

Abstracts of Memoirs

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

The Loxosomatidae of the Plymouth Area, including *L. obesum* sp.nov.

By D. Atkins.

Quart. Journ. Micr. Sci., Vol. LXXV, 1932, pp. 321-391.

FOUR known species of *Loxosoma*, *L. phascolosomatium* Vogt, *L. crassicauda* Salensky, *L. singulare* Keferstein, and *L. claviforme* Hincks, and a new species *L. obesum* found in the Plymouth region, are described.

In *L. crassicauda*, which lives in the tanks in the Laboratory, males only were found during the year they were kept under observation.

L. claviforme is considered a valid species.

A small group of *Loxosoma*, found on *Aphrodite aculeata*, were intermediate in form between *L. singulare* and *L. claviforme*, and peculiar in retaining a number of their buds. The sex of such buds in several instances differed from that of the parent.

L. obesum sp.nov., found on the dorsal surface of *Aphrodite aculeata*, may reach a length of 2.4 mm., and averages rather more than 1.0 mm. in length. The lophophore is small, and bears almost invariably eight tentacles. Longitudinal muscles only are present in the stalk, which ends in a small disc of attachment. A foot-gland is present in the bud, and is frequently preserved as a vestige in the adult. The buds are near the lophophore, and may be as many as six on each side. The larva resembles that of *L. singulare*.

Two main forms are distinguishable, differing in shape of the calyx and development of the stomach.

The ovary may contain six well-developed ova on each side, and the vestibule twenty-six embryos.

Females, with one exception, greatly exceeded males in number, and it is probable that the male becomes sexually mature at a smaller size than does the female.

D. A.

The Ciliary Feeding Mechanism of the Entoproct Polyzoa, and a comparison with that of the Ectoproct Polyzoa.

By D. Atkins.

Quart. Journ. Micr. Sci., Vol. LXXV, 1932, pp. 393-423.

An account is given of the ciliary feeding mechanism of the Entoproct Polyzoa, and of the structure of the lophophore and tentacles. The long

lateral cilia cause a current of water to pass inwards between the tentacles, and throw particles on to the short frontal cilia of the inner surface, which carry them to the vestibular groove leading to the mouth.

The behaviour of the lateral cilia of the tentacles of *L. crassicauda* is described, and it is suggested that they are under the nervous control of the animal.

A résumé of Borg's work on the ciliary feeding mechanism of the Ectoprocta is given, a note on *Flustrella hispida* being added. It is pointed out that the method of feeding in this group differs widely from that of the Entoprocta.

D. A.

The Nematode Genus *Ascarophis* van Beneden.

By H. A. Baylis.

Ann. & Mag. Nat. Hist. (10), XI, pp. 111-117.

Two female specimens obtained from the stomach of a gurnard (*Trigla lineata*) at Plymouth are referred to the very imperfectly-known species *Ascarophis morrhuae* van Beneden, 1871, which had been recorded previously from the cod, haddock, halibut, and father lasher. The literature dealing with this species and with *Ascarophis helix* Cobb, 1928, is reviewed. In the light of the present material the description of the female is amplified (the male being unknown), the doubtful systematic position of the genus is discussed, and an emended generic diagnosis is given.

H. A. B.

The Osmotic Relations between White and Yolk in the Hen's Egg.

By J. B. Bateman.

Journ. Exp. Biol., 9, 1932.

Vapour-pressure determinations on white and yolk of the hen's egg, (a) by direct comparison, (b) by reference to an intermediate salt solution, and (c) by dialysis against known salt solutions, have confirmed the existence of a real osmotic difference between these two substances. These experiments show A. V. Hill's vapour pressure thermopiles to be reliable when used with viscous protein solutions such as egg yolk, and that a recent criticism is unfounded.

The vapour pressure changes which occur on mixing white and yolk indicate a removal of osmotically active substances; they disagree, therefore, with Straub's freezing-point determinations (1930). Dilution of white and yolk with water and with various salt solutions is studied from this point of view and also in connection with the problem of bound water. It is concluded that the amount of bound water in both white and yolk is small, and this is confirmed by the effect of solid sodium chloride

on the vapour pressure of white and yolk. Other substances (urea, sodium lactate) produce abnormal effects resembling their effects on blood. Glucose behaves normally.

The result of mixing white and yolk, mentioned above, is discussed in relation to the osmotic changes occurring in the fertilised and unfertilised egg.

J. B. B.

The Heat Production and Economy of Maintained Contractions in Crustacean Muscle.

By D. W. Bronk.

Journ. Cell. & Comp. Physiol., *11*, pp. 285-294, 1932.

The heat production of crustacean muscle has been measured during the course of a short tension by means of a single thermocouple thrust into the adductor muscle of the claw of *Maia*. It has been found that there is a marked increase in the economy of maintaining tension, as represented by the ratio of tension developed to heat produced, as a result of previous activity of the muscle. This striking increase in economy is shown to be due to a very marked slowing of the muscle as a result of previous contractions. The slowing is very much greater in this type of muscle than in vertebrate striated muscle. It is pointed out that this would make it possible for the animal economically to maintain powerful contractions for considerable periods of time in spite of the fact that the motor nerve fatigues rapidly, as has previously been shown to be the case by A. V. Hill.

D. W. B.

The Effect of Veratrine on the Electrical Response of Crab's Nerve.

By S. L. Cowan.

Jour. Physiol., *77*, 27P.

After soaking for half an hour in aerated sea water (pH 8) containing 1 in 10 millions to 1 in 100 millions of veratrine, a nerve from a walking leg of *Maia* gave a much increased initial action current, as measured with a galvanometer of 3.8 sec. period.

For autumn crabs the optimum concentration of veratrine was 1 in 25 millions to 1 in 50 millions; the initial response was about 200 times that of untreated nerve and the area of the deflection \times time curve was increased more than a hundredfold. The "retention of action current" lasted for nearly half an hour.

Asphyxiation, previous to stimulation in oxygen, did not affect the response. (Compare Fromherz, H., and Hill, A. V. *J. Physiol.*, *77*, 25 P.)

S. L. C.

Note on the Occurrence of *Graffilla gemmelipara* Linton (Turbellaria) at Plymouth.

By W. Harold Leigh-Sharpe.

Parasitology, Vol. XXV, No. 1, 1933.

On 28.viii.1932 seven specimens of *Graffilla gemmelipara* Linton 1910 were found by Miriam Rothschild on the body inside the mantle cavity of a specimen of *Cardium edule* from Millbrook, Plymouth.

Though only taken previously in America and on a different host, *Modiolus plicatulus*, Linton's excellent figure leaves no doubt that these specimens belong to the same species.

The mother, a perfect oval, is uniformly ciliated, colourless and transparent, with a pair of typical Turbellarian bean-shaped eyes, and contains within her body eight bubble-like, transparent, spherical cysts. Each of these contains a pair of ciliated young, complete with eyes like their mother; and the young of each pair are arranged head to tail and slowly revolve within the cyst.

W. H. L.-S.

A Second List of Parasitic Copepoda of Plymouth with a Description of Three New Species.

By W. Harold Leigh-Sharpe.

Parasitology, Vol. XXV, No. 1, pp. 113-118, 1933.

The following constitutes a supplement to my previous list (Leigh-Sharpe, 1926), and consists of a few records previously omitted, and also an account of some Copepoda taken by me during a visit to the Laboratory of the Marine Biological Association, Plymouth, Aug.-Sept. 1932, with notes on these and previously recorded species. Three new species are described: *Lernæocera phycidis*, *Clavella deliciosa* and *C. typica*, and an account of normal and abnormal specimens of *Lernæocera lusci*. Notes are given on the eggs and nauplii of the Dichelesthidiæ. W. H. L.-S.

On the Mitraria Larva of *Owenia fusiformis* Delle Chiaje.

By Douglas P. Wilson.

Phil. Trans. Roy. Soc. B., Vol. 221, 1932, pp. 231-334.

THIS is a detailed histological study of the development from the early trochosphere to the young worm a few days after metamorphosis. The larva is of a most unusual type, in which the normal mode of Polychæte development is masked by an exaggeration of some larval structures associated with a peculiar disposition of certain parts of the developing worm trunk. The prototroch beginning as a simple ring becomes folded

into a sinuous tract simulating the ciliated band of an Echinoderm larva. The blastocœl is spacious. Long provisional bristles probably protect the larva during its month of pelagic life. The worm trunk develops in such a way that the anterior segments are turned inside out and are folded back to envelop the posterior segments. The head is widely separated from the trunk, but is connected with it by the circumœsophageal nerve commissures and by a pair of retractor muscles, as well as by the larval tissues of the blastocœl wall. The development culminates in a metamorphosis of cataclysmic violence and rapidity in which during the course of a few seconds the trunk is straightened out while the head is drawn down on to its anterior end and there subsequently fuses with it. The provisional bristles are thrown off and lost, but the softer larval tissues—the prototroch and other structures—break down in rapid histolysis and are swallowed by the newly-formed worm during the first few minutes of benthonic life. Laboratory experiments indicate that in the sea it is usual for this metamorphosis to take place only when the fully developed larva comes into contact with a suitable sandy bottom, and that it is delayed for a time if the larva has not reached the sea-bed or if the bottom conditions are unsatisfactory. Such a power of suspending metamorphosis must greatly add to a larva's chance of ultimately reaching the right kind of bottom for adult life.

D. P. W.

The Autonomic Nervous System of Selachians.

By J. Z. Young.

Quart. Jour. Micr. Sci., Vol. 75, p. 571.

An analysis of the visceral motor nerves of Selachians was made, with a view to comparison with the arrangement in mammals. Very little evidence was found of the existence of functionally antagonistic sympathetic and parasympathetic systems, and it is suggested that these systems in Tetrapods represent specialisations within a single segmental set of visceral motor fibres, running primarily through the dorsal roots, but coming to pass through the ventral roots in those segments in which the roots join.

In the trunk region of Selachians the rami communicantes contain only pre-ganglionic fibres, i.e. there are no grey rami, and in accordance with this it was found that the melanophores of the skin are not innervated.

The structure of the autonomic neurons is described in detail. In the case of the post-ganglionic cells which innervate the suprarenal bodies the processes can sometimes be followed all the way from nerve cell to nerve ending so that the hypothesis of Elliott, that the chromophil cells themselves represent post-ganglionics, is disproved.

J. Z. Y.

**Comparative Studies on the Physiology of the Iris. I. Selachians.
II. Uranoscopus and Lophius.**

By J. Z. Young.

Proc. Roy. Soc. London, Ser. B, Vol. 112, p. 228, 1933.

It was found that the sphincter muscle of the iris of Selachians is not under nervous control but contracts in direct response to illumination. The dilatator muscle, on the other hand, receives motor fibres from the oculomotor nerve. The action of various drugs on these muscles was then tested and it was found that whereas adrenaline, acetyl choline, pilocarpine and eserine all caused contraction of the dilatator muscle, none of these substances caused any contraction of the sphincter. This is held to be evidence that these drugs act at the mioneural junction and not on the muscle fibres themselves.

Both of the muscles of the iris of *Uranoscopus* and *Lophius* are under nervous control and a study of the effects of drugs in these forms gave results in agreement with the above hypothesis.

J. Z. Y.

Nervous Degeneration and Regeneration in Cephalopods.

By E. Sereni and J. Z. Young.

Pubbl. Staz. Zool. Napoli., Vol. 12, p. 173, 1932.

A study was made of the effects of sectioning the mantle connective or stellar nerves in various Cephalopods. The process of degeneration and regeneration of the nerves is described in detail and an analysis made of functional components of the nerves in question. After section of the mantle connective degeneration proceeds as far as the stellate ganglion but not into the stellar nerves, and this fact demonstrates that there is no continuity between the axons of the connective and the neurons of the stellate ganglion. In agreement with this the actual terminations of the fibres in the stellate ganglion ("boutons terminaux") were recognised, this being the first time that such structures have been described in invertebrates.

J. Z. Y.