

cimens in which the stipulæ were largely developed. Of introduced plants, the common water-cress grows by cart-loads in and about the streams for several miles round Wellington; and *Mimulus luteus* is also spreading itself along the streams and over the swampy places behind the town. He adds that he is very desirous of introducing some of the British plants which would probably thrive, such as *Stellaria Holostea* and *Antirrhinum Cymbalaria*; and states that he brought out with him from England *Vallisneria spiralis*, of which he has specimens intended for the Botanic Garden at Melbourne, from whence it may perhaps make its way to Sydney and Hobart Town. Mr. Ralph concludes his sketch by mentioning a species of *Nitella* (*N. translucens*?) found in a rapid stream about five-and-twenty miles from Wellington.

MISCELLANEOUS.

On the Mode of Reproduction and Development in various groups of Zoophytes and Mollusca. By M. GEGENBAUR.

Acalephæ.

1. IN a new species of *Lizzia*, the development of the ova takes place in the following manner:—After exclusion from the ovary, which is rent at its external portion, the mature eggs become furrowed; a ciliated oval embryo is then formed, which is soon converted into a polypiform larva. This larva, after fixation, acquires a transparent corneous envelope, and throws out from a little below its extremity, four arms disposed in the form of a cross, whilst the mouth makes its appearance at the apex. The embryo of the Medusa has thus become a Polype, which resembles the genus *Stauridium* of Dujardin.

2. In a discophorous Medusa, the author saw gemmules arising in great quantity from the inner surface of the stomach; these gemmules at first presented the appearance of flat tubercles, which, becoming detached from their parent, gradually acquired the form of a bell. On the lower surface of this bell, near its circumference, four protuberances made their appearance; in its centre a small opening, the mouth was formed; the protuberances, which are marginal tentacles, soon increased in number, whilst the embryo continued growing. At last these gemmules, the whole development of which took place within the stomach of the mother, produced Medusæ, which did not differ from their parent in any respect.

3. The author considers that in a considerable number of genera, such as *Charybdea*, *Pelagia*, *Ephyropsis* (new genus), and *Rhizostoma*, the marginal organs are composed of an auditory apparatus and an organ of vision. The latter, which have hitherto only been seen by M. Kölliker in an *Oceania*, are placed close to the auditory vesicles, and attached to a prolongation of the stomachal sacs; they consist of a hemispheric mass of pigment-cells, in which a spherical

lens is half-buried; the free portion of this lens is perfectly naked and bathed by the sea water.

Siphonophora.

1. The genus *Eudoxia* lately studied by M. Busch is distinguished by the possession of two organs serving for generation; one of these is the natatory bell of the animal which contains either an ovary or a testicle at its bottom. The other, which is smaller, and fixed at the base of this bell, has a certain resemblance with the medusiform gemmules of polypes, which has led M. Busch to the opinion that the *Eudoxia* produced Medusæ. This opinion does not agree with the author's observations; he has seen very distinctly that the organ in question is only a natatory bell containing the organs of generation and serving to replace the other after it has detached itself.

2. With regard to *Abyla pentagona* the author has made a discovery which will serve to elucidate the history of the *Siphonophora* with a single sucker. A small siphonophorous Medusa of the *Eudoxia* type, which occurs very frequently in the port of Messina, and which possesses all the organs of the *Eudoxia*, including those of generation, was found to be nothing but a detached portion of an *Abyla*. That is to say, the fully developed *Abylæ* consist of a great number of Eudoxiiform animals, which become detached and lead an independent existence. Each of these animals possesses a trunk or sucker (polype according to M. Vogt) with a tentacle, a natatory bell, containing the organs of generation, and a protective portion resembling a cube. This latter portion has not hitherto been observed, which accounts for the relation between the *Abylæ* and *Eudoxia* having escaped the notice of MM. Quoy and Gaimard, and M. Kölliker. trompe

3. With respect to the *Veellæ*, the author believes he has observed a Medusa which is an ulterior development of the gemmules of these animals, which are attached to the smaller suckers. The youngest of these Medusæ resembled the detached gemmules described by Huxley, whilst the larger ones possessed a stomach and well-developed organs of generation, but no marginal corpuscles, and only one tentacular cirrus.

4. During last winter, the author attempted the artificial fecundation of the *Siphonophora*. He succeeded completely with the genera *Diphyes*, *Physophora*, *Agalmopsis*, *Hippopodius*, and *Forskahlia*. The development of the egg commenced with a complete wrinkling of the yolk; an embryo resembling a ciliated Infusory is then formed. Its further development was only observed in the genus *Diphyes*; the first portion of the *Diphyes* which makes its appearance is the upper part of the body and the natatory bell. M. Gegenbaur found a great number of young *Physophoridae* very similar to those described by M. Kölliker. cleavage

Pteropoda and Heteropoda.

1. The author has observed the embryos of nearly all the genera inhabiting the Mediterranean, viz. *Carinaria*, *Firola*, *Atlanta*, *Hy-*

alea, *Cleodora*, *Tiedemannia*, and *Pneumodermon*. In all, with the exception of *Pneumodermon*, the development of which has been described by Müller (Monatsbericht der Kön. Akad. der Wiss. zu Berlin, October 1852), and by Kölliker and Gegenbaur (Zeitschrift für Zoologie, Bd. iv.), an oval embryo is formed, furnished with membranous ciliated lobes (*velum*) and a shell (even in *Firola*). In the Pteropoda this *velum* is persistent, and becomes transformed into the finlike lateral appendages of these animals. In the Heteropoda, on the contrary, it gradually disappears as the animal acquires its characteristic form. The velum of the Heteropoda and Pteropoda corresponds exactly with that of the Gasteropoda, from which it follows that the lateral lobes or fins of the Pteropoda, which are only an ulterior metamorphosis of the velum, cannot be compared with the foot of the Gasteropoda, as was Cuvier's opinion.

2. Lastly, the author has ascertained that in many Mollusca the generative organs contain both eggs and spermatozoa. The excretory canal of these organs is not double, or furnished with two semi-canals, as was supposed by Meckel, but contains at once eggs and spermatozoa: this was shown by H. Müller of Wurzburg to be the case in *Phyllirhoë*.—*Comptes Rendus*, Sept. 26, 1853, p. 493.

TEETH OF TESTACELLUS AND GLANDINA.

M. Moquin-Tandon, in the 'Journal de Conchyliologie' (ii. 125), describes the teeth of *Testacellus*, and among other particulars states that the animal has no horny jaws, a retractile proboscis, and is carnivorous.

M. Morelet (in vol. iii. pp. 27 & 257) and M. Raymond (in vol. iv. p. 14 of the same Journal) describe the animal of two species of *Glandina* from America and Africa as having nearly similar teeth, a retractile proboscis without a horny jaw, and the same carnivorous appetite. The latter author considers *Testacellus* as "a *Glandina* with a rudimentary shell." Dr. Wyman described and figured the teeth of *Glandina* in the 'Boston Journal of Natural History,' showing them to be of a conical form.

I intended, in my paper on the Teeth of Pulmonata in the last Number, to have observed, that the illustrations of that paper were kindly drawn by Mr. S. P. Woodward from the well-mounted specimens of Messrs. Cocken and Wilton. The examination of the large series of mounted specimens belonging to these gentlemen and other microscopists, has been very useful to me in these researches, as showing the uniformity and permanence of the characters afforded by the teeth, and sometimes of drawing my attention to peculiarities of form, and inducing me to examine the teeth of the animal they were said to be taken from.—JOHN EDWARD GRAY.

On the Structure of the Retina in Man. By Profs. KÖLLIKER and H. MÜLLER.

The retina is composed of different layers—viz. 1. the layer of cylinders and cones; 2. that of nucleiform bodies; 3. the layer of



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