

PROCEEDINGS OF THE
ENTOMOLOGICAL SOCIETY OF WASHINGTON

VOL. 50

MAY, 1948

No. 5

A NEW SUBGENUS AND TWO NEW SPECIES OF THE
GENUS *CULEX* L.

(DIPTERA, CULICIDAE)

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When the writers¹ described *Culex bicki* they mentioned the uncertain taxonomic position of this species and its relative *Culex binigrolineatus* Knight and Rozeboom,² and suggested that a new subgenus was probably needed for these two species from New Guinea and for two from the Solomon Islands not yet described. It is the purpose of the present paper to describe this new subgenus and the two new species, and to present keys for separating the four included species.

We are indebted to the collectors for making these specimens available to us and particularly to Dr. John N. Belkin, who first recognized the Solomon Islands species as being new and unusual.

ACALLYNTRUM, new subgenus

ADULT CHARACTERS.—Rather small species. Vertex with a large central area of narrow, curved, pale scales; broad, flat, white scales laterally, but not bordering the eye margin above the lower edge of central patch of narrow scales. Antenna of male unmodified. Palpus of female not more than one-fourth length of proboscis. Third segment of male palpus with a ventral row of several to many long thin hairs; the last two segments bristly. Proboscis of male with some long hairs from ventral surface. Scales of scutellum narrow. One lower mesepimeral bristle; pleuron without scale patches. Wing scales narrow, dark. Hind femora almost completely white; all tarsi dark. Pale markings of abdomen, if present, basal on the segments. Male genitalia: Basistyle without scales but with a number of long hairs; subapical lobe with two large spines or filaments and several smaller filaments or setae, but no leaf; dististyle simple, tapering apically, with a small hair on inner surface; terminal spine short, broad; mesosome rather simple, composed of one pair of dentate plates joined by a ventral bridge; tenth sternite with a large tooth or a number of serrations on inner margin and with a reduced apical tuft.

¹Washington Acad. Sci., Jour 37(3):89-91, 1947.

²Ent. Soc. Washington Proc. 47(9):289, 1945.

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LARVAL CHARACTERS.—Head hair A multiple; B and C triple to multiple. Antenna with tuft large, near middle, the part beyond not much smaller. Siphon of moderate length; three pairs of prominent siphonal tufts, all beyond the pecten; sclerotization of anal segment not forming a complete ring, the hind margin with short spines; ventral hairs of anal segment reduced to a single pair of simple or trifid hairs with no barred area at base.

Type of subgenus: *Culex (Acallyntrum) perkinsi*, new species.

This subgenus appears to lie between *Neoculex* and *Culiciomyia*. The subgenus *Neoculex* lacks the row of thin setae projecting down from the third segment of the male palpus, the pale markings of the abdomen, if present, are usually apical on the segments, the subapical lobe of the basistyle of the male usually has a leaf, and the larva has a well developed ventral brush on the anal segment. The subgenus *Culiciomyia* differs in having a row of long translucent scales on the ventral surface of the third segment of the male palpus which are always distinctly modified and expanded beyond simple hairs. Also, the dististyle of the male genitalia is usually expanded and crested before the tip and the larva has a well developed ventral brush. The most striking character of the subgenus *Acallyntrum* is the great reduction of the ventral hairs of the anal segment of the larva, but the adult characters also show considerable homogeneity, the close relationship of the species being readily seen.

An examination of the four keys presented at the end of this paper will show that in each, the species from New Guinea are separated from those of the Solomon Islands in the first couplet. This appears to indicate that we have two distinct species groups within the subgenus.

***Culex (Acallyntrum) perkinsi*, new species**

(Figs. 1, 3, 5, 7, 8, 11)

FEMALE.—Rather small, the wing length 3 mm.

Head: Proboscis dark, about as long as fore tibia. Palpus dark, about one-sixth length of proboscis. Clypeus bare. Antenna considerably longer than proboscis; torus with a few scales and minute setae medially, yellowish brown, darkest dorso-medially; flagellar segments dark with pale pubescence and dark verticils. Vertex with a large central area of narrow pale scales and abundant, upright, brown, forked scales; a patch of broad, flat, white scales laterally extending only very slightly upward along eye margin.

Thorax: Prothoracic lobes bare, with several long dark bristles. Posterior pronotum bare with several long dark bristles near posterior border. Mesoscutum dark brown, the narrow scales a lighter brown: a pair of narrow submedian lines anteriorly, the prescutellar area, and a pair of sublateral lines posteriorly, bare. Several rows of long dark bristles on

mesoscutum and a number of similar bristles above and in front of wing base. Scutellum bare of scales except for a small patch of narrow brown ones on median lobe; scutellar bristles long, dark brown. Postnotum brown. Pleuron mostly greenish, the postspiracular area darker, brown; a row of pale bristles along posterior border of mesopleuron; one lower and several upper mesepimeral bristles. Knob of halter with brown scales.

Wings: Scales all dark. First fork cell about twice length of its stem, its base slightly proximad of that of second fork cell; anterior and posterior crossveins well separated.

Legs: Coxae and trochanters pale greenish; fore femur with anterior surface dark brown except for a narrow ventral stripe of pale scales; posterior surface pale-scaled ventrally, dark-scaled dorsally, the line of demarcation not sharply defined; fore tibia dark dorsally, pale ventrally; mid legs colored almost the same as fore legs; hind femora entirely creamy white, with at most a few dark scales in a median stripe on hind surface near apex; hind tibia dark brown, sometimes with some light scales in a line; all tarsi dark brown.

Abdomen: First tergite bare except for a median patch of dark scales and pale bristles; rest of tergites dark-scaled with small, basolateral pale spots on tergites IV or V to VII; venter yellowish green, the distal segments with broad pale scales.

MALE.—Color, scales, and setae essentially as in female. Proboscis with scattered, rather long hairs from ventral surface of apical half. Palpus extending beyond end of proboscis by a little more than length of terminal segment; third palpal segment with an even row of hairs on apical half or more, the hairs curving downward and forward so that their tips touch and form an unbroken line; fourth and fifth palpal segments upturned with abundant, long dark hairs. Antenna about as long as proboscis. White basolateral patch of seventh tergite larger than on other segments. Genital segments yellowish with long yellow hair. *Genitalia* (Figs. 1, 3, 5): Basistyle conical, narrowed apically, without scales, but with 10-12 stout hairs and a number of finer ones; two of the stout hairs on the dorsal (convex) surface near the apex and longer than the dististyle; subapical lobe rather large, with two groups of filaments; outer group of four of equal length, the tips pointed, broadened, and turned toward dististyle; inner group consisting of a slender, straight, sharply pointed filament and two longer, stout, flattened filaments with their tips curved toward base of basistyle; the straight filament is about as long as those of the outer group, the more distal stout filament is much longer, and the more basal stout filament is intermediate in length. Dististyle curved, tapering abruptly beyond the middle, with one or two fine setae just beyond middle; terminal spine short and broad. Lateral plate of mesosome columnar, the apical third abruptly narrowed to form a curved prong bearing a stout subapical tooth and a series of irregular teeth near the base of the prong more or less surrounding a swollen, pilose area; near base of column a very sharp late-

ral tooth. Inner edge of tenth sternite with a single large tooth, and its apex with an irregular tuft of spines; basal arm short, stout. Ninth tergite simple, without lobes, clothed with long curved hairs except medially.

LARVA.—*Head* (Fig. 8): About three-fourths as long as wide, lightly pigmented. Antenna about half as long as the length of the head, with small spinules near the base. Antennal tuft consisting of 7 to 9 plumose hairs, not reaching the apex of the shaft, and situated just proximal to the midpoint. Anteantennal tuft (A) plumose, 9- to 11-branched, usually 11; upper head hair (B) plumose, 7- to 11-branched, usually 8; lower head hair (C) plumose 6- to 9-branched, usually 8; posterior clypeal tuft (D) short, 4- to 5-branched, usually 4; inner occipital hair (E) 2-branched; outer occipital hair (F) 4-branched; orbital hair (G) single.

Abdomen (Fig. 7): Stellate hairs on segments II to VIII 4- to 9-branched, length of hairs almost equalling that of the segment. Comb of segment VIII in a triangular patch of about 2 or 3 rows, consisting of 14 to 20 teeth, usually about 16: each tooth consisting of a central spine fringed apically by a few short hairs. Pentad hairs of VIII: 1 usually double, range from 2- to 4-branched; 2 and 4 always single; 3 plumose, 6- to 9-branched, usually 9; 5 plumose, 3- to 4-branched, usually 4. Siphon: Index ranging from 2.8 to 3.7, average in 10 specimens 3.3; pecten averaging 3 teeth with a range of 2 to 5, usually situated close to the base of the siphon, each tooth a simple, acute, flat spine; 3 pairs of siphonal tufts, plumose, usually 5-branched. Anal segment with dorsal plate almost encircling the segment and with a number of well-developed short spinules on its posterior dorsal border; ventral brush consisting of a pair of 3- to 4-branched, short, plumose hairs; lateral hair of dorsal plate 2-branched, plumose; dorsal brush with inner hair consisting of a tuft of 2 to 4 long hairs, the outer hair single, longer than inner hairs, and about eight times as long as dorsal plate. Anal gills subequal in length, the dorsal pair about four times the length of dorsal plate, each with a definite constriction about 0.37 from its base.

PUPA.—*Cephalothorax*: Lightly pigmented and without any darker markings except on the metathorax which is darker medially and at the posterior tips of the lateral triangular plates. Trumpets darkly pigmented in the tracheoid portion only, long and narrow, the pinna not as long as in *belkini*, being not quite one-fourth of length of trumpet. All setae except those of the metathorax the same as in *belkini*. Posterothoracic setae of metathorax as follows: 10 a multibranched, fine-haired tuft; 11 large, stout, simple and plumose; 12 3- to 4-branched; all setae subequal in length.

Abdomen (Fig. 11):³ Segments I to III conspicuously more darkly

³For reasons which will be fully explained in a forthcoming publication on the pupae of New Guinea mosquitoes by the junior author, the designation of the setae of abdominal segment II given in the figure of *C. bicki* by Stone and Penn (1947, Jour. Wash. Acad. Sci. 37:90, fig. 7) has been revised for the subgenus as presented herein.

pigmented than the others. All setae on dorsal side non-plumose except A-VII and A-VIII. Seta K of segment I single, well-developed; seta S single, equal in length to T which is single or 2-branched. Seta A a small simple spine on segments II through VI; 3-branched, plumose and well developed on VII; 8-branched, plumose and prominently developed on VIII. Seta B a well developed, 2-branched hair twice the length of the segment on IV, V and VI; well developed, but only half as long and single on II and III; inconspicuous on VII. Seta C a small 4- to multi-branched tuft on II; medium sized, 4- to 7-branched tuft on III, IV and V; 2-branched on VI and VII. Seta C' laterad of B on II, mesad of C on III through VII; a small simple seta on all segments. Seta 1 a well developed, forked hair on II, a simple hair on III through VI; inconspicuous on VII. Seta 2 equal to B on segment II; a small simple or variously branched hair on III through VII. Seta 3 a small simple hair on II, represented by its socket only on III to V, absent on the other segments. Seta 5 a small simple hair on all segments. Seta A' on VIII a forked, simple hair. Paddle with an inconspicuous fringe of hairs on its lateral margins and notched at the apex; midrib not as strong as in *belkini*, but almost reaches the apex; width of paddle equal to about two-thirds the length, the medial portion definitely wider than the lateral portion; paddle-hair small, simple.

Holotype.—Male, U. S. National Museum No. 58628 Belkin No. 670-19 (see following data).

Type locality.—Umasini River, Guadalcanal, Solomon Islands.

Material examined (Holotype and paratypes).—1 larval skin and 1 pupal skin, associated from tree hole, Tenaru Area, Guadalcanal, XII.3.43, A. B. Gurney No. 35; 1 larval skin, 1 pupal skin, associated, from *Pandanus* leaf axil, First MAC Camp, Guadalcanal, V.25.44, Coll. Cuccio, Belkin No. 405; 1 female, 1 male, from *Pandanus* leaf axils, Umasini River, Guadalcanal, V.29.44, Coll. Civinski, Belkin No. 416; 2 females, 2 males, 2 larvae, 1 larval skin, 1 pupal skin, associated, from *Pandanus* leaf axils, Umasini River, Guadalcanal, VI.16.44, Colls. Lipovsky, Roa, Cuccio, Wysocki, and McCormick, Belkin No. 447; 19 females, 22 males, 12 larval skins and 12 pupal skins, associated, from *Pandanus* leaf axils, Umasini River, Guadalcanal, X.4.44, Colls. Belkin, Laffoon, and Rozeboom, Belkin No. 670 and Knight No. 123; 1 female, 4 males, 5 larval skins and 5 pupal skins, associated, from *Pandanus* leaf axil, Sprague Swamp, Guadalcanal, XI.15.44, Colls. Belkin and Cohen, Belkin No. 740; 3 females, 8 males, 1 larva, *Pandanus* trees, Empress Augusta Bay, Bougainville, Solomon Islands, IV.27.44, A. B. Gurney No. 357; 2 females, 5 males, from *Pandanus* leaf axils, Arundel Island, New Georgia Group, Solomon Islands, May 1944, J. G. Franclemont No. 92. Paratypes in the U. S. National Museum, Cornell Uni-

versity, British Museum, University of Queensland, and J. N. Belkin collections.

The species is named in honor of Mr. F. A. Perkins, Lecturer in Entomology at the University of Queensland, Brisbane, Australia.

Culex (Acallyntrum) belkini, new species

(Figs. 2, 4, 6, 9, 10, 12)

FEMALE.—Agreeing with *perkinsi*, with the following exceptions: Usually slightly smaller. Tori and pleura darker, the latter not so greenish. Hind femur usually with a noticeable patch or streak of dark scales on apical third dorsally or posteriorly.

MALE.—Like the female, slightly darker than *perkinsi*. Curved hairs of third palpal segment on apical fourth; long hairs of fourth and fifth palpal segments fewer and shorter; proboscis with scattered hairs ventrally. Abdominal tergites with scarcely any white, the patch on the seventh tergite small. Genital segments not so yellow as in *perkinsi*. **Genitalia** (Figs. 2, 4, 6): Basistyle conical, narrowed apically without scales, but with 12 to 14 stout hairs and a number of finer ones; two of the stout hairs on dorsal (convex) surface near the apex and longer than the dististyle; subapical lobe rather long, with seven filaments as follows: Distally a group of four of equal length, the tips pointed, broadened and turned toward dististyle; below this a long stout filament with a swollen, curved, two-pronged tip; below this a stout filament with a swollen, modified head and a strongly curved stem as figured; close to this a slender, short, straight filament. Dististyle tapering abruptly at apical two-fifths with a bend and a minute seta at this point; terminal spine short and broad. Lateral plate of mesosome curved medially at distal half and narrowed, this portion finely pilose and bearing about 10 irregular teeth; extreme base of plate, below median bridge with a number of short, slender spines. Inner edge of tenth sternite with a stout, bidentate projection, and its apex with an irregular tuft of spines; basal arm short, stout. Ninth tergite with weakly developed, broad, lateral lobes, bearing long, curved hairs.

LARVA.—**Head** (Fig. 10) about three-fourths as long as wide, lightly pigmented. Antenna about half as long as the length of the head, with a number of small spinules near base. Antennal tuft consisting of 6-11 plumose hairs, reaching well beyond apex of shaft, and situated just proximal to the mid point. Anteantennal tuft (A) plumose, 8- to 11-branched, usually 9; upper head hair (B) plumose, 6- to 10-branched, usually 9; lower head hair (C) plumose, 6- to 8-branched, usually 6; posterior clypeal tuft (D) short, usually 4-branched; inner occipital hair (E) 2-branched; outer occipital hair (F) 4-branched; orbital hair (G) single or 2-branched.

Abdomen (Fig. 9): Stellate hairs present on segments I-IV, 7- to 9-branched, short and stout, not equalling more than half length of segment. Comb on segment VIII in a triangular patch of about 3 or 4 rows,

and consisting of about 35 teeth; each tooth with a central blunt spine fringed on either side by a large number of short, fine hairs. Pentad hairs on VIII: 1 usually 4-branched, range from 3 to 4; 2 and 4 always single; 3 plumose, 7- to 8-branched, usually 8; 5 plumose, 2- to 4-branched, usually 2. Siphon: Index ranging from 4.4 to 5.4, usually about 4.6; pecten averaging 5 teeth with a range of 3 to 8, and usually situated away from base of siphon; each tooth a short, blunt, flat scale with an apical fringe of acute spinules; three pairs of plumose siphonal tufts, 4- to 6-branched, usually 5. Anal segment with dorsal plate almost encircling the segment and with a number of well developed short spinules on its posterior border; ventral brush consisting of a pair of 3-branched, plumose hairs; lateral hair of dorsal plate plumose, single or 2-branched, usually 2; dorsal brush with inner hair consisting of a 5-branched tuft of long hairs and outer hair single, longer than the inner hair, and about eight times as long as the dorsal plate. Anal gills subequal in length, the dorsal pair about five times the length of dorsal plate; each gill with a definite constriction about 0.45 from its base.

PUPA.—*Cephalothorax*: Lightly pigmented and without any pattern of darker color. Respiratory trumpets darkly pigmented in the tracheoid portion only, long and narrow, the pinna elongate and comprising nearly one third of length of trumpet. Most of the setae small to medium in length, the median post-ocular being the most conspicuous, 3-branched, slightly plumose and nearly twice as long as the other cephalothoracic setae. The posterothoracic setae of the metathorax (Fig. 12) as follows: All approximately equal in length and non-plumose, 10 being 2-branched, 11 single, stout, and 12 2-branched.

Abdomen (Fig. 12): Lightly pigmented on all segments. All setae on dorsal side non-plumose except A-VII and A-VIII. Seta K on segment I single, well developed, equalled in size by S which is also single and T which is single or 2-branched. Seta A on segments II through VI a small, simple spine; A-VII plumose, 3-branched and well developed; A-VIII plumose, 8-branched, very well developed. Seta B the most prominent hair on IV, V and VI, 2-branched, slightly more than twice the length of the segment. Seta C a medium-sized tuft, about 20-branched on II, 7- or 8-branched on III and IV, and 2-branched or simple on V, VI, and VII. Seta C' a small simple hair, laterad of B on segment II, mesad of C on segments III through VII. Seta 1 two or more branched on II; a small simple hair on III through VI; a 4-forked hair on VII. Seta 2 a long, simple hair equal to B on segment II; small, variously branched on III through VII. Seta 3 a small, branched hair on II, represented only by a socket on III, IV and V, absent on VI through VIII. Seta 5 always a minute simple hair. Seta A' on segment VIII a long single hair forked near the tip. Paddles with a light fringe of fine hairs on the lateral margins and notched slightly at the apex; midrib strong, but not reaching the apex; width of paddle equal to about half of length, the midrib dividing the paddle into approximately equal lateral and medial portions; paddle hair simple.

Holotype.—Male, U. S. National Museum No. 58629 Belkin No. 461-15. (See following data).

Type locality.—West Cape, Guadalcanal, Solomon Islands.

Material examined (Holotype and paratypes): 1 female, 5 males, from *Pandanus* leaf axils, Rendova Island, New Georgia Group, Solomon Islands, Jan. 1944, J. G. Franclemont No. 93; 3 larvae, 1 larval skin, 1 pupal skin from axils of large, wide-leaved *Pandanus*, the leaves of which persist only within a few inches of the growing tip and are not arranged in an obvious spiral, Segi Point, New Georgia, Feb. 7, 1944, C. O. Berg No. 97; 4 males, from *Pandanus* axils, Munda, New Georgia, Feb. 17, 1944, J. G. Franclemont No. 45; 1 female, 1 male, 8 larvae, from *Pandanus* axils, Sasavele Island, New Georgia Group, Feb. 1944, J. G. Franclemont No. 77; 1 male, Guadalcanal, March 1, 1944, Lechner No. 29; 2 males, 5 larvae, 2 larval and 2 pupal skins, associated, from *Pandanus* leaf axil, West Cape, Guadalcanal, June 28, 1944, Belkin No. 461. Paratypes in the U. S. National Museum, Cornell University, British Museum, University of Queensland, and J. N. Belkin collections.

KEYS TO SPECIES OF THE SUBGENUS ACALLYNTRUM FEMALES

1. Scutum predominately white-scaled, with a pair of dark stripes converging posteriorly 2
 Scutum with the scaling uniformly brown 3
2. Dark stripes of scutum nearly covered with dark brown scales *bicki* Stone and Penn
 Dark stripes of scutum mostly bare with a few dark scales along edges *binigrolineatus* Knight and Rozeboom
3. Hind femur usually with a patch or streak of dark scales on apical third dorsally or posteriorly; pleuron mostly brownish
 *belkini*, n. sp.
 Hind femur entirely creamy white, with at most a few dark scales in a median stripe on hind surface near apex; pleuron decidedly greenish *perkinsi*, n. sp.

MALE GENITALIA

1. Inner margin of tenth sternite with a number of irregular serrations 2
 Inner margin of tenth sternite with one or two large teeth, but not irregularly serrate 3
2. Lateral plate of mesosome with about 5 teeth; lower arm of mesosomal plate projecting lateroposteriorly, the apex obliquely truncate *bicki* Stone and Penn
 Lateral plate of mesosome with 10 or more teeth; lower arm of

- mesosomal plate projecting laterally, sharply pointed
 *binigrolineatus* Knight and Rozeboom
3. Subapical lobe of basistyle with the proximal one of the two filaments strongly curved; inner margin of tenth sternite with two stout teeth in middle *belkini*, n. sp.
- Subapical lobe of basistyle with both stout filaments nearly straight except for the bent tips; inner margin of tenth sternite with one stout tooth near base *perkinsi*, n. sp.

FOURTH INSTAR LARVAE

1. Abdomen without stellate tufts of hairs dorso-ventrally on the first four segments; upper and lower head hairs not more than 4-branched; anal gills not constricted 2
- Abdomen with stellate hair tufts on the dorso-lateral margins of at least the first four segments; upper and lower head hairs more than 6-branched; anal gills constricted at a point about one-third of distance from base 3
2. Lateral comb of segment VIII composed of a single row of 8 to 11 teeth *bicki* Stone and Penn
- Lateral comb of segment VIII composed of a more or less triangular patch of teeth in two to four rows and consisting of from 14 to 43 teeth *binigrolineatus* Knight and Rozeboom
3. Hairs of antennal tuft extending beyond the apex of the shaft; stellate tufts of hairs on segments I to IV of the abdomen less than half the length of the segment; pecten teeth short blunt scales with an apical fringe of acute spines *belkini*, n. sp.
- Hairs of antennal tuft not reaching to the apex of the shaft; stellate hairs on segments II to VIII of the abdomen nearly equal to the length of the segment; pecten teeth simple, acute spines *perkinsi*, n. sp.

PUPAE

1. Paddles without terminal setae 2
- Paddles with terminal setae 3
2. Lateral margins of paddles finely serrate; only the larger setae of segments III to VII plumose, all other setae non-plumose *bicki* Stone and Penn
- Lateral margins of paddles smoothly rounded, not serrate; nearly all of the dorsal abdominal setae finely plumose *binigrolineatus* Knight and Rozeboom
3. Width of paddle equal to about half the length, lateral and medial portions about equal in width; setae B and C of segment VII single *belkini*, n. sp.
- Width of paddle about two-thirds of length; medial portion distinctly wider than lateral portion; setae B and C of segment VII 3- and 2-branched respectively *perkinsi*, n. sp.

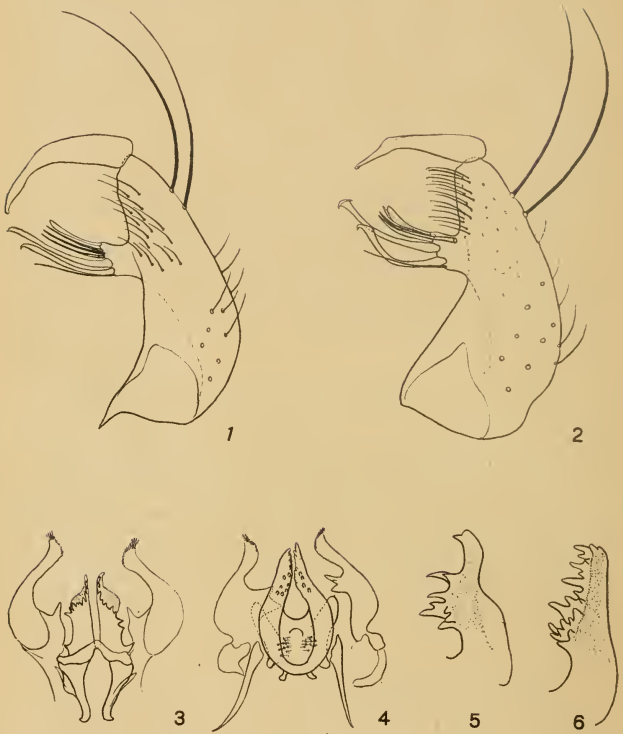


PLATE 9. MALE GENITALIA (Drawn by Alan Stone)

1. *Culex perkinsi*, n. sp., basistyle and dististyle.
2. *Culex belkini*, n. sp., basistyle and dististyle.
3. *Culex perkinsi*, n. sp., mesosome and tenth sternites.
4. *Culex belkini*, n. sp., mesosome and tenth sternites.
5. *Culex perkinsi*, n. sp., lateral plate of mesosome, lateral view.
6. *Culex belkini*, n. sp., lateral plate of mesosome, lateral view.

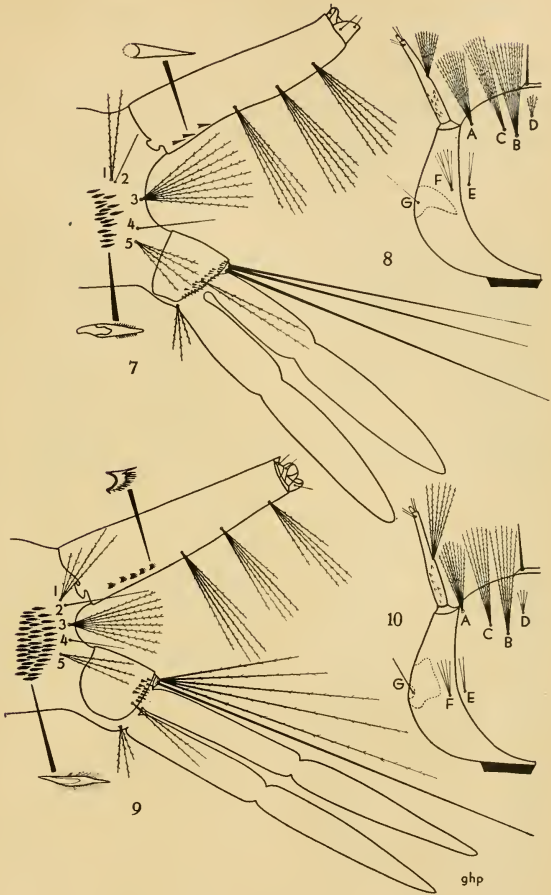


PLATE 10. LARVAE (Drawn by G. H. Penn)

- 7. *Culex perkinsi*, n. sp., end of abdomen.
- 8. *Culex perkinsi*, n. sp., head.
- 9. *Culex belkini*, n. sp., end of abdomen.
- 10. *Culex belkini*, n. sp., head.

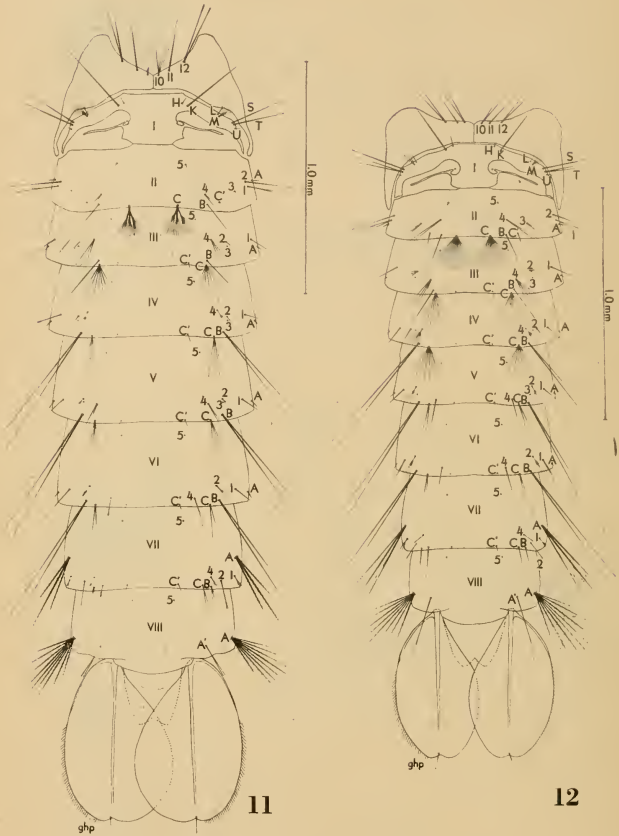


PLATE 11. PUPAE (Drawn by G. H. Penn)

- 11. *Culex perkinsi*, n. sp., abdomen (male).
- 12. *Culex belkini*, n. sp., abdomen (male).