

wards, without any constancy.* A delicate net-work of vessels is next formed in various parts of the area of the circle, which are seen successively to join by the formation of communicating branches; and ultimately to compose larger trunks, so as to establish a more general system of vascular organization. But increased power for carrying on this extended circulation will soon be wanted; and for this purpose there must be provided a central organ of propulsion, or heart, the construction of which is now commenced, at a central point, by the folding inwards of a lamina of the middle membrane, forming first a simple groove, but, after a time, converted, by the union of its outer edges, into a kind of sac, which is soon extended into a longitudinal tube.† The next object is to bring this tube, or rudimental heart, into communication with the neighbouring vascular trunks, and this is effected by their gradual elongation, till their cavities meet, and are joined; one set of trunks (the future veins,) first uniting with the anterior end of the tube; and then another set (the future arteries,) joining its other end. The addition of this central tube to the vessels previously formed completes the continuity of their course; so that the uniform circulation of the blood is established in the direction in which it is ever after to flow; and we may now recognise this central organ as the heart, which, under the name of the *punctum saliens*, testifies by its quick and regular pulsations that it has already begun to exercise its appropriate function. It is long, however, before it acquires the form which it is permanently to retain; for from being at first a mere lengthened tube, presenting three dilatations, which are the cavities of the future auricle, ventricle, and bulb of the aorta, it assumes in process of time a rounded shape, by the folding of its parts, the whole of

* These phenomena are similar to those which were noticed as presented by the larvæ of some insects and other inferior animals.

† The discovery of this fact is due to Pander. See also the works of Rolando, Wolff, Prevost and Dumas, and Serres.