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THE LARVÆ OF CULICIDÆ CLASSIFIED AS
INDEPENDENT ORGANISMS.

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(Plates IV–XVI.)

“Wer A sagt muss auch B sagen.”—*German proverb.*

We are compelled to the conclusion that specific limits are more sharply defined or at least more readily appreciable, in the larvæ of the Culicidæ, than in the adults, although generic limitations are less closely drawn. In the larvæ we observe many marked modifications in shape and details of the chitinized parts which appear constant for the species and lend themselves readily to definition, while, in the adults, the specific characters, in the females at least, seem largely dependent upon comparatively undefined differences in coloration, which are easily lost or obscured if the specimen is at all injured in emergence or worn by flight. We are further impelled to present the results of our study of the larval forms separately for the following considerations. Dr. L. O. Howard has placed in the hands of the senior author all the larval material collected with the aid of grants from the Carnegie Institution of Washington for a monograph of the

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Culicidæ of North and Central America, for classification and description, with the very kind permission to publish descriptions of the new larvæ in advance of the monograph. The adults have been given into other custody, and the determinations that have been transmitted to us are, in many cases, at variance with larval characters. We have been unable to personally examine into the discrepancies without exceeding the field which has been assigned to us. Therefore it seemed advantageous to treat the larvæ as independent organisms and classify them separately, especially as an independent classification, consistently worked out, when compared with the one based on adult characters, should throw light on the phylogeny of the group and indicate the more reliable distinctions. If any apology is due for proposing new names for larval forms, we hereby make the apology. To us, it seems justified in this case, especially as, in nearly all cases, bred adults are in the hands of our co-workers. We find, moreover, that a synonym is easily dealt with, whereas a misidentification or confusion of two species under one name is really more troublesome. Therefore, if it shall prove that we have named the larvæ of previously described species, we believe that less difficulty will be experienced than if we had left them nameless, or doubtfully referred them to known species.

The junior author has made a trip to the West coast of Central America after mosquito larvæ and has been closely associated with the work subsequently as artist for the early stages. We are indebted to Dr. Howard for the opportunity to study the material, as well as the drawings of the mouth parts made by Miss Evelyn G. Mitchell and Miss Mary Carmody for the monograph. We also feel grateful to Dr. Howard's numerous assistants and correspondents, who have helped to collect the material and, especially, to Mr. August Busck and Mr. F. W. Urich, who have obtained so many of the West Indian species.

The identifications of adults here used have been made by Mr. D. W. Coquillett of the Bureau of Entomology, U. S. Department of Agriculture, custodian of Diptera in the U. S. National Museum. We have accepted these determinations wherever there existed no apparent reason to discredit them. We have not personally verified them in any case, as the specimens are not before us.

Family CULICIDÆ.

Definition.-

The larvæ of the Culicidæ are characterized by a well-formed head, enclosed in a chitinous covering, with compound eyes, single-jointed antennæ, a vibratile or prehensile group of hairs before the oral orifice, well-developed toothed mandibles with a row of cilia, quadrate or conical hirsute maxillæ and a short single-jointed palpus. The thoracic segments are consolidated into a transversely elliptical flattened mass; the abdomen consists of nine segments slender and submoniliform, the eighth with a dorsal respiratory opening, often prolonged into a chitinous tube, connecting with two tracheæ running the length of the body. The last segment is smaller, is furnished with a chitinous plate and usually with four delicate anal appendages. The body is supplied with setæ in tufts or singly, usually more or less conspicuously feathered. There are generally present certain scales on the sides of the eighth segment and in two rows on the posterior aspect of the air tube.

From the other aquatic Nematoceros Diptera, the Culicidæ are separable by the presence of the mouth brush, the shape of the anal segment and the absence of abdominal feet. The Corethridæ and Dixidæ run very close to the Culicidæ, and seem, indeed, inseparable therefrom on any one character, although different enough in the general complex of characters.

Classification.

Until their very recent sudden rise into economic importance, the Culicidæ have been a much neglected family. Very lately there has arisen great activity in the collection and study of these insects, which has resulted in an extensive work by Mr. F. V. Theobald of Wye, England, based on the large material which has been accumulated at the British Museum. The results have been remodelled by Prof. R. Blanchard of Paris, France, and certain crudities eliminated, the whole now presented to the public in excellent form. The system seems to us unsound from top to bottom. We cannot restrain a feeling of surprise that eminent authors should adopt such weak characters for the separation of subfamilies and genera. Much weight is given to the length of the palpi in the male or female, to which we find two fundamental objections. The length of palpi

is, in our experience, never an important character, in any insects, being adaptive and not of more, often of less than generic value. When a character exists in one sex only, it is of far less importance, belonging to the class of secondary sexual characters, which by some systematists of standing are uniformly denied to be of even generic value. In this case, both these objections, applying together, have added force and appear to us to utterly discredit any system founded on them.

In the definition of genera, much importance is attached to the shape and arrangement of the scales. To any one conversant with the value of different characters in insects, this appears, a priori, an unfortunate selection. How it works cannot be better shown than by a quotation from James and Liston*, whose common sense remarks deserve the greatest publicity:

"In the classification of mosquitoes Mr. Theobald relies almost entirely upon scale structure for the distinctions between different genera, and in one case he has used this character alone for the formation of a subfamily.

"The classification is based in great part on the shape, and not upon the presence or absence of scales, and it is a matter of great difficulty to decide in some cases what form of scale predominates; nor does Mr. Theobald give any indication of what portion of a wing, for example, should be examined to decide this point.

"The terms 'lanceolate', 'long and narrow', 'true scales', etc. are not sufficiently definite to permit of such scales being easily distinguished from one another, except perhaps by Mr. Theobald himself. It is obvious that the distinction between 'hair-like curved scales' and 'narrow curved scales' is not great, and also that it would be difficult to decide whether the abdomen is 'hairy' or whether it is covered with 'hair-like scales' which apparently resemble hairs so closely that they cannot be termed 'true scales.' As regards the wing again it would be certainly difficult to decide whether most of the scales were 'lanceolate' or whether they were 'mostly long and narrow' especially as the part of the wing to be examined is not stated, but on this decision alone depends the distinction between the genera *Anopheles* and *Myzomyia*.

*A monograph of the *Anopheles* mosquitoes of India, Calcutta, 1904; pp. 16 and 64.

"One of the objects of classification is to simplify the identification of species, but the new classification does not aid this in any way. In practice, it will be found much easier to determine the specific name of any specimen than its generic name according to the new system.

"Species which differ widely in their habits and pathological significance are placed in the same genus, while those which are similar in these important respects are placed in different genera.

"Species of which the eggs and larvæ, the characters of which are at least as important as the shape of the wing scales in the adult insect, are essentially different are placed in the same genus, while those with eggs and larvæ of the same type are placed in different genera.

"The distinctions between the different genera are not of equal value, for whereas certain species are placed in different genera because in the one case the wing scales are 'lanceolate' while in the other they are 'mostly long and narrow'; the fact that the abdomen of one is densely covered with scales while that of the other is, practically speaking, entirely free from them, is not considered sufficient to warrant these two species being placed in different genera.

"Abnormal forms or monstrosities have been made the basis of new genera and species. During the examination of the types of *Anopheles rossi* deposited in the British Museum, Mr. Theobald encountered a specimen the abdomen of which was covered with scales arranged as in mosquitoes of the genus *Culex*. To us it appears very probable that this is an instance of a monstrosity. Mr. Theobald, however, classifies the insect without question as the type of a new genus (*Aldrichia*). Another instance is the specimen on which Mr. Theobald has founded a new subfamily (*Heptaphlebomyina*); the single insect was provided with seven longitudinal veins on its wings instead of only six."

The final test of any system of classification is the degree of its agreement with the phylogeny of the group. The past history is indicated by all the stages, often more clearly in the larvæ than in the adults. We present the following study of the Culicid larvæ in the hope that it may elucidate the subject. The senior author has shown* that adult characters, rightly understood, harmonize beautifully with those of the larvæ in the case of subfamilies. We be-

*Science, n. s., xxiii, 233, 1906. The classification of Dr. Lutz, in C. Bourroul, Mosquitoes do Brasil, Bahia, 1904, approaches this.

lieve that the same relation can be traced to genera and, indeed, have in mind certain adult characters which we think would work out excellently. At present, however, we are restrained by the limitations of our field from applying these ideas.

After writing the above we have seen a recent classification by Mr. Coquillett (*Science*, n. s., xxiii, 312, 1906) in which one of our characters, the tarsal claws of the female, is used to good effect. Otherwise the arrangement is based too largely on larval characters* to be of value in the present connection. We wish to compare our arrangement, based solely on larval characters with one based solely on adult characters. The only one so available is that of Mr. Theobald, which does not stand the test of that comparison, for the reasons we have discussed.

Table of subfamilies.

Air tube short and sessile; a series of subdorsal palmate hair tufts on the abdomen.....	ANOPHELINÆ
Air tube elongate, at least longer than wide; no dorsal palmate hairs.	
Anal segment with an unpaired ventral brush or rudder of dense hair tufts.....	CULICINÆ
Anal segment without unpaired median ventral brush.....	SABETHINÆ

Subfamily ANOPHELINÆ

Table of genera.

Abdomen with plumose lateral hairs only on the first three segments; head with plumose hairs.....	<i>Anopheles</i>
Abdomen with plumose lateral hairs to the sixth segment; head with small simple hairs only.....	<i>Coelodiazesis</i>

Genus ANOPHELES Meigen.

- Anopheles* Meigen, Syst. Besch. bek. eur. zweifl., Inst., i, 10, 1818.
Cyclolepteron Theobald, Jn. trop. med., iv 234, 1901.
Cyclolepidopteron Blanchard, Cont. rend. heb. soc. biol., liii, 1045, 1905.
Grassia Theobald (not Fisch), Jn. trop. med., v, 181, 1902.
Myzomyia Blanchard, Cont. rend. heb. soc. biol., liv, 795, 1902.
Stethomyia Theobald, Jn. trop. med., v, 181, 1902.
Howardia Theobald (not Dalla Torre), Jn. trop. med., v, 181, 1902.
Pyretophorus Blanchard, Cont. rend. heb. soc. biol., liv, 795, 1902.

*Miss Mitchell's generalization, adopted by Mr. Coquillett, about the egg-laying habits is fallacious, and will not hold. This might have been anticipated as it is clearly an adaptive character.

- Rossia* Theobald (not Bonaparte, not Owen), Jn. trop. med., v, 181, 1902.
Myzorhynchus Blanchard, Cont. rend. heb. soc. biol., liv, 795, 1902.
Laverania Theobald (not Grassi and Feletti), Jn. trop. med., v, 181, 1902.
Nyssorhynchus Blanchard, Cont. rend. heb. soc. biol., liv, 795, 1902.
Cellia Theobald, Mon. Culic., iii, 107, 1903.
Arribalzagia Theobald, Mon. Culic., iii, 81, 1903.
Aldrichia Theobald, Mon. Culic., iii, 353, 1903.
Christya Theobald in Giles, Rev. Anoph., suppl. i, Handb., Gn. or Mosq., 2 ed. 40, 1904.
Lophomyia Theobald in Giles, Rev. Anoph., suppl. i, Handb. Gnats or Mosq., 2 ed., 366, 1904.

Table of species.

1. A pair of palmate hairs on the second abdominal segment (2d to 7th)... 2
 No palmate hairs on the second abdominal (3d to 7th)..... 4
2. Comb of the eighth segment with the teeth coarsely serrate below. *albipes*
 Comb teeth finely and inconspicuously serrate..... 3
3. Comb with the two upper long teeth with a short tooth between; three
 lower teeth with five between..... *argyrotarsis*
 Comb with the two upper teeth with none between; three lower with four
 between..... *albimana*
4. Comb with seven long teeth regularly alternating with six short ones
mediopunctatus
 Comb with short teeth irregularly alternating..... 5
5. Comb with the four upper teeth short..... *maculipes*
 Comb with some of the upper teeth long, at least the first or third..... 6
6. One long lower tooth, followed by four little ones..... *franciscanus*
 One long lower tooth, followed by three little ones..... *punctipennis*
 Lower long tooth followed by another as long or nearly so..... 7
7. Upper tooth short..... 8
 Upper tooth long..... 9
8. Two long lower teeth followed by *two* short, one long, *three* short ones
grabhamii
 Two long lower teeth followed by *three* short, one long, *four* short ones
maculipennis
9. The three upper teeth long..... *eiseni*
 The second upper tooth short..... 10
10. One short tooth between the two upper long ones..... *cruciaus*
 Three short teeth between the two upper long ones... *pseudopunctipennis*

Anopheles albipes Theobald.

- Anopheles argyrotarsis albipes* Theobald, Mon. Culic., i, 125, 1901.
Nyssorhynchus cubensis Blanchard, Les Moustiques, 204, 1905.

Recorded from South America and the West Indies. Our specimens are from Port Limon, Costa Rica.

Anopheles argyrotarsis Desvoidy.

Anopheles argyrotarsis Desvoidy, Mem. soc. d'hist. nat. Paris, iii, 411, 1827
Nyssorhynchus albimanus Blanchard (in part), Les Moustiques, 202, 1905.

Blanchard makes this a synonym of *albimanus*. The names have been given us separately and the larvæ differ. Our specimens are from Rincon Antonio, Oaxaca, Mexico.

Anopheles albimanus Wiedemann.

Anopheles albimanus Wiedemann Dipt. exot., 10, 1821.
Nyssorhynchus albimanus Blanchard, Les Moustiques, 202, 1905.

Recorded from South America and the West Indies. We have it from Trinidad, Martinique and St. Domingo (Busck).

Anopheles mediopunctatus Theobald.

Cyclolepteron mediopunctatus Theobald, Mon. Culic., iii, 60, 1903.

Described from Brazil. The junior author obtained a specimen in Cordoba, Mexico, which has been so named.

Anopheles maculipes Theobald.

Arribalzagia maculipes Theobald, Mon. Culic., iii, 81, 1903.

Described from Brazil and Trinidad. Our specimens are from Trinidad (Urlich), one of the type localities.

Anopheles franciscanus MacCracken.

Anopheles franciscanus MacCracken, Ent. news, xv, 12, 1904.

Described from California. We have specimens from Salina Cruz and Cordoba, Mexico, as well as Miss MacCracken's material.

Anopheles punctipennis Say.

Culex punctipennis Say, Journ. acad. nat. soc. Phil., iii, 9, 1823.

Anopheles punctipennis Blanchard, Les Moustiques, 167, 1905.

The commonest species in the Atlantic Coast region and Mississippi Valley, much commoner than *maculipennis*.

Anopheles grabhamii Theobald.

Anopheles grabhamii Theobald, Mon. Culic., i, 205, 1901.

Cyclolepidopteron grabhamii Blanchard, Les Moustiques, 185, 1905.

Described from Jamaica. Our specimens are from St. Domingo (Busck).

Anopheles maculipennis Meigen.

Anopheles maculipennis Meigen, Klass. Besch. eur. zweifl. Ins., i, 5, 1804.

Anopheles maculipennis Blanchard, Les Moustiques, 160, 1905.

Received from various parts of the United States. Occurs also in Europe.

Anopheles eiseni Coquillett.

Anopheles eiseni Coquillett, Journ. N. Y. ent. soc., x, 192, 1902.

Described from Guatemala. We have it from Cordoba, Mexico.

Anopheles crucians Wiedemann.

Anopheles crucians Wiedemann, Ausser. Zweifl. Ins., i, 12, 1828.

Anopheles crucians Blanchard, Les Moustiques, 171, 1905.

Occurs in the southern Atlantic States from New York to Florida.

Anopheles pseudopunctipennis Theobald.

Anopheles pseudopunctipennis Theobald, Mon. Culic., ii, 305, 1901.

Described from New Grenada, Lesser Antilles. Our specimens are from Acapulco and Salina Cruz, Mexico. We assume them to be correctly named, although the localities are rather remote.

Genus COELODIAZESIS, new.

Differs from *Anopheles* in the slight development of the head hairs, the presence of plumose hairs after the third abdominal segment, and the absence of short teeth on the comb of the eighth segment. Type, *C. barberi* Coq.

Coelodiazesis barberi Coquillett.

Anopheles barberi Coquillett, Can. ent., xxxv, 310, 1903.

Anopheles barberi Dyar, Journ. N. Y. ent. soc., xii., 243, 1904.

The larvæ live in the water in hollow trees. This habit is unique among the Anophelinae, which are in general surface feeders in open water. As a compensation for the restricted surface offered in their habitat, the larvæ have acquired a predaceous habit and devour the unfortunate larvæ of *Aedes triseriatus* and *Mansonia signifer* with which they live.

Subfamily CULICINÆ.

Table of genera.

- 1. Mouth brush prehensile, folded outward in a pencil.....2
 Mouth brush vibratile, diffusely folded inward.....4
- 2. A lateral plate on the eighth abdominal segment.....*Megarhinus*
 A lateral patch of scales on the eighth abdominal segment.....3
- 3. Scales of the 8th segment in a line preceded by a patch of minute ones.
 Psorophora
 Scales alike, in a triangular patch without small ones.....*Lutzia*
- 4. Air tube long, the hairs in scattered tufts or absent, the antennæ
 usually with the tuft beyond the middle arising from a notch.....5
 Air tube short, less than four times as long as wide, or if longer
 the antennæ with the tuft at or before the middle.....7
- 5. Anal segment without hairs before the barred area.....6
 Anal segment with hairs along ventral line, piercing the chitinous band
 Culicella
- 6. Lateral comb of the 8th segment of many scales in a triangular patch *Culex*
 Lateral comb of the 8th segment a single row of bar-like spines *Mochlostyrax*
- 7. Air tube strongly inflated.....*Janthinosoma*
 Air tube not conspicuously inflated.....8
- 8. Antennæ strongly inflated and distorted.....*Ceratocystia*
 Antennæ not so.....9
- 9. Head normal, without lateral angular projection.....10
 Head with lateral projection covering a process on the mandible.....
 Deinocerites
- 10. Head with large thick spinous setæ.....*Uranotenia*
 Head with normal fine hairs.....11
- 11. Seventh abdominal segment with a dorsal plate; tube without pecten
 Mansonia
 Abdomen without plates; air tube with pecten.....12
- 12. Air tube conical or tapered, normal.....13
 Air tube bottle-shaped, the outer half narrow.....*Tæniorhynchus*
- 13. Air tube pecten produced into long hairs.....*Culiseta*
 Air tube with the pecten not so produced.....*Aedes*

Genus MEGARHINUS Desvoidy.

Megarhinus Desvoidy, Mem. soc. d'hist. nat. Paris, iii, 412, 1827.

Megarhinus Blanchard, Les Moustiques, 220, 1905.

Table of species.

- 1. Large species, the chitinized parts very dark.....*portoricensis*
 Smaller species, the chitinized parts very pale.....*violaceus*

Megarhinus portoricensis von Roder.

Megarhina portoricensis von Röder, Stett. ent. Zeit., xlv, 337, 1885.

Megarhinus rutila Coquillett, Can. ent., xxviii, 44, 1896.

We are unable to distinguish the larvæ of *portoricensis* and *rutila*, which occur together, and conclude that there is but one species, the degree of white banding on the tarsi of the adults being probably variable. The larvæ inhabit hollow trees and similar artificial situations. They are exclusively carnivorous in their diet, devouring the larvæ of the other Culicinae with which they live. Mr. Busck has noted that they kill all the larvæ that are with them before pupation. We have the species from the southern Atlantic States, West Indies and Central America. A specimen from Guadeloupe (Busck) was named "*M. violaceus*," but the adult was in poor condition.

***Megarhinus violaceus* Wiedemann.**

Culex violaceus Wiedemann, Dipt. exot., i, 7, 1821.

We accept this determination with some hesitation for some very pale colored larvæ of normal structure taken from the leaves of Bromelias by Mr. Urich in Trinidad. The species was described from Bahia (Brazil), but is insufficiently known, as stated by Blanchard. We would note that Dr. Lutz has recently described two *Megarhinus* bred from Bromelia water, one in Bahia, the other in Rio Janeiro. We are surprised that there should be several species with this limited habitat, and suspect the possibility of variability in the adults, as in the foregoing species.

Genus PSOROPHORA Desvoidy.

Psorophora Desvoidy, Mem. soc. d'hist. nat. Paris, iii, 412, 1827.

Psorophora Blanchard, Les Moustiques, 237, 1905.

Table of species.

1. Air tube less than three times as long as wide; a single tuft almost at tip
cilipes
Air tube four times as long as wide; a single hair shortly beyond the pecten.....2
2. Labial plate with the teeth regular and subequal.....*ciliata*
Labial plate with the next to basal tooth greatly enlarged.....*howardii*

***Psorophora cilipes* Fabricius.**

Culex cilipes Fabricius, Syst. Antliat., 34, 1805.

Culex cilipes Blanchard, Les Moustiques, 373, 1905.

We have accepted this identification for some very distinct larvæ taken by the junior author in Puntarenas, Costa Rica. Blanchard

includes the name in his list of uncertain or indeterminable species, but Coquillett is apparently able to recognize it. The larvæ occurred in a temporary pool full of vegetation, together with many Culicid larvæ on which they were feeding.

Psorophora ciliata Fabricius.

Culex ciliatus Fabricius, Ent. Syst., iv, 401, 1794.

Culex molestus Wiedemann, Dipt. exot., i, 36, 1821.

Psorophora boscii Desvoidy, Mem. soc. d'hist. nat. Paris, iii, 413, 1827.

Culex conterrens Walker, Ins. Saund., Dipt., i, 427, 1856.

Culex perterrens Walker, Ins. Saund., Dipt., i, 431, 1856.

Psorophora ciliata Blanchard, Les Moustiques, 239, 1905.

The species occurs in the Atlantic seaboard as far North as Massachusetts, and is common locally at Baltimore and Washington. The larva occurs in temporary rain puddles, hatching immediately after a shower. It is predaceous and very voracious. The principal prey are the species of *Janthinosoma*.

Psorophora howardii Coquillett.

Psorophora howardii Coquillett, Can. ent., xxxiii, 258, 1901.

Occurs on the Atlantic and Gulf coasts, but does not extend its range so far to the North as *ciliata*. The habits are the same and the two species occur mixed in the same puddles. The larvæ are very similar. In Mexico, the junior author found *howardii* considerably more abundant than *ciliata*, while in Central America *howardii* occurred alone.

Genus LUTZIA Theobald.

Lutzia Theobald, Mon. Culic., iii, 155, 1903.

Lutzia bigotii Bellardi.

Culex bigotii Bellardi; Mem. d. R. accad. di Torino, xxi, 200, 1864.

Culex bigotii Blanchard, Les Moustiques, 275, 1905.

Lutzia bigotii Blanchard, Les Moustiques, 394, 1905.

This interesting larva has the predaceous habits of *Psorophora* and in the main agrees structurally therewith; but in the less degree of modification of the maxillæ, lateral comb of the eighth segment and pecten of the tube, retains more of the structural characters of the other Culicid genera. The junior author collected it at Cordoba,

Mexico, and it has been sent us from Las Cascadas in the Panama Canal zone by Dr. J. A. LePrince.

Genus JANTHINOSOMA Arribalzaga.

Janthinosoma Arribalzaga, Rev. del Mus. de La Plata, ii, 152, 1891.

Conchyliastes Coquillett in Howard, Mosquitoes, 234, 1901.

Feltidia Dyar, Proc. ent. soc. Wash., vii, 47, 1905.

Janthinosoma Blanchard, Les Moustiques, 231, 1905.

Table of species.

- | | |
|---|---------------------|
| 1. Antennæ long and prominent, longer than the head | 2 |
| Antennæ moderate or short, shorter than the head | 5 |
| 2. Anal segment long and slender, longer than wide | 3 |
| Anal segment short, shorter than wide | 4 |
| 3. Comb of the eighth segment of six or seven subequal spines | <i>sayi</i> |
| Comb of five spines, the upper and lower ones small | <i>varipes</i> |
| 4. Pecten teeth of the air tube with four long sharp spines | <i>injine</i> |
| Pecten teeth of the air tube with two reduced rounded branches | <i>scholasticus</i> |
| 5. Tube fusiform-inflated; teeth of comb joined by a chitinous band | 6 |
| Tube barrel-shaped; teeth of comb separate | <i>pygmæa</i> |
| 6. Antennæ black on outer half; four spines of tube pecten scattered to the
basal half of the tube | <i>jamaicensis</i> |
| Antennæ all white; the four spines of the tube pecten restricted to the
basal third of the tube | <i>signipennis</i> |

***Janthinosoma sayi*, new name.**

Culex musicus Say (not Leach), Proc. acad. nat. sci. Phil., vi, 149, 1827.

Janthinosoma mexicana Blanchard, Les Moustiques, 234, 1905.

The larva is found in temporary rain puddles and develops rapidly, as do all of this genus. It occurs along the Atlantic seaboard as far North as Massachusetts, but is common only further South. The senior author met with it in abundance at Tampa, Florida. The junior author collected it at Santa Lucrecia, Almoloya and Tehuantepec, Mexico; Sonsonate, Salvador; Corinto, Nicaragua; Puntarenas and Port Limon, Costa Rica. Blanchard says that *musicus* Say (preoccupied) is surely the same as *mexicanus* Bellardi; but Coquillett has identified as *mexicana* another species, which he refers to "*Culex*" as it differs in scale structure. We therefore propose the new name *sayi* for our familiar species.

***Janthinosoma varipes* Coquillett.**

Conchyliastes varipes Coquillett, Can. ent., xxxvi., 10, 1904.

Janthinosoma varipes Blanchard, Les Moustiques, 626, 1905.

Described from Mexico and Mississippi. Our larvæ are from Baton Rouge, Louisiana, from Dr. Dupree.

***Janthinosoma infine*, new species. Fig. 1.**

The characters are normal for the genus. The antennæ are greatly developed, the anal segment short, the scales of the lateral comb of the eighth segment are joined by a very weak chitinous band; the single scale has its apical spinule long. The larvæ were collected by Mr. Busck in Trinidad and St. Domingo in rain water pools and ditches, in a spring in a cave, in a slowly running spring, in a pot-hole in coral rock in the woods, in a pot-hole near the coast with rather salt water and in holes made by wild pigs in the San Francisco Mts. of St. Domingo. The specimens have been named '*Culex confinis*,' but *confinis* was described by Arribalzaga from the Argentine and is referred by Blanchard to *Tæniorhynchus*; so we do not accept the identification.

***Janthinosoma scholasticus* Theobald. Fig. 2.**

Culex scholasticus Theobald, Mon. Culic., ii, 120, 1901.

Culex scholasticus Blanchard, Les Moustiques, 336, 1905.

Described from the Antilles. Our specimens are from Trinidad, taken by Mr. Busck in rain water pools at Cedros, with the preceding species. We have accepted this identification, although it is perhaps open to some doubt, as Mr. Coquillett later applied this same name (*scholasticus*) to a very different species, collected by the junior author in Central America, which same species he had also named "*secutor* Theob." Not, however, the true *secutor* Theob. of Jamaica, of which we have specimens from Dr. Graham. (See *Culex lactator* and *C. coronator* described below).

***Janthinosoma pygmaea* Theobald. Fig. 3.**

Grabhamia pygmaea Theobald, Mon. Culic., iii, 245, 1903.

Described from Antigua and Jamaica. Our specimens were taken by Mr. Busck in St. Domingo in pools in coral rock close to the sea, filled with clear salt water, only submerged by the highest tides. We have accepted the determination because we do not know but that Theobald's specimens came from larvæ with the same peculiar habits as ours; this is not stated, and we give the matter the benefit of the doubt.

Janthinosoma jamaicensis Theobald.

Culex jamaicensis Theobald, Mon. Culic., i, 345, 1901.

Grabhamia jamaicensis Theobald, Mon. Culic., iii, 244, 1903.

Culex jamaicensis Blanchard, Les Moustiques, 279, 1905.

Grabhamia jamaicensis Blanchard, Les Moustiques, 397, 1905.

Recorded from Jamaica only. We have before us a widespread species, common along the Atlantic seaboard, taken by Mr. Busck on St. Domingo and by the junior author in Santa Lucrecia, Rincon Antonio, Tehuantepec, Salina Cruz and Almoloya, Mexico. It was formerly named "*perturbans* Walk." by Mr. Coquillett, then changed to "*confinis* Arrib." under which name a figure of the larva was published by the senior author (see Blanchard, Les Moustiques, p. 297), and lastly named *jamaicensis* Theob. We accept this name, although lacking the positive identification of larvæ from Jamaica.

Janthinosoma signipennis Coquillett.

Tæniorhynchus signipennis Coquillett, Proc. ent. soc. Wash., vi, 167, 1904.

Tæniorhynchus signipennis Dyar, Journ. N. Y. ent. soc., xii, 244, 1904.

Described from Monterey, Mexico. Our larvæ are from Laredo, Texas, bred by Dr. Berry.

Genus CERATOCYSTIA, new.

Characterized by the greatly enlarged, bent antennæ, which have two of the apical spines far removed from the tip. The larva is allied to *Janthinosoma*, except that the tube is not inflated. This is apparently compensated for by the enlargement of the antennæ. Type, *C. discolor* Coq.

Ceratocystia discolor Coquillett.

Culex discolor Coquillett, Can. ent., xxxv, 256, 1903.

Culex discolor Smith, Ent. news, xv, 147, 1904.

Culex discolor Dyar, Journ. N. Y. ent. soc., xii, 173, 1904.

Culex discolor Felt, Bull. 79, N. Y. Sta. Mus., 297, 1904.

Culex discolor Smith, Agr. Exp. Sta. N. J., Rept. Mosq., 193, 1905.

Described from New Jersey. The species occurs sparingly along the Atlantic seaboard and has been taken by the junior author at Tehuantepec, Mexico. The larvæ occur in temporary rain puddles in company with *Janthinosoma* and *Psorophora*. The eggs are spinose, as in those genera. All these spinose eggs seem adapted to lie in dried ground and hatch immediately after a shower. The development of the larva is rapid.

Genus TÆNIORHYNCHUS Arribalzaga.

Tæniorhynchus Arribalzaga, Rev. del Mus. de La Plata, ii, 147, 1891.

Coquillettidia Dyar, Proc. ent. soc. Wash., vii, 47, 1905.

Tæniorhynchus Blanchard, Les Moustiques, 381, 1905

Tæniorhynchus perturbans Walker.

Culex perturbans Walker, Ins. Saund., i, 428, 1856.

Culex perturbans Dyar & Currie, Proc. ent. soc. Wash., vi, 218, 1904.

Tæniorhynchus perturbans Blanchard, Les Moustiques, 386, 1905.

The mature larva is undiscovered and its habits remain a mystery. Several excellent collectors searched for it in vain. Professor J. B. Smith had masses of *Spirogyra* examined, but without result, as he tells us. The young larva obtained from eggs has been described, but failed to feed. The peculiarities of habit, whatever they may be, which have rendered this species undiscoverable are evidently common to the other members of the genus, for Professor Goeldi in Brazil (Os Mosq. no Para, 107, 1905) has exactly repeated our experience with *T. fasciolatus* Arrib. and *T. arribalzagæ* Theob., and his first stage larvæ agree structurally with ours. The antennæ are excessively long and the air tube is roundedly narrowed at the middle, the distal half being slender and resembles a thick spine. The tip is armed with hooks.

Genus MANSONIA Blanchard.

Panoplitès Theobald (not Gould), Journ. Trop. Med., iv, 229, 1901.

Mansonia Blanchard, Cont. rend. heb. Soc. Biol., liii, 1045, 1901.

Pneumaculex Dyar, Proc. ent. soc. Wash., vii, 46, 1905.

Tæniorhynchus Dyar (not Arribalzaga), Proc. ent. soc. Wash., vii, 47, 1905.

We are unacquainted with the larva of the typical species of *Mansonia* (*titillans* Walk.) and if it should prove to be different in structure,* the name *Pneumaculex* is available for the forms here associated. The senior author has shown that the genus should be called *Tæniorhynchus* if the rule of first species be accepted in determining the type.

Table of species.

1. Plate on the sixth abdominal segment a dorsal saddle; no plate on the eighth segment below the comb..... *signifer*

*We are almost certain that this will prove to be the case. Goeldi figures the eggs of *titillans* (Os Mosq. no Para. 114, 1905), which have nothing in common with those of the species here treated, but are of the type of an *Aedes*.

Plate on the sixth segment reaching to the middle of the side; a plate on the eighth segment below the comb *fascipes*

***Mansonia signifer* Coquillett.**

- Culex signifer* Coquillett, Can. ent., xxviii, 43, 1896.
Stegomyia signifer Theobald, Mon. Culic., i, 322, 1901.
Culex signifer Smith, Ent. news, xi, 26, 1903.
Culex signifer Dyar, Journ. N. Y. ent. soc., xi, 26, 1903.
Culex signifer Smith, N. J. Agr. exp. Sta., Bull. 79., 338, 1904.
Stegomyia signifer Blanchard, Les Moustiques, 258, 1905.
Culex ? signifer Ludlow, Med. Record, N.Y., Jan. 20, 1906.

The larva is a normal inhabitant of the water in hollow trees. It occurs also in similar artificial situations, such as rain barrels, and is rather widely distributed in the United States. The peculiar dorsal platings on the abdomen appear only in the last stage, but the larva is recognizable in all stages by the absence of pecten on the air tube. The tracheal tubes are expanded into bladders in the thorax. The eggs are deposited at the water line and adhere firmly to the side of the vessel. They are covered by a peculiar veil, marked by radial folds.

***Mansonia fascipes* Coquillett.**

Mansonia fascipes Coquillett. Proc. ent. soc. Wash., vii, 182, 1906.

We have received these peculiar larvæ from Mr. F. W. Urich from Trinidad, who communicates the following notes. "The predominating colour of these larvæ is red; when young the pigment is pale on the dorsal anterior half of each segment of thorax and abdomen and gets lighter, until a white ring is formed at the joint with the next segment, thus giving the larva a red and white ringed appearance. This coloration is maintained right through all stages of the larva. At each change of skin the red color gets more intense, until the mature larva has a rather dark appearance. The pupa also has a reddish tint showing through the brown coloration. The larvæ live in bamboo joints, the water in which teems with infusoria, small worms and other micro-organisms. It would appear as if this fauna is essential to their well-being, for if isolated too young they die or do not mature well. The larval period seems to take a long time." Mr. F. C. Pratt has observed a similar red coloration in the larvæ of *signifer*, but we had heretofore attributed to it a pathological significance. Probably it is normal to the genus.

Genus URANOTAENIA Arribalzaga.

Uranotænia Arribalzaga, Rev. del Mus. de La Plata, ii, 163, 1891.

Uranotænia Blanchard, Les Moustiques, 406, 1905.

Uranotænia Mitchell, Journ. N. Y. ent. soc., xiv, 8, 1906.

Our species are in a very unsatisfactory state, but the paucity of our present material does not enable us to remedy it. Miss Mitchell has given a table of the species identified from the United States and Dr. Grabham figures the two Jamaican species. We have another from Mr. Urich in Trinidad and the junior author collected one in Mexico. The following table, as compiled, appears to show that the continental forms identified as *socialis* and *lowii* are not conspecific with the insular forms, and we have no recourse but to rename them, although we would much prefer to have good material for actual comparison.

Table of species.

- | | |
|--|-------------------|
| 1. Antennæ without spines; longest terminal seta as long as antenna..... | |
| | <i>geometrica</i> |
| Antennæ with scattered spines; longest terminal seta shorter than antenna... 2 | |
| 2. Terminal setæ three, the short one obsolete..... 3 | |
| Terminal setæ four..... 4 | |
| 3. Shaft rather numerously spined; terminal digit simple..... <i>lowii</i> | |
| Shaft with but two spines; terminal digit double..... <i>coatzacoalcos</i> | |
| 4. Antennæ with the hair beyond the basal third..... <i>continentalis</i> | |
| Antennæ with the hair at about the basal third..... 5 | |
| 5. Pedicellate digit double, the two forks about equal in length..... 6 | |
| This digit large and single, the second digit small and arising below the apex of the pedicel..... <i>sapphirina</i> | |
| 6. Shortest spine a lanceolate blade; apical tooth of labial plate broad and flat..... <i>socialis</i> | |
| Shortest spine slender, filiform; apical tooth of labial plate triangularly pointed..... <i>coquilletti</i> | |

***Uranotænia lowii* Theobald.**

Uranotænia lowii Theobald, Mon. Culic., ii, 339, 1901.

Uranotænia lowii Grabham, Can. ent., xxxvii, 401, 1905.

Described from Santa Lucia. We accept Dr. Grabham's definition of Jamaican specimens rather than Mr. Coquillett's determination of those from Louisiana.

***Uranotænia coatzacoalcos*, new species.**

The antennæ are stout with a single stout hair at basal third and two short spines on the other side; at tip two long hairs, not as long

as the antennæ, a short one and a sharp angle; a long double blade-like digit that appears to be divided to the base, one part dark and about two-thirds as long as the longer pale portion.

The larvæ were collected by the junior author at Santa Lucrecia, Mexico, in the valley of the river Coatzacoalcos. They were not bred. The larvæ occurred in a ditch full of vegetation.

***Uranotænia continentalis*, new species.**

Sent to Miss Mitchell by Dr. Dupree from Baton Rouge, Louisiana, and identified as "*Uranotænia lowii* Theob." The characters are indicated in the table.

***Uranotænia sapphirina* Osten-Sacken.**

Aedes sapphirinus Osten-Sacken, Trans. Am. ent. soc., ii, 47, 1868.

Uranotænia sapphirina Blanchard, Les Moustiques, 407, 1905.

Not uncommon in permanent swamps or ponds. We have it from New Hampshire and New York. The larva looks like an *Anopheles* with a long tube, owing to its position in the water and shape of the head.

***Uranotænia geometrica* Theobald.**

Uranotænia geometrica Theobald, Mon. Culic., ii, 247, 1901.

Described from Santos, Brazil. Our specimens are from Mr. F. W. Urich in Trinidad, who collected them in a small puddle in a drain. The water was covered with green algæ. Mr. Urich says that the larvæ reminded him at first sight of *Anopheles albipes*. They were colored green, from algæ, no doubt. We have accepted the determination rather because we have no means of disproving it, than that we feel any confidence in its accuracy.

***Uranotænia socialis* Theobald.**

Uranotænia socialis Theobald, Mon. Culic., ii, 340, 1901.

Uranotænia socialis Grabham, Can. ent., xxxvii, 403, 1905.

Described from Jamaica. Dr. Grabham has made known the larva with a description and figure.

***Uranotænia coquilletti*, new species.**

Near *socialis* Theob., but differentiated by the characters given in the table. Dr. Dupree sent the specimens to Miss Mitchell and Mr.

Coquillett named them "*Uranotenia socialis* Theob." We dedicate the species to Mr. Coquillett, who has certainly performed a vast amount of labor on a difficult subject, whatever we may think of his results.

Genus DEINOCERITIES Theobald.

- Deinocerites* Theobald, Mon. Culic., ii, 215, 1901.
Brachiosoma Theobald, Journ. Trop. med., iv, 229, 1901.
Brachiomysia Theobald, Mon. Culic., ii, 343, 1901.
Deinokerides Giles, Handb. Gn. or Mosq., 472, 1902.
Dinocerites Blanchard, Les Moustiques 413, 1905.

Deinocerites cancer Theobald.

- Deinocerites cancer* Theobald, Mon. Culic., ii, 215, 1901.
Deinocerites cancer Theobald, Mon. Culic., iii, 279, 1903.
Deinocerites cancer Dyar, Journ. N. Y. ent. soc., xiii, 27, 1904.
Dinocerites cancer Blanchard, Les Moustiques, 414, 1905.

The now well-known inhabitant of crab holes at high water mark along the sea shore of southern Florida and the Antilles. We have specimens from Dr. Grabham from Jamaica and it was collected in southern Florida by the senior author and Mr. Caudell. Descriptions have been published.

Genus AEDES Meigen.

- Aedes* Meigen, Syst. beschr. bek. eur. Zweifl. Ins., i, 13, 1818.
Ochlerotatus Arribalzaga, Rev. del Mus. de La Plata, ii, 146, 1891.
Hæmagogus *Williston, Trans. ent. soc. Lond., 271, 1896.
Stegomyia Theobald, Mem. Liverp. Sch. Trop. Med., iv, App., iii, 1901.
Grabhamia Theobald, Mon. Culic., iii, 243, 1903.
Howardina Theobald, Mon. Culic., iii, 287, 1903.
Verrallina Theobald, Mon. Culic., iii, 295, 1903.
Culicelsa Felt, Bull. 79, N. Y. Sta. Mus., 391 b, 1904.
Culicada Felt, Bull. 79, N. Y. Sta. Mus., 391 b, 1904.
Ecculex Felt, Bull. 79, N. Y. Sta. Mus., 391 c, 1904.
Protoculex Felt, Bull. 79, N. Y. Sta. Mus., 391 d, 1904.
Pseudoculex Dyar, Proc. ent. soc. Wash., vii, 47, 1905.
Gymnometopa Coquillett, Proc. ent. soc. Wash., vii, 183, 1906.
Lepidoplatus Coquillett, Science, n. s., xxiii, 314, 1906.

*The genus *Hæmagogus* may perhaps be recognized on the larval character of a small triangular chitinous plate on each side of the ventral brush of the last segment, the segment being not ringed. If so, it will take *Howardina* and *Gymnometopa* as synonyms, and include the species *cyaneus* Fab., *philosophicus* D. & K., *walkeri* Theob., *albonotata* Coq., *busckii* Coq. and *mediovitata* Coq.

In this group the antennæ are moderate or small; the tuft is always at or before the middle; the air tube is short, three times as long as wide or less and carries a single tuft beyond the pecten. A few species vary in having a more elongate tube and one has multiple tufts. The anal segment is generally not encircled by the chitinous plate, but this occurs in some species.

Table of species.

1.	Air tube with the hair tuft within the pecten	2
	Air tube with the tuft beyond the pecten	8
2.	Anal segment ringed by the plate	3
	Anal segment with the ring broken on the ventral line	6
3.	Lateral comb of the eighth segment of few scales in a row.....	<i>tormentor</i>
	Lateral comb of the eighth segment many scales in a triangular patch. . . .	4
4.	Pecten of the air tube with detached teeth outwardly.....	<i>bimaculatus</i>
	Pecten of the air tube with the teeth evenly spaced.....	5
5.	Ring of the anal segment narrow; pecten of tube not to the middle	<i>janitor*</i>
	Ring of anal segment broad; pecten beyond middle.....	<i>lactator*</i>
6.	Comb of few spines in an irregular row; tube with several tufts	<i>trichurus</i>
	Comb of long spines in a straight row; pecten running to apex.....	<i>walkeri</i>
	Comb a patch of scales; tube with one hair tuft.....	7
7.	Pecten with detached teeth; abdominal hairs normal.....	<i>atropalpus</i>
	Pecten evenly spaced; short abdominal hairs stellate.....	<i>busckii</i>
8.	Pecten of the air tube with detached teeth outwardly.....	9
	Pecten of the air tube with evenly spaced teeth.....	13
9.	Air tube 4 x 1; comb a patch of scales three rows deep.....	<i>abfitchii</i>
	Tube 3 x 1 or less; comb of few scales in an irregularly double row. . . .	10
10.	Antennæ enlarged basally, large, tuft rather beyond the middle	<i>aurifer</i>
	Antennæ moderate only; tuft before the middle.....	11
11.	The two rows of pecten on the tube approximate behind dorsal plate of anal segment a saddle only.....	<i>impiger</i>
	Two rows of pecten well separated; dorsal plate over half encircling the segment.....	12
12.	Tuft of tube before outer third; anal processes blunt.....	<i>sylvestris</i>
	Tuft of tube beyond outer third; anal processes pointed.....	<i>fuscus</i>
13.	Comb scales few, in a single or irregularly single row.....	14
	Comb scales more numerous to many in a patch.....	20
14.	Anal segment ringed by the plate.....	15
	Anal segment not ringed, at least a small space along ventral line	18
15.	Anal processes moderate, normal.....	16
	Anal processes very long with a stout wavy central trachea	<i>dupreei</i>
16.	Comb of six scales; pecten not reaching half of tube.....	17
	Comb of 12 scales; pecten reaching half of tube.....	<i>meridionalis</i>

*Treated under *Culex*, q. v.

17. Pecten of air tube running about one-third; anal segment wider than long. *punctator*
 Pecten of air tube running about one-half; anal segment longer than wide. *atlanticus*
18. Comb scales smooth or nearly so, bluntly rounded 19
 Comb scales sole-shaped with trifid apex 20
 Comb scales long, pointed, thorn-shaped *philosophicus*
19. Short abdominal hairs normal; anal plate smooth *triseriatus*
 Short abdominal hairs stellate; anal plate spined behind. *albonotata*
20. Air tube pecten small, in a straight row. *calopus*
 Air tube pecten long, strongly spiral. *mediovittata*
21. Anal segment ringed by the plate. 22
 Anal segment not ringed by the plate. 31
22. Air tube over twice as long as wide, its pecten of 19-22 teeth. 23
 Air tube twice as long as wide or less, pecten of 12-14 teeth. 26
23. Scales of comb with central spine shorter than the body of the scale; pecten of the air tube of equal teeth. 24
 Scales of comb with central spine as long as body of scale; pecten of air tube longer outwardly. 25
24. Air tube two-and-a-half times as long as wide; comb scales moderate, thorn-shaped. *sollicitans*
 Air tube 3 x 1; comb scales long thorn-shaped. *mitchellæ*
25. Air tube pecten to beyond middle of tube; comb of 21 scales in nearly three rows. *trivittatus*
 Pecten not to middle of tube; comb of 17 scales in two imperfect rows *auroides*
26. Scales of comb feathered on the sides with central thorn; pecten reaching half the length of tube; body glabrous. *infirmatus*
 Scales of comb evenly spinulated without central thorn. 27
27. Body glabrous. *inconspicuus*
 Body pilose. 28
28. Pecten to four-fifths of tube; tuft almost apical. *hemisurus*
 Pecten scarcely over half of tube; tuft normal. 29
29. Lateral hairs single on third to fifth abdominal segments. *euplocamus*
 Lateral hairs double or in threes on these segments. 30
30. Anal segment short with narrow chitinous ring *damnosus*
 Anal segment moderate with broad ring *habanicus*
31. Tube long, 4 x 1; tracheæ narrow, angled. *fitchii*
 Tube three times as long as wide or less. 32
32. Anal plate small, not covering more than half of the segment; anal gills very large, sac-like, spotted. *varipalpus*
 Anal plate covering more than half the segment; anal gills moderate 33
33. Comb scales tapered, a single median spine stouter or longer, differentiated from the rest 34
 Comb scales bluntly ended, the median spine resembling the others. 40
34. Both median head tufts multiple. 35
 Lower head tuft single or double (rarely three). 37

35. Subdorsal prothoracic hairs single.....	<i>canadensis</i>	
	<i>nivitarsis</i>	
Subdorsal prothoracic hairs multiple.....		36
36. Weakly colored; tufts of ventral brush short-stemmed.....	<i>cantator</i>	
Darkly colored; tufts of ventral brush long stemmed.....	<i>pullatus</i>	
37. Lower head hair double (or three).....		38
Lower head hair single.....		39
38. Comb scales with the lateral spines as long as the apical one.....	<i>grossbecki</i>	
Comb scales with the lateral spines very short.....	<i>pretans</i>	
39. Apical spine of the comb scales sharp and distinct.....	<i>æstivalis</i>	
Apical spine of the comb scale subequal to the others.....	<i>subcantans</i>	
40. Antennæ very long and slender.....	<i>laternaria</i>	
Antennæ normal, short, stout.....		41
41. Antennæ spinulated.....		42
Antennæ smooth, the spinules obsolete.....		43
42. Anal gills normal. moderate.....	<i>lazarensis</i>	
Anal gills very short, bud-shaped.....	<i>quaylei</i>	
43. Air tube conic-tapered; pecten long, very dense, slightly spiral; the secondary hairs normal.....		44
Air tube cylindrical, bluntly rounded; pecten normal; short abdominal hairs stellate.....	<i>cyaneus</i>	
44. Pecten followed by a single hair; labial plate low triangular with prominent side teeth.....	<i>knabi</i>	
Pecten followed by a small tuft; labial plate long triangular with small teeth.....	<i>insolita</i>	

***Aedes tormentor*, new species. Fig. 4.**

This species was collected by Dr. Dupree in Baton Rouge, La., and named "*Culex serratus* Theob." as was also the species we describe as *atlanticus*. We do not believe that either of these forms are identical with the South American species, certainly they both cannot be. It is characterized in the table above.

***Aedes bimaculatus* Coquillett.**

Culex bimaculatus Coquillett, Proc. U. S. Nat. Mus., xxv, 84, 1902.

Culex bimaculatus Dyar, Journ. N. Y. ent. soc., xi, 27, 1903.

Culex bimaculatus Dyar, Proc. ent. soc. Wash., v, pl. 2, f. 14, 1903.

Described from Brownsville, Texas. The larvæ were discovered by Dr. Dupree at Baton Rouge, La.

***Aedes trichurus* Dyar.**

Culex trichurus Dyar, Journ. N. Y. ent. soc., xii, 169, 1904.

Culex cinereoborealis Felt & Young, Science, n.s., xx, 505, 1904.

Culex cinereoborealis Felt, Bull. 79, N. Y. Sta. Mus., 314, 1904.

Culex trichurus Dyar, Journ. N. Y. ent. soc., xii, 244, 1904.

This is one of the early Spring species, the larvæ of which live in the pools formed by the melting snows. They hatch from overwintering eggs and are all developed by the first of May. There is only one generation a year. The species have a northern range. Our localities for this species are Springfield, Mass. (Dimmock), Plattsburgh, N. Y. (Dyar), Kaslo, B. C. (Dyar). We have no records from further North because no collections have been made there.

***Aedes walkeri* Theobald. Fig. 5.**

Culex walkeri Theobald, Mon. Culic., i, 424, 1901.

Howardina walkeri Dyar, Journ. N. Y. ent. soc., xiii, 27, 1904.

Culex walkeri Blanchard, Les Moustiques, 312, 1905.

Howardina walkeri Blanchard, Les Moustiques, 416, 1905.

We have this peculiar larva from Dr. Grabham from Jamaica. A description has been published by the senior author, which is in error in stating that the long lateral hairs are absent; they are really present, although they have been broken off nearly all the specimens.

***Aedes atropalpus* Coquillett.**

Culex atropalpus Coquillett, Can. ent., xxxiv, 292, 1902.

Culex atropalpus Dyar, Ent. news, x, 195, 1902.

Culex atropalpu. Smith, Ent. news, xiii, 301, 1902.

Culex atropalpus Dyar, Proc. ent. soc. Wash., v, 144, 1903.

Culex atropalpus Dyar, Ent. news, xiv, 180, 1903.

Culex atropalpus Dyar, Journ. N. Y. ent. soc., xii, 172, 1904.

Culex atropalpus Felt, Bull. 79, N. Y. Sta. Mus., 306, 1904.

Culex atropalpus Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 282, 1905.

Culex atropalpus Blanchard, Les Moustiques, 628, 1905.

This species ranges widely, from New Hampshire to Almoloya, Oaxaca, Mexico, where it was taken by the junior author. The only breeding places are the pot holes in rocks beside swift streams or cavities in rocks on the shores of lakes, filled by the waves during storms. It is remarkable that the species should be able to withstand the rush of water in flood, even if it be in the egg state.

***Aedes busckii* Coquillett. Fig. 6.**

Stegomyia busckii Coquillett, Can. ent., xxxviii, 60, 1906.

Collected by Mr. Busck in Dominica and Guadeloupe. The locality given in the original description is an error.

Aedes abfitchii Felt.

Culex abfitchii Felt, Bull. 79, N. Y. sta. Mus., 381, 1904.

Culex abfitchii Dyar, Journ. N. Y. ent. soc., xiii, 29, 1904.

Culex siphonalis Smith & Grossbeck, Psyche, xii, 16, 1905.

Culex siphonalis Smith, N. J. Agr. exp. Sta., Rept. Mosq., 245, 1905.

One of the early Spring forms with northern distribution. The senior author collected specimens in Kaslo, B. C., which were named first "*Culex cantans* Meig." and a description published under that name (Journ. N. Y. ent. soc., xii, 36, 1904). Later the determination was changed to "*Grabhamia vittata* Theob.," but it cannot possibly be that species to judge from Theobald's figure (Can. ent., xxxv, 313, 1903). The figure is too sketchy to admit of placing the form in a table, though we conjecture it to be intended for some species of *Culiseta*.

Aedes aurifer Coquillett.

Culex aurifer Coquillett Can. ent., xxxv, 255, 1903.

Culex aurifer Smith, Ent. news, xv, 148, 1904.

Culex aurifer Dyar, Journ. N. Y. ent. soc., xii, 172, 1904.

Culex aurifer Felt, Bull. 79, N. Y. Sta. Mus., 337, 1904.

Culex aurifer Dyar, Journ. N. Y. ent. soc., xii, 244, 1904.

Culex aurifer Smith, N. J. Agr. exp. Sta., Rept. Mosq., 298, 1905.

One of the early Spring forms, which was discovered by Mr. J. T. Brakeley in New Jersey.

Aedes impiger Walker.

Culex impiger Walker, Cat. Dipt. Ins. Brit. Mus., i, 6, 1848.

Culex impiger Felt, Bull. 79, N. Y. Sta. Mus., 316, 1904.

Culex impiger Dyar, Journ. N. Y. ent. soc., xiii, 27, 1905.

Culex nigripes Blanchard (in part), Les Moustiques, 345, 1905.

One of the early Spring species which was discovered by Dr. E. P. Felt in northern New York. We are not at all sure that Walker's species is determinable, but having been thus fixed by Dr. Felt, it will be better to accept it. The species referred to by the senior author as *impiger* (Proc. ent. soc. Wash., vi, 37, 1904) is *pullatus* Coq., and the forms referred to by us (Proc. ent. soc. Wash., vi, 144, 1904,) are a mixture of *pullatus* Coq. and *trichurus* Dyar. Theobald and Blanchard refer our species to the synonymy of *nigripes* Zett. of Europe; but we have as yet no evidence that any of these American species occur in Europe.

Aedes sylvestris Theobald.

- Culex sylvestris* Theobald, Mon. Culic., i, 406, 1901.
Culex cantans Dyar (not Meigen), Proc. ent. soc. Wash., v, 47, 142, 1902.
Culex sylvestris Smith, Ent. News, xiii, 303, 1902.
Culex sylvestris Dyar, Science, n. s., xvi, 672, 1902.
Culex sylvestris Smith, Rept. ent. Dept. N. J. Agr. exp. Sta., 540, 1903.
Culex sylvestris Johannsen, Bull. 68, N. Y. Sta. Mus., 422, 1903.
Culex sylvestris Smith, Bull. 171, N. J. Agr. exp. Sta., 25, 1904.
Culex sylvestris Felt, Bull. 79, N. Y. Sta., Mus., 291, 1904.
Culex sylvestris Smith, N. J. Agr. exp. Sta., Rept. Mosq., 251, 1905.
Culex montcalmi Blanchard, Les Moustiques, 307, 1905.

Probably the most generally abundant mosquito of the Atlantic region, breeding all Summer. It is a woods mosquito, the larvæ living in temporary rain pools. Near Washington, a large brood of *sylvestris* hatches in the early pools but it occurs also later after heavy rains. The eggs hibernate, scattered in the mud.

Prof. Blanchard has changed the name on the ground that *sylvestris* Theobald is preoccupied by *silvestris* Ross; but besides the slightly different spelling, Ross' name is said to be a "nomen nudum" and we therefore do not think that the change is required by the rules.

Aedes fuscus Osten-Sacken.

- Aedes fuscus* Osten-Sacken, Bull. U. S. Surv., iii, 191, 1877.
Aedes fuscus Dyar, Journ. N. Y. ent. soc., x, 197, 1903.
Aedes fuscus Dyar, Proc. ent. soc. Wash., v, 145, 1903.
Aedes fuscus Felt, Bull. 79, N. Y. Sta. Mus., 340, 1904.
Aedes fuscus Smith, N. J. Agr. exp. Sta., Rept. Mosq., 335, 1905.
Aedes fuscus Blanchard, Les Moustiques, 402, 1905.

This occurs with the preceding and has the same habits, though the distribution is more northern. We have not taken it around Washington.

Aedes punctor Kirby.

- Culex punctor* Kirby, Faun. Bor.-Am., iv, 308, 1837.
Culex punctor Dyar, Proc. ent. soc. Wash., vi, 39, 1904.
Culex abserratus Felt & Young, Science, N. S., xx, 505, 1904.
Culex punctor Dyar, Journ. N. Y. ent. soc., xii, 169, 245, 1904.
Culex punctor Blanchard, Les Moustiques, 359, 1905.

One of the early Spring forms, all of which have similar habits and distribution. We have little idea that this is the species actually in-

tended by Kirby, but just what that was will probably never be known, and this species will do as well as another to represent the name. It is a distinct and easily recognized larva and comes very early. We got them near Springfield, Mass. in a marsh still containing ice, on which we stood to collect them and beneath which the larvæ retreated.

***Aedes meridionalis*, new species. Fig. 7.**

Antennæ with the tuft before the middle; head hairs single; lateral hairs single after the second abdominal segment. Air tube 2 x 1, pecten short, reaching over one-half, followed by a large hair tuft; comb of twelve scales in a straight row. Anal segment broadly ringed.

Taken by the junior author in the forest beyond settlement, Las Loras, near Puntarenas, Costa Rica, in a pond choked by vegetation which is dry in the dry season. The specimen was named "*Janthin-osoma musica* Say" by Mr. Coquillett.

***Aedes dupreei* Coquillett.**

Culex dupreei Coquillett, Can. ent., xxxvi, 10, 1904.

Culex dupreei Smith, Ent. News, xv, 49, 1904.

Culex dupreei Felt, Bull. 79, N. Y. Sta. Mus., 335, 1904.

Culex dupreei Smith, N. J. Agr. exp. Sta., Rept. Mosq., 283, 1905.

In this peculiar larva the air tube is nearly or quite functionless and it lives at the bottom among leaves. It is recorded from New Jersey and Louisiana. Mr. Busck got it at Arima, Trinidad, in a deep virgin Palm swamp in permanent water. He says "it reminds one of a Japanese gold-fish with its very long floating tail hairs." One specimen was taken by the junior author associated with the preceding species.

***Aedes philosophicus*, new species. Fig. 8.**

The characters are indicated in the table. It was collected by the junior author at Tehuantepec, Salina Cruz, Acapulco, Mexico, and Sonsonate, Salvador. The specimens were named "*Hæmagogus equinus* Theobald" by Mr. Coquillett, but we are unaware that any species has been so named. The *Culex equinus* of Linnæus and Fabricius is said to be probably a *Simulium*.

***Aedes triseriatus* Say.**

Culex triseriatus Say, Journ. Acad. Nat. S., Phil, iii, 12, 1823.

Culex triseriatus Smith, Ent. news, xiii, 301, 1902.

- Culex triseriatus* Dyar, Journ. N. Y. ent. soc., xi, 25, 1902.
Culex triseriatus Dyar, Science, n. s., xvi, 672, 1902.
Culex triseriatus Johannsen, Bull. 68, N. Y. Sta. Mus., 423, 1903.
Culex triseriatus Felt, Bull. 79, N. Y. Sta. Mus., 336, 1904.
Culex triseriatus Smith, N. J. Agr. exp. Sta., Rept. Mosq., 275, 1905.
Culex triseriatus Blanchard, Les Moustiques, 288, 1905.

The larva lives in holes in trees, occasionally frequenting rain water barrels, especially if placed in the woods. We have the species from all along the Atlantic coast, but only from the continent. The senior author and Mr. Caudell got it at New Smyrna, Florida, which is our southernmost record.

***Aedes albonotata* Coquillett. Fig. 9.**

Gnometopa albonotata Coquillett, Proc. ent. soc. Wash., vii, 183, 1906.

Collected by Mr. Busck in the San Francisco Mts. of San Domingo. They were in bamboo stalks. Mr. Busck describes them as "snaky-looking larvæ, ringed with red, pretty and distinctly marked."

***Aedes calopus* Meigen. Fig. 10.**

- Culex fasiatus* Fabricius (not Meigen), Syst. Antliat., 36, 1805.
Culex calopus Meigen, Syst. beschr. bek. eur. Zweifl. Ins., i, 3, 1818.
Stegomyia fasciata Theobald, Mem., Liverp. Sch. Trop. Med., iv, App., iii, 1901.
Stegomyia fasciata Howard, Mosquitoes, 135, 1901.
Stegomyia fasciata Dupree and Morgan, Science, n. s., xvi, 1037, 1902.
Stegomyia fasciata Dyar, Proc. ent. soc. Wash., v, 51, 146, 1903.
Stegomyia fasciata Parker, Beyer & Pothier, Bull. 13, Yellow Fev. Inst., 25, 1903.
Stegomyia fasciata Taylor, Le Rev. de Med., Trop., 1903.
Stegomyia fasciata Theobald, Mon. Culic., iii, 142, 1903.
Stegomyia calopus Blanchard, Les Moustiques, 249, 1905.

The well-known "yellow fever mosquito," a strictly domestic form. It was found by Mr. Busck and the junior author in nearly every town visited in the tropics. It occurs in the United States sometimes as far North as Virginia, but in March, the senior author and Mr. Caudell found it only at Key West and Miami, Florida, below the line of hard frost.

***Aedes mediovittata* Coquillett. Fig. 11.**

Stegomyia mediovittata Coquillett, Can. ent., xxxviii, 60, 1906.

Mr. Busck got a lot of these peculiar larvæ in San Domingo. They differ from all our species in having the pecten of the air tube strongly spirally twisted. Mr. Busck's localities are: a pot-hole in coral rock, in a coral rock cave, in a hollow trunk of a royal palm 40 feet from the ground and twice in hollow palm trunks, San Francisco Mts.

Aedes sollicitans Walker.

- Culex sollicitans* Walker. Ins., Saund., Dipt., i, 427, 1856.
Culex sollicitans Dyar, Journ. N. Y. ent. soc., x, 197, 1902.
Culex sollicitans Smith, Ent. News, xiii, pl. f. 4, 1902.
Culex sollicitans Smith, Sp. Bull. N. J. Agr. Exp. Sta., July, 1902.
Culex sollicitans Dyar, Proc. ent. soc. Wash., v. 47, 1902.
Culex sollicitans Smith, Pysche, x, 1, 1903.
Culex sollicitans Smith, Rept. ent., Dept., N. J. Agr., Exp., Sta., 515, 1903.
Culex sollicitans Smith, Bull. 171, N. J. Agr. Exp. Sta., 17, 1904.
Culex sollicitans Felt, Bull. 79, N. Y. Sta. Mus., 295, 1904.
Culex sollicitans Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 203, 1905.
Culex sollicitans Blanchard, Les Moustiques, 295, 1905.

The well-known "New Jersey mosquito" breeding in the salt water marshes and pools left by high tides along the Atlantic coast from Maine to Florida. The senior author found it at New Smyrna, Florida. We do not know if it extends into the tropics.

Aedes mitchellæ Dyar.

- Culex mitchellæ* Dyar, Journ. N. Y. ent. soc., xiii, 74, 185, 187, 1905.

Found by the senior author and Mr. Caudell in Georgia and Florida. It is nearly allied to the preceding, but differs in habits, living in temporary rain-water puddles away from the coast.

Aedes trivittatus Coquillett.

- Culex trivittatus* Coquillett, Journ. N. Y. ent. soc., x, 193, 1902.
Culex trivittatus Smith, Ent. News, xv, 145, 1904.
Culex trivittatus Felt, Bull. 79, N. Y. Sta. Mus., 333, 1904.
Culex trivittatus Smith, N. J. Agr. exp. Sta., Rept. Mosq., 288, 1905.
Culex trivittatus Blanchard, Les Moustiques, 339, 1905.

Known as yet only from New Jersey. We have not personally collected the species; the credit for its discovery belongs to Prof. J. B. Smith.

Aedes auroides Felt.

- Culicelsa auroides* Felt, Bull. 79, N. Y. Sta. Mus., 449, 1905.

One of the early Spring species detected in northern New York by Dr. Felt. We have as yet no additional localities.

Aedes infirmatus, new species. Fig. 12.

With the characters given in the table. The specimens were obtained by Dr. Dupree at Baton Rouge, La., and determined by Mr. Coquillett as "*Culex confirmatus* Arrib." a determination which appears to us too improbable to accept.

Aedes damnosus Say. Fig. 13.

- Culex damnosus* Say, Jn. Acad. nat. soc. Phil., iii, 11, 1823.
Culex tæniorhynchus Smith (not Wiedemann), Ent. News, xiii, 300, 1902.
Culex tæniorhynchus Dyar, Journ. N. Y. ent. soc., xi, 13, 1903.
Culex tæniorhynchus Dyar, Proc. ent. soc. Wash., v, 146, 1903.
Culex tæniorhynchus Smith, Rept. ent. Dept. N. J. Exp. Sta., 530, 1903.
Culex tæniorhynchus Taylor, Rev. de Med. Trop. June, 1903.
Culex tæniorhynchus Smith, Bull., 171, N. J. Agr. exp. Sta., 21, 1904.
Culex tæniorhynchus Felt, Bull. 79, N. Y. Sta. Mus., 302, 1904.
Culex tæniorhynchus Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 219, 1905.
Culex tæniorhynchus Blanchard, Les Moustiques, 291, 1905.

This species occurs along the Atlantic coast from Rhode Island to Florida. It has been identified with *tæniorhynchus* Wied., described from Brazil, but we have felt too doubtful of the correctness of that to adopt the name. The larvæ inhabit pools near the sea, not necessarily salt. The senior author and Mr. Caudell found them in myriads at New Smyrna, Florida, in a large pool just across a road from salt water.

Collected by the junior author at Champerico, Mexico, in a big marsh behind the beach in brackish water; at San José de Guatemala in a puddle near the town; near Puntarenas, Costa Rica, at the head of a mangrove-lined inlet in muddy puddles.

Aedes habanicus, new species. Fig. 14.

Antennæ rather small with the tuft at the middle; head hairs single; body coarsely hairy; lateral hairs mostly lost, but two are present on the sixth abdominal segment; air tube two-and-a-half times as long as wide, the pecten reaching to the middle, followed by the hair tuft; anal segment broadly ringed by the plate; anal gills short, about as long as the segment.

Havana, Cuba, Oct. 28, 1903, from Mr. John R. Taylor, labelled "*Culex confirmatus* Arrib." we do not know on whose authority. They were associated with many *Psorophora ciliata*, and doubtless came from some temporary pool or swamp.

Aedes atlanticus, new species. Fig. 15

- Culex serratus*, Smith (not Theobald), Ent. news, xiv, 309, 1903.
Culex serratus, Felt (not Theobald), Bull. 79, N. Y. sta. Mus., 334, 1904.
Culex serratus, Smith (not Theobald), N. J. Agr. exp. sta., Rept. Mosq., 279, 1905.

Figured by Prof. J. B. Smith under the name "*Culex serratus* Theobald" as determined for him by Mr. Coquillett (N. J. Agr. exp.

Sta., Rept. Mosq., 280, fig 86, 1805). While it is possible that this is the true *serratus* of Theobald, described from Brazil and Guiana, we do not think it is probable, especially in view of what we note under *Aedes tormentor* above. We therefore propose a new name for the Atlantic coast form. Prof. Smith has taken it in New Jersey and the senior author at Sanford, Florida.

***Aedes inconspicuus* Grossbeck.**

Culex inconspicuus Grossbeck, Ent. News, xv, 313, 1904.

Culex inconspicuus Smith & Grossbeck, Psyche, xii, 18, 1905.

Culex inconspicuus Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 297, 1905.

One of the Spring species detected by Mr. Grossbeck. Its range is unknown, as no other specimens have been collected.

***Aedes hemisurus*, new species.**

This is the species figured by Dr. Grabham from Jamaica (Can. ent., xxxvii, 405, 1905) as "*Culex confirmatus* Arrib." We do not believe that the insular form can be conspecific with the one described from the Argentine, especially as it is very different from the one identified as *confirmatus* from the United States. (See *Aedes infirmatus* above) We therefore propose a new name.

***Aedes euplocamus*, new species.** Fig. 16.

Antennal tuft small, at the middle; head hairs single. Air tube a little over 2 x 1 with even pecten of 12 teeth to the middle. Anal segment ringed; gills long, pointed, spotted.

Collected by the junior author at Zent, near Port Limon, Costa Rica, in a ditch. It was named "*Culex trivittatus* Coq." by Mr. Coquillett, but the larva disagrees.

***Aedes fitchii* Felt & Young.**

Culex fitchii Felt & Young, Science n. s., xx, 505, 1904.

Culex fitchii Felt, Bull. 79, N. Y. Sta. Mus., 282, 1904.

Culex siphonalis Grossbeck, Can. ent., xxvi, 332, 1904.

Culex fitchii Dyar, Journ. N. Y. ent. soc., xii, 246, 1904.

One of our early Spring forms with northern distribution. The larva is readily recognizable by the long tube and the narrow angled tracheæ.

Aedes varipalpus Coquillett.

- Culex varipalpus* Coquillett, Can. ent., xxxiv, 292, 1902.
Culex varipalpus Dyar, Proc. ent. soc. Wash., vi, 40, 1904.
Culex varipalpus Dyar, Journ. N. Y. ent. soc., xii, 90, 1904.
Culex varipalpis Blanchard, Les Moustiques, 628, 1905.

A western species, probably a hollow tree feeder. The only larvæ found were in an artificial receptacle.

Aedes canadensis Theobald.

- Culex canadensis* Theobald, Mon. Culic., ii, 3, 1901.
Culex canadensis Smith, Ent. News, xiii, 267, 1902.
Culex canadensis Dyar, Science, n. s., xvi, 672, 1902.
Culex canadensis Dyar, Journ. N. Y. ent. soc., x, 194, 1902.
Culex canadensis Smith, Ent. News., xiii, 300, 1902.
Culex canadensis Dyar, Proc. ent. soc. Wash., v, 141, 1903.
Culex canadensis Smith, Bull., 171, N. J. Exp. Sta., 27, 1904.
Culex canadensis Felt, Bull. 79, N. Y. Sta. Mus., 304, 1904.
Culex canadensis Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 267, 1905.
Culex canadensis Blanchard, Les Moustiques, 316, 1905.

A very common woods species, breeding in temporary pools all Summer, most abundantly in early Spring. Its distribution is northern, although it occurs sparingly as far South as Washington, D. C., where we have taken it, and even at Jacksonville, Florida, where it was taken by the senior author and Mr. Caudell.

Aedes nivitarsis Coquillett.

- Culex nivitarsis* Coquillett, Proc. ent. soc. Wash., vi, 168, 1904.
Culex nivitarsis Smith & Grossbeck, Psyche, xii, 14, 1905.
Culex nivitarsis Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 229, 1905.

A species discovered by Mr. Grossbeck in New Jersey. We have not been able to separate the larva from that of *canadensis*, but that may be due to the fragmentary condition of the material.

Aedes cantator Coquillett.

- Culex cantator* Coquillett, Can. ent., xxxv, 255, 1903.
Culex cantator Smith, Bull. 171, N. J. Agr. Exp. Sta., 22, 1904.
Culex cantator Felt, Bull. 79, N. Y. Sta. Mus., 293, 1904.
Culex cantator Dyar, Journ. N. Y. ent. soc., xiii, 28, 1905.
Culex cantator Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 238, 1905.

The species breeds near the sea shore along the northern Atlantic coast, not necessarily in salt water. It breeds all Summer, apparently.

Aedes pullatus Coquillett.

Culex impiger Dyar, Proc. ent. soc. Wash., vi, 37, 1904.

Culex impiger Dyar & Knab (in part), Proc. ent. soc. Wash., vi, 144, 1904.

Culex pullatus Coquillett, Proc. ent. soc. Wash., vi, 168, 1904.

Culex pullatus Dyar, Journ. N. Y. ent. soc., xii, 245, 1904.

One of the early spring species, very abundant in snow water in the Selkirks of eastern British Colombia. It possibly has a northern distribution, but no data are available, as all the black-legged species have been lumped under *nigripes* Zett. in the literature.

Aedes grossbecki, new species.

Culex squamiger Smith (not Coquillett), Ent. News, xv, 80, 1904.

Culex squamiger Smith & Grossbeck, Psyche, xii, 13, 1905.

Culex squamiger Smith, N. J. Agr. Exp. Sta., Rept. Mosq., 224, 1905.

Culex curriei Dyar (in part), Journ. N. Y. ent. soc., xiii, 28, 1905.

Culex squamifer Blanchard (in part), Les Moustiques, 630, 1905.

The New Jersey specimens identified as "*Culex squamiger* Coq." by Mr. Coquillett and published by Prof. Smith we fully believe to be a distinct species. Mr. Quayle records (Can. ent., xxxviii, 27, 1906) the true *squamiger* (Coquillett, Proc. U. S. Nat. Mus., xxv, 85, 1902) as a salt marsh species from the Californian coast, to which it is no doubt confined. The New York records of "*Grabhamia curriei* Coq." seem to refer to the present species. Unfortunately we have not been able to secure Californian larvæ for comparison, although Mr. Quayle kindly endeavored to supply us. It is quite possible that the *Culex onondagensis* Felt (Bull. 79, N. Y. Sta. Mus., 304, 1904) may prove to be this species, in which case our new name may be placed in the synonymy.

Aedes pretans Grossbeck.

Culex pretans Grossbeck, Ent. News., xv, 332, 1904.

Culex pretans Smith & Grossbeck, Psyche, xii, 17, 1905

Culex pretans Smith, N. J. Agr. exp. Sta., Rept. Mosq., 293, 1905.

Culex pretans Britton & Viereck, Rept. Conn. Agr. Ex. Sta. 1904, pt. iii, pl., xii, 1905.

One of the early Spring forms. Its distribution seems to be less northern than some of the others.

Aedes æstivalis Dyar.

Culex æstivalis Dyar, Journ. N. Y. ent. soc., xii, 245, 1904.

Common in the Selkirks of eastern British Colombia, the adults flying later than the earliest Spring species, of which this is probably one.

Aedes subcantans Felt.

- Culex cantans* Smith (not Meigen), Ent. News, xiii, 300, 1902.
Culex cantans Johannsen (not Meigen), Bull. 68, N. Y. Sta. Mus., 420, 1903.
Culex cantans Smith (not Meigen), Bull. 171, N. J. Agr. Exp. Sta., 24, 1904.
Culex cantans Dyar (not Meigen), Journ. N. Y. ent. soc., xii, 174, 1904.
Culex cantans Felt (not Meigen), Bull. 79, N. Y. Sta. Mus., 286, 1904.
Culex cantans Smith (not Meigen), N. J. Agr. Exp. Sta., Rept. Mosq., 242, 1905.
Culicada subcantans Felt, Bull. 97, N. Y. Sta. Mus., 474, 1905.

One of the early Spring forms, occurring in the northeastern United States. This is probably the *Culex stimulans* Walker (Cat. Brit. Mus., Dipt., i, 4, 1848); the types should be compared.

Aedes laternaria Coquillett. Fig. 17.

Verrallina laternaria Coquillett, Proc. ent. soc. Wash., vii, 184, 1906.

Collected by Mr. Busck in a hollow tree in Trinidad.

Aedes lazarensis Felt & Young.

- Culex lazarensis* Felt and Young, Science, n. s., xx, 505, 1904.
Culex lazarensis Felt, Bull. 79, N. Y. Sta. Mus., 310, 1904.
Culicada lazarensis Felt, Bull. 79, N. Y. Sta. Mus., 478, 1905.

One of the early Spring forms not uncommon in northern New York. The senior author has collected it in Plattsburgh.

Aedes quaylei, new species.

- Culex curriei* Coquillett (in part), Can. ent. xxxiii, 259, 1901.
Grabhamia curriei Theobald (in part), Mon. Culic., iii, 249, 1903.
Culex curriei Blanchard (in part), Les Moustiques, 285, 1905.
Grabhamia curriei Dyar (in part), Journ. N. Y. ent. soc, xiii, 28, 1905.
Culex curriei Quayle, Ent. News, xvii, 4, 1906.

This species is the salt marsh form of the Pacific Coast, as shown by Quayle. The types of *curriei* were from diverse localities, but the North Dakota specimen must be regarded as the actual type in restricting it. This form has never been bred; it cannot be the same species as the Californian salt marsh species. It may be conspecific with the specimens from New York mentioned above under *A. grossbecki*, but this has yet to be proved.

Aedes cyaneus Fabricius. Fig. 18.

- Culex cyaneus* Fabricius, Syst. Antliat., 35, 1905.
Hæmagogus cyaneus Blanchard, Les Moustiques, 112, 1805.

Mr. Busck brought some living larvæ from San Domingo collected in bamboo joints. The junior author found it at Sonsonate, Salvador,

and Port Limon, Costa Rica, in water in cocoanut shells and cacao husks.

Aedes knabi Coquillett. Fig. 19.

Culex knabi Coquillett, Proc. ent. soc. Wash., vii, 183, 1906.

Collected by the junior author at Tehuantepec, Mexico, in a hollow in a mango tree and at Salina Cruz, Mexico, also in a tree hole.

Aedes insolita Coquillett. Fig. 20.

Verrallina insolita Coquillett, Can. ent. xxxviii, 62, 1906.

Collected by the junior author at Tehuantepec, Salina Cruz, Almoloya, Mexico; Sonsonate, Salvador, and Puntarenas, Costa Rica. The larvæ were all in holes in trees except in one instance, at Tehuantepec, they were in a (cemented) tank in a shaded part of the garden at the public bath house.

Genus CULISETA Felt.

Theobaldia Neveu-Lemaire (not *Theobaldius* Nevill), C. R. heb. soc. Biol., liv, 1329, 1902.

Culiseta Felt, Bull. 79, N. Y. Sta. Mus., 391 c, 1904.

Theobaldinella Blanchard, Les Moustiques, 390, 1905.

The larvæ of this genus are extremely similar; the following small differences appear to hold for the species. The European *annulatus* Schrank is recorded from the West coast of America, but we have seen no larvæ. Meinert's excellent figure as well as Theobald's (Mon. Culic., iii, 150, 1903) show it to be a *Culiseta*, but neither is detailed enough to let us place the larva in the table. *Grabhamia vittata* Theobald (Can. ent. xxxv, 313, 1903) probably belongs here likewise. (See remarks under *Aedes abfitchii*).

Table of species.

- | | |
|---|--------------------|
| 1. Lower head tuft with three long hairs, upper multiple..... | 2 |
| Both head tufts multiple, alike..... | <i>absobrinus</i> |
| 2. Basal pecten teeth of the air tube furcate..... | <i>incidens</i> |
| Basal pecten teeth of the air tube with many branches..... | <i>consobrinus</i> |

Culiseta incidens Thomson.

Culex incidens Thomson, Kongl. Sven. Freg. Eugenies Resa omk. jood., Dipt., 443, 1868.

Culex incidens Dyar, Proc. ent. soc. Wash., vi, 38, 1904.

Culex nigripes Blanchard (not Zetterstedt), Les Moustiques, 345, 1905.

Theobaldinella incidens Blanchard, Les Moustiques, 393, 1905.

The species is common in the western United States to the Pacific coast, the larvæ occurring in water barrels and tanks as *Culex pipiens* does in the East, although not so exclusively a domestic mosquito. The eggs are laid in boats. Our easternmost record is Banff, Alberta, where the senior author collected it in sulphurous pools.

***Culiseta absobrinus* Felt.**

Culex absobrinus Felt, Bull. 79, N. Y. Sta. Mus., 318, 1904.

Culex absobrinus Dyar, Journ. N. Y. ent. soc., xiii, 24, 1905.

Theobaldia absobrinus Dyar, Journ. N. Y. ent., soc., xiii, 107, 1905.

The species has a northern distribution, being recorded from Elizabethtown and Tupper Lake, New York, and Kaslo, British Columbia. The larvæ occur in permanent pools in the same manner as *C. incidens*. We have not found them in artificial receptacles.

***Culiseta consobrinus* Desvoidy.**

Culex consobrinus Desvoidy, Mem. soc. d'his. nat., Paris, iii, 408, 1827.

Culex consobrinus Dyar, Journ. N. Y. ent. soc., xi, 24, 1903.

Culex consobrinus Dupree & Morgan, Science, n. s., xvi, 1036, 1902.

Culex magnipennis Felt, Bull. 79, N. Y. Sta. Mus., 324, 1904.

Culex consobrinus Dyar, Journ. N. Y. ent. soc., xiii, 26, 1905.

Culex consobrinus Blanchard, Les Moustiques, 352, 1905.

The species occurs throughout the eastern United States. We have it from Baton Rouge, La. (Dupree), Urbana, Ill. (Knab), Jacksonville, Fla. (Dyar), Albany, N. Y. (Felt). Professor Blanchard gives western localities, which we have not seen verified by any specimens from beyond the Rocky Mountains. The larvæ live in permanent water, often in pools left in the beds of streams in well shaded places.

Genus *CULICELLA* Felt.

Culicella Felt, Bull. 79, N. Y. Sta. Mus., 391c, 1904.

***Culicella dyari* Coquillett.**

Culex dyari Coquillett, Journ. N. Y. ent. soc., x, 192, 1902.

Culex dyari Blanchard, Les Moustiques, 364, 1905.

The larva is one of the early Spring forms, although rather late in the cold northern bogs. It is the only larva of the long-tubed series that has such a habit. We took the species not uncommonly early in Spring near Springfield, Mass., and the senior author has collected it in New Hampshire, northern New York and eastern British Co-

lumbia. It undoubtedly has a northern range, like all the early Spring forms that hibernate in the egg state.

Genus CULEX Linnæus.

Culex Linnæus, Syst. nat., ed. x, 602, 1758.

Melanoconion Theobald, Mon. Culic., iii, 238, 1903.

Melanoconium Blanchard, Les Moustiques, 395, 1905.

Neoculex Dyar, Proc. ent. soc. Wash., vii, 48, 1905.

Micraëdes Coquillett, Proc. ent. soc. Wash., vii, 185, 1906

Tinolestes Coquillett, Proc. ent. soc. Wash., vii, 185, 1906.

The larvæ typically have the antennæ with a large tuft at about the outer third, beyond the middle, the part before the tuft thick, that beyond it slender; air tube long, over four times as long as wide with several tufts along the posterior edge; anal segment uniformly ringed by a chitinous band, the ventral brush confined to the barred area. Certain species diverge from this type in the degeneration of the antennæ, which come to resemble those of *Aëdes*. Others diverge in the shortening of the air tube. In two species both these divergences coexist and, although they still retain the multiple tufts of the air tube, we have been obliged to include their names in both the tables of the species of *Aëdes* and *Culex* to avoid confusion. It happens that some *Aëdes* have the anal segment ringed, and one (*trichurus* Dyar) has multiple tufts on the tube, which renders the absolute definition of these genera difficult when the aberrant forms are included.

Table of species.

- | | |
|---|-----------------------|
| 1. Antennæ with the tuft at the middle of the uniformly shaped joint..... | 2 |
| Antennæ with the tuft outwardly placed, the part beyond slender..... | 5 |
| 2. Air tube very long (8 x 1), pecten teeth long spines; abdominal hairs in coarse stellate tufts..... | <i>bisulcatus</i> |
| Air tube shorter, about four times as long as wide..... | 3 |
| Air tube only about two-and-a-half times as long as wide..... | 4 |
| 3. Antennæ with a tuft; anal segment smooth..... | <i>restuans</i> |
| Antennæ with a single hair; anal segment spined..... | <i>pleuristriatus</i> |
| 4. Ring of anal segment narrow; pecten not to half of the tube; two tufts within pecten, two beyond in line..... | <i>janitor</i> |
| Ring of anal segment broad; pecten over half of tube; two tufts within, two beyond not in line, two on dorsal aspect..... | <i>lactator</i> |
| 5. Air tube three times as long as wide or less..... | 6 |
| Air tube four times as long as wide or over..... | 7 |
| 6. Body pilose; pecten of the air tube to three-fourths..... | <i>interrogator</i> |
| Body spicular-granular; pecten of the air tube small, to one-third..... | <i>barbarus</i> |

7. Anal appendages only two. *bahamensis*
 Anal appendages four, normal. 8
8. Air tube with three paired tufts posteriorly outwardly, the middle one moved laterad out of line, usually situated near or not much beyond the middle of the tube. 9
 Air tube with four paired tufts posteriorly outwardly (sometimes increased by additional ones basally), the subapical one moved laterad out of line, usually situated at the outer third of the tube. 14
 Air tube with four to ten paired tufts along the posterior line in a straight row, none displaced, or the hairs obsolete or absent. 18
9. Body glabrous; air tube 7 x 1; antennæ dark. *mortificator*
 Body spicular or pilose. 10
10. Dislocated tuft of tube well beyond the middle. *carmonyæ*
 Dislocated tuft of tube not, or scarcely beyond the middle. 11
11. Anal processes broad and bluntly rounded. 12
 Anal processes long and tapered, rather sharply pointed. 13
12. Air tube subfusiform, tapered on outer half; body spicular. *extricator*
 Air tube gently tapered uniformly; body pilose. *declarator*
13. Air tube very slightly flared at tip; pecten very long, as long as the diameter of the tube at the middle. *proclamator*
 Air tube regularly tapered on outer two-thirds to tip; pecten long hut not equalling half the diameter of the tube. *inquisitor*
14. Air tube long, over 5 x 1, the sides nearly straight without marked tapering. 15
 Air tube less than five times as long as wide, the sides curved, tapering rather rapidly after the middle, subfusiform. 17
15. Body glabrous. *salinarius*
 Body spicular-pilose. 16
16. Air tube 8 x 1, the tufts 3-haired and short; antennæ dark. *habilitator*
 Air tube 6 x 1, the tufts 2-haired and long; antennæ pale at base. *factor*
 Air tube 7 x 1, the tufts single and very long; antennæ pale. *regulator*
17. Air tube 5 x 1, pecten teeth about 15; subdorsal hairs of abdominal segments 3 and 4 double. *picipiens*
 Air tube 4 x 1, pecten teeth about nine; subdorsal hairs of abdominal segments 3 and 4 single. *cubensis*
18. Air tube with a subapical crown of spikes; body pilose. *coronator*
 Air tube without a crown of spikes, smooth throughout. 19
19. Air tube with long well-defined tufts. 20
 Air tube with small double or single hairs, or bare. 31
20. Body spicular-pilose. 21
 Body glabrous or lightly granular. 26
21. Five tufts on posterior margin of tube subequal in length, short; lateral abdominal hairs in twos on segments 3 to 5. 22
 Five tufts on tube with the basal one very long, the rest progressively shorter; abdominal hairs in threes on segments 3 to 5. 23

22. Air tube 11 x 1; upper head hair double; pecten of air tube moderate
derivator
Air tube 6 x 1; upper head hair single; pecten long *investigator*
Air tube 6 x 1; upper head hair multiple; pecten rather long. *inhibitor*
23. Upper head hair triple; tufts of tube long, the basal one over half the
length of the tube *mutator*
Upper head hair single; tufts of tube all shorter than half its length. 24
24. Pecten of tube dense and fine, not as long as diameter of tube. 25
Pecten sparse and open, equalling the diameter of the tube at middle
elevator
25. Dorsal hairs stellate, long; antennæ dark. *educator*
Dorsal hairs small; antennæ pale at base. *conspirator*
26. Air tube concave, the tip expanded. 27
Air tube regularly tapered, the tip not widened. 28
27. Pecten of air tube short; antennæ pale at base; lateral comb of the eighth
segment a large patch of spines. *territans*
Pecten of the air tube of long spines; antennæ dark; lateral comb of
the eighth segment scarcely over two rows deep. *simulator*
28. Both head hairs single. *gravitator*
Upper head hair triple, lower single. *decorator*
Both head hairs triple or multiple. 29
29. Lateral abdominal hairs in threes after the second segment; body glabrous;
air tube not over five times as long as wide. *tarsalis*
Lateral abdominal hairs in twos after the second segment; body spicular-
granular; air tube 6 x 1. 30
30. Air tube with ten close tufts; antennæ pale at base; dorsal tufts of anal
segment 1 + 3 on each side. *secutor*
Air tube with six to seven sparse tufts; antennæ dark; dorsal tufts of anal
segment 1 long + 1 long and one short. *lamentator*
31. Air tube very long with a swelling at outer fourth. *daumasturus*
Air tube uniform, without any swelling. 32
32. Air tube with slight tufts. 33
Air tube with single hairs or bare. 37
33. Pecten of the air tube reaching to one-third (Dr. Grabham). 34
Pecten of the air tube reaching one-fourth or less. 35
34. Pecten short and broad, the tube 8 x 1, slightly curved forward; labial plate
with subbasal tooth projecting. *microsquamosus*
Pecten long, the tube 10 x 1; labial plate with even teeth. *atratus*
35. Pecten dense and fine; lateral hairs in threes after the second segment
carcinophilus
Pecten sparse and long. 36
36. Lateral hairs in twos after the second segment; comb of the eighth seg-
ment of very long spines. *rejector*
Lateral hairs in fours after the second segment; comb of shorter spines
and more rows deep. *vector*

37. Pecten of the air tube of five teeth, the last two long and remote, on the basal one-seventh of the tube *inimitabilis*
 Pecten of numerous teeth densely and regularly spaced 38
38. Lateral abdominal hairs single on segments 3 to 5 *conservator*
 Lateral abdominal hairs double on segments 3 to 5 39
39. Air tube with four rather long single hairs on posterior margin... *restrictor*
 Air tube with a single small hair or none. 40
40. Pecten of the air tube reaching to one-fourth..... *divisor*
 Pecten of the air tube reaching to one-third..... *latisquamma*

***Culex bisulcatus* Coquillett. Fig. 21.**

Micraëdes bisulcatus Coquillett, Proc. ent. soc. Wash., vii, 185, 1906.

The antennæ have the tuft at the middle; the head tufts multiple; air tube very long with long pecten reaching nearly half way, followed by scattered tufts. Anal segment with the chitinous ring furnished with long spines on the posterior edge.

The specimens were collected by Mr. Busck in Guadeloupe on the Soufrière, 3,000 feet altitude, and in San Domingo, from larvæ in Bromelias and leaf angles of Spanish Bayonet.

***Culex restuans* Theobald.**

- Culex restuans* Theobald, Mon. Culic., ii, 142, 1901.
Culex restuans Dyar, Journ. N. Y. ent. soc., x, 199, 1902.
Culex restuans Smith, Ent. News, xiii, 302, 1902.
Culex restuans Dyar, Ent. News, xiv, 41, 1903.
Culex restuans Dyar, Proc. ent. soc. Wash., v, 144, 1903.
Culex restuans Johannsen, Bull. 68, N. Y. Sta. Mus., 417, 1903.
Culex restuans Smith, Bull. 171, N. J. Agr. Exp. Sta., 16, 1904.
Culex restuans Dyar & Knab, Proc. ent. soc. Wash., vi, 143, 1904.
Culex restuans Felt, Bull. 79, N. Y. Sta. Mus., 326, 1904.
Culex restuans Smith, N. J. Agr. Ex. Sta., Rept. Mosq., 315, 1905.

The larva is apparently a normal inhabitant of hollow trees and dirty permanent pools. It is a wild species, native to the northeastern part of the continent, but takes very kindly to rain water barrels and other artificial breeding places. In places well removed from the seaboard and from large towns, where *Culex pipiens* has not yet penetrated, it is the dominant species in water barrels. Nearer the coast, it appears mixed with *pipiens*. The eggs are laid in rafts and the early stages are closely similar to *pipiens*, although the larva is readily enough distinguished by the structure of the antennæ.

Culex pleuristriatus Theobald. Fig. 22.

Culex pleuristriatus Theobald, Mon. Culic., iii, 177, 1903.

Culex pleuristriatus Bourroul, Mosq. do Brasil, 43, 1904.

Described from Brazil. Mr. Coquillett has given us the name for a specimen from Trinidad from Mr. F. W. Urich, bred from Bromelia water. Its peculiar characters are indicated in the table. The mosquito fauna of the Bromelias is very rich, both in Sabethines and members of the genus *Culex*, as well as the *Megarhinus* that prey on them.

Culex janitor Theobald.

Culex janitor Theobald, Mon. Culic., iii, 182, 1903.

Culex janitor Grabham, Can. ent., xxxvii, 406, 1905.

Described from Jamaica. Dr. Grabham figures the larva which we have not seen in nature. Mr. Coquillett applied the name tentatively to a very different species, to which we shall refer further on.

Culex lactator, new species. Fig. 23.

With the characters given in the table; a very distinct form. The larva contradicts both the characters which usually define the species of *Culex*, but we nevertheless believe that it belongs here. The anal segment has the normal structure of all the *Culex* species.

The larvæ were taken by the junior author in puddles at Cordoba, Santa Lucrecia, Rincon Antonio, Tehuantepec and Almoloya, Mexico; Puntarenas and San José, Costa Rica. The adults were named "*Culex? secutor* Theob." and mixed with another species (*C. coronator* D. & K.) under this name. Compare our remarks under *Culex secutor* and *Janthinosoma scholasticus*.

Culex interrogator, new species. Fig. 24.

The antennæ have the normal structure for *Culex*, but the air tube is short as in *Aedes*. Its pecten is stout and runs to the apical fourth. There are three hair tufts and a fourth smaller, placed laterally. The comb of the eighth segment is in a long straight row, supplemented by a second shorter one. The anal segment is normal. The skin is pilose; the tracheæ broad.

Collected by the junior author at Rincon Antonio, Mexico, in ditches. The adults were named "*Culex? salinarius* Coq." by Mr. Coquillett, with which species they have nothing whatever to do.

***Culex barbarus*, new species.** Fig. 25.

Very nearly allied to *C. cubensis* Bigot, but the air tube much stouter. The lateral hairs are in twos after the second abdominal segment, the subdorsal ones also in twos. Tracheæ broad.

A single specimen was collected by Mr. Busck in a lagoon pool far from habitation on the South coast of Trinidad. It was named "*Culex pipiens* L." by Mr. Coquillett.

***Culex bahamensis*, new species.** Fig. 26.

This very peculiar species was collected by Dr. T. H. Coffin in the Bahamas, but, although he preserved pupæ, he obtained no adults. The skin is glabrous, but curiously enough, the air tube is pilose outwardly. The lateral hairs are in threes on the third and fourth segments, in twos on the fifth and sixth. There are but a single pair of anal gills, a character only paralleled in *Wyeomia*. The six tufts of the air tube are arranged in a line along the posterior margin, three of them within the pecten.

***Culex mortificator*, new species.** Fig. 27.

Antennæ normal, dark throughout; head hairs in threes. Air tube seven times as long as wide, uniformly slightly tapering, the pecten on the basal fourth; tufts very long but few-haired. Comb of the eighth segment of many long spine-like scales in a large patch. Anal segment rather long, normal; anal gills unusually long.

Collected by the junior author in Zent, Costa Rica, in a hollow in a stump of a banana tree, but no adults were obtained.

***Culex carmodyæ*, new species.** Fig. 28.

Antennæ normal, pale at base. Body pilose; lateral hairs in twos after the second segment; subdorsal hairs long and in twos on segments 5, 6 and 7; tracheæ broad. Air tube five to seven times as long as wide with the three tufts in twos, the basal very long, the others successively shorter. Comb of the eighth segment normal, moderate.

Collected by Mr. Busck in San Domingo from a vase in the hotel parlor and in a slowly running water course across a road. The adults were named "*Culex salinarius* Coq." and "*Culex pipiens* L.," neither of which species occurs in the island to our knowledge. We

name the species for Miss Mary Carmody, who has done excellent and faithful work in drawing the mouth parts of larvæ, and is withal a most amiable young lady.

***Culex extricator*, new species.** Fig. 29.

The antennal tuft arises near the middle, but has a distinct notch; the head hairs are in threes or fours; air tube much tapered on outer half, the tufts weak; body shortly hairy, the spicules not much elongated. The lateral hairs are in twos after the second abdominal segment. Lateral comb of the eighth segment well developed. Anal gills bluntly rounded.

Collected by Mr. Busck in a bucket used to keep live crabs at Cedros, Trinidad. The adults were named "*Culex pipens* L." by Mr. Coquillett.

***Culex declarator*, new species.** Fig. 30.

Antennal tuft placed well outward, the member all dark. Head hairs in fours; body pilose; lateral hairs in twos after the second abdominal segment. Air tube five times as long as wide, the pecten reaching one-third. Lateral comb of the eighth segment large; anal gills short and blunt.

Collected by Mr. Busck in a lagoon pool far from habitation on the south coast of Trinidad. The adults were named "*Culex pipiens* L." by Mr. Coquillett.

***Culex proclamator*, new species.** Fig. 31.

Antennal tuft at the outer third, the member dark; head hairs in threes; body pilose; tracheæ broad. The subdorsal hairs of the abdominal segments are very long. Air tube five times as long as wide, strongly tapered outwardly, the apical third nearly straight; pecten very long and running to one-half.

Collected by the junior author at Santa Lucrecia and Almoloya, Mexico; Puntarenas, Costa Rica.

The adults were named "*Culex? salinarius* Coq." and "*Culex? secutor* Theob."

***Culex inquisitor*, new species.** Fig. 32.

Antennal tuft well outward, the whole member dark; head hairs in threes; lateral abdominal hairs in twos after the first segment.

Air tube five times as long as wide, the pecten short and reaching nearly to the middle. Anal gills long and pointed.

Collected by Mr. Busck in a manure ditch behind a stable, Cedros, Trinidad, and in pods of cocoa in "stinking black half solid water" in Dominica. The eggs are laid in boats. Also obtained by the junior author in Santa Lucrecia, Mexico and Puntarenas, Costa Rica. All the adults were labelled "*Culex secutor* Theob." by Mr. Coquillett.

***Culex salinarius* Coquillett.**

Culex nigritulus Smith, Ent. news, xiii, 303, 1902.

Culex nigritulus Dyar, Journ. N. Y. ent. soc., xi, 24, 1903.

Culex nigritulus Dyar, Proc. ent. soc. Wash., v, 143, note, 1903.

Culex nigritulus Smith, Rept. ent. Dept. N. J. Agr. Exp. Sta., 535, 1903.

Culex salinarius Coquillett, Ent. News, xv, 73, 1904.

Culex salinarius Smith, Bull. 171, N. J. Agr. Exp. Sta., 23, 1904.

Culex salinarius Dyar, Journ. N. Y. ent. soc., xii, 173, note, 1904.

Culex salinarius Felt, Bull. 79, N. Y. Sta. Mus., 332, 1904.

Culex salinarius Smith, N. J., Agr. Exp. Sta., Rept. Mosq., 318, 1905.

This species is unfortunately misnamed, for it never lives in salt water. It is a permanent swamp species, often frequenting rain barrels and occurring from the Atlantic to the Mississippi Valley. Our records are Chesapeake Beach, Md. (Dyar), Newark, N. J. (Brehme), Urbana, Ill. (Knab), Washington, D. C., (Dyar), Georgetown, D. C. (Caudell), Springfield, Mass. (Knab), St. Louis, Mo. (Busck).

***Culex habilitator*, new species. Fig. 33.**

Antennæ with the tuft at outer third, all dark. Head hairs, the upper tuft in four or five, the lower in three. Body pilose; lateral hairs in twos after the second abdominal segment; subdorsal hairs in threes on segments 3 to 7. Air tube very long, 8 x 1, the pecten reaching nearly one-third.

The larvæ were collected by Mr. Busck in a small pool in a cave in coral cliffs near the ocean in San Domingo and in a large crab hole in a lagoon along a river, but these last are referred here with doubt as the condition of the skins is imperfect. The specimens were named "*Culex secutor* Theob."

***Culex factor*, new species. Fig. 34.**

Antennal tuft beyond the middle, the member pale on the basal half. Head hairs in threes; body pilose; tracheal tubes broader than

in *coronator*. Lateral hairs in twos after the second abdominal segment. Subdorsal hairs very long and in twos on segments 4 to 7. Air tube long, 6 x 1, the pecten reaching to one-third.

Collected by the junior author at Santa Lucrecia, Rincon Antonio, Tehuantepec and Salina Cruz, Mexico, and labelled "*Culex? secutor* Theob." by Mr. Coquillett. Others were taken at St. Vincent, Barbadoes and Martinique by Mr. Busck and labelled "*Culex salinarius* Coq." by the author of that species; but these specimens of Mr. Busck we refer here more doubtfully, as their condition is so poor that we cannot be certain of them. Mr. Busck's material was all taken out and handled by Mr. Coquillett before our final examination, which extra handling was far from beneficial to the skins.

***Culex regulator*, new species.** Fig. 35.

Antennæ with the tuft nearly at the outer third, pale at base. Head hairs in threes; body pilose; lateral hairs in twos after the second abdominal segment; tracheæ broad. Air tube 7 x 1, with long single hairs, the pecten reaching to one-fourth. Anal gills long and pointed.

Collected by Mr. Busck in an old bucket in a field in San Domingo. The adults were named "*Culex salinarius* Coq."

***Culex pipiens* Linnaeus.** Fig. 36.

Culex pipiens Linnaeus, Syst. Nat., ed. x, 601, 1758.

Culex pipiens Blanchard, Les Moustiques, 340, 1905.

Antennal tuft at the outer third, the member all dark. Head hairs in fours or more; body glabrous; lateral hairs in twos after the second abdominal segment; subdorsal hairs in twos; tracheæ broad. Air tube about five and a half times as long as wide, the pecten reaching nearly one-third.

We have accepted this form as the common European species introduced into America, although in spite of various efforts we have been unable to secure any European larvæ for comparison. The species is domestic in habits, the larvæ occurring in rain water barrels and other artificial receptacles. The distribution is Northern, but not boreal and is confined to the vicinity of civilization. Our records are: Bellport, N. Y. (Dyar), Ithaca, N. Y. (Johannsen), West Springfield, Mass. (Knab), Durham, N. H. (Dyar), Chicago, Ill. (Kelly),

Urbana, Ill. (Knab), Murphysboro, Ill. (Mosier), Arlington and Rosslyn, Va. (Pergande).

Culex cubensis Bigot. Fig. 37.

Culex pungens Wiedemann (not Desvoidy), Auss. zweifl. Ins., i, 11, 1828.

Culex cubensis Bigot, Hist. fisc. Isl. Cuba, vii, 329, 1857.

Culex fatigans Blanchard (in part), Les Moustiques, 353, 1905.

This is the *Culex pungens* Wied. and is the form called "*Culex fatigans* Wied." by Mr. Theobald and, following him, by Miss Ludlow. We are unable to consider it conspecific with the Indian *fatigans*. In the first volume of his monograph of Culicidæ (pp. 28 and 43), Mr. Theobald quotes a figure of the larva and account of its habits from Capt. James, which evidently refers to a wild long-tubed species, something like our *territans*. Other authors refer to *fatigans* as a domestic species, so it may be that Mr. Theobald did not rightly name Capt. James' material. We have specimens from India labelled *fatigans* which come very near our *cubensis*, yet show enough difference to prevent our putting them under the same name. *Cubensis* appears to be the earliest valid name based on American specimens, of those that have been referred to the synonymy of *fatigans*, and we therefore use the name.

The larva is close to *pipiens*, but has a shorter air tube, 4 x 1, and the subdorsal hairs are single. It is a domestic species, but has a southern distribution, overlapping *pipiens* in the northern part of its range only. The junior author collected it in a shallow puddle at Cordoba, in a water barrel at the door of a workman's dwelling and in a trench back of a store in Rincon Antonio; in a hole in a tree trunk at Tehuantepec, Mexico; in a barrel of clear water in a shed at San José; in a boat full of rain water, Port Limon, Costa Rica. Mr. Busck collected it in an earthen-ware vessel of rain water, in an open ditch along a road, in a bucket used to keep live crabs, in an unused chicken feeder in Cedros; in a hollow tree near a house, Montserrat, Trinidad; in an old starch barrel, St. Vincent; in a barrel back of a house, Barbadoes; in a hollow tree, Fort de France; in running water in a horse trough, in running water in the country with green algæ, in a rain water barrel in a negro's house, Martinique; in an old sugar boiler, Dominica; in a water hole in the country, St. Thomas; in an old iron tank, City of San Domingo. We have North American specimens

from Victoria, Texas (Hinds), Baton Rouge, La. (Dupree), and Washington, D. C. (Dyar). The specimens were uniformly determined as "*Culex pipiens* L." by Mr. Coquillett.

Concerning the supposed transference of *Filaria* by this species, we presume it is not necessary for it to be strictly conspecific with the Indian *fatigans* in order to accomplish it, for a number of not closely allied mosquitoes appear to be regarded as carrying agents (compare Blanchard, Les Moustiques, 536, 1905). We would observe that the *Culex skusei* which Col. Giles regarded as the transferring agent of *Filaria* is a good species, not a synonym of *fatigans* as stated by Blanchard, nor even a variety of it as Theobald makes it, to judge from the published figure of the larva. We do not know *skusei* in America.

***Culex coronator*, new species.** Fig. 38.

Antennæ with the tuft slightly beyond the middle, pale; head hairs, the upper in four or five, the lower in three or four, rarely five; body hairy. Air tube long, 9×1 , the pecten reaching two-fifths, a crown of coarse spikes before apex, usually well developed, sometimes nearly obsolete. Anal gills moderate.

An abundant species throughout the tropics, apparently absent from the islands. Mr. Busck took it in a pool in the woods at St. Joseph, Trinidad, in a lagoon pool on the South side of Trinidad, in a bucket with live crabs and an open ditch in the middle of the village, Cedros, Trinidad. The junior author found this the commonest species in Mexico and Central America. The localities are: puddles in street, shallow puddle on outskirt, pools in a stream, Cordoba; muddy road way along railroad tracks, Tehuantepec; puddles, etc., Salina Cruz; tanks at Acapulco, Mexico; puddles, San Jose de Guatemala; ditch, San Salvador; hole in root of tree, Sonsonate, Salvador; shallow pool, Puntarenas, large muddy puddle and barrel of clear water, San Jose, Costa Rica; puddles in freshly dug railroad ditch, Port Limon, Costa Rica. This is a most inoffensive mosquito. Although breeding in myriads in all roadside puddles it seems not to bite and does not enter houses. The adults were all named "*Culex secutor* Theob." by Mr. Coquillett, except one of Mr. Busck's, which was called "*pipiens*" (it may have been in bad condition). To the junior author's specimens he added a query and the note "also *janitor*? and *tarsalis*?"

Culex derivator, new species. Fig. 39.

Antennæ with the tuft well outward; upper head tuft double, very long, body hairy; tracheæ narrow; lateral hairs in twos after the second abdominal segment. Air tube very long, 11 x 1, pecten reaching one-third its length, the distal teeth detached; five short tufts on posterior margin. Lateral comb of the eighth segment large, of long spines.

Taken by the junior author in a puddle in a ravine at Cordoba, Mexico, but not bred.

Culex investigator, new species. Fig. 40.

Antennæ with the tuft slightly beyond the middle, dark; head hairs single; body pilose; lateral hairs in twos after the first abdominal segment. Air tube five-and-a-half times as long as wide, rather markedly tapered on basal third; pecten of long teeth, reaching two-fifths, followed by five rather short hair tufts.

Taken by the junior author in a pool beside the railroad track, three miles from town, Santa Lucrecia, Mexico. Mr. Coquillett seems not to have named the adult although one was bred.

Culex inhibitor, new species. Fig. 41.

Antennæ with the tuft near the outer third, dark; upper head tuft of four, short, lower long and single; body hairy; lateral hairs in twos after the first abdominal segment; tracheæ narrow. Air tube long, 6 x 1, the pecten long and reaching one-third, with five tufts, decreasing in length a little toward tip. Anal segment long, but the gills short.

Collected by Mr. Busck in a slowly running clear cold spring in the San Francisco Mts. of San Domingo. It was named "*Melanoconion indecorabilis* Theob." by Mr. Coquillett, but that was described from Para, Brazil, and we do not believe it is our species.

Culex mutator, new species. Fig. 42.

Antennæ with the tuft near the outer third, pale at base; upper head tuft of three, lower single; body pilose. Air tube 5 x 1, tapered, five or six tufts along the posterior margin, the basal one longest; pecten long, but not immoderately so.

Collected by the junior author at Cordoba, Mexico, in puddles in a

ravine. The adults were named "*Melanoconion humilis* Theob." by Mr. Coquillett, but we see no reason to accept this determination. *M. humilis* was described from São Paulo, Brazil.

Culex elevator, new species. Fig. 43.

Antennæ with the tuft beyond the middle, pale at base; head hairs single; body hairy; two lateral hairs on the second abdominal segment, three on the third to sixth. Air tube 6 x 1, nearly straight with very long pecten; five tufts on the posterior margin; anal gills short.

Taken by the junior author in a pool of clear water containing vegetable debris at the head of a small stream two miles west of Port Limon, Costa Rica. The adults were not bred.

Culex educator, new species. Fig. 44.

Antennæ with the tuft at outer third, dark; head hairs single; body coarsely hairy; lateral hairs in twos on the second segment, in threes on the third to sixth; subdorsal hairs long, stellate; tracheæ narrow. Air tube 6 x 1, a little tapered, pecten moderate; five tufts on the posterior margin decreasing to tip.

Collected by the junior author in an old stream bed disconnected from the stream, containing fish, but the larvæ in reeds at the edge, Rio Aranjuez, near Puntarenas, Costa Rica. The adults were named "*Melanoconion atratus* Theob." by Mr. Coquillett.

Culex conspirator, new species. Fig. 45.

As in the preceding species, but differentiated by the characters given in the table.

Collected by the junior author at Almoloya, Oaxaca, Mexico, in a large pot hole full of clear water and in a shallow pool frequented by cattle at Las Loras near Puntarenas, Costa Rica. The specimens were named "*Melanoconion atratus* Theob."

Culex territans Walker.

Culex territans Walker, Ins. Saund., Dipt., i, 428, 1856.

Culex territans Dyar, Journ. N. Y. ent. soc., ix, 178, 1901.

Culex territans Smith, Ent. news, xiii, 302, 1902.

Culex territans Dyar, Proc. ent. soc. Wash., v, 48, 142, 1903.

Culex territans Dyar, Science, n. s., xvi, 672, 1902.

Culex territans Dyar, Proc. ent. soc. Wash., vi, 40, 1904.

Culex territans Smith, Bull. 171, N. J. Agr. exp. Sta., 24, 1904.

Culex territans Felt, Bull. 79, N. Y. Sta. Mus., 307, 1904.

Culex territans Knab, Journ. N. Y. ent. soc., xii, 246, 1904.

Culex territans Smith, N. J. Agr. exp. Sta., Rept. Mosq., 329, 1905.

Culex territans Blanchard, Les Moustiques, 367, 1905.

Our most common species in the Summer time, breeding in all the swamps especially if cold and clear. It seems entirely harmless as we have never been bitten by a specimen. The adult is in fact seldom seen, being of retiring habits. It may be obtained by sweeping the bushes.

The species occurs throughout the United States. We may mention Springfield, Mass. (Knab), Ithaca, N. Y. (Johannsen), Lahaway, N. J. (Brakely), Baltimore, Md. (Dyar and Caudell), Baton Rouge, La. (Dupree), Stanford Univ., Cal. (MacCracken), Kaslo, B. C. (Dyar and Currie).

***Culex simulator*, new species. Fig. 46.**

Antennæ with the tuft at outer third, dark; upper head tuft double, lower single; body smooth; lateral hairs single on the second abdominal segment, double on the third to sixth; tracheæ narrow. Air tube 7×1 , slightly flared at tip, with five tufts on the posterior margin; pecten very long, reaching one-third; lateral comb of the eighth segment scarcely over two rows deep. Anal segment long.

Taken by Mr. Busck in Arima, Trinidad, in the primeval woods. No adults were obtained.

***Culex gravitator*, new species. Fig. 47.**

Antennæ with the tuft before the outer third, dark; hairs single; body glabrous; lateral hairs in threes on abdominal segments 3 to 6; tracheal tubes narrow, angulated within the segments. Air tube six-and-a-half times as long as wide, with long pecten reaching to one-third. Anal gills small.

Collected by the junior author in a large Bromeliaceous plant containing water between the leaves, growing in a thicket in a valley above Cordoba, Mexico. In spite of careful attention no adults were bred. Some of the larvæ lived two months after being collected; they probably died of starvation.

***Culex decorator*, new species. Fig. 48.**

Antennæ with the tuft beyond the outer third, dark; head hairs, the upper tuft triple, the lower single; lateral hairs double on the second

segment, in threes on the third to fifth, in twos and much longer on the sixth. Air tube 7 x 1, the pecten not reaching one-third, short. Anal gills short.

Collected by Mr. Busck on Tobago Island, the larvæ in bamboo joints. They were brought to Washington alive, but failed to mature.

***Culex tarsalis* Coquillett.**

Culex tarsalis Coquillett, Can. ent., xxviii, 43, 1896.

Culex kelloggi Theobald, Can. ent., xxxv, 311, 1903.

Culex tarsalis Dyar, Proc. ent. soc. Wash., vi, 40, 1904.

Stegomyia (?) *tarsalis* Blanchard, Les Moustiques, 265, 1905.

We have the species from three widely separated localities, Stanford University, Cal. (MacCracken), Victoria, B. C. (Dyar), Urbana, Ill. (Knab). The larvæ differ perceptibly; especially the Californian ones have a shorter, darker air tube and a thicker labial plate; but we do not esteem the differences to be of specific value.

***Culex secutor* Theobald. Fig. 49.**

Culex secutor Theobald, Mon. Culic., ii, 321, 1901.

Culex secutor Blanchard, Les Moustiques, 300, 1905.

Culex secutor Dyar, Journ. N. Y. ent. soc., xiii, 26, 1905.

Dr. Grabham has kindly sent us the larvæ from Cinchona, Jamaica. They represent a distinct species, which has not come to us from any of the other islands or the mainland.

***Culex lamentator*, new species. Fig. 50.**

Antennæ with the tuft but slightly beyond the middle, dark; head hairs in threes; body granular, subspicular; lateral hairs in twos after the first segment; tracheæ broad. Air tube 6 x 1, with six tufts along posterior line; pecten reaching a little over one-fourth. Lateral comb of the eighth segment large; gills moderate.

Collected by Mr. Busck in a hollow palm trunk in the San Francisco Mts., San Domingo. It was named "*Culex secutor* Theob." by Mr. Coquillett; it should be regarded as a distinct, but allied species, representing the Jamaican form in San Domingo.

***Culex microsquammosus* Theobald.**

Culex microsquammosus Theobald in Grabham, Can. ent., xxxvii, 407, 1905.

Dr. Grabham gives the larval characters in presenting Mr. Theobald's description. The species is from Jamaica.

Culex atratus Theobald.

Culex atratus Theobald, Mon., Culic., ii, 55, 1901.

Melanoconion atratus Grabham in Theobald, Mon. Culic., iii, 238, 1903.

Culex atratus Blanchard, Les Moustiques, 335, 1905.

Melanoconium atratum Blanchard, Les Moustiques, 395, 1905.

Melanoconion atratus Grabham, Can. ent., xxxvii, 403, 1905.

The larva has been made known by Dr. Grabham. His first communication is accompanied by a plate (Mon. Culic., iii, pl. xvi) which, however, gives no adequate idea of the species, so that the senior author was led to accept one of Mr. Coquillett's determinations, and published a description of another larva under this name. (See Journ. N. Y. ent. soc., xiii, 29, 1905, and compare *Mochlostyrax erraticus* of this paper).

Culex carcinophilus, new species. Fig. 51.

Antennæ with the tuft beyond the middle, dark; upper head tuft multiple, lower single; body spicular, not pilose; lateral hairs in twos on the second abdominal segment, in threes on the third to sixth. Air tube very long, 10 x 1, straight; four small, two-haired tufts on posterior margin; pecten of long spines outwardly, reaching to one-sixth. Lateral comb of the eighth segment large; anal gills very small.

Collected by Mr. Busck from crab holes containing fresh water near San Domingo City. The adults were named "*Melanoconion atratus* Theob."

Culex daumasturus, new species. Fig. 52.

Distinct from any known larva by the very long air tube (12 x 1) with a swelling at the outer third.

It was collected by Mr. Busck in the leaf corner of a Century Plant near the pitch lake, La Brea, Trinidad. A second specimen has been sent us by Mr. Urich from Bromelias at Arima, Trinidad. The adult was named "*Culex imitator* Theob." by Mr. Coquillett, and it may be that species, which was bred from Bromelia water by Dr. Lutz in Brazil; but we do not feel certain enough of it to accept the name.

Culex vector, new species. Fig. 53.

Antennæ with the tuft at the outer third, pale; body glabrous; lateral abdominal hairs in four on first segment, twos on second, fours

on third to fifth, single and long on the sixth. Air tube 9 x 1, wide at base, the pecten sparse and long, reaching to one-fourth, followed by a little double-haired tuft. Lateral comb of the eighth segment a large patch of long spines. Anal gills moderate, pointed.

Collected by Mr. Urich in Trinidad from Bromelia water. It was named by Mr. Coquillett "*Culex varipalpus* Coq.," but on our remonstrating with him, it was changed to "*Culex imitator* Theob." We cannot adopt this name, either. (See remark under the preceding species).

***Culex rejector*, new species.** Fig. 54.

Antennæ with the tuft near the outer third, pale; head hairs, the upper tuft multiple, the lower single; body glabrous; lateral hairs in twos on segments 2 to 5, single on the sixth; tracheal tubes narrow, angled. Air tube very long, 10 x 1, nearly straight, with four small tufts on posterior margin; pecten of very long spines to one-fifth. Lateral comb of the eighth segment of long spine-like scales. Lateral tuft of the anal segment very large; gills long and pointed.

Collected by the junior author in a large Bromeliaceous plant at Cordoba, Mexico, with *C. gravitator*. All these larvæ died, presumably from lack of their natural food.

***Culex inimitabilis*, new species.** Fig. 55.

Collected in Bromelia water by Mr. Urich in Trinidad with *C. daumasturus*, which it resembles, but lacks the swelling on the tube. The body is smooth; the lateral hairs are in threes on the first segment, twos on the second, threes and short on the third to fifth, twos and long on the sixth. It was named "*Culex? pipiens* L.," by Mr. Coquillett; rather a worse guess than usual.

***Culex conservator*, new species.** Fig. 56.

Antennæ with the tuft beyond the outer third, dark; air tube 8 x 1, a single hair at the middle; pecten not reaching one-third. Anal segment long with short gills.

Collected by Mr. Busck in a hollow tree in the village of St. Joseph, Trinidad. Also in hollow trees near Montserrat, Trinidad, and Fort de France, Martinique, but these are broken and we do not feel sure of them. All were labelled "*Aedes perturbans* Will." by Mr. Coqu-

illett. Blanchard refers *perturbans* Will. to the genus *Wyeomia* (Sabethinæ) and makes it the same as *W. grayii* Theob. Apparently nobody knows what Williston's species really was; it may be our *C. conservator* or *C. divisor* or some other species, more probably the latter, we believe.

***Culex restrictor*, new species.** Fig. 57.

Antennæ with the tuft near the outer third; upper head hair triple, lower single, long; lateral hairs in twos on the second to sixth abdominal segments. Air tube 8 x 1, the pecten to one-fifth; four single hairs on posterior margin. Lateral comb of the eighth segment large; anal gills small.

Collected by the junior author in a small hole in a tree in a ravine at Almoloya, Oaxaca, Mexico. Our larva pupated, but failed to emerge.

***Culex latisquamma* Coquillett.** Fig. 58.

Tinolestes latisquamma Coquillett, Proc. ent., soc. Wash., vii, 185, 1906.

Antennal tuft at the outer third, dark; upper head tuft four, lower single; lateral hairs in four on the first segment, two long ones on the second, in twos but short on the third to fifth, one long one on the sixth. Air tube 8 x 1, pecten to one-third.

Collected by the junior author at Port Limon, Costa Rica, with *Deinocerites* in crab holes. The larvæ were not bred, although they lived a month and were brought back to Washington. Adults captured in the hole, which are in all probability adults of these larvæ, were named "*Aedes? nigricorpus* Theob." by Mr. Coquillett and later described as a new genus and species.

***Culex divisor*, new species.** Fig. 59.

The characters are included in the table, all that can be demonstrated in the rather badly damaged material, which suffered in transit.

It was collected by Mr. Urich in Trinidad; ten specimens were bred from the same egg mass collected in a hollow bamboo joint. The egg mass was floating free, the eggs stuck together by their sides in the normal way. Mr. Coquillett has identified the adults as "*Aedes pertinans* Will.," which may be correct. The species *pertinans* has, however, been referred to the Sabethinæ, and we do not feel justified in accepting the same till someone has examined Williston's types.

Mr. Coquillett's results, especially in the genus *Culex*, have produced in our minds a feeling of most profound distrust, and we are not prepared to accept anything that he says without corroboratory evidence.

Genus MOCHLOSTYRAX, new.

Differs from *Culex* in the structure of the comb of the eighth segment, which consists of a single row of bars instead of a patch of scales. We had thought to call this genus *Melanoconion* Theob., but the type species of that genus is *atratus* Theob., of which the larva has been made known by Dr. Grabham (in Theobald, Mon. Culic., iii, 238, 1903 and Can. ent., xxxvii, 404, 1905). In neither place is the structure of the comb accurately stated, but it is said to consist of "numerous flattened elongate scales bordered with fine setæ." It is clear that no one would so describe a row of bars, and the species *atratus* must be referred as a typical *Culex* of that group that has a very long slender tube. Type, *M. caudelli*, new species.

Table of species.

- | | |
|--|-----------|
| 1. Antennæ with the tuft at the middle, slight; tube with 15 hair tufts along the posterior line | urichii |
| Antennæ with the tuft from a notch beyond the middle..... | 2 |
| 2. Air tube over four times as long as wide, slender, scarcely tapered, with slight terminal setæ | 3 |
| Air tube not over four times as long as wide, stout at base and tapering, slightly curved forward with two stout hooks at tip..... | 4 |
| 3. Bars of comb in a perfectly regular row, body glabrous..... | melanurus |
| Bars of comb in an irregular row, body pilose..... | erraticus |
| 4. Bars of comb in a curved row; body pilose..... | pilosus |
| Bars of comb in a straight row; body glabrous | 5 |
| 5. Comb of sixteen bars | caudelli |
| Comb of only eight bars..... | cubensis |

Mochlostyrax urichii Coquillett. Fig. 60.

Melanoconion urichii Coquillett, Can. ent., xxxviii, 61, 1906.

We have the larvæ from Mr. Urich from Trinidad, who says: "Often found associated with *Mansonia facipes* and occurring under the same conditions. Predominating color brown. During life the similarity of the two larvæ is marked."

Mochlostyrax melanurus Coquillett.

Culex melanurus Coquillett, Journ. N. Y. ent. soc., x., 193, 1902.

Culex melanurus Dyar, Journ., N. Y. ent. soc., x, 196, 1902.

Culex melanurus Dyar, Proc. ent. soc. Wash., v, 143, 1903.

Culex melanurus Dyar, Science, n. s., xvi, 672, 1902.

Culex melanurus Felt, Bull. 79, N. Y. Sta. Mus., 337, 1904.

Melanoconion melanurus Dyar, Journ. N. Y. ent. soc. xiii, 28, 1905.

Culex melanurus Smith, N. J. Agr. exp. Sta., Rep. Mosq., 322, 1905.

Occurs in the northern Atlantic States; we have it from New Hampshire, New York and New Jersey. The fully grown larva hibernates, which is the only known instance of such a habit.

***Mochlostyrax erraticus*, new species. Fig. 61.**

The larva resembles that of *Culex salinarius*. The skin is densely covered with minute spiculæ, making it appear pilose. The air tube is long and straight, about six times as long as wide, has the pecten small, running to the basal third, followed by five moderate tufts on the posterior edge and two very short dorsal ones. The lateral comb of the eighth segment has the spines in a rather irregular row, not in the normal perfectly straight line, yet not doubled. We have the species from Dr. Dupree, Baton Rouge, Louisiana. It was identified as "*Melanoconion atratus* Theob." by Mr. Coquillett, but of course erroneously.

***Mochlostyrax pilosus*, new species. Fig. 62.**

The upper epistomal hair is double, the lower single, the anteantennal tuft of four. Air tube straight along the front side, curved behind, the pecten not reaching one-half, composed of long spines; eight hair tufts on the posterior edge, the two within the pecten very long, the others shorter. Comb of the eighth segment of 15 thorn-shaped scales in a curved row.

The specimens were collected by the junior author in Santa Lucrecia, Mexico, in cattle tracks filled with water in the edge of a swamp. They have the habit of lying on the back at the bottom. The adults were named "*Melanoconion atratus* Theob." by Mr. Coquillett.

***Mochlostyrax caudelli*, new species. Fig. 63.**

The upper epistomal tuft has three hairs, lower three, the small tuft below eight hairs, the anteantennal tuft five hairs. Air tube straight or slightly concave before, curved behind, with a pair of hooks at the tip. Pecten very long, not reaching half way along the tube; seven tufts on the posterior edge, the two within the pecten

longest, the rest successively shorter; a single tuft on the side of the tube. Comb of sixteen bar-like spines in a straight row. Anal segment with complete chitinous ring, the gills very long, tapered. The body is without spicules.

Mr. Busck collected the specimens in a rather large pool in a palm swamp far from civilization at Arima, Trinidad. He says: "the larvæ are weakly looking small fellows, which lie on their backs with jaws upward and open. They feed on very minute animal life (Crustacean) which abounds in these pools; observed this habit both in nature and in captivity and bred so few (five specimens) because the rest died when the Crustaceans gave out."

The adults were named "*Melanoconion atratus* Theob." by Mr. Coquillett. We have it for Mr. A. N. Caudell, our friend and co-worker.

***Mochlostyrax cubensis*, new species.** Fig. 64.

The specimens are badly damaged, but enough is left to give the specific characters. The tube is of the same shape as in *caudelli* and had apparently similar hair tufts. Pecten very long, not reaching half way along the tube. Lateral comb of the eighth segment of eight bars, stout, well separated, the upper ones smaller.

We have the specimens from Havana, Cuba, from Mr. John R. Taylor as "*Melanoconion atratus* Theob." the determination made by Mr. Coquillett, we believe.

Subfamily SABETHINÆ.

Table of genera.

- | | |
|---|---------------------|
| 1. No lateral comb on the eighth segment..... | <i>Joblotia</i> |
| Lateral comb present on the eighth segment..... | 2 |
| 2. Air tube spicular; maxillæ heavily armed, raptorial..... | 3 |
| Air tube smooth; maxillæ without heavy armature, not raptorial..... | <i>Wyeomyia</i> |
| 3. Head normal, the mouth parts not visible from above..... | <i>Sabethoides</i> |
| Mandibles and maxillæ visible from above..... | <i>Lesticocampa</i> |

Genus **JOBLOTIA** Blanchard.

Trichoprosopon Theobald (not *Trichoprosopus* Macquart), Mon. Culic., ii, 283, 1901.

Joblotia Blanchard, Cont. rent. heb. Soc. Biol., liiii, 1045, 1901.

***Joblotia niveipes* Theobald.** Fig. 65.

Trichoprosopon niveipes Theobald, Mon. Culic., ii, 285, 1901.

Joblotia niveipes, Blanchard, Les Moustiques, 429, 1905.

Joblotia niveipes Goeldi, Os Mosq. no Para, 120, 1905.

Prof. Goeldi has described and figured the larvæ from Brazil. He found them in the water in the leaves of Bromelias, in the axils of banana leaves and in holes in fallen trees. The species is distributed throughout the moist tropics. Mr. Busck collected larvæ in Trinidad from cacao husks and the junior author found them in cocoanut shells and cacao husks at Puntarenas, Costa Rica, and Sonsonate and Izalco, Salvador. The water in which they occur is very dirty, of a thick consistency. The eggs are laid in rafts, erect as in *Culex*, but of circular outline, not elliptical. Larvæ which were brought home lived for four months in the laboratory, perhaps delayed in development by the absence of their natural rich food.

Genus SABETHOIDES Theobald.

Sabethoides Theobald, Mon. Culic., iii, 328, 1903.

Sabethoides Blanchard, Les Moustiques, 423, 1905.

We are not acquainted with the larva of the typical species of this genus (*confusus* Theob.), but use the name on the supposition that *undosus* Coq. has been correctly referred generically.

Sabethoides undosus Coquillett. Fig. 66.

Sabethoides undosus Coquillett, Proc. ent. soc. Wash., vii, 186, 1906.

We have the larvæ from Mr. Ulrich in Trinidad, who got them in bamboo joints in St. Ann's Valley. Mr. Busck also collected them and observed that they were predaceous, as is obvious from the structure of the maxillæ.

Genus *Lesticocampa*, new.

Differs from all the other Sabethid larvæ by the remarkably developed mouth parts; the maxillary palpi are much like the antennæ in size and shape; the maxillæ are very large and project twice as far as the antennæ. Type, *L. lunata* Theob.

Lesticocampa lunata Theobald. Fig. 67.

Wyeomyia lunata Theobald, Mon. Culic., ii, 279, 1901.

Joblotia lunata Theobald, Mon. Culic., iii, 336, 1903.

Described from Brazil. Our larvæ are from Mr. Ulrich in Trinidad. He got them in Arima, in Bromelia water. They are probably

predaceous on the other larvæ living in the Bromelia leaves. The identification is by Mr. Coquillett; we have no means of checking it.

Genus WYEOMYIA Theobald.

Wyeomyia Theobald, Mon. Culic., ii, 267, 1901.

Limatus Theobald, Mon. Culic., ii, 349, 1901.

Simondellea Laveran, in Simond, C. rend. heb. Soc. Biol., liv, 1158, 1902.

Phoniomyia Theobald, Mon. Culic., iii, 311, 1903.

Dendromyia Theobald, Mon. Culic., iii, 313, 1903.

Table of species.

1. Anal processes two, the upper pair aborted.....2
Anal processes equally developed.....3
2. Tube and plate without basal infuscation.....*smithii*
Tube and plate with heavy black basal ring.....*asullepta*
3. Lateral comb of the eighth segment of six separate teeth.....*durhami*
Lateral comb of the eighth segment of many teeth in a long line..... 4
4. Comb a long row of single-teeth, nowhere doubled..... 5
Comb of teeth in a band, at least in part two rows deep..... 7
5. Tube with delicate scattered tufts, dark with pale tip.....*grayii*
Tube with coarse single hairs, all pale.....6
6. Air tube $3\frac{1}{2} \times 1$; spines of comb scales shorter than the base.....*ochrura*
Air tube 5×1 ; spines of comb scales longer than the base.....*telestica*
7. Tube with short spines resembling pecten.....8
Tube without false pecten.....9
8. Pecten of the air tube 3 spines preceded by a hair.....*ulocoma*
Pecten of the air tube without preceding hair.....*autocratica*
9. Tube strongly tapered outwardly; tube and plate without black ring.
longirostris
Tube straight, tapered only near tip; tube and plate with back basal ring.....*aporonoma*
10. Tube and plate with black basal ring; subventral tuft short....*aporonoma*
Tube and plate without black ring; subventral tuft long.....*hemisagnosta*

Wyeomyia smithii Coquillett. Fig. 68.

Culex pungens Smith, (not Wiedemann), in Howard, Mosq., 83-90, 1901.

—— — Smith, Ent. news, xii, 93, 125, 1901.

Aedes fuscus Smith, (not Osten-Sacken), Ent. news xii, 189, 220, 1901.

Aedes smithii Coquillett, Can. ent., xxxiii, 260, 1901.

Aedes smithii Smith, Ent. news, xii, 254, 1901.

Aedes smithii Dyar, Journ. N. Y. ent. soc., ix, 178, 1901.

Aedes smithii Smith, Journ. N. Y. ent. soc., x, 10, 1902.

Aedes smithii Dyar, Proc. ent. soc. Wash., v, 51, 1902.

Aedes smithii Johannsen, Bull. 68, N. Y. Sta. Mus., 426, 1903.

Verrallina ? *smithii* Theobald, Mon. Culic., iii, 295., 1903.

Aedes smithii Felt, Bull. 79. N. Y. Sta. Mus., 341, 1904.

Aedes smithii Blanchard, Les Moustiques, 403, 1905.

Wyeomyia smithii Dyar, Journ. N. Y. ent. soc., xiii, 23, 1905.

Wyeomyia smithii Smith, N. J. Agr. exper. sta. Rept. Mosq., 345, 1905.

Wyeomyia smithii Mitchell, Can. ent., xxxvii, 332, 1905.

The larvæ occur in the leaves of the pitcher plant, *Sarracenia purpurea*, wherever that grows. This is its only place of occurrence; the record from Bromelia leaves in Florida, made by Mr. Coquillett, is obviously erroneous. That is some other species which we hope will be collected again.

***Wyeomyia asullepta* Theobald. Fig. 69.**

Dendromyia asullepta Theobald, Mon., Colic., iii, 315, 1901.

Dendromyia asullepta Blanchard, Les Moustiques, 426, 1905.

Described from Guiana. We have the larvæ from Mr. Urich in Trinidad. The determination seems plausible and we have not rejected it.

***Wyeomyia durhami* Theobald. Fig. 70.**

Limatus durhamii Theobald Mon. Culic., ii, 350, 1901.

Simondella curvirostris Laveran, in Simond, C. R. heb. Soc Biol., liv, 1158, 1902.

Aedeomyia curvirostris Neveau-Lemaire, Mem. soc. zool. France, xv, 223, 1902.

Limatus durhami Blanchard, Les Moustiques, 429, 1905.

Limatus durhami Goeldi, Os Mosq. no Para, 122, 1905.

Prof. Goeldi found the larvæ in water in the forest, rich in detritus of leaves and flowers. Mr. Busck got them in Trinidad in a hollow tree, in a broken cacao shell with *Joblotia*, in a thick rotten fluid, and in a broken rotten Calabash-fruit in the forest far from civilization. Mr. Urich also sent us the species from Trinidad. The junior author collected them at Sonsonate and Izalco, Salvador; Puntarenas, Esparta and Port Limon, Costa Rica. They were in cacao husks. The species is evidently widely spread in the moist tropics.

***Wyeomnia grayii* Theobald. Fig. 71.**

Wyeomyia grayii Theobald, Mon. Culic., ii, 235, 1901.

Wyeomyia perturbans Blanchard, Les Moustiques, 424, 1905.

Described from Jamaica. Our larvæ were taken by Mr. Busck in Trinidad, Tobago Island and San Domingo, in a hollow tree, bamboo stalk and Bromelia leaves. Prof. Blanchard refers the name as a synonym of *Aedes perturbans* Williston; but Mr. Coquillett has made

an entirely different identification of *perturbans*. We accept the name *grayii* for our larva tentatively (see remarks under the following species).

***Wyeomyia ochrura*, new species.** Fig. 72.

The air tube is pale, with concolorous tip, with coarse single hairs. Pecten teeth of the comb of the eighth segment simple. Subventral tuft of the anal segment, large and stellate; lateral hair single. Abdominal hairs tufted. Mr. Busck collected the larva at San Domingo, in the leaf stalks of young palms; it was named "*Dendromyia* sp." by Mr. Coquillett. We have it also from Mr. Ulrich in Trinidad, named "*Phoniomyia longirostris* Theob." and from Surgeon W. Campbell in Dominica named "*Wyeomyia grayii* Theob." What it would have been named the next time it occurred, we do not know, as we propose to fix it now by a name of its own.

***Wyeomyia ulocoma* Theobald.** Fig. 73.

Dendromyia ulocoma Theobald, Mon. Culic., iii, 313, 1903.

Dendromyia ulocoma Blanchard, Les Moustiques, 426, 1905.

Described from Guiana. We have it from Mr. Busck's collecting in Trinidad and San Domingo. The larvæ occurred in the flower sheaths of wild *Canna*, where there is very little water and that of a slimy nature. There is but a narrow space between the sheath and bud for the larvæ to live in. The eggs are laid singly, but in large numbers in the uppermost, just opening flower. They are elliptical and black. We have nothing to urge against the determination, nor in its favor either. The species is evidently a very specialized one.

***Wyeomyia longirostris* Theobald.** Fig. 74.

Wyeomyia longirostris Theobald, Mon. Culic., ii, 275, 1901.

Wyeomyia trinidadensis Theobald, Mon. Culic., ii, 277, 1901.

Phoniomyia longirostris Theobald, Mon. Culic., ii, 311, 1903.

Phoniomyia longirostris Blanchard, Les Moustiques, 425, 1905.

Described from Brazil and recorded from Trinidad. Mr. Busck got the larva in Tobago Island in the base of a leaf of Bromelia. Mr. Ulrich has sent it to us from Trinidad. The air tube is stout, strongly tapered outwardly, pale with single stout feathered hairs. The anal segment has the subventral tuft short and stellate, the lateral

tuft two-haired. Pecten of the eighth segment of very long fringed teeth. The identification seems plausible and we have therefore accepted it.

Wyeomyia aporonoma, new species. Fig. 75.

The air tube is pale, straight, tapered only near tip, with scattered single hairs. Lateral comb of the eighth segment of scales in a broad band, beginning above in single teeth, then a double row below, the teeth smaller. Anal segment with the subventral tuft small and stellate. Anal plate and tube with a black basal border. Body hairs fine, stellate.

The junior author got the larvæ at Sonsonate and San Salvador, Salvador; Santa Lucrecia, Mexico; Port Limon, Costa Rica. They were in cocoanut shells, a hollow in a stump of a banana tree and cacao shells. The species was named "*Dendromyia? quasiluteoventralis* Theob." but we have been averse to adopting a name so doubtful.

Wyeomyia telestica, new species. Fig. 76.

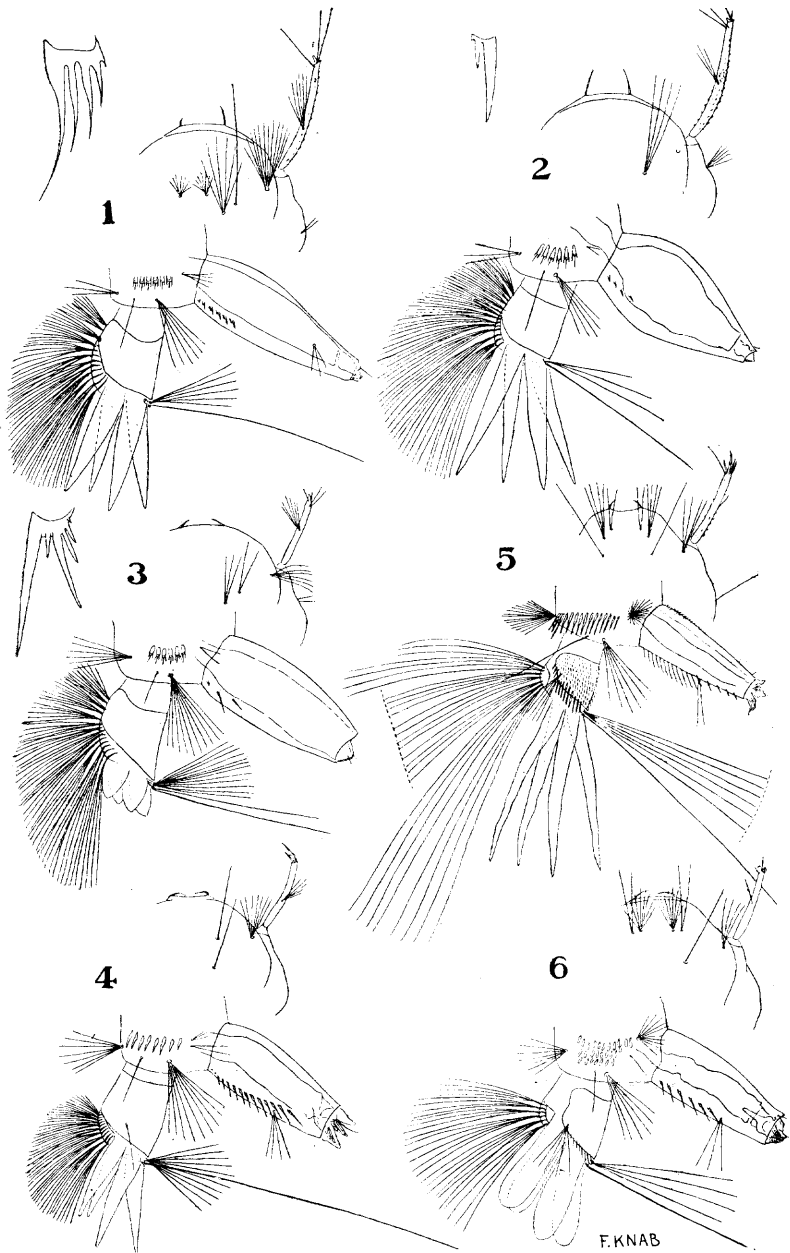
The larva is allied to *W. ochrura* D. & K., described above. It was sent to us by Mr. Urich from Trinidad, bred from Bromelia water. The adults were named "*Dendromyia quasiluteoventralis* Theob." by Mr. Coquillett.

Wyeomyia autocratica, new species. Fig. 77.

This species is allied to *W. longirostris* Theob., but differs markedly in the structure of the tube and comb. The tube bears a false pecten as in *W. ulocoma* Theob. but otherwise these larvæ are not much alike. The specimen was received from Mr. Urich in Trinidad, bred from Bromelia water with the preceding. Mr. Coquillett did not find the adult different from the foregoing species.

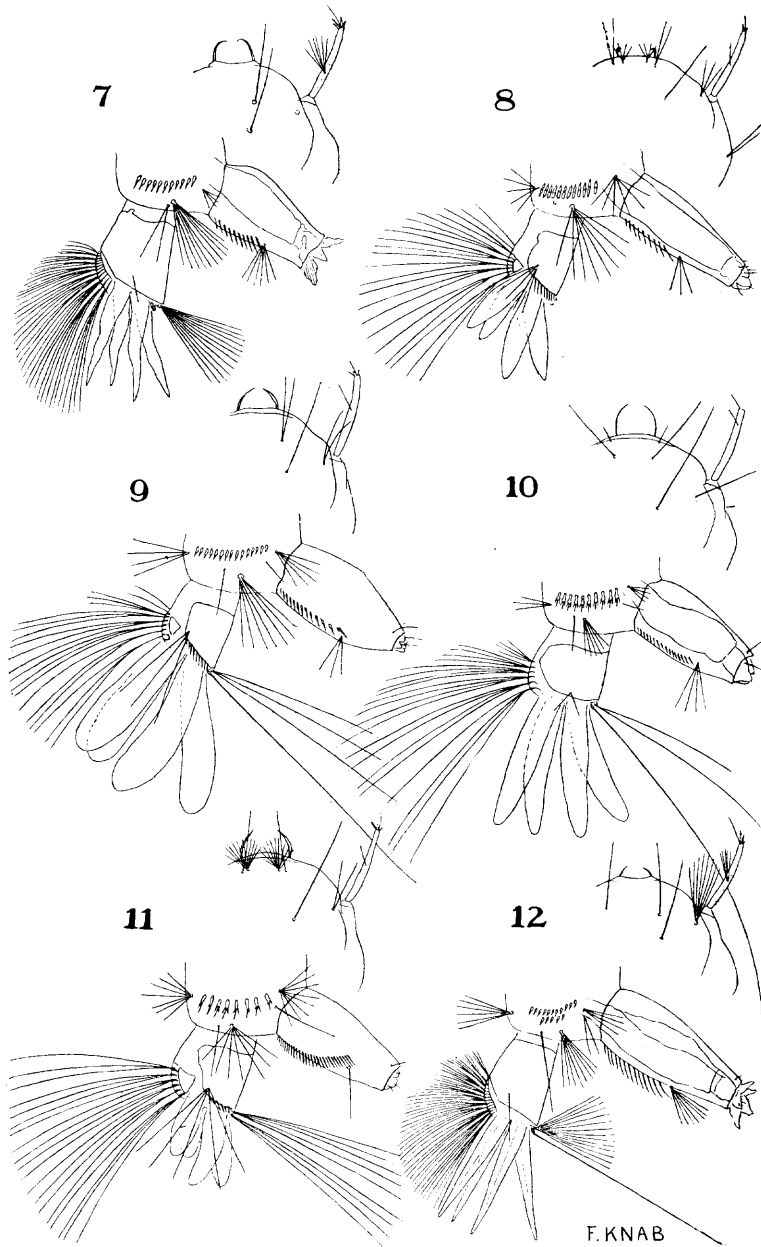
Wyeomyia hemisagnosta, new species. Fig. 78.

Allied to *W. aporonoma* D. & K., but entirely without the broad black margin of the anal plate; the subdorsal abdominal hairs are long in twos and threes, while they are short, stellate tufts in *aporonoma*. They were collected by the junior author at Sonsonate, Salvador, in cacao shells, associated with *Aedes cyaneus* and *W. durhami* and at Port Limon, Costa Rica.



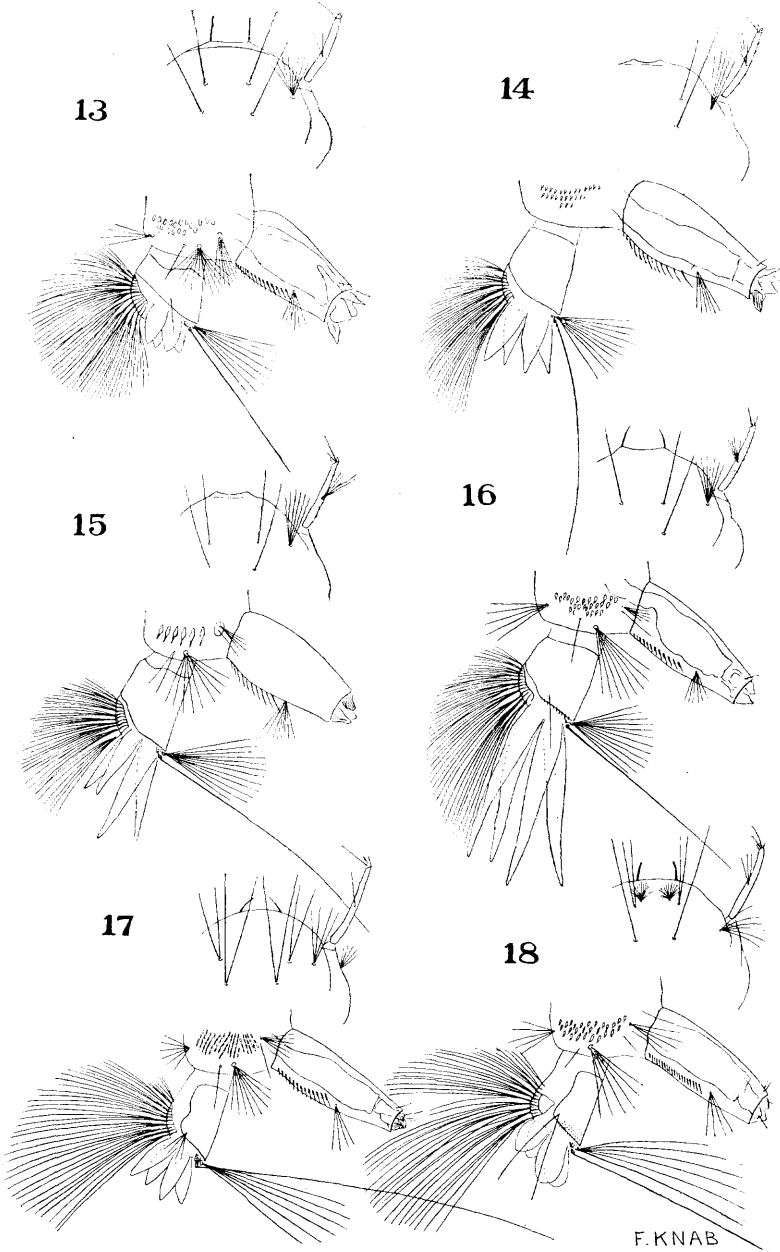
1. *Janthinosoma infine* D. & K.
3. *J. pygmaea* Theo.
4. *Aedes tormentor* D. & K.

2. *J. scholasticus* Theo.
5. *A. walkeri* Theo.
6. *A. busckii* Coq.



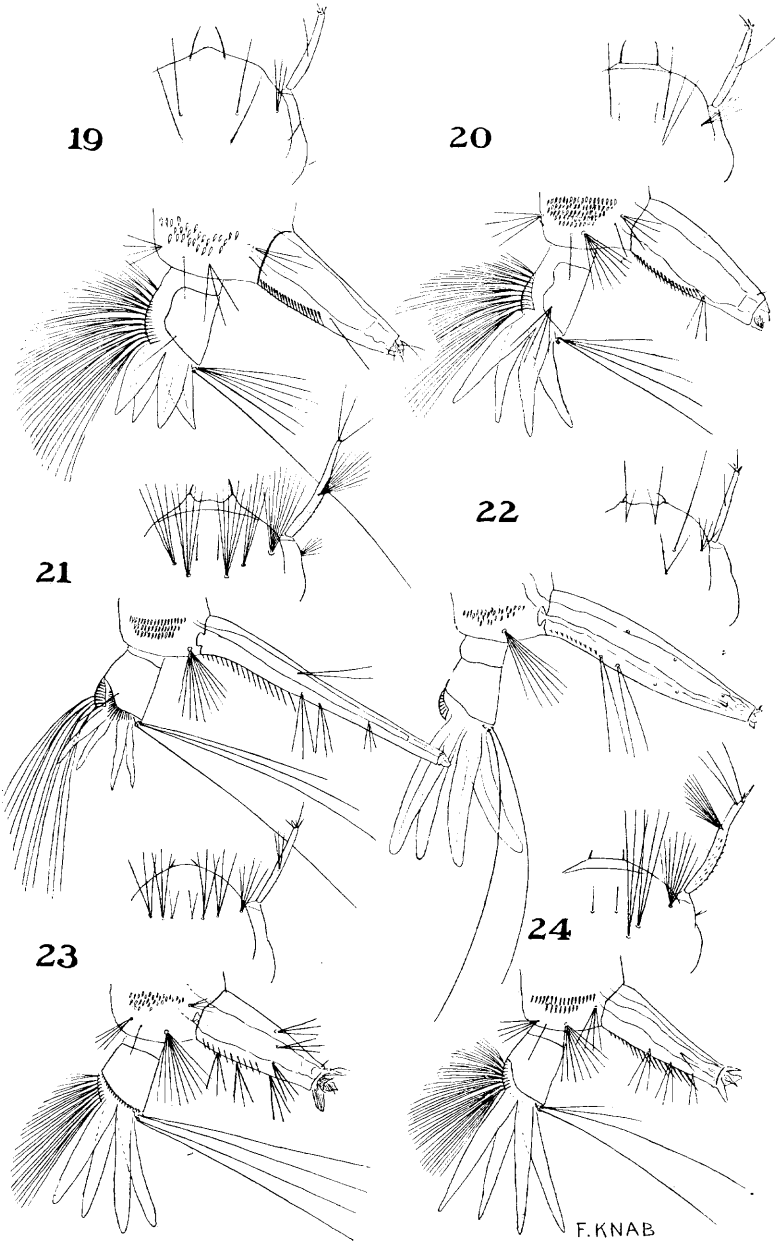
7. *Aedes meridionalis* D. & K.
9. *A. albonotata* Coq.
11. *A. mediovitata* Coq.

8. *A. philosophicus* D. & K.
10. *A. calopus* Meig.
12. *A. infirmatus* D. & K.



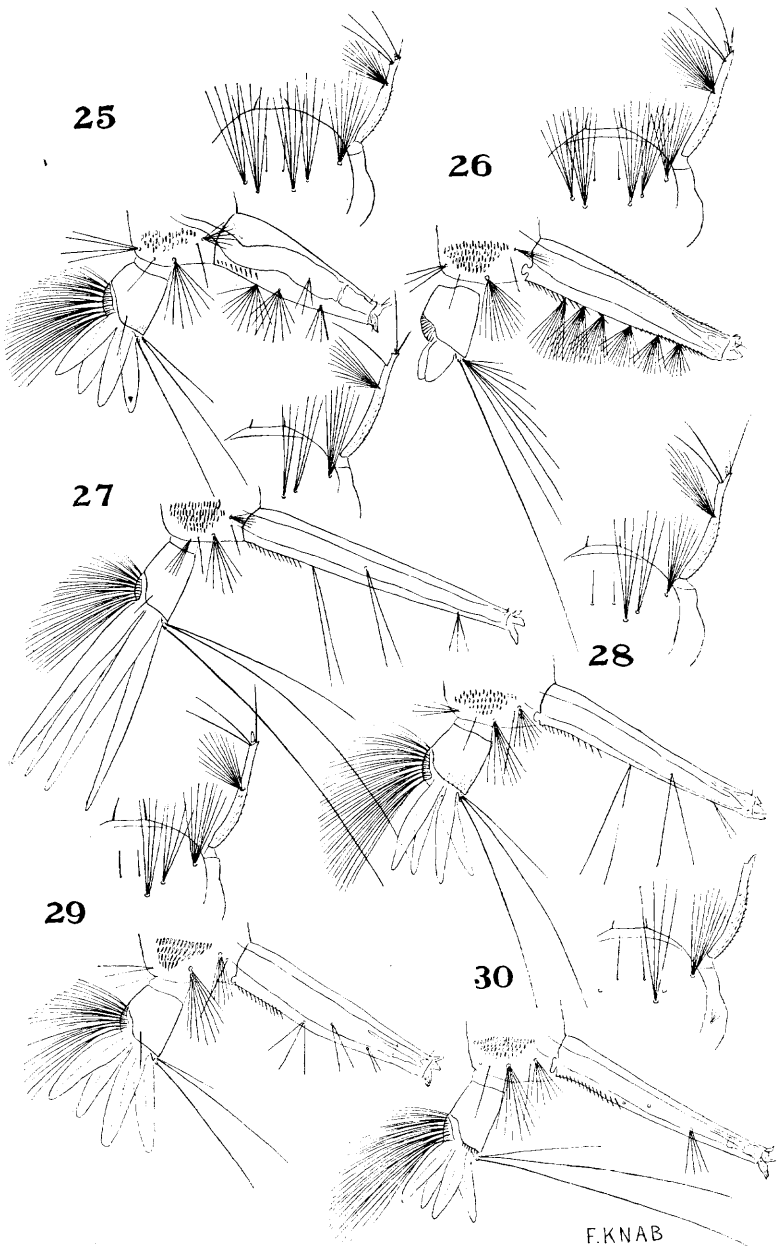
13. *Aedes damnosus* Say.
15. *A. atlanticus* D. & K.
17. *A. laternaria* Coq.

14. *A. habanicus* D. & K.
16. *A. cuplocamus* D. & K.
18. *A. cyaneus* Fab.



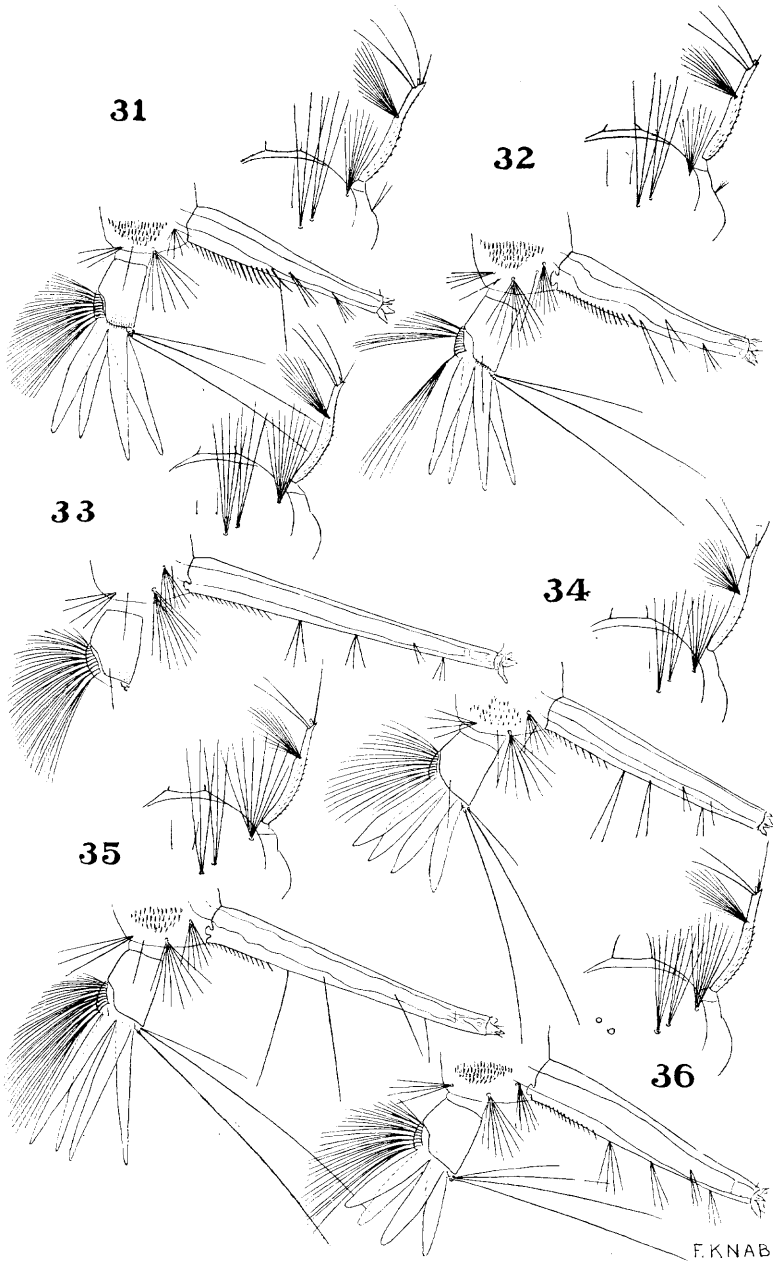
19. *Aedes knabi* Coq.
21. *Culex bisulcatus* Coq.
23. *C. lactator* D. & K.

20. *A. insolita* Coq.
22. *C. pleuristriatus* Theo.
24. *C. interrogator* D. & K.



25. *Culex barbarus* D. & K.
27. *C. mortificator* D. & K.
29. *C. extricator* D. & K.

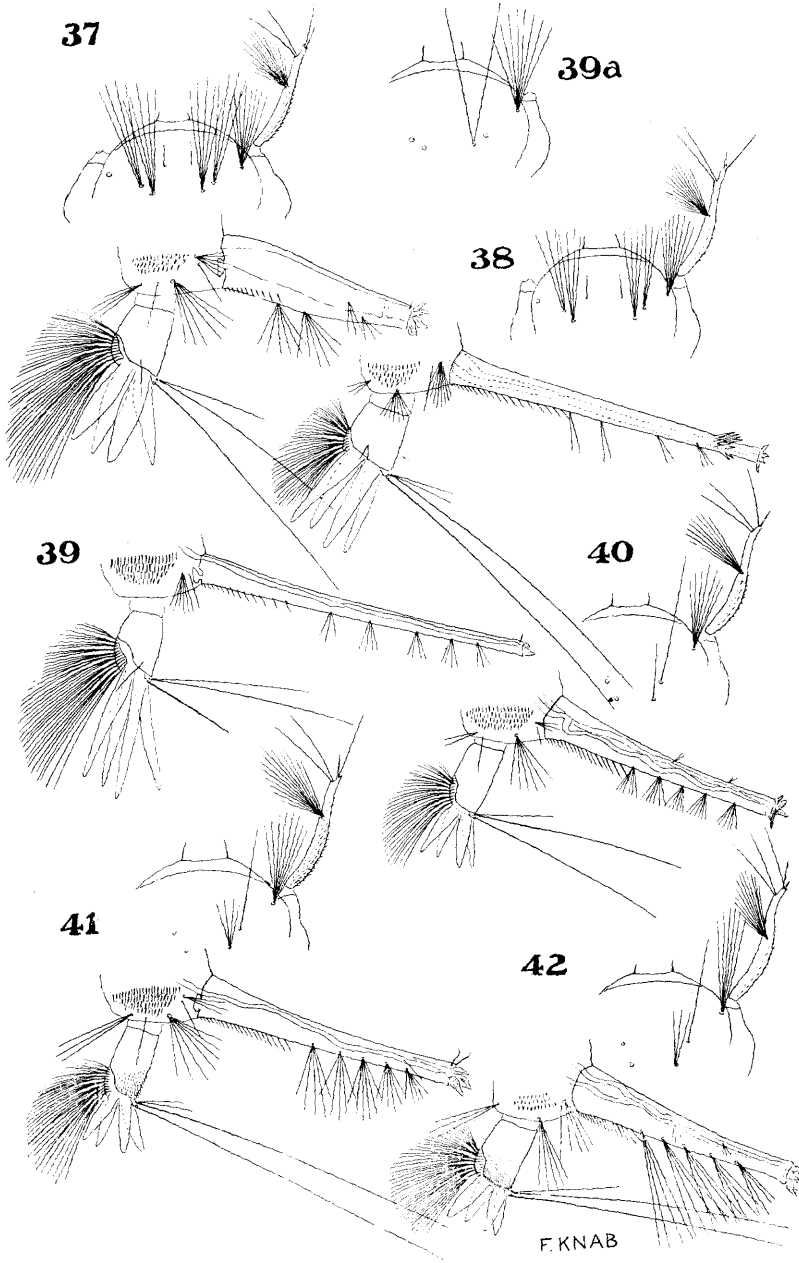
26. *C. bahamensis* D. & K.
28. *C. carmodyæ* D. & K.
30. *C. declarator* D. & K.



F. KNAB

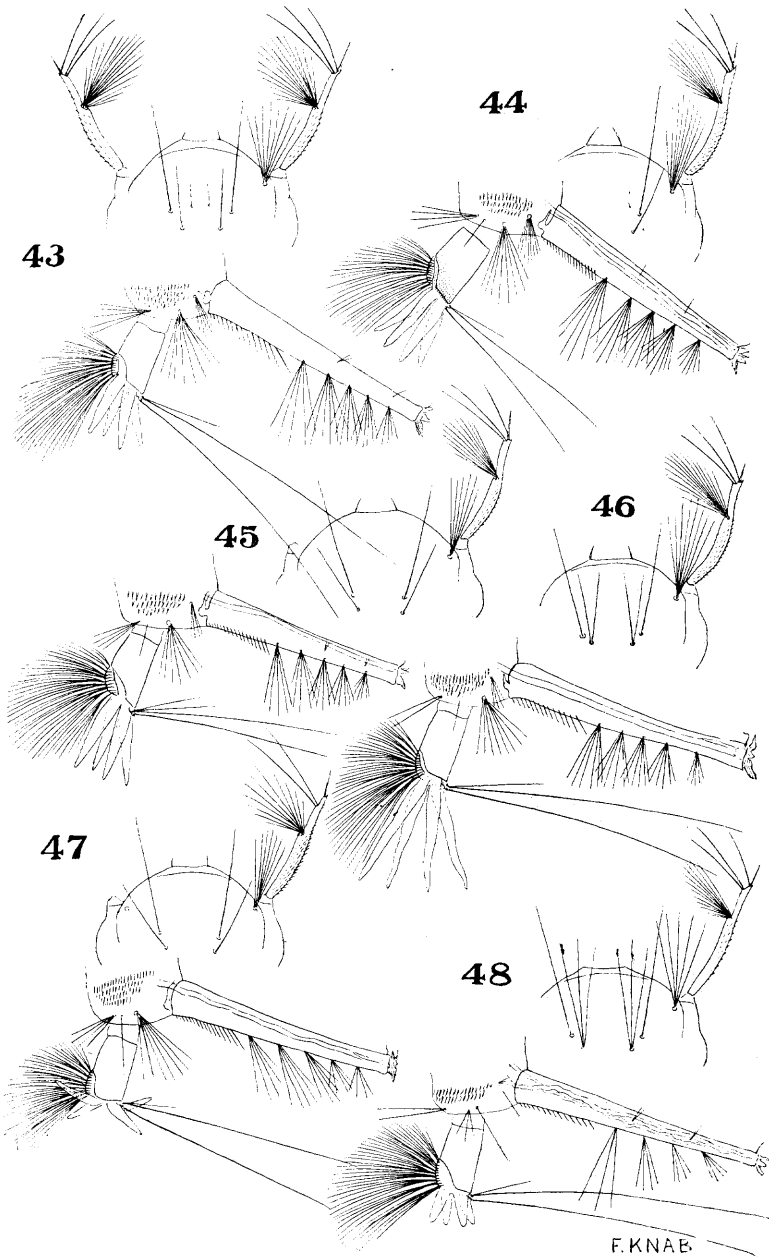
- 31. *Culex proclinator* D. & K.
- 33. *C. habilitator* D. & K.
- 35. *C. regulator* D. & K.

- 32. *C. inquisitor* D. & K.
- 34. *C. factor* D. & K.
- 36. *C. pipiens* Linn.



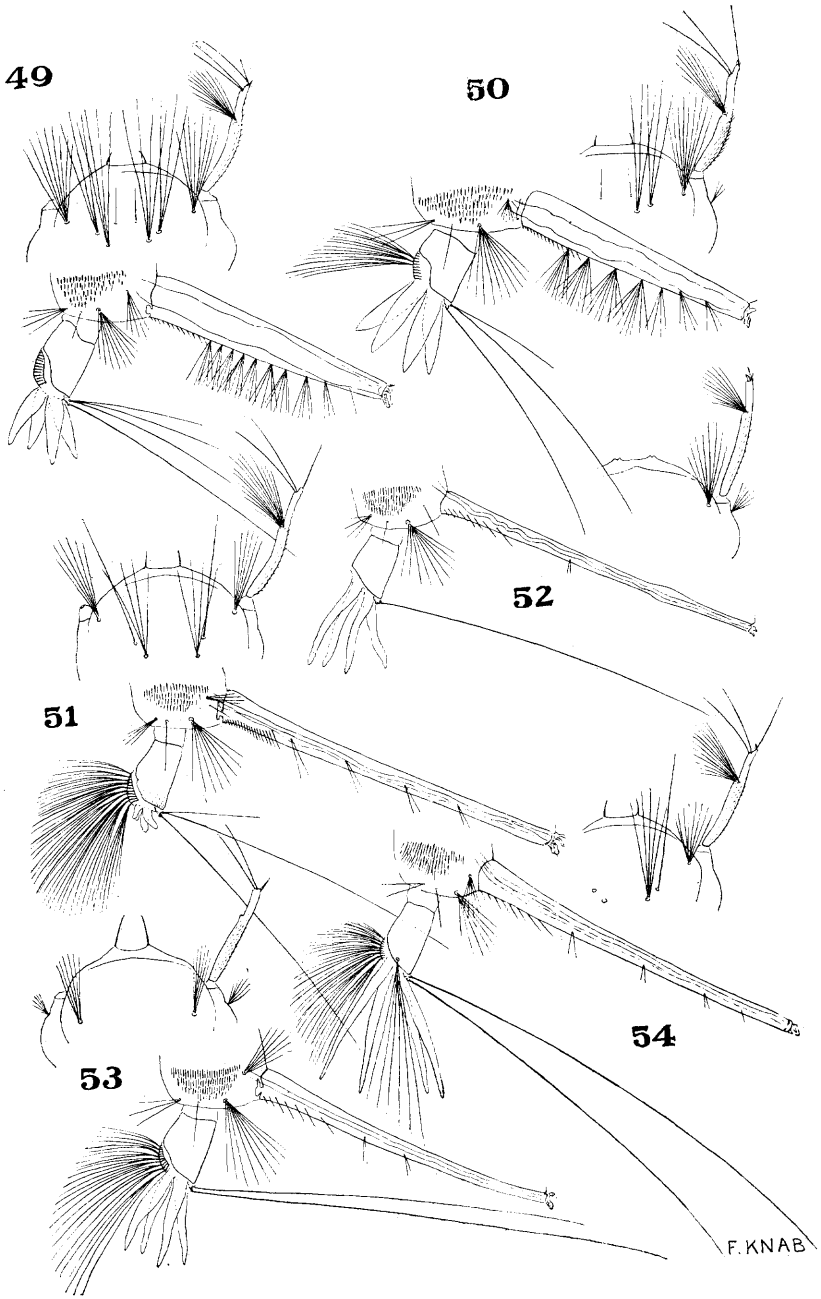
37. *Culex cubensis* Big.
39. *C. derivator* D. & K.
41. *C. inhibitor* D. & K.

38. *C. coronator* D. & K.
40. *C. investigator* D. & K.
42. *C. mutator* D. & K.



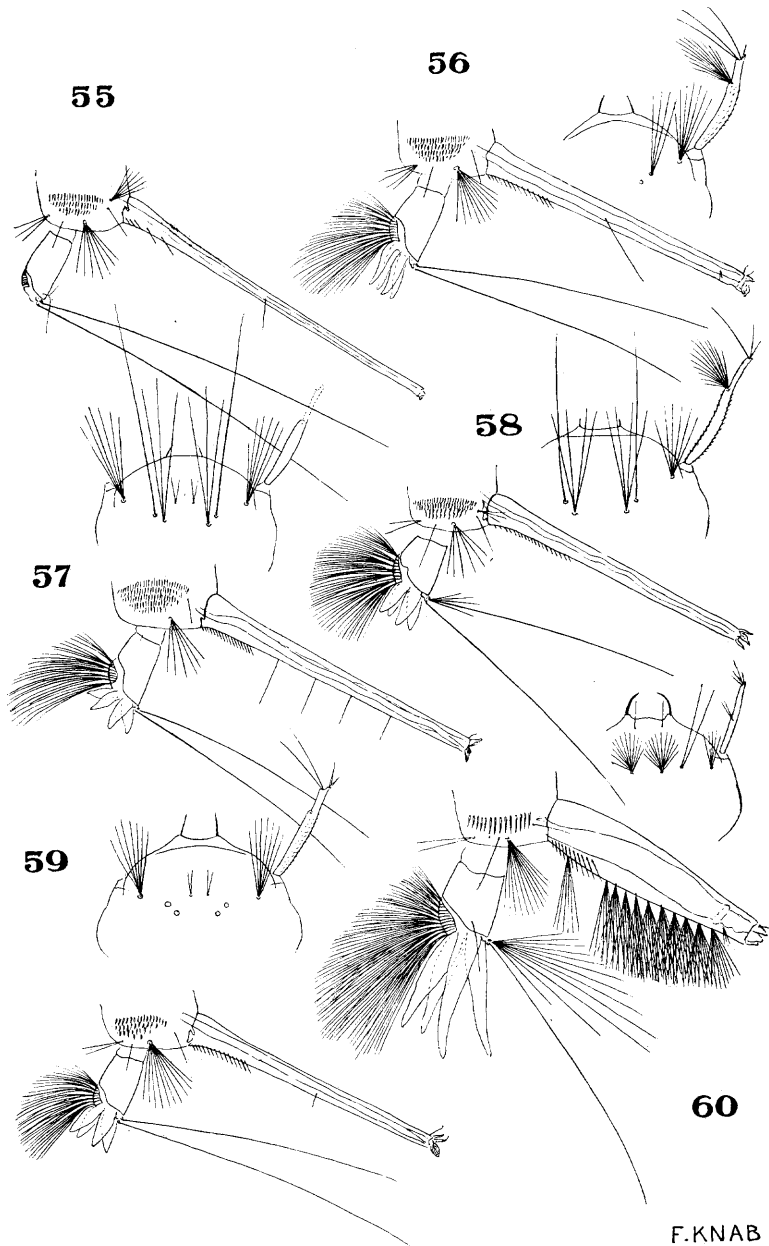
43. *Culex elevator* D. & K.
45. *C. conspirator* D. & K.
47. *C. gravitator* D. & K.

44. *C. educator* D. & K.
46. *C. simulator* D. & K.
48. *C. decorator* D. & K.



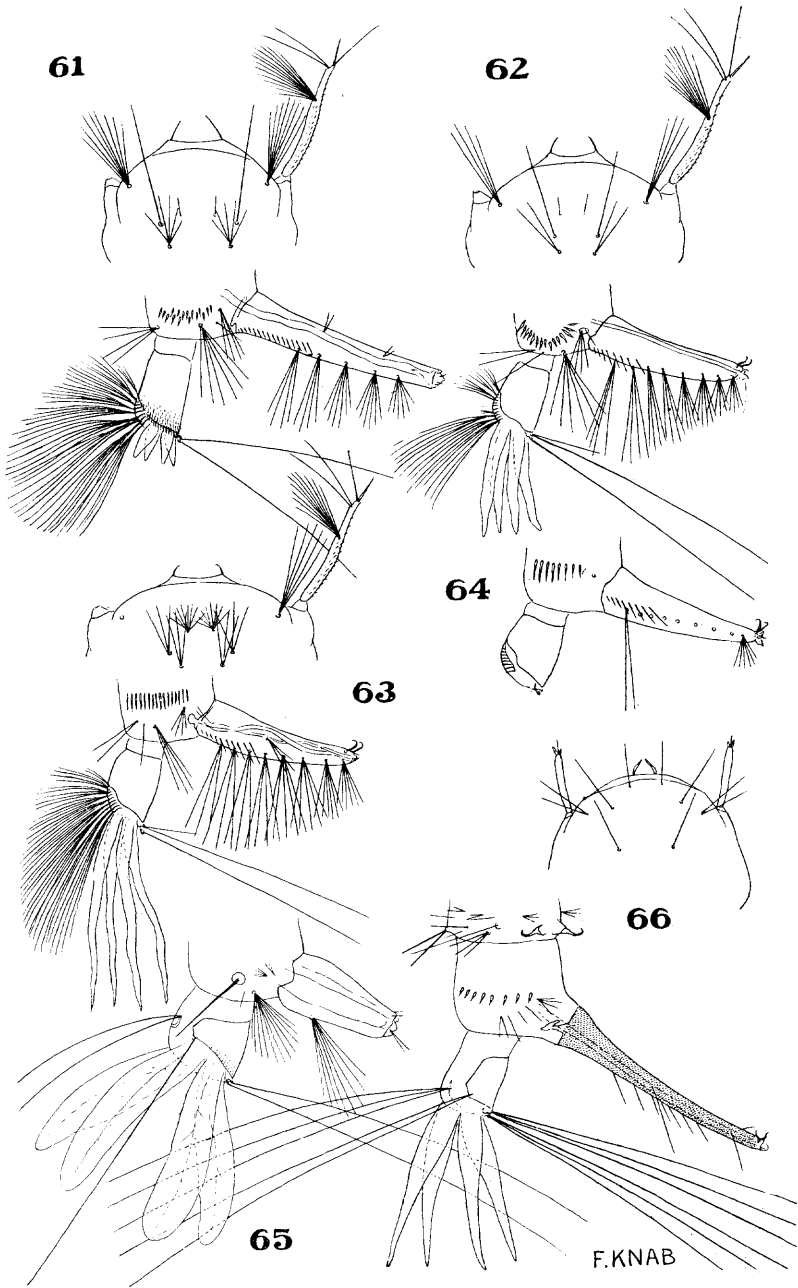
49. *Culex secutor* Theo.
51. *C. carcinophilus* D. & K.
53. *C. vector* D. & K.

50. *C. lamentator* D. & K.
52. *C. daumasturus* D. & K.
54. *C. rejector* D. & K.



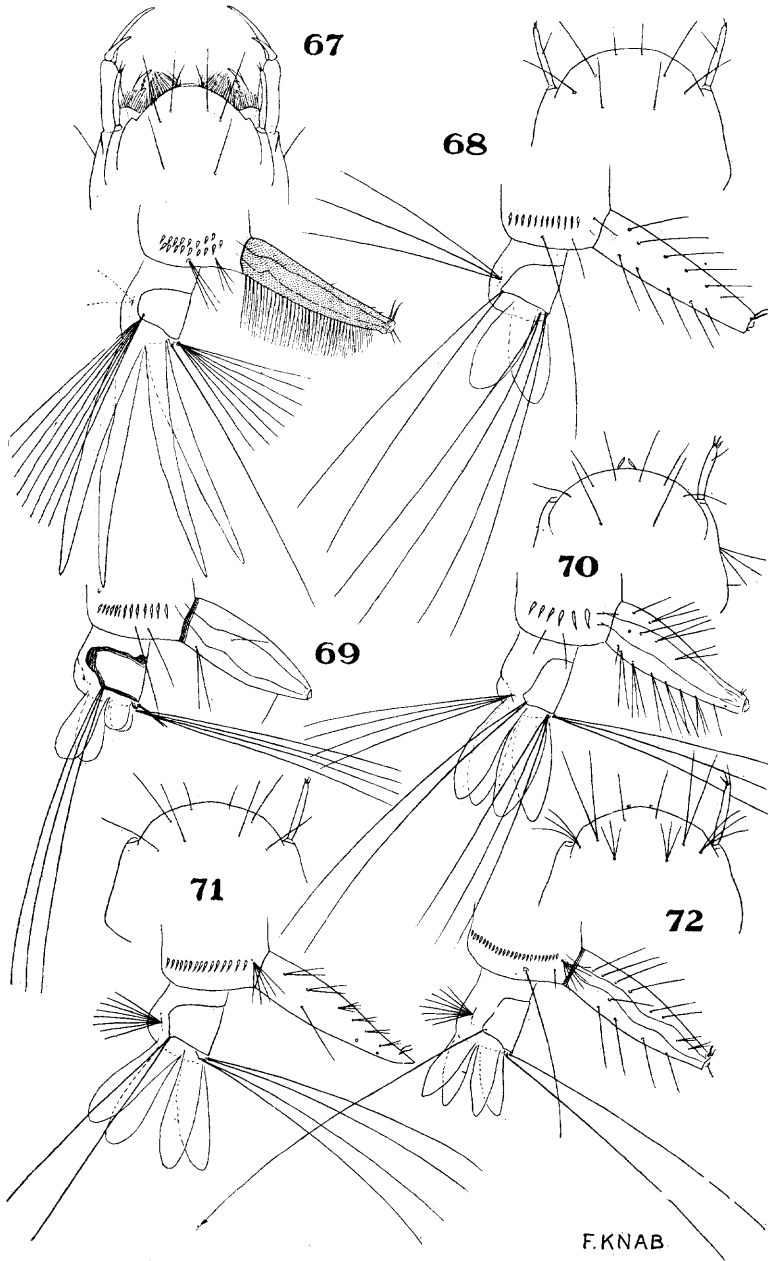
55. *Culex inimitabilis* D. & K.
57. *C. restrictor* D. & K.
59. *C. divisor* D. & K.

56. *C. conservator* D. & K.
58. *C. latisquamma* Coq.
60. *Mochlostyrax urichii* Coq.



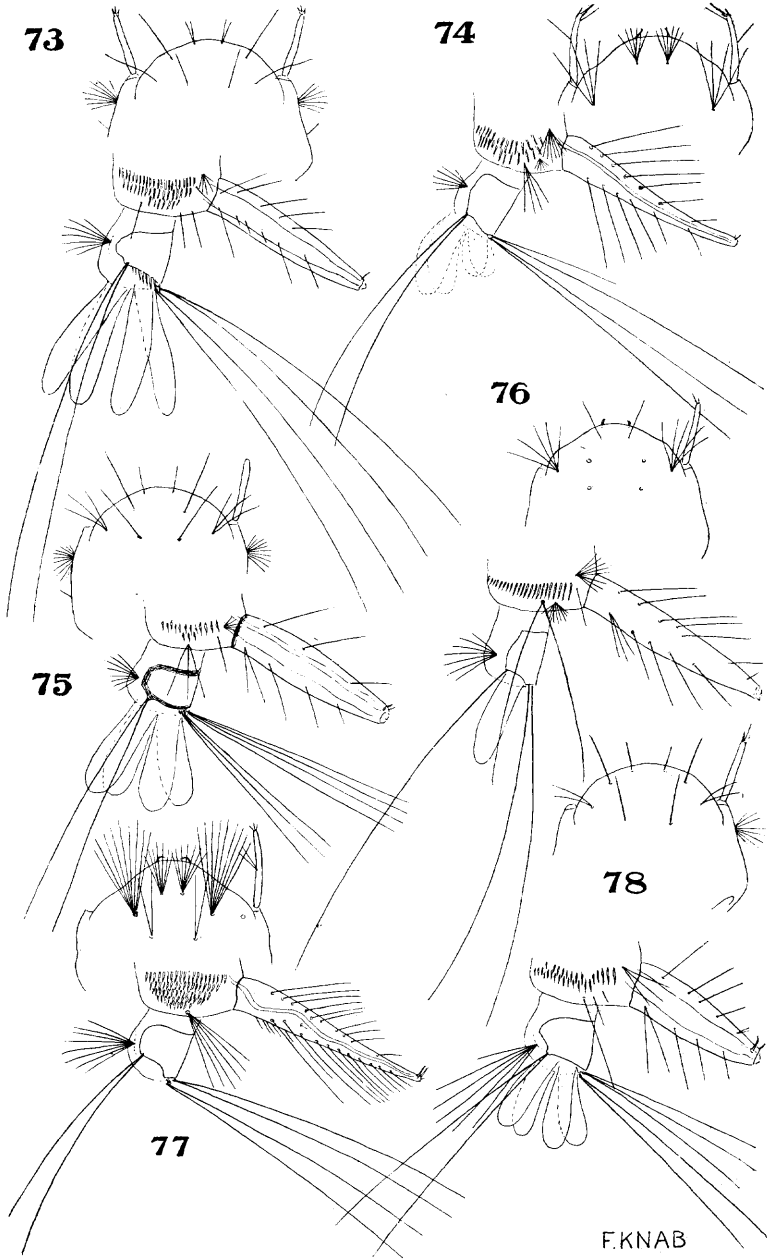
61. *Mochlostyrax erraticus* D. & K.
63. *M. caudelli* D. & K.
65. *Joblotia nizeipes* Theob

62. *M. pilosus* D. & K.
64. *M. cubensis* D. & K.
66. *Sabethoides undosus* Coq.



67. *Lesticocampa lunata* Theo.
69. *W. asullepta* Theo.
71. *W. grayii* Theo.

68. *Wyeomyia smithii* Coq.
70. *W. durhami* Theo.
72. *W. ochrura* D. & K.



73. *Wyeomyia ulocoma* Theo.
75. *W. aporonoma* D. & K.
77. *W. autocratica* D. & K.

74. *W. longirostris* Theo.
76. *W. telestica* D. & K.
78. *W. hemisagnosta* D. & K.