

## ABSTRACTS OF MEMOIRS

### RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

BAKER, P. F. & SHAW, T. I., 1965. A comparison of the phosphorus metabolism of intact squid nerve with that of the isolated axoplasm and sheath. *J. Physiol.*, Vol. 180, pp. 424-38.

Extruded axoplasm maintained its initial content of energy-rich phosphate compounds for many hours. Exposure to cyanide vapour resulted in a rapid and largely irreversible breakdown of these phosphate compounds. The initial rate of  $P_i$  release during cyanide poisoning was 28% lower in axoplasm than in intact axons and 20% slower in ouabain-treated intact fibres than in untreated controls. These observations suggest that only 20-30% of the resting metabolism is used in the sodium pump and the Na: $\sim$ P ratio is between 2 and 4. Perfused axons contained a composite ATPase; part of which was activated by internal Na and inhibited by external application of ouabain, while the rest was unaffected by Na, K or ouabain.

P.F.B.

BAKER, P. F., 1965. Phosphorus metabolism of intact crab nerve and its relation to the active transport of ions. *J. Physiol.*, Vol. 180, pp. 383-423.

Intact nerves of the crabs *Maia squinado* and *Carcinus maenas* contain an energy-rich phosphatase which requires both intracellular Na and extracellular K for activity and is inhibited by external application of ouabain. The rate of  $\sim$ P breakdown and the steady-state level of  $P_i$  are increased during periods of intense pumping activity and, under a variety of conditions, the activity of the  $\sim$ Pase closely parallels that of the Na pump. Between 2.5 and 4 Na ions are extruded for each  $\sim$ P bond split. In activating the  $\sim$ Pase, internal Na cannot be replaced by Li; but external K can be replaced by  $Tl^+$ , Rb and to some extent Cs and  $NH_4$  ions. The properties of the ouabain-sensitive  $\sim$ Pase of intact nerve are identical, in almost every detail, with those of the ouabain-sensitive (Na+K)-activated ATPase isolated by Skou from *Carcinus* nerve and it is concluded that this enzyme forms part of the Na pump mechanism in intact nerve.

P.F.B.

COOPER, L. H. N., 1965. Chemistry of the Sea. 2. Organic. *Chemistry in Britain*, Vol. 1, pp. 150-4.

This paper presents not a review but a series of perspectives of the present state of organic chemistry of the sea. The amount of total organically combined carbon in the sea is in doubt by an order of magnitude. Some of the polycarboxylic acids in deep cold water may be saturated with respect to the calcium salts. Especial attention is given to the part played by coenzymes and vitamins in the biological cycle. The distribution of cobalamin (vitamin  $B_{12}$ ) is discussed at some length, whereas the probable roles of chelators and viruses has had to be discussed briefly. A massive attack on the chemical processes responsible for plankton blooms is proposed. Standard oceanographic collecting gear is inadequate for sampling for organic analysis and biological assay because it cannot be maintained sufficiently clean. The need is stressed for an 'International Standards Service for the Biological Assay of Chemical

Agents in the Ocean' and means are suggested for bringing it about. The need for co-operative research in organic chemistry requires allocation of funds to this end.

L. H. N. C.

COOPER, L. H. N., 1965. Radiolarians as possible chronometers of continental drift. *Prog. in Oceanogr.*, Vol. 3, pp. 71-82.

A problem in historical oceanography is described. Thermochemical enrichment of sea water with heat and silica following interaction with basaltic lava flows is postulated as creating short-lived situations favouring speciation, particularly of radiolarians. For the first time in the geological column new radiolarian taxa may appear in very thin layers over lava. To give reality to this thesis, a speculative reconstruction of the history of the North Atlantic proved necessary. It is suggested that preceding the Caledonian orogeny, the Baltic and Canadian shields were one, not as usually depicted with the west coast of Europe joined to the east coast of North America but to the north coast or Canadian Archipelago. Strike-slip faulting at what is now called the Mid-Atlantic Ridge allowed the two shields to move towards their present positions and provided a mechanism by which the transverse ridges of the North Atlantic may have been formed.

L. H. N. C.

DARTNALL, H. J. A. & LYTHGOE, J. N., 1965. The spectral clustering of visual pigments. *Vision Res.*, Vol. 5, pp. 81-100.

Evidence is presented that the  $\lambda_{\max}$  of visual pigments are not distributed uniformly throughout the spectrum but, on the contrary, are clustered around certain discrete positions. Eight of these positions for the  $A_1$  pigments have been determined from a consideration of published data and a comparably large amount of new data presented here for the first time. These positions are 478.5, 486.5, 493, 501, 506, 511.5, 519 and 528 nm. The relationship between  $A_1$  and  $A_2$  pigments, and the structural implications of the clustering phenomenon, are discussed.

H. J. A. D.

EDMUNDS, M., 1961. *Polycera elegans* Bergh: a new species to Britain and discussion of its taxonomy. *Proc. malac. Soc. Lond.*, Vol. 34, pp. 316-321.

Three specimens of *Polycera elegans* were found at Plymouth in 1960. Comparison with related forms from the Mediterranean suggests that the species is synonymous with *P. messinensis* and *P. atlantica*. The ecology is discussed, and reasons are suggested to account for the widespread distribution but rare occurrence of this species.

M. E.

ROBERTS, B. L., 1965. The spinal nerves of the dogfish. *J. Physiol.*, Vol. 179, pp. 23-4P.

In contrast to the usual vertebrate condition of mixed peripheral nerves, the abdominal spinal nerves of dogfish are shown to consist of distinct sensory and motor bundles. The axons of the sensory bundle terminate in skin sense organs and in subcutaneous mechanoreceptors, whereas the motor bundle innervates the muscle fibres of the myotome.

B. L. R.