

NOTES ON THE IDENTIFICATION OF ANOPHELES PSEUDO-
PUNCTIPENNIS THEOBALD (DIPTERA, CULICIDAE).

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Of recent years, much attention has been given to the larvae of Anopheline mosquitoes, as in some instances they offer better characters for separation of closely allied species than do the adult females, or even the male terminalia. During the course of the author's work, he examined a large number of larvae of *Anopheles pseudopunctipennis* from Panama, and noted a very striking character, which serves as an excellent recognition-mark of the species. A search through the available literature, particularly the works of the late F. M. Root and H. G. Dyar, showed that this character had been overlooked by these workers and others. However, the author found that the character had been discovered in 1927 by Shannon and Del Ponte, who published a description of it in an obscure Argentinian journal (1). The character is found in the postspiracular plates of the larva; the tips of these plates are produced into two thin black tails, which curve upwards at right angles to the plane of the postspiracular plates. In the living larva these tips project through the surface film. As a means of positive identification of the species, this character seems superior to any of those hitherto used, because of its size and easy visibility. In fact, the tails may be seen with a 20X lens. The accompanying photomicrograph shows the tails flattened, and lying in the same plane as the postspiracular plates.

The author has examined material from Argentina, Panama, Mexico, Costa Rica, New Mexico, and California, and finds that the character is present in larvae of *pseudopunctipennis* from all these regions.

The male terminalia of *A. pseudopunctipennis* have been described by a number of American workers. As Root (2) has pointed out, his own earlier description (3) of the mesosome, and the description by Howard, Dyar and Knab (4), were incorrect in stating that the mesosome was without leaflets. Freeborn (5) also described the mesosome as without leaflets. Actually two pairs of very small, delicate, serrate leaflets are normally present.

Dr. F. M. Frost has recently published a comparative study of the male terminalia of Californian *Anopheles* (6), in which she states that none of the specimens examined by her showed the presence of mesosomal leaflets.

The author, after a number of fruitless attempts to procure male material from California, obtained a male specimen

¹ From the Gorgas Memorial Laboratory, H. C. Clark, Director, Panama City, Rep. de Panama.

collected in Stockton, California, through the courtesy of the authorities of the U. S. National Museum in Washington, D. C. Upon staining and dissecting the terminalia of this specimen, the mesosome was seen to have a pair of delicate leaflets on one side of the tip only, the pair normally present on the other side doubtless having been broken off, as the specimen was over 30 years old, and very brittle, when examined. The accompanying photomicrograph from the Californian specimen shows these leaflets plainly.

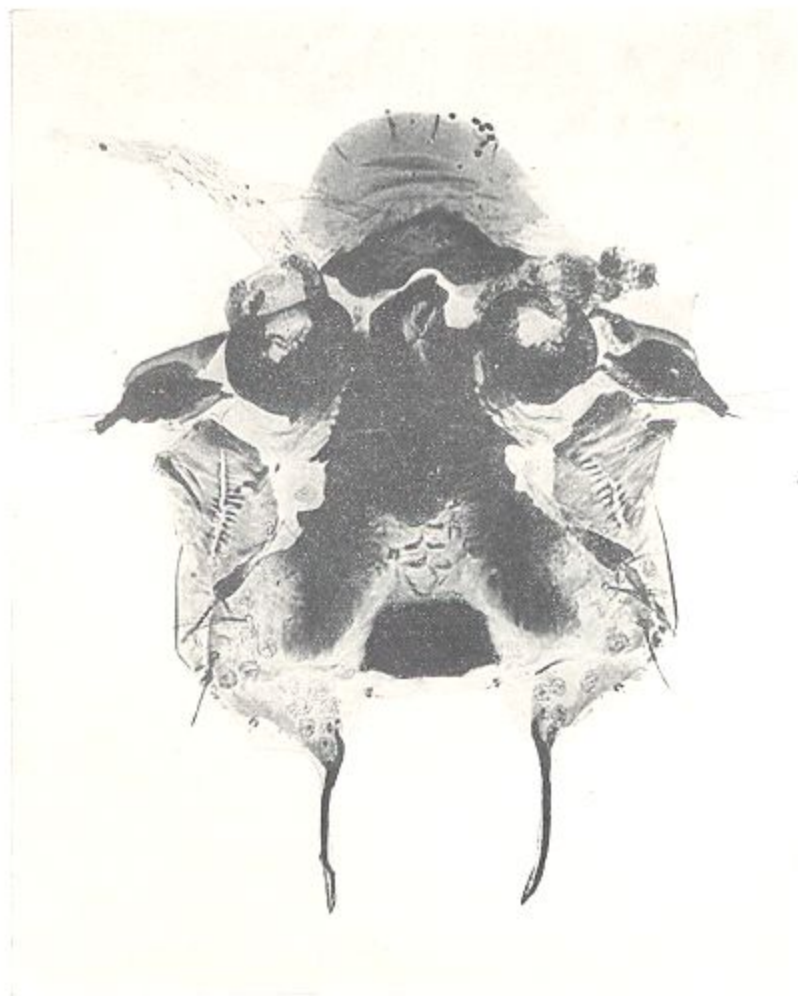
The author has examined male material from Argentina, Panama, Costa Rica, Mexico, the island of Grenada in the Lesser Antilles, the States of New Mexico and Texas, as well as the single Californian specimen mentioned, and has found mesosomal leaflets present in material from all these regions. Dr. D. P. Curry informs the author that he has taken specimens of *pseudopunctipennis* in Panama which had an extra pair of mesosomal leaflets, making six in all. Evidently the number of pairs present is somewhat variable.

As the leaflets are so delicate, material in which they are to be demonstrated should be stained (acid fuchsin is excellent), and at least partially dissected. The folds of the anal lobe will effectively obscure the leaflets, and this lobe, at least, should be removed before attempting to see them.

The presence or absence of mesosomal leaflets is of importance as possibly indicating a separation of the species into local races, as has occurred in *A. maculipennis* in Europe. *A. pseudopunctipennis* apparently varies greatly in its habits and ability to transmit malaria in different parts of its range. The work of Barber, Komp, and King (7), and of Barber and Forbrich (8) in New Mexico, shows that it is not important as a vector there. It is not considered dangerous in California. In the highlands of Guatemala it is suspected on epidemiological grounds (9). In Panama it is considered of minor importance, although it is experimentally infectible. On the other hand, Davis (10) has shown that it is the principal vector of malaria in northwestern Argentina, where it enters houses readily, and is avid for human blood.

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Spiracular apparatus of *A. pseudopunctipennis* larva, showing terminal "tails."



Mesosome of specimen of *A. pseudopunctipennis* from California, showing serrate leaflets.

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 9. Molloy, Daniel, Personal communication.
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