as follows in my previous paper:—"Most of them were pretty severely crushed, in part even mutilated. Some, however, on being brought into a warm room, soon so far recovered again that no injury whatever could be perceived." This is not quite correct. In the year 1888 Dr. Döderlein informed me that his attention also had been drawn by an agriculturalist near Strassburg to the winter supplies of the mole. He stated that examination revealed the fact that the first segment of all the worms was severely injured, so that they could not burrow. A new investigation of my own completely confirmed this statement. In all the specimens the first segment was injured, and often several others besides. It is true that in many instances the wounds were already almost completely cicatrized; the most recently captured individuals were, however, still bleeding. The worms were therefore prevented from escaping not only through being securely imprisoned within the walls of the dwelling-chamber and passages, but also through this highly practical mutilation, and were nevertheless preserved alive. The crushings, which, as I stated previously, are not always present, are probably to be regarded as of a secondary nature, and result from the worms being pressed into the walls.—*Zoologischer Anzeiger*, Jahrg. xiv. no. 353, Jan. 5, 1891.

On the Development of the Chromatophores of Octopod Cephalopoda. By L. Joubin.

The anatomical structure of the chromatophores of adult Cephalopoda is now tolerably well understood, and the theory which attributed the movements of the pigmented matter to contractions of muscular fibres appears to be definitely abandoned; but people are far from being agreed as to the mode of development of these organs. Having had the opportunity of studying the embryogeny of *Argonauta* and *Octopus* at Banyuls, I have arrived at results which appear to me to be very different from what was found to be the case in the Decapod Cephalopoda.

Contrary to the opinion of M. Girod, who regards the chromatophores of the Decapoda as developing at the expense of the mesoderm, contrary, too, to the belief of M. Phisalix, who considers the pigmented cell of *Sepiola* as resulting from the fusion of a number of other cells, I hold that the chromatophore of the Octopod is of ectodermic origin, and that its accessory parts alone are mesodermic. This is tolerably comparable to what is found in the organs of sense.

In the embryo of *Argonauta* the integument consists of a simple ectodermic epithelium covering a loose mesodermic connective tissue.

In the dorsal region enclosed between the two eyes we observe, better than anywhere else, certain scattered ectodermic cells becoming larger than those surrounding them, then, little by little, sinking down into a sort of depression shaped like a funnel, dragging the neighbouring cells with them.

The tip of the projection into the subjacent mesoderm, which is thus formed, is constituted by the large cell, destined to form the essential portion of the chromatophore. Sinking still further, it at last finds itself at the bottom of a little ectodermic pit, and commences to become very large; its protoplasmic contents divide into two layers, a more solid one, which condenses round the nucleus, and another, more limpid, in which the former is immersed.

This cell, the wall of which has thickened concurrently with its expansion, finishes by being attached to the invaginated ectodermic cells by a narrow area only, and at last separates from them and becomes free in the mesoderm, a few cells of which fix themselves upon it and drive it deeper in. Henceforth it loses its spherical shape, and nearly resembles a biconvex lens.

But while this has been taking place in the ectoderm the mesodermic cells have not remained inactive. Beneath the ectodermic invagination they arrange themselves to the number of five or six in a circle; successive radical divisions then take place, and the cells are finally some twenty in number, forming a circle of greater area. In shape they are of an elongate ovoid. It is at this period that, suspended above this circle, the ectodermic cell becomes free, and there finds itself naturally enclosed; it increases in size, and by its circular rim comes in contact with this wreath of ovoid cells. The chromatophore is thus constituted. The protoplasm of the chromatic cell assumes a yellow or rose-colour, and the peripheral cells become elongated and transformed into fibres.

The muscular or connective nature of these radial fibres has been the subject of much discussion. If muscular they would, by their sudden contraction, have induced the movements of the pigmented matter; if connective, they would not have had any immediate action on these movements. According to my own observations, both of these views are nevertheless true, though in succession. The young peripheral fibres are muscular and animated by contractile movements which are most distinct, though they have no sort of action on the pigmented protoplasm; they simply cause the entire apparatus to move in the direction of the contracted fibres. It is not until later that these fibres lose their contractile quality, become similar to bundles of fibres, and serve exclusively to retain the whole chromatophore in position.

The chromatophore, then, appears to me to be formed of an essential portion, the pigmented ectodermal cell, and of accessory mesodermic parts, which primitively resemble muscular fibres, and later on become connective.

As regards the nerve-endings belonging to each chromatophore, they can be rendered visible in the living animal by means of a special preparation of methylene blue. We then see with the greatest clearness the cutaneous nervous plexus of the chromatophores, each fibre of which terminates in a slight swelling, which is applied to the chromatic cell, though it does not appear to me to penetrate it.—*Comptes Rendus*, t. cxii. no. 1 (Jan. 5, 1891), pp. 58–60.