

# Metallic Flies in need of identification

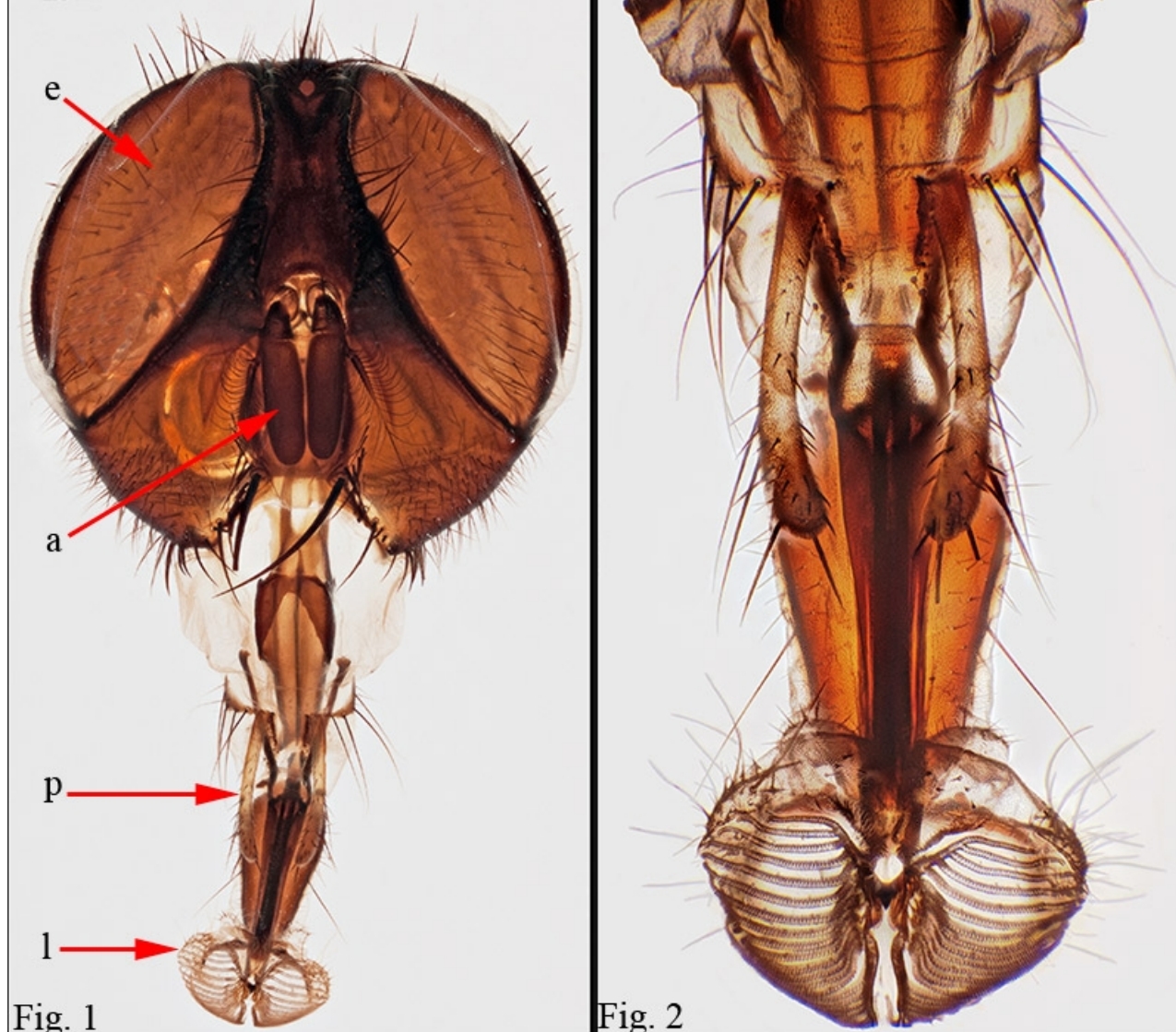
## Part 2 – Close-up.

Anthony Thomas (Canada)

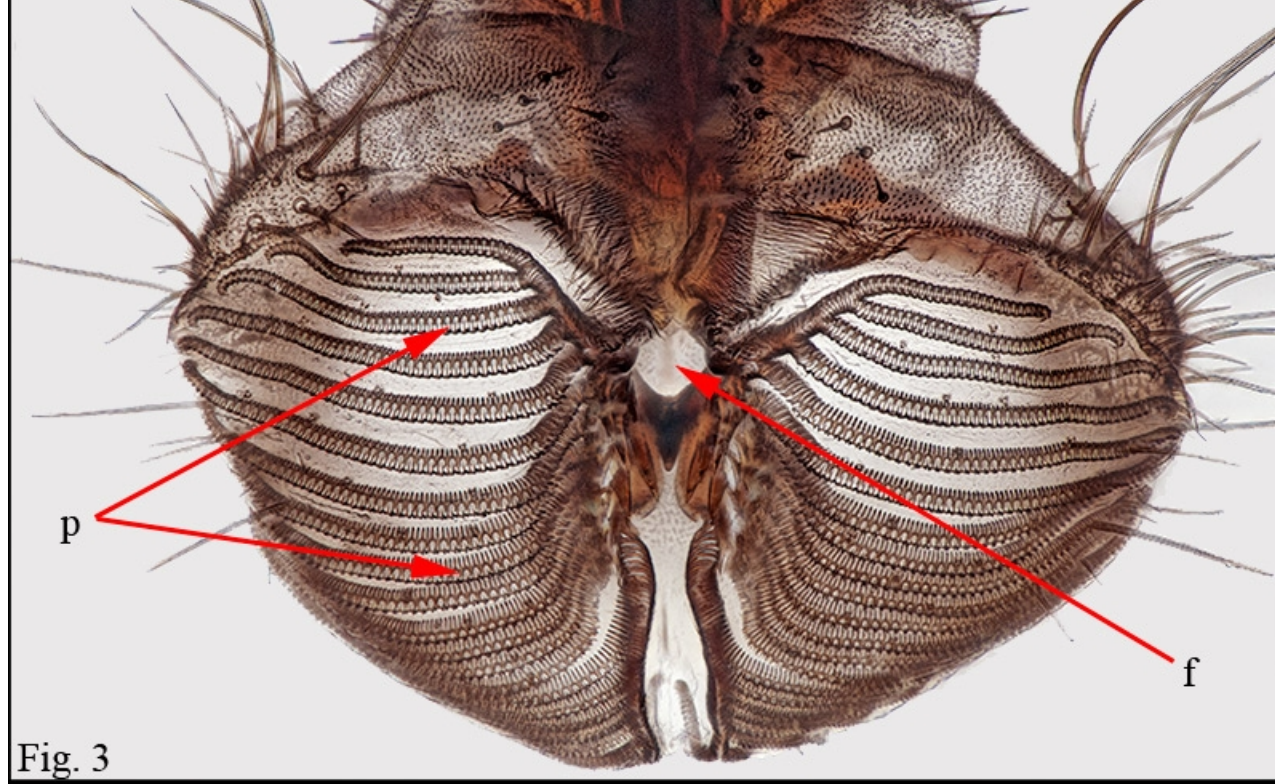
This is follow-up to my article in issue 191: September 2011 Micscape Magazine where I examine the feeding apparatus of those flies.

### Head

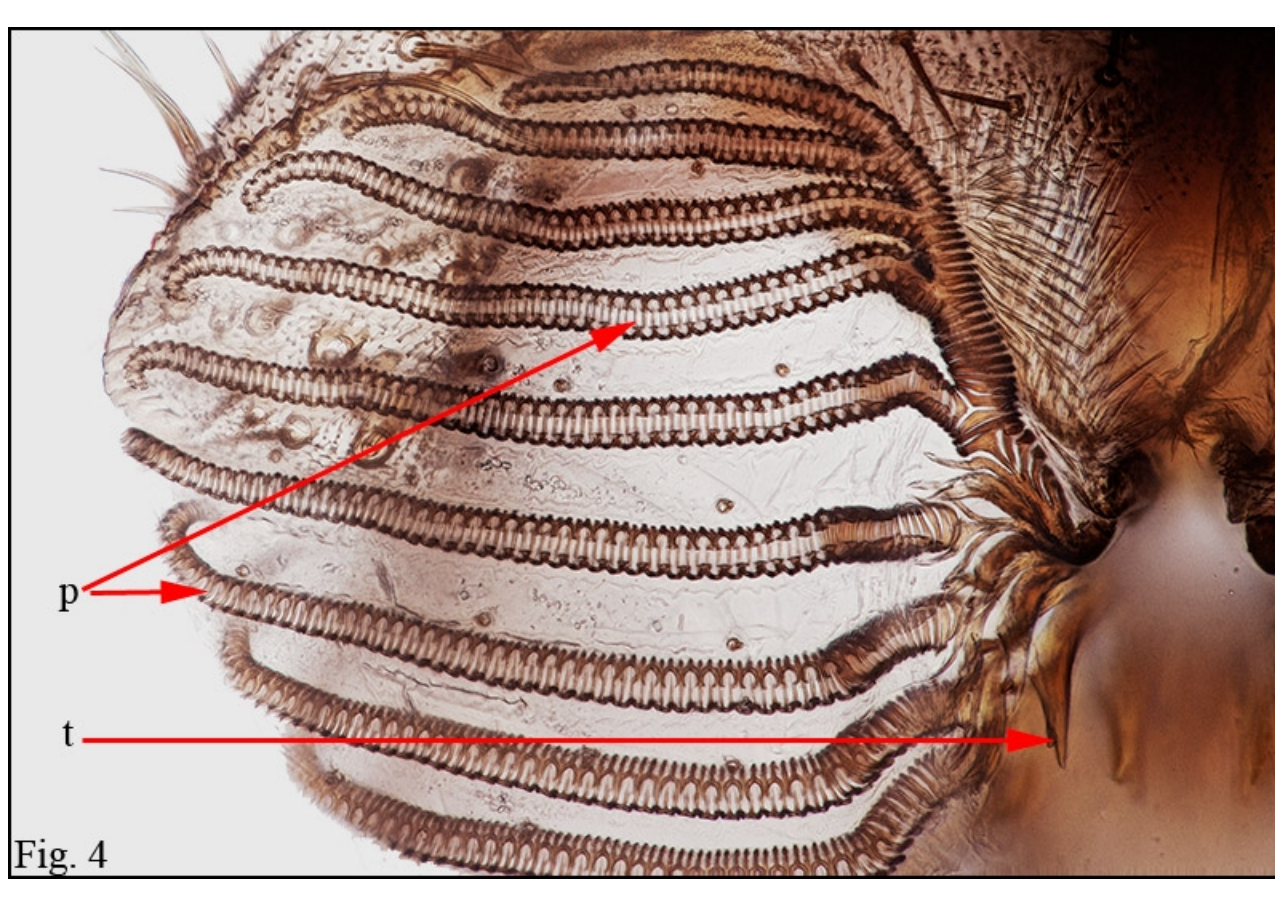
The structure of the antenna was illustrated in Fig. 6 of the September article as it is an important character for the determination of the family. But perhaps the most interesting structures on the head, from a microscopists' point of view, are the mouthparts. Figure 1 shows a front view of the head, after treatment in 5% KOH, for orientation to show some of the major features: e, eye; a, antenna; p, palpus; l, labella. Figure 2 shows the mouthparts in more detail. I plan to concentrate on the structure of the labella which is the structure the fly uses to distribute saliva and take up dissolved food. All the images of the labella are views of the ventral surface.



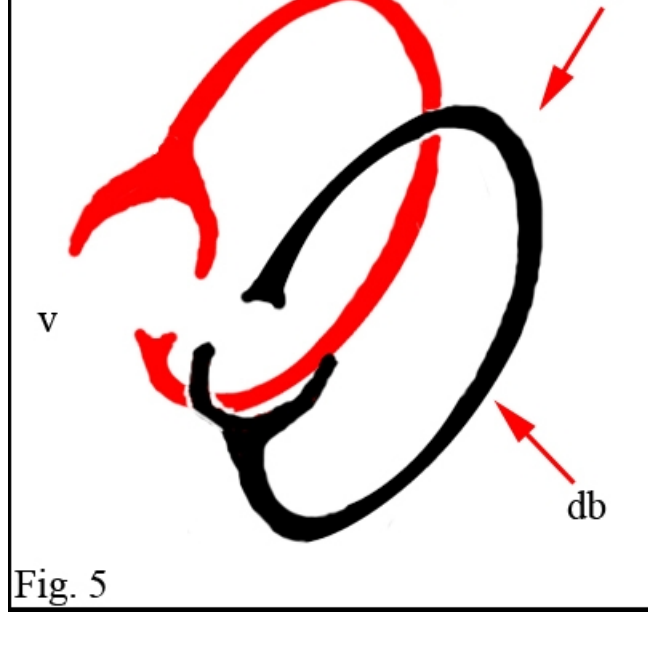
The labella consists of two membranous, cushion-like lobes each of which has a system of canals, pseudotrachea, (Figs. 3 & 4, p) that open into a single median food canal (Fig. 3, f).



At the opening of the food canal there are a few sharply-pointed chitinous teeth, prestomal teeth, (Fig. 4, t ) which are used as a rasp for rupturing surfaces and breaking up food particles.



The pseudotrachea canals are formed by a series of alternating rigid rings, each of which is open at the ventral surface (Fig. 5, v). These rings form open-bottomed tunnels with a rounded, concave, roof and rounded, concave, sides. These strengthening rings flare out at one open end to form a horizontal U. The 'U's of adjacent rings are on opposite ends of the rings (Fig. 5). Figure 5 attempts to show 2 adjacent rings rotated, v = ventral opening, db = dorsal bar, k= lateral edges of the rings which show up as knobs when looking at a stacked image when all planes are in focus.



The following 3 images (Figs. 6, 7, 8) are from the ventral surface of the labella showing just short sections of two adjacent pseudotrachea canals. Figure 6 is at the extreme lower surface and clearly shows the alternating flared ends of adjacent rings. Those rings at the lower edge, in the image, of one canal are offset to those of the top edge.

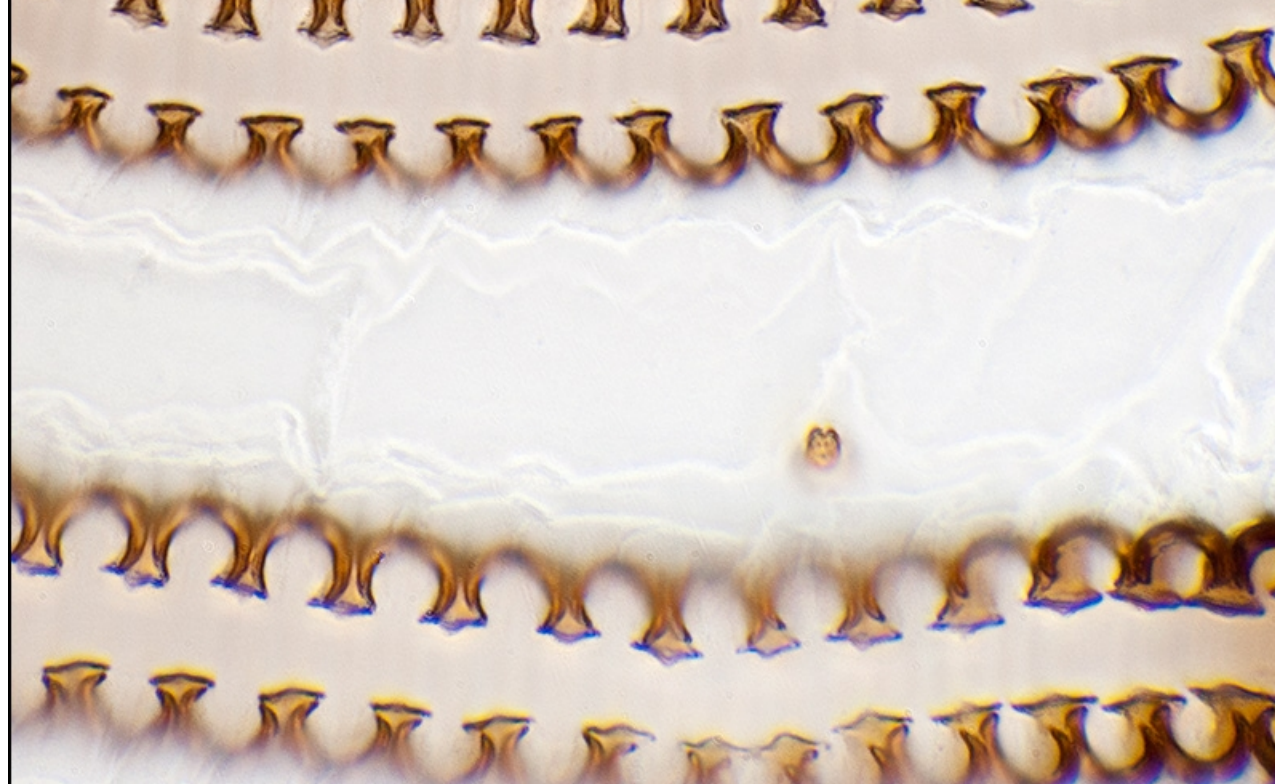


Figure 7 is at about the mid-level of the pseudotrachea canals and again shows the offset arrangement of adjacent rings. It also shows that at the midlevel the rings, as expected, are at their greatest diameter, *i.e.*, the knobs that appear to be originating from the flared ends of the rings.



Figure 8 is at the inner top surface of the canals and shows the arrangement of the strengthening rings. Depending on how you see these canals the rings may look like the outer (dorsal), convex, surfaces but they are actually the inner (ventral), concave, surfaces.

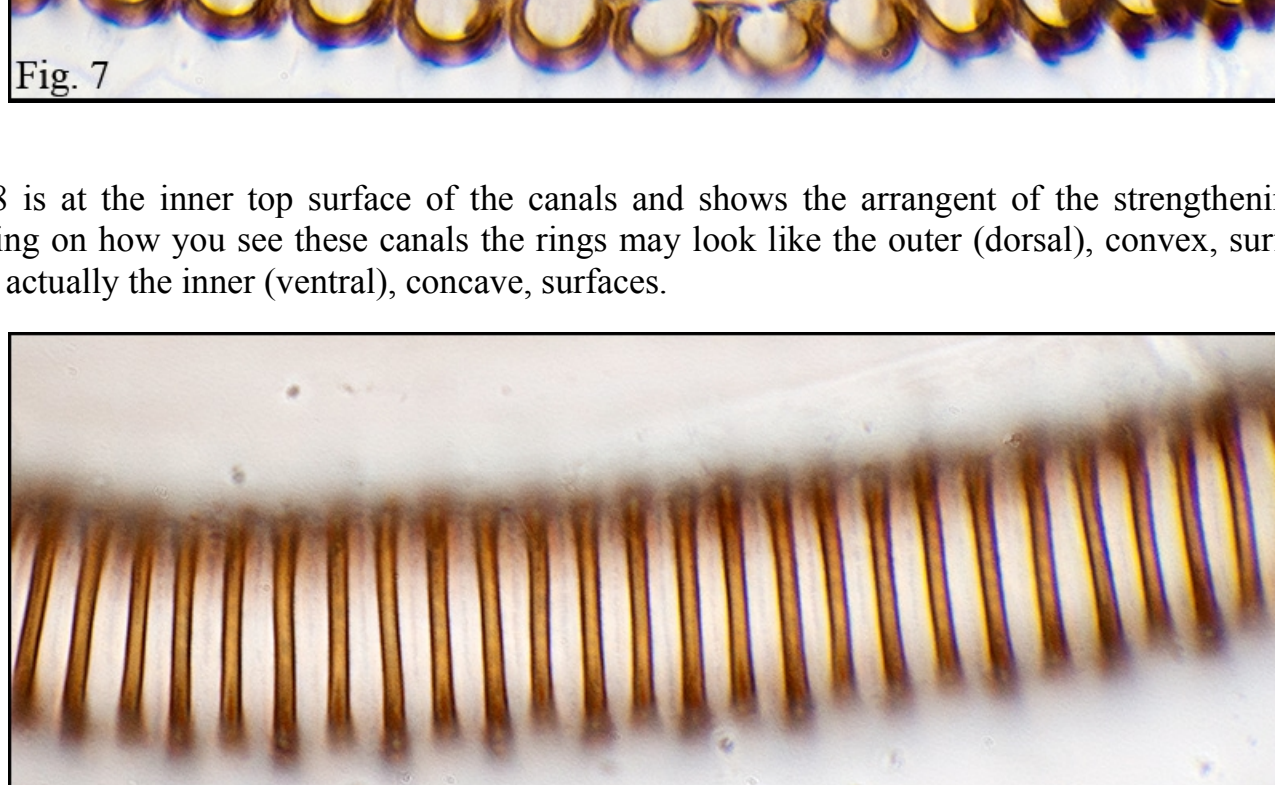
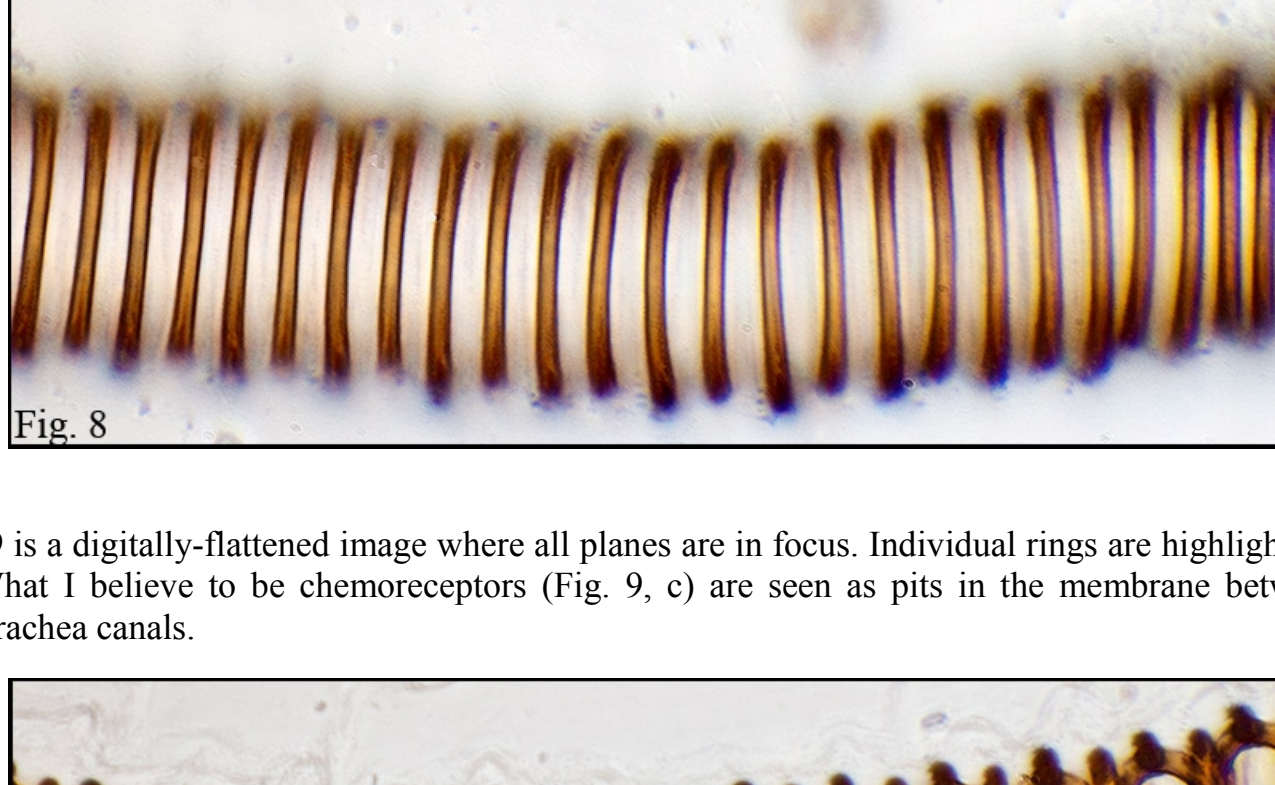


Figure 9 is a digitally-flattened image where all planes are in focus. Individual rings are highlighted (Fig. 9, r). What I believe to be chemoreceptors (Fig. 9, c) are seen as pits in the membrane between the pseudotrachea canals.



### Microscope and Photographic Equipment

My basic equipment is an Olympus BH2 with 2x, 4x, 10x, 20x, 40x, 60x, and 100x objectives; Olympus 2.5x NFK relay lens; Nikon D90 with Nikon PB-6 bellows; Nikon flash in place of Olympus' halogen lamp. All images are stacks of several frames processed by Zerene Stacker.

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