of the body of the *Euphoberia* correspond exactly to the condition of the young *Julus*.

With regard to the double segments of *Julus*, Newport held that each double segment corresponded to two segments originally distinct which had fused together; subsequent writers have held that each double segment is a single segment which has developed a second pair of legs. Now considering the double segments with regard to the development as well as to the adult condition, we see that the mesoblastic segmentation is double, so are the tracheal, the nervous, and circulatory systems. The only part of these double segments which is single is the dorsal plate with its stink glands which arise as invaginations in it; this dorsal plate being so enlarged as to form a complete ring round the body of the adult. Looking at the palæontology, we find that in the Archipolypoda, a family including the Archidesmidæ, Euphoberidæ and Archijulidæ, the dorsal plate did show distinct traces of a division. Therefore I think that each double segment represents two complete segments, the dorsal plates of which have fused together to make one plate.

III. "On the Sexual Cells and the early Stages in the Development of *Millepora plicata*." By SYDNEY J. HICKSON, M.A. Cantab., D.Sc. Lond., Fellow of Downing College, Cambridge. Communicated by Professor M. FOSTER, Sec. R.S. Received November 19, 1887.

(Abstract.)

The investigations were made upon several specimens of *Millepora plicata* I found growing in abundance on the fringing reefs of Talisse Island, N. Celebes.

The young sexual cells, both male and female, are found in the ectoderm of the cœnosarcal canals, between the dactylozooids and the gastrozooids.

At an early stage they leave the ectoderm, and by perforating the mesoglœa take up a position in the endoderm.

The ova at an early stage become stalked. The stalk of the ovum, which is simply a modified pseudopodium, serves to keep the ovum attached to the mesoglœa.

The stalk may at times be completely withdrawn, and the ovum by amœboid movements migrate along the lumen of the canal to a more favourable locality, where it becomes again attached to the mesoglœa by a stalk.

Before maturation the germinal vesicle disappears, and a spindle-shaped body with longitudinal striæ appears, which throws out the first polar globule.

A second and larger spindle appears after the first polar globule is thrown out, which in its turn discharges the second polar globule.

The mature ova of *M. plicata* are very small ($\frac{1}{100}$ mm. in diameter), and contain no yolk globules or granules.

After maturation the ova are impregnated. The heads of two or three spermatozoa may be seen within a single ovum, the flagella remaining on the surface.

After fertilisation the germinal vesicle is again apparent, and at a later stage it is seen to contain a number of nucleoli.

The germinal vesicle next fragments, the fragments being scattered over that pole of the ovum which previously contained the germinal vesicle, *i.e.*, the pole nearest to the stalk.

The fragments at a later stage travel towards the middle of the ovum, where they form an equatorial zone.

This equatorial zone of fragments divides into two parties, which travel towards the poles.

The fragments during these movements increase in size and in number, and in the next stage observed they are scattered over the whole ovum.

This stage corresponds with the morula stage of other embryos, the fragments of the original germinal vesicle being the nuclei of its constituent cells. Very faint markings in the substance of the embryo indicate the outlines of the cells.

The embryo next assumes the form of a solid blastosphere, in which stage it migrates into the gastrozooid, and its subsequent history is lost by its being discharged most probably by the mouth to the exterior.

No trace of any medusa or medusiform gonophore or sporosac was found either on the dactylozooids or gastrozooids containing ova or embryos.

The young male sexual cells or spermospores are at an early stage distinguished from the young ova by their large nucleus containing a coarse protoplasmic meshwork.

The nucleus fragments and the fragments soon come to occupy the whole spermospore.

The spermospore is matured in the canals, and then migrates into the basal endoderm of the dactylozooids, where its wall disappears, and a colony of young spermoblasts pass into the cavity of the zooid. These push out the wall of the zooid into the form of sporosacs, which they occupy until they are mature. The sporosacs do not seem to be formed before the advent of the spermoblasts. There is no spadix nor any other indication of their being degenerate medusiform gonophores. In a very few cases they were found in the gastrozooids.

The origin of the sexual cells in Millepora support the views of the Hertwigs and Weismann that the ectoderm is the original seat of the sexual cells in the Hydrozoa.

The absence of segmentation may probably be accounted for by the migratory habits of the embryo after development has commenced. The fact that no sperm-morula is formed supports this view. The evidence before us does not support the view that the ovum of Millepora formerly contained much yolk and has subsequently lost it.

I am inclined to believe that the Hydrocorallinæ belong to a separate stock of the Hydrozoa, which probably never possessed medusiform gonophores. Millepora is not related to Hydractinia.

IV. "On Photometry of the Glow Lamp." By Captain ABNEY, R.E., F.R.S., and Major-General FESTING, R.E., F.R.S. Received November 21, 1887.

In a paper which we read before the Royal Society ('Roy. Soc. Proc.,' No. 232, 1884) it was shown when a carbon filament or a platinum wire *in vacuo* was gradually raised in temperature, that the different rays in the visible and invisible regions of the spectrum followed a law governing their intensity.

In the dark region of the spectrum (below the red) if the abscissæ to a curve represented watts (current × potential), and the ordinates the intensity of the ray under consideration, the curve so formed was hyperbolic, approaching more nearly to the parabolic form as the red was approached. In the visible spectrum the parabolic curve was actually reached, the vertices of the parabolas moving along the axis of abscissæ; the shift being greater the more refrangible the rays under consideration. This implied that until a certain number of watts had been expended the ray was absent. Further, we had shown in the 'Philosophical Magazine' for September, 1883, that when measured by a thermopile,

$$\text{total radiation} \propto (\text{watts} - \text{constant}).$$

In the visible radiation of an incandescent filament in a glow lamp we are only dealing, however, with a small portion of the radiation, and therefore could not expect it to follow such a simple law as that which governs total radiation. It appeared probable, however, that as the intensity of any individual ray in this part of the spectrum increased parabolically, the sum of all the visible rays ought also to follow very closely the same form of curve, the vertex of such parabola lying at some point in the axis of abscissæ between the vertices of the parabolas of the extreme visible rays. It likewise appeared probable that when the rays of extreme refrangibility were absent or in defect, as is the case when the filament is red hot, the parabola would fail to represent the intensity of visible radiation.

In the communication we have already referred to one example of