exhibited in the public gallery of the British Museum (Natural History), was taken four miles west of the Lizard in 27 fathoms. The large male found alive in only 2 ft. of water on the Cork coast probably strayed from much deeper water, because Halbert mentions that one of the epizoic organisms, the hydroid *Sertularella gayi* (Lamouroux), is found in fairly deep water. In recent years *Paromola* has extended its range, via the west coast of Scotland, to the waters around the Orkneys, Shetlands and the southern part of the Norwegian west coast.

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Naphthaquinone Pigments in the Tropical Sea Urchin *Diadema antillarum* (Philippi)

IN addition to black pigment[1], the sea urchin, *Diadema antillarum*, contains abundant red and purplish pigments.

Extracts of spines, test, peristome, periproct, podia, gut wall, radial water vascular canals and nerve cords, axial complex and amœbocytes of the cœlomic fluid, made by dilute hydrochloric acid under diethyl ether, yielded bright red ethereal solutions showing absorption maxima, when acidified, at 259–62 mμ, 337–42 mμ and 460–70 mμ. Solutions deposited dark red, somewhat unstable, needle-like crystals soluble in benzene, chloroform, acetone, methanol, ethanol, and concentrated sulphuric acid, less soluble in carbon disulphide and light petroleum and slightly soluble in water and hexane. They give a bright green colour with ferric chloride, and in acid solution are unaffected by hydrogen peroxide, but are rapidly and reversibly decolorized by hydrosulphite. If partitioned between diethyl ether and water, the pigment is red and epiphasic when acidified, purplish and hypophasic in the presence of alkali. Neutral or alkaline solutions are unstable. These properties indicate naphthaquinones.

Chromatography is difficult; most of the pigment altered on columns of calcium carbonate, magnesium silicate, and to a lesser extent on silica gel, yielding purplish, brownish or black products and eluates with varying absorption characteristics. On powdered cellulose columns (tried at the suggestion of Prof. C. H. Hassall[2]), slow development with light petroleum or benzene produced chromatograms with three or more zones, yielding unstable eluates showing one or more of the above absorption bands, sometimes with a varying number of additional maxima between 230 mμ and 400 mμ. Eluates which showed no additional maxima on the first chromatographing usually did when re-chromatographed. The additional maxima disappeared when the solutions were warmed. More rapid development with diethyl ether usually produced chromatograms with a single homogeneous orange zone showing three absorption maxima close to those of the crude extract. Sometimes two zones appeared, the main one similar to the last, and a much smaller purple zone, which left the column in acid ethanol as an orange solution. Paper chromatography of a crude extract from an individual provided by the Zoological Society of London, recently performed by Dr. T. W. Goodwin, confirmed the instability of the main orange pigment and showed that it changed on the chromatogram to a purple pigment with an absorption maximum in the visible, at about 480 mμ. The latter is eluted from the paper with acid ethanol only with difficulty, while the original pigment is easily eluted with diethyl ether.

The main pigment, purified by chromatography and re-crystallization, shows absorption maxima in acidified diethyl ether at 263–64, 337–39, and 462–63 mμ. It melts at 223° C., sublimes at about 200° C., and does not fluoresce in the ultra-violet in ethereal solution.

Pigment is present in the form of spheroids in the podia, radial water vascular canals, gut wall, axial complex and cœlomic fluid. Some are enclosed in amœbocytes[3], others are free in the tissues, suggesting an origin from amœbocytes. Some pigment is present in the gut wall, in the form of much more minute granules or droplets. The gonads, at least during the summer, contained none of this pigment except in amœbocytes. In the amœbocytes of the cœlomic fluid a reduced precursor of the pigment appears to exist[3].

Much of this work was done in the Zoology Department of the University College of the West Indies, the spectrophotometer being provided by the Rockefeller Foundation. A full account is being prepared.

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An Ecdysial Membrane in the Locust Cuticle

Passonneau and Williams[1] have described in the developing cecropia silkworm an 'ecdysial membrane' situated between pupal and adult cuticles. Richards[2] has studied the fine structure of this membrane, but was unable to demonstrate clearly its nature and origin.

A similar membrane has been found between new and old cuticles of the locust *Schistocerca gregaria* at the time of moulting from nymph to adult and at all the preceding nymphal moults. Its origin has been studied in successive stages of the nymphal-adult moult. No trace of the membrane is seen until after the retraction of the epidermis from the nymphal cuticle, when a few of the innermost laminæ of the endocuticle show properties different from those of the outer laminæ. They are sudanophil, and become detached from the dissolving endocuticle. They do not dissolve, and although at first separate from each other, later become adherent to form a discrete compact membrane. There seems no reason to doubt that the ecdysial membrane represents an innermost sheet of endocuticle which is in some way protected from the action of the moulting fluid.