

CHAPTER XI.

RESPIRATION.

§ 1. *Respiration in General.*

THE action of atmospheric air is equally necessary for the maintenance of animal and of vegetable life. As the ascending sap of plants cannot be perfected unless exposed to the chemical agency of air in the leaves, in like manner the blood of animals requires the perpetual renovation of its vital properties by the purifying influence of respiration. The great importance of this function is evinced by the constant provision which has been made by Nature, in every class of animals, for bringing each portion of their nutritive juices, in its turn, into contact with air. Even the circulation of these juices is an object of inferior importance, compared with their aeration; for we find that insects, which have but an imperfect and partial circulation of their blood, still require the free introduction of air into every part of their system. The necessity for air is more urgent than the demand for food; many animals being capable of subsisting for a considerable time without nourishment, but all speedily perishing when deprived of air. The influence of this element is requisite as well for the production and development, as for the continuance of organized beings in a living state. No vegetable seed will germinate, nor will any egg, even of the smallest insect, give birth to a larva, if kept in a perfect vacuum. Experiments on this subject have been varied and multiplied without end by Spallanzani, who found that insects under an air pump, confined in rarefied air, in general lived for shorter periods in propor-