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On the reproduction of some Ctenostomatous Bryozoa

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F. Heckeli, Thiollière, from the French Lithographic Stone in size, the latter are much smaller.

6. *Brownieichthys ornatus*, gen. et sp. nov.—Remains of a small elongated fish, discovered by Mr. Montagu Browne in the Lower Lias of Barrow-on-Soar, pertain to a new generic and specific type, apparently related to the Belonorhynchidæ. The notochord is persistent and the neural and hæmal arches are ossified, but there are no well-developed ribs. The scales are thin, cycloid, with prominent concentric lines of growth, deeply overlapping and externally ornamented with ganoine tubercles. Portions of a dorsal and ventral series of very large, narrow, pointed ridge-scales are also observable. The cranial bones are invested with ganoine and are coarsely tuberculated.

On the Occurrence of the Devonian Ganoid Onychodus in Spitzbergen*.

By A. SMITH WOODWARD, F.G.S., F.Z.S.

In the collection of Devonian fossils from Mimes Dal, Spitzbergen, in the State Museum, Stockholm, kindly shown to the author by Professor Lindström, is a small, arched, tooth-bearing bone, undistinguishable from the so-called "intermandibular arch" or "presymphysal bone" of the remarkable Ganoid fish *Onychodus*. The genus has hitherto been met with only in the Devonian of Ohio and New York (Newberry, Geol. Surv. Ohio, vol. i. pt. ii. p. 296) and the Lower Old Red Sandstone Passage-beds of Ledbury, England (*Onychodus anglicus*, A. S. Woodward, Geol. Mag. [3] vol. v. p. 500). The new specimen thus considerably extends the known range of *Onychodus* in space, and, so far as can be ascertained, pertains to a hitherto undetermined specific type. Four fractured teeth are preserved, scarcely more than half as large as those of the smallest described species, *O. anglicus*, and differing from the latter in the very large size of the internal cavity. The form may be provisionally named *Onychodus arcticus*.

On the Reproduction of some Otenostomatous Bryozoa.

By M. HENRI PROUHO.

The author's observations were made upon three species of Alcyonellæans collected at Baugy-sur-Mer, namely *Alcyonidium albidum*, Alder, *Alcyonidium duplex*, sp. n.†, and *Pherusa tubulosa*, Ell. and Sol.

In *A. albidum* the polypides of the sexual zoecia have, between two tentacles of the anal side, a tubular organ communicating with the perivisceral cavity and opening outwards by a small ciliated vestibule. This organ occurs only in a few Bryozoa; it has been called the *intertentacular organ*; in *A. albidum* it is found only on

* Abstract of paper read before Section C, British Association, Newcastle-upon-Tyne, 1889.

† A species very nearly allied to *A. mytili*, Daly., but easily distinguished by the greater size of its cells, which attain a length of 1 millim.

the polypides of the sexual zoëcia. At the time of reproduction the ova detaching themselves successively from the ovary float in the perivisceral cavity; they then show irregular shrivelled forms and are furnished with a very delicate transparent shell. In this state they pass one at a time through the intertentacular organ of the expanded polypide, and when they thus get into the water they become regularly ovoid and the contents regularly spherical. During this process, which may last for some days, the spermatozooids press round the ovary and the ova detached from it. The author could not determine the precise moment of fecundation, but thinks that it takes place before the formation of the shell. Under any circumstances the intertentacular organ here fulfils the functions of an oviduct and the development is external.

The reproduction of *A. duplex* is more complex and very interesting. At the moment when the sexual elements are about to be developed the zoëcium is occupied by a polypide *destitute of any intertentacular organ*, and a cellular mass destined to form the spermatozooids appears against the wall of the stomachal cæcum. At the same time towards the aboral extremity of the same zoëcium a second polypide is formed, upon the funiculus of which young ovules originate. Thus one zoëcium has two polypides of different ages, of which the older one may be called the *male* and the other the *female polypide*. The male polypide soon begins to degenerate, leaving in the cell the brown body and a mass of spermatoblasts, while the female polypide, which continues growing, takes its place. The zoëcium then contains only a single polypide, the female, and *this is furnished with an intertentacular organ*. Later on the ova are seen to have passed into the sheath of this polypide probably by means of the intertentacular organ; they have a transparent shell and are attached, to the number of seven or eight, by a fine peduncle to the walls of the sheath, where their development takes place.

The liberation of the larvæ is very simple. When the polypide proceeds to expand the ovigerous part of the sheath becomes evaginated, forming a papilla, to the apex of which the ova are appended, and the larvæ which have completed their development burst through the shell and escape into the water. Thus in *A. duplex* two polypides of different sexes at first coexist in the same zoëcium; then the female polypide takes the place of the male and alone possesses the intertentacular organ through which the ova are evacuated; but while in *A. albidum* the ova are passed by this organ into the external medium, where they undergo a free development, in *A. duplex* it only conducts the ova into the invaginated sheath when their development takes place as in a sort of marsupium.

In *Pherusa tubulosa*, the polypides of which have no intertentacular organ, the larval form is a bivalve larva nearly identical in structure with that of *Flustrella*. The only known Bryozoan larvæ with two chitinous valves were those of *Membranipora* (*Cyphonautes*) and *Flustrella*; *Pherusa* furnishes a third example of this larval form.—*Comptes Rendus*, July 29, 1889, p. 197.