

age, the series from each lateral passage along either side, and each sending off a small branch toward the other, somewhat before reaching the lateral margin, where they terminate. Whether these tubules are open at the tips or not I have not been able to determine. If so, they doubtless act as a sieve through which the air is admitted to the lateral passages which convey it to the main tracheal trunks. But if we consider them as closed, as I am inclined, the whole structure is remarkably well adapted to aerating the tracheæ by osmosis, whether the pure air is secured from the air cells of the plants or from the water. The wedge-shaped apex of each appendage shuts down tightly on either side, thus making a solid cylinder with which to pierce the plant. That it does so pierce the tissue of the root while constructing the cocoon, and that the passage thus made replenishes the air of the cocoon, there can be no doubt. But whether the larva secures air from the intercellular spaces of the root by direct communication or osmosis, or by osmosis from the water, the appendages thus serving as tracheal gills, would seem to need demonstration, inasmuch as Dr. Schmidt-Schwedt observed only the points of these appendages inserted into the roots.

However that may be, I feel certain that the appendages are truly a highly specialized form of spiracle. I would hardly arrive at this conclusion had I not observed a very similar structure in the pupæ of the genera *Ocotoma* and *Odontota* of the tribe *Hispini*. The larvæ of these species mine within leaves, and the pupæ remain within the leaves. Projecting caudad from either fifth abdominal spiracle—which is usually the last in Chrysomelid pupæ—is found a stout, chitinous spine about the length of a body segment. In the pupa of *Ocotoma plicatula* the fourth spiracle is expanded caudally about half as much as the fifth, and the third is but slightly expanded, merely being produced to a point caudally. But the gradation is complete, and it is easily seen that the spine-like process of the fifth segment is but an outgrowth of the spiracle. Each of these spiracles, 3 to 5, has the external opening surrounded by a circular tube, also connecting with the trachea, and this circular tube is merely drawn out to a point, so to speak, to form the process of the fifth segment, the process gradually increasing in length and acuteness from the second to the fifth abdominal spiracle. This appendage forms merely a simple tube with the sides curled up and in to form an elongate cavity, in which the lining surface is membranous and finely reticulated. Further than this I was unable to observe any structure, as the projections are