

other important products derived from blood, the removal of effete particles and the substitution of new ones, and all those changes by which the bright blood of the arteries becomes the dark blood of the veins; and again, in the cells of the respiratory organs which the capillaries supply, the dark venous blood is oxygenated and restored to the bright scarlet hue of the arterial blood.

235. Where there are blood-vessels in the lowest animals, the blood is kept in motion by the occasional contraction of some of the principal vessels, as in the worms. Insects have a large vessel running along the back, furnished with valves, so arranged that, when the vessel contracts, the blood can

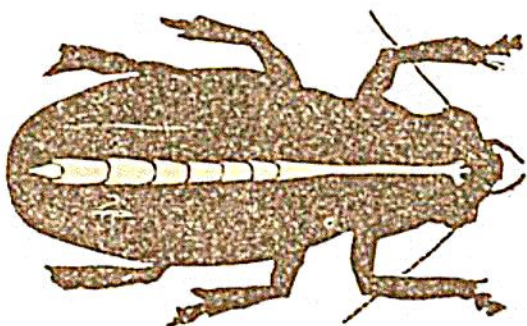


Fig. 84.

flow only towards the head, and, being thence distributed to the body, is returned again into the *dorsal vessel*, (Fig. 84,) by fissures at its sides.

236. In all the higher animals there is a central organ, the *heart*, which forces the blood through the arteries towards the periphery, and receives it again on its return. The HEART is a hollow, muscular organ, of a conical form, which dilates and contracts at regular intervals, independently of the will. It is either a single cavity, or is divided by walls into two, three, or four compartments, as seen in the following diagrams. These modifications are important in their connection with the respiratory organs, and indicate the higher or lower rank of an animal, as determined by the quality of the blood distributed in those organs.

237. In the mammals and birds the heart is divided by a vertical partition into two cavities, each of which is again divided into two compartments, one above the other, as seen in the diagram, (Fig. 85.) The two upper cavities are called