

second, or first of the second contraction, systole of the auricles, etc. The whole rhythm was remarkably regular, except some variation in the measure of the last four seconds, which, as stated above, were generally thus divided into two pairs; but sometimes this division was not distinctly marked, the filling of the auricles beginning already in the fourth or even in the third second. As we have not found any important structural differences in the hearts of the most different families of Turtles, we are induced to believe that the rhythm observed in *Emys rubriventris* is probably the general rule for the contractions of the heart in all Turtles. This rhythm exhibits great uniformity, not only in the duration of the contractions as a whole, but also in the measure of its successive steps.

Three large vessels, intimately connected at their basis, which is sometimes supported by a cartilaginous frame, arise from the ventricle. Two of them, carrying red blood, soon form one common trunk, the aorta; but before this takes place, each of them sends off many vessels, namely, to the right the *arteria anonyma*, from which soon start the *arteriæ carotides* and *subclaviæ*, and to the left the arteries of the stomach and mesenterium.

The venous system of Turtles agrees with that of other Reptiles. Two *venæ anonymæ* from before, and two from behind, the umbilical veins of Bojanus, open into the *sinus venosus*, which pumps the blood into the right auricle. It is characteristic of the Turtles, that the *venæ vertebrales*—*vena azygos* of Bojanus, of which there are two, as in Saurians, while in Ophidians there is only one—run above the ribs in Turtles, while in all other Reptiles they run below the ribs. We find such veins in Turtles above the transverse processes of the *vertebræ* all along the dorsal column, and also in the neck and tail. There are moreover some veins, peculiar to Turtles, running from the liver directly to the heart, while in other Reptiles the *vena cava* receives all the veins of the liver. The blood of Turtles does not show different features from that of other Reptiles.<sup>1</sup>

<sup>1</sup> Its constituents, and its changes by starvation, thirst, etc., have been recently illustrated by Joseph Jones, q. a., p. 279. When taken from fresh specimens, the specific gravity of the blood of different Turtles varies from 1025 (*Chelydra serpentina*) to 1034 (*Emys reticulata*.) The amount of solid constituents in 1000 parts varies from 105 (*Chel. serpentina*) to 156 (*Emys serrata*.) The water in 1000 parts of blood varies from 895 (*Chel. serpentina*) to 843 (*Testudo polyphemus*); the dried organic constituents (blood globules) vary from 56 in *Chel. serpentina* to 87 in *Testudo polyphemus*. Thus, as was to be expected, the blood of water Turtles is more

watery than that of land Turtles. Jones (p. 29) notices another difference in the color of the serum, namely, that, while in some Turtles (*Testudo polyphemus*) this color is light yellow, as in most Mammalia, Birds, Reptiles, Batrachians, and Fishes, it is golden in some Emydoidæ, (*Emys serrata*, *reticulata*, *concentrica*), as it also is in the black Turkey Buzzard (*Cathartes atratus*.) With reference to the influence of hunger on the blood, we find the following experiment related in the same paper. *Emys concentrica*, recently captured, had on the 16th of June a weight of 14,285 grains. Kept without food and drink for forty days, weighed, July 29d, 11,400 grains. Loss,