

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

DENTON, E. J., 1959. The contributions of the orientated photosensitive and other molecules to the absorption of whole retina. *Proc. roy. Soc., B*, Vol. 150, pp. 78-94.

Various animals were chosen to give golden, red and purple retinæ. It is confirmed, by a method giving the absorption curve of unbleached retina, that deep-sea fish have golden photosensitive pigments in densities so high that they absorb over 90% of blue-green light striking the retina. Although light has passed through all retinal layers the spectral total density curves correspond closely to those obtained on highly purified retinal extracts. After making a small correction for losses of light in the layers of retina other than the receptor layer the $D_{\min.}/D_{\max.}$ ratios were about 0.25 for chrysopsin retinæ and 0.45 for porphyropsin retinæ. The losses of light in retinæ from which the rod and cone layer has been brushed off, although varying little with wavelength, rise slowly in the near ultra-violet and red from a minimum in the yellow.

The edge-fold preparation, useful for studying the dichroism of the retinal rods is described. It is shown that the spectral curves of dichroic difference in density are very close to those of total retinal density and therefore there can be little material absorbing light between 400 and 720 m μ orientated along the axes of unbleached rods. There is such material absorbing near ultra-violet light present in unbleached retinæ whose principal photosensitive pigment is derived from vitamin A₂. For both vitamin A₁ and vitamin A₂ retinæ the sense of the dichroism in the near ultra-violet is reversed in the first hour following the bleaching of the photosensitive pigments. This shows that the molecules of vitamin A in the bleached isolated retina are orientated with their axes of resonance parallel to the axes of the rods, a conclusion confirmed by studies of the polarization of the fluorescence of visual white in the bleached retina.

E.J.D.

MURRAY, R. W., 1959. The response of the ampullæ of Lorenzini to combined stimulation by temperature change and weak direct currents. *J. Physiol.*, Vol. 145, pp. 1-13.

When single units in the ampullæ of Lorenzini are stimulated by weak direct currents their impulse frequency varies linearly with current in most preparations. When thermal stimuli are applied during the adapted response to maintained D.C. the change in frequency due to the combined stimuli equals the sum of the changes due to each separately. When the unadapted response to D.C. is combined with the thermal response, interaction occurs. The direction of the spatial gradient of temperature is not significant for the thermal response. Some anomalous thermal responses are described.

R.W.M.

NICHOLS, D., 1959. Changes in the Chalk heart-urchin *Micraster* interpreted in relation to living forms. *Phil. Trans.*, B, Vol. 242, pp. 347-437.

Seven species of irregular echinoids, whose morphology, behaviour and ecology show important comparative features, were studied, and many aspects of their mode of life, in particular their burrowing, feeding, sanitation and locomotion, are shown to be

closely correlated with the particle-sizes of the substrata in which they live, and this adaptation is expressed in many features of their tests, in particular the position and degree of development of the fascioles and the division of labour in the tube-feet.

The fossil heart-urchin *Micraster* is one of the best examples of continuous and directional evolution of individual characters, and the study of living forms has been used to suggest the changes in mode of life which accompanied the structural changes. The main change appears to have been a gradual increase in the depth to which the *Micrasters* burrowed below the sea-floor. When the shallow-burrowing forms ceased to occur, another closely-related form, *Isomicraster*, arose in the English area, probably by immigration. By analogy with living forms, in particular the number and arrangement of tube-feet in the petaloid parts of the paired ambulacra, this form most likely lived only partially submerged in the substratum. The taxonomy of the English *Micraster* complex is discussed in the light of this approach.

D.N.

SPOONER, G. M., 1959. New members of the British marine bottom fauna. *Nature, Lond.*, Vol. 183, pp. 1695-6.

Some unfamiliar small invertebrates are recorded from bottom gravels off Plymouth, more particularly the Eddystone shell gravel (at depth of about 25 fm.). Acochliadiacean gastropods are reported from Britain for the first time and represented by *Microhedyle lactea* Hertling, *Hedylopsis suecica* Odhner, and *Philinoglossa helgolandica* Hertling. The holothurian *Leptosynapta minuta* (Becher) was also found.

The Eddystone shell gravel harbours one oligochaete and five species of mites, including *Scaptognathas tridens* Trouess. and *Halacarus bisulcus* Viets which are new to Britain; and, furthermore, it is particularly rich in small malacostracans. Out of 56 species listed, 20 are new to the Plymouth Fauna and five or six new to science.

Tanaidacea are dominated by *Typhlotanais microcheles* Sars and *Strongyurella indivisa* Hansen. Isopoda include *Paramunna bilobata* Sars, *Eurycope pygmaea* Sars, *Microjaera anisopoda* Bocquet and Lévi, and *Microcharon harrisi* Spooner. The last belongs to a genus of small blind colourless forms of which six of the nine species recognized live in terrestrial ground-water in southern and eastern Europe, and are truly 'interstitial' or 'phreatic'.

Among many Amphipoda, there is a new metopid and a new syrroid, but the most interesting and unexpected finds were representative of two cosmopolitan 'phreatic' families—Bogidiellidae and Ingolfiellidae. The bogidiellid will require a new generic name. Previously species have been found in fresh water or coastal sand of southern Europe or Brazil. The genus *Ingolfiella* includes six species from the most diverse range of habitats (from the abyssal Atlantic to a cave in the Belgian Congo): the two specimens from the Eddystone are very close to *I. acherontis* Karaman from the Macedonian uplands.

G.M.S.