

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

ON THE CILIARY MECHANISMS AND INTERRELATIONSHIPS OF LAMELLIBRANCHS.

PART VIII: NOTES ON GILL MUSCULATURE IN THE MICROCILIOBRANCHIA

By D. Atkins

Quart. Journ. Micr. Sci., Vol. 84, 1943, pp. 187-256

In the gill axes of the Microciliobranchia (Arcacea—less the Trigoniidae—Anomiacea, Pteriacea, Pectinacea, and Ostreacea) the most important muscles are longitudinal and transverse. The longitudinal muscles are: (a) those extending from one extremity of the gill axis to the other, inserted on the shell anteriorly, and (b) those in the free posterior portion of the axis, inserted on the shell where the axis becomes attached. Together these muscles act as branchial retractors. Withdrawal of the gills prevents (a) their being caught and crushed by the edges of the shell when the valves are suddenly closed, and (b) excessive fouling with sudden intake of muddy or noxious water. The transverse muscles below the chitinous structure arching the axial food groove serve to draw the demibranchs of a gill together, while those above the arch serve to separate them. Such swaying movements of the demibranchs rid them of unwanted material.

In the demibranchs are: (1) muscles of the free edges. These include (a) muscles responsible for movements of the walls of the food grooves, and (b) longitudinal muscles, which effect antero-posterior contraction and assist in retraction of the axis in retraction of the gills; (2) vertical muscles of the demibranchs, found chiefly in the Pteriacea, and responsible for dorso-ventral contraction of the demibranchs; (3) muscles of the inter-lamellar junctions serving to draw the two lamellae of a demibranch together, expelling the contained water; (4) horizontal muscles of the lamellae, present in forms with plicate and heterorhabdic gills and effecting by their action changes in the shape of the frontal surface of the principal filaments and movements of the plicae important in connexion with the ciliary sorting mechanism; their contraction increases the folding of the lamellae and decreases the length of the gill: and (5) fine muscle fibres forming the intrafilamentar 'septum'.
D.A.

THE VITAMIN C SATURATION TEST

By W. R. G. Atkins

Brit. Med. Journ., 27 Feb., 1942.

Slight changes in the conditions of the Harris and Abbasy test as performed in the Army effected a saving of several weeks in calculations on the examination of 600 soldiers, as compared with an equal number on the earlier

procedure. The period of retention of urine was limited to the fourth and fifth hours after dosing with $\frac{3}{4}$ g. of vitamin. The volume passed was not measured, but was made up to $\frac{1}{2}$ or 1 l., of which 10 ml. was mixed with 1 ml. of acetic acid and 2.2 ml. used for titration. The reagent, 2:6 dichlorophenol indophenol, is best adjusted so that 1.0 ml. corresponds to 0.1 mg. of vitamin C.

W.R.G.A.

THE VITAMIN C SATURATION TEST OF HARRID AND ABBASY

By W. R. G. Atkins

Nature, Vol. 151, 1943, p. 21

The examination of 1200 men showed the method to be reliable and capable of distinguishing between groups of 100 living under slightly different conditions. The results cannot be disclosed, but the form of the curves obtained is instructive. These were drawn with the number of daily doses required to approach saturation on the vertical axis and the percentage of men who reacted on the horizontal. The distribution obtained shows why some of a ship's company get scurvy and others escape. Saturation is obtained sooner when the vitamin is given after food. Vitamin C is not stored in quantity for long; very little residual effect could be detected four months after saturation.

W.R.G.A.

A NOTE ON AN ABNORMAL SPECIMEN OF *ELPHIDIUM CRISPUM* (L.)

By Arthur Earland and Margaret W. Jepps

Journ. Roy. Micr. Soc. Vol. LXIII, 1943, pp. 43-47

An abnormal shell of *Elphidium* (*Polystomella*) *crispum* from Plymouth is figured and designated var. nov. *detorquens*.

The genus *Ozawaia* Cushman, 1931, is superfluous, and should be regarded as a synonym of *Elphidium* Montfort, 1808, in part. Nautiloid specimens have all the typical features of that genus, and the few specimens with final linear chambers should be regarded as variations. So the genotype of *Ozawaia* becomes *Elphidium tongaense* (Cushman), and its var. *ozawaia*.

An account is given of the Millett specimens of *Elphidium* remaining in the Heron-Allen and Earland collection at the British Museum of Natural History, London.

M.W.J.

THE GIANT MYELINATED NERVE FIBRES OF THE PRAWN

By William Holmes

Phil. Trans. Roy. Soc., B, Vol. 231, 1942, pp. 293-311

The structure of the giant fibre system in the central nervous system of the prawn *Leander serratus* was examined, using cytological and neurological techniques. Evidence was obtained that the median and lateral giant fibres are syncytial structures, each formed by the fusion of the processes of many segmental nerve cells. The motor giant fibres, on the other hand, are the processes of single cells.

The prawn giant fibres are almost as heavily myelinated as vertebrate nerve fibres of the same diameter and the structure of the prawn axon sheaths shows many significant similarities to that of the sheaths of myelinated fibres in the higher animals.

The contention of Johnson (1924) that the structure of the synapses in the crustacean nervous system is incompatible with current views on the nature of the synaptic transmission mechanism is shown to be unfounded. W.H.

RELATIVE GROWTH OF THE EUROPEAN EDIBLE CRAB, *CANCER PAGURUS*:
I. GROWTH OF THE CARAPACE

By Donald C. G. MacKay

Growth, Vol. 6, 1942, pp. 251-8

This is the first of several papers dealing with form changes in the European edible crab, *Cancer pagurus*. In this paper the relative growth of the carapace is analysed by Huxley's method. An analysis of eight carapace widths from anterior to posterior in relation to carapace length indicates an orderly change in values for the constant k from 0.70 to 1.12. This is found to be in the form of an anterior-posterior gradient in which the low point is at the extreme anterior of the animal. Values for immature individuals are in general slightly higher for the same dimension than are those of mature individuals.

D.C.G.McK.

RELATIVE GROWTH OF THE EUROPEAN EDIBLE CRAB, *CANCER PAGURUS*:
II. GROWTH OF THE ABDOMEN

By Donald C. G. MacKay

Growth, Vol. 7, 1943, pp. 217-26

This is a continuation of the study of form changes in the European edible crab, *Cancer pagurus*. In this paper the widths of six abdominal segments and the telson in relation to carapace length are analysed by the method of

Huxley. The results are based on 4643 measurements and indicate a considerable range of values for the constant k . The widths of all abdominal measurements show positive heterogony, k , varying between 1.07 and 1.50. This is in the form of a gradient lowest at the anterior end of the abdomen and highest in the middle segments. Considered in conjunction with the carapace gradients for the same species it is apparent that the differential growth ratios are higher in the abdomen than in the cephalothorax and that the growth centre is in the middle abdominal segments.

Immature and mature crabs differ in the values of the relative growth constant, mature crabs having a higher k . Changes in form are correlated with the onset of sexual maturity and probably are causally related thereto. In general females are found to have a higher k for the abdominal segments than males. This is accentuated after sexual maturity by an increase in the differential growth ratio in females and a decrease in males.

Very few crabs of this species were found to be parasitized by *Sacculina*.

D.C.G.McK.

A QUANTITATIVE STUDY OF THE PRODUCTIVITY OF THE FORAMINIFERA IN THE SEA

By Earl H. Myers

Proc. Amer. Phil. Soc., Vol. 85, 1942, pp. 325-42

Samples of populations of the foraminifer *Elphidium crispum* Linnaeus numbering from 500 to 1000 individuals were taken both in the littoral and sublittoral zones of Plymouth Sound at intervals of one month for 12 consecutive months. Percentage frequency distribution curves based on the number of chambers in the tests as determined from protoplasmic casts revealed that the life span in tide pools is usually 1 year, and the life cycle including a sexual and an asexual phase 2 years, while below low-tide level 2, 3 or even 4 years are required. Growth is limited to the spring and summer months and the rate of growth is 40% greater and the diameter of the test 60% larger in the sublittoral zone. Sexual and asexual reproduction as determined from the presence of juvenile individuals in the samples and cytological evidence of gametogenesis are limited to March and April, although some asexual reproduction takes place in the sublittoral zone in September. From the number of megalospheric juveniles produced in cultures and the ratio of microspheric to megalospheric individuals in the sea it was determined that the annual rate of increase is about thirtyfold and fortyfold in the littoral and sublittoral zones respectively. Populations well in excess of 1000 individuals per sq. ft. were observed at a number of stations. In a

later paper an attempt will be made to correlate these observations on the sequence of events in the life activities of this species with measurable ecological conditions in the sea. E.H.M.

THE EFFECT OF WAVE-LENGTH ON THE RELATION BETWEEN THE INTENSITY OF ILLUMINATION AND THE CURRENT IN SELENIUM RECTIFIER PHOTO-CELLS

By H. H. Poole and W. R. G. Atkins

Sci. Proc. Roy. Dublin Soc., Vol. 22, 1941, pp. 395-400

Fall in sensitivity with increasing illumination is greater for wave-lengths exceeding 6600 Å. than for those shorter. With increase in resistance the resultant relative fall in current for a given illumination is a function of the zero-resistance current only and is independent of the wave-length. The decreased sensitivity found in deep red light is therefore not due to increased leakage of current in the cell, as this would be greater with large external resistance. The effect may be due to the occurrence of a threshold for the selenium cell in the neighbourhood of 6600 Å. W.R.G.A.