

The lymphatic system is very much developed in Turtles.<sup>1</sup> Two hearts, lying near the base of the tail, immediately under the bony shield, and provided with fat cushions for protection against pressure, form the pump-work of this vascular system. Like the blood-heart, these lymphatic hearts are provided with transversely striated muscular fibres. Lymph vessels bathe all the arteries of the body, surrounding not only the main stems, but running with them along all their branches. There lies a large lymph cistern between the lungs, opening into the ductus thoracicus, which leads into the venæ subclaviæ.

## SECTION XIII.

## UROGENITAL ORGANS.

*Urinary Organs.* We find that the so-called primordial kidneys, or Wolffian bodies, which exist in all Turtles, as well as in all other true Reptiles, are built up, as in these, of fine canals, sending off a duct into the cloaca. We have never found a distinct secretion in this duct. Investigations about their relation to the real kidneys and to the genital organs have led us to results which are in many respects at variance with those of other authors.<sup>2</sup> The urinary bladder of the Turtles is always more or less bilobed, and mostly onesided. It is remarkably large, and in land Turtles almost always filled. The ureters are short, the kidneys lying in the cavity of the pelvis, outside of the peritoneum. The kidneys are generally flattened, and composed of many lobes. Their weight, in relation to the weight of the body, varies much in different Turtles, and the laws about this variation are not yet clear;<sup>3</sup> but all of them have the kidneys two or three times smaller in proportion than other Reptiles.

*Genital Organs.* While in Turtles the kidneys lie outside of the peritoneum,

2885 grains. Amount of blood obtained, 400 grains; not more than one third the usual quantity. Solid constituents in 1000 parts, 199; water, 800. We quote this experiment only to show how intensively all the systems of the body are working on, even in this state of starvation, and how erroneous is the idea of a general torpor of such hungering animals.

<sup>1</sup> After this system had been first discovered in Turtles by Hewson, in 1769, and beautifully illustrated by Bojanus in 1819, J. Müller discovered, in

1839, the hearts which set it in motion. This important discovery of J. Müller seems, however, to be unknown to Rymer Jones, who, in the year 1852, in Todd's Cyclopedia, (Reptiles, p. 302,) denies the existence of these lymphatic hearts in Turtles. They are easily found in any living Turtle, and may be seen beating for a long time after being laid bare.

<sup>2</sup> See Part III. of this work, where this point is fully considered.

<sup>3</sup> See p. 127 of Jones's paper, q. n., p. 277, note.