

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

BAKER, P. F. & CRAWFORD, A. C., 1972. Mobility and transport of magnesium in squid giant axons. *Journal of Physiology, London*, **227**, 855-74.

Nerve cells contain very much less magnesium than the tissue fluids surrounding them. Since magnesium is an essential co-factor for many intracellular enzymes, these experiments investigate the state and maintenance of the internal magnesium in a giant nerve cell.

From measurements of electrical and diffusional mobility it seems that about half of the 6.4 mM of intracellular magnesium is ionized. This contrasts with intracellular calcium where 99.9% is bound, mainly in the mitochondria. Resting fluxes of Mg across the axon membrane are roughly the same and equal to 1 p-mole/cm²sec.

The efflux of Mg is particularly interesting in that it occurs against its electrochemical gradient and involves a pumping mechanism. Extrusion of Mg is dependent on the presence of external sodium, independent of external calcium or potassium, and is inhibited by metabolic inhibitors such as cyanide. The efflux from a cyanide poisoned axon can be restored by injecting ATP. The inhibition is not secondary to the known rise in intracellular calcium under these conditions since it occurs in axons pre-injected with a calcium buffering agent such as EGTA.

The influx of Mg shows many similarities to that of calcium; it is elevated by replacing external sodium with lithium, and a small amount of Mg enters the axon during the conduction of a nervous impulse.

DAVIES, A. G., 1973. The kinetics of and a preliminary model for the uptake of radio-zinc by *Phaeodactylum tricornerutum* in culture. In *Radioactive Contamination of the Marine Environment; Proceedings of a Symposium Held by the International Atomic Energy Agency in Seattle, U.S.A., 10-14 July 1972*, pp. 340-20. Vienna, IAEA.

Using ⁶⁵Zn-labelling, measurements of the rate of uptake of zinc ions by initially zinc-free cells have been made. Treatment of a suspension of cells containing zinc with a chelating agent indicates that a portion of the metal associated with the cells is loosely bound and probably adsorbed on to the cell surface. The remainder of the metal in the cell is more firmly based; in the early stages of uptake it increases linearly with the square root of time and this has been taken to indicate that the uptake of the metal is passive and diffusion controlled. The metabolic zinc content of the cells later passes through a maximum, despite the availability of further zinc for uptake, and then gradually decreases. This has been interpreted as being due to a reduction in the number of zinc-binding sites (probably protein) within the cells, as they progress through their growth cycle. A simplified model of these events, capable of computerization, has been developed and tested against the experimental observations.

GREEN, J. C., 1973. Studies in the fine structure and taxonomy of flagellates in the genus *Pavlova*. II. A freshwater representative, *Pavlova granifera* (Mack) comb.nov. *British Phycological Journal*, **8**, 1-12.

The fine structure of the palmelloid and swimming cells of *Chrysocapsella granifera* (Mack) Bourelly is described. Many features - for example, the superficial deposit on the longer flagellum, the presence of a reduced haptonema, the pit penetrating the cell close to the appendages and the strongly refringent inclusion bodies - are strikingly similar to those of members of the genus *Pavlova* Butcher (Haptophyceae). The taxonomic position of *C. granifera* in relation to this and other genera is discussed. The organism is transferred to the genus *Pavlova* and a revised description of *Pavlova granifera* (Mack) comb.nov. given.

KRESS, A., 1972. Veränderungen der Eiakapselvolumina während der Entwicklung verschiedener Opisthobranchier-Arten (Mollusca, Gastropoda). Changes in egg-capsule volumes during the development of different opisthobranch species (Mollusca, Gastropoda). *Marine Biology*, **16**, 236–52.

An attempt has been made to estimate volumes of eggs and egg-capsules employing the formula of the rotation-ellipsoid. Measurements of the following stages have been made: immediately after oviposition; blastula, gastrula; appearance of velumanlage; velarcilia, foot and velum small; velarcilia, foot and velum distinct; 1–2 days before hatching; hatching. Calculations permit analysis of: (1) relationship between egg-case volume and egg-volume; (2) capsule volumes during development until hatching in comparison to those after oviposition (enlargement factor). The sacoglossan nudibranch *Elysia viridis* shows no increase in capsule volume during development. The nudibranchs *Catriona aurantia*, *Tergipes despectus*, *Eubranthus exiguus*, *Eubranthus cingulatus*, *Eubranthus pallidus*, *Eubranthus farrani* and *Janolus cristatus* reveal a distinct increase in capsule volume when velarcilia, foot, and velum appear. The degree of egg-capsule enlargement and its intensity during development exhibit interspecific differences. The results of this and of a previous paper (Kress, 1971) are compared and discussed with respect to possible explanations for the enlargements (e.g. excretion of larval kidneys, composition of capsular fluid, influence of salinity).

POTTS, G. W., 1973. The ethology of *Labroides dimidiatus* (Cuv. & Val.) (Labridae, Pisces) on Aldabra. *Animal Behaviour*, **21**, 250–91.

A small group of *Labroides dimidiatus* were studied over a period of 4 months in the shallow reef environment of Aldabra. It was found necessary to redefine the concept of a cleaning station. Different sizes of *Labroides* occupied different types of area, and it was found that the smallest individuals do not have fixed ranges but move about beneath available crevices. Larger individuals occupied more open situations and the adults usually lived in pairs. The areas occupied appeared to reflect the fishes' ability to maintain position against strong water movements and tidal currents. *Labroides dimidiatus* shows territorial, intraspecific aggression and model presentation experiments indicate that body pigmentation acts as the releaser for this aggression. This aggression serves as a dispersal mechanism for young fish. Interspecific aggression occurred against fish with similar body markings to *Labroides* or which constituted a threat. The cleaning behaviour was studied and it was found that different species of host fish are cleaned in a highly specific manner, and certain hosts are preferred to others. There is evidence that this may be learned as a result of early experience with the host fish. Measurements are made of the cleaning intensity in the area. Some host fish were shown to be attracted to the cleaning range and may adopt invitation postures in the absence of the cleaner. The results are discussed in relation to the recent literature on *Labroides dimidiatus* and their importance to reef fish populations.