

## ABSTRACTS OF MEMOIRS

### RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

ARMSTRONG, F. A. J., WILLIAMS, P. M. & STRICKLAND, J. D. H., 1966. Photo-oxidation of organic matter in sea water by ultra-violet radiation, analytical and other applications. *Nature, Lond.*, Vol. 211, pp. 481-3.

Rapid oxidation of dissolved organic matter in sea water occurred when samples saturated with oxygen were irradiated at a few centimetres distance from a medium-pressure mercury arc of 1200 W. The effective radiation was of wavelengths shorter than 2500 Å. Carbon compounds were oxidized to carbon dioxide in 1 h, and nitrogen compounds and ammonium ion to a mixture of nitrate and nitrite in 3 h. Phosphate was released from phosphorous compounds in about 20 min. A number of compounds were tested, and only urea was found to be difficult to oxidize. Dissolved organic carbon may be estimated from the change in pH after irradiation and dissolved organic nitrogen by change in nitrate + nitrite concentration. Photo-oxidation gives a simple and blank-free method for determination of organic phosphorus; polyphosphates are not hydrolysed. Profiles of organic nitrogen and phosphorous in 2000 m off southern California are shown. Possible applications are discussed; they include preparation of organic and heavy-metal-free sea water for culture work, and combustion of dissolved organic matter for radiocarbon dating.

F. A. J. A.

COOPER, L. H. N., 1966. Re-calibration of deep-sea reversing thermometers. In *Some Contemporary Studies in Marine Science* (ed. H. Barnes), pp. 205-7. London: George Allen and Unwin.

Re-calibration and methods of obtaining high-precision results from deep-sea reversing thermometers are discussed with special reference to the problems of oceanography in India. Indian oceanographers need standardizing facilities in their country as do others in developing countries.

L. H. N. C.

COWEY, C. B. & CORNER, E. D. S., 1966. The amino-acid composition of certain unicellular algae, and of the faecal pellets produced by *Calanus finmarchicus* when feeding on them. In *Some Contemporary Studies in Marine Science* (ed. H. Barnes), p. 225-31. London: George Allen and Unwin.

Relative molar concentrations of eighteen amino acids were determined after prolonged acid hydrolysis of each of six species of unicellular algae. An amino-acid spectrum, containing most of the amino acids essential to mammals, was characteristic of all the species tested and also closely resembled that of the proteins in *Calanus*. It is therefore likely that amino acids are presented to the tissues of the animal in the correct relative amounts for protein formation, a circumstance favouring efficient synthesis of proteins by *Calanus*.

The amino-acid composition of faecal pellets produced by feeding *Calanus* is similar to that of the algal diets. Protein assimilated by the animal therefore resembles that of the alga on which it feeds and there is no preferential absorption of particular protein fractions. Moreover, this relationship holds whether the animal feeds in the presence of high or low concentrations of the diet.

Further experiments showed that when a low concentration of plant cells was used, 13% of the dry weight of the faecal pellets was in the form of amino acids: in the presence of a high concentration of food the corresponding value was 26%. Thus, the extent to which an important fraction of the food is digested depends upon the level of food available.

E. D. S. C.

MARTIN, A. L., 1966. Feeding and digestion in two intertidal gammarids; *Marinogammarus obtusatus* and *M. pirloti*. *J. Zool.*, Vol. 148, pp. 515-25.

The diet of two intertidal species of gammarid, *Marinogammarus obtusatus* Dahl and *M. pirloti* Sexton and Spooner, is described. Both species feed largely, but not exclusively, on decaying algae, but may eat some living algae and, more rarely, carrion.

The feeding activities are influenced by the rhythmic pattern of tidal ebb and flow, feeding only when covered by water. When immersed by the incoming tide they ingest food rapidly for a while and then feed more intermittently, ingesting small amounts at a time until they are uncovered once more by the receding tide. They probably eat sufficient food to fill the gut twice in 24 h. The optimum rate for the digestion of food is approximately 5 h, although food remains in the gut for about 12 h.

The pH of the contents of the proventriculus, digestive gland and intestine of *M. obtusatus* is distinctly acid. Digestive enzymes are secreted only by the digestive gland. Carbohydrases are present which will hydrolyse soluble starch, glycogen, sucrose, maltose, arbutin, salicin, raffinose and melibiose. Inulin, lactose and cellulose are not hydrolysed. Non-specific esterase and true lipase were detected by histochemical methods.

It is concluded that the food supply available to these animals is plentiful and it is unnecessary to utilize the food supply to the maximum.

A. L. M.

MEVES, HANS, 1966. The effect of veratridine on internally perfused giant axons. *Pflügers Arch. ges. Physiol.*, Bd. 290, pp. 211-17.

The effect of adding small amounts of veratridine to the internal fluid of perfused squid giant axons was investigated.  $2 \times 10^{-5}$  g/ml. veratridine applied internally caused a transient depolarization of 50 mV whereas  $8 \times 10^{-6}$  g/ml. had little effect on the resting potential. The spike was followed by a long-lasting after-depolarization of up to 19 mV amplitude which decayed in a non-exponential manner. Repetitive activity following a single brief shock was observed. Repetitive stimulation (4/sec) produced non-linear addition of the after depolarizations. The effects of internally applied veratridine were fully reversible. The findings are compared with the effects of externally applied veratridine on squid axons.

H. M.

PARKE, M., 1966. The genus *Pachysphaera* (Prasinophyceae). In *Some Contemporary Studies in Marine Science* (ed. H. Barnes), pp. 555-63. London: George Allen and Unwin.

Two phases, cyst and motile, of two species of *Pachysphaera* (Prasinophyceae), *P. pelagica* Ostenf. (type species), and *P. marshalliae* Parke sp. nov. are described. Only the scale-covered motile phase with four flagella can persist as an independent form reproducing asexually by fission. The cyst phase is comparable, if not identical, with the microfossil genus *Tasmanites* Newton. The sparsity of records for the distribution of the cyst phase of species of this genus may be due either to mistaken identity

or to the lack of knowledge of the existence of this genus. All green spherical cells with punctate walls do not necessarily belong to this genus: the motile phase must also be known. The study of living material is therefore essential.

M. P.

SHAW, T. I., 1964. Core conductor properties of tissue reticulum. In *A Collection of Papers presented to Sir Charles Lovatt Evans, F.R.S., on the occasion of his 80th birthday*, 1964, pp. 159–66. (Mimeogr., C.D.E.E., Porton, Wilts)

A mathematical study was made of a uniform three-dimensional tissue reticulum having core conductor properties. Linear current–voltage relationships were assumed, and it is shown that an intracellular voltage-measuring electrode close to an intracellular current-carrying electrode would measure a voltage virtually independent of the membrane resistance, provided the cells branched frequently within their space constant. The study is relevant to experiments made upon blocks of syncytial tissue such as cardiac muscle.

T. I. S.