

Our studies indicate that while the function attributed to the proventriculus by Emery and others is correct, the accepted explanation of its mechanics as given above is basically erroneous. The reason for this lies in several fundamental misconceptions established by Emery in his 1888 paper and maintained in the literature ever since. First, Emery believed that the filter hairs of the euformicine sepal canals actually seal off the canals from the calyx cavity: "Die Rinne wird gegen das Lumen des Kelches durch das Ineinandergreifen der die Flügel besetzenden Härchen verschlossen". Because of this he was inclined to treat the canals as relatively unimportant structures. Subsequent workers, including Forbes, have observed that the canals really open into the lumen, but none have considered the obvious possibility that they might serve to conduct liquid past the oclusory tract. That this conduction may occur has been ascertained by our observations on the proventriculi of *Camponotus* fed with stained honey. Following spontaneous contractions of the calyx and ejection of the contents into the crop, the canals could often be seen to remain full of the honey, usually back to the level of the oclusory tract, but in one instance through most of the length of the bulb as well. In these cases there were no evidences of the honey in the bulb cavity itself.

A second misconception which Emery established is that the oclusory tract acts as a valve. Actually, even if the oclusory tract could be closed entirely, which is possible, the presence of strongly reinforced canals passing through the tract prevents it from stopping flow altogether. At the same time, the cruciform slit cannot be opened to an extent much greater than that shown in plate 6. In all, the entire structure of the tract appears to be too rigid to be able to exert much control over the rate of flow by the action of its intrinsic muscles.

A third misconception is that the canals of the bulb are collapsed as the transverse muscles contract. We have already seen that these canals are sealed off in the anterior portion of the bulb even when the muscles are relaxed. It is probable that they become sealed off but not collapsed in the posterior portion as contraction is initiated. Why this happens can be seen in an examination of the cross