

ABSTRACTS OF MEMOIRS

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY

RECEPTOR ELEMENTS IN THE THORACIC MUSCLES OF *HOMARUS VULGARIS* AND *PALINURUS VULGARIS*

By J. S. Alexandrowicz

Quart. Journ. Micr. Sci., Vol. 93, 1952, pp. 315-46

In the thoracic muscles of *Homarus vulgaris* and *Palinurus vulgaris* the presence of receptor elements of various kinds has been recorded. Muscle receptor organs belonging to the same category as described previously in the abdomen have been found in the two posterior (7th and 8th) thoracic segments. Like those in the six abdominal segments they are linked with the system of the extensor muscles. The topography and the structure of these organs have been described.

Nerve cells regarded as receptors of a different category have been found in some of the muscles inserting in the median surface of the epimeral plate. These cells, termed 'N-cells', are smaller elements than those of the first category and have not a special muscle of their own, but end with long processes between the fibres of the ordinary muscles. In each of the species investigated five such elements have been found. It is suggested that the N-cells may represent more primitive forms of muscle receptors, and the receptor organs of the extensor muscles in the thorax and abdomen are more highly evolved forms.

J.S.A.

NOTES ON THE NERVOUS SYSTEM IN THE STOMATOPODA.

II. THE SYSTEM OF DORSAL TRUNKS.

III. SMALL NERVE CELLS IN MOTOR NERVES

By J. S. Alexandrowicz

Pubbl. Staz. Zool. Napoli, Vol. 24, 1953, pp. 29-45

On the ventral surface of the extensor muscles in *Squilla mantis* a pair of nerve trunks has been found which run longitudinally through the thoracic and abdominal segments. In each of the first five abdominal segments there are four ganglion cells in each trunk. In the same segments five paired nerves arise from the trunks and give off branches ending in two neuropile-like networks situated in the pericardial cavity: the first in its lateral wall and the second in a lamella spanned between the dorsal muscles of the opposite sides. It is suggested that these nervous elements have a neurosecretory function.

In the motor nerves running on the ventral surface of the extensor muscles in *Squilla mantis* nerve cells of small size have been found. They have long processes running alongside the motor fibres. There is no evidence of any relations of these cells with the system of dorsal trunks. J.S.A.

RESISTENZ DER MEERESALGEN GEGEN SICHTBARES LICHT UND GEGEN
KURZWELIGE UV-STRAHLEN

By R. Biebl

Protoplasma, Bd. 41, 1952, pp. 353-77

The tissues of marine algae show a typical 'ecological resistance' to direct sunlight. After 2 hr. exposure to sunlight or 3-5 days' exposure to two 350 W. electric-light bulbs all the cells of sublittoral algae were killed, while those of intertidal algae remained intact.

The degree of resistance to ultra-violet light is characteristic for algae within each ecological zone (intertidal, low-water, or sublittoral): it is constitutional, and not conditioned by the environment. Resistances to sunlight and to ultra-violet light are different characteristics of the tissues.

Photographs of dead cells show that those killed by visible light are in general rapidly bleached, in contrast to those killed by ultra-violet light or other deleterious agents. R.B.

LICHTTRANSMISSIONSÄNDERUNGEN AN MEERESALGEN, IM BESONDEREN
AN *PORPHYRA UMBILICALIS* F. *LACINIATA*

By R. Biebl

Oesterr. botan. Zeitschr., Bd. 100, 1953, pp. 179-202

The light-transmission between 400 and 800 m μ was measured with an Unicam Photoelectric Quartz Spectrophotometer on small pieces of the red alga *Porphyra umbilicalis* (L.) Kütz. f. *laciniata* (Lightf.) J.Ag. in order to compare the values obtained before and after various treatments.

If *Porphyra*, after being kept for 17 hr. in hypotonic (10% normal) or hypertonic (300% normal) sea water, is desiccated for 3 hr. or exposed for 2 hr. to direct sunlight, it exhibits a remarkable raising of light-transmission, which is fully reversible if the alga is brought back to normal conditions for about 20 hr. If the pieces are put in darkness after 2 hr. exposure to sunlight, the light transmission continues to rise for about 5 hr., but afterwards returns

gradually to the original values. Heat (34° C.) also causes raising of light-transmission. Cold (-2° C.) does not.

There is a certain contrast between the extinction curves obtained with algae treated with distilled water or 10% sea water on the one hand, and those treated with concentrated sea water, or desiccated, on the other. For descriptive purposes, the terms 'swelling type' (Quellungstyp) and 'shrinking type' (Entquellungstyp) have been adopted.

It was not possible to study the cause of changes in light transmission in the time available. Alterations in the form of the big plastids as well as changes in the colloidal structure of a reversible nature in the plastids ought to be taken into consideration. It is unlikely that the pigments could be decomposed and resynthesised during the short duration of the experiments.

R.B.

SOME STRUCTURAL PROTEINS OF *MYTILUS EDULIS*

By C. H. Brown

Quart. Journ. Micr. Sci., Vol. 93, 1952, pp. 487-502

The byssus threads, periostracum, hinge and ground substance of the shell and the supporting material of the gills of *Mytilus edulis* were examined by physical, chemical and histochemical means. The byssus threads, periostracum and hinge were shown to consist of a quinone-tanned protein. The byssus threads are formed in the posterior groove of the foot from the secretions of two glands, the 'white' gland which supplies the bulk of the protein of the thread and the 'purple' gland which supplies the aromatic material responsible for the tanning. The periostracum is secreted by gland cells in the epithelium of the outer lobe of the mantle edge. The supporting material of the gills is a fibrous protein without quinone-tanning. This protein is in some respects similar to the untanned protein of the byssus.

C.H.B.

PRESENZA DI SPICOLE IN *DIPLOSOMA LISTERIANUM* (MILNE EDWARDS). CONTRIBUTO ALLA SISTEMATICA DEGLI ASCIDIACEA, DIDEMNIDAE (THE PRESENCE OF SPICULES IN *DIPLOSOMA LISTERIANUM* [MILNE EDWARDS]. A CONTRIBUTION TO THE SYSTEMATICS OF THE ASCIDIACEA, DIDEMNIDAE)

By D. B. Carlisle

Pubbl. Staz. Zool. Napoli, Vol. 24, 1953, pp. 62-8

The presence of calcareous spicules is reported in the test of some colonies of this species collected at Naples and in a much less proportion of colonies collected at Plymouth. They are much smaller than is usual in the Didemnidae and are rapidly destroyed by the trace of formic acid present in formalin so

that they are normally absent from preserved material. They are invisible except with phase contrast when a piece of test is mounted in canada balsam. The nomenclature of the species is discussed and it is suggested that the report of these spicules destroys the last remaining difference between the genera *Lissoclinum* and *Diplosoma*, so that they should now be merged under the older name—*Diplosoma* Macdonald. It is possible that *Lissoclinum pseudoleptoclinum* (Drasche) may be a subspecies of *Diplosoma listerianum*.

D.B.C.

STUDIES ON *LYSMATA SETICAUDATA* RISSO (CRUSTACEA DECAPODA).

II. EXPERIMENTAL EVIDENCE FOR A GROWTH- AND MOULT-ACCELERATING FACTOR OBTAINABLE FROM EYESTALKS

By D. B. Carlisle and P. F. R. Dohrn

Pubbl. Staz. Zool. Napoli, Vol. 24, 1953, pp. 69–83

A solution made by extracting the eyestalks of fast-moulting (summer) female *Lysmata* or *Palaemon* spp. with distilled water acidified to pH 3.5–3.8 with hydrochloric acid was active in accelerating the rate of moulting when injected intramuscularly into *Lysmata*. There was no significant activity in male eyestalk extracts or in extracts made from eyestalks taken from females in winter when the moult rate is very low. The active material was destroyed by boiling. The moult rate was also accelerated by vertebrate pituitary extracts and crude human chorionic gonadotrophin. It is suggested that the active material in the eyestalk extracts is a hormone whose site of origin is probably neurosecretory cells in the central nervous system of the eyestalk and other ganglia. It is concluded that the initiation of the moulting process may be under the control of the moult-inhibiting hormone, but the process of the premoult, once begun, is controlled by the moult-accelerating hormone.

D.B.C.

PLANKTON OF THE BENGUELA CURRENT

By T. J. Hart

Nature, Vol. 171, 1953, pp. 631–4

Preliminary results from net-caught phytoplankton samples showed good agreement with the hydrological results described in a previous article by Currie, and some analogy with conditions off California. Many cosmopolitan species seemed especially abundant in both areas. In the Benguela, chaetocerids predominated in the richest coastal area both in autumn and in spring. *Planktoniella* formed a good indicator of the much poorer offshore current at both seasons, and followed intrusions of this water into the area of the

upwelling current very closely, as Gunther had found off Peru. *Goniaulax spinifera* was dominant in a localized area where lateral mixing between the two main types of surface waters seemed most probable, but the total plankton there was not rich. Many individual species of diatoms showed distributional patterns conforming to the disposition of the water masses. The population of the rich inshore area tended to be greater in autumn than in spring, and this is thought to be due to the lessened upwelling intensity in autumn, some time-lag favouring maximum development of the succession in the previously upwelled water.

Samples of discoloured surface-water near Walvis Bay at the time of a moderate fish mortality showed *Peridinium triquetrum* dominant in reddish areas (3–6 million cells/l.). Khaki areas were less rich (some half-million cells/l.) and contained many diatoms (*Asterionella*) and *Prorocentrum* in addition to the *P. triquetrum*. Water bloom of several different types is now known to occur in the region, though blooms due to *Gymnodinium* or *Goniaulax*, such as are known to be lethal elsewhere, have not yet been identified. It is suggested hypothetically that the fish mortalities may result from multiple causes, with the emphasis on lack of oxygen in the subsurface layers, rather than from the action of noxious dinoflagellates alone.

Some outstanding features of the zooplankton distribution are also briefly mentioned.

T.J.H.

CONTRACTION AND RELAXATION IN THE ADDUCTOR MUSCLES OF *MYTILUS EDULIS*

By J. Lowy

Journ. Physiol., Vol. 120, 1953, pp. 129–40

The spontaneous electrical and mechanical activity in the intact posterior adductor muscle of *Mytilus edulis* has been recorded simultaneously and continuously for long periods of time with the animal in water or exposed to air. It was found that both phasic and tonic contractions of the adductor are accompanied by muscle action potentials. Tonic contraction is associated with intermittent excitatory volleys as well as with electrical activity in the muscle during the intervals between volleys.

Experiments with preparations of the posterior adductor muscle show that nerve elements in the visceral ganglia control the duration and termination of a state of contraction. On the present evidence no explanation can as yet be given about the mechanism involved in the nervous control of relaxation.

When placed in oxygenated sea water the denervated posterior adductor muscle relaxes within a few hours. Strips of this muscle can also be isolated in a relaxed state. Such preparations remain excitable to electrical stimuli and exert a maximum tension for up to two days at 14° C.

J.L.