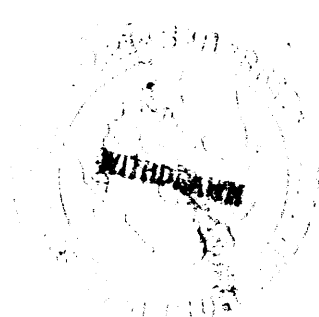


ANOPHELES FILE

pp 460 Anopheles sinensis Lind

Hygienic Laboratory.

A HANDBOOK
 OF THE
 GNATS OR MOSQUITOES
 GIVING
 THE ANATOMY AND LIFE HISTORY
 OF THE
 CULICIDÆ



BY
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696

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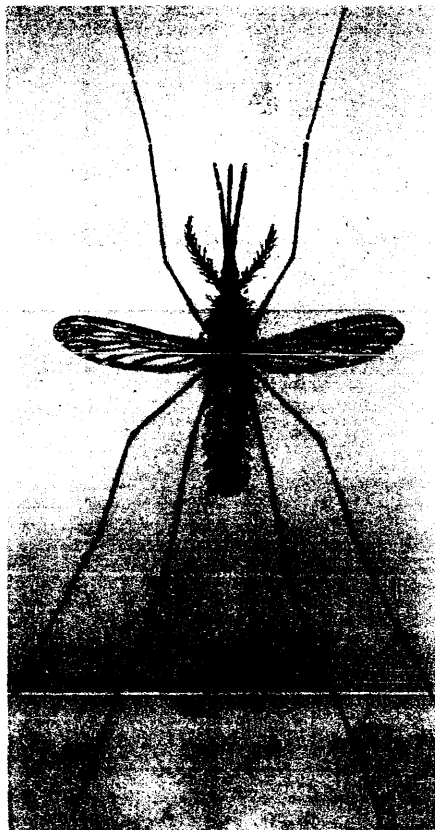
Anopheles costalis.

♀



Anopheles costalis.

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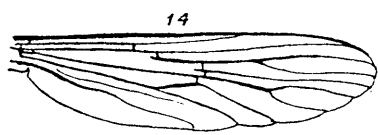
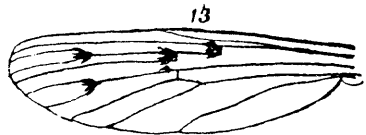
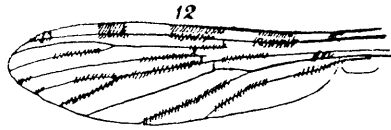
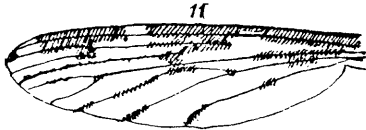
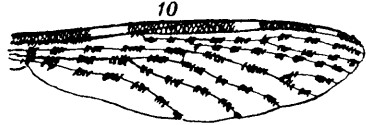
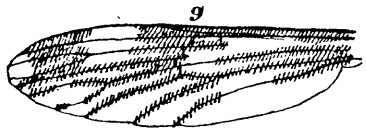
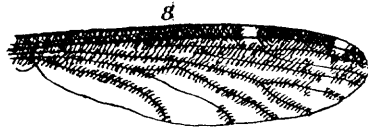
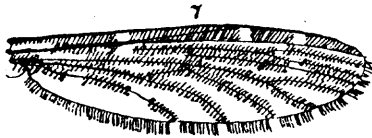
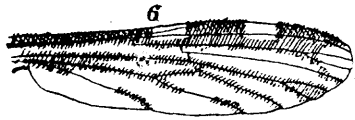
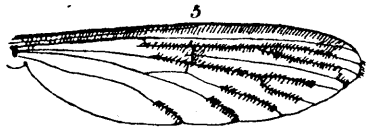
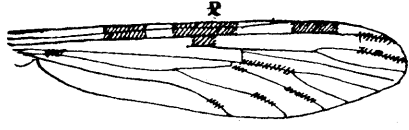
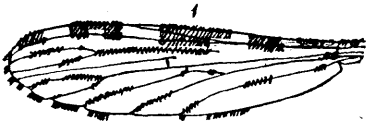


Anopheles funestus.

PLATE VII.—ILLUSTRATING THE MARKINGS OF THE WING IN CERTAIN SPECIES OF ANOPHELES.

- Fig. 1.—Wing of *Anopheles costalis*, Loew, from West Africa.
Fig. 2.—Wing of *Anopheles Rossii*, Mihi, from Calcutta.
Fig. 3.—Wing of *Anopheles funestus*, sp. n., from West Africa.
Fig. 4.—Wing of *Anopheles albimanus*, Wied., from Jamaica.
Fig. 5.—Wing of *Anopheles Lindesayii*, Mihi, sp. n., Bakloh, Punjab.
Fig. 6.—Wing of *Anopheles vanus*, Walker, from type.
Fig. 7.—Wing of *Anopheles* sp. "a," from Calcutta.
Fig. 8.—Wing of *Anopheles* sp. "b," from Calcutta.
Fig. 9.—Wing of *Anopheles punctipennis*, Say, from the type of *C. hyemalis*, Fitch, in British Museum.
Fig. 10.—Wing of *Anopheles annulipes*, Walker, from the type in the British Museum.
Fig. 11.—Wing of *Anopheles pictus*, Loew, after Ficalbi's figure of its supposed synonym *An. pseudopictus*, Grassi.
Fig. 12.—Wing of *Anopheles superpictus*, Grassi, after Ficalbi's figure.
Fig. 13.—Wing of *Anopheles claviger*, from a specimen of *An. maculipennis*, Hfmg. in British Museum.
Fig. 14.—Typical wing of *Anopheles* according to Skuse.

The first five figures were drawn with the camera lucida at about the same amplification. The others, however, are free-hand drawings and necessarily cannot claim the same accuracy, nor do they at all represent the proportional size of the wings. The dark-scaled portions are represented by oblique shading.



Genus II. **ANOPHELES**, Meigen (1818).

ALTHOUGH not containing anything like the number of species comprised in *Culex*; this is not only the second largest, the number of species enumerated in the present work being thirty, but from the medical point of view it is by far the most important genus of the family, for with the exception of some doubtful observations on *Culex nemorosus* and *C. pipiens*, the great weight of evidence tends to show that it is the members of this genus alone that are concerned in the transmission of the malarial parasite from man to man. If this prove to be actually the case, it is certainly a not only fortunate but very astonishing circumstance, for though the females of this genus attack man and animals, being less frequently house species, they do not inflict one tithe of the annoyance on the human race that is effected by its constant companion, the *Culex*, considered merely as biting insects.

However, it is probably the case that this genus alone acts as the intermediate host of the malarial parasite, and its comparative uncommonness goes far to explain how it is that, although malaria cannot be shown to originate in localities where gnats are unknown, it is not always most rife where they are commonest, and may be entirely absent in extremely infested districts. It does not follow that any and every member of the genus is capable of transmitting the disease, and it is quite possible that a limited number of species of this and other genera are alone able to do so, but for the present all its members must be regarded with suspicion.

It must, however, be remembered that, whatever be the case with regard to human malaria, the members of the genus *Culex* are certainly capable of becoming infected by closely allied protozoal parasites, as has been conclusively demonstrated in the case of *Culex fatigans*, Wied., by Major Ronald Ross, I.M.S., who traced in that species the intermediate stage of a blood parasite of sparrows

and other birds,—the *Proteosoma Labbé*, “Report,” Calcutta Government Press, 1898.

The great distinguishing character of the genus is that the *palpi are about the length of the proboscis in both sexes*. It is true that this is also the case in *Megarhina*, but the *Anopheles* are grey insects, and generally have dappled wings, and show none of the brilliant colouring and metallic reflection of the other genus, and are for practical purposes, not likely to be confused with it by any one who has had the opportunity of inspecting a few species of both. In *Megarhina* none of the species have dappled wings. It may be asked how the genus is to be distinguished from *Culex*, if a male specimen be alone available, but there is no real difficulty as the spatulate form of the last joint of the male palpi distinguishes them easily alike from *Culex* and *Megarhina*.

In five of the known species the wings are without spots and though in the majority of these there is some tendency to accumulations of scales on certain portions of the veins these would certainly not be denominated as “dappled” by the ordinary observer. As already mentioned, the attitude of the resting insect is characteristic, the members of this genus posing themselves at an angle with the surface on which they rest, while the *Culices* hold themselves more or less parallel to it.

The following formal description of the genus is taken from Ficalbi's “Revisione delle specie Europei.” The only essential characters of Meigen's genus are those of the palpi, and that the additional characters given by Ficalbi and others are merely interesting as representing the usual characteristics of the genus which are mostly correlated with them. For example, Skuse does not mention the point, noted by Arribáizaga, that the basal cells may be open externally owing to the absence of the transverse veins that bound them on that side.

Skuse, in his monograph on the Australian *Culicidæ*, gives a description of the wing which he considers characteristic of the genus; but an examination of some fourteen species leads me to the conclusion that it would be impossible to

draw up a description that would be in any way generic. Not only are the transverse veins wanting in several species, but in several cases the auxiliary and first longitudinal have a common stem and do not separate till the origin of the second longitudinal, all three commencing at one point as separate veins.

There is, however, one character which is more or less marked in all five of the species, in which I have been able to inspect specimens of both sexes, and that is, that both fork-cells appear to be uniformly smaller, and with longer stems in the male than in the female. In the female the anterior fork-cell is usually distinctly longer, though narrower, than the posterior, but in the male the anterior is seldom longer than the posterior, and is often of dimensions almost recalling those of the wing in *Megarhina*. Whether this is the case in other species I cannot, of course, say, but the point is worthy of further examination.

Anopheles (Culex, L. ; Fabr., Schrank, Gmelin, Villiers, Meigen, 1804), from "F. R."

Characters of the family, with the following generic distinctions—Palpi about the length of the proboscis in both sexes. In the female the palpi are really four jointed, but there exists in the basal joint a constriction which makes them appear five jointed, and sometimes a further constriction which brings up the number of apparent joints to six. In the male the palpi are really three jointed, but a constriction near the base of the first joint similarly gives the appearance of four joints, and sometimes there are two further constrictions, one towards the middle of the long joint and one in the apparent basal joint, which gives the appearance of five or even six articulations; but the enumeration of four joints for the male and five for the female is that generally received. In the female the palpi are filamentous, and are kept when at rest parallel with the proboscis, forming with it a bundle of three pieces. When the female bites she raises and separates them; and in her the ante-penultimate joint is as long as, or a little longer than, the penultimate and last joints together.

In the male the last two joints of the palpi are short, thick, and olive-shaped. Nape with a crown of scales behind. Abdomen villous, but as regards the dorsal and ventral surfaces the villosity wants the scaly covering which is so abundant in the genus *Culex*. Legs very long, terminated by simple or denticulate claws. *Anopheles*, from *Ἄνωφελής*, noxious.

Table of the Species of the Genus ANOPHELES.

- A. With the costal margin of the wings marked with interrupted darker and lighter colouring.
- I. The dorsum of the abdomen decorated with lighter markings.
- ⊕. With the tarsi more or less decorated with lighter portions.
1. *An. albimanus*, Wied. Abd. segs. with triangular grey spots. Last 2 tarsal joints wholly white.
 2. *An. superpictus*, Grassi. Abd. segs. brownish yellow with dark brown hinder borders. Costa yellowish white with 4 comparatively small, completely separated blackish spots.
- ii. With the tarsi not stated to be banded.
3. *An. barbirostris*, Wulp. Costa fuscous, with 2 snowy spots. "Abdomen with pale incisions."
- II. Abdomen not noticeably banded, but with a thin darker hind border to the segments, especially distinct when rubbed.
- i. With the tarsi more or less decorated with lighter portions.
4. *An. pictus*, Loew. Abd. brassy yellow. Wings with 3 large and small sub-apical brown spots, the 2 basal united on the actual costa.
 5. *An. Rossii*, Mihi. Much like *An. pictus* but with the wings lighter, the spots separate, and the large middle one prolonged inwards so as to form a flattened letter T.
 6. *An. costalis*, Loew. Wings darker than either of the preceding, the costa being black at the very base, counting which, there are 5 separate black, with 4 narrow light intervals.
- III. Abdomen not stated to be at all adorned.
- i. With the tarsi more or less decorated with lighter portions.
7. *An. albitarsis*, Arribálzaga. Costa black with 3 grey spots. Last 3 tarsal joints wholly white.
 8. *An. argyrotarsis*, Desv. Costa with fuscous spots, last joints of hind tarsi clay-coloured.
 9. *An. musivus*, Skuse. Costa violet brown with 4 whitish spots. First 4 tarsal joints tipped whitish. Subcostal transverse vein at the middle of the auxiliary.
 10. *An. Mastersi*. Like *musivus*, but with the subcostal transverse, well beyond the middle of the auxiliary vein.

11. *An. annulipes*, Walker. Costa black with 3 narrower light interruptions, the remaining veins minutely beaded with black and white spots. Femora and tibiae minutely banded.
 12. *An. vanus*, Walker. The wings elsewhere pale, are dark along the costa with 2 small snowy interruptions, both rather far out, and the apex also white.
 13. *An. annularis*, Wulp. Closely resembles the above, but it is probable, from the context, that the costal spots are more numerous.
 14. *An. sinensis*, Wied. The costa bright brown with 2 interruptions.
 15. *An. sp.* "a," from Calcutta. Wings sooty, with 3 small white interruptions on the costa. Apices of palpi white.
 16. *An. sp.* "b," from Calcutta. Wings intensely black with 2 yellow interruptions on the costa. Apices of palpi black.
- ii. The tarsi not stated to be banded.
17. *An. quadrimaculatus*, ~~Gay~~. Wings with a brown spot on the middle of the costa and another large and a small spot on the wing-field.
 18. *An. funestus*, *sp. n.* Wings, very dark, with 5 dark patches on the costa, the 2 basal, connected by dark scales on the auxiliary vein; the whitish interruptions very narrow.
 19. *An. punctipennis*, Say. Wings dark-scaled with the costa and other veins interrupted in the outer third by an ill-defined band; and an apical whitish spot. General coloration rufous.
- B. With the costa uniformly coloured but with spots on the wing-field.
- a. The wing spots produced by differently coloured scales.
 - ii. Abdomen and tarsi not stated to be banded.
 20. *An. crucians*, Wied. With white spots here and there on the brown veins.
 21. *An. Lindesavi*, Mihi, *sp. n.* Wings with a small apical whitish spot and the veins with grey and black scales.
 - b. The wing spots formed by accumulations of scales.
 - i. The abdomen and tarsi banded.
 22. *An. claviger*, Fabr. With 4 wing spots over the junctions of veins.
 - ii. The abdomen not distinctly banded but with the hind border of the abd. segs. darker, the tarsi banded (presumably from the name).
 23. *An. annulimanus*, Wulp. With 2 spots on the wing-field, formed by accumulations of scales.
 - iii. The abdomen and tarsi alike unadorned.
 24. *An. atratipes*, Skuse. Costa black, but with 6 prominent patches of scales on the other veins.
- C. Wings with an ill-defined brown spot in the stigmatic region. Abdomen and tarsi unadorned.

25. *An. stigmaticus*, Skuse. Scales and wing membrane alike darker in the stigmatic region.

D. Species in which the wings are unspotted.

I. The abdomen dorsally decorated with lighter bands or marks.

i. The tarsi with a band at the base of the first joint.

26. *An. bifurcatus*, L. Of medium size.

27. *An. nigripes*, Stæger. Smaller than the above, with the appendages darker.

28. *An. villosus*, R. Desvoidy. Larger than *An. bifurcatus*.

Probably all the three above Species are mere synonyms of *An. claviger*.

II. With the dorsum of the abdomen uniformly coloured.

i. With the tarsi white-ringed.

29. *An. annulipalpis*, Arribálzaga. Last tarsal joints wholly white.

ii. With the tarsal joints uniformly coloured.

30. *An. ferruginosus*, Wied. Stems of halteres pure white.

1. ANOPHELES ALBIMANUS (Wied.).

Wings with yellowish spots on the dusky brown costa, as well as others on the wing-field and along inner border. Tarsi with the apices white. Abdomen with large triangular grey spots. Plate vii., fig. 4.

Description from Wied., "A. Z. I.," p. 13.—Fuscous; the abdomen with large, triangular, grey spots; the wings with dusky spots; the apices of the tarsi snow-white. Length, $2\frac{2}{3}$ lines (German), ♀.

Apices of the joints of the palpi snow-white. Each segment of the abdomen with a grey, triangular spot, the apex of which is directed forwards. Costa of the wings dusky brown with yellowish intersections which lie lengthwise; there are spots also on the inner edge and middle part of the wings, but they are much smaller.

Noted as found in the island of Porto Rico by V. von Röder, in "Entomolog. Zeitung, Stetin," 1885, p. 338.

Major Ross has also recently received from Jamaica some specimens, undoubtedly of this species, which, though much rubbed, enable me to furnish the following additional details.

The general ground colour of the insect is sooty black, but remains of the scales forming the dorsal abdominal spots can still be made out, and there are also remains of linear grey markings on the thorax. In addition to the terminal white on the ♀ palpi there are minute white rings at the articulations of the next two joints; the rest of these appendages being sooty black with very long, shaggy tomentum near the base. The sooty proboscis has also a minute whitish tip. The anterior femora do not appear to be dilated at the base and have no bands, but there is a faint knee-spot. The apices of the tibiæ and of the first three tarsal joints show minute white rings in addition to the very characteristic pure white of the whole of the last two joints.

The costal margin of the wings is pale at the actual base, but soon shows short lengths of black; these are followed by a large dark spot occupying the greater part of the middle third of the fore part of the wing and, after a yellowish interval of some length, there is a second irregularly triangular spot not quite so large; the intervals between these are a golden brown, but the apex of the wing and some portions of the other long veins are white scaled, though the dark scaled parts greatly preponderate. The markings throughout are of a rather diffuse character and appear to vary somewhat in different individuals.

Habitat.—St. Domingo, Hayti.

2. ANOPHELES SUPERPICTUS, Grassi (1899).

Wings spotted; yellowish white with four comparatively small, completely separated, brownish-black spots on the anterior margin; a small apical dark spot and certain limited portions of the longitudinal veins with dark scales. Tarsal joints nearly black with white, mainly apical, bands. Thorax brown ornamented with white scales in the middle. Abdominal segments brownish-yellow with darker distal borders.

The following description from Ficalbi's "Venti Specie de Zanzare Italiane," Florence, 1899, is somewhat abbreviated.

Proboscis nearly black but whitish at the lip. Palpi of the female as long as the proboscis, nearly black with white rings at junction of second and fifth, third and fourth, as well as the entire terminal joint white. Nape black with a median white tuft. Thorax with the dorsum browner at the sides, ornamented towards the middle by white scales; pleuræ grey. Legs with the femora brownish, those of the first pair not proximally dilated. The remainder of the joints brownish-black with white rings at the tibio-tarsal, and tarsal articulations affecting mainly the apices of the proximal joints.

Wings, light coloured and generally clear, spotted with yellowish-white and brownish-black or black; the anterior margin black, completely interrupted by three light spots so that the black portion is divided into four parts, or elongated spots of not very unequal length; in addition to those an apical black spot and several of the longitudinal veins are black-scaled for various portions of their lengths, much as in *An. pseudopictus* but not so densely.

Abdomen very hairy but without scales on either its dorsal or ventral surface; the segments generally brownish-yellow with darker hinder borders. Ficalbi has only met with a female. Length including the proboscis 7-8 mm. Plate vii., fig. 12.

Habitat.—Italy.

3. **ANOPHELES BARBIROSTRIS**, Van der Wulp.

Wings with two white spots on the brown costa, both in outer third. Tarsi unbanded; legs brick-red; abdomen dark brown with pale incisions; thorax faintly striped.

Description from "Notes from the Leyden Museum," VI, p. 48.—Fuscous; thorax faintly striped; proboscis and palpi very hairy; legs brick-red; halteres fuscous; costa of the wings fuscous, with two snow-white spots. Length 5 mm. ♀.

The straight, projecting, hairy palpi give this species a peculiar aspect, differing from our indigenous species of the genus. Dark brown. Rostrum and palpi longer than the head

and thorax taken together, clothed with brown, scaly hairs; the joints of the palpi hardly distinguishable. Thorax rather long and narrow, somewhat lighter coloured than the head and abdomen, quadrangularly truncated in front, with indistinct longitudinal stripes on the upper part. Abdomen with pale incisions. Legs very long and slender, testaceous; femora a little enlarged towards the end, when viewed in some directions, whitish at the tip. Halteres piceous. Veins of the wings with brown scales which are accumulated towards the costa; a point of snow-white scales at two-thirds of the costa, and a similar point near the tip; the two furcate cells of equal length.

Habitat.—Mount Ardjoeno, East Java (Hekmeyer).

4. ANOPHELES PICTUS, Loew.

An. pseudopictus, Grassi, 1899. Wings spotted; three prominent yellow spots on the dark costa, and five to seven small dark ones on the wing field. Tarsi unbanded; abdomen unbanded, brown with yellow scales; thorax grey, with linear markings. Anterior femora slightly dilated at the base.

Description from Loew, "Dipt. Beiträge," 1845.—Wings spotted, anterior femora thickened at the base. Length of the body three lines. Rather pale brownish-grey; the thorax dorsally cinereous, with five longitudinal black lines, between which the greyish-white shows; in front of the scutellum which has the form of a tranverse line, and is brownish-yellow, is a boat-shaped mark which combines with the dark median line and reaches well out to the sides; the grey colour of the upper part of the thorax is limited at the sides by a brown longitudinal line. In the middle of the sides of the glabrous thorax are brownish-yellow marks, which show white in certain lights, and are especially brilliant on the anterior and middle coxæ. The head is ash-coloured, the margin of the eyes whitish and the frons has a tuft of dirty white hairs in front. The antennæ are brownish, with brownish hairs, which vary in colour from brownish to

black, according to the direction of the light. The first joint of the palpi is brown and very short; the second longer and densely covered with scales, especially at the base so that it appears thickened; its colour and that of the scales is brown, although the latter have a whitish lustre on the surface. The third joint is brown, longer than the second, slender at the very base, but thickened at the extremity, where it is furnished with a long tuft of iridescent brown hairs, the scales of which resemble hairs, and have a distinctly whitish lustre, especially on the second half on the internal and upper aspect, as also have the scales which clothe the second halves of both the last joints which are shorter, nearly equal in length, flattened, brown, fringed on its internal and upper part with brownish hairs, and the fourth joint with a tuft. The abdomen is flattened, brownish, with clear brownish hairs, shining white on the upper surface, with an obsolete median blackish stripe. The last segment is entirely brown. The wings are hyaline, the veins and margin covered partly with white and partly with black scales, those of the internal fringe form alternate patches of white and brown. On the anterior margin are three large brown spots; the first, which commences not far from the root of the wing, is connected with the second on the costa itself, although separated internally by a point of white; the second brown spot, at its outer end, sends out a bow-shaped band over the transverse veins, concavity backwards, and is separated from the third spot by a small snow-white area, which lies adjoining, and upon the costal margin itself. The third spot is separated by a similar area towards the tip of the wing. In addition to these spots the veins at the tip of the wing are clothed with brown scales, though the fringe is there whitish. The other longitudinal veins have patches of brown scales, one on the middle of the sixth being especially distinct, but they do not form visible spots. Legs; the tips of the tibia and of the three first tarsal joints show, in certain lights, a yellowish lustre which makes them look ringed; the fore coxæ are exceptional in that they taper towards the end instead of being of uniform width.

Grassi has recently ("Venti Specie de Zanzare") appar-

ently separated this species into two—*pseudopictus* and *superpictus*. The latter is clearly a new and distinct species, but it is difficult to make out any valid distinction between it and Loew's species, so I prefer to give it as a synonym, as the description of *An. pictus* appears to sufficiently cover all the characters given. Plate vii., fig. 11.

Habitat.—Southern Europe and coast of Asia Minor opposite Rhodes.

5. ANOPHELES ROSSII, *Mihi*.

Wings with four black spots on the white costa, and some of the other veins with alternate portions white-scaled and black-scaled, forming indistinct additional spots; tarsal joints pale grey with minute apical bands; abdomen indistinctly banded, the lighter basal portion of the segments greatly preponderating; thorax without longitudinal markings. Plate vii., fig. 2.

SIZE OF PARTS IN ♂ AND ♀ SPECIMENS.

<i>Male.</i>	<i>Female.</i>
Head0.5 mm.	Head0.7 mm.
Thorax1.2 mm.	Thorax1.0 mm.
Abdomen2.7 mm.	Abdomen3.4 mm.
Proboscis2.0 mm.	Proboscis1.9 mm.
Palp.....2.0 mm.	Palp.....1.7 mm.
Antenna1.8 mm.	Antenna1.2 mm.
Wing4.0 × 1.0 mm.	Wing3.3 × 0.8 mm.

♂.—Head covered with a mixture of brown and whitish scales, the latter preponderating on the vertex, the nape nearly black; eyes black, with a narrow whitish margin; antennæ pale fulvous, with silky-brown verticils, the last joint rather darker at the tip, the basal entirely golden-brown; proboscis nearly black, golden-brown at the tip. The palpi are mainly whitish, with the extreme apex and the base for some little distance, and points on the joints dark brown; thorax of the same tint as the head, with a minute, blackish shoulder patch, and some indistinct darker markings laterally and on the coxæ; legs pale grey, the anterior

femora are perhaps somewhat thicker than those of the other legs, but cannot be said to be perceptibly dilated at the base. The tarsal joints have narrow apical white bands. Wings longer than the abdomen, hyaline, the veins with white scales except on the spots and dappings; there are four distinct black costal spots, the largest of which is placed opposite the origin of the second longitudinal vein, close behind it is one of smaller size; at the tip of the wing is the smallest of the series, and the fourth is placed midway between this and the large spot first mentioned. The large spot in the middle of the costa is not oblong as in *An. costalis*, but consists of a long portion on the costa, and opposite the middle of this, on the auxiliary vein, a shorter portion, so that the entire spot forms a flattened letter T. Besides these spots, visible to the naked eye, many of the veins are black for small portions of their length, the most noticeable situations being the fourth longitudinal, which is black from its forking to the transverse veins; the tips of the fourth, fifth and sixth longitudinals; the root of the fifth longitudinal, and a minute spot on the costa at its base. The humeral transverse vein is curved and placed very close to the root of the wing, so that it is with difficulty made out; the subcostal transverse is placed a good deal beyond the middle of the auxiliary vein, and quite near the origin of the second longitudinal, the latter being placed much nearer to it than to the origin of the supernumerary transverse, auxiliary vein reaching the costa before the level of the tip of the hinder branch of the fifth longitudinal. Third longitudinal appearing at the junction of the supernumerary and middle transverse veins, which together form a continuous line joining the second and fourth longitudinals, and a little beyond the tip of the sixth longitudinal; all these cross-veins being of about equal length. Anterior fork cell slightly longer and narrower than the posterior, the base of the former slightly in advance of that of the latter; base of the anal cell a little beyond the level of the origin of the second longitudinal vein. Halteres with white stem and black club. The abdomen is pale yellowish, with pale golden hairs, distinctly paler than in *An. costalis*; venter pale brown,

except a pair of lateral white spots on the first four segments. In the rubbed state the hind border of the dorsum of the segments is very distinctly darker, but this barely shows through the tomentum in undenuded specimens.

♀.—Closely resembles the ♂. Her palpi are uniformly black except the apical half of the end joint, a band at its base and another on that of the penultimate, which are more or less golden-brown. The antennæ are black throughout, with scanty verticils of lighter tint, the basal joint golden-brown; the legs have the coxæ pale drab, the femora very pale at the base, darker at the distal end where there is an external black line which is continued on the tibia, with the interruption of a faint lighter knee spot; the hind legs show four lighter basal bands to the tarsal joints. The venter of the abdomen is pale drab with indistinct darker lateral lines, and a dark hinder border to the three or four distal segments.

The venation of the wings differs in the two sexes, the anterior fork-cell being smaller than the posterior which it barely equals in length, both cells being much shorter than in the female, in which the anterior though narrow is very distinctly the longer of the two cells.

This description, which has been drawn up from the better preserved specimens in the British Museum, replaces my description in the "Journal of Tropical Medicine," October, 1899, as the specimens then at my disposal were much rubbed, so that some of the markings had disappeared.

Habitat.—Taken in Calcutta by Major Ronald Ross, I.M.S. He did not, however, succeed in cultivating in it the parasite of human malaria.

6. ANOPHELES COSTALIS, Loew.

Wings with the costa interrupted by patches of darker and lighter colouration, but not generally dark; the costa has the basal third dark with two minute interruptions, followed by three other dark spots, the first of which is the largest, separated by smaller yellowish interruptions; por-

tions of the other veins are black-scaled, but the lighter tinted scales preponderate. Abdomen not distinctly banded, but with the hind border of the segments rather darker, especially in the male. Tarsi with minute rings mainly apical, but involving also the base of the next joint.

Description from Loew, "Berlin. entomol. Zeitschr.," 1866, p. 55. ♀.—Pale tinted, with the palpi black with white rings: wings with uniformly black costal spots. Length of the body, 2 lines, of the wings, $2\frac{1}{2}$ to $2\frac{1}{8}$ lines. Clay-coloured; the two first joints of the antennæ yellow, remaining joints brownish; palpi black, with a white ring on each of their joints. Thorax with a bright brownish, longitudinal stripe on either side, and a distinct brownish line in the middle; pleuræ striped and speckled with pale brown; the hairs on the thorax, scutellum, and abdomen entirely light yellowish; legs yellowish brown; the femora yellowish at the base; all the outermost points of the knees and tibiæ of a yellowish coloration. Wings limpid, with pale yellowish, almost white-haired veins, with here and there, patches of black hairs, so as to produce a characteristic marking of the wing. Of these spots, the most striking are four placed on the anterior border of the wing, and not extending beyond the first longitudinal vein; and forming elongated black spots, which alternate with clearer portions of the wing-border; the spots on the remaining area of the wing are not so distinct, because, owing to the veins being placed further apart, they nowhere approach each other sufficiently closely to admit of their black portions combining to form a noticeable spot.

In the examples collected by the Liverpool Malaria Expedition on the West Coast, with the exception of the wings, the insect is a rather dark brownish grey rather than clay coloured. The palpi of the ♀ have the apex broadly white, and there are in addition, two narrow white bands on the articulations, further their scaly covering is rougher than in *An. funestus*. The legs are dark brown, somewhat speckled with yellowish, especially beneath, but show nothing of the nature of a band, except on the tarsi. In the fore legs, these have the first three joints with apical bands, which involve somewhat the contiguous bases of

the next joints: in the middle legs the first three, and in the hind, the first four joints have purely apical, narrow yellowish bands. The wings are lighter than in *An. funestus*, but have a larger proportion of dark scales than in *An. Rossii*, Mihi, or, to judge from Ficalbi's figures, than Grassi's *pseudopictus* and *superpictus*. The ♂ has the terminal joint of the palpi with a dense tuft of hairs, which are brownish yellow internally and blackish externally; the only other ornament being a very minute ring on the articulation between the second and third joints.

Mr. Austen further makes the following note:—Although this species much resembles *An. pictus*, Loew (described from two females from the coast of Asia Minor, opposite the island of Rhodes), in having the front femora thickened towards the base, I think it is undoubtedly distinct. In the first place, it is much smaller (only 2½ instead of 3 German lines). Then the two last joints of the palpi have an adornment of yellowish-white scales instead of being brown; and the wings have four dark blotches on the costal margin in place of three, and all are separate, whereas, in Loew's species, the first and second patches are joined together on the costa itself. Lastly, the legs differ, the tarsi being banded in *costalis*.

Habitat.—Caffraria, South Africa.

7. ANOPHELES ALBITARSIS, Arribáizaga.

Wing spotted; the costa black with three grey spots; there is also an apical black spot, and the veins are clothed with alternate lengths of grey and black scales. The last three tarsal joints of the hind legs wholly white, and the first two dusky, sometimes with apical white rings; in the other legs, only the apical joint is wholly white, and the tips of the other joints; abdomen grey with fuscous hairs; thorax grey with linear markings.

Description from "L. A.," p. 36. ♂ and ♀.—Head cinereous with grizzly hairs; eyes black with narrow silvery margins; proboscis black, whitish or grey at the

apex; palpi black or dusky, with black scales among which some grey ones are sprinkled; with three white rings at the apex, which are always distinct but vary in size. Antennæ black or dusky, with grey hairs in the ♀; or cinereous with dusky verticils in the ♂. Thorax dorsally grey with three fuscous lines which vary in distinctness; pleuræ blackish or dusky testaceous, lightly clothed with frosty grey, mixed with a few silvery scales. Wings hyaline, but densely clothed with fuscous scales, which are thickest, and nearly black on the costa, where however, the dark coloration is interrupted by three large grey spots; there is a minute black spot near the apex of the wing, and the remaining veins are clothed with alternate lengths of grey and black scales, so as to appear banded. Anterior and middle legs dusky or blackish, tending to yellowish in certain lights, the femora and tibiæ with more or less scanty white or whitish scales; the tibiæ white at the apex; the first four tarsal joints white at the apex and the last wholly white; the hinder femora and tibiæ like those of the other legs, but only the first two joints of the tarsi are banded, that on the first joint being often indistinguishable; while all the last three joints are wholly white. Abdomen blackish, opaque, frosty cinereous, with scanty dusky villosity; length 5 to 5.50 mm. There is an immature variety in which the legs and pleuræ are testaceous, and the white spots wanting.

The bites of this species are not particularly irritating, nor is it very blood-thirsty. It is not often found in houses.

Habitat.—Buenos Ayres, and parts of the Argentine littoral.

8. **ANOPHELES ARGYROTARSIS**, Desvoidy.

Wings with the veins spotted and fuscous spots on the costa; tarsi dusky, the apices of those of the hind legs clay-white; abdomen unadorned, black.

Description from Desv., "Essai," p. 411. Proboscis black; body blackish; abdomen unspotted; legs thin, pale fuscous, the hinder tarsi clay-white at the apex.

♀.—Proboscis black; palpi fuscous; thorax and abdomen black or blackish, the abdomen without marks; legs long and slender, pale brown, the last joint of the hind tarsi clay-white; wings with villous spotted veins, the costa with fuscous spots. Length, $2\frac{1}{2}$ lines.

Habitat.—Brazil.

9. ANOPHELES MUSIYUS, Skuse.

Wings spotted, tinged brown in the stigmatic region, with the costa violet-brown with four whitish spots; tarsal joints, the first four tipped whitish; femora and tibiæ with small patches of whitish scales.

Description from "S. A. C.", p. 1754. ♂.—Length of antennæ 2.02 mm.; expanse of wings 5.08×1.27 mm.; size of body 5.84×1.01 mm. Antennæ brown, with a white pubescence as well as verticils; second, of scapus and first three or four flagellar joints with white scales, about four-fifths the length of the palpi, first joint of scapus ochre-brown; head brown with some white scales on the vertex, from which stretch out over the front, some long white hairs; proboscis brown, equal to the palpi. Palpi violet black-scaled, second joint with a slight apical, white-scaled ring; last three joints with a broad white apical ring, and the second and third with a longitudinal white patch above; in the second about the middle, and in the third on the first third of its length. Thorax tawny with a slaty reflection, sparsely white-scaled, beset behind and laterally with yellow hairs; pleuræ tawny; scutellum fuscous, ochreous at the sides, densely fringed with long yellow hairs; metanotum fuscous. Halteres, stem yellow; club fuscous. Abdomen rather more than twice the length of the thorax, fuscous, levigate, yellow-haired, the last segment with some yellow scales; lamellæ fuscous. Legs violet black-scaled, the femora and tibiæ, and sometimes the metatarsi, with small patches of whitish scales, the tibiæ and first four tarsal joints slightly tipped whitish. Coxæ ochre-grey, sprinkled with white scales and yellow

hairs. In the hind legs the metatarsus slightly longer than the tibiæ. Wings the length of the thorax and abdomen combined; hyaline tinged brown in the stigmatic region, the veins densely scaled with alternate patches of violet-brown and whitish, four long very dark patches occurring on the costal vein; subcostal transverse placed at the middle of the auxiliary vein. Auxiliary reaching the costa before tip of hinder branch of fifth longitudinal; second longitudinal starts a little before the marginal transverse; third appearing to commence in the fifth basal cell, a little before the supernumerary transverse and almost opposite the tip of sixth longitudinal; middle, half its length in advance of the supernumerary transverse; posterior transverse opposite tip of sixth longitudinal, ~~and~~ placed half its length before the middle transverse; all three cross veins of about equal length; first sub-marginal considerably longer and somewhat narrower than the second posterior cell, its base a little before that of the latter; base of anal cell slightly before the origin of the second longitudinal vein.

Habitat.—Elizabeth Bay, near Sydney; Mount Kembla, Illawara, N.S.W. February.

10. ANOPHELES MASTERSI, Skuse.

In all respects like *An. musicus*, but smaller, but with the subcostal transverse vein placed considerably beyond the middle of the auxiliary vein, instead of in the middle, as in that species.

Description from "S. A. C.," p. 1,757.—Length of antennæ ♂, 1.89 mm.; ♀, 1.54 mm. Expanse of wings, ♂, 3.55 × 0.76 mm.; ♀ 3.81 × 0.76 mm. Size of body, ♂, 4.31 × 0.62 mm.; ♀, 3.30 × 0.62 mm.

Very like *A. musicus*, but smaller. Antennæ in the ♂, about $\frac{3}{4}$ the length of the palpi, very pale ochreous, with silky verticils; first joint light red-brown; in the ♀, about $\frac{2}{3}$ the length of the palpi, dark brown, with the pubescence and verticils white, and the first two or three flagellar joints

white-scaled. Head brown, with white scales on the vertex, from which long white hairs project over the front. Proboscis about the length of the palpi; in the ♂, entirely brown, in the ♀, with the basal half dark brown, and the apical half pale ochreous. Palpi brown, the second joint just white tipped, and the last three with a broad white apical band, nearly covering them in the last two; in the ♂, the second and third joints have a short white streak above. Thorax, ♂, fuscous; ♀, ochre-brown; imperfectly clothed with whitish scales and yellow hairs; pleuræ, metanotum, and scutellum fuscous, the last, dull ochreous laterally, thickly fringed with long yellow hairs. Halteres, club fuscous, stem yellow. Abdomen in the ♂, more than twice the length of the thorax, shorter in the ♀; fuscous, levigate, densely golden-haired (longer in the ♂); last segment and ♂ forceps white-scaled. Legs violet-black-scaled, the femora, tibiæ and metatarsus with numerous whitish spots, and the tibiæ and first four tarsal joints slightly tipped with the same. In the hind legs, the metatarsus a little longer than the tibiæ. Wings about the length of the abdomen in the ♂, longer than the whole body in the ♀, hyaline, tinged with very pale brownish yellow in the stigmatic region, the veins densely clothed with alternate series of violet-brown and whitish scales, four long very dark violet patches on the costa. Subcostal transverse, placed considerably beyond the middle of the auxiliary vein; the latter reaching the costa considerably before the tip of the hinder branch of the fifth longitudinal; third longitudinal appearing to begin a little before the supernumerary transverse, opposite the posterior, and somewhat before the tip of the sixth longitudinal; these three cross-veins about equal in length, indistinct in some specimens; middle transverse placed half its length in advance of the supernumerary transverse; posterior placed its entire length before the middle transverse, first submarginal cell considerably longer, and somewhat narrower than the second posterior cell, its base placed somewhat before that of the latter; base of anal cell placed opposite the origin of the second longitudinal.

Habitat.—Blue Mountains, N.S.W. (Masters).

11. **ANOPHELES ANNULIPES**, Walker.

Wings spotted, greyish, the costa black with four oblong whitish spots. Tarsal joints with apical white bands. The femora and tibiæ with numerous whitish bands.

Description from Walker, "Insecta Saundersiana," Vol. I. Dipt., 1850, p. 433.—Brown, very slender, with hoary tomentum. Proboscis partly testaceous, rather longer than the palpi. Palpi whitish with brown bands, longer than the antennæ. Thorax indistinctly striped. Legs very long and slender; femora and tibiæ with numerous whitish bands; femora testaceous towards the base; tarsi with a white band; hind tarsi extremely long. Wings slightly greyish; veins brown, with whitish bands, thickly ciliated; costa blackish, with three oblong whitish spots. Halteres whitish. Length of body 3-3½ lines; of the wings 6-7 lines.

The type in the British Museum has four broad interruptions along the black costa, and as there are corresponding white spaces on the auxiliary, and first and second longitudinal veins, these spots have a considerable width, as well as length and they are considerably longer than the pale interruptions. The actual root of the wing is pale. There are smaller interruptions on some of the other veins, but they are too small to catch the eye and give rise to brindling rather than to dappling. The hinder tibiæ are markedly shorter than the first tarsal joints and the former, as well as the femora are fuscous, marbled whitish so as to impart a minutely banded appearance to them. The tarsal joints all have minute apical white bands. In the wings, the first submarginal cell is much longer and narrower than the second posterior. Plate vii., fig. 10.

Habitat.—Tasmania.

12. **ANOPHELES YANUS**, Walker.

Wings spotted, cinereous, with black points along the costa. Tarsi testaceous with white basal rings on the joints, general coloration brown.

Description from Walker, "Journ. Proc. Linn. Soc.," IV. (1860), p. 91.—Male. Cinereous brown, slender. Proboscis full half the length of the body. Antennæ broadly plumose. Legs testaceous, long, very slender; joints of the tarsi white at the base. Wings slightly cinereous, with black points on the fore part; veins black, fringed. Length of the body $2\frac{1}{2}$ lines; of the wings 4 lines.

The type in the British Museum shows this to be a pale slender species, with long thin legs. The wings though generally rather pale, are dark along the costal margin, with two small snowy interruptions, one just before the middle and the other at the junction of the middle and apical thirds, and with an apical white spot; the rest of the scales are grey with a few scattered white scales in the internal fringe. The specimen is too denuded to form any idea of the original decoration, if any, but there is, at any rate, no remaining trace of banding of either the abdomen or tarsi. The palpi (σ) retain their tomentum, and are strongly tufted, without any bands, being uniformly dark brown and considerably longer than the proboscis. Plate vii., fig. 6.

Habitat.—Makassar, in the Celebes.

13. ANOPHELES ANNULARIS, Van der Wulp.

Wings spotted, the costa black with white spots, the veins with fuscous and white scales; tarsi banded white, position of bands not stated; legs brick-red; abdomen unbanded, (?) black; thorax adorned with linear marks.

Description from Van der Wulp, "Notes the Leyden Museum," VI., p. 249. σ . Fuscous; the thorax striped; the proboscis naked and black; the palpi brownish, white banded; legs brick-red; the tarsi banded white; costa of the wings spotted white. Length 4.5 mm. φ . Blackish; thorax with a dark bluish dust, and five longitudinal, fuscous lines; pleura light grey, with black spots arranged in longitudinal rows. Antennæ with light brown hairs; rostrum black; palpi fuscous, as long as the rostrum; the base of the first and second joints and the whole

of the apical joint white; the two first joints covered with a dense, short, dark pilosity. Legs long and slender, testaceous; anterior tarsi with a white ring on each joint; the long hind tarsi fuscous in the middle, and with a white ring, wholly white towards the end. Veins of the wings with fuscous and white scales; the costa alternately spotted with dark brown and white.

This species may be perhaps identical with *A. sinensis* Wied, "A.Z.I.," p. 547, according to Van der Wulp but the tabulation shows it to much more closely resemble *An. vanus* (Walker), with which it is possibly identical.

Habitat.—Mount Ardjoeno, East Java (*vide* Hekmeyer).

14. **ANOPHELEIS SINENSIS**, Wied.

Wings spotted, the costa being bright brown with two interruptions; there being also brown puncta on the wing-field; abdomen undescribed, unbanded; thorax with linear adornment.

Description from Wied. "A.Z.I.," p. 547. Brownish, with the costa and puncta on the wings brown; the legs with whitish joints. Length, $2\frac{3}{4}$ lines (German), ♂ ♀. Antennæ and palpi brown; the latter, in the females, appears thicker than the proboscis; thorax with a linear stripe in the middle and with deeper brown stripes on the sides; wings, with bright brown scales along the costa with two, as it appears, constant interruptions; on the mid-field of the wing are several brown points or spots.

Habitat.—China.

15. **ANOPHELES** sp. "a," from Calcutta.

♀.—Wings very dark, but with three small white interruptions on the costa; abdomen uniformly black. The last two hind tarsal joints white, the rest black, saving a

minute ring on articulation between the second and third joints; apex of palpi white. Plate vii., fig. 7.

Besides *An. Rossii*, Mihi, two other species were separated by Mr. Austen from those brought from Calcutta, by Major Ronald Ross. The above is that which he speaks of as his "small dapple-wing." On account of its sooty blackness, it might well be named *fuliginosus*.

With the exception of a few extremely narrow white marks on the wings and appendages, it is of a sooty black throughout. The antennæ are black with whitish verticils; the proboscis black a little whitish at the tip; the palpi black with about half the terminal joint white, and very minute white rings at the joints; thorax (denuded) black, appears to have had some white tomentum when fresh. Legs black, with small white bands near the apex of the femora, and at the apex and base of the tibiæ, except those of the hind legs which appear to have only apical tibial dots; there are also some whitish marks on the coxæ; the fore legs have minute apical rings to all the joints, except the last, which are entirely black, while the hind tarsi are as above described. The wings are intensely black, relieved only by three very narrow interruptions on the costa, a few small white spots on some of the longitudinal veins, and minute white interruptions of the internal fringe at the points of junction of the longitudinal veins with the margin; abdomen entirely black. Distinctly smaller than *An. Rossii*, Mihi.

16. **ANOPHELES** sp. "b," from Calcutta.

♀.—Wings intensely black, except two very small yellow interruptions on the costa, the outer one of which is sub-apical, and a few white dots on the longitudinal veins; abdomen entirely black; tarsi with apical whitish rings to some of the joints; apex of palpi black. Plate vii., fig. 8.

The above is all that can be stated with certainty of the third of the species from Calcutta, separated by Mr. Austen, as the specimens are not sufficiently well preserved for final

description. It differs from the preceding in the apex of the palpi being entirely black and in the light portions of the costa being yellow instead of white. The few remaining tarsal joints have apical yellowish bands. As it is, if anything darker than *sp. a.*, it might very well be named *nigerrimus*. It is distinctly the largest of the three species brought by Major Ross from Calcutta.

17. **ANOPHELES QUADRIMACULATUS**, Say.

Wings with a large brown spot on the costa, and another large and two smaller spots on the wing-field. Tarsi unbanded, (?) dark brown; abdomen unbanded, pale tinted, with brownish hairs; thorax grey, with linear markings.

Description from Weid., "A. Z. I.," p. 356.—Thorax cinereous, with fuscous lateral spots; the wings with four fuscous spots Length $3\frac{1}{2}$ lines (German) ♀.

Thos. Say:—"Long's Exped. to St. Peter's River," II., Appen., p. 356. Palpi brown; thorax ash-grey, with two brown lines. They run together, when seen from in front, and when seen obliquely from in front are very distinct with a very clear brown stripe on either side; abdomen whitish, with brownish hairs; wings limpid, the veins fringed with brown scales. In the middle of the costa of the wings, a large brown scaly spot, and, further from the apex, in the middle of the wing, another, equally large; and there are two smaller spots, at the bifurcation of the veins extending to the apex; legs deep brown; the extreme apex of the femur and tibia yellowish.

Habitat.—The north-western part of Pennsylvania.

18. **ANOPHELES FUNESTUS**, sp. n.

Wings with the costa marked by interrupted darker and lighter coloration, the dark portions preponderating; on the actual costa there are five interruptions, the two basal being

connected by dark scales on the auxiliary vein; there are also white areas over the transverse veins, the stem of the posterior fork-cell and the bases of the fifth and sixth longitudinal veins. Abdomen unbanded, black. Tarsi uniformly black.

Description from Giles's "Report of Liverpool Malaria Expedition," Addendum I. :—

♀.—General coloration black, with but little adornment. Head black with a crest of scattered white scales; eyes with a minute white margin; proboscis black, a little paler at the apex. Antennæ black with scanty whitish verticils; palpi black, very smooth, with the apex and two narrow bands on the articulations white. Thorax black, clothed with white scales over the greater part of the dorsum; legs black, the only relief being a scarcely perceptible paler knee-ring; Wings ornamented as above described; the anterior fork-cell long, parallel-sided, with a short stem; the posterior much shorter, wider, and wedge-shaped, with a longer stem; supernumerary and middle transverse veins of fair length, in one line, the posterior shorter and more than twice its length internal to it; the scales of the internal fringe with minute white interruptions opposite to the junctions of the longitudinal veins with the margin. Halteres with the knob black and the stem rather lighter; abdomen black, glabrous, with very scattered white hairs.

In the ♂ there is no obvious banding of the palpi, but the apex of the last joint is grey, followed by a narrow black ring, and then by an even narrower pale ring; the rest of the appendage being of the same funereal tint as the rest of the body. The antennæ are black with dense black verticils; which, however, show a certain paler lustre in certain lights; the abdomen is black; the wings, though they resemble those of the ♀ closely in ornamentation, differ somewhat in venation, the anterior fork-cell being twice as long as the posterior, and its stem much the shorter, though both stems are rather long, while the posterior is very short and but little wider than the anterior. Length, excluding the proboscis, 2.6 mm. *Vide* plate vii., fig. 3, and plate viii.

Habitat.—Free Town, West Coast of Africa. This species is undoubtedly concerned in the transmission of malaria. For further details *vide* "Report of Liverpool Malaria Expedition."

19. ANOPHELES PUNCTIPENNIS (Say).

Culex punctipennis, Say. *Culex hyemalis*, Fitch. Wings with a single broad interruption on the costa in the outer third which extends across the greater part of the width of the wing as a rather ill-defined band, and an apical whitish spot, the rest of the wing being rather darkly tinted; abdomen unadorned (?); tarsi uniformly coloured (?).

Although this species was regarded by Wiedemann as a synonym of his *An. crucians*, Howard and Marlatt, from the examination of a large amount of material, state that the two species are undoubtedly distinct, though they do not specify the points of difference. On the other hand, they regard *C. hyemalis*, Fitch, as a synonym of this species ("Household Insects of the U. S.," p. 22, 1896). The figure of the wing was drawn from a specimen of Fitch's species in the British Museum.

Description from "Journ. Acad. Nat. Sci.," Philadelphia, III. (1823), and "Insec. N. Amer.," vol. II., p. 39 (1869):—*C. punctipennis*, body dark rufous, covered with cinereo-ferruginous hair; feet elongated; wings maculated. Orbits, bright cinereous eyes deep black. Antennæ and proboscis deep fuscous or blackish, immaculate; thorax dark rufous, with obsolete blackish lines, and covered with cinereo-ferruginous hair; wings hairy, dusky, with a hardly perceptible pale band beyond the middle, and obsolete dusky spots; scutel glabrous, dark rufous, with a longitudinal bluish vitta; halteres yellow at base; feet elongate, deep fuscous or blackish; pectus each side, above the posterior feet, plumbeous.

It is probable this is the species which Fabr. considers as the same with the *pulicaris* of Europe; it is common on the Mississippi and troublesome to travellers. When the

insect is at rest, the wings being incumbent, one on the other, the pale band is very distinct; when recent the eyes are greenish-blue. I observed this species in considerable numbers on the eastern shore of Maryland. The dusky spots on the wings of this species are occasioned by the thicker growth of hair in those parts.

[Belongs to *Anopheles*; Wiedemann has changed the name to *A. crucians*.—Osten-Sacken.] Plate vii., fig. 9.

Habitat.—United States.

20. ANOPHELES CRUCIANS, Wied.

Wings with white spots here and there on the brown veins, uniform along the costa; tarsi unbanded, dusky brown; abdomen uniformly brown with grey hairs; thorax red-brown with linear markings.

Description from Wied., "A. Z. I.," p. 12.—Tawny; the thorax with three deeper tinted lines; the abdomen covered with grey hairs; the wings with dusky spots, and costa. Length $2\frac{1}{2}$ lines (German).

Thos. Say:—"Journ. Acad. Nat. Sci.," Philadel. 1822, 9, 1; *C. punctipennis*.—Antennæ brown; palpi brownish black, the joints at its root nearly white. Thorax reddish-brown, with three dusky brown lines, the middle one of which is much the most delicate, the spaces between them whitish, in certain lights; the hinder part of the back with dusky brown stripes. Abdomen uniformly brown, with grey hairs. Wings uniform along the costa, elsewhere brown scaled, with white spots, and white here and there on the veins. When at rest, unless the wings lie apart, one sees beyond the middle a pale band, this can also be made out in the single wing, but is not so clear; halteres yellowish, with brown knobs; legs brownish-yellow, with dusky-brown tarsi.

Habitat.—Pennsylvania, New Orleans. Very common on the Mississippi, where it is very troublesome to travellers.

21. **ANOPHELES LINDESAIL**, sp. n.

Wing not distinctly spotted, but with the costa and some of the anterior veins black scaled, giving a diffused darker appearance to this portion of the wing, the rest of its scales being grey, with the exception of a small whitish spot at the apex of the wing; tarsi without bands. Thorax black with a large well defined patch, forming the greater part of the dorsum, grey, saving a very fine black median line. Abdomen nearly black, the hinder border of the segments darkest. Plate vii., fig. 5.

Head black, with a patch of whitish tomentum^{ca} on the vertex, which extends forwards between the bases of the antennæ so as to give the appearance of a rostrum; eyes black; proboscis, palpi, and antennæ uniformly dark brown. Thorax with a large quadrangular patch covered with whitish scales, covering the greater part of the dorsum, on which is a very fine median black line, in front the patch has a rather ferruginous tint; pleuræ black with a few white scaled spots in front. Legs generally brown, darker on the tarsi, which do not appear to be banded; the hind femora whitish, with a broad black band at its apex, and a smaller one about its mid-length, the other femora, black and white scaled, the former preponderating at their tips, the anterior femora slightly thickened near the base. Wings not distinctly spotted, but with the costa, the greater part of the length of the second and fourth longitudinal veins and their forks, as well as the tips of the branches of the fifth longitudinal, with dense black scales, the remaining scales being grey. Auxiliary vein joining the costa just beyond the middle transverse vein; second and third longitudinals with distinct scaly extensions running back into the first basal cell; supernumerary and middle transverse veins forming a single line; posterior transverse a little longer and placed a little internal to them, the latter opposite a point nearer the base than the apex of the hinder branch of the fifth longitudinal; first sub-marginal cell longer and narrower than the second

posterior, its base distinctly nearer the base of the wing. Length of the body 4.50 mm. ; of the wing 3.30 mm.

Habitat.—Sent me by Captain Victor Lindesay, I.M.S., from Bakloh, in the Punjab. In many respects it resembles *An. Rossii*, Mihi, but the wing is quite different, and it is generally much darker, so that it is very possibly the darker species which Major Ross, I.M.S., originally found to convey human malaria, but of which he was unable to obtain a further supply of specimens.

22. ANOPHELES CLAVIGER (Fabricius).

Wings with four spots on the wing-field, the costa being uniformly dark, except at the apex, where its colour fades to form a fairly distinct spot ; tarsi unbanded, but with an apical yellowish spot to the first joints ; abdominal segments brown with yellowish basal markings ; anterior femora not thickened at the base. Plate v., fig. 9, and plate vii., fig. 13.

Description from "F. R.," p. 228.—*C. bifurcatus*, Meigen, 1804 ; *C. claviger*, Fabr., 1805 ; *An. maculipennis*, Meigen, 1818 ; *An. griseus*, Stephens, 1828. Wings with four spots, formed by accumulations of scales. Anterior femora not thickened at the base, resembles *An. bifurcatus*, but has a generally yellower coloration, and the latter has no wing-spots ; proboscis dark brown, with a faint yellowish ring at the point of attachment of the terminal labelli in the ♂ ; palpi of the ♂ just shorter than the proboscis ; last joint clubbed ; brownish-black throughout, except on the last joint, which has numerous, rather long pale hairs, especially internally. Palpi of the ♀ just shorter than the proboscis, very dark brown, with the penultimate about twice the length of the last joint, and the antepenultimate a little longer than the last two joints together ; plumes of the ♂ antennæ brownish with yellowish reflections, its extremity darker. Antennæ of ♀ dark brown, with brownish-yellow reflections, and a faint whitish ring at the origin of the verticil of the scapus ; eyes rather dark metallic green, with a border of clearer tinted down. Nape brown, with a straw-

coloured patch of bristly scales in the middle line, which extends also over the head, to end in an acuminate tuft between the roots of the antennæ, and is broadened immediately in front of the nape, and narrows as it passes forwards; the nape is also provided with a crown of scales exactly resembling that of *An. bifurcatus*, its yellowish portion forming a continuation of the patch on the nape and head. Thorax clothed with rather short brazen hairs, those on the posterior and lateral margins of the dorsum being longer and stiffer, in the middle of the dorsum of the thorax is a brownish leaden-grey area, which shows in front some traces of a continuation of the whitish nuchal spot, while behind, a minute chocolate-coloured line may be nearly always distinguished, and the area is limited laterally by distinct reddish-brown lines, thickest in the middle, and extending the entire length of the thorax; the pleuræ are of the same colour but lighter than the bands; halteres brownish-black, with brownish-yellow stems. Wings generally brown, rather yellowish, especially in the ♂, with four black spots, brightest in the ♀, and placed at the first anterior bifurcation on the transverse vein, which joins the bases of the stems of the two forks with the vena interposita, and at each of the two forks. The border of the wing is adorned with brownish-black scales, which fade off at the apex to a tawny tint, so as to form a fairly distinct spot; stem of the anterior fork a little shorter than that of the hinder, the branches of the anterior fork longer than its stem, and also than those of the hinder fork; anterior branch of the hinder fork nearly equal to its stem, and longer than the hinder branch; coxæ glabrous yellowish; the rest of the leg joints are generally yellowish brown, varying in some individuals to even black, though those of the type are dark brown. Femora nearly black, rather lighter below; in all three pairs the apex of the femora, with the base of the tibiæ show a faint straw-coloured mark, so as to form a sort of knee-spot, only indistinctly present in the type; the tibiæ and first tarsal joints have similar yellowish apical marks; the abdomen is hairy, especially laterally, the hairs being clear yellow, and more developed in the ♂. On the

dorsal surface of the ♂, the segments, when denuded, are dark brown in the middle, and along the whole hinder border, but are clear yellow in front, the brown portion forming a triangle with the base behind, giving the appearance of alternate dark and yellow bands. In the ♂ the segments denuded of scales are dark brown for their hinder thirds, and this tint extends a little along their lateral margins, the rest of each segment being clear yellow; on the ventral surface, the segments denuded of scales are in the ♂, generally dark brown behind, and clear yellow in front; while in the ♀ they are of a very yellowish grey, tending somewhat to brown on the hinder border; this brownning is more distinct on the two hinder segments, and the last may even appear totally brown. From this it appears that the whole abdomen has more brown in the ♂ than in the ♀. Length, including the proboscis, in the ♂, $7\frac{1}{2}$ -9 mm.; in the ♀ $7\frac{1}{2}$ -10 mm. The ♂ is always slimmer than the ♀.

Mr. Theobald, I understand, looks upon this species as a synonym of *An. bifurcatus* L., an opinion with which I am personally inclined to agree. I have seen a specimen in the Jardin des Plantes labelled as *bifurcatus*, in which the absence of any spots was by no means pronounced, and I believe the only difference is one of age, in old or rubbed specimens the wing spots losing their distinctness.

Habitat, &c. — Widely diffused throughout Europe; Zetterstedt records it from Scandinavia, Stephens and Walker from England, Schiner from Austria, Meigen and others from Germany, Gimmerthal from Russia, and Ficalbi finds it common in Italy, in fact, from the extreme north to the Mediterranean Islands. It is very common throughout Italy, but especially in small houses, near water, more so than the other species of the genus. The larva lives at the surface of clear water, and will not tolerate dirty water, such as is often preferred by species of the genus *Culex*. It generally subsists upon the juices of plants, but the female does not disdain to suck the blood of man and mammals. It is often very troublesome to domestic animals

in stables, and is more persistent in its attacks on man than the ordinary Mosquito, producing great irritation of the skin.

Grassi's recent researches indicate this as the species most concerned in the communication of human malaria in Italy.

23. **ANOPHELES ANNULIMANUS**, Van der Wulp.

Wings with the costa uniformly coloured but with two spots on the wing-field formed by accumulations of scales; abdomen grey-brown, with darker hinder borders to the segments; tarsi banded (?).

Description from "Tijdschr. voor Ent.," 1867, p. 129.—♂.—Head dark brown; occiput with dense black hairs. Antennæ whitish, with brown rings, the verticils light brown with yellow reflections; proboscis dark brown, one and a-half times as long as the head and thorax, with lighter brown reflections above and at the tip; palpi brown, the two first joints deeper coloured, the second joint a little longer than the first, together as long as the antennæ; the two last joints each as long as the second, brownish-yellow, together forming a flattened ellipse, sparingly beset with long hairs. Thorax, scutellum dark brown behind; with fine yellow hairs on the shoulders; near the root of the wings, a small light grey border which is somewhat bowed out in the middle on either side; pleuræ mostly clothed with light-grey tomentum; abdomen proportionately short, grey-brown, the hinder borders of the segments dark brown, which is more obvious on the venter, where the ground colour is lighter; claspers shorter than the last abdominal segment, with long curved points; abdominal tomentum moderately dense, blonde-coloured. Legs dark brown, the coxæ and root of the femora brownish-yellow, apex of the latter rather dark, so that the pale yellow or whitish knee spots show out the more distinctly. Close to the base of the mid-femora is a whitish ring, bounded on both sides by a deeper brown than that of the ground colour; the fore tibiæ, except the basal

third, whitish with three darker brown rings, the last just before the tip, which is neither white nor yellowish; the white colour appears also at the tips of the other tibiae; the hind legs are long and slender, especially the tarsi, the first joint of which is a fourth longer than the tibia; halteres dark brown, the stem and base lighter than the knob. Wings longer than the abdomen, with a slightly greyish tint; veins and scales brown; in the middle of the fore part of the wing, under the costa, on the second longitudinal vein, is a spot, and a little further out, above the small transverse vein; a second spot, both formed by accumulations of scales; the upper basal cell is always longer than the lower.

Habitat.—North America.

24. ANOPHELES ATRATIPES, Skuse.

Wings with six prominent patches of scales, not on the costa (which is black) but on the veins; tarsi black, without bands; abdomen black with golden hairs, but not banded.

Description from "S. A. C.," p. 1,755.—♀.—Length of antennae 1.77 mm.; expanse of wings 4.18 × 0.84 mm.; size of body 4.18 × 0.76 mm.

Antennae about three-fourths the length of the palpi, darkest brown, with hoary pubescence and verticils, first joint black; head fuliginous with white scales intermixed with some black hairs, and a tuft of long white hairs extending from vertex over the bases of the antennae; proboscis and palpi uniformly densely violet-black scaled, terminal joint of palpi slightly white-tipped. Thorax pruinose brown, with a small roundish dark spot laterally, about the middle of its length and another immediately in front of the scutellum; traversed by three longitudinal, parallel double lines of rather long black hairs, mixed with short, slender glistening white scales; lateral margins slightly testaceous with a few white scales and some short white hairs above and in front of the origin of the wings;

pleuræ dark brown, somewhat marbled with testaceous; scutellum testaceous with a dark roundish spot near the apex fringed with long black hairs; metanotum brown; halteres nearly black, the stem ochreous. Abdomen about twice the length of the thorax, black, levigate, sparsely golden-haired; lamellæ black fringed with short golden hairs; coxæ ochreous; legs violet-black scaled, femora and tibiæ bright ochre below and slightly at the tips. Wings the length of the entire body, bright ochre at the base, hyaline, very densely scaled, those on the auxiliary, first longitudinal and costa black, those on the remaining veins with black and yellowish scales arranged in alternate series, almost entirely black on the sixth longitudinal; there are six prominent patches of black scales placed as below:—On the fifth longitudinal, mid-way between its origin and its bifurcation, at the base of its fork, at the bases of the second and third longitudinals, and at the bases of the forks of the second and fourth. Costal ciliæ for a little more than the distance between the tips of the first and third longitudinals whitish, rest of the cilia violet-black with a light, silky reflection. Auxiliary reaching the costa opposite the middle transverse; second longitudinal beginning some distance before the marginal transverse; supernumerary and middle transverse opposite each other, placed half the length of the posterior transverse, beyond it; the last placed opposite the beginning of the third longitudinal and considerably beyond the tip of the sixth; first submarginal longer, but not narrower than the second posterior cell, its base placed a little before that of the latter; base of anal cell lying a little before the origin of second longitudinal.

Habitat.—Berowra, N.S.W. January.

25. **ANOPHELES STIGMATICUS**, Skuse.

Wings unspotted, though a little darker in the stigmatic region; tarsi without bands, violet-brown scaled; halteres yellow with brown knobs; abdomen unadorned, dark brown with golden hairs; thorax red-brown.

Description from "S. A. C.," p. 1,759.—Length of antennæ ♂ 2.02 mm.; ♀ 1.77 mm.; expanse of wings ♂ 4.06 × 0.88 mm.; ♀ 4.06 × 0.88 mm.; size of body ♂ 4.56 × 0.76 mm.; ♀ 4.06 × 0.76 mm.

Antennæ in the ♂ about five-sixths the length of the palpi, ochre-brown; first joint nearly black; in the ♀ about four-fifths the length of the palpi dark brown with whitish pubescence and verticils brown; scapus, except distal half of second joint, red-brown; head ochre brown, with golden hairs; proboscis scarcely longer than the palpi brown, almost black in the ♀, as also are the palpi. Thorax red-brown, darker in the ♀, with three double streaks of pale golden hairs, and laterally rather densely fringed with the same; pleuræ, ♂, red brown, ♀, fuscous; scutellum, ♂, ochreous, ♀, testaceous fringed with long golden hairs; metanotum, ♂, testaceous, ♀, very deep fuscous. Halteres, club-brown, stem yellow; abdomen in the ♂ twice the length of the thorax, shorter in the ♀, dark brown, levigate, golden-haired; ♂ forceps testaceous, densely haired. Legs violet-brown scaled, the femora pale yellow for four-fifths of their length in the hind legs, but beneath only in the other legs; coxæ warm brown; in the hind legs the metatarsus one-seventh longer than the tibia. Wings in the ♀ the length of the entire body; in the ♂ shorter by the length of the head; hyaline tinged brownish, in the stigmatic region, where the veins, elsewhere light-brown scaled, are also darker. Subcostal transverse placed about the middle of the auxiliary vein, which latter reaches the costa opposite the middle transverse and considerably before the tip of the hinder branch of the fifth longitudinal; second longitudinal appearing to start in the first basal cell opposite the base of the anal cell and some distance before the base of the marginal transverse; third longitudinal apparently starting a little before the supernumerary transverse and before the tip of the sixth longitudinal; middle transverse in the ♂ placed opposite or somewhat before the posterior; in the ♀ its length beyond the latter, which is opposite the supernumerary; all about the same length; first sub-marginal considerably longer and narrower than the second posterior

cell, the tips of the fork slightly convergent, its base opposite that of second posterior cell.

This species is possibly a synonym of *An. ferruginosus*, Wied.; at least, there is nothing in the descriptions to distinguish them unless that the halteres in the present species are said to be yellow instead of white.

Habitat.—Blue Mountains, N.S.W. (Masters).

26. ANOPHELES BIFURCATUS (L.).

Wings unspotted; tarsi black throughout, with the exception of a very faint ring on the base of the first joint; abdominal segments brown with lighter basal bands; thorax grey with linear markings.

Description from "F. R.," p. 225. *C. bifurcatus*, L., 1758; *C. trifurcatus*, Fabr., 1792-1794; *C. claviger*, Meig., 1804; *A. plumbeus*, Stephens ex Haliday, 1828. Head with a yellowish patch formed of bristly scales, which, starting from the nape where it is somewhat enlarged, narrows as it passes forwards between the eyes, and ends between the roots of the antennæ as a small acuminate tuft; the nape brown, with a median dorsal line, and provided rather behind with a crown of erect, bristly scales, yellowish in the middle to match the cephalic patch, and black at the sides; proboscis black or nearly so. Palpi of the ♀ similarly tinted, just surpassing the proboscis in length by their apices; last joint half the length of the penultimate which is slightly shorter than the antepenultimate, the last being slightly shorter than the last two joints combined. Palpi of the ♂ distinctly shorter than the proboscis, which surpasses them by the length of its terminal dilatation, nearly black, sparsely haired but scaly; the last joint clubbed and but little shorter than the penultimate. Antennæ of the ♀ brownish-black, with slight brownish-yellow reflections, and indistinct whitish rings at the roots of the verticils; basal joint rotund; of the ♂ with its plumes brownish-black, with a rotund first joint; the whitish scapus shews a black ring; the eyes are metallic green with a somewhat lighter border of downy hair.

Thorax grey, rather villous dorsally, with a double median straw-coloured line, and chocolate-coloured laterally, the brown colour forming two rather glabrous, dorsal bands, distinct in the middle and fading off at the ends; pleuræ clear grey; halteres black with yellowish stems. Wings brown (lighter in the ♂), unspotted, the veins and margin black-scaled; stem of the anterior fork rather shorter than the hinder, its branches alike longer than its own stem or those of the hinder fork; anterior branch of the hinder fork longer than the hinder, and nearly equal to its stem; coxæ yellowish, glabrous; femora nearly black throughout, yellowish at the extreme base; tibiæ black; there is an almost imperceptible yellowish knee; tarsi black throughout, with the exception of a faint basal ring to the first joint. Abdomen sparsely clothed with light yellow hairs throughout; the dorsal surface dark brown, with the anterior thirds of the segments a clearer tint in the ♀, while in the ♂ the lighter tint is disposed as a triangle, with its base behind on the distal border of each segment. Ventrally the segments in both sexes are hairy, but devoid of scales, and are dark leaden grey with a faint median brown line. Length with proboscis (♂), $7\frac{1}{2}$ - $8\frac{1}{2}$ mm., (♀), 8-10 mm.

The ♀ attacks human beings.

I have seen a specimen of Meigen's in the Jardin des Plantes, and believe that the only difference between this and *An. claviger* is that the description of the latter applies to young, fresh specimens, while that of the present species corresponds to females that have hibernated, and to rubbed specimens generally. In the above-mentioned specimen the wing marks are not as plain as in a fresh specimen, but they are quite distinguishable. If this be the case, the name *claviger*, being more modern, cannot stand.

Habitat.—Widely diffused through Europe, from Lapland (Zetterstedt) to Italy and the Mediterranean islands.

27. ANOPHELES NIGRIPES, Stæger (1839).

In all respects like *An. bifurcatus*, but smaller, not exceeding 8 mm., and with the proboscis, palpi, antennæ, tibiæ, and tarsi blacker, and the thorax cinereous.

Description from "F. R.," p. 227.—Proboscis, palpi, antennæ, and nape black; from the last starts a patch of bristly white scales, which passes forwards to end in a white tuft between the roots of the antennæ; behind, on the nape, there is a crown of bristly black scales sloped backwards. On the thorax, dorsally, are scattered cinereous scales, as well as two faint median longitudinal lines of clear-tinted down, and a brown lateral streak on either side; the pleuræ are grey; the halteres are black, with whitish bases; the wings are hyaline, with black-scaled veins, which cause the anterior margin to assume a darker tint; the legs have the coxæ dirty yellow, the femora black except at the extreme base, where they are yellowish, and the tibiæ and tarsi black; the abdomen is brownish-black, and its bristly hairs brazen yellow. Total length, including the proboscis, $7\frac{1}{2}$ -8 mm. The male is unknown.

Observation.—Probably this is also merely a variety of *A. bifurcatus*.

Habitat.—Mostly from Northern Europe, and said to be rare.

28. **ANOPHELES YILLOSUS**, Desvoidy (1827).

In all respects like *An. bifurcatus*, but larger and more villous. Length, 3 lines.

I merely place this species on the list because it is accepted with some reserve by Ficalbi. It can hardly amount to more than a variety of *An. bifurcatus*.

Habitat.—Paris.

29. **ANOPHELES ANNULIPALPIS**, Arribalzaga.

Wings unspotted, the costal vein and cell densely black-scaled, the remaining veins brindled black and gold; tarsal joints white-ringed, the last joints wholly white; abdomen dusky, with yellowish hairs; thorax fawn-coloured, with linear markings.

Description from "L. A.," p. 36.—Fuscous; the thorax

with chestnut scales, and three indistinct lines, the palpi dusky, densely plumed in the ♂, or black with silvery rings in the ♀; the legs and tarsi dusky black with white rings; the tibiæ with silvery spots (♂), or the legs black with silvery rings (♀); head cinereous, with white hairs towards the frons. Antennæ black with dusky hairs (♀); or fuscous with dense verticils (♂); palpi black, straight, with silvery rings (♀), or dusky and densely villous, dilated and divergent at the end (♂); proboscis dusky black, with the apex white; eyes with white margins. Thorax dark fawn above with three dusky lines; scutellum dusky; metanotum dusky red; pleuræ dull testaceous; coxæ yellow; femora black, pale yellow internally and silver-banded externally; tibiæ black with white bands (♀), or dusky with numerous silvery dots (♂); tarsi nearly black, with silvery rings and the last joint wholly white. Wings hyaline, the costal vein and cell black-scaled, the other veins with alternate black and gold scales, so that they look confusedly banded; abdomen dusky with yellowish hairs. Length 7 mm.

Habitat.—The banks of the Parana in Argentina. A rare species.

30. ANOPHELES FERRUGINOSUS, Wied.

An. quinquefasciatus. Say.

Wings unspotted; tarsi unbanded, nearly black; abdomen unbanded, dusky brown with yellow hairs; thorax deep red-brown with linear markings. Stems of halteres with brown knobs.

Description from "A.Z.I.," p. 12.—Ferruginous; the abdomen fuscous; the wings spotless. Length $2\frac{1}{2}$ lines (German) ♀.

Antennæ and palpi brown, the latter more dusky with a little white at the joints; thorax intense red brown, but only in certain lights, if seen from behind whitish, and it then exhibits linear stripes, but looking backwards without stripes; abdomen dusky brown with yellowish hairs; veins of the wings with brown scales; halteres intense

white with brown knobs ; legs shorter than in *An. crucians*, brownish-black with yellowish femora.

Say. "Journ. Acad. Nat. Sci." Philadel. III., 10, 2
C. quinquefasciatus.

Habitat.—New Orleans.

Genus III. **PSOROPHORA**, Rob. Desvoidy (1827).

THIS Genus is usually included within *Culex*, Desvoidy's genus not having generally received acceptance. It has been revived, however, by Arribálzaga, in his monograph on the Argentine *Culicida*, and after inspecting the type in the Jardin des Plantes, I am also inclined to think that its peculiarities deserve generic value.

The great distinctive peculiarity is the presence on the shoulders (of the prothorax) of a pair of appendages, which serve to protect the stigmata of that segment (*vide* fig. 17, Plate VI.) from Desvoidy's "Essai." These are, I believe, present in no other members of the family, except *Megarhina*, and as such are surely of generic value. Another striking, though not quite exceptional character, is the great length of the male palpi.

Description from "L.A.," p. 38, and from Desv. "Essai."—*Psorophora*, Desv. "Essai," p. 412. Latreille in Cuv., "Règ. An.," p. 440 (1829). Habit entirely as in *Culex*, but with evidently distinctive generic characters. Antennæ short in both sexes (Desv.) but with the two terminal joints of the ♂, elongated. Prothorax with appendages on either side ; mesothorax gibbous, with a distinct triangular depression on either side (Desv.). Palpi of the male almost twice as long as the proboscis when extended, with the last two joints curved upwards ; the first two joints minute, the third linear nearly as long as the proboscis and parallel with it, a little swollen at the apex, moderately plumose ; the last two joints somewhat stouter and together nearly equal to the third ; the last somewhat rounded at the tip and thicker than the preceding ; of the ♀ about a third the

length of the proboscis; the first joint very small, second and third obconical, the latter twice the length of the former; the fourth the longest, and the fifth rudimentary. Wings (*vide* fig. 12, Plate VI.), with the first sub-marginal no longer or scarcely as long as the second posterior cell. Legs with the tips of the femora, the tibiæ, and the tarsi, especially the hinder, densely ciliate. Claws of all the feet (figs. 13 and 14, Plate VI.) in the ♀ with a short sharp additional tooth so as to almost appear bifid; in the ♂ with the claws of the hind legs equal and single toothed; and those of the fore and hinder feet, with the outer claw more than twice as long as the inner, the latter being single-toothed and the former with two teeth; abdomen of the ♀ oblong, narrowed towards the tip; of the ♂ narrow, depressed, of nearly uniform width, with long sparse woolly hairs on either side. (Arribáizaga).

1.—PSOROPHORA CILIATA, Fabr.

Wings unspotted; tarsi with basal white bands; thorax with yellowish scales and dusky marks and white pleuræ; abdomen with a median ferruginous stripe; prothoracic lobes large and prominent; general coloration brownish testaceous or yellowish; variable.

If included in the genus *Culex* the tabulation would bring this species between Nos. 30 and 31.

Description from "L. A.," p. 40.—*C. ciliatus*, Fabr., "E. S.," p. 401 and "S. A.," p. 35; Wied., "D. E.," pp. 36 and 39, and "A. Z. I.," 1, 3, 5; Walker, list 1, p. 2; Macquart, "D. E.," Sup. IV., p. 11; Osten-Sacken, "Catal. N. Amer. Dipt.," 18. *C. molestus*, Wied., "D. E.," 7, p. 4. *C. conterrens*, Walker, "Insecta Saunders.," p. 427.

Fuscous or yellowish red, densely clothed with whitish or yellowish scales; the legs testaceous, densely clothed with long black scales; the tarsi white-ringed. Head fuscous or testaceous, with close light yellow scales, and fuscous hairs, nude and dull in front, behind with a dull black median longitudinal line; eyes coppery green (during life). Antennæ

more or less fuscous, sometimes testaceous, with the base paler and yellowish; the basal joint testaceous; proboscis testaceous, darker at the tip, densely black and white scaled; palpi brick-red, darker at the tip; those of the ♀ with dense black scales and hairs. Thorax with whitish or yellowish lines, narrow parallel and prolonged forwards, and a patch on either side, broad towards the back and narrowed in front, as well as some lateral spots; scutellum with whitish yellow scales; pleuræ with dense greyish or whitish yellow scales; legs pale testaceous; the femora sparsely and the tibiæ and tarsi densely black fringed; the first and sometimes the second tarsal joints pale testaceous, the rest yellowish-white at the base and black at their apices. Wings slightly yellow with dusky scales; abdomen in the ♀ with dense yellowish scales and a few dusky hairs above and below; in the ♂ darker, with dense woolly hairs on either side. Length 7-9 mm.

The type in the Jardin des Plantes is so rubbed that little of the coloration can be made out.

Habitat.—Carolina (Fabr.); Georgia (Wied., Mcqt., Walker); Atlantic Coast (Ost.-Sack.); Honduras (Walker); Argentina (Arribálzaga).

Van der Wulp in his list of Asiatic *Diptera* makes *C. molestus*, Wied., an Asiatic species, but I cannot trace his authority for this statement. Wied. gives only Georgia.

2. **PSOROPHORA HOLMBERGII**, Arribálzaga (1891).

Wings unspotted; tarsi with basal white bands; thorax with cinereous scales and three intense black marks, a broad median longitudinal, and a pair of lateral patches, narrowing off in front; abdomen black, with grey scales above and below.

Like the preceding, if placed in *Culex*, it would come between species 30 and 31.

Description from "L. A.," p. 42.—Of about the same size as the preceding, but differs in the very black marking and

in the head having no line behind, as well as the mesonotum being grey with three black marks; head black, dark reddish or pitchy in front; behind and below with dense ash-grey scales; longer hairs than the preceding, and no line behind. Eyes black; palpi piceous with black scales; thorax deepest black, densely clothed with cinereous scales above, and adorned with three deep black marks; a broad median longitudinal and a pair of lateral patches, cut off in front, and extended back on each side of the scutellum; pleuræ frosty-cinereous; coxæ pitchy black. Legs testaceous, but with the femora paler, almost yellow; their apices and also the tibiæ densely clothed with black scales and hairs; anterior tarsi dusky black, indistinctly white-ringed; middle tarsi with the bases of the first and second joints almost silvery at the base; of the hind legs black with the first four joints basally white-banded, and the last joint entirely black; abdomen black, with grey scales above and below. Length 7-8 mm.

Habitat.—Chaco, in the province of Formosa, Argentina.

3. PSOROPHORA BOSCHII, Desvoidy.

Description from Desv., "Essai," p. 413.—Pale yellow, the legs rather dusky yellow; the wings with villous veins. Length $2\frac{1}{2}$ lines.

Closely resembles *Ps. ciliata*, but is generally pale yellow. Thorax with the dorsum rather dusky; the abdomen less so; legs rather dusky yellow.

Habitat.—Carolina; troublesome and common; spoken of as "the Mosquito" by the natives.

UNDESCRIBED SPECIES.

Note on undescribed species in the British Museum collection.

In all probability *C. mucidus*, Karsh., and *C. laniger*, Wied., belong to this genus. In the British Museum