility must be borne in mind. E.I.B.D. & V.M.

The Effect of Stimulation on the Opacity of a Crustacean Nerve Trunk and its Relation to Fibre Diameter

By D. K. Hill

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It was known previously that the opacity of a crustacean nerve trunk undergoes a change when the nerve is stimulated. The present paper describes experiments for a further examination of the phenomenon. The effect is measured by making photoelectric recordings of the intensity of light scattered by the nerve. It was found that the opacity of the nerve is very sensitive to changes

in fibre diameter, brought about by altering the osmotic pressure of the solution. When the fibres swell the opacity decreases, when they shrink it increases: a quantitative relation can be obtained.

Under some conditions there may be an initial, transitory, increase in opacity following stimulation; but the main effect is a decrease, and recovery takes 10–15 min. On the basis of known figures for ionic movements across a nerve membrane it is argued that this change in opacity is attributable to an increase in fibre diameter.

The dependence of opacity upon fibre size has been made use of in studying the permeability of the fibre membrane to certain solutes. D.K.H.

The Volume Change Resulting from Stimulation of a Giant Nerve Fibre

By D. K. Hill

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There are reasons for supposing that stimulation of a nerve fibre causes an increase of the osmotic pressure in the interior. The fibre should therefore swell. The present paper describes a method for measuring the swelling of a cuttlefish nerve fibre following repetitive stimulation.

The relation between length and volume of a giant nerve fibre is also investigated; the volume is varied by altering the osmotic pressure of the external medium.

A study is made of the kinetics of water exchange across the fibre membrane resulting from a sudden change in the external osmotic pressure. D.K.H.

The Males of *Canthocamptus bidens* Schmeil

By Ashley G. Lowndes

Proc. Zool. Soc. London, Vol. 120, 1950, pp. 395–403

There has been a considerable difference of opinion over the taxonomy of this species. In 1929 Chappuis created a new genus *Elaphoidella* and placed *Canthocamptus bidens* (Schmeil) in that genus. All taxonomists, so far as I am aware, followed Chappuis, with the single exception of Gurney, who not only disagreed with the creation of the new genus but also pointed out that there was no justification whatsoever for placing *C. bidens* in that genus, especially since the genus was founded almost entirely on the characteristics of the males. The recent discovery of the males and the structure of the fifth foot, among other things, have shown beyond question that Gurney was right so far as the taxonomy of *C. bidens* is concerned. A.G.L.

The Autonomic Nervous System of the Chimaeroid Fish *Hydrolagus colliei*

By J. A. Colin Nicol

Quart. Journ. Micr. Sci., Vol. 91, 1950, pp. 379–99.

The autonomic nervous system of the chimaeroid fish *Hydrolagus colliei* has been investigated by dissections and histological methods. It consists of a cranial parasympathetic portion and a sympathetic portion confined to the trunk. The latter extends from the level of the heart to the anus, and consists of segmentally arranged ganglia on each side of the dorsal aorta. These ganglia are closely associated with small accumulations of suprarenal tissue. Two axillary bodies are the largest of the sympathetic and suprarenal structures. They lie about the subclavian arteries and are made up of a gastric ganglion and a relatively large mass of chromaffin tissue. The sympathetic ganglia lie in an irregular plexus of longitudinal and crossing sympathetic strands but there is no regular sympathetic chain or commissure between ganglia. There are white rami communicantes which connect the sympathetic ganglia with spinal nerves. A small pregastric ganglion lies on the rami communicantes to the gastric ganglion. The visceral nerves arising from the sympathetic ganglia proceed to blood vessels, genital ducts, chromaffin tissue, and gut. The latter is supplied by large splanchnic nerves which originate in the gastric ganglia and proceed along the coeliac axis to the intestine, pancreas, and liver. Prevertebral ganglia are absent. A mucosal and a submucosal plexus are present in the intestine. The cranial component of the autonomic system comprises a midbrain and a hindbrain outflow. In the former there is a ciliary ganglion on the inferior oblique branch of the oculomotor nerve. Short ciliary nerves proceed from this branch to the eyeball. A radix longa is absent. Sensory fibres go directly to the eyeball from the profundus nerve as anterior and posterior long ciliary nerves. The hindbrain outflow comprises scattered nerve cells and ganglia on post-trematic branches of the glossopharyngeal and vagus nerves. These autonomic fibres in the branchial nerves innervate smooth muscle in the pharyngeal region. A visceral branch of the vagus innervates the heart, oesophagus, and intestine; it also establishes a connexion with the pregastric ganglion. In general, the autonomic nervous system of *Hydrolagus* is very similar to that of selachians. It appears that the autonomic systems of these two groups have undergone little alteration since their origin in the Palaeozoic from some common form. Their autonomic systems reflect a simple and primitive level of organization from which more complex systems of the bony fishes and amphibians have evolved. J.A.C.N.