ON THE CLASSIFICATION OF THE MOSQUITOES.

BY HARRISON G. DYAR AND FREDERICK KNAB.

Now that Professor Williston has cleared the ground and destroyed the Theobaldian classification of Culicidæ, let us try a little constructive work. We regard it as essential that all the groups, both generic and higher, should be based only on characters found in both sexes of the adults; that these characters should be fundamental as generally recognized by systematists, and that they should be supported by sound larval characters. We have only one cause of difference with Prof. Williston's remarks, namely, his implied statement that the palpal characters are of value in generic definition. They are not, in the case of the mosquitoes. The differences consist in varying length and the number of joints. They seem at first sight interesting, and we were much attracted to them on beginning our generic studies. But they prove to be entirely secondary sexual characters, not correspondingly represented in both sexes, and are, therefore, ruled out. Moreover, the small terminal joint or joints of the female palpi, on the presence or absence of which Neveu-Lemaire's classification is based, is variable within the limits of a single species (*Culex tarsalis*, Coq.), and is gradually evanescent in another series of species (*Aedes*, spp.), besides there being no modification in the male to correspond with it. The long palpi of the male have been developed independently in several groups (the short palpi being the generalized condition), and are therefore a parallel development without fundamental value. Therefore, the old classification, which Prof. Williston advises his readers to retain, is unsound, as it is based on these palpal characters. We may remark that the same condition appears to obtain in the Tipulidæ, since Loew says, speaking of the division of the family on the long and short palpi: "The division, indeed, is no natural one" (Dipt. No. Am., 10, 1862).

All the subfamilies of the Culicidæ recognized by the Theobaldian school are untenable, including the Anophelinæ. We have found only two subfamilies, the Culicinæ and Sabethinæ. We will not quarrel with Prof. Williston over the terminology, but hasten to call them tribes. The Culicini, then, have the metanotum devoid of setæ; the larvæ furnished with a median ventral brush on the anal segment; the Sabethini have a group of setæ on the metanotum, and the larvæ without a ventral brush on the anal segment. These are primary and essential divisions, the two groups showing a general dissimilarity in their appearance and habits, both as adults and larvæ, beside the structural points noted.

February, 1907

In tabular form we recognize the following genera. We have employed one new character, the tibial comb or scraper, a microscopic structure situated at the end of the tibiæ, and consisting of a row of fine spines. It apparently functions as a cleansing organ for the body parts or wings.

CULICINI.

1. Scutellum evenly rounded, not lobed.....2.
Scutellum distinctly trilobed.....3.
2. First submarginal cell longer than its petiole.....*Anopheles*.
First submarginal cell less than half as long as its petiole.....*Megarhinus*.
3. Hind tibial scraper with a row of 7 to 12 closely set setæ.....4.
Hind tibial scraper with none to 5 sparsely set setæ.....13.
4. Scutellum with central lobe elongate, collar-like, not tubercularly prominent.....5.
Scutellum with central lobe distinctly prominent and tubercular.....6.
5. Terminal antennal joints slender, long.....*Mansonia*.
Terminal antennal joints short, broad.....*Ædeomyia*.
6. Second joint of antennæ very long, 14 x 1.....*Deinocerites*.
Second joint of antennæ moderate, less than 8 x 1.....7.
7. First submarginal cell less than half as long as its petiole.....*Uranotenia*.
First submarginal cell at least nearly as long as its petiole.....8.
8. Head with a distinct neck, the occiput broad and exposed.....*Psorophora*.
Head without a distinct neck, appressed to the thorax.....9.
9. Cross veins tending to lie in line, the third separated from the second by less than its own length.....*Culiseta*.
Cross veins normal, widely separated, the third distinct from the second by its own length.....10.
10. ♀ with the last segment of the abdomen not extensile, large, squarely ended; ♂ genitalia with the harpes slender, columnar with bent spined tip.....*Teniorhynchus*.
♀ with the last segment of the abdomen extensile, slender; ♂ genitalia with harpes broad, concavely curved.....11.
11. Clypeus bare.....12.
Clypeus with dense appressed scales.....*Stegomyia*.
12. Prothoracic lobes approximate.....*Hæmagogus*.
Prothoracic lobes well separated.....*Ædes*.
13. Feet with large empodia.....*Lutzia*.
Feet with small empodia.....*Culex*.

SABETHINI.

1. Clypeus without hairs.....2.
Clypeus hairy on the sides.....*Joblotia*.
2. Prothoracic lobes contiguous, densely hairy*Sabethes*.
Prothoracic lobes well separated3.
3. Eyes separated by a narrow wedge; proboscis rather short, swollen
at tip.....4.
Eyes contiguous on vertex5.
4. Claws of hind tarsi two, normal*Wyeomyia*.
Hind tarsi with but a single claw.....*Limatus*.
5. No erect forked scales on occiput; proboscis longer than the
body*Phoniomyia*.
With a row of erect forked scales on occiput; proboscis not longer
than body...6.
6. Front of head normal, smooth.....*Lesticocampa*.
Front with a conical process above the clypeus*Runchomyia*.

List of American genera, with principal synonyms.

Anopheles, Meigen.	<i>Conchyliastes</i> , Coq.
<i>Myzomyia</i> , Blanch.	<i>Grabhamia</i> , Theob.
<i>Cyclolepteron</i> , Theob.	<i>Howardina</i> , Theob.
<i>Nototricha</i> , Coq.	<i>Culiselsa</i> , Felt.
<i>Cellia</i> , Theob.	<i>Culicada</i> , Felt.
<i>Arribalzagia</i> , Theob.	<i>Ecculex</i> , Felt.
<i>Cælodiazesis</i> , D. & K.	<i>Protoculex</i> , Felt.
Megarhinus, R.-D.	<i>Pseudoculex</i> , Dyar.
Mansonia, Blanch.	<i>Gymnometopa</i> , Coq.
<i>Pneumaculex</i> , Dyar.	<i>Lepidoplatys</i> , Coq.
<i>Ædeomyia</i> , Theob.	<i>Feltidia</i> , Dyar.
Deinocerites, Theob.	<i>Ceratocystia</i> , D. & K.
Uranotænia, Arrib.	Hæmagogus, Will.
Psorophora, R.-D.	<i>Cacomya</i> , Coq.
Culiseta, Felt.	<i>Stegoconops</i> , Lutz.
<i>Theobaldinella</i> , Blanch.	<i>Stegomyia</i> , Theob.
Tæniorhynchus, Arrib.	Lutzia, Theob.
<i>Coquillettidia</i> , Dyar.	Culex, Linn.
Ædes, Meig.	<i>Neoculex</i> , Dyar.
<i>Ochlerotatus</i> , Arrib.	<i>Culicella</i> , Felt.
<i>Heteronycha</i> , Arrib.	<i>Melanoconion</i> , Theob.
<i>Janthinosoma</i> , Arrib.	<i>Tinolestes</i> , Coq.

<i>Micraedes</i> , Coq.	Limatus, Theob.
<i>Isostomyia</i> , Coq.	<i>Simondella</i> , Laveran.
<i>Mochlostyrax</i> , D. & K.	Phoniomyia, Theob.
Sabethes, R.-D.	Lesticocampa, D. & K.
<i>Sabethoides</i> , Theob.	Runchomyia, Theob.
Wyeomyia, Theob.	Joblotia, Blanchard.
<i>Dendromyia</i> , Theob.	<i>Trichoprosopon</i> , Theob.

A NEW SPECIES OF MEGARHINUS.

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A small lot of mosquitoes which were recently received from Dr. W. F. Thornton, of Bluefields, Nicaragua, contains a single specimen of a *Megarhinus*, which represents a new species. It is related to the forms with white-ringed tarsi, recently dealt with in a paper by Dr. Dyar and myself (Smithsonian Miscellaneous Collections, Quarterly Issue, xlviii, 241-253, 1906), but differs from all the known species in that the white on the hind tarsi does not encircle them, but is upon the outer side only.

Microscopic preparations show that the so-called second and third segments of the male palpus are really one, being only apparently divided by a false joint, a slight constriction accentuated by a difference in the coloration of the scales. The male palpus is, therefore, only four-jointed, consisting of a very short basal joint, a very long second joint (apparently homologous with the third joint of the males of the Culicine and Anopheline forms), a third shorter joint, and a fourth long and sabre-like. In the female there is a fifth very minute terminal joint, hidden beneath a dense vestiture of scales. What has been called the first abdominal segment in previous descriptions is in reality the post-scutellum, which overlaps the basal portion of the abdomen. In the following description, for the sake of uniformity, the palpi are treated as in previous descriptions.

Megarhinus hypoptes, new species.—Male: Head behind the eyes velvety-black, the eyes broadly bordered with light metallic-blue, beneath and at the sides silvery. Antennæ densely plumose; the toruli with silvery lustre; second segment long and stout, longer than the three succeeding ones, somewhat compressed laterally, the heavy scaling of the crest condensed to a prominent iridescent blue patch on the anterior portion. Palpi metallic-blue and purple, segments 2 to 4 pale lilac at the tip, second and fourth segments nearly equal, the third longer, fifth twice as long as the fourth. Prothoracic lobes deep metallic-blue. Mesothorax greenish-black on the disk, with a few coppery scales intermixed; the anterior and

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