

## Abstracts of Memoirs

RECORDING WORK DONE AT THE PLYMOUTH LABORATORY.

### The Osmotic Properties of Medusæ.

By **J. B. Bateman.**

*J. Exp. Biol.*, 9, pp. 124–127, 1932.

The erroneous statement made by Gortner (1929) that the water content of medusæ is 99·8 per cent, is corrected by reference to earlier works (Krukenberg, 1880; Mœbius, 1880, 1882; Vernon, 1896; Myers, 1919). Macallum's statement (1903) that slowness of diffusion in the medusæ is responsible for the existence of considerable osmotic differences between the animal and the surrounding sea-water, is corrected by experiments in which the vapour pressure of the jelly was compared with that of the external medium. The animals, whether alive or dead, rapidly came into osmotic equilibrium with their environment. "Bound" water determinations on slices of the jelly disc, by A. V. Hill's "direct" and "differential" methods (1930), showed nearly all of the water to be capable of acting as a solvent for added substances.

J. B. B.

### On the Influence of the Extra-Cardiac Nerves upon Sino-Auricular Conduction in the Heart of Scyllium.

By **J. J. Izquierdo.**

*Journal of Physiology*, Vol. LXIX, No. 1, pp. 29–47, March, 1930.

Previous observers had reported, both for the mammals and cold-blooded animals, that during faradization of the vagus nerves blocks are produced or increased and conduction intervals are lengthened. Cases of "reversed" vagus action, in which stimulation of the nerve produced the opposite effects, were also known and explained as due to the stimulation of sympathetic fibres included in the vagus trunk.

Nevertheless, neither the "pure" sympathetic effect in the hearts in which the "reversed" effects had been described was known, nor sufficient evidence was at hand to prove that improvement and slowing of conduction are always characteristic of vagal and sympathetic stimulation.

In view of this double interest, two first series of experiments made by the author in the turtle (*Am. Journ. of Physiol.*, LXXXVIII, p. 195, 1929) and in the dog (*Am. Journ. of Physiol.*, XCI, p. 696, 1930) were completed at the Laboratories of the Marine Biological Association with a third one made on the heart of Scyllium. The results of the experiments, which were published in the *Journ. of Physiol.*, LXIX, p. 29, 1930, are summarized as follows:—

1. Faradization of the nerves coursing along the walls of the ducti Cuvieri brought about two groups of effects upon conduction between sinus and auricle impaired by pressure.

(a) *Primary effects.* After a stimulation which slows the sinus rhythm or produces a partial block, and independently of the slowing produced which by itself should improve conduction, the S-A intervals are lengthened (50–75%) and gradually return to normal after the stimulation is over.

Neither normal nor impaired conduction were influenced by the stimulation.

(b) *After-effects.* Stronger faradization, producing total blocks and arrest of the heart, are followed by an extremely brief secondary phase of opposite character.

2. *After atropinization*, the vagal effects are no longer observed. Instead, the S-A intervals are found appreciably shortened both during and after the end of the stimulation.

This shows that the influence of the vagus upon the basal segments of the heart of Scyllium consists in lengthening conduction, while the sympathetic influence, although less notable, has an opposite character.

J. J. I.

## The Larval Stages of Caridion, with a Description of a New Species *C. steveni*.

By Marie V. Lebour, D.Sc.

*Proc. Zool. Soc., London, May, 1930, pp. 181–194.*

The larvæ which were regarded by Sars as belonging to *Pseudalulus borealis* and *P. bonnierii* are now found to belong to Caridion. Sars' *P. borealis* is the larva of *Caridion gordonii* and Sars' *P. bonnierii* is the larva of a new species, here called *C. steveni*. *C. gordonii* is a deeper water species and has not been found at Plymouth in the adult state, although the young stages and the larvæ occur, the larvæ fairly commonly. *C. steveni* is occasionally to be found between tide-marks and its larva occurs with that of *C. gordonii* or separately. The larvæ, post-larvæ, and young stages are described in this paper and the new species *C. steveni* described

in its adult state. The larvæ of the latter species were hatched out in the Laboratory, and the late larvæ of both species kept until they turned into post-larvæ and young.

M. V. L.

**The Larvæ of the Plymouth Caridea.—I. The Larvæ of the Crangonidæ.  
II. The Larvæ of the Hippolytidæ.**

**By Marie V. Lebour, D.Sc.**

*Proc. Zool. Soc., London, April, 1931, pp. 1–9.*

The larvæ of all the species of Crangon and Philoceras occurring at Plymouth are described and all but one have been hatched from the egg. *Philocheras sculptus* larva is described for the first time.

The larvæ of the two species of Hippolyte known from Plymouth are described. Both were hatched from the egg. *H. prideauxiana* larvæ are described for the first time. *H. fascigera* Gosse is shown by hatching its larvæ to be a variety of *H. varians*.

M. V. L.

**Further Notes on Larval Brachyura.**

**By Marie V. Lebour, D.Sc.**

*Proc. Zool. Soc., London, April, 1931, pp. 93–96.*

There are additions to the "Larval Stages of the Plymouth Brachyura." Amongst other things *Pisa biaculeata* has been hatched from the egg in a plunger jar, the zoea being more like Inachus and Macropodia than it is like Hyas, although there are certain important differences. A table shows the relationship with these crabs.

M. V. L.

**Preliminary Studies on the Bacterial Cell-Mass (accessory cell-mass) of *Calandra cruzæ* (Linn.): the Rice Weevil.**

**By K. Mansour.**

*Quart. Jour. Micro. Sci.*, 73 (3) 421–436, 2 plates, 4 figs., 1930.

Examination of the ovaries has shown the presence of bacterial cells at the tips of the ovarioles. From these cells the bacteria pass to the germarium and infect the growing oocytes at a very early stage. During embryonic development an alimentary bacterial cell-mass is formed in all eggs. In the eggs destined to give rise to females a second bacterial

cell-mass is formed close to the genital cells. This later on gives rise to bacterial cells at the tips of the ovarioles. A study of the feeding habits of *Calandra* and *Hylobius abietis*, another similarly infected weevil, throws doubt on the supposed digestive rôle of this kind of bacteria.

K. M.

### **Tyrosinase in Crustacean Blood.**

**By Kathleen Godwin Pinhey.**

*Brit. Jour. Exp. Biology, Vol. VII, p. 19, 1930.*

The blackening of crustacean blood when it is shed, or in clots at wounds, is caused by an enzyme similar to, if not identical with, the tyrosinase systems previously described in various invertebrates, fungi and in the higher plants. The components of the system are an enzyme contained in the blood corpuscles, from which it is freed on cytolysis, and its substrate tyrosine, free in the blood stream. The enzyme is by definition a tyrosinase, since it will bring about the oxidation of tyrosine with the ultimate production of melanin, deriving the oxygen necessary for the reaction from the air. The tyrosinase content of the blood is not constant, nor does it undergo a seasonal variation. The possibility of shorter cycles in tyrosinase activity has not been investigated.

The blood will accelerate the oxidation of diphenylenediamine and  $\alpha$  naphthol to the blue indophenol derivative; but as this reaction is comparatively insensitive to NaCN, it is unlikely that it is due to an indophenol oxidase.

The enzyme is inhibited by low molecular concentrations of NaCN, indicating the presence of a metallic group as an active part of the enzyme molecule. The activity of the enzyme is also depressed by  $H_2S$ ,  $CuSO_4$ ,  $FeCl_3$ , sodium fluoride, sodium pyrophosphate, and the alcohols. Of the latter, ethyl alcohol is effective in concentrations of 2.7 molar, while methyl has no effect in 3.5 molar concentration. This is the expected result from Warburg's hypothesis, but as tyrosine is insoluble in alcohol, and the amounts of the higher alcohols which could be introduced into the watery solution were too small to have any effect, a series could not be investigated. Thymol, phenyl urethane and urethane in certain concentrations will depress the oxidation of tyrosine by the enzyme, but higher concentrations of these reagents increase the rate of oxidation. A possible explanation of this effect is discussed.

K. G. P.

**Studies on some Sporozoa in Polychæte Worms. I. Gregarines of the genus *Selenidium*.**

**By Harendranath Ray.**

*Parasitology (Cambridge), Vol. XXII, pp. 370-398, 1930, with 4 plates and 3 figs. in the text.*

1. The main facts in Brasil's (1907) account of the intracellular schizogony in *Selenidium caulleryi* from *Protula tubularia* have been confirmed. Early stages in the sporogony of this species are described now for the first time.

2. Intracellular schizogony is described for the first time in *Selenidium mesnili* Brasil from *Myxicola infundibulum*, and here also the early stages in sporogony are noted for the first time.

3. The life-histories of Caullery and Mesnil's two unnamed species of *Selenidium* (now called *S. spionis* (Koll.) and *S. foliatum* n.sp.) from *Scolecopsis fuliginosa* have been exhaustively studied. No schizogonic phase has been seen in either. The gametocytes, here described for the first time, are found to develop fully only after escape into the sea. The gametocytes of *S. spionis* are ovoid,  $108\mu \times 60\mu$ , and contain spores with four sporozoites: those of *S. foliatum* are spherical,  $70\mu$  in diameter, and their spores contain eight sporozoites.

4. Precocious association is observed in *S. foliatum*. In this species two associates are of very different sizes—the larger is  $230-250\mu \times 40-50\mu$ , and the smaller  $40-50\mu \times 15-30\mu$ —and when stained *intra vitam* with neutral red, the cytoplasm of the shorter of the two behaves differently from that of the longer and shows innumerable pink granules.

5. New or hitherto little-known species of *Selenidium* are recorded from *Cirratulus cirratus*, *Branchiomma vesiculosum*, *Sabella pavonina* and *Terebella lepidoria* and the morphological characters of the trophozoites are described.

6. A discussion follows of the value of the diagnostic characters of the genus *Selenidium*. It is suggested that this genus requires drastic revision and will probably have to be dismembered. Stress is laid, however, on the occurrence in all the gregarines examined, and at all the described stages of their development, of characteristic chromatic bodies at the anterior end, structures which have hitherto escaped the notice of most observers.

H. N. R.

**Studies on some Sporozoa in Polychæte Worms. II. *Dorisiella scolelepidis*  
n. gen., n. sp.**

**By Harendranath Ray.**

*Parasitology (Cambridge), Vol. XXII, pp. 471-480, 1930.*

The organism dealt with here is the first gut-inhabiting organism remotely resembling Coccidia that has ever been described in detail from an annelid worm. The chief characters are : chromatic granules present at the anterior end at all stages ; two types of schizogony, with merozoites arranged "en barillet" ; the macrogametocytes are migratory ; no oocyst is developed round the zygote ; two spores are formed, each containing eight sporozoites. Type-species : *Dorisiella scolelepidis*, in the epithelial cells of the gut of *Scolelepis fuliginosa* Clpde.

H. N. R.