

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

AN EXPERIMENTAL STUDY OF THE SCATTERING OF LIGHT BY NATURAL WATERS

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

Proc. Roy. Soc. Lond., B, Vol. 140, 1952, pp. 321-38

A blue-sensitive multiplier phototube was used to measure light scattered from a parallel beam in distilled, tap and sea water, the first-named serving as a check upon errors from extraneous sources of light. Forward and back scatter are closely the same for distilled water, but with natural waters by far the greater part of the effect occurs through angles less than 25° . A minimum is found for a deviation of about 110° , back scattering increasing somewhat for greater angles. The relative importance of forward scatter increases with turbidity, and in sea water about three-quarters of the effect is due to matter removable by filtration through a collodion filter of average pore diameter $1\ \mu$ or by sedimentation; further passage through 0.6 and $0.2\ \mu$ filters produces little change. Scattering is greater in blue light. Plymouth tap water scatters more than surface coastal water and the latter more than surface water 20 miles out, station E I. Surface water scatters more than deeper—the water column being remarkably homogeneous even when a well-marked thermocline had existed for weeks, but a small increase was detectable at the top of the cold water. E I surface water increased in scattering between August and January, and decreased till May. Deep water showed little change. Extinction due to scattering between 20 and 155° amounted to less than one-sixth of that found for a similar sample with a Pulfrich photometer, so probably much scattering occurs below 20° . This explains why Pulfrich extinctions are so much greater than vertical extinction coefficients found in the sea.

The preponderance of forward scattering within the range 20 – 155° and the effects of filtration suggest that such scattering is due chiefly to refraction through transparent mineral particles, large compared with the wave-length of light. The refractive index of organic matter is too near that of water to produce refraction through angles as large as 20° . Such matter may, however, be responsible for some of the scattering through smaller angles, which apparently accounts for most of the turbidity found with the Pulfrich photometer.

W.R.G.A.

D-AMINO-ACID OXIDASE IN THE MOLLUSCAN LIVER

By H. Blaschko and Joyce Hawkins

Biochem. Journ., Vol. 52, 1952, pp. 306-12

The livers of two cephalopods, *Octopus vulgaris* and *Eusepia officinalis*, contain the enzyme D-amino-acid oxidase. Since this is the first time that the enzyme has been described in invertebrates, some of its properties have been studied and compared with those of the corresponding mammalian enzyme. The pattern of substrate specificity of the cephalopod enzyme is similar to the mammalian enzyme, but there are a few differences; for instance, the octopus enzyme oxidized D-glutamic acid more rapidly. Both homogenates and acetone-dried powders were active.

The enzyme was also found in *Mytilus edulis* and in *Helix*, but not in *Anodonta*. H.B.

OBSERVATIONS ON AMINE OXIDASE IN CEPHALOPODS

By H. Blaschko and Joyce Hawkins

Journ. Physiol., Vol. 118, 1952, pp. 88-93

This paper contains a report on the occurrence of the enzyme amine oxidase in the tissues of *Octopus vulgaris* and *Eusepia officinalis*.

In *Octopus*, very high amine oxidase activity was found in liver extracts; in order of decreasing activity, the enzyme was present in the posterior salivary glands, the anterior salivary glands and in brain tissue. The high amine oxidase activity of the tissues of *Eusepia* already described in earlier papers has been confirmed. Differences in the pattern of substrate specificity between the enzymes from the two species are also reported.

The significance of these findings in relation to the presence of amines in the tissues of cephalopods is discussed.

Amine oxidase activity was not detected in *Mytilus edulis* and *Helix*.

H.B.

THE MECHANICAL ANALYSIS OF THE RESPONSES FROM THE END-ORGANS OF THE HORIZONTAL SEMICIRCULAR CANAL IN THE ISOLATED ELASMOBRANCH LABYRINTH

By J. J. Groen, O. Lowenstein and A. J. H. Vendrick

Journ. Physiol., Vol. 117, 1952, 329-46

The mechanical properties of the cupula-endolymph system were subjected to experimental tests by means of the oscillographic method of recording from the nerve supplying the horizontal semicircular canal of the isolated labyrinth of the ray (*Raja clavata*).

Tests on torsion-swing and turn-table furnished conclusive evidence that the cupula-endolymph system behaves like a true pendulum, and a differential equation describing the behaviour of this system is suggested.

During the tests, sense organs deviating from the expected mode of behaviour were encountered, but a simple physical model (the characteristic curve of an electronic valve) renders possible a unified description of all behaviour types of semicircular canal organs. O.L.

MUSCLE ACTIVITY AND DRUG ACTION IN THE BODY-WALL OF THE
SABELLID WORM *BRANCHIOMMA VESICULOSUM* (MONTAGU)

By J. A. Colin Nicol

Physiol. Comp. et Oecol., Vol. 2, 1952, pp. 339-45

The effects of certain autonomic drugs on strips of body-wall of *Branchiomma vesiculosum* (Sabellidae) are described. In preparations lacking central nervous system, acetylcholine and nicotine cause contractions of the longitudinal musculature. The threshold concentration lies about 1/100,000, and nicotine has the stronger effect. Eserine and DFP potentiate the contraction due to acetylcholine. Atropine, pilocarpine, and adrenaline are without effect. Repetitive electrical stimulation of body-wall (with and without nerve cord) shows no augmentation of response after eserization. D-tubocurarine does not block neuromuscular transmission in *Branchiomma*. The contrast with the earthworm preparation in which augmentation or facilitation occurs is brought out. Evidence for antagonistic systems, adrenergic and cholinergic, in annelids is reviewed, and the differences in the blocking action of curare within this group are taken to indicate considerable diversity in receptor mechanisms concerned with neuromuscular transmission.

J.A.C.N.