

there were not this natural disposition in all locomotion to influence the process of respiration more than any other system, why should not the blood, when such powerful motions take place, be accumulated in any other part of the body,—for instance, in the tail, which is the very cause of the motion,—rather than in the gills? In Birds, the extensive development of the lungs, and the prolongation of air sacs into the abdominal cavity, the wings, and the sternum, in those most remarkable for their power of flight, plainly indicate again the most strict connection between locomotion and respiration, though the nature of this connection is perhaps different from that observed in the lower classes. Nevertheless, it exists even in these, and can be traced to a very remarkable extent. We cannot fail to trace similar relations among Mammalia also, though here the influence between the two functions is not so direct. However, it must be acknowledged that it is important enough, when we consider how the aquatic types have to accommodate all their movements to the wants of the system for atmospheric air, and remain constantly within reach of the surface, in order to be able to return to it in a short time. How much the breathing is affected by violent movements is so well known to every one, that the existence of accessory muscles of respiration in Mammalia, the antagonism between the pectoral and abdominal muscles and the diaphragm, and the use of belts by athletes in running, leaping, or wrestling, need only to be mentioned as evidence of this mutual relation. Of course, in animals in which all the functions have reached a great degree of independence, they are no longer subservient to each other to such a degree as they are in the lower types; but even the unpleasant influence which excessive exercise of the locomotive powers has upon respiration in the higher animals, shows the intimate relation which prevails in the plan of organization.

It has already been mentioned, that there is a wide chymiferous cavity in the centre of the body of this animal, trending in the vertical direction of the digestive cavity; but the natural relations of these parts are so difficult to appreciate, the ramifications of the chymiferous tubes so complicated and nevertheless so regular, and again so movable in their constant contractions and dilatations, that, with all the assistance of numerous drawings as given in my paper in the *Memoirs of the American Academy*, I hardly expect to be able to give a correct idea of this apparatus, unless the reader is willing to consider attentively every point of the following description by itself, and to keep at the same time constantly in mind the relative connection of all parts, and their bearing upon the general appearance of the body.

In the first place, let it be remembered that the central chymiferous cavity and its main trunks undergo constant changes as to their size and outlines, according to their temporary state of contraction and dilatation, and that both halves