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BY

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STUDIES OF QUEENSLAND MOSQUITOES.

3. THE *AÈDES* (FINLAYA) AUSTRALIENSIS GROUP.

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Mosquito Control Committee.

(WITH 17 TEXT FIGURES.)

The *Aedes* (*Finlaya*) *australiensis* group, as treated in this paper, comprises those species from the mainland of Australia which have at least the anterior half of the mesonotum with a large patch or broad medial stripe of rather dense white or golden scales¹; the narrow curved scales on the head all, or nearly all, pale; narrow curved scales on the scutellum. Full descriptions of two new species are given, as well as additional details of species previously very briefly described, while males, larvae and pupae of several species are described for the first time.

The species comprising the *australiensis* group are *Aedes australiensis* (Theo.), *Aedes biocellatus* (Taylor), *Aedes auridorsum* Edw., *Aedes palmarum* Edw., *Aedes monocellatus* n.sp., and *Aedes subauridorsum* n.sp. Edwards (1924) grouped together the first four of these with the New Guinea species *Aedes papuensis* (Taylor) and *Aedes novalbitarsis* King and Hoogstraal (= *albitarsis* (Taylor)). King and Hoogstraal (1946) have dealt fully with the species of the *Aedes* (*Finlaya*) *papuensis* group in New Guinea.

The grouping of the above six Australian species is an artificial one and they are by no means as closely interrelated as the species of the *papuensis* group. *A. palmarum* shows marked affinities with the latter group. The male of *A. australiensis* is still unknown, but larval characters indicate a relationship to *A. biocellatus*, which in turn shows affinities with *A. monocellatus* and these three species might be regarded as the *australiensis* group in a restricted sense. Neither *A. auridorsum* nor *A. subauridorsum* shows any close relationship with the other species in the group.

(1) *AÈDES* (FINLAYA) AUSTRALIENSIS (Theobald).

Leucomyia australiensis Theobald, 1910, Mon. Cul., 5: 313.

Aedes (*Finlaya*) *australiensis* Edwards, 1922, Bull. ent. Res., 13: 93; 1924, *ibid.*, 14: 381.

Type: Holotype female from Stannary Hills, Queensland, 27.iii.1909, Dr. Bancroft, deposited in British Museum.

Theobald described the type as a nearly perfect specimen, but Edwards (1924) stated that it was considerably damaged. Hitherto it has been the only known example of the species. A female in the University of Queensland collection reared from a larva collected at Gracemere, Qld., shows so few differences from the description of the type that there can be no doubt of its being the same species. As some characters not mentioned in the original description may now be found useful in separating this from related species, a full description of this specimen is given. The larva and pupa are described for the first time. The male is still unknown.

Distinctive Characters: Anterior $\frac{2}{3}$ of mesonotum entirely creamy to silvery scaled, with straight posterior margin; posterior $\frac{1}{3}$ brown scaled; hind tarsal segments I-III basally banded; wings black scaled, but may have some pale reflections medially.

¹ *A. monocellatus* is an exception, having comparatively sparse mesonotal scaling, but is included in the group because of its affinities with *A. biocellatus*.

Larva: Head seta d equal in length to A and B, 8-15 branched, plumose; lateral comb of 19-28 apically rounded fringed scales; siphonal index 3.0-3.3; saddle without apical spines, lateral seta single; gills subequal, $3-3\frac{1}{2}$ x saddle. Closely resembles the larva of *A. biocellatus* from which it is readily distinguished in life by its grey colour and also by the length of the gills.

Description of Adult ♀:

Wing length 3.1 mm.

Head: Integument brown, clothed with narrow curved creamy scales, which also form a border to the eyes, and numerous creamy upright forked scales; flat creamy scales laterally; a pair of strong pale vertical setae with, on each side, a row of 3 strong pale medially directed ocular setae and several strong dark ocular setae laterally. Torus light brown, medial aspect darker with some fine dark hairs; basal half of first flagellar segment of antenna light brown, remaining segments dark with sparse black verticillate hairs. Clypeus dark brown. Palpi and proboscis clothed with purplish black scales; palpi $\frac{1}{2}$ length of proboscis, which is slightly longer than fore femur; labella dark.

Thorax: Integument reddish brown. Anterior $\frac{2}{3}$ of mesonotum completely clothed with dense silvery-white narrow curved scales, those along the margins having a creamy tinge. The white scaling has a straight, horizontal posterior margin in front of the wing roots and the posterior $\frac{1}{3}$ of mesonotum is clothed with brown narrow curved scales, giving golden reflections in some lights, and some creamy ones on either side of the prescutellar bare area. Acrostichal and dorsocentral bristles cannot be observed on the anterior half of the mesonotum but there are about 4 dorsocentral bristles on the posterior half; there is a double row of about 8 strong dark prescutellar bristles and a patch of similar bristles above the wing roots. Scutellum clothed with narrow curved creamy scales; 6 border bristles to each lobe. Metapostnotum reddish brown.

Pleura brown. Narrow curved creamy scales on anterior and posterior pronotum, the latter with some narrow curved brown scales also; patches of flat white scales on propleuron, prealar area, paratergite, upper and lower sternopleuron and upper $\frac{1}{2}$ of mesepimeron. Pleural bristles brown, about 10 propleural, 5 posterior pronotal, 5 postspiracular, 4 upper sternopleural in a horizontal row above the patch of scales, and a row of 6-8 long and several shorter bristles along posterior margin of sternopleuron; about 10 prealar, about 12 upper and no lower mesepimeral bristles.

Legs: Purplish black scaled with basally banded tarsi. Coxae brown, creamy scaled. Trochanters creamy scaled. Femora pale basally. Fore leg: Femur and tibia creamy scaled beneath for their whole length; tarsal segment I with pale streak ventrally and basal white band $\frac{1}{6}$ its length; II with basal white band $\frac{1}{3}$ its length, III-V all dark. Mid leg: Femur pale scaled beneath on basal $\frac{3}{4}$ and with prominent creamy kneespot; tibia dark ventrally and at base and apex, otherwise almost entirely creamy scaled; tarsal segments as on fore leg, but a few pale scales at base of III. Hind leg: Femur with basal $\frac{2}{3}$ entirely creamy scaled and an apical creamy ring; tibia with a few pale scales at base, otherwise dark; tarsal segments I-III with basal white bands, $\frac{1}{3}$ length of I, $\frac{1}{4}$ length of II and III, IV and V dark. Claws equal; those on fore and mid legs toothed, hind simple.

Wings: With purplish black scales, giving indefinite pale reflections in some lights medially on *C*, *Sc* and *R*₁; outstanding scales all long and narrow. Cell *R*₂ nearly $1\frac{1}{2}$ times length of its stem; cell *M*₁ slightly longer than its stem; their bases level; *r-m* $1\frac{1}{2}$ times its own length distal to base of *M*₃₊₄. Halteres pale with white scaled knob.

Abdomen: Integument light brown, with sparse pale hairs along lateral and apical margins of sclerites. Tergite I with pale scales medially and lateral white patches; tergites II-VII purplish black scaled with large rounded basal creamy patches or bands and large lateral basal white patches. Sternites creamy scaled, III-VII with broad apical purplish bands; VIII light brown, large, bare and exerted (but considerably smaller and less exerted than in *auridorsum*). Cerci short, dark.

Described from a single female reared from a larva found in a tree cavity at Gracemere, Qld.

This specimen differs from the type in having creamy instead of brown upright forked scales on the head and in lacking pale reflecting scales on the middle of the proboscis. The type was described as having the first two tarsal segments basally banded but Edwards (1922) stated that its hind tarsi were damaged, and it was not possible for him to say whether or not the first three hind tarsal segments were basally banded. On the wings there are no "traces of ochreous scales", as described on the type; the proportions of the fork cells to their stems also differ, but not significantly.

A ♀ taken biting at Gracemere corresponds closely to that described but has wing length 3.3 mm.; posterior pronotum with narrow curved creamy scales only; about 14 propleural, 5-6 posterior pronotal and 6-7 postspiracular bristles; wing without pale reflections and with cell R_2 almost twice the length of its stem; creamy medial patches reaching to the apex of abdominal tergites V-VII.

Description of Larva: (Fig. 1.)

Length approximately 6.0 mm. A grey larva with dark brown head, siphon and saddle, and very long gills.

Head slightly broader than long. Antenna a little over $\frac{1}{2}$ length of head, about 8 times as long as broad at base, tapering on its apical $\frac{1}{2}$, and sparsely clothed with fine spicules; tuft 2-3 branched, plumose, about $\frac{1}{2}$ length of antenna, arising at $\frac{1}{2}$ from base; terminal and subterminal setae arising close together, one long and one short in each pair. Clypeal spines moderately long, fine and slightly curved. Setae A, B, C and d long and plumose; A, B and d arising in a line curving very slightly posteriorly, the distance A-B being about twice B-d; A 7-11 branched, slightly shorter than antenna, arising level with its base; B 6-9 branched and d 8-15 branched, equal in length to A; C 4-6 branched, longer than A, arising at a short distance almost directly behind B; e 2-3 branched, long, simple, about $\frac{1}{2}$ length of A; f 4-8 branched, long, simple. Mentum broadly triangular with large medial tooth and 9-12 slightly smaller lateral teeth, the basal ones being widely separated.

Thorax: Base of metapleural setae with short spines.

Abdomen: Two pairs of long plumose lateral setae on segment I, the longer 3-4 branched, the shorter single or bifid; one pair 1-3 branched on II and 1-2 branched on III-VI.

8th Segment: Lateral comb an uneven double row of 19-28 broad, apically rounded, and laterally and apically fringed scales. First pentad seta 4-6 branched, plumose; second and fourth long, single, inconspicuously frayed; third 5-6 branched, long, plumose; fifth 3-4 branched, plumose.

Siphon: Index 3.0-3.3. Pecten extending over $\frac{1}{2}$ length of siphon, made up of 18-26 evenly spaced broad pointed spines, each with 2-4 prominent pointed lateral denticles on basal half. Subventral tuft 4-5 branched, plumose, arising just beyond pecten. Acus present.

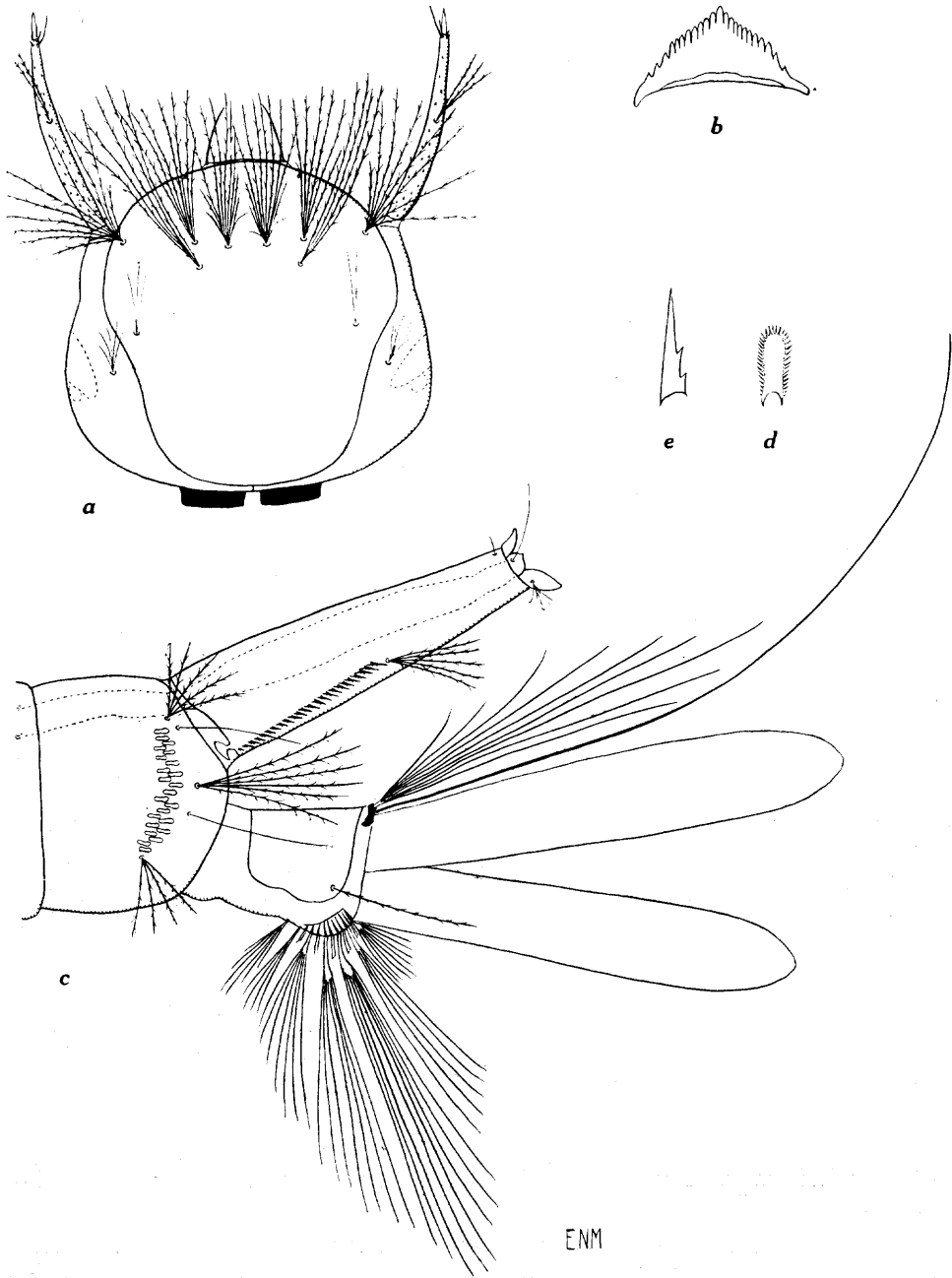


FIG. 1.—Larva of *Aedes australiensis* Theo. *a*, head; *b*, mentum; *c*, terminal segments; *d*, lateral comb tooth; *e*, pecten tooth (*a* and *c*, x 56; *b*, x 145; *d* and *e*, x 290).

Anal segment: Saddle covering dorsal $\frac{2}{3}$ of segment, without apical spines. Lateral seta single, plumose, slightly longer than saddle. Caudal setae simple; upper 6–11 branched, three times as long as saddle; lower long, single, twice

length of upper. Ventral brush of 12-13 multiple tufts, each with 7-11 branches, arising from a grid except the proximal 1 or 2 which are precratal. Gills subequal, $3-3\frac{1}{2}$ x saddle, long, broad and ribbon-like, with rounded tips.

Description based on one pelt correlated with adult from Gracemere, and ten whole larvae from Gordonvale, Q.

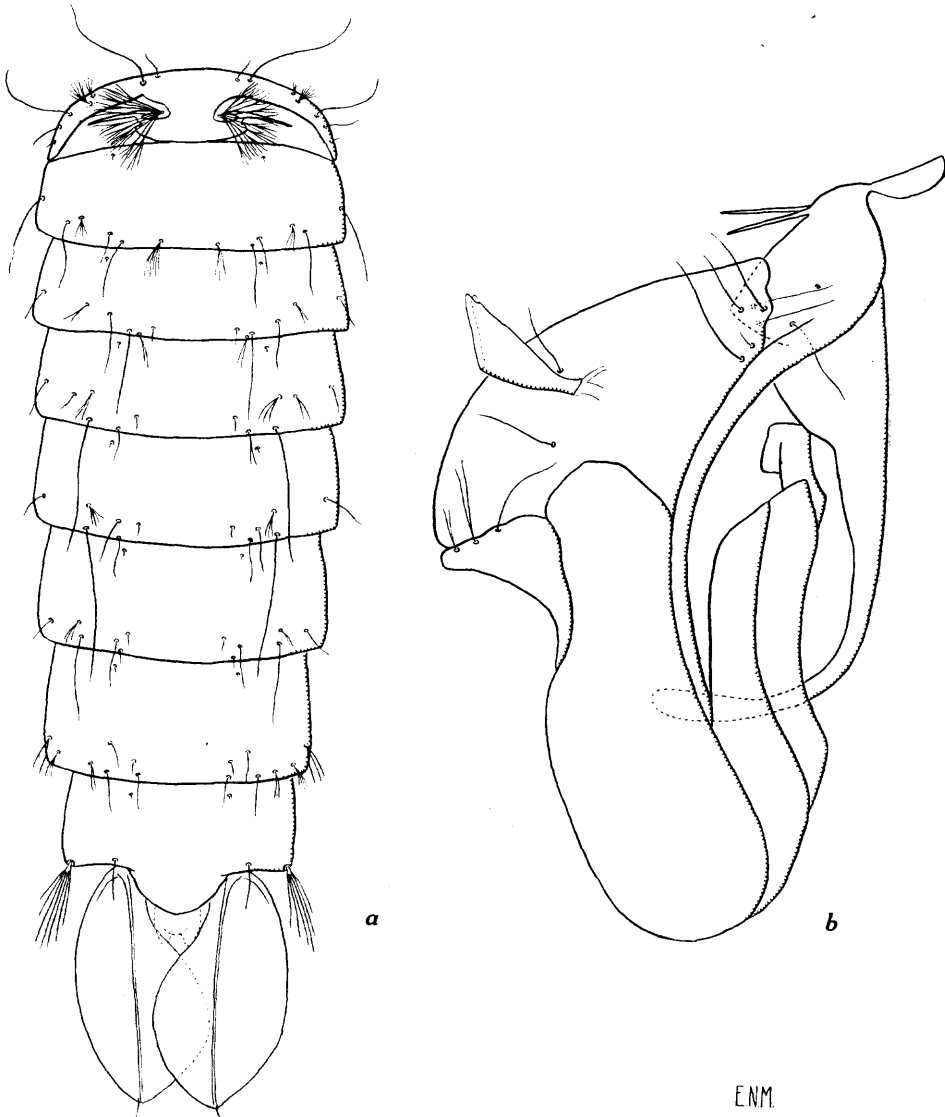


FIG. 2.—Pupal pelt of *Aedes australiensis* Theo., x 38. *a*, abdomen (dorsal view); *b*, cephalothorax.

Description of Pupa: (Fig. 2.)

General coloration brown, darker on upper surface of cephalothorax and basal abdominal tergites.

Cephalothorax: An indefinitely demarcated darkly pigmented area dorsally extending back from the anterior margin below the base of the trumpet, and including the metapostnotum and upper half of the wing cover. Trumpet dark brown, narrow at base and broad distally, with oblique opening, ratio of meatus to whole 1:1.5; apical notch moderately developed.

Abdomen: Tergites I-IV more darkly pigmented, V slightly darker than remainder. Float setae dendritic. Some of the larger abdominal setae may be finely pilose. Lateral seta of segment VIII 6-7 branched, plumose. Paddles narrow (breadth index 1.7), tapering distally to a bluntly pointed apex; margin very finely denticulate, buttress and midrib moderately developed; paddle seta single.

Described from a pupal pelt correlated with adult from Gracemere.

Biology: The adult specimen described above was bred from a larva collected from a cavity in the butt of a tree in dry vine scrub at Gracemere, in association with *Aedes quasirubrithorax* (Theo.), *Aedes notoscriptus* (Skuse), *A. auridorsum* and *Tripteroides* sp.

Larvae of *A. australiensis* were collected in association with *A. notoscriptus* and *Aedes aegypti* (Linn.) from a shaded cavity 4 in. deep, in a mango tree in the town of Gordonvale, by a pupil of the Gordonvale State School.

Habits: A female was taken biting at 10.30 p.m. in dry vine scrub at Gracemere.

Distribution: The type specimen was collected by Dr. Baneroft, 27.iii.1909, at Stannary Hills, which is a settlement between Boonmoo and Irvinebank, N. Qld.; Boonmoo is 81 miles by rail S.W. of Cairns. Larvae have been examined from Gordonvale, 15 miles S. of Cairns (C. Cummings, 10.vii.1944). The adult described was bred from a larva from Fairy Bower, Gracemere, about 6 miles S.W. of Rockhampton in Central Queensland. (J. L. Wassell, 6.x.1945). and a second female was taken biting at the same locality (J. L. Wassell, 3.x.1947).

(2) *ÄEDES (FINLAYA) BIOCELLATUS* (Taylor).

Culex biocellatus Taylor, 1914, *Proc. Linn. Soc. N.S.W.*, 39: 463.

Aedes (Finlaya) biocellatus Edwards, 1924, *Bull. ent. Res.*, 14: 381.

Type: The type female, labelled "Milson Is., Hawkesbury R., N.S. Wales, Dr. J. B. Cleland, 15.xi.13," is in the collection of the School of Public Health and Tropical Medicine, Sydney.

The male, larva and pupa are herein described for the first time.

Distinctive Characters: Mesonotum clothed with pale golden or creamy scales on the anterior half, forming a dense area with rounded posterior margin; hind tarsal segments I-IV basally banded; wings dark scaled medially with basal and apical areas of creamy to ochraceous scaling. ♂ Genitalia: Coxite with medially directed scale tuft extending from mid length, half way to apex; basal lobe with setae only; appendage of style $\frac{2}{3}$ length of style, its apical $\frac{1}{2}$ bifurcated; harpago shorter than its appendage which is expanded on its apical half only.

Larva: A white larva; head seta d equal in length to A and B, 8-20 branched, plumose; lateral comb of 19-28 apically rounded fringed scales; siphonal index 3.5; saddle without apical spines, lateral seta single or bifid; gills unequal, upper $1\frac{1}{2}$ -2 x saddle.

*Description of Adult:**Male*

Wing length 2.1–3.6 mm¹.

Head brown, clothed fairly densely with narrow curved pale golden scales which also form a border to the eyes and numerous pale golden upright forked scales; flat creamy scales laterally. A pair of strong golden vertical setae and a row of 3–5 strong medially directed ocular setae. Torus ochraceous to brown; flagellar segments of antenna light brown with dense dark verticillate hairs, the apical segments dark. Clypeus light brown. Palpi from slightly shorter to slightly longer than proboscis; segments IV and V black scaled, with white basal bands $\frac{1}{3}$ – $\frac{2}{3}$ their length, and dense long dark hairs; scaling of basal segments very variable; I entirely black or with pale scales apically; II entirely creamy to entirely black, the intermediate forms having an apical black band varying from a few black scales to a width of one half the segment, and as much as basal $\frac{1}{3}$ black, the intervening portion being sometimes mottled with dark scales; segment III creamy scaled basally, with apical $\frac{1}{4}$ – $\frac{2}{3}$ black. Proboscis about $1\frac{1}{2}$ length of fore femur, black scaled with a few creamy scales medially or an indefinite narrow medial pale ring, or with as much as basal $\frac{2}{3}$ creamy scaled, except for a small area of dark scales at base; labella dark.

Thorax: Integument brown. Mesonotum clothed with narrow curved pale golden or creamy scales, densest on the anterior half of the mesonotum. In some cases the scaling on the posterior half appears a slightly darker golden, at least in some lights; the denser and paler scaling has a rounded posterior border, curving behind the scutal angles, and a medial line of paler scales extends back, dividing on either side of the precutellar bare area; on either side of the mid line, a line of the darker scales extends forward towards the anterior margin of the mesonotum. Acrostichal bristles small and pale, about 6 in number; no dorsocentral bristles on anterior half of mesonotum, but 4 or 5 fairly strong bristles on posterior half; 6–8 light brown precutellar bristles and a patch of similar bristles above the wing roots. Scutellum light brown, clothed with narrow curved pale golden scales, 4–6 long bristles to mid lobe, and 3–5 to lateral lobes, in addition to shorter bristles. Metapostnotum pale ochraceous to light brown.

Pleura: Anterior pronotum clothed with broad or oval flat creamy or white scales, sometimes with a few narrow curved creamy scales above; posterior pronotum with narrow curved creamy scales and often with flat white scales below or along posterior margin; patches of flat white scales on propleuron, subspiracular area, paratergite, prealar area, a large patch on upper sternopleuron, and smaller patch on lower posterior margin of sternopleuron and a large patch on upper mesepimeron. Pleural bristles pale; about 14 propleural, 3–6 posterior pronotal, 2–8 postspiracular; 2–4 upper sternopleural and a row of 6–8 long and about 7 shorter bristles along posterior margin of sternopleuron; about 12 prealar, 6–8 upper and no lower mesepimeral bristles.

Legs: Black scaled with extensive pale scaling and banded tarsi. Coxae pale, fore and mid with patches of pale scales, hind bare or with a few pale scales. Trochanters pale scaled. Fore leg: Femur creamy scaled with a mottling of dark scales dorsally, or entirely dark scaled anterodorsally; tibia dark scaled dorsally, creamy laterally and ventrally; tarsal segments dark, with indefinite pale scaling beneath on basal half of I, or on I and II, I with a very narrow white basal band

¹ The wide variation in size of adults, larvae and pupae of this species might perhaps in part be attributed to the smaller specimens being reared in the laboratory in what might be unfavourable conditions; however, all intergradations in size are seen, and a wild female with wing length 2.7 mm. has been taken.

or patch, II usually with a white basal band up to $\frac{1}{4}$ its length, and in one specimen there appears to be a pale spot at base of III. Mid leg: Femur creamy scaled, the middle $\frac{2}{3}$ with a mottling of dark scales anterodorsally terminating in a dark indefinite preapical ring, or with the apical $\frac{1}{2}$ dark scaled except for a pale streak ventrally and pale apical ring; tibia creamy with a dark antero-ventral line, or mainly dark scaled, with apical $\frac{2}{3}$ pale dorsally; tarsal segments dark, I with some pale scaling dorsally, or both I and II, occasionally also III, pale dorsally and posteriorly, I-III with white basal bands $\frac{1}{6}$ - $\frac{1}{4}$ of I, $\frac{1}{4}$ - $\frac{1}{3}$ of II and III, with rarely a few white scales at base of IV. Hind leg: Femur creamy scaled with a broad dark preapical ring sometimes incomplete ventrally; tibia dark with a few pale scales at base; tarsal segments dark, I-IV with white basal bands, $\frac{1}{5}$ - $\frac{1}{4}$ of I, $\frac{1}{5}$ - $\frac{1}{3}$ of II, $\frac{1}{3}$ - $\frac{1}{2}$ of III, and $\frac{1}{5}$ - $\frac{1}{3}$ of IV, V usually dark but rarely with white scales at base. Claws of fore and mid legs unequal, the anterior long with a strong tooth; hind equal, simple.

Wings mainly black scaled medially, with basal and apical areas of creamy scaling; outstanding scales all long and narrow. The basal pale scaling includes the basal $\frac{1}{4}$ - $\frac{1}{3}$ of *C*; *R* is always dark basally (but pale scaled on the underside of the wing); *Cu* and *An* may be entirely dark or entirely pale, but usually *Cu* has a basal dark patch and then is pale to about its junction with *m-cu*, and *An* is dark apically. The apical pale scaling on the wing usually includes all veins beyond the level of the tip of *Sc*, but *R*₂ and *R*₃ may be dark scaled; the anterior margin of *C* is dark and continues into the dark wing fringe at the apex. Cell *R*₂ 1-1 $\frac{3}{4}$ times the length of its stem; cell *M*₁ $\frac{3}{4}$ -1 times the length of its stem; the base of cell *M*₁ is usually proximal to that of cell *R*₂ but may be level with it; *r-m* 1-1 $\frac{1}{2}$ times its own length distal to base of *M*₄. Halteres pale with creamy scaled knob.

Abdomen: Integument light brown with numerous long pale golden hairs along lateral and apical margins of sclerites. Tergite I pale scaled, II entirely pale scaled or with apical $\frac{1}{3}$ - $\frac{1}{2}$ dark scaled, or with a narrow apical dark band, or dark apical lateral patches. III-VII pale scaled basally with apical $\frac{1}{4}$ - $\frac{2}{3}$ dark, or V-VII pale with some dark scales along apical border, or medial dark apical patches, or VI and VII entirely pale. The pale scaling of the tergites is mainly creamy medially with large basal lateral white patches. Sternites pale scaled with apical $\frac{1}{3}$ - $\frac{1}{2}$ dark on III-VII. Segment VIII is entirely white scaled.

Description based on 27 males, all bred specimens, from South Queensland.

♂ *Genitalia*: (Fig. 3.)

Coxites dark scaled, or with some pale scales on basal half, and with a medially directed preapical tuft of golden scales. Coxite cylindrical, slightly tapering, almost 4 times as long as its width at base, with a longitudinal groove-like membranous area along inner aspect. On the sternal side of this groove, extending from mid length half way to apex of coxite, is a tuft of 20-30 long broad outstanding scales; near the distal end of the scale tuft, between it and the groove, is a patch of about 12 long fine setae with curved and slightly flattened tips. The coxite has a slightly developed basal lobe bearing a patch of about 30 long medially directed setae, the longest about equal in length to width of coxite; these are continuous distally with a row of fine setae along the tergal side of the groove, which become longer near the apex of coxite, 2-4 being more strongly developed than remainder. In addition there are scattered fine setae tergally on the coxite, smallest near its base, and there are numerous long setae laterally and sternally. Style about $\frac{2}{3}$ length of coxite, curved, tapering on its apical third, finely pilose, with 1-2 small preapical setae; terminal appendage about $\frac{2}{3}$ length of style, bifurcating at $\frac{1}{2}$ its length into two fine, pointed branches.

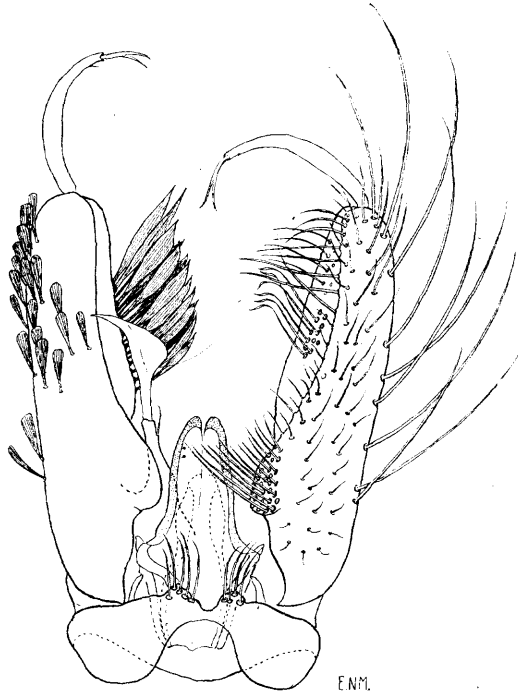


FIG. 3.—♂ genitalia of *Aedes biocellatus* Taylor, x 160.

Harpago stout, pilose, with 1-2 short preapical setae; appendage considerably longer than harpago, its basal half slender, its apical half with a broad lateral membranous expansion, tapering to a fine pointed tip. Paraproct with 1-2 teeth. Phallosome simple, pear-shaped. Lobes of IXth tergite with 3-7 setae; IXth sternite with 3-5 short setae.

Female differs from the male as follows:—

Wing length 2.2-4.0 mm. Tori ochraceous with a few fine hairs medially; basal half of first flagellar segment ochraceous, remaining segments of antenna black with sparse black verticillate hairs. Palpi $\frac{1}{4}$ - $\frac{1}{8}$ length of proboscis, black scaled, or with creamy scales basally and medially, or entirely pale scaled except for a black apical ventral patch. Proboscis $1\frac{1}{4}$ - $1\frac{1}{2}$ length of fore femur, black scaled or with basal $\frac{2}{3}$ either entirely pale or mottled with pale scales, but usually dark at extreme base. Mesonotal and pleural scaling as in ♂, but one specimen from Wengen Creek had dark brown scales on posterior half of mesonotum and upper margin of posterior pronotum; mesonotal bristles dark, stronger and more numerous, about 12 acrostichal, 6-10 dorsocentral (on posterior half of mesonotum only) and 8-12 prescutellar; 4-7 long bristles to mid lobe of scutellum and 3-6 to lateral lobes; 3-12 postspiracular, about 16 prealar and 9-18 upper mesepimeral bristles. Leg markings similar to ♂ but mid femur may be dark almost to base anterodorsally; white basal bands on mid tarsal segment II and hind tarsal segments II and III up to $\frac{1}{2}$ length of segment; there may be some pale scaling posteriorly towards apex of hind tarsal segment I; claws equal, those of fore and mid leg toothed, hind simple. Wings: Basal creamy scaling usually on *C* only; apical creamy scaling as in ♂, but the patch on *C* may be reduced and the apices of remaining veins may be dark scaled; cell R_2 $1\frac{1}{4}$ -2 times length of its stem; cell M_1 $\frac{2}{3}$ - $1\frac{1}{2}$ times the length of its stem; the bases of

fork cells level or that of cell M , slightly proximal; $r-m$ 1-2 times its own length distal to base of M_{3+4} . Abdomen: Scaling similar to δ , the tergites with large lateral white patches, but basal pale scaling may be reduced to a band less than $\frac{1}{4}$ length of tergite II, and to a small medial patch on tergite III; on tergites IV and V the dark scaling may form a large, proximally rounded apical patch; tergite VIII retracted, apex pale scaled; sternite VIII large, bare, pale, exerted; cerci short, pale basally, dark apically.

Description based on 49 ♀♀ from South Queensland, also notes on the type, a topotypical specimen, 1 ♀ Mt. Victoria and 1 ♀ Eidsvold, in Sydney collections.

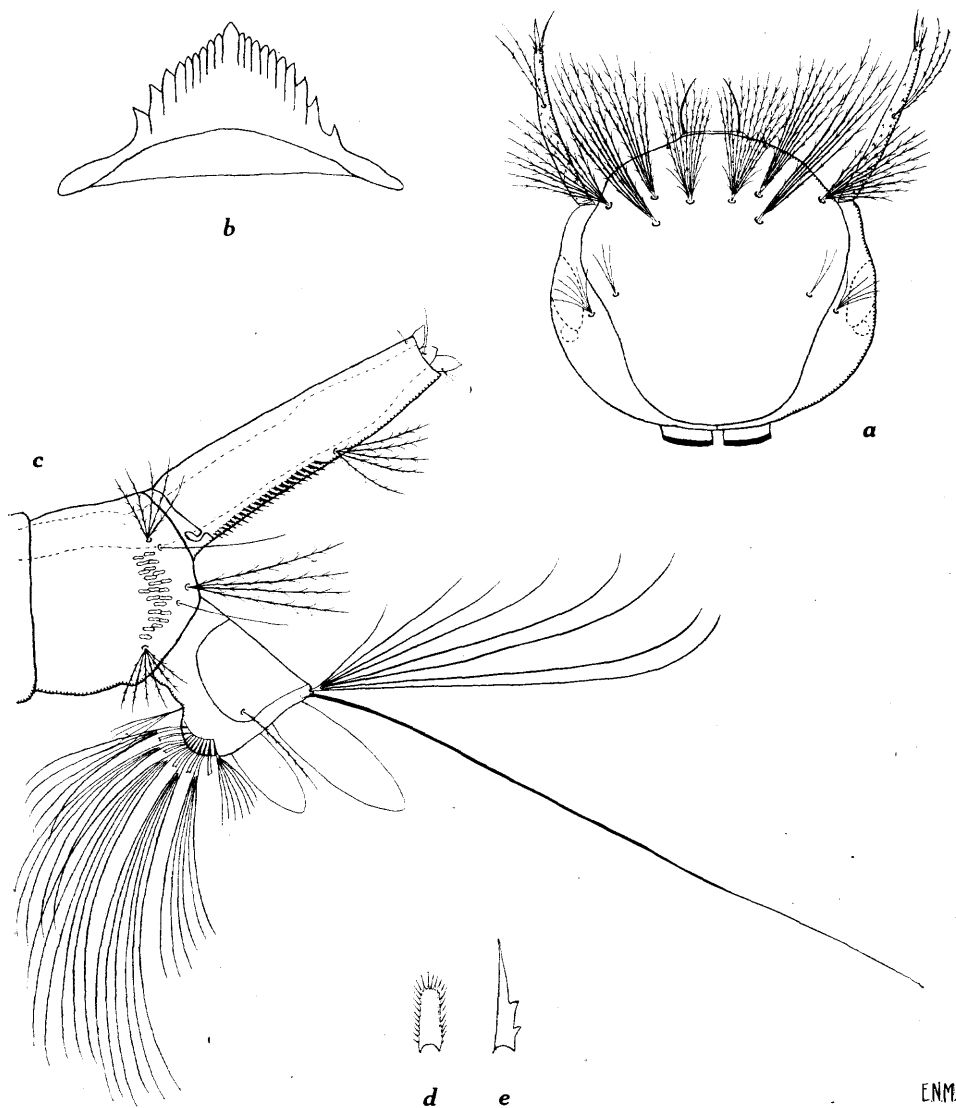


FIG 4.—Larva of *Aedes biocellatus* Taylor. a, head; b, mentum; c, terminal segments; d, lateral comb tooth; e, pecten tooth. (a and c, x 56; b, d and e, x 290).

Description of Larva: (Fig. 4.)

Length 6.0–7.0 mm. A white larva with yellowish brown head, brown siphon and saddle, and short unequal gills.

Head slightly broader than long. Antenna a little over $\frac{1}{2}$ length of head, about 9 times as long as broad at base, tapering on its apical $\frac{1}{2}$, and sparsely clothed with fine spicules; tuft 2–5 branched, plumose, about $\frac{1}{2}$ length of antenna, arising at slightly more than $\frac{1}{2}$ from base; terminal and subterminal setae arising close together, one long and one short in each pair. Clypeal spines moderately long, fine, inconspicuously frayed and slightly curved. Setae A, B, C and d long and plumose; A, B and d arising almost in a straight line, d being slightly posterior and B being nearer to d than to A; A 8–14 branched, slightly shorter than antenna, arising level with its base; B 5–9 branched, equal in length to A; d slightly shorter and finer, 8–20 branched; C 4–7 branched, longer than A, arising at a short distance almost directly behind B; e 2–3 branched, simple, about $\frac{1}{2}$ length of A; f 4–7 branched, long, simple. Mentum broadly triangular, with a large medial tooth and 9–12 slightly smaller lateral teeth, the basal ones being more widely separated.

Thorax: Base of metapleural setae with short spines.

Abdomen: Two pairs of long plumose lateral setae on segment I, the longer 3–6 branched, the shorter bifid; one pair on II–VI, 3–5 branched on II, 2–4 branched on III and 2–3 branched on IV–VI.

8th Segment: Lateral comb a triangular patch of 19–28 apically rounded scales, laterally and apically fringed. First pentad seta 4–8 branched, plumose; second and fourth long, single, simple or inconspicuously frayed; third 2–6 branched, long, plumose; fifth 3–8 branched, plumose.

Siphon: Index 3.5. Pecten extending approximately $\frac{1}{2}$ length of siphon, made up of 19–34 evenly spaced pointed spines, each with 1–3 (usually 2) prominent pointed lateral denticles on basal half. Subventral tuft 4–8 branched, plumose, arising just beyond pecten. Acus present.

Anal Segment: Saddle covering dorsal $\frac{2}{3}$ of segment, without apical spines. Lateral seta single or bifid, plumose, slightly longer than saddle. Caudal setae simple; upper 6–10 branched, almost 4 times as long as saddle; lower long, single, twice length of upper. Ventral brush of 11–14 multiple tufts, each 5–12 branched, arising from a grid except the proximal 1 or 2 which are precratal. Gills short, broad, unequal, with bluntly pointed tips, the upper $1\frac{1}{2}$ –2 x saddle and lower 1 – $1\frac{1}{2}$ x saddle.

Description based on 24 larvae and larval pelts from Wengen Creek, Mt. Mowbullen and Mt. Glorious.

Description of Pupa: (Fig. 5.)

General coloration creamy to light brown, darker brown on upper surface of cephalothorax and basal abdominal tergites.

Cephalothorax: An indefinitely demarcated darkly pigmented area extending back from the level of the base of the trumpet and including the metapostnotum and upper and posterior margins of the wing cover. Trumpet dark brown but margin of pinna lighter; trumpet fairly narrow at base, widening gradually, with oblique opening; ratio of meatus to whole 1:1.4–1.6; apical notch shallow. Dorsal seta very long and strongly developed.

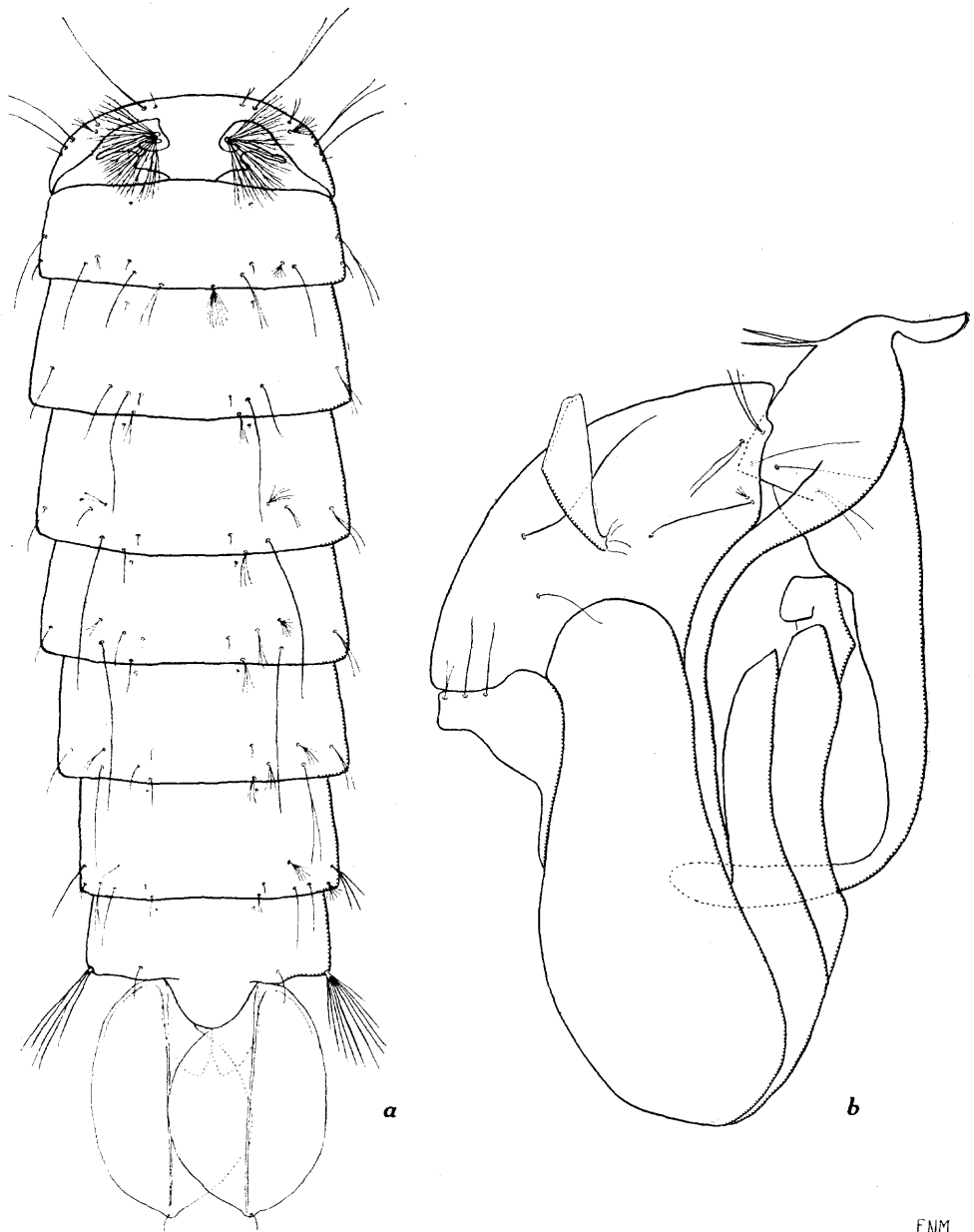


FIG. 5.—Pupal pelt of *Aedes biocellatus* Taylor, x 38. *a*, abdomen (dorsal view); *b*, cephalothorax.

Abdomen: Tergites I–III or I–IV darkly pigmented, bases of IV–V or IV–VI may also be darker. Float setae dendritic. Some of the larger abdominal setae may be plumose. Lateral seta of segment VIII 5–10 branched, plumose. Paddles moderately broad (breadth index 1.4–1.7), rounded, with a small blunt point at apex, margin denticulate, buttress and midrib fairly well developed, paddle seta single.

ENM.

Described from 14 pupal pelts, 3 from Mt. Mowbullen and 11 from Wengen Creek.

Biology: Larvae are found in shaded water-holding cavities in trees or stumps, usually in rain forest, and all collections of this species have been from water of a dark reddish brown colour, in some cases with a very heavy suspension of organic debris, making the larvae very difficult to observe. The larvae of this species, though rarely found, occur in large numbers in a breeding place.

The breeding place at Mt. Glorious was a hollow pipe in a fallen rain forest tree with a lateral opening, the lower end being blocked by an epiphytic fern and the bottom covered with thick leaf mould, rotting leaves, wood and fern roots. On 16th July, 1943, this hole was dry and some of the damp leaf mould was collected, and on 19th July placed in an enamel dish and covered with tap water. On 17th August, 4th instar and smaller larvae of *A. biocellatus* were observed and isolated but these failed to breed through. On 5th October, 4th instar larvae of *A. biocellatus* were again observed and the first adult from this batch emerged on 13th October. It seems probable that the two series of *biocellatus* were hatched from different batches of eggs present in the leaf mould. (*A. notoscriptus* and *A. quasirubri-thorax* were bred from the same sample.) Samples of water from the breeding place taken on 24th September and 11th October, 1943, contained the same three species.

At Wengen Creek, larvae of *A. biocellatus* were collected from a cavity in a living pine tree in rain forest, the liquid being very thick with rotting wood; no other species were associated. This sample was collected on 20th September, 1944, and on 23rd December, 1944, one larva had still not pupated.

A second sample from Wengen Creek and one from Mt. Mowbullen were from pipes in the 6 foot high stumps of fallen rain forest trees, and resting females of *biocellatus* were taken from one pipe. Associated species were *A. quasirubri-thorax* and *A. notoscriptus* at Wengen Creek, and *A. quasirubri-thorax*, *A. monocellatus* and *Tripterooides* spp. at Mt. Mowbullen.

A pupil of the Nanango State School collected *A. biocellatus* in association with *A. aegypti* from a hollow in the green branch of a tree at the rear of a store in the town.

The pupal period occupies 2-5 (usually 3) days.

Habits: This species occasionally bites man. Two females were taken biting at noon in rain forest at Camp Mountain. A laboratory bred female from Wengen Creek which emerged on 3rd November, 1944, took a large bloodmeal from a thumb inserted in its cage at 4 p.m. on 6th November; this specimen survived until killed on 10th November. The bite was noted as leaving a stinging itch.

Distribution: Specimens have been examined from the following localities:—NEW SOUTH WALES: Hawkesbury River, type ♀, Milson Is. (J. B. Cleland, 15.xi.13), 1 ♀ "say biting" (22.xi.13); Mount Victoria, 1 ♀ (R. H. Wharton, i.1944). QUEENSLAND: Eidsvold, 1 ♀ (T. L. Bancroft); Bunya Mts.: Wengen Creek, 19 ♂♂, 40 ♀♀, larvae (J. L. Wassell, ix.1944); Mt. Mowbullen, 2 ♂♂, 2 ♀♀, larvae (J. L. Wassell, ix.1944); Nanango, 1 ♀ (R. A. Andrews, ii.1945); Mt. Glorious, 3 ♂♂, 1 ♀, larvae (J. L. Wassell, x.1943); 3 ♂♂, 3 ♀♀, labelled Brisbane (F. A. Perkins, x.1942), which are almost certainly also from Mt. Glorious; Camp Mountain, 2 ♀♀ taken biting (E. N. Marks, iv.1945).

(3) **AËDES (FINLAYA) MONOCELLATUS** n.sp.
(*monocellatus*—having one spot on the wing.)

Types: Holotype ♀, allotype ♂, Upper Cedar Creek, Queensland, ix.1943, J. L. Wassell and E. N. Marks (reared from larvae taken from a cavity in a tree).

Paratypes: 21 ♀♀ and 10 ♂♂, same data as holotype; 1 ♀, 1 ♂, Mt. Glorious¹, Queensland, xii.1943, J. L. Wassell; 5 ♀♀ (4 with associated larval and pupal skins), Mt. Glorious, ii.1945, J. L. Wassell. Morphotypes: 8 larvae, x.1943, 5 larvae, i.1944, and 1 larva, vi.1947, all from Mt. Glorious, J. L. Wassell.

Holotype ♀, allotype ♂, 21 ♀♀ and 7 ♂♂ paratypes and 11 morphotype larvae in collection of University of Queensland; paratypes of each sex and a morphotype larva in Museum of Division of Economic Entomology, Council for Scientific and Industrial Research, Canberra, A.C.T., British Museum, and U.S. National Museum, Washington; male and female paratypes in Queensland Museum, and a female paratype in Macleay Museum, and in collection of School of Public Health and Tropical Medicine, Sydney, N.S.W.

Distinctive Characters: Mesonotum clothed with rather sparse golden scales, with patches of dark scales on the fossae and above the wing roots and usually a line of dark scales on either side of the prescutellar bare area; hind tarsal segments I–IV basally banded; wings black scaled with preapical area of creamy scaling beyond tip of *Sc.* ♂ Genitalia: Coxite with medially directed scale tuft extending from mid length to apex, basal lobe with long narrow scales and setae; appendage of style $\frac{1}{4}$ length of style, its apical $\frac{1}{4}$ – $\frac{1}{4}$ bifurcated; harpago longer than its appendage which is expanded from its base.

Larva: Head seta d $\frac{2}{3}$ length of A and B, 8–15 branched, plumose; lateral comb of 35–70 apically rounded fringed scales; siphonal index 3.0–3.5; saddle with prominent apical spines, lateral seta 1–3 branched; gills equal, about 1 x saddle.

Description of Adult:

Holotype ♀.

Wing length 4.4 mm.

Head: Integument brown, clothed with narrow curved golden scales, which also form a border to the eyes, and with flat creamy scales laterally; numerous dull golden upright forked scales on the vertex and some dark ones laterally; a pair of strong brown vertical setae, a row of 5 long, medially directed ocular setae with about 5 dark curved ocular setae laterally. Torus ochraceous with a few fine dark hairs on medial aspect; basal half of first flagellar segment ochraceous, remainder of antenna dark with sparse black verticillate hairs. Clypeus brown. Palpi $\frac{1}{2}$ length of proboscis, black scaled, with some pale scaling basally and a medial pale band. Proboscis $1\frac{1}{2}$ times length of fore femur, black scaled with a few scattered pale scales dorsally on its basal half; labella dark.

Thorax: Integument light brown; mesonotum clothed with rather sparse fine narrow curved golden scales with patches of narrow curved black scales on the fossae and a few also above the wing root. Mesonotal bristles numerous, strong and dark; a double row of 26 acrostichals, a row of about 12 dorsocentrals, continuous posteriorly with a double row of about 12 prescutellar bristles; numerous strong bristles on the fossae, laterally and above the wing roots. Scutellum clothed with narrow curved golden scales, 8 strong dark bristles to each lobe. Metapostnotum light brown.

¹ Upper Cedar Creek is at the foot of Mt. Glorious, the two localities being 3–4 miles apart.

Pleura with patches of flat pale scales on anterior pronotum, propleuron, subspiracular area, prealar area, paratergite, upper sternopleuron, posterior margin of lower stenopleuron, and upper mesepimeron; posterior pronotum with narrow curved golden scales above and flat pale ones below. Bristles pale golden, about 12 propleural, 8 posterior pronotal, 8 postspiracular; 4 upper sternopleural and a row of 7 long bristles along posterior border of stenopleuron with some finer ones below; about 20 prealar; 13 upper and no lower mesepimeral bristles.

Legs: Black scaled with banded tarsi. Coxae and trochanters pale with creamy scales. Fore leg: Femur creamy scaled at base and ventrally, with an indefinite creamy longitudinal streak anteriorly and an inconspicuous golden kneespot; tibia with a very small creamy patch dorsally at base, creamy ventrally; tarsal segment I with narrow basal white band and some pale scaling beneath, II with basal white band $\frac{1}{4}$ its length; III with one or two pale scales at base on one side, IV and V all dark. Mid leg: Femur and tibia as in fore leg, but anterior streak on femur wider basally and more indefinite apically, pale scaling on tibia extends as mottling on to dorsal surface; tarsal segment I entirely and II partially pale beneath, I-III with basal white bands covering $\frac{1}{6}$ I, $\frac{1}{3}$ II and III, IV with one or two pale scales at base on one side. Hind leg: Femur with basal $\frac{2}{3}$ creamy scaled except for a narrow dorsal dark streak not reaching to base, and widening on the apical $\frac{1}{3}$ to form an almost complete dark ring with a small golden kneespot at apex; tibia dark scaled with a basal white ventral patch $\frac{1}{6}$ its length; tarsal segments dark, I-IV with basal white bands, $\frac{1}{4}$ I and II, $\frac{1}{3}$ III and IV; V all black (tarsal segments IV and V of the right hind leg are missing). Claws equal, those of fore and mid leg toothed, hind simple.

Wings: Clothed mainly with purplish black scales, and with dark fringe; outstanding scales all long and narrow. There is a preapical area of creamy scaling fairly sharply demarcated basally in line approximately with the tip of *Sc*. From this point, on *C* the creamy scaling extends along its posterior edge half way to apex of wing; on R_1 both anteriorly and posteriorly (but not medially) for a similar distance, on R_s to the fork of R_2 and R_3 and on *M* to a short distance beyond the fork of M_1 and M_2 the outstanding scales are creamy; R_{4+5} and M_{3+4} have a few pale scales. Cell R_2 almost twice the length of its stem; cell M_1 equal in length to its stem, the base of cell R_2 slightly proximal to that of cell M_1 ; $r-m$ its own length distal to base of M_{3+4} . Halteres pale with pale scaled knob.

Abdomen: Integument light brown. Tergite I with a small patch of pale scales medially; tergites II-VI purplish black scaled, with lateral basal white patches; II-IV with narrow basal bands, golden medially, white laterally, continuing into these patches; V with a row of pale scales at base and with a few golden scales laterally towards apex; VI golden scaled laterally; VII entirely golden scaled except for lateral basal white patches; VIII retracted. Sternites II and III pale scaled, III with lateral apical dark patches; IV-VI dark with pale basal bands, tending to be golden medially, white laterally; VII golden scaled with lateral white patches and a slight mottling of dark scales apically; sternite VIII large, exerted, ochraceous, clothed with fine golden hairs. Cerci short, dark. There are numerous fine golden setae along the apical and lateral borders of the tergites and sternites, also subapically on tergite VI, and scattered over tergite VII and the sternites.

The following were the main variations from the holotype shown by a series of 37 ♀♀ from various localities:—Wing length 3.1-4.5 mm. Torus with small dark scales on medial aspect, palpi $\frac{1}{6}$ length of proboscis, with one or two pale scales at tip, or with medial pale band reduced. Proboscis entirely dark

scaled, or up to basal $\frac{2}{3}$ extensively mottled with pale scales. Usually a line of narrow curved dark scales on posterior $\frac{1}{3}$ of mesonotum along the line of dorsocentral and prescutellar bristles; patches above wing roots may be larger; dark scales on fossae may be reduced to only 1 or 2. In a number of specimens the integument is dark brown, but in the majority of cases this is apparently due to some artificial cause. Scutellar bristles 4-9 on mid lobe, 4-8 on lateral lobes. Pleura: There may rarely be narrow curved golden scales on the anterior pronotum and paratergite; posterior pronotum may bear a few black narrow curved or flat scales; 5-8 posterior pronotal and 4-12 postspiracular bristles. Legs: Fore leg: Coxa and trochanter may bear a few dark scales, the creamy streak on femur and pale scales ventrally on tarsal segment I may be absent; basal band on tarsal segment II $\frac{1}{5}$ - $\frac{1}{3}$ its length. Mid leg: Femur and tibia may be entirely dark anteriorly and there may be only a few pale scales ventrally on tarsal segment I, none on II; basal bands $\frac{1}{3}$ - $\frac{1}{5}$ I, $\frac{1}{5}$ - $\frac{1}{3}$ II and III. Hind leg: Apical $\frac{1}{3}$ - $\frac{1}{2}$ of femur dark; pale ventral basal patch on tibia may be inconspicuous, basal bands on tarsal segments $\frac{1}{6}$ - $\frac{1}{4}$ I, $\frac{1}{5}$ - $\frac{1}{3}$ II, $\frac{1}{4}$ - $\frac{1}{3}$ III, $\frac{1}{3}$ IV. Wings: The creamy scaling may extend almost to apex of *C* and *R*₁ or may be reduced on *C* to a few pale scales and on *R*₁ to a few pale scales or a short streak; it may be more extensive on *R*₄₊₅; *M*₃₊₄ may be pale almost from base to apex; there may be a few pale scales at tip of *Cu*₁. Cell *R*₂ $1\frac{1}{2}$ -2 times length of its stem, its base may be slightly distal to, or level with that of cell *M*₁; *r-m* $1-1\frac{1}{2}$ times its own length distal to base of *M*₃₊₄. Halteres may have 3 or 4 dark scales among the pale scales on knob. Abdomen: Tergite I may have the medial patch partially or entirely of dark scales. The basal bands on tergites II-IV may be up to $\frac{1}{3}$ width of segment; V and VI may have narrow basal bands and may lack the golden scales laterally and apically or the golden patches on VI may widen to form an apical border; VII is usually almost entirely golden, often sparsely mottled with dark scales, but it may be dark scaled with a small medial basal golden patch or band. Sternite VII may have the apical half dark scaled.

Male: A series of 19 males from various localities differed from the females in the following characters:—Wing length 2.7-4.0 mm. Tori ochraceous, darker on medial aspect with a few flat dark scales; first flagellar segment of antenna ochraceous with some flat dark scales, remaining segments brown, with dense dark verticillate hairs. Palpi equal in length to proboscis, black scaled, with white bands at bases of segments II-V, narrow on II, $\frac{1}{5}$ - $\frac{2}{5}$ III, $\frac{1}{5}$ - $\frac{1}{2}$ IV and V; long dense dark hairs at tip of III and on IV and V. Proboscis black scaled, with sometimes a few pale scales medially. In one specimen there were a few dark scales between the dorsocentral and acrostichal bristles on the anterior half of mesonotum. Claws of fore and mid leg unequal, the anterior long with a strong tooth; hind claws equal, simple. Wings: The pale scaling on wing veins distal to tip of *Sc* tends to be more extensive than in ♀, and may reach practically to tip of wing; pale scaling may also extend proximally on *Sc* almost half way to base; cell *R*₂ from equal to, to twice length of its stem, cell *M*₁ from $\frac{2}{3}$ to equal in length to its stem. Abdomen: Tergites II-VII may be dark with narrow basal white bands, or V may be golden scaled laterally, VI golden scaled with lateral basal white patches and a dark medial apical patch, and VII golden scaled with lateral basal white patches. Segment VIII entirely white scaled.

♂ *Genitalia*: (Fig. 6.)

Coxites dark scaled with some golden scaling laterally at base, and with a medially directed apical tuft of dark scales. Coxite cylindrical, about 4 times as long as its width at base, with a longitudinal groove-like membranous area along inner aspect. On the sternal side of this groove, extending from a little

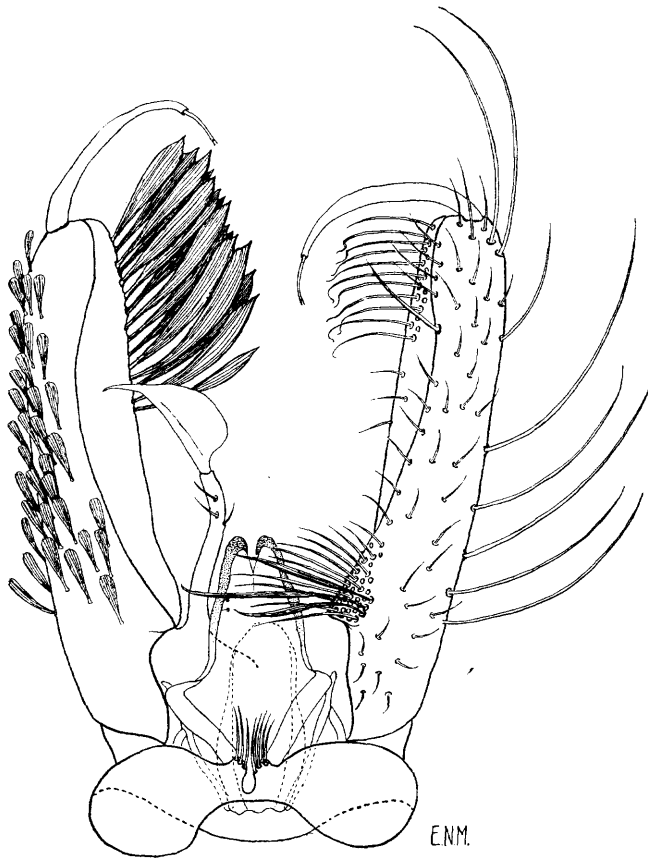
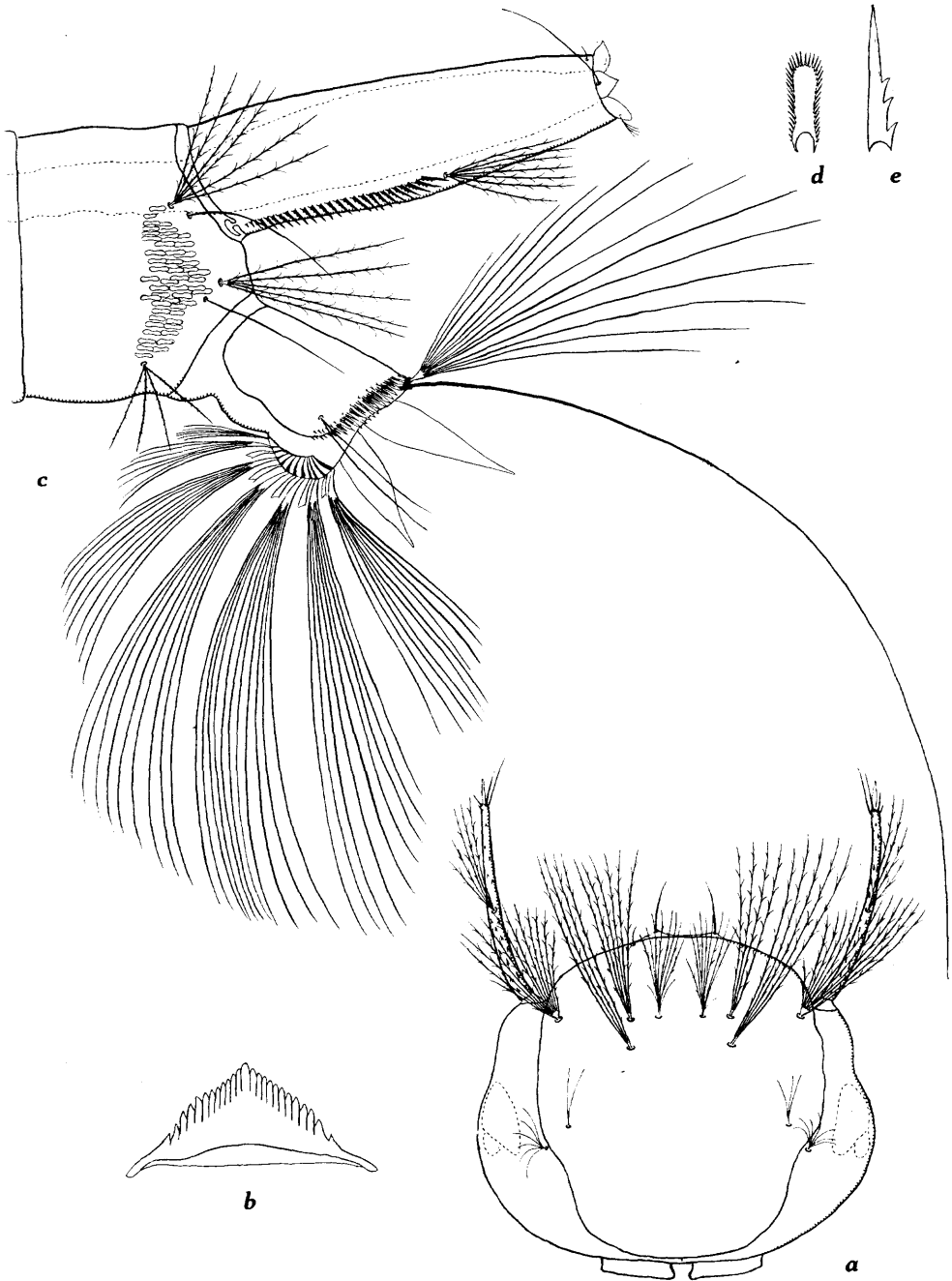


FIG. 6.—♂ genitalia of *Aedes monocellatus* n.sp., x 160.

beyond mid length almost to apex of coxite, is a tuft of 20–30 long, broad outstanding scales; between the scale tuft and the groove is a row of about 30 long setae, curved but not flattened at their tips. The coxite has a slightly developed basal lobe bearing a patch of about 30 long medially directed setae and included in the patch, along its tergal side are several very long narrow scales, the longest seta or scale being $\frac{1}{3}$ as long again as width of coxite; these are continuous distally with a row of fine setae along the tergal side of the groove, one of which preapically is more strongly developed than remainder. In addition, there are scattered fine setae tergally on the coxite and numerous long setae laterally and sternally. Style about $\frac{1}{3}$ length of coxite, curved, tapering on its apical third, pilose, without distinct preapical seta; terminal appendage about $\frac{1}{4}$ length of style, its apical $\frac{1}{6}$ – $\frac{1}{4}$ split into two pointed branches. Harpago stout, pilose, with 2–3 short preapical setae; appendage slightly shorter than harpago, widening close to its base into a broad lateral membranous expansion, tapering to a fine pointed tip. Paraproct with 1–2 teeth. Phallosome simple, pear-shaped. Lobes of IXth tergite with 3–5 setae; IXth sternite with 6–10 setae.



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FIG. 7.—Larva of *Aedes monocellatus* n.sp. *a*, head; *b*, mentum; *c*, terminal segments; *d*, lateral comb tooth; *e*, pecten tooth. (*a* and *c*, x 56; *b*, x 145; *d* and *e*, x 290).

Description of Larva: (Fig. 7.)

Length 7.5–8.5 mm. A grey larva with brown head and dark brown siphon and saddle.

Head $\frac{4}{5}$ as long as broad. Antenna $\frac{2}{3}$ length of head, 12 times as long as broad at base, tapering on its apical $\frac{1}{2}$, sparsely clothed with fine spicules; tuft 3–7 branched, plumose, about $\frac{1}{2}$ length of antenna, arising at $\frac{2}{5}$ – $\frac{1}{2}$ from base; terminal and subterminal setae arising close together, one long and one short in each pair. Clypeal spines fine, inconspicuously frayed and slightly curved. Setae A, B and C long and plumose; A, B and d arising in a straight line, the base of B twice as far from A as from d; A 9–14 branched, $\frac{3}{4}$ length of antenna, arising slightly posterior to its base; B 4–8 branched, equal in length to A; C 4–7 branched, as long as antenna, arising at a short distance directly behind B; d $\frac{2}{3}$ length of B, fine, sparsely plumose, 8–15 branched, the basal branches sometimes dividing again at mid length; e 2–3 branched, simple, f 6–10 branched, simple. Mentum broadly triangular, with a large medial tooth and 10–12 slightly smaller lateral teeth, the basal ones being more widely separated.

Thorax: Base of metapleural setae with short spines.

Abdomen: Two pairs of long, plumose, lateral setae on segment I, the longer 3–6 branched, the shorter bifid; one pair on II–VI, usually bifid, but may be trifold on II and IV.

8th Segment: Lateral comb a triangular patch of 35–70 apically rounded scales, laterally and apically fringed. First pentad seta 5–8 branched, plumose; second and fourth long, single, simple; third 4–9 branched, long, plumose; fifth 4–7 branched, finely frayed.

Siphon: Index 3.0–3.5. Pecten extending approximately $\frac{1}{2}$ length of siphon, made up of 21–30 closely set pointed spines, each with 2–5 (usually 3) prominent pointed lateral denticles on basal half; the most basal spines may be small and simple. Subventral tuft 4–9 branched, plumose, arising just beyond pecten. Acus present.

Anal Segment: Saddle covering dorsal $\frac{2}{3}$ of segment, with 2–3 rows of prominent spines apically, the distal row being the largest; 2 or 3 spines dorsally may be apically fringed, the remainder are tapering and sharply pointed. Lateral seta as long as saddle, usually bifid, occasionally single or trifold, simple or inconspicuously frayed. Caudal setae simple; upper 8–16 branched, about 3 times as long as saddle; lower long, single, more than twice length of upper. Ventral brush of 12 multiple tufts, each 8–12 branched, arising from a grid. Gills equal, tapering, pointed, slightly longer than saddle.

Description based on 20 larvae and larval pelts from the type locality, 3 from Mt. Mowbullen and 1 each from Maleny, Binna Burra, and Eungella Range.

Description of Pupa: (Fig. 8.)

General coloration brown, darker on upper surface of cephalothorax and basal abdominal tergites.

Cephalothorax: An indefinitely demarcated more darkly pigmented area extending dorsally almost to the anterior margin, and posteriorly across the base of the trumpet to include the metapostnotum and the posterior margin of the wing cover. Trumpet dark brown, fairly narrow at base, widening gradually, with oblique opening, ratio of meatus to whole 1:1.4–1.6; apical notch shallow.

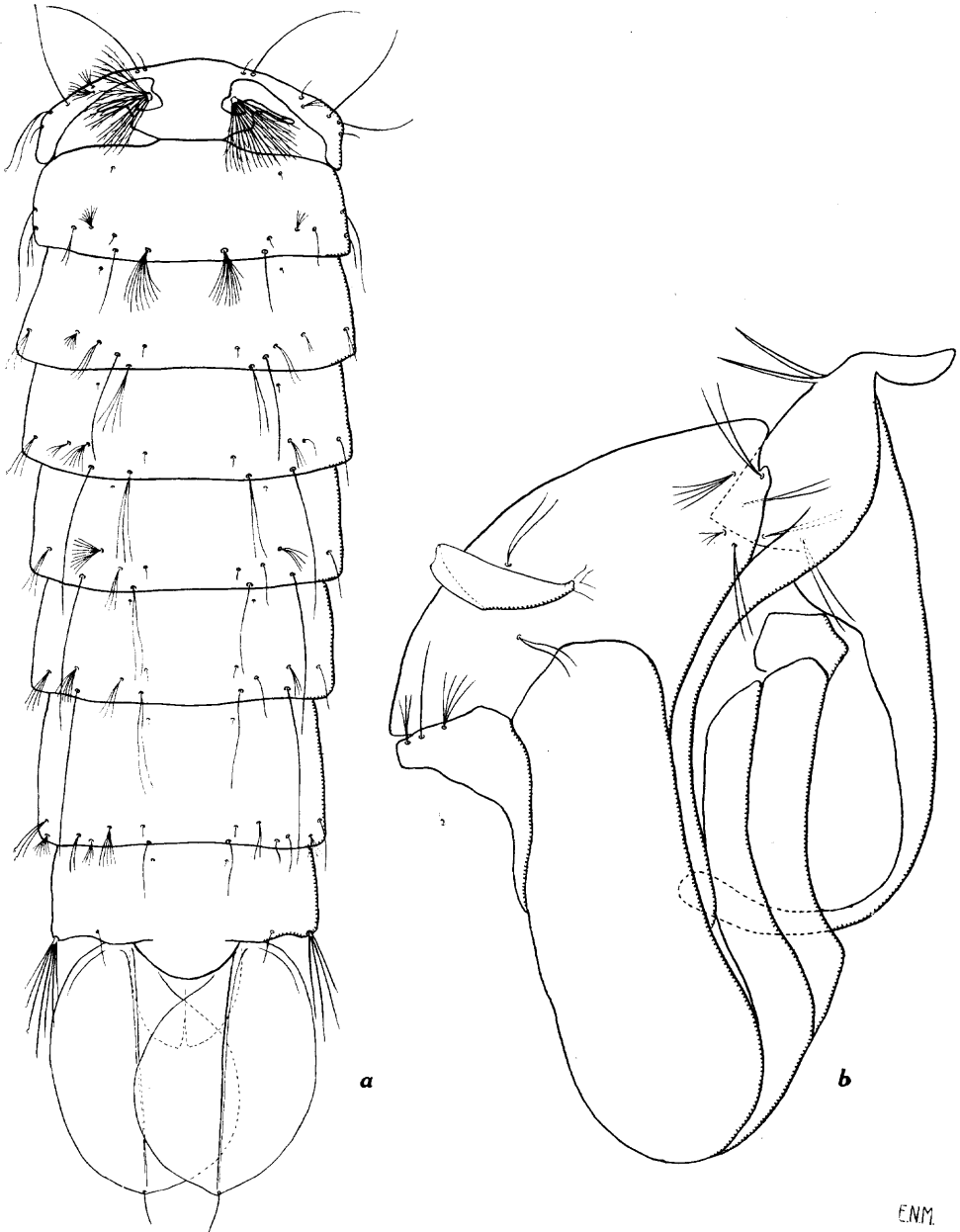


FIG. 8.—Pupal pelt of *Aedes monocellatus* n.sp., x 38. *a*, abdomen (dorsal view); *b*, cephalothorax.

Abdomen: Tergites I–III more darkly pigmented, bases of IV and V also may be darker. Float setae dendritic. Some of the larger abdominal setae may be plumose. Lateral seta of segment VIII 4–8 branched, plumose. Paddles moderately broad (breadth index 1.4–1.6) with bluntly pointed apex; margin denticulate, buttress and midrib fairly well developed; paddle seta single.

ENM

Described from 12 pupal pelts, 5 from Mt. Glorious, 3 from Binna Burra, 2 from Mowbullan and 1 each from Mt. Mitchell and Eungella Range.

Biology: This species has been found breeding in shaded water-holding cavities in the branches, buttresses or roots of trees, and in hollow pipes in tree stumps and fallen logs in rain forest or dry scrub. The larvae are more frequently encountered than those of *A. biocellatus*, but usually only in small numbers in association with other species, those from which the type series was bred being the only large series collected. The water in which they occur may be clear or strongly coloured by organic matter.

They have been found associated with larvae of the following species: *A. biocellatus*, *A. notoscriptus*, *Aedes candidoscutellum* Marks, *A. quasirubrithorax*, *Megarhinus speciosus* Skuse, *Tripteroides* spp.

From a sample collected at Binna Burra on 29th May, 1944, a specimen pupated on 10th August, 1944, and emerged on 16th August. Of larvae which were first instar when collected at Mt. Mowbullan on 26th September, 1944, the last remaining larva pupated on 6th December, 1944.

The pupal period is usually about 3 days, but may be up to 6.

Habits: Adults are known only from specimens reared in the laboratory and there is no information on their habits in nature.

Distribution: This species has been found only in Queensland. Specimens have been examined from the following localities:—Upper Cedar Creek, 22 ♀♀, 11 ♂♂ (J. L. Wassell and E. N. Marks, ix. 1943), Mt. Glorious, 6 ♀♀, 1 ♂, larvae (J. L. Wassell, x.,xi.,xvi.1943, i.,ii.1944, ii.1945, vi.1947), Camp Mountain, 1 ♀, 1 ♂ (E. N. Marks, i.1946) [all from 14–30 miles west of Brisbane], also 4 ♀♀, 3 ♂♂ labelled Brisbane, and larvae labelled Samford, xi.1942, F. A. Perkins, which were probably from Mt. Glorious; Maleny, larvae (J. L. Wassell, iv.1945); Mt. Mowbullan, Bunya Mts, 1 ♀, 2 ♂♂, larvae (J. L. Wassell, ix.1944); Maidenwell, larvae (J. L. Wassell, ix.1944); Binna Burra, Lamington National Park, 3 ♀♀, larvae (F. A. Perkins and E. N. Marks, xi. 1943, v.1944); Mt. Mitchell, 1 ♂, larvae (E. N. Marks, v.1947); Eungella Range (about 50 miles W. of Mackay), 1 ♀, larva (E. N. Marks, ix.1947).

(4) *AÈDES (FINLAYA) AURIDORSUM* Edwards.

Edwards, 1922, *Bull. ent. Res.*, 13: 93; 1924, *ibid.*, 14: 381.

Lee, 1944, Atlas of Mosquito Larvae of the Australasian Region. Australian Military Forces (Restricted): 64 (figure of larva).

Type: Holotype female from Eidsvold¹, Queensland, T. L. Bancroft, in the British Museum.

Distinctive Characters: Anterior half of mesonotum golden scaled, posterior half all golden scaled or with stripes of dark scales; basal $\frac{1}{3}$ – $\frac{2}{3}$ of mid tarsal segment I pale scaled, hind tarsal segments I–III or I–IV basally banded; wings black scaled but with a small patch of pale scales at bases of *C* and *R*₁; halteres with creamy scaled knob. ♂ Genitalia: Long narrow coxite without apical scale tuft, basal lobe with long narrow scales and setae; appendage of style $\frac{1}{6}$ length of style; harpago longer than its appendage which has wide membranous expansion close to base.

Larva²: Head seta d short, A, B and C single; lateral comb of 8–12 apically rounded fringed scales; distal tufts of ventral brush arising from a prominent chitinous projection.

¹ The original description gave the type locality as Sydney, but this was corrected by Edwards (1924).

² Larval characters of *A. auridorsum* suggest a relationship to *Aedes pecuniosus* Edwards—see Lee (1944).

*Description of Adult:**Female*

Wing length 4.0-5.2 mm.

Head: Integument brown, clothed with narrow curved golden scales, which also form a border to the eyes, and numerous golden upright forked scales; flat creamy scales laterally; a pair of strong dark or golden vertical setae with, on each side, a close-set row of 9-12 strong medially directed ocular setae, and finer dark ocular setae laterally. Torus brown, with a few hairs and small dark, or pale-reflecting scales on medial aspect; flagellar segments of antenna black, with sparse black verticillate hairs; basal half of first flagellar segment paler, and may bear a few pale scales on medial aspect. Clypeus brown. Palpi and proboscis clothed with purplish black scales; palpi $\frac{1}{6}$ - $\frac{1}{3}$ length of proboscis, which is slightly longer than fore femur; labella dark.

Thorax: Integument brown. Anterior half of mesonotum clothed with dense golden narrow curved scales, which continue as 5 longitudinal stripes on the posterior half, a broad medial stripe dividing in two on either side of the prescutellar bare area, two narrow submedial stripes, and two broad lateral stripes above the wing roots; these are separated by 4 longitudinal stripes of purplish black narrow curved scales. In some specimens the patch of golden scales above the wing root is completely separated anteriorly by dark scales; in others the mesonotum is entirely golden scaled. Mesonotal bristles fairly strong; about 20-24 acrostichal; no dorsocentral bristles on anterior $\frac{1}{3}$ of mesonotum but 5-8 posteriorly, continuous with a double row of 12-16 long strong prescutellar bristles and a patch of similar bristles above the wing roots. Scutellum clothed with narrow curved golden scales; bristles golden or dark, 7-14 on mid lobe, 6-12 on lateral lobes. Metapostnotum brown. Pleura brown. Narrow curved golden scales on anterior and posterior pronotum; flat pale scales on propleuron, in a long vertical stripe extending from prealar area along posterior border of sternopleuron, and on upper $\frac{2}{3}$ of mesepimeron; there may be in addition a few lanceolate pale scales on propleuron; paratergite with either pale narrow curved, or flat white scales. Pleural bristles dark or golden; 6-9 propleural; 5-7 posterior pronotal; 5-10 postspiracular; 1-4 upper sternopleural, and a row of about 10 along posterior margin of sternopleuron; 12-18 prealar; 8-12 upper and no lower mesepimeral bristles.

Legs: Purplish black scaled with basally banded tarsi. Coxae pale, clothed with flat pale scales. Trochanters pale scaled with some dark scales ventrally. Fore leg: Femur pale scaled beneath on basal half, extending in streak towards apex; there may be a few pale scales anteriorly at apex. Tibia dark, may have a few pale scales dorsally at base and some pale scaling ventrally. Tarsal segments I and II with basal pale bands $\frac{1}{3}$ - $\frac{1}{2}$ their length; III occasionally with a small basal pale patch or band; IV and V dark, V sometimes with some pale reflections. Mid leg: Femur and tibia similar to fore leg, but femur with prominent pale patch at apex. Tarsal segment I with basal pale band $\frac{1}{3}$ - $\frac{2}{3}$ its length dorsally and sometimes a few pale scales at apex, or may be entirely pale above except for a small preapical dark ring; II with basal band $\frac{1}{2}$ - $\frac{2}{3}$ its length dorsally; III with basal band or patch $\frac{1}{4}$ - $\frac{2}{3}$ its length; IV and V dark, V sometimes with some pale reflections. Hind leg: Femur with entire basal half creamy scaled, and wide apical pale band. Tibia dark, sometimes with some pale reflecting scales at base; tarsal segments I-III with basal pale bands $\frac{1}{3}$ - $\frac{2}{3}$ their length, I sometimes with small pale patch at apex; IV usually unbanded, but sometimes with narrow basal band; V paler scaled than IV, either dark showing pale reflections in some lights, or apparently completely pale creamy scaled. Claws of fore and mid legs strong, equal, toothed; hind claws smaller, equal, simple.

Wings: Clothed with purplish black scales, outstanding scales all long and narrow; patches of flat pale golden scales at base of *C* and *R*₁ and sometimes *M*. These may extend to the humeral crossvein, and that on *R*₁ is often divided in two by a patch of dark scales. Cell *R*₂, 1-1½ times length of its stem; cell *M*₁ about ¼ length of its stem, its base proximal to that of cell *R*₂; *r-m* 1-1½ times its length distal to base of *M*₃₊₄. Halteres pale with creamy scaled knob.



FIG. 9.—♂ genitalia of *Aedes auidorsum* Edw., x 125.

Abdomen: Integument brown. Tergites with golden hairs along lateral and apical margins, hairs on sternites mostly darker and scattered over surface of sternites. Tergite I with pale scales medially; tergite II purplish black scaled, with a basal pale golden medial triangular patch, broadened to form a basal band; similar triangular patches on III-V, but usually not forming a complete band; on VI and VII, sometimes also on V, the triangular golden patch is considerably enlarged so that it covers almost entire dorsal surface of tergite, with some purplish scales laterally at apex; II-VII with large rounded lateral basal white patches; tergite VIII partially extruded, pale scaled. Sternites creamy scaled; III-VII with broad apical purplish black bands, or IV-VII may be mainly dark, with large lateral basal pale patches; sternite VIII bare, light brown, very large and exerted. Cerci short, dark.

Male: Wing length 3.5–4.1 mm. Coloration and scaling similar to ♀. Torus dark brown; flagellar segments of antenna brown with dense purplish black verticillate hairs. Palpi equal in length to proboscis, purplish black scaled, two apical segments with dense long dark hairs. Specimens examined had no dark scales on posterior half of mesonotum. Postspiracular bristles may number only 3. Claws of fore and mid legs large, unequal, the anterior being longer, with two teeth, and the posterior shorter with one tooth; hind claws smaller, equal, simple. Abdominal tergites II–VIII with broad pale golden basal bands; sternites III–VII purplish scaled with lateral basal pale patches, VIII mainly pale.

♂ *Genitalia:* (Fig. 9.)

Coxite purplish-black scaled with a few pale scales at base, cylindrical, about 5 times as long as broad at base, with a longitudinal groove-like membranous area along inner aspect. On the sternal side of this groove on the apical $\frac{2}{3}$ of coxite is a row of about 30 long fine apically curved setae, some with slightly flattened tips; sternal to these are numerous very long setae. The coxite has a slightly developed basal lobe bearing a patch of about 20 medially directed setae and very long narrow scales, the longest being about twice width of coxite in length. Tergally the coxite bears numerous long setae, with shorter ones medially, and very long ones laterally. Style about $\frac{2}{3}$ length of coxite, slightly curved and tapering, pilose, with 2–3 short preapical setae; terminal appendage $\frac{1}{3}$ length of style, apically grooved but not split. Harpago long, stout, pilose, narrowing slightly on its apical fourth and with 3–8 setae on its apical half, the longest almost $\frac{1}{2}$ length of appendage; appendage slightly shorter than harpago, widening close to its base into a broad lateral membranous expansion, tapering to a fine pointed tip. Paraproct with 1–3 teeth. Phallosome simple, cylindrical, narrower apically. Lobes of IXth tergite with 4–5 setae; IXth sternite with 8–10 setae.

Description of Larva: (Fig. 10.)

Length about 9.5 mm. A stout dark grey larva with brown head and saddle and dark brown siphon.

Head: Almost as broad between the eyes as it is long but narrower anteriorly, giving it an elongated appearance. The portion anterior to the insertion of the antennae is roughly the shape of a triangle with rounded apex slightly overhanging the mouthbrushes, the preclypeus being apparently not differentiated from the clypeus. A deep medial furrow extends from the anterior margin $\frac{2}{3}$ distance to bases of B and d. Antenna $\frac{1}{4}$ – $\frac{1}{3}$ length of head, about 8 times as long as broad at base, cylindrical and sparsely clothed with fine spicules; tuft a single simple seta about $\frac{1}{2}$ length of antenna arising at $\frac{2}{3}$ – $\frac{1}{2}$ from base; terminal and subterminal setae arising close together, one long and one short in each pair. Clypeal spines arising a short distance behind anterior margin of head, slender, slightly curved and frayed. Setae A, B and C single, simple, their bases about equidistant from one another; A slightly more than $\frac{1}{2}$ length of antenna and arising some distance behind its base; B and C slightly longer than antenna, B arising level with its base and nearer midline than A, C arising directly behind and some distance from B; d arising medial to and in line with B, simple, single or bifid, about $\frac{2}{3}$ length of B; e arising well back, simple, single or bifid; f 4–7 branched, simple. The mouthparts are adapted for predacity. The setae of the mouthbrushes are pectinate, and some of the facets on the basal plates from which the brushes arise are produced into blunt teeth. The mentum is triangular and very heavily chitinised, with a medial tooth and 8–10 strong lateral teeth, becoming

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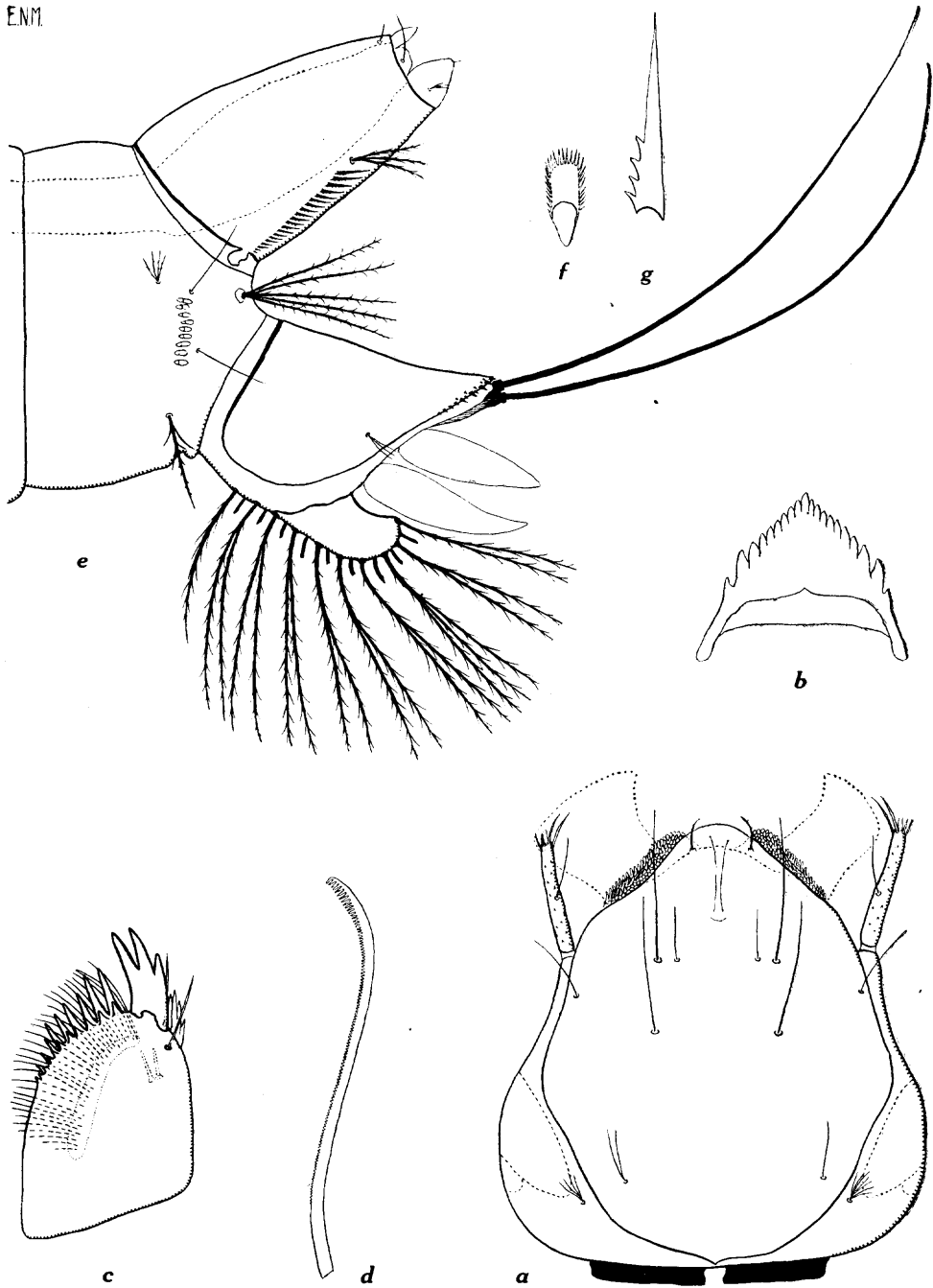


FIG. 10.—Larva of *Aedes auridorsum* Edw. *a*, head; *b*, mentum; *c*, maxilla; *d*, seta from mouthbrush; *e*, terminal segments; *f*, lateral comb tooth; *g*, pecten tooth. (*a* and *e*, x 56; *b* and *c*, x 145; *d*, *f* and *g*, x 290.)

progressively larger laterally, though the most basal tooth is smaller. The maxilla bears apically a very stout heavily chitinised spine, about $\frac{1}{3}$ length of maxilla and divided distally into three teeth. On the outer side of this is a group of 4-6 smaller close-set spines. There is a strong seta on the ventral surface near the base of these and another on the dorsal surface at the base of the large spine. A short distance proximal to the latter are a pair of short blunt spine-like setae with their bases closely approximated. On the dorsal surface of the maxilla is a longitudinal membranous ridge bearing long fine setae. The inner edge of the maxilla is produced into two rows, each of 10-12 teeth, the dorsal row being long, and the ventral row very short.

Thorax: Base of metapleural setae with inconspicuous spines; the two long setae of the metapleural group are stout, single and plumose.

Abdomen: Two pairs of moderately long plumose lateral setae on segments I and II, their bases fused into a large chitinous boss; the longer (upper) single, the shorter (lower) 2-3 branched on segment I, 1-3 branched on segment II. One pair of single plumose lateral setae on segments III-VI.

8th Segment: Lateral comb a single row of 8-12 short, broad, apically rounded, laterally and apically fringed scales. First pentad seta small, 2-6 branched, frayed; second and fourth longer, single, simple; third 3-6 branched, long, plumose; fifth single, bifid or trifid, stout and coarsely frayed.

Siphon: Index 1.5-1.6. Pecten extending about $\frac{1}{2}$ length of siphon, made up of 19-22 (but in one specimen, only 12) evenly spaced long slender pointed spines each with 2-4 prominent lateral denticles; the most basal spines are reduced in size. Subventral tuft 2-3 branched, stout and plumose, arising just beyond pecten. Acus present.

Anal segment: Saddle covering almost $\frac{9}{10}$ of segment, longest dorsally, with a sloping apical border bearing some small spines on its upper portion. Lateral seta 2-5 branched, small and simple, about $\frac{1}{2}$ length of saddle. Upper and lower caudal setae single, simple, $2\frac{1}{2}$ times length of saddle. The ventral brush is composed of 18-22 plumose, 1-3 branched setae about equal in length to saddle; all except the basal 3 or 4 of these arise from a prominent hollow chitinous projection resembling the prow of a canoe. There is no grid but the setae arise from alternate sides. Gills short, unequal, tapering, the upper pair shorter, about $\frac{1}{2}$ length of saddle, the lower about $\frac{3}{4}$ length of saddle.

Described from two whole larvae and five larval pelts correlated with adults, all from Gracemere.

Description of Pupa: (Fig. 11.)

General coloration brown, darker on upper surface of cephalothorax and basal abdominal tergites.

Cephalothorax: An indefinitely demarcated more darkly pigmented area posteriorly, extending slightly beyond the base of the trumpet anteriorly and including the metapostnotum, and all but the upper anterior angle of the wing cover. Trumpet dark brown but margin of piina lighter, moderately long, widening gradually from base; opening oblique, ratio of meatus to whole 1:1.3-1.6, apical notch shallow.

Abdomen: Tergites I-IV more darkly pigmented particularly basally, and remainder with some dark pigmentation at base. Float setae dendritic. Some of the larger setae are frayed. Lateral seta of segments VII and VIII stout, single, frayed, that of VIII $\frac{1}{2}$ length of paddles. Paddles almost circular with shallow apical notch, breadth index 1.0-1.1; margin denticulate; buttress

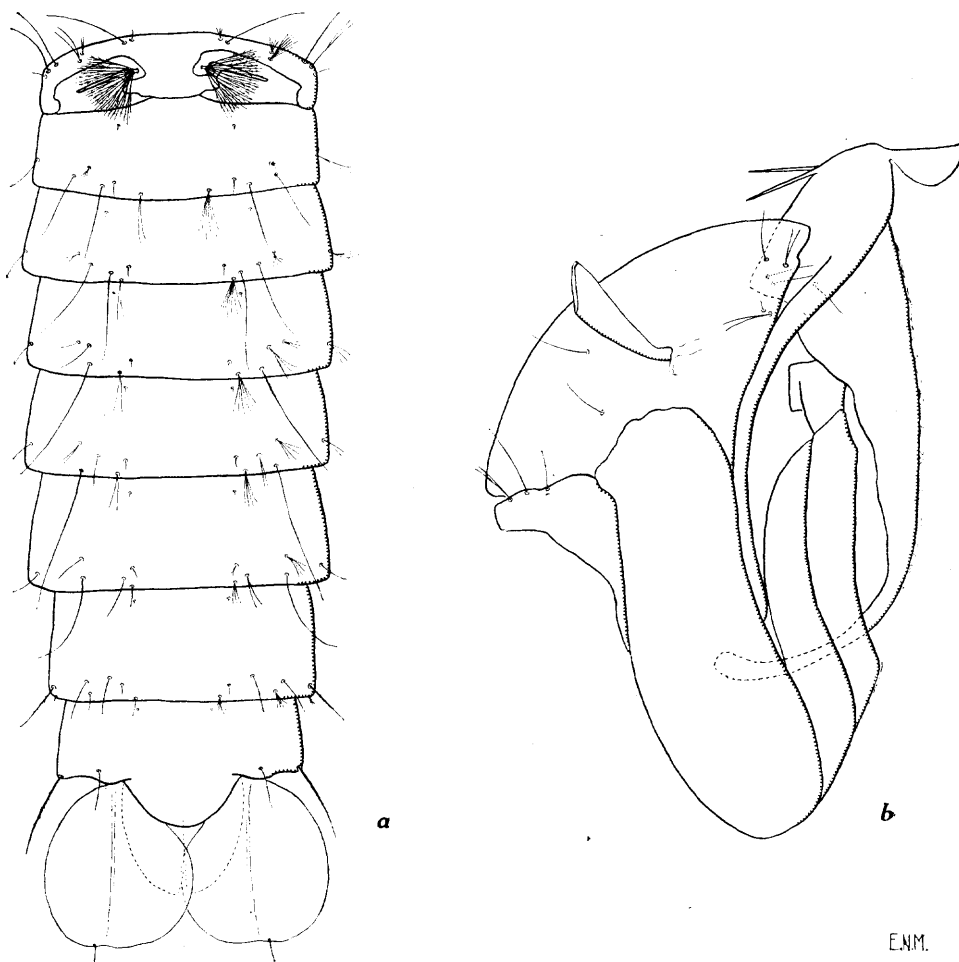


FIG. 11.—Pupal pelt of *Aedes auridorsum* Edw., x 30. *a*, abdomen (dorsal view); *b*, cephalothorax.

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and midrib moderately developed but entire paddle is chitinised to same degree as segment VIII; paddle seta single, about $\frac{1}{5}$ length of paddle, inserted lateral to notch. The paddles of this species are not unusually small but a noteworthy feature is the comparatively large size in proportion to them of the membranous sheath enclosing the developing genital organs which in the female is $\frac{1}{2}$ and in the male $\frac{3}{4}$ the length of the paddles.

Described from seven pupal pelts, five correlated with adults, from Gracemere.

Biology: Adults were reared from a mixed collection of larvae from a cavity in the butt of a tree in dry vine scrub at Gracemere; associated species were *A. australiensis*, *A. quasirubrithorax*, *A. notoscriptus* and *Tripterooides* sp. Mr. J. L. Wassell has observed a larva of *A. auridorsum* preying on other living mosquito larvae.

The pupal period occupies 4 days.

Habits: An adult was taken biting at 11 a.m. in dry vine scrub at Gracemere. It was raining at the time. Dr. Bancroft also collected adults biting.

Distribution: Known only from Queensland. Specimens collected by Dr. Bancroft and described by Edwards were from Eidsvold and Brigalow Scrub. The latter, I am informed by Dr. Bancroft's daughter, Mrs. M. J. Mackerras, does not refer to any specific locality, but indicates that the specimen was taken in one of the areas of brigalow scrub in the neighbourhood of Eidsvold. Specimens examined included 14 ♀♀, all recognisable as T. L. Bancroft's specimens, 11 in Queensland Museum collection, and 3 in University of Queensland collection; of these, 2 are dated March, 1913, and 2 July and August, 1926, both dates being during Dr. Bancroft's residence at Eidsvold, and it is not unlikely that the whole series is from the type locality. 3 ♂♂ examined were from Fairy Bower, Gracemere, *via* Rockhampton, Q. (6.x.1945), and a further series from the same locality comprised 2 ♂♂ and 3 ♀♀ with correlated larval and pupal skins, 2 additional bred ♀♀, 2 larvae (2.x.1947) and 1 ♀ taken biting (4.x.1947), all being collected by J. L. Wassell.¹

(5) *ÆDES* (FINLAYA) *SUBAURIDORSUM* n.sp.

Types: Holotype ♀, allotype ♂ (with associated pupal skins), Mt. Mowbullian, Bunya Mountains, Queensland, 22.ix.1945, J. L. Wassell (reared from pupae taken from a cavity in a tree) and two morphotype larvae (same data), all deposited in University of Queensland collection.

Distinctive Characters: Mesonotum clothed with bright golden scales; white basal bands on hind tarsal segment I, or I-II only; wings black scaled; halteres with black scaled knob. ♂ Genitalia: Coxite without apical scale tuft, shorter and broader than in *auridorsum*, basal lobe with setae only; appendage of style almost $\frac{1}{2}$ length of style; harpago equal in length to its appendage which widens from base with narrow membranous expansion.

Larva: Head seta d short, 4-6 branched, simple; clypeal spines long, stout, and pointed; lateral comb of 19-31 narrow, pointed fringed scales; siphonal index 3.5; saddle without apical spines, lateral seta 4-5 branched; gills equal, 1 x saddle.

Description of Adult:

Holotype ♀.

Wing length 3.0 mm.

Head: Integument black, clothed with narrow curved bright golden scales, which also form a border to the eyes, and numerous golden upright forked scales; flat creamy scales laterally; a pair of long golden vertical setae and a row of 3 long golden medially directed ocular setae, with shorter black setae laterally. Torus black with a few dark hairs on medial aspect; flagellar segments of antenna black with sparse black verticillate hairs. Clypeus black. Palpi and proboscis black scaled; palpi $\frac{1}{3}$ length of proboscis which is $1\frac{1}{2}$ length of fore femur; labella dark.

Thorax: Integument dark brown to black. Mesonotum clothed with fairly large bright golden narrow curved scales. Mesonotal bristles long, light brown; acrostichals rubbed; about 10 dorsocentral, a double row of 8 prescutellar, and a patch of similar bristles above the wing roots. Scutellum clothed with narrow curved golden scales, 3 long golden border bristles to each lobe. Metapostnotum dark brown.

¹An additional locality is Moolyamba Gorge, Carnarvon Ra., Q. (J. L. Wassell, 9.v.1948)—larvae collected from a cavity in a bottle tree (*Brachychiton* sp.).

Pleura dark brown. Posterior pronotum practically bare, a few lanceolate golden scales on posterior margin. Broad flat shining white scales on propleuron, anterior pronotum, paratergite and prealar area, in a large patch on upper sternopleuron, and smaller patches on lower sternopleuron posteriorly, and on upper mesepimeron. Bristles golden, 4 propleural, 3 posterior pronotal, 4-5 postspiracular, 1 upper sternopleural and a row of about 4 along posterior margin of sternopleuron; about 10 prealar, 9 upper and no lower mesepimeral bristles.

Legs: Purplish black scaled with reduced tarsal banding. Coxae and trochanters pale scaled. Fore leg: Femur creamy scaled ventrally on basal $\frac{2}{3}$ and with a few pale scales ventrally at apex; tibia with a few scattered pale scales beneath; tarsal segment I with a small basal pale patch, II-V all black. Mid leg: Femur with basal $\frac{2}{3}$ creamy scaled, except for a narrow dorsal strip, and with minute pale kneespot; tibia dark; tarsal segment I with narrow basal pale band $\frac{1}{3}$ its length, II-V all black. Hind leg: Femur with basal $\frac{2}{3}$ entirely creamy scaled, and with prominent silvery kneespot; tibia dark; tarsal segment I with basal pale band $\frac{1}{3}$ its length, II-V all black. Claws equal, those of fore and mid legs toothed, hind simple. (The right foreleg and tarsal segments III-V on right hind leg are missing.)

Wings: Clothed with purplish black scales; no pale scales; outstanding scales all long and narrow. Cell R_2 twice the length of its stem; cell M_1 a shade longer than its stem, the bases of the cells level; $r-m$ its own length distal to base of M_{3+4} . Halteres with pale stem and black scaled knob.

Abdomen: Integument dark brown, with sparse pale hairs along lateral and apical margins of sclerites. Tergites I-VII purplish black scaled, unbanded, with large rounded lateral basal patches of silvery white scales; VIII retracted. Sternites II-VII purplish scaled with narrow basal white bands widening into large lateral patches; VIII bare, dark brown, large and exerted. Cerci short, black.

A female from Eungella Range differs from the type in having wing length 3.1 mm; about 8 acrostichal bristles; 5 long bristles to mid lobe of scutellum; a patch of broad flat shining white scales on posterior pronotum; 5 propleural, 3-5 posterior pronotal and 2-3 postspiracular bristles, 2 long bristles along posterior margin of sternopleuron; fore tibia all dark and small pale basal patches on mid and hind tarsal segment II; wing with $r-m$ twice its own length distal to base of M_{3+4} ; halteres with a few pale scales on underside of knob; abdominal tergites II-VI with indefinite basal bands of bronzy scales.

Male: The allotype differs from the female as follows: Wing length 2.9 mm. Laterally, the border to the eyes is of flat pale scales; there are 3-4 long ocular setae. The flagellar segments of the antenna are brown with dense purplish black verticillate hairs. Palpi unbanded, almost equal in length to proboscis, the two distal segments with long black hairs; proboscis $1\frac{1}{3}$ length of fore femur. Scutellum with 4 bristles to mid lobe. There are a couple of flat white scales on posterior pronotum, 2-3 postspiracular bristles. Claws of fore and mid legs toothed, the anterior claw being longer; hind equal, simple. Wings: Cell R_2 $1\frac{1}{3}$ length of its stem; cell M_1 slightly shorter than its stem, the bases of the cells level; $r-m$ $1\frac{1}{2}$ times its length distal to base of M_{3+4} . Abdomen: Tergites I-VII purplish black scaled with small lateral basal silvery white patches; II-VII with some golden scales medially at base; VIII entirely silvery white scaled. Sternites II-VII dark scaled with some white scales basally and laterally; VIII entirely silvery white scaled.

A male from Tumoulin has wing length 2.5 mm.; mid tarsal segment I has a white basal band $\frac{1}{4}$ its length, and II has a narrow basal band $\frac{1}{5}$ its length; there is a small dorsal pale patch at the base of hind tarsal segment II; abdominal tergite I is pale scaled medially; II and III with a pale medial basal patch; IV-VI with narrow basal bands; II-VII have lateral basal white patches, larger on the posterior segments; sternites III-VII have basal pale bands.

A male from Highvale has wing length 2.7 mm., leg and abdominal markings as in the Tumoulin specimen.

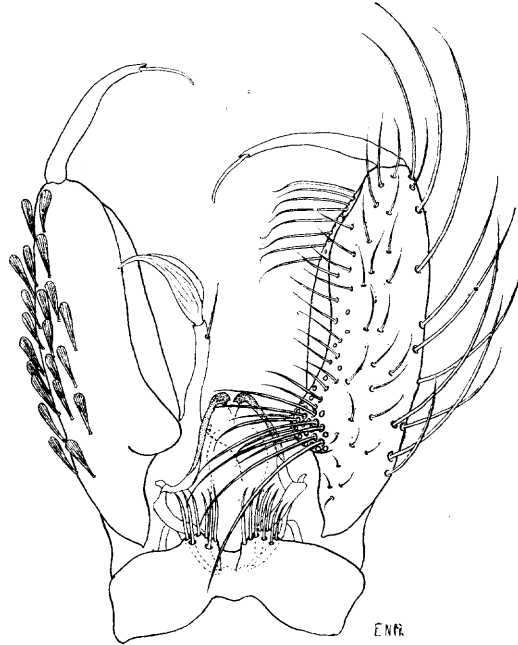


FIG. 12.—♂ genitalia of *Aedes subauridorsum* n.sp., x 160.

♂ *Genitalia*: (Fig. 12.)

Coxite black scaled, tapering apically, about $3\frac{1}{2}$ times as long as broad at base, with a longitudinal groove-like membranous area along inner aspect. On the sternal side of this groove on the apical $\frac{2}{3}$ of coxite, is a row of 15-20 long fine curved setae. The coxite has a slightly developed basal lobe, bearing a patch of about 30 medially directed setae, the longest being $1\frac{1}{2}$ times width of coxite in length; these are continuous distally with scattered setae extending to apex of coxite; there are some small setae basally and very long ones laterally and sternally. Style $\frac{2}{3}$ - $\frac{1}{2}$ length of coxite, slightly curved and tapering, pilose, without distinct preapical seta; terminal appendage slender, apically grooved, $\frac{3}{8}$ - $\frac{1}{2}$ length of style. Harpago stout, pilose, with a preapical seta almost $\frac{2}{3}$ length of appendage; appendage equal in length to harpago, widening bilaterally close to its base and tapering to a curved, pointed tip, longitudinally striated and with a narrow membranous expansion. Paraproct with 1-2 teeth. Phallosome simple. Lobes of IXth tergite with 4-11 setae. IXth sternite with 6-7 setae.

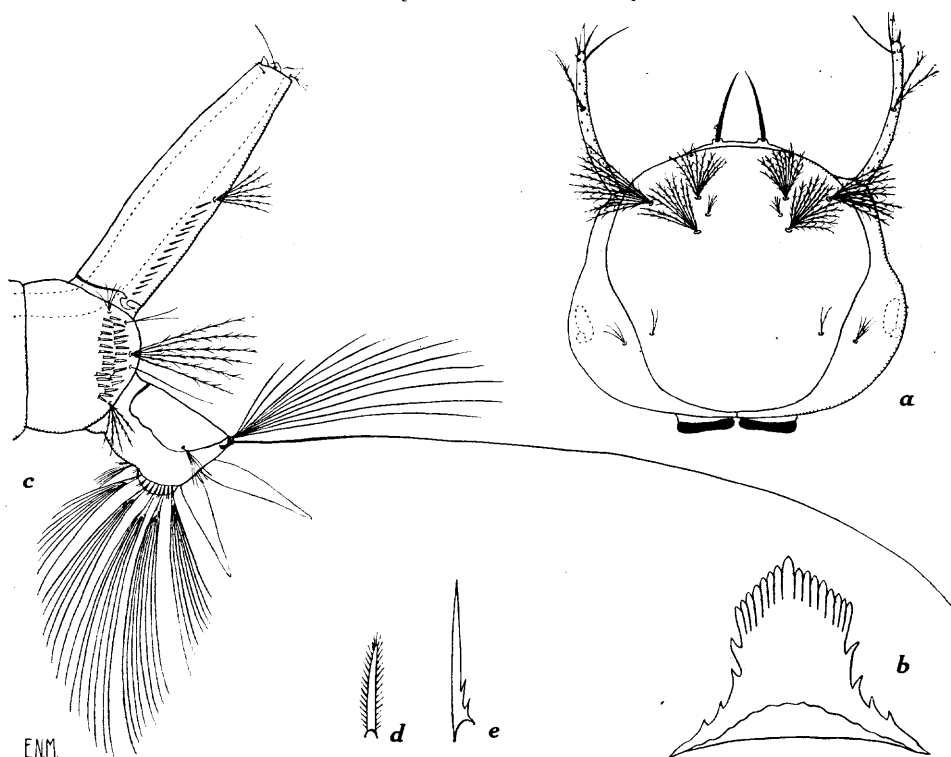


FIG. 13.—Larva of *Aedes subauridorsum* n.sp. *a*, head; *b*, mentum; *c*, terminal segments; *d*, lateral comb tooth; *e*, pecten tooth. (*a* and *c*, x 56; *b*, *d* and *e*, x 290).

Description of Larva: (Fig. 13.)

Length approximately 4.0 mm. A small light grey larva; head and saddle light brown, siphon darker brown, particularly towards apex.

Head: Slightly broader than long. Antenna $\frac{1}{2}$ length of head, about 10 times as long as broad at base, slightly curved and tapering, sparsely clothed with fine spicules; tuft single or bifid, plumose, about $\frac{1}{2}$ length of antenna, at $\frac{2}{3}$ from base; subterminal setae arising a short distance from terminal setae, one long and one short in each pair. Clypeal spines long (about $\frac{1}{2}$ length of antenna), dark, stout, pointed, slightly curved, arising from prominent bases. Setae A, B and C plumose; A 8–15 branched, about $\frac{2}{3}$ length of antenna, and arising level with its base; B 7–10 branched, arising a little anteriorly to A, and halfway between it and mid line; C 6–10 branched, arising a short distance from, and directly behind B; d 4–6 branched, short, simple, arising halfway between B and C and slightly medial to them; e bifid, f 3–6 branched, both simple. Mentum of distinctive shape, long and narrow except at base; large medial tooth flanked by 7–8 slightly smaller close set teeth in a row at an angle of about 30° with the base; the angle then changes sharply to almost 90° , and is again reduced as the mentum broadens at its base; there are 3–5 widely spaced teeth on this portion.

Thorax: Base of metapleural setae with very short spines.

Abdomen: Two pairs of long, plumose, lateral setae on segment I, the longer single or bifid, the shorter single; one pair, single or bifid on segments II–VI.

8th Segment: Lateral comb a triangular patch of 19-31 narrow pointed, laterally and apically fringed scales in 2-3 rows. First pentad seta fine and simple, 3-4 branched; second similar, 2-3 branched; third long, 6-8 branched, plumose; fourth long, single, simple; fifth shorter, 4-6 branched, plumose.

Siphon: Index about 3.5. Pecten extending over slightly less than $\frac{1}{2}$ length of siphon, made up of 10-16 evenly spaced long slender pointed spines, often appearing simple, but each with 2-3 short pointed lateral denticles near its base. Subventral tuft 6-7 branched, plumose, arising at mid length of siphon. Acus present.

Anal Segment: Saddle covering dorsal $\frac{1}{2}$ of segment, without apical spines. Lateral seta 4-5 branched, fine and simple, about $\frac{1}{2}$ length of saddle. Caudal setae simple, upper 10-12 branched, about 3 times length of saddle; lower long, single, $2\frac{1}{2}$ times length of upper. Ventral brush of 12 multiple tufts, each with 6-10 branches, arising from a grid except the proximal one or two which are precratal. Gills equal, tapering, pointed, equal in length to the saddle.

Description based on two morphotype larvae, and portions of four larvae or pelts from the same source; also one complete larval pelt, correlated with adult, from Tumoulin, N.Q.

Description of Pupa: (Fig. 14.)

General coloration brown, darker posteriorly on the cephalothorax, and on the basal abdominal segments.

Cephalothorax: An indefinitely demarcated darkly pigmented area dorsally extending forwards to level of base of trumpet and including the metapostnotum and upper and posterior margin of the wing cover. Trumpet brown, fairly narrow, but widening gradually from base, with oblique opening; ratio of meatus to whole 1 : 1.25, apical notch shallow.

Abdomen: Darker pigmentation on tergites I-V, not extending to apical and lateral margins on IV and V; there may also be a faint darker area basally on VI. Float setae many-branched, but do not appear dendritic. Some of the longer abdominal setae may be finely pilose. Lateral seta of segment VIII with 3 plumose branches. Paddles narrow (breadth index 1.6), tapering distally to a bluntly pointed apex; margin denticulate, buttress and midrib well developed; paddle seta single.

Described from pupal pelts of holotype and allotype and one correlated with adult from Tumoulin.

Biology: The type specimens were bred from larvae and pupae collected from a cavity formed where a scarf had been cut into the trunk of a living 'bean' tree in a patch of felled rain forest, at an altitude of about 3,500 feet. The water was tea coloured. One larva survived for eight weeks in the laboratory. Associated species were *A. quasirubrithorax* and *Tripterooides* sp.

The specimen from Highvale was reared from a sample of water out of a rot hole down the centre of a post in forest country, approximating to a dry rain forest, at an altitude of about 600 feet.

At Tumoulin (altitude 3,165 feet), this species was collected from a hollow bloodwood stump 2 feet high in forest country; the water was 4-5 in. deep with a surface area of about 100 sq. in., and contained rotting leaves and grass; the nearest rain forest was 4 miles distant. Stump holes were filled during a season of hot sultry weather and heavy rains, approximately 70 in. having fallen during the 10 weeks preceding the collection. Three days before the collection was made, larvae were numerous in these sites, but, in the interval,

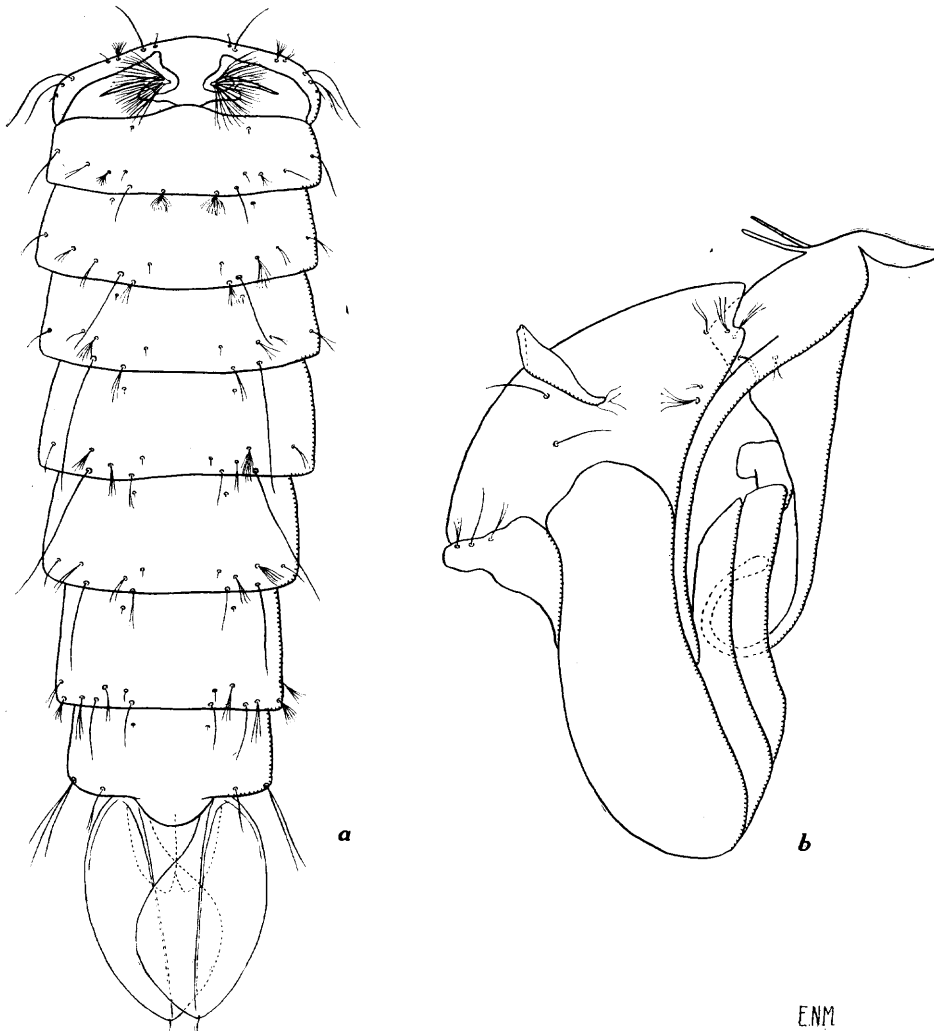


FIG. 14.—Pupal pelt of *Aedes subauridorsum* n.sp., x 38. a, abdomen (dorsal view); b, cephalothorax.

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some holes had dried up and in others many larvae had died, possibly due to a sudden drop in temperature to a minimum of 28°F. Associated species were *A. notoscriptus*, *Aedes tremula* (Theo.) and *Tripteroides* sp.

Habits: A female was taken biting about 4 p.m. in rather open rain forest on the Eungella Range.

Distribution: Specimens have been examined from the following localities in Queensland: Mt. Mowbullan, Bunya Mts., 1 ♂, 1 ♀, larvae (J. L. Wassell, 22.ix.1944); Highvale (Samford district, about 20 miles west of Brisbane), 1 ♂ (J. L. Wassell, 9.xi.1943); Tumoulin (4 miles from Ravenshoe), 1 ♂, larva (W. A. R. Hedges and pupils of Tumoulin State School, 9.iv.1945); Eungella Range, 1 ♀ (E. N. Marks, 20.ix.1947).

ÆDES (FINLAYA) PALMARUM Edwards.

Aedes (Finlaya) palmarum Edwards, 1924, *Bull. ent. Res.*, 14 : 382; King and Hoogstraal, 1946, *Proc. ent. Soc. Washington*, 48 : 150.

Aedes (Finlaya) albatarsis Taylor, 1944 (in part), *Proc. Linn. Soc. N.S.W.*, 69 : 121.

Aedes (Finlaya) australiensis Lee, 1944, Atlas of Mosquito Larvae of the Australasian Region, Australian Military Forces. (Restricted) : 58 (figure of larva).

Type: Holotype ♀, Palm Island, North Queensland (G. F. Hill) in the British Museum.

The male and pupa have not hitherto been described.

Distinctive Characters: Mesonotal pattern similar to that of *Aedes novalbatarsis* King and Hoogstraal. Anterior $\frac{2}{3}$ of mesonotum in the male white or creamy scaled except for outer half of fossae, in the female with medial white or creamy stripe $\frac{1}{3}$ its width, bulb-shaped posteriorly, remainder mainly dark scaled; hind tarsal segments I-IV with basal white bands; wings black scaled, *r-m* usually at least its own length distal to base of M_{3+4} . ♂ Genitalia: Coxite without apical scale tuft, basal lobe with setae only, 3-4 being stout and flattened; appendage of style almost $\frac{1}{2}$ length of style; harpago slightly shorter than its appendage which is slender with a very narrow membranous expansion and horizontal wrinkling on its basal half. IXth tergite bare of setae.

Larva: Head setae B and C near front margin of head, d short, simple, 2-5 branched, in line with C; clypeal spines stout, bluntly pointed; lateral comb of 8-15 teeth each consisting of a long pointed spine with a fringe of small denticles at its base; siphonal index 2.0-2.5, pecten teeth widely spaced; saddle with scattered small spines apically, lateral seta 1-2 branched; gills unequal, upper 1-3 x saddle.

Description of Adult:*Male.*

Wing length 2.3-3.4 mm.

Head brown, clothed with narrow curved whitish or creamy scales medially, and flat creamy scales laterally; upright forked scales creamy medially, with some dark ones laterally at nape; 1 or 2 pairs of strong golden vertical setae and a row of 3-5 long medially directed ocular setae with shorter ones laterally. Torus brown; flagellar segments of antenna brown with dense brown verticillate hairs, apical segments dark brown. Clypeus brown. Palpi almost equal in length to proboscis, black scaled with white bands or patches at bases of segments III-V, not more than $\frac{1}{5}$ length of III, $\frac{1}{4}$ - $\frac{1}{3}$ IV and V, and with long dark hairs at tip of III and on IV and V. Proboscis $1\frac{1}{3}$ - $1\frac{1}{2}$ times length of fore femur, black scaled, sometimes with some pale reflecting scales medially; labella brown.

Thorax: Integument brown. Mesonotum clothed with fine narrow curved scales; the anterior $\frac{2}{3}$ is mainly pale scaled, with dark scales on the outer half of the fossae continuing back in a narrow lateral strip, so that the pale scales form a broad patch, narrower anteriorly, and with the posterior margin fairly straight, or slightly curved and produced medially; the patch may be white or creamy, or white with a creamy margin. The posterior $\frac{1}{3}$ of mesonotum is mainly dark scaled, usually with a line of creamy scales on either side of the prescutellar bare area, and sometimes with a few creamy scales above the wing roots. There are no acrostichal bristles; 3-4 fairly strong dorsocentral bristles on posterior half of mesonotum, a double row of 6-8 strong prescutellar bristles

and a patch of similar bristles above the wing root. All lobes of scutellum clothed with narrow curved creamy scales, the mid lobe having narrow curved dark scales basally; 4-5 long bristles to mid lobe and 3-5 to lateral lobes in addition to shorter bristles. Metapostnotum brown.

Pleura: Anterior pronotum clothed with broad, and sometimes also narrow curved pale scales, and nearly always with a few broad black scales above. Posterior pronotum with flat creamy scales below and flat black scales above, with a few narrow curved creamy and dark scales along upper margin; patches of pale scales on propleuron, postspiracular area (usually), subspiracular area, upper sternopleuron, lower posterior margin of sternopleuron, paratergite, prealar area, and two patches, one above and one medially, on mesepimeron. Pleural bristles pale; a row of 10-14 propleural; 4-5 posterior pronotal; 3-6 postspiracular; 3-5 upper sternopleural, and a row of 4-6 along posterior margin of sternopleuron, one of the lower often being longer and stronger than remainder; about 12 prealar; 9-12 upper, and no lower mesepimeral bristles.

Legs: Mainly black scaled, with banded tarsi. Coxae pale, with pale scales. Trochanters pale scaled with some admixture of dark scales. Fore leg: Femur creamy scaled posteriorly and with indefinite pale scaling on basal $\frac{1}{3}$ anteriorly; tibia pale scaled posteriorly, or almost entirely dark; tarsal segment I, or I-II, with very narrow white basal band or patch; tarsal segment I may have some pale reflecting scales posteriorly. Mid leg: Femur creamy scaled ventrally and posteriorly; tibia and tarsal segment I as on fore leg; very narrow white basal band on II or II-III. Hind leg: Femur creamy scaled with a dark dorsal streak which widens gradually on the distal $\frac{1}{2}$ to form a complete, or almost complete ring at apex (there may be a few pale scales laterally and ventrally at apex, but no distinct kneespot); tibia as on fore and mid legs; tarsal segments I-IV with white basal bands $\frac{1}{6}-\frac{1}{5}$ I, $\frac{1}{5}-\frac{1}{3}$ II, $\frac{1}{3}-\frac{1}{2}$ III and IV. Claws of fore and mid legs unequal, the anterior long, with a strong tooth; hind claws equal, simple.

Wings: Black scaled; outstanding scales all long and narrow. Cell R_2 from slightly longer than, to $1\frac{1}{2}$ times the length of its stem; cell M_1 $\frac{2}{3}-\frac{5}{6}$ length of its stem; the bases of the cells usually level but that of either may be very slightly proximal; *r-m* $1-1\frac{1}{2}$ times its own length distal to base of M_3+4 . Halteres pale; knob creamy scaled, usually with a few dark scales apically.

Abdomen: Integument light brown. Tergites purplish black scaled with white lateral basal patches; II with a white basal band or medial patch; III-VI or III-VII with narrow white basal bands; VIII may have a white medial basal patch. Sternites creamy scaled with dark apical bands on IV-VII or on II-VII; these bands may be narrow, or up to $\frac{1}{2}$ length of segment; sternite VIII silvery white scaled. Numerous long golden hairs along lateral and apical borders of tergites and sternites, also scattered over the sternites.

Described from 29 ♂♂ from the following localities:—Somerset (1), Maleny (10), Mapleton (1), Nambour (4), Mt. Glorious (3), Binna Burra (8), Mt. Mowbullen (2). Males from other localities showed no notable differences from the above description.

♂ *Genitalia:* (Fig. 15.)

Coxites dark scaled, sometimes with a few pale scales laterally at base, cylindrical, about $3\frac{1}{2}$ times as long as broad, with a longitudinal groove-like membranous area along inner aspect. Tergal to this groove, on inner aspect of coxite, is a basal lobe in the form of an elongate ridge bearing along its rim a row of 6-7 long setae of which the outer or tergal 1-2 are slender, the next 3-4

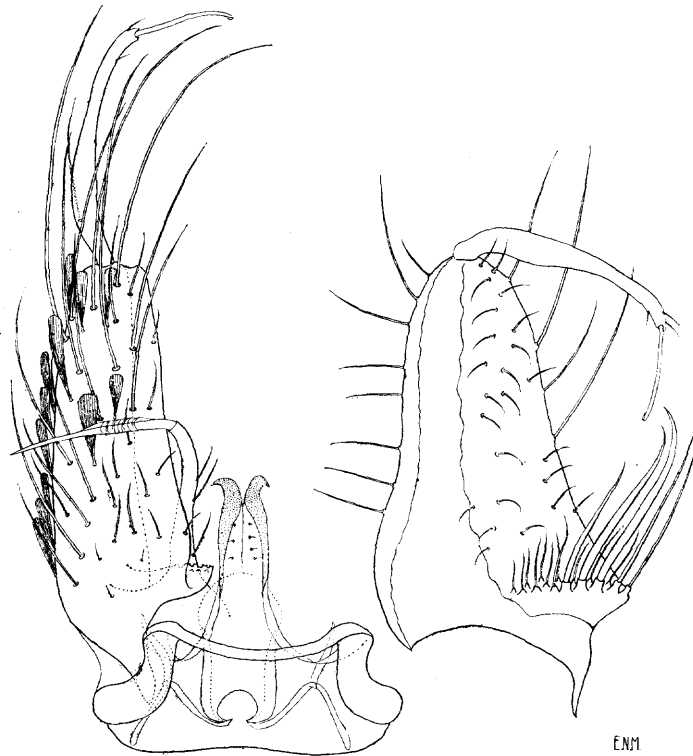


FIG. 15.—♂ genitalia of *Aedes palmarum* Edw., x 240. One coxite is detached and shown viewed from its inner aspect to illustrate the basal lobe.

flattened, the longest being about $\frac{1}{2}$ length of coxite, and the succeeding setae shorter and slender; in line with these are a few short setae, and there are also a number of short setae distal to this row, the basal lobe bearing in all about 20–25 setae. The coxite bears scattered short setae basally and on its inner surface, and numerous long setae apically and on its outer aspects. Style a little more than $\frac{1}{2}$ length of coxite, slightly curved, widening a little beyond base, then gradually tapering, non-pilose, with 1–4 short fine preapical setae, and in some specimens with a long seta, about $\frac{3}{4}$ length of style, arising on its sternal aspect at about $\frac{1}{8}$ from base; terminal appendage slender, fairly straight, almost $\frac{1}{2}$ length of style, with rounded, grooved tip. Harpago long, stout, pilose, bearing 2–3 setae about $\frac{1}{4}$ its length; appendage slightly longer than harpago, slender, tapering to a sharply pointed tip, and with a very narrow membranous expansion and horizontal wrinkling on its basal half. Paraproct with a single tooth. Phallosome simple, widening slightly on distal half, with rounded apex. Lobes of IXth tergite rounded, without setae, and widely separated, being connected by a narrow bar. IXth sternite with 5–6 setae.

Female differs from the male as follows:—

Wing length: 2.4–3.5 mm.

Head clothed with narrow curved silvery scales medially which extend forwards in a broad strip between the eyes; lateral to these are narrow curved pale golden scales and then flat creamy scales. There may be two patches of black scales laterally. These are best developed in Somerset specimens which,

lateral to the pale golden scales, have a patch of narrow curved black scales reaching almost to the nape, and among the flat creamy scales have a small patch of black scales on the ocular border. In other specimens the upper patch does not extend to the nape and may be of flat scales; either or both patches may be greatly reduced, but nearly all specimens have at least a few dark scales laterally on the head. Upright forked scales usually creamy medially, dark laterally, but almost all may be dark. Tori usually ochraceous (in Somerset specimens brown), with fine hairs and sometimes a few small dark scales medially; first flagellar segment of antenna pale basally, remainder dark with sparse black verticillate hairs. Palpi and proboscis black scaled, palpi about $\frac{1}{3}$ length of proboscis; labella dark brown.

Thorax: The pale scaling on the anterior $\frac{2}{3}$ of mesonotum is in the form of a broad medial stripe about $\frac{1}{3}$ width of mesonotum, slightly expanded and rounded posteriorly, in colour silvery, with or without a golden border, or entirely golden. The posterior $\frac{1}{3}$ of mesonotum may be almost entirely dark scaled, but there are usually some pale scales on either side of the prescutellar bare area and above the wing roots; in addition there may be a line of pale scales lateral to the prescutellar bristles and extending forwards to the outer edge of the broad anterior stripe; the latter may also be produced medially in a line of pale scales running back to the prescutellar bare area; mesonotal bristles as in the male. Pleural scaling similar to male; anterior pronotum with broad black scales above, posterior pronotum sometimes without narrow curved scales along upper margin; 4-7 propleural, 3-7 posterior pronotal, 2-6 postspiracular, 3-5 upper sternopleural, 12-21 prealar and 9-15 upper mesepimeral bristles.

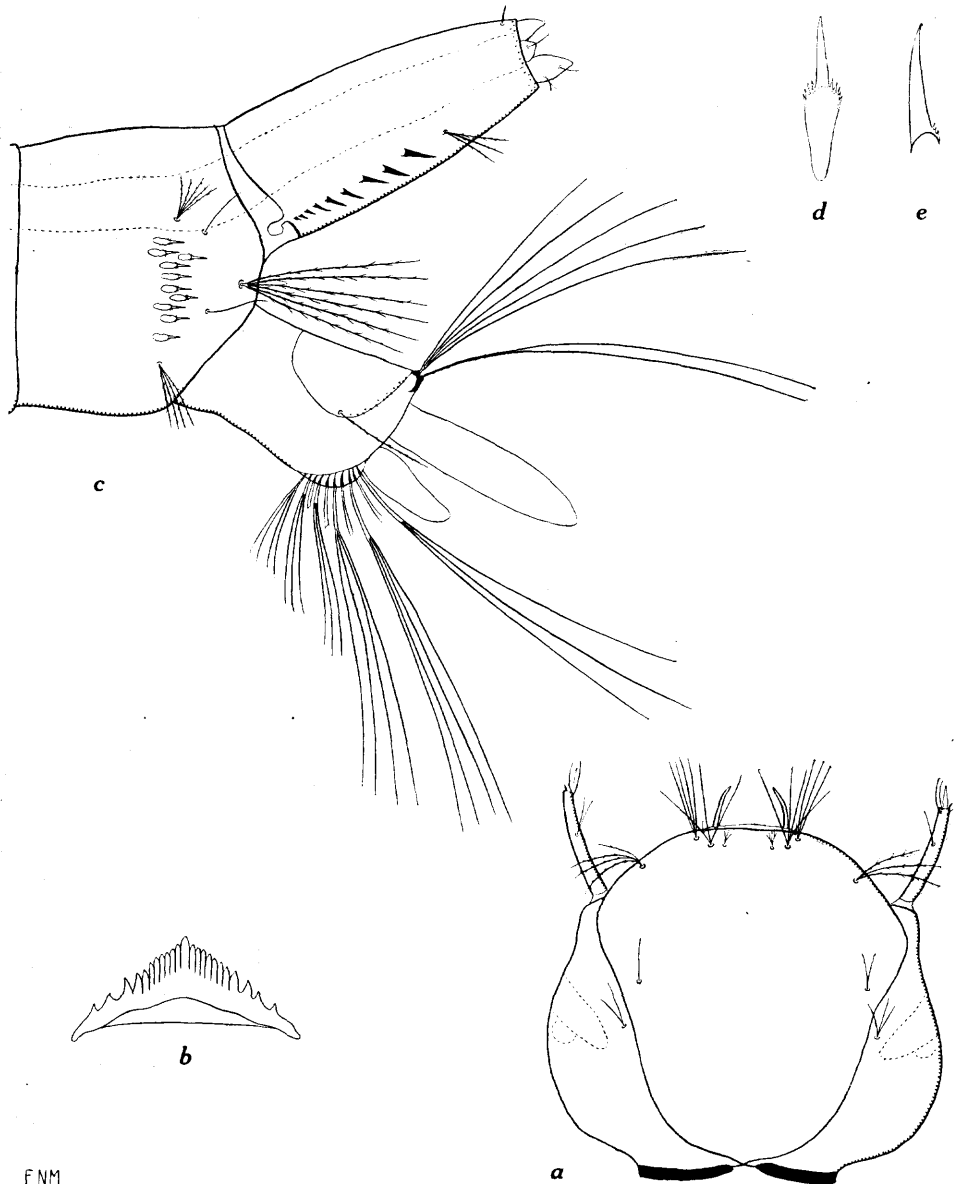
Legs: Fore coxae may have some dark scales above; fore tarsal segment III occasionally with one or two white scales at base; one specimen with one or two white scales at base of mid tarsal segment IV and a small white patch at base of hind tarsal segment V; the basal bands on hind tarsal segments III and IV may be only $\frac{1}{4}$ length of segment; hind tarsal segment V though dark scaled may give paler reflections than the preceding segments. Claws equal, those of fore and mid legs toothed, hind simple.

Wings: Cell R_2 $1\frac{1}{2}$ - $2\frac{1}{3}$ times length of its stem; cell M_1 $\frac{3}{4}$ -1 times length of its stem, $r-m$ $\frac{2}{3}$ -2 times its own length distal to base of M_{3+4} .

Abdominal tergites with white lateral basal patches; II with a medial basal creamy patch; narrow basal creamy bands or patches on III-V or III-VI, rarely on VII and VIII. Sternites III-VII creamy scaled with lateral apical dark patches or complete dark apical bands. Sternite VIII large, brown, exserted, clothed with fine hairs, and with some dark and pale scales at base. Cerci very short, brown, usually retracted within segment VIII.

Description based on 41 specimens from the following localities:—Somerset (2), Maleny (5), Nambour (6), Mountain Creek (1), Mt. Glorious (3), Camp Mountain (4), Binna Burra (17), Mt. Mowbullin (3); also notes on 3 topotypical specimens in the collection of the School of Public Health and Tropical Medicine, Sydney, N.S.W.

Females from other localities showed no notable differences from the above description, except two specimens from O'Connell River, one of which had no medial bands or patches on abdominal tergites, while the second had medial basal creamy patches on tergites II and III only.



ENM

FIG. 16.—Larva of *Aedes palmarum* Edw. a, head; b, mentum; c, terminal segments; d, lateral comb tooth; e, pecten tooth. (a and c, x 56; b, x 145; d and e, x 290).

Description of Larva: (Fig. 16.)

Length about 7.0–8.5 mm. A long brownish larva with light brown head, siphon and saddle, and having a very sinuous swimming motion.

Head slightly broader than long. Antenna almost $\frac{1}{3}$ length of head, cylindrical, about 7 times as long as broad at base, usually smooth but occasionally bearing a few fine spicules; tuft 1–3 branched, simple, less than $\frac{1}{2}$ length of antenna, and arising at $\frac{1}{2}$ – $\frac{2}{3}$ from base; terminal and subterminal setae arising

close together, one long and one short in each pair. Clypeal spines $\frac{1}{3}$ – $\frac{1}{2}$ length of antenna, stout, moderately curved, and bluntly pointed.¹ Seta A slightly shorter than antenna and arising medial and anterior to its base, 2–4 branched, weakly plumose; B and C arising near front of head, C being almost directly behind clypeal spines and B a short distance lateral and anterior to C, B 2–4 and C 3–4 branched, both usually simple but sometimes slightly frayed, and about equal in length to A; d arising medial to and in line with C, short and fine, 2–5 branched; e single or bifid, simple; f 2–3 branched, simple. Mentum broadly triangular with large medial tooth and 10–12 slightly smaller lateral teeth, the basal ones being widely separated.

Thorax: Base of metapleural setae with short spines.

Abdomen: Two pairs of long plumose lateral setae on segment I, the upper 2–4 branched, the lower usually single, but may be 2–3 branched; one pair on segments II–VI, 2–5 branched on II, 3–6 branched on III and IV, 2–6 branched on V and 2–3 branched on VI.

8th Segment: Lateral comb of 8–15 teeth in 1–2 uneven rows; each tooth consists of a long stout pointed spine arising from a broad base, which bears a fringe of small denticles lateral to the spine; the denticles may be fine or comparatively strongly developed, particularly in a Pascoe River specimen. First pentad seta 3–7 branched, frayed; second and fourth single, or rarely bifid, simple; third long, 4–7 branched, plumose; fifth 3–5 branched, frayed.

Siphon: Cylindrical, slightly tapering apically, with some minute spines round apex; index 2.0–2.5. Pecten extending over $\frac{1}{2}$ – $\frac{2}{3}$ length of siphon (usually $\frac{1}{2}$), made up of 5–14 spines of which the distal 4–9 are widely spaced, stout and pointed, with 1–3 small denticles basally; the remainder become progressively smaller and closer together. Subventral tuft 2–6 branched, sparsely plumose, arising at $\frac{2}{3}$ length of siphon, and usually distal to pecten, but may be proximal to apical pecten spine. Acus present.

Anal Segment: Saddle covering dorsal $\frac{1}{2}$ of segment, with some minute spines along its posterior border. Lateral seta single or bifid, frayed, slightly longer than saddle. Caudal setae simple; upper 3–6 branched, 3–4 times as long as saddle; lower long, single, bifid or, rarely, trifid, a little longer than upper. Ventral brush of 9–11 multiple tufts, each with 3–5 branches, all arising from a grid. Gills unequal, bluntly pointed, the upper pair 1–3 x saddle, and the lower $\frac{2}{3}$ –2 x saddle.

Description based on 21 specimens, 4 whole larvae from Somerset and 2 from Pascoe River, 11 pelts correlated with adults and 4 whole larvae from Binna Burra, Mapleton, Maleny, Mt. Mowbullen, and Mt. Glorious.

Description of Pupa: (Fig. 17.)

General coloration brown.

Cephalothorax: Fairly evenly pigmented, but somewhat paler in front of trumpet. Trumpet brown, moderately long, widening gradually from base; opening oblique, ratio of meatus to whole 1:1.2–1.3, apical notch shallow.

Abdomen: Tergites fairly evenly pigmented. Float setae dendritic. Some of the larger abdominal setae may be finely plumose. Laterally on segment VII there are two well developed, branched, plumose setae almost as long

¹The clypeal spines are not as strongly curved as indicated by Lee (1944), but they are about twice as thick basally as those of the larva of *Aedes doboodurus* King and Hoogstraal (1946), which also differs in having equal gills and head seta d arising behind the level of C.

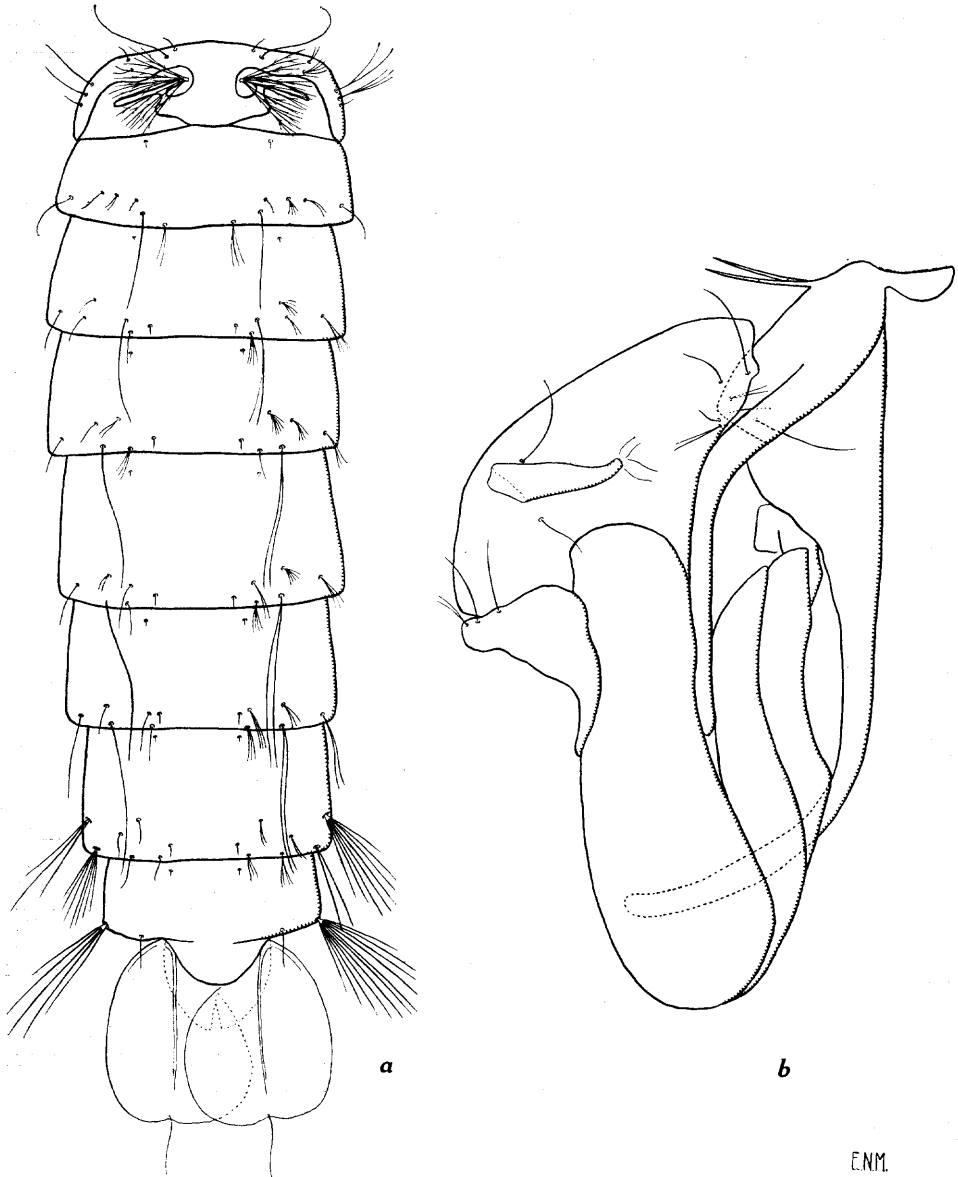


FIG. 17.—Pupal pelt of *Aedes palmarum* Edw., x 38. *a*, abdomen (dorsal view); *b*, cephalothorax.

as the segment; lateral seta of segment VIII 5–11 branched, plumose, more than half as long as paddles. Paddles pear-shaped, broad distally, with apical notch, breadth index 1.15–1.65; margin finely denticulate; buttress and midrib moderately developed; paddle seta single, about $\frac{2}{3}$ length of paddle. (On one specimen this seta was absent from one paddle, while there were two separate setae on the other paddle.)

Described from 11 pupal pelts correlated with adults, 1 from Mapleton, 4 from Maleny, 2 from Mt. Mowbullan, and 4 from Binna Burra.

Biology: Breeding places of *A. palmarum* are located in rain forest or palm groves, in dense shade. The larvae are commonly found in water lying in fallen palm fronds, in which they may be taken at any time of the year, if there has been sufficient rain to prevent the frond drying out. Samples of leaf mould taken from dry fronds in the vicinity of known breeding places have been tested for the presence of eggs by being placed in water in the laboratory, but no mosquito larvae have been bred and further investigations are required to determine how this species survives an adverse season.

In palm fronds it has been found associated with *A. notoscriptus*, *Aedes occidentalis* (Skuse), *Anopheles stigmaticus* Skuse, *Tripteriodes* sp. and *Culex* (*Lutzia*) *halifaxi* Theo. At O'Connell River, thousands of fallen palm fronds were located in an area of palms and rain forest fringing the river. *A. palmarum* larvae were plentiful, associated with *A. notoscriptus* and in about 25% of fronds larvae of *C. halifaxi* also were found. The latter species appeared to be confined to palm fronds in this area, as it was not observed in collections from adjacent rock pools, or backwashes of the river.

Larvae of *A. palmarum* have also occasionally been taken from rusty tins containing water and fallen leaves (Binna Burra, Mapleton); once from the tops of funnel-shaped fungi (*Polystictus versicolor*), each of which held about a wine-glass of water (Maleny); twice from water in large fallen seed ("bean") pods (Maleny and Bilyana); once from a very old abandoned snailshell containing approximately $\frac{1}{2}$ teaspoonful of water (O'Connell River); and once from the hollow segment of a cut bamboo, in which they were associated with larvae of *A. notoscriptus* and *Tripteroides* spp. (Mapleton). Larvae of *A. palmarum* from Somerset, N.Q., were collected from a flower spathe.

In the laboratory, the pupal period takes about 3-7 days according to the season.

Habits: *A. palmarum* has occasionally been taken biting during the day, in rain forest close to its breeding places.

Distribution: Specimens have been examined from the following localities:—NORTH AND CENTRAL QUEENSLAND: Palm Island (the type locality), 3 ♀♀ (one collected by G. F. Hill); Somerset, 1 ♂, 2 ♀♀, larvae (i.1943); the following, collected by J. L. Wassell—Pascocoe River, larvae (xii.1942); Bilyana via Cardwell, 3 ♂♂, 3 ♀♀, larvae (x.1947); O'Connell River via Proserpine 2 ♂♂, 4 ♀♀, larvae (x.1947); Mackay, 2 ♀♀, larvae (x.1947); Carmila Creek, 1 ♂, 1 ♀, larvae (x.1947). SOUTH QUEENSLAND: Binna Burra, Lamington National Park, 8 ♂♂, 17 ♀♀, larvae (F. A. Perkins and E. N. Marks, x., xi.1943; v., vi.1944); the following, collected by J. L. Wassell—Mt. Mowbullin, Bunya Mts., 2 ♂♂, 3 ♀♀, larvae (ix.1944); Mt. Glorious, 3 ♂♂, 3 ♀♀, larvae (x., xi., xii., 1943; i., ii., iv.1944); Upper Cedar Creek, larvae (ix., xii., 1943; i.1944); Camp Mountain, 4 ♀♀ (iv.1945); Maleny, 10 ♂♂, 5 ♀♀, larvae (iv.1945); Mapleton, 1 ♂, larvae (iv.1945); Nambour, 4 ♂♂, 6 ♀♀, larvae (iii.1945); Mountain Creek, Buderim Mt., 1 ♀ (viii.1947).

Taylor's (1944) records of *A. albivittis* from Eungella via Mackay and Berner Creek via Innisfail presumably refer to *A. palmarum*.

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for his continual encouragement; and to Mr. J. L. Wassell who collected a large proportion of the material studied. It is appropriate here also to pay tribute to the good work done by teachers and pupils of State Schools throughout Queensland in response to requests for collections of mosquito larvae; they have contributed materially to our knowledge of Queensland mosquitoes. In particular thanks are due to members of the Gordonvale, Nanango and Tumoulin State Schools who supplied specimens of comparatively rare species dealt with in this paper.

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