1909.
British Guiana Medical Annual. 1-25, 4 pl

NOTES ON THE MOSQUITOES OF BRITISH GUIANA:

By

Rev. JAMES AIKEN, M.A.

In the latter part of 1907 a collection of mosquitoes was received by Dr. K. S. Wise from Yupukari and the Kanuku Mountains. These are specially interesting as the first collection which has been examined from the highlands of Guiana, the mosquitoes hitherto identified have been for the most part collected on the lower lying lands near the coast and in the forest belt immediately interior.

As might be expected some genera and species new to the colony and some new to science have been discovered in the territory referred to.

On a visit paid to Epira and Orealla in June, 1907, I had an opportunity of collecting on the Dutch side of the Corentyne River, and from that source also some new species have been identified. Even in the immediate vicinity of New Amsterdam the occurrence of occasional new species serves to show that the field of discovery is by no means yet exhausted, while in regard to the life history of certain species much also remains to be done. Mansonia tittilans, for example, has eluded all investigators heretofore and its manner of breeding is still a mystery, though every likely locality has been searched here and in other places where this gnat occurs. Other species of this genus have been found in water in hollow trees and Bamboo joints and in rain barrels. Probably this larva is peculiar in its habits and they may be similar to those of Taeniorhynchus fasciolatus as has been surmised by Messrs. Dyar and Knab. On one occasion only from a miscellaneous collection of larvae and pupae from a pond in Stanley-

town, one of these mosquitoes developed, the pupa was recovered and mounted; probably this occurrence was accidental as in many similar collections from the same place no larvae or pupae of this mosquito were found.

The importance of larval characters has become paramount in recent years since more detailed investigation has revealed the sharp specific differences between closely allied types. Messrs. Dyar and Knab have, by treating the larvae as independent organisms, thrown valuable light on some vexed questions as to the value of the characters used by Professor Theobald in his system.

While in this paper I shall still retain the classification hitherto adhered to in naming the local mosquitoes described in the Annual, there is a practical certainty that the nomenclature will have to be revised in light of the further knowledge of life history which recent extensive research has given. Many of Professor Theobald's genera, based on scale structure, seem unsatisfactory, and indeed the application of his system is so difficult as to be almost impossible.

As has been remarked by Messrs. James and Liston in "A monograph of the Anopheles mosquitoes of India "the terms 'hair like,' 'lanceolate,' 'long and narrow,' "'true scales,' &c., are not sufficiently definite to permit "of such scales being easily distinguished from one "another, except perhaps by Mr. Theobald himself."

His divisions seem to the writer to neglect some prominent modifications of structure in the adult more primary than those of say the palpi and which, if not macroscopic, are at any rate easily defined with an ordinary lens. In figure 8 of the drawings attached to these notes I have endeavoured to illustrate certain modifications of chitinous structure which so far as the limited material at my disposal goes seem constant for certain groups. For example the Sabethoides form of the ventral aspect of the final segments of the abdomen seems to hold good for Sabethes and Sabethoides, the Anopheles form for all the Anophelinae I have seen, and the Culex form for all the local species of this family the larval characters of which indicate close relationship, while the distinct difference in the form of *C. taeniorhynchus* has a significance

in view of the corresponding differences in larval structure. A new genus has been lately formed for this insect, Felt's "Culicelsa," and has been adopted by Professor Theobald. Of course without access to a much larger range of species than our local gnats afford it is impossible to generalise, and these characters of the chitinous covering are merely offered as a suggestion for further investigation. It may be remarked that upon the manner of imbrication of the segments and the presence as in Culex of a broadish ventral plate on the final segments capable of independent movement in longitudinal directions, freedom of movement of the parts and vital functions depend and such characters are therefore likely to be invariable. The difference in this respect between Culex with its ventral plates broadening posteriorly between the edges of the dorsal plate, and Sabethoides in which the dorsal plates are continuous till they meet ventrally except in the final segment, is sufficiently marked to make an easily applied distinction (*vide* Fig. 8).

NEW SPECIES.

The following species new to the colony have been identified since our last contribution to the Annual went to press:—

From Yupukari and Kanuku:
- Anopheles nigra (Myzorynchella nigra), Theobald.
- Anopheles n.sp. near albimanus, Wied.
- Culex cubensis, Bigot.
- Culex n.sp.
- Janthinosoma posticata, Wied.
- Mansonia fasciceps, Coquillet.
- Joblotia sp.
- Haemagogus affirmatus, Dyar and Knab.
- Wyeomyia melanocephala, Dyar and Knab.
- Sabethes n.sp.
- Sabethoides n.sp.
- Dendromyia sp.
- Limatus durhami, Theobald.

From the Corentyne River—Dutch side:
- Culex Cubensis, Big.
- Gualteria oswaldi, Lutz.

Collected in New Amsterdam:
- Culex aikenii, Dyar and Knab.
- Culex indecorabilis, Theobald.

Uranotaenia minuta, Theobald.
Uranotaenia lowii, Theobald.
Janthinosoma posticata, Wied.
Haemagogus affirmatus, Dyar and Knab.
Sabethes undosus, Coq.
Sabethoides, n.sp.

Several new species of Culex and Sabethoides are not yet determined. The full descriptions of all above species except Joblotia and Dendromyia will, I expect, appear in the work on "The Mosquitoes of America," soon to be issued by the Department of Agriculture of the U.S.A.*

ANOPHELES (MYZORHYNCHELLA) NIGRA, Theobald.—Head black with greyish white flat scales and black upright scales; thorax deep shiny black with creamy white spindle-shaped scales and dark chetae; abdomen black with golden hairs, no scales; wings with black and light scaled patches; legs with dark brown scales and white tarsal bands.

Female.—Head black, with a median bare line, flat grey scales on each side with a dull blue shade, flat rather outstanding black ones on each side of the pale median area, becoming more upright at the back, and with some small outstanding narrow white ones in front, a few narrow curved creamy scales between the eyes in front, and a tuft of long pale hairs projecting forwards; antennae black, with a few scales on the basal segments and pale pubescence to the internodes; palpi black scaled with four narrow white bands, the two apical ones close together, the third closer to the second than the third is to the fourth; proboscis thin, black; thorax black, with creamy-white spindle-shaped scales and dark chetae, a tuft of longer pale scales on each side in front; scutellum with similar scales to mesonotum but narrower, metanotum black; abdomen black, with dull golden hairs, no scales; legs with the femora, tibiae and to some extent the first tarsals with brown and pale scales, first and two following tarsals of fore legs with pronounced apical white bands, in the mid legs the femora are darker and have a pure white spot near the apex, and the apical bands are much narrower, in the hind legs the femora have the white spot near

* Since writing above I hear from Messrs. Dyar and Knab that work British Guiana Species will be postponed for separate publication later.

the apex, are all dark, as also the the tibiae, the last three tarsals snowy white, also half the second and apex of the first, femora and tibiae of all the legs white beneath, apex of all the tibiae also white; wings dusky scaled with dark scales and a few yellow patches, three small prominent yellow spots on the costa and two small ones basally, the last at root of wing, first the longest and extends on to the first long vein, the second is next largest and also extends on to first long vein, the third only exists on costa, also the small fourth and fifth basal ones, two small yellow spots on each side of the third costal spot on the first vein and another near its base, two on the lower branch of the first forked cell and one at the base, two pale areas on its stem near the cross veins, third long vein with four yellow spots, a small one at the base and apex, two small ones on the upper branch of the second fork cell, one at the apex of lower branch and one at the base of the cell, three spots on upper branch of fifth, one at the base of the fork and half (basal) the lower branch yellow, three small yellow spots on sixth; first submarginal cell longer but no narrower than second posterior cell, its base much nearer base of wing, its stem half the length of cell, stem of second posterior cell as long as cell, supernumerary and mid cross veins close together, posterior longer than mid about its own length distant from it, fringe pale at junction of each vein with costa; halteres with dusky stem and black knob.

Length 6 m.m.

Male.—Palpi elbowed, apical segments swollen, deep black, a narrow white band at elbow joint, white scales on one side near apex and at apex, penultimate segment with a dense short tuft of brown hairs; antennae deep brown with pale internodes, deep brown hairs with pale grey reflections; thorax, legs, as in female but hind legs show less banding; wings slightly different in spotting, the third pale costal spot broken by a dark speck, base of first and fourth veins all creamy white, many pale scales on third, fringe has no pale spots after upper branch of fifth; fore ungues very unequal, the longer biserrate, mid and hind equal, simple; claspers black horny. (Theobald Mon. Cul., pp. 78-79).

Length 6 m.m.

NOTE.—The only specimen I have seen was somewhat rubbed and broken, the markings of hind tarsi and deep black body colours distinguish it from *albipes* and *argyrotarsus*. Specimens were obtained by Dr. K. S. Wise from Yupukari sent to Professor Howard and identified by Messrs. Dyar and Knab as *nigra* Theobald.

ANOPHELES N.SP., Dyar and Knab, near *albimanus*, Wiedemann. I do not know on what grounds Dr. Dyar and Mr. Knab have separated this species. *Albimanus* itself has been by Blanchard made synonymous with *Argyrotarsis*, Desvoidy, but Dyar and Knab separate them on account of differences found in the larvae. The larvae of *albipes* have a pair of palmate hairs on each of the segments second to seventh, the comb of the eighth segment has teeth coarsely serrate below; *argyrotarsis* is similar but the teeth of the comb are very finely serrate and the comb consists of two upper long teeth with a short one between and three lower with five between; *albimanus* has two upper teeth in comb with none between and three lower with four between.

JANTHINOSOMA POSTICATA, Wiedemann.—Thorax brown and rather testaceous behind, with flat, spindle-shaped, bronzy and yellow scales; abdomen steel black with metallic violet scales, with basal triangular patches of creamy scales, venter yellow scaled; legs dark brown with metallic steel, and purple reflections, the last hind tarsal joints dull white, legs densely scaly; wings with a brownish tinge.

Length 5 m.m.

Habitat, St. Lucia, Argentina (Theobald Mono. Culic., Vol. I, p. 254).

Specimens were obtained by Dr. K. S. Wise from Yupukari, identified by Messrs. Dyar and Knab. The ungues of foreleg are large, equal and single toothed, one slightly more curved at apex than the other; of mid leg similar, one has a bluntish tooth, the other rather a longer thinner tooth.

The length of the forked cells vary; in one specimen the right wing has the base of first forked cell more towards root of wing than the left, which is only very slightly posterior to base of second forked cell. Metanotum is rather purplish brown, and scutellum has very

narrow pale scales and eight black bristles to mid lobe, five large and two small in two rows on lateral lobes; mid lobe bristles show a grouping of three, two, and three.

STEGOMYIA SP. male.—Head black with two median rows of brilliant silvery flat scales rather spindle-shaped converging towards vertex and nape forming a lenticular-shaped figure, lateral patches of same, rest of head covered with dull brownish scales, two brown bristles at vertex; antennae plumose with long brownish hairs, first joint dark purply brown encircled by garland of silvery scales thirteen jointed; palpi as long as proboscis clothed with dark brown scales, two broad silvery bands on second joint and silver spot on base of third and fourth; proboscis as long as body brown scaled acuminate; thorax black with small, hair-like, pale scales prothorax bordered by a line of broader silver white scales, scutellum with silvery scales, and three bristles *in situ* on mid lobe, a fourth apparently rubbed off, side lobes with four bristles; abdomen ochraceous brown, shading to black, clothed with dark brown scales, a median patch of silvery white scales on third segment and possibly a wider patch on fourth, but the specimen under examination has only one or two scales, the rest apparently rubbed off, ochraceous triangular basal patches show laterally on second, third and fourth segments, and very small silvery basal lateral spots on last two segments, the dark scales are peculiarly translucent and seem to borrow their colour from the chitin, their own colour being greyish or brownish; final segment tufted strongly with bristly hairs; wings clothed with brownish scales, cells of forked veins rather short; stem of first equal in length to cell, posterior cross vein twice its own length internal, no long lateral scales on lower branch of fifth long vein or on sixth; halteres pale testaceous; legs brown, fore with silvery white knee spot, mid with knee spot and basal bands on metatarsals and first tarsal joint, hind with femora testaceous beneath, basal white bands on metatarsus and all tarsal joints, the band on last including the whole joint except for a few brownish scales at tip, probably merely a discolouration; ungues, hind equal and simple; mid, unequal simple large and sharply curved; fore unequal sharply curved, the larger with a strong short tooth about the middle.

Female.—Thorax shows more distinct silvery lyre-shaped marking and two short lines on prothorax; ungues equal and simple.

Length 2 m.m.

NOTE.—These specimens are rather rubbed. I would have suspected them to be S. *fasciata* (Theobald), *calopus* (Meigen), but for the extreme minuteness of the insect and the extremely hirsute appearance of the final segment. The specimens were collected near Omai; some specimens from same district were sent to Professor Howard, amongst them S. *calopus* has been identified, but I have not heard whether their specimens present the same peculiarities.

CULEX N.SP. (female.)—Head black, clothed with dull black flat scales and a few dull curved scales; thorax, deep brown; abdomen, altogether black; legs, dark brown, with lighter knee spots; wings amber brown on costa and sub-costa; head clothed with dull black flat scales, some curved scales of same colour and black upright forked scales; proboscis black scaled and stout; antennae, first joint dark ochraceous; palpi, very short, apparently three-jointed, black scaled; thorax dark ochraceous, clothed with dark brown narrow curved scales, two double rows of bristles on mesonotum and a large group at roots of wings; scutellum rather lighter in colour with six bristles to mid lobe, divided into two groups by a bare space; metanotum same shade as scutellum; halteres paler, with black top; abdomen black scaled throughout; venter likewise; wings of brownish hue with brown scales, long and narrow on base of veins, becoming broad and exactly like atratus wing scales at apex; first forked vein very long, about four times length of stem, branches much nearer root of wing than second forked cell, which is about same breadth; mid cross veins in line, posterior cross vein two-and-a-half times its length internal; legs dark brown, femora of forelegs much swollen, mid and hind slightly so; ungues small, equal and simple.

Length 2.5 m.m.

NOTE.—I obtained this specimen at Epira on the Corentyne River and propose the name (*epirus*) for it. It is very near to Gnoph. inornata, but is smaller and differs in the absence of all spots on abdomen and in the length of first forked cell of wing.

TRICHOPRONOMYIA MICROANNULATA (Theobald Mon. Culic. Vol. iv, p. 481).—Head brown, pale scaled, proboscis with pale band; thorax deep fawn-coloured with bright brown scales, two median bare paler lines which converge posteriorly, a curved one on each side of wings; abdomen deep brown with basal yellow spots to the segments; front and mid legs brown, unbanded, hind with faint banding involving both sides of joints.

Length 6 m.m.

This genus has been separated from Culex by Professor Theobald on account of the hirsute proboscis which carries a tuft of hairs about the middle and shorter ones on apical portion. The wings have some Mansonia-like scales on the base of first long vein, and on sub-costal, and Taeniorhynchus-like scales on the branches of fork cells. Two species are known *annulata* from New Guinea and above from New Amsterdam.

C. AIKENII (male). Dyar and Knab.—Head brown, clothed with pale curved scales and dark ochraceous, and pale upright forked scales, white flat scaled lateral patches; palpi with pale scales on penultinate segment and a basal pale patch on final joint; thorax dark ochraceous, with curved golden scales and three rows of bristles; scutellum with small pale curved scales on central lobe, six large and some smaller bristles; abdomen with pale basal bands, forming a median patch on second segment, becoming deeper until on fifth the band tends to a triangular shape then on sixth and seventh narrows and spreads into lateral patches; wings with light brownish scales, first forked cell narrower than second but base parallel; stem of first cell almost as long as cell; legs coppery brown scaled, with faint knee spot on hind leg; ungues fore and mid unequal, uniserrated, hind small, equal and simple (*vide* Figs. 1, 2 and 3).

Types with larvae sent to United States Bureau of Entomology, full description will be published in Messrs. Dyar and Knab's forthcoming book on American mosquitoes. The larvae were taken from water in an old iron tank in the yard of a house in Queenstown. Males only developed.

This mosquito must not be confused with *G. aikenii*

of former issues of The British Guiana Medical Annual. The latter was renamed *inornata* when described by Professor Theobald in the Journal of Econ. Biology, Vol. i, No. 1. He had previously given the name *aikenii* in a letter to Dr. Rowland dated 19th August, 1905.

CULEX CONFIRMATUS, Arribalzaga.—Specimens from Kanuku Mountains show only silky white scales on prothorax, mesonotum thickly clothed with narrow bronzy brown scales. The head is clothed with flat purply scales, a few silky white curved scales in middle spreading towards vertex and shading to ochraceous round eyes, which are black and gold; the proboscis is brown scaled; the first joint of antennae is purplish brown, of same shade as the flat head scales; the scutellum has five long, dark, brown bristles on mid lobe, and six on lateral lobes, arranged four below and two above; the abdomen shows no trace of median line of ochraceous scales, but last segment has an apical patch of these; legs have femora covered with brown scales, the fore is light scaled beneath, about half its length, the mid is swollen and is light scaled on the posterior aspect almost to the apex, the hind is pale scaled beneath throughout its length, the tibiae and tarsi of all the legs are deep purply brown, much darker than the femora, but give browny reflections in some lights.

C. CUBENSIS (Bigot), female.—Thorax ochraceous with curved golden scales and three single rows of bristles, the two side rows double as they are diverted round the bare spot on mesonotum and the middle row splits into a Y-shaped expansion consisting of three small bristles on each side; pleurae ochraceous with three small patches of white scales; metanotum pale ochraceous; abdomen deep brown with broad, curved, basal pale bands on third, fourth, fifth and sixth segments; on second segment the pale band is almost triangular coming to a point half way across the segment, the seventh has a very narrow band, and on this and penultimate is a lateral pale patch not visible from above; legs brown; coxae and femorae light ochraceous, with darker ridge on upper side, ungues all small equal and simple; wings, first submarginal cell longer and narrower than second; stem of first less than half the length of the cell.

Male.—Palpi brown, longer than proboscis by last joint, apical segment acuminate, both have fringe of long hairs; thorax as female, but metanotum is much darker; abdomen similar, but on three apical segments the lateral spread of the basal bands is more marked, and on the seventh the basal band is broader; legs as in female; ungues of forelegs unequal, larger one serrated; mid similar; hind, small, equal and simple (*vide* Fig. 5).

This mosquito differs from *fatigans* in the distinctly lenticular shape of the abdominal bands and in the ungues the hind leg has faint spots on apex of hind tibiae and perhaps of femora in female.

The larva has a medium syphon very slightly longer than the anal segment, about four times as long as it is broad, and with two large and two small groups of hairs; the anal segment carries a brush and four broadly acuminate fans, the eighth segment has a triangular patch of small scales; the head has three groups of fine hairs on each. side; antennae long and spinous with tuft rather apical of middle. It has been found in small pools, rain barrels, ditches, ponds, holes in trees, etc., etc. I have found it in vats, iron troughs, in water in a sloughed cabbage palm leaf. Its favourite breeding place is small collections of water (*vide* Fig. 4).

This culex is identified with *pungens* of Wiedemann, and *fatigans* by Theobald. Dr. Dyar and Mr. Knab distinguish it from above and think the American species sufficiently distinct to be separated from Indian *fatigans*.

Dr. Rowland and myself have always had some hesitation in identifying any of the species found here with the *fatigans* of the text books, and I therefore accept gladly a name which will mark the variation of the local species from those of other regions.

CULEX LATEROPUNCTATA (Theobald) Mon. Culic. Vol. iv, pp. 458 and 459, 1907.—Head and thorax brown, palpi and proboscis black; abdomen black with lateral basal white spots; legs dark brown unbanded, a pale tibial spot; wings rather long, dark scaled, fork cells long, stem of the first submarginal less than one-fourth length of the cell.

Length 5 m.m.

1909. Aiken, James

 1-25, 4 plate

The specimens sent to Professor Theobald were bred from larvae taken by me at Chalk hill on the Supenaam creek in October, 1905. The larvae were brought to me by an Acowoi Indian in a calabash and were, I understand, got in a barrel or tub. In a note Theobald says it is near *scholasticus* and *neglectus*, but differs in the very long first submarginal cell, which is more than one-third of the whole length of wing. My notes taken at the time indicate two distinct lines on mesonotum and a colour scheme corresponding very closely with Dr. Lutz's description of his *Culex neglectus*. The latter notes the variable length of second forked cell, and gives the proportion of stem of first as less than one-fourth length of cell, I am disposed to think *C. lateropunctata* and *neglectus* may turn out to be one and the same species.

GUALTERIA OSWALDI (?) (Lutz).—Head black, clothed with dark brown flat scales, patch of flat white scales at sides, white border to the eyes, black upright forked scales at nape with some smaller ones extending to vertex; group of bristles at vertex; proboscis uniformly dark brown; antennae light brown with silvery bands and joints, basal joint dark brown; palpi dark brown with some white scales at tip; thorax shiny black with two lateral patches of silvery white scales silky in appearance in front; median patch in front, and rest of mesonotum with small curved dark bronzy scales, a few bristles over roots of wings, and six or seven longish bristles on each side of median line of mesothorax; scutellum with minute brown scales, mid lobe with six or seven bristles, lateral lobes five bristles; metanotum dark brown glossy; abdomen black clothed with small dark brown flat scales with bronzy reflections, small apical bristles much longer laterally, last five segments with lateral basal patches of bluish white scales, visible from above only on last two segments, last two segments have bunches of oarshaped dark scales projecting, giving a rugged appearance to caudal end of abdomen; legs, purplish brown, coxae light ochraceous, mid leg with light spot above knee, basal and apical testaceous band on first tarsal joint, basal band on second, femora of hind legs with large light coloured band in middle and light coloured patch just above knee; metatarsus entirely dark, basal and apical light coloured bands on first tarsus, the apical one in-

volving the base of second tarsus; ungues equal and simple; wings with Culex-like scales, costa and subcostal veins very dark brown scaled, forked cells rather short, first longer than second, stem of first half the length of cell, posterior cross vein rather more than its own length internal, subcostal first, third, fifth and sixth longitudinal veins with median scales which are absent on second and fourth; halteres light ochraceous with dark top.

Habitat. Sande and Goyaz, Brazil (Lutz), banks of Corentyne river, Dutch Guiana (Aiken).

The above description is from my notes on the only specimen I had which was forwarded to Professor Howard, and identified by him as Aedes oswaldi. The specimen appears to differ in several points from Dr. Lutz's description of Gualteria oswaldi as given in Mon. Culic. vol. iv, pp. 552 and 553 (Theobald, 1907). The presence of upright forked scales as well as flat on the head seems to bring it into Theobald's genus Aedes, in Lutz's description G. oswaldi has flat scales only. The V-form of white scales on head was not noticeable in my specimen while the bunches of elongated oar-shaped scales on last two segments are very prominent and the tarsal bands are also conspicuous, while in G. oswaldi the only leg ornamentation appears to be "two snow white spots one apical," on fore and mid femora, and silvery spot on knee hind. The two final segments of abdomen are described as expanding ventrally; this was hidden in my specimen by the clustered scales referred to in my description. The ungues appeared to be simple, but as I had not a spare specimen for dissection it was difficult to make them out quite clearly. On the whole the tone of colour of my specimen was brown while the dark scales of G. oswaldi are described as black throughout. The thoracic dark scales did not appear to me to be strictly flat, at least not appressed like the head and abdominal scales. On the whole I am inclined to think this mosquito may be "gelidus" (Leucomyia gelida) of Theobald.

MANSONIA FASCIPES (Coquillet). — This mosquito seems to be midway between *tittilans* and *pseudo-tittilans*. The absence of a band on proboscis and presence of scattered grey scales, the white elongated spots on tarsi

carried in most cases round and just traceable on the ventral aspect, the pale grey scales laterally forming a disconnected line relate it to *pseudo-tittilans* while the presence of long black curved scales at root of wings and a few long scales on veins of wings relate it to *tittilans*. The scales on posterior border of wings are entirely dusky, no white scales appear, in which it differs from both of above types. Two lines appear on the denuded thorax, each with a narrow dark outer border shading to a dusky brown internally. The apical segment of abdomen has a border of short black bristles.

URANOTAENIA LOWII (Theobald, Mon. Cul., Vol. ii, p. 339).—Head with two silvery blue patches; thorax bright chestnut-brown, with two dark parallel median lines, a dark brown patch on each side of the root of the wings, a shiny silvery spot at the root of each wing; metanotum dark brown in the middle, pale chestnut brown at the sides; abdomen dark brown with traces of apical, pearly-blue spots: legs brown, the last two and the apical half of the antepenultimate hind tarsi white; wings with a patch of violet and mauve scales at base of the fifth long vein.

The detailed description from notes taken by Dr. Rowland and myself in 1906, is as follows:—Head clothed with dark flat scales, a patch of iridescent blue scales each side, and two or three just at vertex, there are also three or four bristles, antennae light brown first joint ash colour; proboscis long dark brown, much broadened at apex, indeed distinctly spatulate; thorax ochraceous with dark brown band extending from front to back in middle and another dark area extending forward from root of wings, some very minute dark scales in three rows on median area and a double row of long golden bristles, a thick group of bristles at roots of wings, a few hair-like scales scattered over mesonotum, a very small patch of blue scales in front of root of wings and on prothoracic lobes; scutellum, mid lobe with three bristles; metanotum dark brown paler laterally; abdomen with dark brown scales unbanded, but has apical lateral patches on fourth, sixth and seventh segments, that on fourth is the angle of a ventral patch extending from second to fourth segment, and the others are similarly ventral patches showing

more or less from above; wings, costa dark scaled, subcostal likewise, rest of veins very lightly scaled, expanded blue scales at root of fourth and fifth longitudinal veins, cross veins alternate, posterior vein its own length internal; legs, femora of mid leg much swollen, all dark brown scaled with purply reflections, lighter on ventral aspect of femora, hind with two-and-a-half tarsi light showing silvery in some lights; ungues hind equal simple, very long and slender, mid equal simple much curved, fore sharply bent near root.

Length 1.5 m.m.

Found by Dr. Low in St. Lucia and St. Vincent; by Dr. Durham, in Para; by Mr. C. W. Hewlett, in Trinidad, and in New Amsterdam by Dr. Rowland. Specimens sent to Professor Theobald in 1905 and to Professor Howard, May, 1907. Larvae: Antennae without spines, longest terminal setae three in number, all shorter than antenna, shortest one obsolete, shaft has numerous spines, terminal digit simple; small, blackish in colour, lie at the surface obliquely, breathing tube short. Found by Dr. Low in small pools at Kingstown, St. Vincent, and by Dr. St. George Grey, in a drain near Castries; by me in a pond at Stanleytown, New Amsterdam.

URANOTAENIA MINUTA (Theobald Mon. Culic., Vol. iv, p. 559, 1907).—Head deep brown in the middle, azure blue at the sides and in front; thorax dark brown in the middle, pale brown at the sides, with a patch of flat azure blue scales in front of the roots of the wings; abdomen brown, some of the segments with apical lateral pale blue spots; legs deep brown, the hind pair with the apical half of the third tarsal whole of the fourth and the fifth white, the fifth however dusky in some lights; wings with a pale blue patch at the base (*vide* Fig. 6).

I am unable to distinguish between *minuta* and *lowii*. I have a specimen which corresponds in most respects with *lowii* but shows the dusky appearance of the last hind tarsi noted in Theobald's description of *minuta*. The blue scales at vertex of head are absent, but the lateral blue scales are azure rather than silvery, indeed almost royal blue in some lights. The wing has the dusky or metallic blue scales at base of fifth long vein

only, while the supernumerary slopes backwards in the way described by Theobald in *minuta*. The blue scales on thorax in front of wing form a spot rather than a line. There are pale blue scales on the prothoracic lobes and a spot on pleurae. The mid femora is markedly swollen and the ungues are notably long and slender. The larva of this specimen was taken by Mr. H. W. B. Moore in the swamp at Ogle. It has three spines only, bordering the seventh segment and apparently no pecten teeth.

ANISOCHELEOMYIA LEUCOPTERA (Theobald, Mon. Culic. Vol. iv, pp. 575 and 576, 1908).—Head deep brown, with flat dark scales with violet reflections pale at the sides; thorax brown with a line of silvery white flattish scales outstanding on each side; abdomen brown ornamented, with white scales on first to fourth and apical segments the scales mainly apical; legs brown unbanded; wings white scaled except for a dark brown area on the basal part of the costa and ending in a brown patch over the cross veins where the membrane is also tinged with brown.

Length 3 m.m.

Found in Stanleytown, New Amsterdam, on 8th August, 1905, and January 20, 1906. This seems to be the Pseudouranotaenia, n.sp., referred to in Professor Theobald's letter to Dr. Rowland about the beginning of 1906.

THE LARVAE OF URANOTAENIA.—The larvae of this genus so far as met with by us have invariably simple antennae with some terminal setae, in pulcherrima three, with two very short processes, the shaft unspined, four long very strong spines projecting rather forward defend the head and at the extreme border of the seventh segment five small spines in *pulcherrima*, three in *lowii*, and as many as nine in an undentified species, project over head, and at the extreme border of the seventh segment the caudal segment. In pulcherrima the air tube has two tufts of hairs abreast, at about two-thirds from base and pecten has seven teeth, in lowii none are visible. In another larva of this genus there are two ranges of teeth on the air tube.

HAEMAGOGUS AFFIRMATUS (Dyar and Knab).—This mosquito has been separated by Dr. Dyar and Mr. Knab

from a collection sent by Dr. Rowland. The specimens in this collection were obtained by me in the upper reaches of the Canje Creek and were determined by us as H. *albomaculatus*. Other specimens were sent by Dr. K. S. Wise in a collection from the Kanuku mountains. I have no certain duplicate from which to describe the species which, however, must be near *albomaculatus*.

JOBLOTIA SP. and DENDROMYIA SP.—In the specimens sent me by Dr. Wise I do not find a representative of these species, which were found amongst some forwarded by Dr. Wise to the London School of Tropical Medicine. Only one specimen was found of this and Dendromyia. Both were collected on the Rupununi.

SABETHES N.SP. (Dyar and Knab), and SABETHES UNDOSUS (Coquillet).—Head covered with broad, flat scales; thorax deep brown with bronzy scales; abdomen unbanded black with green reflections; venter creamy scaled, last three mid tarsi light scaled; wings brownish hued.

Head clothed with broad, flat scales, black on the occiput, a border round the eyes of whitish scales spreading laterally low down into a light coloured patch; two strong golden bristles at vertex projecting over the eyes; palpi short, black scaled; antennae black with pale pubescence, first joint ochraceous; proboscis black scaled with steely blue reflections rather brownish towards the base, and a few minute hairs at tip; eyes brown with a blackish area towards the underside; thorax brownish black, giving bluish black reflections in some lights, clothed with flat, broad scales dark brown and black in colour, prothoracic lobes thickly covered with broad, dark flat scales, a few pale ones in front, the pale scales form a border to the thorax extending round nearly to base of wing, from which it is separated by a strong tuft of golden brown bristles projecting laterally; the scutellum is thickly covered with larger flat blackish scales which project over it, and appears to have three or four bristles on mid lobe and on lateral lobes three or four large bristles interspaced with two small ones; metanotum dark brownish purple, with six bristles springing from posterior half; halteres black at tip, shading to ochraceous at base; abdomen first segment black scaled with group of small pale bristles at each side projecting laterally,

1909. Aiken, James

 1-25, 4 plates

second segment in some specimens shows traces of a pale ochraceous band, remainder black scaled final segment with tufts of strong dark bristles; genitalia show pale, venter creamy scaled; legs, fore dark scaled, mid with pale ochraceous coxae and white patches on femora, last three joints of tarsus pale scaled on upper side, hind legs femora and metatarsus black above, pale underneath; ungues very small, all equal and simple; wings brownish in general hue, dark scaled, costa densely fringed distinctly dark at apex, stem of first longitudinal vein has its rise far back on wing and is joined at some distance from its origin at an angle of about 75 by the submarginal cross vein; first forked cell longer and rather narrower than second, posterior cross vein a little internal, the median scales are slightly asymmetrical, lateral scales are long and narrow on all longitudinal veins except sixth, on one side only of lower branch of fifth and on stem of first forked vein internal to junction of cross veins. (*Vide* Fig. 7.)

Length 6 m.m

Specimens of these mosquitoes were obtained by Dr. K. S. Wise from the Kanuku mountains and were sent to Professor Howard. I had previously sent specimens of the same species marked J. 16, and collected on the Canje creek. The description is taken from duplicates sent me by Dr. Wise and from notes by Dr. Rowland and myself on a specimen sent under same mark to Professor Theobald in 1905. The cross veins of wing are variable, in one specimen the posterior is almost in line with mid cross vein, in another almost its own length internal, in this latter specimen the second longitudinal has the appearance of projecting into the basal cell, one scale having its root on the inner side of cross veins.

LIMATUS DURHAMII.—Thorax ornamented with violet, golden yellow and bronze, the golden yellow forming three patches, looking like the top of a cross; abdomen almost black with basal lateral white triangular spots, venter creamy white; legs bronzy brown, unbanded; bases of the wings pale yellowish.

Length 3=3.5 m.m.

Previqusly found in Para, Brazil, by Dr. Durham. Identified in a collection from the Rupununi sent to Professor Howard by Dr. K. S. Wise in September, 1907.

The genus Limatus is closely allied to Sabethes, Wyeomyia and Trichoprosopon and so far is represented by one known species classed by Dyar and Knab in genus Wyeomyia, in view of the larval characteristics, Professor Goeldi found the larvae in water in the forest rich in detritus of leaves and flowers. Mr. Busch got them in Trinidad in a hollow tree, in a broken cacao husk with Joblotia in a rotton calabash shell and in a thick rotten fluid. The larvae have no anal brush, but groups of long bristles on that segment and four bladed fan. The air syphon is medium length and has numerous groups of hairs, the comb of the eighth segment has six teeth in a single row.

HABITS OF BITING.

Observations of the peculiar habits of mosquitoes in their search after human blood afford indications of apparent differences of intelligence and alertness in different species.

Anopheles during the day never by any chance attack in front, but invariably settle on some part of the anatony invisible to the eyes of the subject to be bled. I have often experimented with a hungry albipes, turning round and following her with my eye as she vainly endeavoured to lodge on the back of my neck. As I am still somewhat sensitive I have sometimes occasion when seated on a cane chair to rise and interpose a sheet of newspaper or some such protection from the subtle attack of this troublesome gnat.

Sometimes it is Stegomyia which attacks in this sneaking way. At night anopheles become more daring and will settle on the hand, but always either on the side in shade or if one holds a book, on the back of the hand so hidden from the owner.

Stegomyia is much more troublesome during the day than any other mosquito, and inside houses is the only one which commonly attacks in daylight, except for Anopheles or very occasionally a Sabethoides which, however, does more circling round and humming than biting. The alertness of Stegomyia is amazing. She will bite repeatedly, shifting her position the moment one looks at the spot attacked, and however smartly one slaps at her, she never waits for the descent of the hand. She seems indeed to be aware the instant the

eye is fixed on her and unless deeply immersed and practically drunk with blood never relaxes her alertness.

Culex except *C. taeniorhynchus* is never troublesome during the day; one finds her hiding in dark corners, but at night she gets on the move. *Cubensis* seems to prefer the joints, if in the darksome hours she finds means to select at her leisure. Then if a hand should be exposed outside the sheet she will land on the second joint ot the thumb or one of the fingers, and leave painful traces of her visit. I have frequently been awakened by the painful bite, the swelling and redness, stiffness and pain remain for hours after she has operated.

C. taeniorhynchus is a blundering creature in comparison with any of those mentioned. During the day she does not fly high, and even in shade beneath a house will bite only on the hands as they hang by the side and on the face only if one is stooping so that it comes within three feet of the ground. She is slow witted and when settled waits calmly while the hand is lifted and the point of the finger pressed gently but firmly on her back. At night she comes in swarms at times into dwellings and swells the crowd of fatigans Cubensis and other culices, stegomyia and anopheles, which combine after dark to break the peace of the lieges in this colony. In your efforts at reprisals you will slay hundreds of *C. taeniorhynchus* and *M. tittilans* for one of any of the other pests, as these two species go about their work in the most ingenuously simple way and are quite unexpectant of any retaliation from their victims The small *atratus* prefers the lips, inside of nose or some such delicate integument for her operations, while a Sabethoid insists upon the very point of the nose or the eyebrow or forehead for her grazing ground, but her hoverings and flirtations with legs and wings spread wide as she passes in front of your face may be very annoying, and it is difficult to catch her at rest long enough to take revenge. Sometimes she is a morning visitor to the gallery of a house, more frequently about sunset she finds appetite for humanity.

Taeniorhynchus fasciolatus may often be mistaken for *M. tittilans* at night. They hunt together a good deal and their manners are similar, but perhaps *fasciolatus* is rather more alert than *tittilans*.

LITERATURE.

Theobald Monograph of Culicidae, Vol. IV, 1907.

Suppression de Paludisme a Ismailia, 1906, published by Compgne. Univers. du Canal Maratime de Suez.

The Larvae of Culicidae Classified as Independent Organisms, by Harrison G. Dyar and Frederick Knab. March 14, 1906, Journal of the New York Entomological Society, Vol. XIV, No. 4.

The Species of Mosquitoes in the Genus Megarrhinus, by Harrison G. Dyar and Frederick Knab, September 27, 1906, Smithsonian Miscellaneous Collections. Vol. XLVIII, Part 3.

On the Classification of the Mosquitoes, by Harrison G. Dyar and Frederick Knab, February, 1907, Canadian Entomologist.

Report on a Trip for the Purpose of Studying the Mosquito Fauna of Panama, by August Busch, May 1, 1908, Smithsonian Miscellaneous Collections, Vol. LII, Part 1.

Journal of Economic Biology, Vol. I, No. 1, p. 21 (1905).

Millions and Mosquitoes, Impl. Dept. of Agriculture.

TABLE OF GENERA,

With Names of British Guiana Species (Theobald's System).

FAMILY.	SUB-FAMILY.	GENUS.	SPECIES. NAMED BY.
Culicidae	...Anophelinae (18 genera)	... 1. Anopheles	...Anopheles n.sp. (Dyar and Knab) Near Albimanus Wiedemann.
		2. Myzomyia	Myzomyia lutzii, Theobald.
		3. Cyclolepidopteron ...	Cyclolepidopteron mediopunctatus, Lutz.
		4. Feltinella	
		5. Stethomyia	Stethomyia nimba, Theobald.
		6. Pyretophorus	
		7. Myzorhynchella ...	Myzorhynchella nigra, Theobald.
		8. Arribalzagia	
		9. Myzorynchus	
		10. Christya	
		11. Lophoscelomyia ...	
		12. Nyssorhynchus	
		13. Cellia	Cellia argyrotarsis, R. Desvoidy.
		14. Neocellia	Cellia albipes, Anopheles tarsimaculata, Goeldi= C. albimana, Theobald nov. nom.
		15. Aldrichia	
		16. Kerteszia	
		17. Chagasia	
		18. Bironella	
	Megarhininae	... 1. Megarhinus	...Megarhinus haemarrhoidalis, Fabricius.
		2. Ankylorhynchus ...	Megarhinus separatus, Arribalzaga.
		3. Toxorynchus	
	Culicinae ... (63 genera)	... 1. Janthinosoma	...Janthinosoma musica, Say.=Sayi Theobald no.v nom. Janthinosoma lutzii, Theobald. Janthinosoma posticata, Wiedemann.

TABLE OF GENERA,

With Names of British Guiana Species (Theobald's System).

FAMILY.	SUB-FAMILY.	GENUS.	SPECIES.	NAMED BY.
		2. Prorophora	Prorophora scintillans,	Walker.
		3. Mucidus		
		7. Stegomyia	Stegomyia luciensis,	Theobald.
			Stegomyia fasciata—Stegomyia calopus,	Meigen.
			Stegomyia n.sp. (?).	
		26. Gnophodeomyia ...	...Gnophodeomyia inornata.	
		45. Culex	...Culex confirmatus,	Arribalzaga.
			Culex nubilis,	Theobald.
			Culex scholasticus,	Theobald.
			Culex flavipes,	Macquart.
			Culex fatigans,	Wiedemann.
			Culex similis,	Theobald.
			Culex palus,	Theobald.
			Culex cubensis,	Big.
			Culex aikenii,	Dyar and Knab.
			Culex n. spp.	
		44. Culicelsa	...Culicelsa taeniorhynchus.	
		47. Protoculex	...Protoculex serratus,	Theobald.
		49. Trichopronomyia ...	...Trichopronomyia microannulata,	Theobald.
		56. Melanoconion	...Melanoconion atratus,	Theobald.
			Melanoconion leuteopleurus,	Theobald.
			Melanoconion indecorabilis,	Theobald.

1909. Aiken, James

TABLE OF GENERA,

With Names of British Guiana Species (Theobald's System).

FAMILY.	SUB-FAMILY.	GENUS.	SPECIES.	NAMED BY.
		50. Taeniorhynchus	...Taeniorhynchus fulvus or C. fulvus, Wiedemann.	
			Taeniorhynchus confinnis, Arribalzaga.	
			Taeniorhynchus fasciolatus, Arribalzaga.	
		52. Mansonia or Panoplites	...Mansonia titillans, Walker.	
			Mansonia fascipes, Coquillet.	
			...Gualteria oswaldi, Lutz.	
	Aedinae ... (7 genera)	Gualteria ...	...Aedeomyia squamipenne.	
		Aedeomyia ...	...Haemagogus cyaneus, Fabricius.	
		Haemagogus ...	...Haemagogus albomaculatus, Theobald.	
			Haemagogus affirmatus, Dyar and Knab.	
	Uranotaeninae (4 genera)	Uranotaenia ...	...Uranotaenia pulcherrima, Arribalzaga.	
			Uranotaenia geometrica, Theobald.	
			Uranotaenia lowii, Theobald.	
			Uranotaenia minuta, Theobald.	
			Uranotaenia n. sp., Dyar and Knab.	
		Pseudo-uranotaenia ...	...Pseudo-uranotaenia rowlandsii, Theobald.	
			Pseudo-uranotaenia, n.sp., Theobald.	
		Anisochelomyia ...	...Anisochelomyia lenoptera.	
		Mimomyia		

plate 1

C aikenii

C. aikenii D & h.

Fig 1

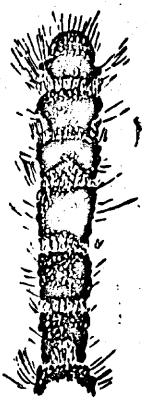


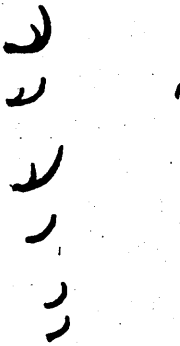
Fig. 2

C aikenii

Fore

Mid

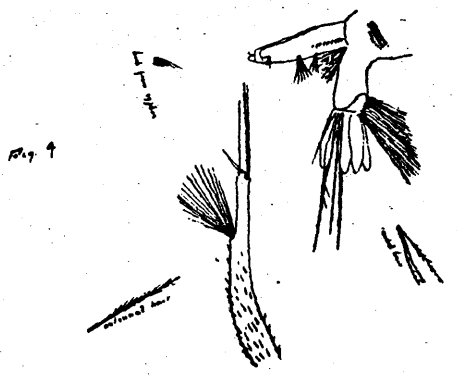
Hind



fore foot

Fig 3

Fig. 1. Larva of C. aikenii—natural attitude when at surface of water.
Fig. 2. Abdomen of C. aikenii—dorsal view.
Fig. 3. Ungues and fore-foot of C. aikenii.



C. cubensis ♂ (21.10.07)

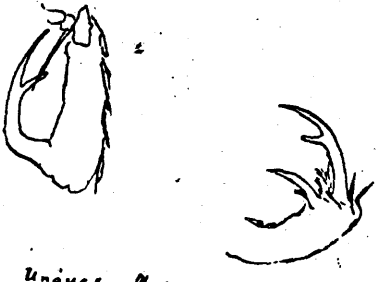


Fig. 5.

Ungues Mid and Fore legs

Fig. 4. Larva C. cubensis, caudal parts, antenna hook from syphon and compound hairs.
Fig. 5. Mid and fore feet C. cubensis showing ungues.

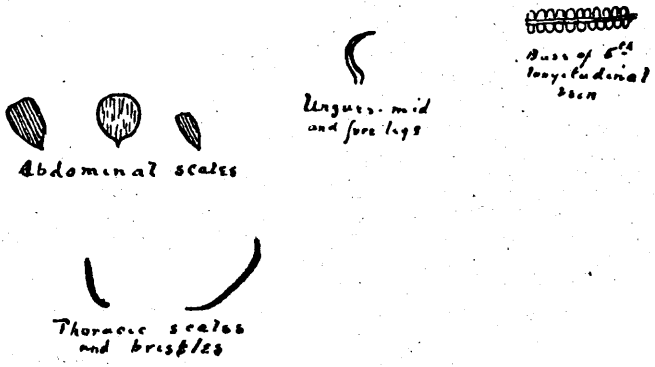


Fig. 6

U. minuta

Fig. 7

Fig. 6. Squamous characters of U. minuta.
Fig. 7. Sabethes n.sp., J. 16—metanotum showing arrangement of bristles.

Plate 1

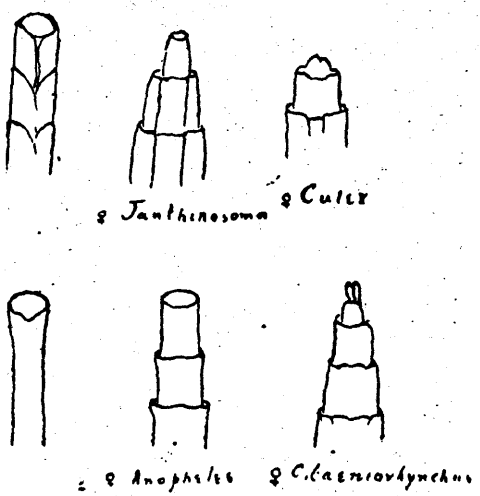


Fig 8

Fig. 8. Ventral views of terminal segments of abdomen of female Sabethes J. 16 (two specimens), Janthinosoma, Culex, Anopheles and C. taeniorhynchus.

TABLE OF GENERA,

With Names of British Guiana Species (Theobald's System.)

FAMILY.	SUB-FAMILY.	GENUS.	SPECIES NAMED BY.
	Deinoceratinae ...	Deinocerites	...Deinocerites cancer.
	Heptaphlebomyinae ...	Heptaphlebomyia ...	
	Trichoprosoponinae (5 genera) ...	Joblotia	...Joblotia, n.sp.
		Runchomyia	...Runchomyia Frontosa.
		Goeldia	...Goeldia fluvatilis.
	Dendromyinae ...	1. Wyeomyia	...Wyeomyia melanocephala, Dyar and Knab.
		2. Phoniomyia	...Dendromyia ulocoma, Theobald.
		3. Dendromyia	Dendromyia assulepta, Theobald.
		4. Philodendromyia ...	Dendromyia luteoventralis, Theobald.
		5. Polylepidomyia ...	Dendromyia quasiluteoventralis, Theobald.
		6. Sabethes	...Sabethes, remipes, Wiedemann. Sabethes undosus, Coquillet.
		7. Sabethoides	...Sabethoides, confusus, Theobald. Sabethoides, n.sp., Dyar and Knab.
	Limatinae	Limatus	...Limatus durhamii, Theobald.

and they may be similar to those of Taeniorhynchus fasciolatus as has been surmised by Messrs. Dyar and Knab. On one occasion only from a miscellaneous collection of larvae and pupae from a pond in Stanley-