

The little ditch in which I found *Palmella uviformis* is sometimes filled with running or stagnant water, sometimes perfectly dry. The metamorphoses undergone by the Algæ it contains enable them to adapt themselves to the different conditions presented by their surrounding medium. The presence of crystals of carbonate of lime, indicating a great concentration of this calcareous salt in the ambient nutritive fluid, might, according to the observations of Famintzin, contribute to the disaggregation of the Confervoid Alga into a *Palmella*.—*Bull. Soc. Vaud. Sci. Nat.* xviii. p. 115; *Bibl. Univ.* January 15, 1883, *Bull. Sci.* p. 109.

*On the Chromatophores of the Cephalopoda.* By M. R. BLANCHARD.

The author has investigated the chromatophores of *Octopus vulgaris*, *Loligo vulgaris*, and *Sepia officinalis* in adult examples, and of the last-named species in the young embryo. The results obtained were identical throughout.

Kölliker, in 1844 ('Entwicklungsgesch. der Cephalopoden,' p. 71) attributed the expansion and contraction of the chromatophores to the contraction and relaxation of peculiar muscular fibres situated near these pigment-cells, but having no connexion with the chromatophores themselves; later writers (such as Haless, Keferstein, and F. Boll) have gone further, and described these muscles as inserted upon the enveloping membrane. In 1875 Harting (*Niederl. Archiv für Zool.* tome ii.) showed that these radiating fibres remain perfectly motionless, and that the play of the chromatophores was not due to the contraction of any muscular fibres. He regarded the radiating fibres, of which from twelve to twenty surround each chromatophore, as so many nerve-terminations attached to the enveloping membrane of the chromoblast by a clavate extremity containing a nucleus. The membrane, he thought, was filled with a transparent liquid, within which the denser coloured protoplasm spread out and contracted under the influence of the nerves.

The author agrees with Harting and Girod that there are no such things as the radiating muscles; but as regards the opinion of the former, he has found that there is no enveloping membrane; and with it disappears the contained liquid. He says that the chromatophore of the Cephalopoda does not differ at all in its general structure from those of fishes, Batrachia, and especially Sauria (Chameleon); it is a simple connective cell charged with pigment, and possessing in the highest degree the faculty of pushing forth amœboid processes into the amorphous material which exists beneath the epidermis. The chromatophore alone is active, and the surrounding tissues take no part in the performance of its movements; and the author compares it to an Amœba loaded with pigment, living its own life independently of the skin in which it is imprisoned.

This Amœba, however, is under the influence of the nervous system, as has been shown to be the case in the chameleon by the experiments of Brücke, H. Milne-Edwards, and Paul Bert, and in the





Blanchard,  
Raphae

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