

outwards towards the eye, then, making a somewhat abrupt elbow, advance into the lateral parts of the face, ending on a level with the base of the mandibles. Their ramifications supply the massive muscles of the mouth-organs. The upper aorta at first ascends towards the antennæ, then bends forwards and terminates in the upper lip. In its course the aorta forms two vascular rings situated in a vertical median plane, the one round the brain, the next round the cohering bases of the antennary or "renal" glands. From the lower branch of the pericerebral ring springs a minute single artery which supplies the œsophageal nerve-ring. From the upper branch of the pericerebral ring two pairs of lateral branches are given off to the antennæ. Two other pairs originate, one between the pericerebral and perirenal rings, the other beyond the perirenal ring. Finally, a fifth pair of branches forms a pericœsophageal vascular collar, with various ramifications to supply the mouth-organs.]

The hinder aorta runs above the intestinal canal to the telson. In *Goplana polonica* it is furcate at the end, each terminal branch being very short and opening abruptly into the body-cavity. Almost in the middle of the compound segment, the aorta gives off a pair of very short lateral branches, embracing the rectal gland and ending abruptly. The aorta, however, terminates differently in other species.

The anterior blood-current flowing from the terminal opening of the corresponding aorta moves in the head from before backwards, rises obliquely upwards, enters the thorax just below the stomach, and pursues its course on either side of the intestine and over the liver-tubes. On the way it gives off lateral currents to the mouth-organs and the four first feet with their branchiæ, but does not reach beyond the fourth peræon-segment. From the hinder aorta arise on either side two currents, an anterior from the lateral branch (in *Goplana polonica*) or the anterior opening (in *Gammarus pulex*), a posterior from the terminal fork (in *Gammarus polonica*) or the terminal opening (in *Gammarus pulex*). Both currents on either side of the body descend to begin with towards the ventral surface, unite between the articulations of the second and third uropods, and form a common stream which runs forwards on the ventral surface, but at the articulation of the first uropods with most of its mass ascends, and then flows forwards, divided into two parallel streams. The one stream approaches the intestine just under the hinder aorta, the other, somewhat deeper, approaches the liver-tubes. The ventral stream appears to be of subordinate importance. From the hinder streams lateral currents go to the pleon-appendages and to the four hinder peræopods. Thus the fourth peræon-segment is a boundary which is overstepped neither by the anterior nor the posterior blood-currents, and in it they all unite, and flow on into the second peræopod.

In the pleopods the arterial current descends the front margin, in the uropods the hind margin, while the venous current ascends the opposite side in each set. [Between the four first and the three last feet of the peræon, there is a similar diversity in the direction of the currents. See Delage, 1881, and Claparède, 1863; Wrześniowski gives a reference also to Claparède, *Études sur la circulation chez les aranéés du genre Lycosa*, 1875.] Into each foot of the peræon two arterial currents enter, but only a single venous current returns. All these streams pass special openings in the articulation between the side-plate (coxa) and the segment, as well as in that between the side-plate and the first joint of the limb (coxa and basis). Each foot possesses a common venous sinus, lying in the under part of the segment above the side-plate, and bounded by the flexors and extensors of the foot. Into this sinus gathers all the blood running back from the foot and its appendages towards the heart. In each branchia the arterial current traverses the hinder rim and passes over by means of numerous transverse currents into the venous current which pursues its course on the front rim. The venous current of each branchia opens into the common venous sinus of the foot, so that the blood oxidised in the branchia flows direct to the heart, without contributing to the nourishment of the foot.