

oesophagus, stomach, and intestine. Similar food occurred in the canal of the Australian *Phoronis*, though there was a greater abundance of muddy debris.

Dr. Strethill Wright considered that the alimentary system of *Phoronis* resembled that in *Plumatella*, the mouth being placed within the tentacular ring and closed by a semicircular lip or valve. In the new form the oral aperture is closed by simple approximation of the surfaces, as the very short free margin can hardly be taken into account functionally. Wright describes the long gullet as terminating in a gizzard the interior of which was provided with bodies apparently cartilaginous and of a prismatic shape. The gizzard communicated with a thick-walled stomach. He probably refers to the massive folds of the mucous surface, as no hard parts occur in the canal. He did not follow the intestine minutely, but he noticed a membranous tube containing fusiform fæces passing to the anus, whence they were often ejected.

Kowalewsky describes the alimentary canal in *Phoronis* as built up on the same plan as in *Ascidia*,¹ the first opening in the embryo being the anus, and the mouth appearing subsequently. The same author mentions that the alimentary canal is suspended by a mesentery. Caldwell, again, derives the anus as well as the mouth from the blastopore, the remnant of the primitive streak—the posterior solid cord of cells—opening up and forming a canal leading from the archenteron to the exterior.

Circulatory Organs.

The chief point observable in regard to the circulatory organs in the preparations is the presence of the great dorsal trunk, which extends almost, but not quite, from the posterior to the anterior end of the body along the posterior (or dorsal) arch of the alimentary canal in the groove between the intestinal mesenteries. In the anterior or contracted region of the body rupture of this vessel frequently occurs, the contents passing laterally, so as to simulate a second vessel. On the right of this region, and not on the anterior or ventral surface, the other great trunk proceeds. The dorsal trunk terminates in the great sinus in the anterior body-cavity (Pl. II. fig. 1), and thence the vessels to the branchiæ go forward. Many large branches occur in the spaces between the alimentary canal and the body-wall, and are very conspicuous in the interstices of the radiate fibres in the anterior region, and at the tip of the tail after the great dorsal and lateral trunks disappear. They are especially abundant in connection with the reproductive organs, as Kowalewsky and others noticed. Many small vessels are apparent beneath the primary divisions of the alimentary canal, but no large trunk occurs in that position. None of the vessels are so small as to merit the name of capillaries, and all are loaded with large circular nucleated cells.

In the living form Dr. Strethill Wright observed an artery passing forward in the axis of the body close to the gullet till it reached the concave side of the tentacular

¹ *Entwicklungsgeschichte d. einfachen Ascidiën*, note, p. 5, *Mem. Acad. impér. St. Petersb.*, t. x.