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ZOOLOGY.—*Observations on the feeding of prostigmatid larvae (Acarina: Trombidiformes) on arthropods.*[1] G. W. Wharton, University of Maryland.

In 1892 M. S. Jourdain, speaking to the Parisienne Academy of Science, described two methods by which larval prostigmatid mites obtain their food from the arthropods which they parasitize. One method consisted simply of the mite piercing the thin integument between the sclerites in order to withdraw blood. The second method involved the formation of a branched feeding tube or stylostome in addition to the puncture. In 1899 Jourdain figured such a tube produced by *Trombidium holosericieum* in its host.

André in 1930 reviewed the observations of earlier workers on the branched stylostomes of trombidiid larvae and called attention to the work of Flögel, 1876, as well as to that of Jourdain. André compared these stylostomes to those produced by *Trombicula autumnalis* in vertebrates and concluded that the stylostomes of parasites of vertebrates and invertebrates are formed by secretions of the larvae. The branching of the stylostomes of certain of the parasites of invertebrates he ascribed to a postulated system of lacunae in the subdermal tissues of the host through which the secretions of the larvae are channeled.

Marshall and Staley in 1929 reported and figured unbranched stylostomes in mosquitoe larvae produced by larvae of water mites that were thought to be similar to *Lebertia tauinsignata.* They recognized that the stylostomes were subdermal but they considered them to be made of chitin and to be products of the host. Feng and Hoeppli (1933) reviewed the entire problem and studied sections of feeding tubes in parasitized mosquitoes. Host cells were shown to be involved in the formation of these tubes, and they support the conclusion of Marshall and Staley. Recently Jones (1950) has discussed the earlier works with reference to the formation of the feeding tube in vertebrates. He recognized that the stylostome was made up of a narrow central canal surrounded by a hyaline mass. The hyaline mass is said to be formed from keratinized malpighian cells.

In the course of investigations on the feeding mechanisms of pest chiggers, *Trombicula alfreddugèsi* and others, a number of prostigmatid larval parasites of arthropods was examined, but only *Trombidium* sp. on the common firefly *Photuris pennsylvanica* formed a stylostome. The multiple branching of the stylostome was readily observed in whole mounts of dissections (Fig. 1), and the nature of the wound could be seen in serial sections. The larvae attached themselves to the synarthrodial membranes between the anterior abdominal sclerites beneath the elytra. The larvae were invariably aligned with the long axis of the host with their anterior ends directed

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toward the head of the beetle. The primary mechanical rupture of the thin host membrane was made solely by the chelicerae of the larva. The tips of the chelicerae penetrated the haemocoel. Within the haemocoel the branched stylostome was formed. It consisted of a heavy basal portion that gave off two main branches each of which branched again. A branched tube in the center of the stylostome connected the preoral cavity of the larva with the tips of the branches of the stylostome. The distal ends of the stylostome were expanded into a terminal knob. These knobs occurred in clumps and in whole mounts resembled tiny bunches of grapes. The central canal of the stylostome did not open directly at the tip of the knob; instead, it gave rise to a group of secondary canaliculi that opened over the surface of each knob.

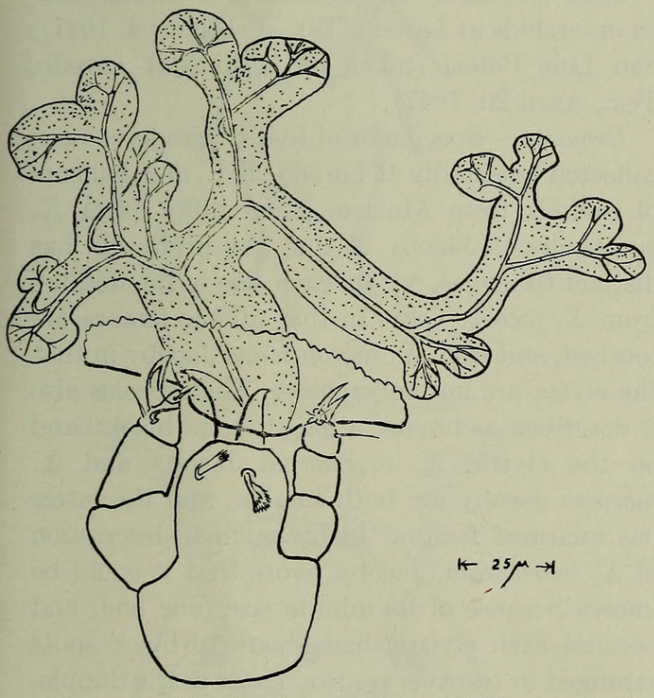

FIG. 1.—Feeding tube of *Trombidium* sp.

Since the stylostome in question is formed in the haemocoel, André's explanation of its branching cannot apply. It is also probable that the stylostome is not made of chitin produced by the host as suggested by Marshall and Staley since in sections treated with a polychrome stain the stylostome is stained deep red and the cuticle of the mite and beetle do not take the stain. No cells of any kind are associated with the tube. Unfortunately the mechanics of formation of the stylostome as well as the nature of the material of which it is formed remain in doubt. However, if the salivary secretions of the mite were precipitated by the host tissues a solid structure would be formed within the host. Solidification would occur first at the interface between the saliva and the blood. Thus as long as saliva was poured into the host, the central portion of the mass would remain fluid and a tube would result. When the mite began removing blood from the host, salivary secretion would stop and blood would be sucked up the tube into the mite. When feeding ceased, saliva would again be free to flow down the tube and the structures would grow as more saliva precipitated at the end of the tube. The characteristic branching of the stylostome might be the result of localized differences in interfacial tension between saliva, blood, and the coagulum produced by a combination of the two. The salivary glands do not open into the mouth or pharynx, but pour their secretions into the space between the chelicerae. Since this is in effect an open groove it is difficult to understand how saliva could be forced into the wound by the chelicerae. The saliva would however normally pass into the preoral cavity where it might be sucked up into the muscular pharynx. From the muscular pharynx it could be ejected forcibly into the host.

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