

§ 3. *Atmospheric Respiration.*

THE next series of structures which are to come under our review, comprehends all those adapted to the respiration of atmospheric air in its gaseous form; and their physiology is no less diversified than that of the organs by which water is respired.

Air may be respired by *tracheæ*, or by *pulmonary cavities*; the first mode is exemplified in insects; the second is that adopted in the larger terrestrial animals.

The greater part of the blood of insects being diffused by transudation through every internal organ of their bodies, and a small portion only being enclosed in vessels, and circulating in them, the salutary influence of the air could not have been generally extended to that fluid by any of the ordinary modes of respiration, where the function is carried on in an organ of limited extent. As the blood could not be brought to the air, it became necessary, therefore, that the air should be brought to the blood. For this purpose, there has been provided in all insects, a system of continuous and ramified vessels, called *tracheæ*, distributing air to every part of the body. The external orifices, from which these air tubes commence, are called *spiracles*, or *stigmata*, and

bladder of fishes inhabiting the greatest depths of the ocean, the quantity of oxygen is greater, while in those of fishes which come often to the surface, the nitrogen is more abundant; and De la Roche came to the same conclusion from his researches on the fishes of the Mediterranean. From the experiments of Humboldt and Provençal, on the other hand, we may conclude, that the quality of the air contained in the air-bladder is but remotely connected with respiration. (*Mémoires de la Société d'Arcueil*, ii. 359.)

According to Ehrmann, the *Cobitis*, or Loche, occasionally swallows air, which is decomposed in the alimentary canal, and effects a change in the blood vessels, with which it is brought into contact, exactly similar to that which occurs in ordinary respiration. It is also believed that in all fishes a partial aeration of the blood is the result of a similar action, taking place at the surface of the body under the scales of the integuments. Cuvier, *sur les Poissons*, I. 383.