have been executed, under the author's superintendence, by Mr. De Wilde and Mr. A. S. Foord; and those artists have worked with a zeal and care which really leave little to be desired. With scarcely an exception the figures are most satisfactory; and we are glad to see that Mr. Foord has succeeded in rivalling the veteran coralliographer with whose work his own is here brought into competition.

MISCELLANEOUS.

On some Facts in regard to the first Phenomena of the Development of the Osseous Fishes. By M. L. F. Henneguy.

The formation of the blastodermic leaves in the osseous fishes is still but little known. In the trout, Œllacher makes the mesoderm and endoderm originate from the deeper layer of the germinal disk by simple differentiation of cells. According to Kupffer, Van Bambeke, His, and Klein the mesoderm alone results from the differentiation of the deeper layer of the germ, and the endoderm is formed by the cells which originate in the *subblastodermic layer* of Lereboullet, or the *parablast* of Klein. Lastly, Götte supposes that the blastoderm folds under at the margins to form a layer of cells, which afterwards subdivides into mesoderm and endoderm.

My own observations in part confirm those of Götte. Sections effected in germs of trout of from seven to ten days, hardened by osmic acid, have in fact shown me very distinctly the reflection of the blastoderm at its margins. The germ at this epoch is spread out upon the vitellus in the form of a lamina with thickened contours, the thinner centre of which conceals a cavity, the germinal cavity. The external surface of the germ is constituted by a layer formed by a single series of cylindrical cells. This layer appears very early, long before the germ begins to spread over the vitellus; Œllacher has given it the name of the *corneous lamina*. Beneath this lamina there is a pluricellular layer, presenting at first the same thickness throughout; this is the *sensorial layer*. This layer soon becomes inflected at the periphery of the disk, towards the vitellus, and penetrates into the germinal cavity; the corneous lamina takes no part in this inflexion, and stops suddenly at the surface of the vitellus. In sections made across a germ arrived at this stage of development, we see a linear fissure separate the sensorial layer from the reflected portion of the blastoderm and stop at a certain distance from the rounded margin of the germ.

In germs hardened by chromic acid the fissure is not visible; in its place one only observes a line separating the two layers of the blastoderm, but stopping at a certain distance from its free margin. This fact explains the opinion of Œllacher, who, having hardened all his trout-ova in chromic acid, assumes only a simple differentiation of cells for the mesoderm.

The parablast extends beneath the germ, and forms the floor of the germinal cavity: it is more abundant at the periphery than in the central region; so that it forms a sort of cupule in which the germ is enshrined. There is a canal with a triangular section surrounding the germ and included between the corneous lamina, the parablast, and the point of inflection of the sensorial layer.

When the embryonal shield begins to appear, the blastoderm is thicker at this level than in the rest of its extent, and the reflected portion advances further into the germinal cavity than that of the opposite side.

In the fresh state, in the ovum of the perch, thanks to its extreme transparency, I have been able to see the reflection of the margins of the blastoderm; and I was easily able to ascertain, by slightly compressing the ovum, the presence of the fissure which separates the sensorial lamina from its reflected part.

In trout-ova of which the blastoderm had covered rather more than half the vitelline globe, I have found, at the posterior part of the embryo, beneath the point at which the dorsal cord stops, a small vesicle lined with cylindrical cells. This vesicle, by its position, its form, and the constitution of its walls, appears to me to be identical with that described by Kupffer in the stickleback under the name of allantoid. In this last fish, in which I have been able to verify its existence, Kupffer's vesicle projects into the interior of the vitellus, and has the form of a hemispherical cap, the convexity of which is turned towards the vitellus, whilst its floor looks towards the ventral surface of the embryo. In the trout the vesicle does not project into the vitellus; and although it presents the same form, its convexity is fixed in the embryo, and it rests by its flat part upon the parablast.

Hitherto I have been unable to ascertain the presence of a canal placing the vesicle in communication with the exterior, either in transverse or in longitudinal sections. This vesicle has only a temporary existence; I have been unable to detect it in more advanced embryos.

By making sections of ova of which the blastoderm had just closed behind the posterior extremity of the embryo, I have been able to see at this point a canal placing the surface of the vitelline globe in communication with the dorsal surface of the embryo. This canal therefore traverses the posterior extremity of the embryo; for the blastodermic pad (*bourrelet*), as demonstrated by His, has just soldered itself to the embryo to become subsequently the extremity of the tail; it is completely independent of Kupffer's vesicle, which has long since disappeared.

In the perch, as Lereboullet was the first to observe, the embryo forms slowly; it does not appear until the blastoderm has almost entirely covered the vitelline globe. The blastodermic pad, corresponding to the reflected part of the margins of the germ, however, some time before the closure of the blastoderm, presents a widened part at the spot where the embryo will be formed. When the blastoderm closes, there remains for some time at the posterior part

of the embryo a funnel-shaped opening, circumscribed by the blastodermic pad and corresponding to the canal which is seen in the trout.

Kupffer's vesicle only appears in the perch after the disappearance of the closure-canal of the blastoderm. It has the same situation and the same form as in the stickleback. In a living embryo I have distinctly seen, at its posterior part, on its dorsal surface and above the vesicle, a small orifice with folded borders, which is very probably the aperture of invagination of the vesicle; but as yet I have unfortunately been unable to assure myself, by sections, of the continuity of this orifice with the vesicle, so as completely to confirm Kupffer's description.

Prof. Balbiani, who has verified my observations, agrees with Balfour and Rauber in regarding Kupffer's vesicle as the homologue of the primitive intestine of the Cyclostomi and Batrachians, its external orifice representing the anus of Rusconi. As to the canal originating from the closure of the blastoderm, it corresponds to the blastopore of English writers, or to the mouth of the gastrula of Häckel. In the Batrachia the blastopore and the anus of Rusconi are confounded; in the fishes these two orifices are distinct.—*Bull. Soc. Philom. de Paris*, April 10, 1880.

Completion of the Biology of the Aphides of the Galls of the Poplar (Pemphigus bursarius, *Linn.*). By M. J. Lichtenstein.

In his former paper on this insect * the author was compelled to leave a gap in its history, namely the life of the insect from the time of its quitting the gall as an emigrant until its return to the trunk of the poplar as a pupiferous form.

After unsuccessful attempts with the roots of grasses and other plants, it occurred to him to try *Filago germanica*, he being led to select that plant because while he only knew the first two stages (founder and emigrant) of *Pemphigus bursarius*, he only knew the last two stages (gemmiparous and pupiferous) of *Pemphigus filaginis*, Boyer. With this purpose he covered a plant of *Filago* with a bell glass, and enclosed with it a poplar-gall filled with winged emigrants. The plant was soon covered with the woolly secretion of *Pemphigus filaginis*. At the same time (from 1st to 15th July) all the plants of *Filago* growing in the open round the bell glass were covered with the same secretion and with the green and velvety black Aphides constituting the gemmiparous phase † of that insect.

The development of the winged pupiferous form proceeds very rapidly; three weeks suffice for it. On taking into his study the bell glass and the plant of *Filago* covered by it, the author saw the

* See 'Annals,' May 1880, vol. v. p. 433.

† In this species the gemmiparous phase is simple, and not multiple as in *Phylloxera vastatrix*; and all the individuals proceeding from it are winged.