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On the oviposition of *Pleurodeles Waltlii*

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MISCELLANEOUS.

Tabulæ in the Stellate Venations of Stromatopora.

By H. J. CARTER, F.R.S. &c.

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,—On the 26th ult., under the kind guidance of my friend Mr. Champernowne, F.G.S., of Dartington Hall, near Totnes, I again went to “Pit-Park Quarry,” which is in the “Devonian Limestone” close by, where we found a block of that species of *Stromatopora*, which, from its large venation, appears to me to have been undescribed; and on clearing it a piece split off, which exposed a plane covered with its stellate venations, in which all the calcite usually filling them in the fossilized condition had been removed, so that they, in fact, presented the cœnenchyma just minus the soft parts or cœnosarc which originally filled them.

On examining these more closely after my return to this place, I found that the larger portions of the branches of the stellate venations were traversed by *tabulæ*.

Thus at once it was proved that the *Stromatoporce* could not have been sponges, and that they were *Tabulate corals*, like those in this respect in the same bed, in which the latter, in great abundance, are overgrown and enclosed by *Stromatopora* throughout, so as once to have formed one great reef-mass now decomposing into its original elements.

In a future communication I hope to describe and illustrate this fact in connexion with the species of *Stromatopora* wherein it was discovered.

I am yours faithfully,

Budleigh-Salterton,
Aug. 7, 1880.

HENRY J. CARTER.

On the Oviposition of Pleurodeles Waltlii.

By M. L. VAILLANT.

We have lately obtained in the menagerie of the Museum the reproduction of a well-known Urodelous Batrachian, *Pleurodeles Waltlii*, Michaelis, which, although belonging to the European fauna, had not previously been investigated in this particular.

In the month of May 1879 M. Desguez and I observed an alteration in the form of the tail in the males of these animals; the membranous crests, both superior and inferior, were visibly more developed. A little later we witnessed the actions preparatory to copulation. These are of the most singular kind, and, while reminding us of what is known of different Batrachians of the same group, present peculiarities which it is important to indicate.

The male places himself beneath the female, in such a way that the upper part of his head answers to the gular region of the latter. He then clasps the anterior limbs of his consort by raising his own; his foot passes successively behind, outside, and in front of the arm of the other individual; and finally the digits are inserted into the

axilla and complete the circuit. The pair are thus firmly united; and the dark colour common to the two sexes aiding the confusion, it is even necessary to look very closely at them in order to recognize the real position of the parts, and distinguish what belongs to each of the animals. The male swims to and fro carrying the female with him, the latter appearing inert and making no movement; from time to time he sinks to the bottom, detaches one of his feet, the right one in the tolerably numerous observations that we have made, and turns round upon the left limb, which he continues to hold grasped by his own. In this manœuvre he stretches himself out at first in front of the female, with the extremities of the two muzzles nearly against one another; then he continues his evolutions so as to place himself parallel to her left side. His tail, at this time, performs rapid undulations, a sort of shivering which resembles the analogous movements described by Rusconi in *Triton cristatus*. From time to time he endeavours to turn himself over beneath the female in order to bring his cloacal aperture near to hers. In all probability it is thus that the actual copulation is effected; but hitherto we have not been able to ascertain this positively. At the end of a variable time the male resumes his first situation beneath the female and begins to swim again; and it is not until after having several times repeated this process that the animals finally separate.

At the period when these facts were observed for the first time they were not followed by any result; but this year, towards the middle of February, the *Pleurodelæ* copulated again; and on the 25th of that month oviposition commenced, and continued during at least two months and a half. It was, however, particularly abundant at first, when the ova could be collected by hundreds.

These ova, which are not unlike those of the Axolotls, are attached to submerged bodies, especially to stones, and isolated from each other (that is to say, without any actual connexion) when, as is frequently the case, they are close together. The transparent albuminous sphere measures from 7 to 10 millims. in diameter, the egg, properly so called, being not more than 2 millims. The latter at first is black in its upper hemisphere, except a central polar point, of which the colour is yellowish, like that of the inferior hemisphere; at the end of three or four days it becomes entirely of a yellow colour, and one can distinguish the mark produced by the evolution of the primitive streak.

It seems useless to dwell upon the evolution, which presents nothing peculiar. The eggs being placed in the best condition of heat and light, the young issued from them from the 16th to the 20th day after deposition. The adherent hooks disappeared on the thirteenth day after exclusion, at which period the young tadpoles possess a tridactyle arm; eleven days later the posterior limbs are already somewhat developed. Finally, the animals at about two months and a half measure 0.07-0.08 metre, the branchiæ are atrophied, and, except in size, they have acquired the characters of the adult.

It may be noted, as the fact is not general among the Urodela, that the *Pleurodeles Waltlii* observed in the menagerie of the Museum accomplished all their transformations without quitting the water, and the most developed still remain there habitually.—*Comptes Rendus*, July 12, 1880, p. 127.

On the Tertiary Echinida of Belgium. By M. G. COTTEAU.

We have just investigated and described the Echinida of the Tertiary deposits of Belgium. The species, belonging to seventeen genera, are thirty-one in number. This little fauna, notwithstanding its comparative poverty, is none the less very interesting, whether we study it from a stratigraphical point of view, or compare it with the fauna which was developed in other countries at corresponding epochs, or examine the species from a purely zoological point of view.

Of the thirty-one species, twenty-three belong to the Lower Tertiary or Eocene group. Four of these occur in the Landenian system—*Holaster Dewalquei*, *Hemiaster nux* and *Vincenti*, and *Schizaster Corneti*. Three of these are new and hitherto peculiar to Belgium; only one, *Hemiaster nux*, was previously known and described from a higher level, in France in the beds with *Serpula spiræa* at Biarritz, in Italy in the Eocene of Vicenza and Verona, and in Switzerland in the Nummulitic deposits of Yberg.

The Laekenian is the system richest in Echinida, including sixteen species, some of which are very abundant, namely *Cyphosoma tertiarium* and *Vincenti*, *Caratomus Lehoni*, *Nucleolites approximatus*, *Echinolampas affinis* and *Duponti*, *Pygorkynchus Gregoirei*, *Echinocyamus propinquus* and *gracilis*, *Lenita patellaris*, *Scutellina lenticularis* and *rotunda*, *Brissopsis bruxellensis*, *Schizaster acuminatus*, *Spatangus pes equuli*, and *Maretia grignonensis*. Five of the most abundant and best characterized of these species, *Pygorkynchus Gregoirei*, *Lenita scutellaris*, *Scutellina lenticularis* and *rotunda*, and *Maretia grignonensis*, have been collected in the Calcaire grossier of the neighbourhood of Paris, and establish the concordance of those deposits with the Laekenian system of Belgium. One species, *Echinolampas affinis*, is wanting in the environs of Paris, but occurs in France at Cassel (Nord) and at Blaye (Gironde) in the Eocene, and in Switzerland in the Nummulitic deposits of Yberg. There remain ten species at present peculiar to Belgium.

Eight species belong to the Pliocene group, the Diestian and Scaldisian systems, namely *Cidaritis belgica*, *Echinus Nysti* and *Colbeaui*, *Psammechinus sphaeroideus*, *Dewalquei*, and *Cogelsi*, *Echinocyamus Forbesi*, and *Schizaster Scilla*. The last two only have been indicated outside of Belgium, namely *Echinocyamus Forbesi*, common in the Red Crag of Suffolk, and erroneously confounded by Forbes with the *E. pusillus* of the European seas, and *Schizaster Scilla*, which, in the south of France and Northern Italy, characterizes the Pliocene marls of Perpignan, Nice, and Asti.

Several of these species, both Eocene and Pliocene, deserve particular notice from a zoological point of view. We may cite in the