

duced by these spiracle appendages, during the rapid ingress and egress of the air; an effect similar to that which is produced by the sweeping of the air over the strings of an eolian harp. The most important vital purpose, however, is doubtless that to which I have already alluded—the protection afforded to the air vessels within. There is also another important end which they may serve, and one which, I think, has not been observed by any writer on the subject. It is this: the modification of the temperature of the air, as it enters the trachea, and the preservation of that within the body, at the normal standard of heat, usually existing in the different members of this class. For this purpose these fringes and plates and membranous folds, would be admirably adapted, and would act in precisely the same way as the metallic framework of a respirator does when worn by consumptive persons. A question might here naturally arise, as to the production and maintenance of animal heat in the insect economy. But the full discussion of this subject would demand more time than we have at disposal. Many interesting observations have been made, which show that the temperature of different insects varies greatly, especially those living in societies (as the hive bee) whose normal standard of heat is very much higher than that of other classes. There has been a prevailing notion that the temperature of insects is altogether regulated by that of the external atmosphere in which they live, but this opinion is, I think, at variance with the common principles of animal physiology; and it is, moreover, contradicted by a variety of experiments, bearing on this question. There can be little doubt, I think, that the standard of heat, in different species of insects, is regulated very much by the degree of muscular activity manifested by them; for this would involve a more rapid and vigorous respiration, and a greater consequent evolution of heat. Without pursuing this question farther, however, I would remark finally respecting the spiracles of insects, that however beautiful and elaborate they may be in their structure, and however perfectly adapted to the habits and peculiarities of the creatures possessing them, they are but the portals to an inner sanctuary of wonders, unspeakably transcending all human contrivances in execution, and surpassing human thought, even in conception. The fact that insects breathe, and that their respiration is carried on by means of an elaborate system of air tubes, which ramify extensively through the interior of their body, has long been known, and