

vessels, spread over the membrane of the egg, and receiving the influence of atmospheric oxygen through the substance of the shell, which is sufficiently porous to transmit it; and these vessels, being brought into communication with the circulatory system of the chick, convey to its blood this vivifying agent. As the lungs cannot come into use till after the bird is emancipated from its prison, and as it was sufficient that they should be in readiness at that epoch, these organs are among the last that are constructed; and as the mechanism of respiration in this class of animals does not require the play of the diaphragm, this muscular partition is only begun, but not completed, and there is no separation between the cavities of the thorax and the abdomen.

The succession of organic metamorphoses is equally remarkable in the formation of the diversified apparatus for aeration, which is required to be greatly modified, at different periods, in order to adapt it to different elements: of this we have already seen examples in those insects which, after being aquatic in their larva state, emerge from the water when they have acquired wings; and also in the steps of transition from the tadpole to the frog. But similar, though less conspicuous changes occur in the higher vertebrated animals, during the early periods of their formation, corresponding to the differences in the modes of aeration employed at different stages of development. In the primeval conditions this function is always analogous to that of aquatic animals, and requires for its performance only the simpler form of heart already described, consisting of a single set of cavities: but the system being ultimately designed to exercise atmospheric respiration, requires to be gradually adapted to this altered condition; and the heart of the Bird and the Quadraped must be separated into two compartments, corresponding to the double function it will have to perform. For this purpose a partition wall is built in its cavity; and this wall is begun around the interior circumference of the ventricle, and is gradually carried on towards the centre, there being, for a time, an aper-