ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

A NEW MUSCLE PREPARATION FOR THE STUDY OF OPTICAL CHANGES DURING CONTRACTION

By B. C. Abbott and J. Lowy

Nature, Lond., 1956, Vol. 177, pp. 788–9

Pieces cut from the mantle muscle of squid have been used to study transient optical changes in the muscle when stimulated. When alive and healthy this muscle is very transparent. Two types of changes are described. The first is a small increase in transparency which begins during the falling phase of the action potential. At room temperature the peak of this increase is at 22 msec after the stimulus. The first sign of tension increase occurs at 19 msec, with no evidence of a preceding latency relaxation.

This transparency increase is followed by a large opacity increase due to light scattering. The scattering closely follows the time course of the twitch, and about 30% of the light is scattered at the twitch peak. B.C.A.

RESTING TENSION IN SNAIL MUSCLE

By B. C. Abbott and J. Lowy

Nature, Lond., 1956, Vol. 178, pp. 147–8

The retractor pharynx of the snail extends to great lengths, even under a small load and its ability to exert a resting tension has been doubted.

The experiments described demonstrate that the muscle has a very wide range of working length. The isometric tensions produced during tetanus have been measured at various lengths, and it is demonstrated that although appreciable tension is produced at as little as 12 mm, the maximum active tension occurs at about 40 mm. Above this length active tension decreases again: as in vertebrate striated muscle.

At lengths above that for maximum active tension, the resting muscle exerts a true resting tension and tears with a breaking stress of about 1·5 kg/cm². B.C.A.

CILIARY FEEDING MECHANISMS OF BRACHIOPODS

By D. Atkins

Nature, Lond., 1956, Vol. 177, pp. 706–7

A preliminary account is given of the ciliary feeding mechanisms of brachiopods based on the articulates *Terebratulina*, *Gryphus* and *Macandrevia* and the inarticulate *Crania*. In all these, the lateral cilia, beating across the length of the filaments and from the inside to the outside of the lophophoral spaces, create the main water current, which in adults, whether with plectolophus or with spirolophus lophophores, enters laterally and leaves the shell anteriorly. In young stages with trocholophus and with early schizolophus lophophores, the inhalant current is single and median, setting into the bell-shaped lophophore, while the exhalant current escapes between the filaments all around. As the anterior indentation increases with age, two lateral arms being formed, the median inhalant current becomes divided into two.

The frontal currents in all the species examined are capable of reversal. Small particles are conveyed by the frontal cilia toward the bases of the filaments and eventually reach the mouth; large particles and collections of particles are conveyed to the tips of the filaments and are finally rejected from the shell. In a thick culture of *Chlorella*, etc., the frontal cilia beat toward the tips of the filaments. This reversal of the frontal currents of the filaments appears to be due to reversal of the ciliary beat and not to adjacent tracts of cilia beating in opposite directions as in certain bivalves.

In *Terebratulina retusa*, *Gryphus vitreus* and *Macandrevia cranium*, abfrontal cilia are present on the filaments and these beat continuously toward their tips. D.A.

OBSERVATIONS ON LUMINESCENCE IN SEA PENS (PENNATULACEA)

By D. Davenport and J. A. C. Nicol

Proc. roy. Soc., B, 1956, Vol. 144, pp. 480–96

Luminescent responses of a sea pen, *Leioptilus gurneyi*, obtained off the Pacific coast of the United States, proved favourable for physiological studies. Light is emitted by autozooids and siphonozooids. Mechanical and electrical stimuli evoke luminescent waves which pass over the rachis at a velocity of 26 cm/sec (20° C). Consecutive flashes increase in intensity owing to neuro-effector facilitation. A flash has a latent period of 0·18 sec (total duration of 1–2 sec) and reaches maximal intensity in 0·2 sec from first deflexion. Strong mechanical and prolonged electrical stimulation produce a refractory state in which transmission of luminescent waves ceases. Slow progressive spread of luminescence can then be induced by maintained repetitive stimulation. This effect is ascribed to internuncial facilitation overcoming fatigue in the nerve net. J.A.C.N.

SYSTEMATICS OF THE MARINE-BUG

By DENNIS LESTON

Nature, Lond., 1956, Vol. 176, pp. 427–8

Study of male and female genitalia, head and mouthparts, abdomen, dorsal glands and other structures shows that the bug, *Aepophilus bonnairei*, hitherto regarded as comprising a monotypic family of uncertain affinities, is a saldid. The lateral abdominal 'strigil' of males confirms this view. Other saldid species from widely separated genera show a tendency to live a submarine life, but *A. bonnairei* has progressed furthest along this path and has well-defined structural and behavioural modifications suiting it to life at the lowest *Fucus* zone. It can survive submergence for at least 49 h in sea water. D.L.

PRESSURE RECEPTORS IN THE FINS OF THE DOGFISH *SCYLLIORHINUS CANICULA*

By OTTO LOWENSTEIN

J. exp. Biol., 1956, Vol. 33, pp. 417–21

The presence of so-called terminal corpuscles in the connective tissues of the fins of *Scylliorhinus canicula*, first described by Wunderer in 1908, is confirmed.

It is demonstrated that they are pressure receptors with a slow rate of adaptation.

From their topographic distribution and from their mode of response to mechanical stimulation, it is postulated that the terminal corpuscles serve as proprioceptors in the widest sense of the term by signalling the spatio-temporal patterns of active or passive deformation of the fin.

Their topographic distribution makes it possible to distinguish their responses from those of sense endings associated with the muscles or tendons of the fin. O.L.

NERVOUS REGULATION OF LUMINESCENCE IN THE SEA PANSY *RENILLA KÖLLIKERI*

By J. A. C. NICOL

J. exp. Biol., 1955, Vol. 32, pp. 619–35

During a visit to the Scripps Institution of Oceanography, advantage was taken of the opportunity to study luminescence in the sea pansy *Renilla kölliken*. When stimulated, *Renilla* produces luminescent waves, which are under control of a non-polarized nerve net. The response is subject to facilitation, which occurs terminally, at the neuro-photocyte junctions. Facilitation is analysed in detail, and a facilitation-decay curve presented. Between successive bursts of stimuli, facilitation may persist for some 10 min. Measured response-parameters were as follows: latent period, 0·12 sec; local duration of response, 1 sec; time to reach maximal intensity, 0·22 sec; conduction speed of luminescent wave, 9 cm/sec (16–17° C). The refractory period of the response is about 0·2 sec, and increases under repetitive stimulation. When strongly excited the animal passes into a hyper-excitatory state, in which luminescent waves continue to arise long after stimulation has ceased.

J.A.C.N.

OBSERVATIONS ON THE ANATOMY AND MODE OF LIFE OF *LASAEA RUBRA* (MONTAGU) AND *TURTONIA MINUTA* (FABRICIUS)

By E. Oldfield

Proc. malacol. Soc. Lond., 1955, Vol. 31, pp. 226–49

The anatomy of *Lasaea rubra* and *Turtonia minuta* is described. Certain organs such as the gills and stomach show simplicity of structure which has probably been acquired secondarily in relation to small size.

In both genera the mode of reproduction is specialized for protection of the developing embryos and consequently relatively few eggs are produced, but these are large and heavily laden with yolk. *Lasaea* and *Turtonia* show entirely different methods for protecting the developing young; in *Lasaea* the embryos are incubated within the suprabranchial chamber, whereas in *Turtonia* the embroys develop within a gelatinous capsule which is attached to the byssus of the female. In both genera the free veliger stage is completely suppressed; a study of the embryology is in progress.

The systematic position of the two genera is discussed and it appears that *Turtonia* should not be included together with *Lasaea* and *Kellia* in the family Erycinidae.

E.O.