foot, which they help to distend, and communicate with the main cavity of the body, supplying it also with liquid; in echinoderms they pass through the skin, and even through

260 a. In order fully :o appreciate the homologies between the various respiratory apparatus observed in different animals, it is necessary to resort to a strict comparison of the fundamental connections of these organs with the whole system of organization, rather than to the consideration of their special adaptation to the elements in which they live. In Vertebrates, for instance, there are two sets of distinct respiratory organs, more or less developed at different periods of life, or in different groups. All Vertebrates, at first, have gills arising from the sides of the head, and directly supplied with blood from the heart; but these gills are the essential organs of respiration only in fishes and some reptiles, and gradually disappear in the higher reptiles, as well as in birds and Mammalia, towards the close of their embryonic growth. Again, all Vertebrates have lungs, opening in or near the head; but the lungs are fully developed only in Mammalia, birds, and the higher reptiles, in proportion as the branchial respiration is reduced; whilst in fishes the airbladder constitutes a rudimentary lung.

260 b. In Articulates, there are also two sorts of respiratory organs; aerial, called tracheæ in insects, and lungs in spiders; and aquatic, in crustacea and worms, called gills. But these tracheæ and lungs open separately upon the two sides of the body, (air never being admitted through the mouth or nostrils in Articulates;) the gills are placed in pairs; those which are like the tracheæ occupying a similar position, so that there are nearly as many pairs of tracheæ and gills as there are segments in these animals, (Figs. 89 and 33.) The different respiratory organs in Articulates are in reality mere modifications of the same apparatus, as their mode of formation and successive metamorphoses distinctly show, and cannot be compared with either the lungs or gills of Vertebrates; they are special organs not found in other classes, though they perform the same functions. The same may be said of the gills and lungs of mollusks, which are essentially alike in structure, the lungs of snails and slugs being only a modification of the gills of aquatic mollusks; but these two kinds of organs differ again in their structure and relations from the tracheæ and gills of Articulates, as much as from the lungs and gills