

- Res., Union of S. Afr., pp. 255, 256 (1911); 2nd ditto, p. 323 (1913).  
 Giles, Handb. Gnats, p. 296 (1902).  
 Donitz, Beit. 3, Kennt. der Anop., p. 53 (1902).  
 Hill & Haydon, Ann. Natal Mus., Vol. I, Pt. 2, p. 146, Pl. 22 (1907).  
 Edwards, Bull. Ent. Res., Vol. III, Pt. III, p. 250 (1912).  
 Kirkpatrick, The Mosquitoes of Egypt, pp. 44-47 (1925).  
 ♀ ♂ larva, and pupa.

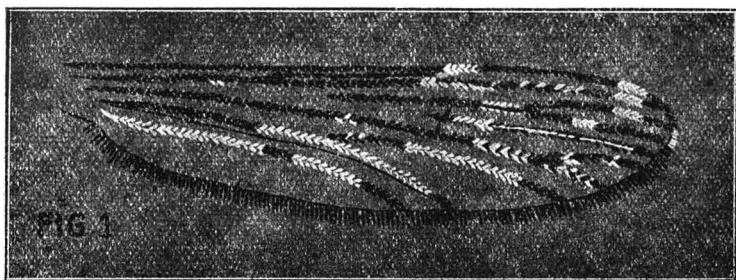


Fig. 1.—*Anopheles mauritanus* Grand. and Charmoy.

According to Edwards the tarsal character given by Theobald for separating *mauritanus* from *paludis* breaks down. He states, however, that there is a fairly constant difference between specimens from East and West Africa; the former possessing a broad white patch embracing the apex of the hind tibia and base of metatarsus, on the upper surface; whereas in the latter, which may be known as *var. paludis*, the patch is very narrow and inconspicuous.

#### *Description of Adults:*

*Female*.—*Palpi* densely clothed with black or dark brown scales, and with two to four, usually four, narrow white bands; apex usually white. *Proboscis* densely clothed with black scales, those at the base being the longest. *Antennae* with white scales on the first three or four segments.

*Thorax*.—Integument of mesonotum dark brown, with a greyish sheen in the middle, and with three longitudinal dark lines; sparsely clothed with yellow and pale creamy, curved, hair-like scales, and a few dark hairs at the sides.

*Legs* with dark scales; first three segments of fore and mid tarsi with white, apical bands, also a white basal band on the second segment. First segment of hind tarsi broadly banded at the base and apex; second segment with a broad apical band; third segment entirely white or with a dark basal band which varies in width; last two joints entirely white.

*Abdomen* black with yellow hairs.

*Wings*.—The costa and veins with black and yellow or white broad spindle-shaped scales, the former predominating. The costa is black with a white spot beyond the middle and one at the apex. Fringe brown, sometimes with a spot at the junction of the fifth long vein, and one between the branches of the second long vein.

*Length*.—5.5-6 mm.

*Male*.—*Palpi* clothed with dark scales; first segment with a few scattered white scales and a narrow band in the middle; second segment with numerous long yellow hairs on the inner surface, and on the last two segments there are two white patches.

*Ungues*.—Fore unguis unequal, the larger one with a distinct tooth; mid and hind unguis equal and simple.

This species can be easily distinguished by its large size, dark wings and markings on the legs. In the specimens collected by Captain Impey at Durban the costa is either entirely dark or the spots are extremely small and indistinct.

#### *Distribution:*

Palestine; Egypt; Sudan; Congo Free State; Uganda; Nyasaland; Kenya Colony; Tanganyika Territory; Madagascar; Zanzibar; Mauritius; Angola; Delagoa Bay; Northern Rhodesia; Salisbury, S. Rhodesia, and Sandup and Otjiwarongo, in South West Africa. In the Union it has been found in the Cape Province at King William's Town; Stellenbosch and Stent Pillows. In the Transvaal it is common at Onderstepoort and has also been taken in Pretoria. In Natal it is common and widely distributed according to Hill and Haydon from sea-level to 4,000 ft., and H. P. Thomasset has collected specimens at Weenen. In Zululand we collected specimens at Ntabanana and Mhlatuse. The Natal Museum possesses specimens from Pietermaritzburg, and in the Durban Museum there are numerous specimens collected in Durban and one from Empangeni, Zululand. Two specimens have been received from Dr. Robertson collected in the neighbourhood of Capetown, and 16 females and 3 males were received from Captain Impey, S.A.M.C., collected at Durban.

#### *Seasonal Prevalence:*

Adults have been collected in mosquito trauas at Onderstepoort throughout the year, and Hill and Haydon also record finding larvae in Natal throughout the year.

#### *Observations:*

In Natal Hill and Haydon found it not infrequently in houses with the onset of cold weather. We have never taken it in houses in the Transvaal, but found it fairly common in houses at Ntabanana from 19.10.22 to the 1.4.23. Dr. Aders informed me that he had never been able to get this species to feed on man in Zanzibar and that he had never seen an engorged female. We have had no difficulty in getting females to feed on horses at Onderstepoort, and the majority of the females which have been collected here in the mosquito traps (each of which contained a horse during the night) were engorged. In Zululand we once caught a female immediately after it had bitten a child in a room early one afternoon. In the same locality we took two or three females in thick bush during the daytime, but in the Transvaal this species appears to be entirely nocturnal in habits.

In Natal Hill and Haydon rarely, if ever, found larvae in water in which grass and weeds were not growing, otherwise in stagnant (occasionally) very slow and steadily flowing water, clean or polluted, but not actually foul. At Onderstepoort we have taken larvae in small pools containing little vegetation close to the Aapies River.

2. *ANOPHELES (MYZOMYIA) SQUAMOSUS* Theobald (1901).

*Cellia squamosus* Theobald (1903).

*Cellia tananarivensis* Ventr. (1906).

*Cellia pretoriensis* Gough (1910).

Theobald, Mon. Culic., Vol. I, p. 167, Pl. 2, f. 6 (1901);  
Vol. III, p. 109 (1903); Vol. V, p. 70 (1910); 2nd Rep.  
Well. Res. Labs., p. 69 (1906). 1st Rep. Dir. Vet. Res.,  
Union of S. Afr., p. 251 (1911); 2nd ditto, pp. 325, 326  
(1913).

Ventr., Bull. Mus. Paris, Vol. XII, p. 198 (1906).

Hill and Haydon, Ann. Nat. Mus., Vol. II, Pt. 2, p. 142,  
Pl. XX (1907).

Gough, Rep. Gov. Vet. Bact., Trans. Dept. Agric., p. 117  
(1910).

Edwards, Bull. Ent. Res., Vol. III, Pt. 3, p. 245 (1912).

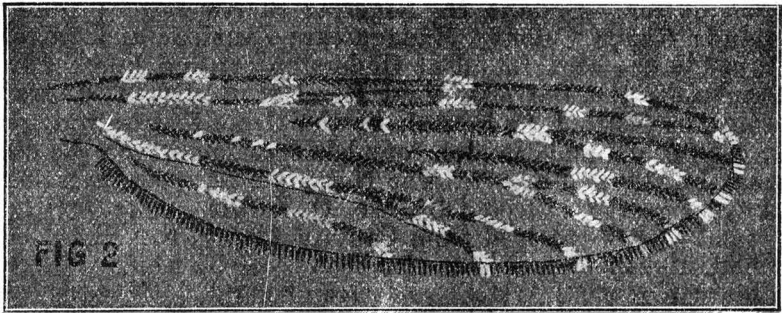


Fig. 2.—*Anopheles squamosus* Theobald.

We agree with Edwards in sinking *C. pretoriensis* Gough, as a synonym of this species. The characters upon which Gough based his species vary in different individuals and cannot be considered to be of any specific value.

*Description of the Adults:*

*Female*.—*Antennae* with a few scales on the first five segments. *Palpi* with long dark brown scales and three narrow white bands; in addition to these there are a few scattered white scales.

Integument of *mesonotum* dark brown with a median black line, clothed with white spindle-shaped scales, which are arranged in lines or bands, and with a few dark hairs. *Scutellum* with three small patches of white spindle-shaped scales and dark border-bristles. *Pleurae* with three longitudinal white lines.

*Legs*.—*Femora* and *tibiae* brown, mottled with white in front, yellow behind; first three joints of fore tarsi with broad apical white bands, mid tarsi with apical white bands on the first two joints only; hind tarsi with apical bands on the first four joints.

*Abdomen* black, dorsum with numerous hairs and a few dull ochreous scales in the middle, except on the basal and apical segments, the latter being covered with white scales which appear yellow.

in colour in certain lights; on the apical lateral margins of the segments there are tufts of black outstanding scales. Venter dark with scattered white scales. Cerci conspicuous, with dark scales and hairs.

*Wings*.—Costa and veins with black and white scales, the former predominating. The white markings differ considerably in different individuals. Costa black with six or seven white spots. At the apices of all the veins there is a minute white spot. Fringe with white spots at the junction of all the veins, these being sometimes very inconspicuous.

*Length*.—5-5.5 mm.

*Male*.—Palpi dark scaled; first segment with numerous outstanding scales on the basal half, a narrow white band in the middle, and usually with a few scattered white scales forming a narrow line on the apical half; second segment with an inconspicuous band at the base and apex; third segment mostly white scaled except at the back.

*Wings*.—The costa and first long vein resemble those of the female, the remainder of the veins are, however, considerably lighter.

*Length*.—5 mm.

*Distribution*.—Sudan; N. Nigeria; Sierra Leone; Gold Coast; Nyasaland; Kenya Colony; Madagascar; Zanzibar and Angola. In the Union it has been found at Onderstepoort and Potchefstroom in the Transvaal; the Barrage, Vaal River (coll. Dr. A. Ingram) and Bloemfontein (coll. J. C. Faure), in the Orange Free State, and also Natal, where Hill and Haydon found it occasionally on the coast and at levels of 2,000 to 2,800 ft. The Natal Museum possesses specimens reared from larvae collected by Mr. C. Fuller at Red Hill, Natal. Nine females were received from Captain Impey, S.A.M.C., collected at Durban, and specimens have also been received which were collected by Captain Drew, S.A.M.C., in Ovamboland. Edwards has also recorded it from Namutoni in South West Africa.

*Seasonal Prevalence*.—Specimens have been collected in mosquito traps at Onderstepoort throughout the year, but it is more numerous during the summer months.

*Observations*.—This is the commonest *Anopheles* found at Onderstepoort. It is for the most part nocturnal in habits, but we have occasionally taken females on horses during the hottest hours of the day in the open.

In Natal, Hill and Haydon found the larvae on one occasion in residual pools in a river bed, and three times in marshy pools directly fed by a small spring. At Onderstepoort larvae have been collected in pools containing little or much vegetation near the Aapies River and also in a stream in which the water was flowing slowly. At Potchefstroom we found larvae in marshy pools.

### 3. ANOPIELES (MYZOMYIA) ARGENTELOBATUS (Gough).

*Cellia argenteolobata* Gough (1910).

*Cellia pseudosquamosa* Newstead & Carter (1911).

Gough, Rep. Gov. Vet. Bact., Trans. Dept. Agr., p. 116 (1910).

Newst. and Cart., Ann. Trop. Med., V, p. 236 (1911).

Theobald, First Rep. Dir. Vet. Res., Union of S. Afr., p. 253 (1910); 2nd ditto, p. 326 (1913).

Edwards. Bull. Ent. Res., Vol. III, Pt. 3, p. 245 (1912).

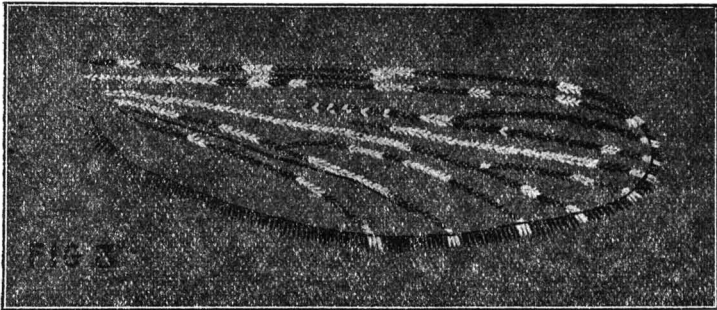


Fig. 3.—*Anopheles argenteolobatus* (Gough).

This species resembles *squamosus*, but can be easily distinguished by the absence of white bands on the mid and hind tarsi.

It was described by Gough from some females collected at Onderstepoort. The only other locality in which this species has been taken is Chinyanta's village, Luombwa River, N.E. Rhodesia.

*Seasonal Prevalence*.—Specimens have been collected in the mosquito traps at Onderstepoort throughout the year.

*Observations*.—This species was fairly common at Onderstepoort in 1910, but became practically extinct from 1911 to 1917. In 1917, however, it again made its appearance, and was one of the commonest if not the commonest *Anopheles* found here during the summer 1917-18. On one occasion a female was caught feeding on the belly of a horse in the day time but this species is for the most part nocturnal in habit.

#### 4. ANOPHELES (MYZOMYLA) PHAROENSIS THEOBALD (1901).

*Celia pharocensis* Theobald (1903).

*Nyssorhynchus bozasi* Neveu-Lemaire (1906).

Theobald, Mon. Culic., Vol. I, p. 169 (1901); Vol. III, p. 109 (1903).

Neveu-Lemaire, Arch. Parasit., X, p. 246 (1906).

Edwards, Bull. Ent. Res., III, iii, p. 245 (1912).

Kirkpatrick, The Mosquitoes of Egypt, pp. 49-53 (1925).  
♀, ♂, larva, and pupa.

#### *Description of Adult:*

*Female*.—Head ashy-grey with a dark median bare line, clothed with white erect scales, yellow ones at the sides, and long hairs projecting forwards in front. Antennae brown with narrow white scales on the basal joints. Palpi densely clothed with outstanding dark-brown scales, and numerous scattered white ones on the dorsal surfaces; apices of the joints with white spots. Proboscis dark brown.

*Mesonotum* grey, with a median dark line extending backwards beyond the middle having yellowish scales on either side; on each side in front of the middle there is a bare oval dark spot, from which extends backwards a broadish line devoid of scales; on the inner margin of each of these lines there is a narrow dark line. The scales

are small, pale to yellowish in colour; those on the latero-anterior angles being dark. Scutellum with three patches of pale scales. Pleurae dark brown with pale reflections and a line of white scales on the mesothoracic episternum.

*Legs.*—Coxae with tufts of long white scales. Femora brown, black at the apices, slightly mottled with white, and with a conspicuous white subapical spot; these being larger on the mid and hind femora. Tibiae mottled with dark brown and white scales. Fore and mid tarsi with the first joint slightly mottled, and with an apical white band; second and third joints each with an apical white band, last two joints dark. Hind tarsi with a broad apical white band on the first four joints; fifth joint entirely white.

*Abdomen* very dark brown; first segment bare, except for one or two scales in the middle; second to seventh segments covered with yellowish scales, these being densest in the middle and on the posterior margin of each segment, and with a tuft of dark brown outwardly projecting scales at the latero-posterior angles; eighth segment covered with yellow scales, and a patch of white ones at the apex.

*Wings* with the veins densely clothed with black and yellowish-white scales, the latter predominating except on the costa. Costa black, pale at the base, and with one large and three small pale spots. First long vein with several black spots. Second long vein with a dark spot at the base, one on the upper branch just beyond the fork and two on its lower branch, one beyond the middle and one before its apex. Third long vein with two dark spots at the base and one before the apex. Fourth long vein with a small black spot before the fork, one near the base and another before the apex on each of its branches. Fifth long vein with a black spot near the base, one at the fork, three on its upper branch, and one on the lower branch before the apex. Sixth long vein with a dark spot at the base, one near the middle, and another before the apex. Fringe dark with yellowish spots at the apices of the veins.

Length 5–6 mm.

*Distribution :*

A single female of this species was collected by the writer at Manyana, Northern Zululand, in October, 1924, and in the Natal Museum there is a female collected at Lake St. Lucia, Zululand, 22nd July, 1918 (R. McKenzie). It has been recorded from Southern Rhodesia, Angola, Belgian Congo, North and South Nigeria, Gold Coast, Gambia, Togo, Madagascar, Egypt, Sudan, Palestine.

*Economic Importance :*

Newstead, Dutton, and Todd (Ann. Trop. Med. and Parasit., I, i, 1907) have demonstrated that *A. pharoensis* can be infected with malarial parasites.

5. ANOPHELES (MYZOMYIA) JACOBI (Hill and Haydon).

*Cellia jacobi*, Hill and Haydon (1907).

Hill and Haydon, Ann. Natal Mus., Vol. I, Pt. 2, p. 144, Pl. XXI (1907).

Theobald, Mon. Culic., Vol. V, p. 71 (1910).

Edwards, Bull. Ent. Res., Vol. III, Pt. 3, p. 245 (1912).

This species was described from nine females bred from larvae collected in a small spring at sea-level in Natal.

*Description of Adult:*

The following is the original description of the female:—"A large black and white mosquito with spotted legs. *Palpi* thickly covered with bushy black scales, a few white interspersed; irregular white bands at apex and last joint; a very narrow band about the middle and a few white scales in an incomplete ring between that and the base. A tuft of white hairs on clypeus, overhanging origin of palpi.

*Thorax* of sepia, with clothing of narrow-curved white scales forming three distinct longitudinal bands; three white bands on lateral aspect of thorax. *Legs*.—Coxa and trochanter dark grey, flecked with white scales. Femora and tibiae thin, white scales predominating over black; a few white flecks on black metatarsi; white bands at apex of metatarsus, and all tarsi, except in the fore and middle legs, the third. Tip of last tarsus white in all legs. *Abdomen* black, thickly covered with narrow-curved yellow scales and long golden hairs; a thick lateral tuft of black scales on second to seventh segments. *Wings*.—Costa black; there are three main white spots, which are small; a fourth still smaller at the apex, and two white dots at the base. First longitudinal vein black, one white dot at base, a white spot under each of the four remaining costal spots, mostly smaller than the latter, and a minute group of white scales in the two long black stripes. Second longitudinal vein black, a white spot at the fork and a large white patch on posterior branch of first fork-cell. Third vein mostly white, with a black spot at each end. Fourth vein black, a white spot near the fork, which also is white, and a large white spot on each branch of the second fork-cell and at the tip of each branch. Fifth vein mostly white, a black patch on the stem and at fork, two on upper and one on lower branch. Sixth vein white with three black spots. On the second and fourth veins white scales are interspersed with black in some specimens. Fringe black with a white spot opposite termination of all branches of veins except the second. *Length* of wing, 4·5 mm.

Principal variation in nine females are:—Very few white scales at fork of second long vein; the stem of the fourth vein almost all or entirely white; and three white spots on the first vein additional to costal spots, instead of two."

6. ANOPHELES (MYZOMYIA) AUREOSQUAMIGER (Theobald).<sup>(1)</sup>

*Pyretophorus aureosquamiger* Theobald (1907).

Theobald, Mon. Culic., Vol. IV, p. 73 (1907); 1st Rep. Dir. Vet. Res., Dept. Agric., Union of South Africa, p. 245 (1911); 2nd ditto, p. 324 (1913).

Edwards, Bull. Ent. Res., Vol. III, p. 246 (1912).

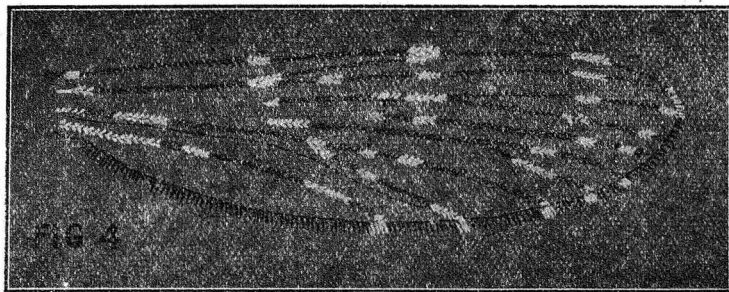


Fig. 4.—*Anopheles aureosquamiger* (Theobald).

This species was described from two females taken in Pretoria by Sir Arnold Theiler. It is fairly common at Onderstepoort, seven miles north of Pretoria, and has been taken here in the mosquito traps throughout the year, but is more common during the winter months. It has not been recorded from any other localities.

*Description of Adult:*

*Female*.—Palpi dark brown to black; the scales at the base somewhat projecting, with four narrow white bands, the last apical. Antennae with some white scales on the second and third segments.

*Thorax*.—Mesonotum slate-grey in the middle, dark brown at the sides, with short, rather broad, rich golden spindle-shaped scales on the median area, and hairs on the lateral margins. Scutellum with a row of scales similar to those on the mesonotum.

*Legs* dark brown to black; femora and tibiae with white spots; first tarsal segments with three white bands; second and third tarsi of fore legs with broad apical white bands, those of the mid legs narrow and inconspicuous; second tarsal joint of hind legs with a broad white apical band, the third is mostly white with a black basal band, and the two apical segments are entirely white.

*Abdomen* black with golden hairs.

*Wings*.—Costa and veins with black and yellow or white lanceolate scales, the black ones predominating. Fringe with pale spots at the junction of all the veins. Average length of wing: 3.8-4 mm. Length 5.5-6 mm.

(1) Dr. Ingram informs me that he has recently bred specimens of *A. natalensis* [Hill and Haydon] from larvae collected in one of the breeding places in which the types were collected, and found them to be the same as *A. aureosquamiger*. *A. natalensis* has priority over *A. aureosquamiger*.



## 7. ANOPHELES (MYZOMYIA) PRETORIENSIS (Theobald).

*Nyssorhynchus pretoriensis* Theobald (1903).

Theobald, Mon. Culic., Vol. III, p. 99 (1903); Vol. V, p. 59 (1910); 1st Rep. Dir. Vet. Res., Union of S. Afr., 257 (1911).

Giles, Rev. Anoph., p. 42, (1904).

Hill and Haydon, Ann. Natal Mus., I, Pt. 2, p. 139, Pl. XIX (1907).

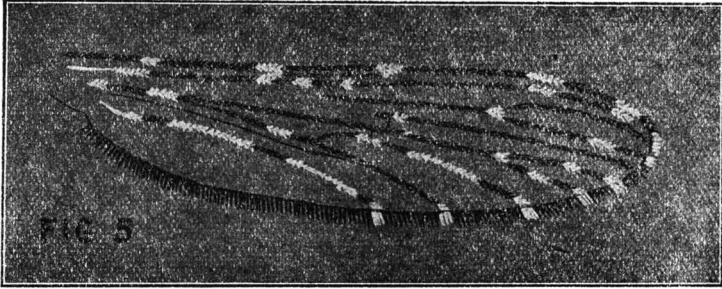


Fig. 5.—*Anopheles pretoriensis* (Theobald).

*Distribution*.—Onderstepoort, Pretoria, and Leydsdorp, Transvaal; Weenen (coll. H. P. Thomasset) and other localities in Natal (*vide* Hill and Haydon); Mhlatuse Settlement, Zululand (G.A.H.B.). It has also been recorded from Arabia and the Gold Coast.

*Observations*.—Usually common at Onderstepoort during the summer months. We have never taken it here in houses. Larvae have been found in pools near the Aapias River. Hill and Haydon state that it is not frequently found in Natal, and its breeding-grounds appear restricted. It has occasionally been found by them inland at an elevation of 2,200 feet, and rarely at sea-level or thereabouts.

*Seasonal Prevalence*.—This species has been collected in mosquito-traps at Onderstepoort during the months of October to July.

*Description of Adults:*

*Female*.—*Palpi* thin, but shaggily scaled at the base, black, with three white bands—a narrow one just before the middle of the first joint, a broad one near the apex, and another equally broad at the tip. Specimens have been found with four white bands. Theobald records one, Gough two, and Hill and Haydon five out of the ten females which they examined. Antennae with a few white scales on the four basal segments.

*Thorax*.—Mesonotum slate-grey in the middle, dark brown at the sides, with broadish elliptical white scales and a few dark bristles; in front there is a tuft of narrow-curved scales.

*Scutellum* with a few white narrow-curved scales in addition to the usual row of border bristles.

*Legs* black; femora, tibiae, and metatarsi with white spots; first two tarsal joints of fore legs with white apical bands; those of the mid legs are indistinct or absent; in the hind legs the first two tarsal joints have white bands at the apex, the third with the apical half or three-quarter or more all white, and the last two joints are entirely white.

Abdomen black, with dark brown hairs.

Wings with black and white scales. - Costa black with five or six small white spots. Fringe white at apex, and with white spots at the junction of all the veins. Average length of wing 3·8 mm. Length 5 mm.

8. ANOPHELES (MYZOMYIA) MACULIPALPIS Giles (1902).

*Nyssorhynchus maculipalpis* Theobald (1903).

*N. maculipalpis* var. *indiensis* Theobald (1903).

Giles, Handb. Gnats or Mosq., 2nd Edit., p. 297, f. 41 (1902); Rev. Anoph., p. 42 (1904).

Theobald, Mon. Culic., Vol. III, pp. 96-99 (1903); Vol. V, p. 62 (1910); 1st Rep. Dir. Vet. Res., Union of S. Afr., p. 256 (1911).

Edwards, Bull. Ent. Res., III, iii, p. 247 (1912).

This species is closely allied to *A. pretoriensis* Theob., from which it can be distinguished by the palpi having spots in addition to the bands, and the last three hind tarsi being all white.

*Distribution.*—This species was originally described from a male collected at Salisbury, S. Rhodesia. It has since been recorded by Theobald from India, Congo Free State, Northern Nigeria, Mauritius, Angola, and Leydsdorp, Transvaal. We took one female at Onderstepoort on the 6th May, 1919.

*Seasonal Prevalence.*—Not known; presumably the same as the previous species in the Transvaal.

*Economic Importance.*—This species is known to be a natural carrier of the malarial parasites in India.

9. ANOPHELES (MYZOMYIA) RUFIPES (Gough).

*Nyssorhynchus pretoriensis* var. *rufipes* Gough (1910).

*Anopheles* (*Nyssorhynchus*) *watsoni* Edwards (1911).

Gough, Rep. Gov. Vet. Bact., Transvaal Dept. Agric., p. 119 (1910).

Theobald, 1st Rep. Dir. Vet. Res., Union of S. Afr., p. 258 (1911).

Edwards, Bull. Ent. Res., Vol. II, p. 143 (1911); Vol. III, Pt. III, p. 246 (1912).

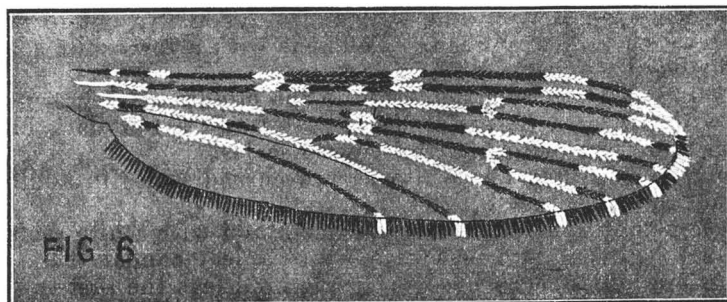


Fig. 6.—*Anopheles rufipes* (Gough).

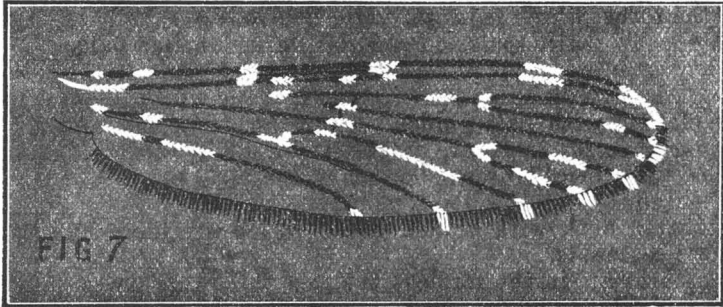


Fig. 7.—*Anopheles rufipes* (Gough).

This species only differs from *A. pretoriensis* Theob. in having the legs unspotted; they are black, not ruddy-brown as described by Gough.

*Distribution*.—It was originally described from two specimens collected at Onderstepoort. It has since been recorded by Edwards from Kenya Colony, Northern and Southern Nigeria, and the Gold Coast.

*Seasonal Prevalence*.—This species has been collected in mosquito traps at Onderstepoort during the months of January to April. Very few specimens were caught from 1909 to 1914, but since then it has been common.

10. ANOPHELES (MYZOMYIA) THEILERI Edwards (1912).

*Pyretophorus albipes* Theobald (1911)  *nec*

*A. albipes* Theo. (1901).

Theobald. 1st Rep. Dir. Vet. Res., Un. S. Afr., p. 243 (1911).

Edwards. Bull. Ent. Res., Vol. III, Pt. III, p. 247 (1912).

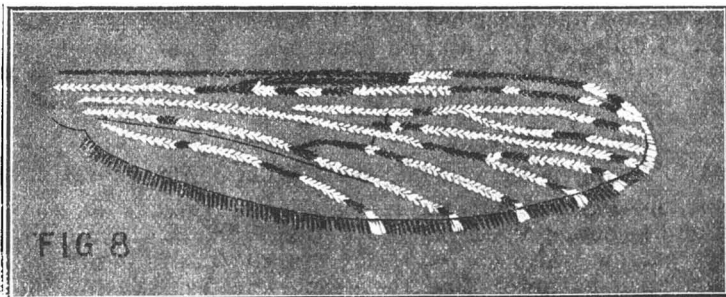


Fig. 8.—*Anopheles theileri* Edwards.

*Description of Adult*.—*Female*: Head clothed with a large patch of white upright forked scales in front, and black ones behind. *Palpi* dark brown to black, with three white bands, of which the two apical ones are broad. The scales are oppressed, except at the base of the first