

SECTION XII.

VASCULAR SYSTEM.

The heart of the Turtles lies just above the liver. It is broad, nearly triangular, the wide basis of the triangle extending across the body. It is inclosed in a double sac of the pericardium, and attached to it, at its point, by means of a fold of the pericardium. The plan of its interior structure is the same in Turtles as in Ophidians and Saurians. While in Crocodiles there exists a true septum between both ventricles,¹ as in Birds and Mammalia, we find in Turtles, typically, only one ventricle.²

In a large specimen of *Ptychemys rugosa*, (*E. rubriventris*), we had an opportunity of studying the beating of the heart. The process is as follows: The auricles are filled simultaneously, one with a bluish red, the other with a light red blood. When filled to the utmost, they have a triangular shape, with rounded corners. But while the auricles are already thus filling, the heart itself, the ventricle, is gradually expanding more and more; then a sudden contraction of the auricles throws all the blood into the broadly expanded, but empty, ventricle, which thus filled assumes the form of a high cone. Immediately after this follows the contraction of the ventricle, then follows a pause until the auricles are filled again, and the powerful pump begins its play anew. This goes on about ten times in a minute. The rhythm in its details is as follows: First second, systole of the auricles; second second, systole of the ventricle; third and fourth seconds, the ventricle remains contracted; fifth and sixth seconds, the auricles are gradually filling; seventh

¹ This difference becomes, however, of less importance when we remember the fact, that in Crocodiles there exists, at their very base, a communication between the two trunks which start from the two ventricles of the heart, causing there a similar mixture of the dark and red blood, outside of the heart, as exists, in Turtles, inside of the heart.

² We cannot agree with the view generally adopted, that this so-called imperfect septum in the heart of Turtles, which seems to divide it into two cavities, a so-called *cavum arteriosum* and a *cavum venosum*, is homologous to the perfect septum between the ventricles which exists in Mammalia and Birds. The

fact, that the great bloodvessels (the aorta and the *arteria pulmonalis*) start together from the *cavum venosum*, seems to prove that the two cavities in the heart of Turtles, which are by no means very marked, do not correspond to the two ventricles in Mammalia and Birds, but, on the contrary, that, as stated above, the ventricle in Turtles is typically one, as in Fishes. Yet this one ventricle of Turtles is not any more identical with the one ventricle of Fishes than with the two ventricles of warm blooded Vertebrata, for in Fishes we find only one vessel, the aorta, arising from it, while in Turtles, both aorta and *arteria pulmonalis* start together from it.