

system of circulating vessels in that insect, of which the former is only a detached part, is shown in Fig. 338, where the course of the blood is indicated by arrows; *a*, representing the currents in the antennæ; *w*, those in the rudimental wings; and *τ*, those in the tail; in all which parts the vessels form loops, derived from the main vessels of the trunk. In some larvæ the vascular loops, conveying these collateral streams, pass only for a certain distance into the legs; sometimes, indeed, they proceed no farther than the haunches. The currents of blood in these vessels have not a uniform velocity, being accelerated by the impulsions they receive from the contractions of the dorsal vessel, which appears to be the prime agent in their motion.

As the insect advances to maturity, and passes through its metamorphoses, considerable changes are observed to take place in the organization of the circulating system, and in the energy of the function it performs. The vessels in the extreme parts, as in the tail, are gradually obliterated, and the circulation in them, of course, ceases, the blood appearing to retire into the more internal parts. In the wings, on the other hand, where the development proceeds rapidly the circulation becomes more active; and even after they have attained their full size, and are yet in a soft state, the motion of the blood in the centre of all the nervures is distinctly visible;* but afterwards, as the wings become dry, it ceases there also, and is then confined to the vessels of the trunk. In proportion as the insect approaches to the completion of its development, these latter vessels also, one after the other, shrink and disappear, till, at length, nothing which had once appertained to this system remains visible, except the dorsal vessel. But, as we observe this vessel still continuing its pulsatory movements, we may fairly infer that they are designed to maintain some degree of obscure and imperfect circulation of the nutrient juices, through vessels,

* These currents in the wing of the *Sembris bilineata* have been described and delineated by Carus, in the Acta Acad. Cæs. Leop. Carol. Nat. Cur. vol. xv. part ii. p. 9.