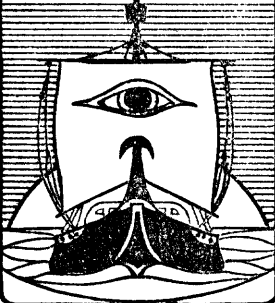


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(Diptera, Culicidae), with a Des-
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BY
P. F. MATTINGLY

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NOTES ON THE SUBGENUS *STEGOMYIA* (DIPTERA,
CULICIDAE), WITH A DESCRIPTION OF A NEW SPECIES

BY

P. F. MATTINGLY

(From the British Museum (Natural History), London)

(Received for publication May 8th, 1954)

Aedes (*Stegomyia*) sp. in the *Aedes scutellaris* Walker Group

The following description is based on a unique male adult very kindly sent to me, together with other interesting specimens, from the Maldive Islands by Dr. M. O. T. Iyengar and Mr. M. A. U. Menon (see Iyengar and Menon, *in the press*). In my opinion it is very probably a new species, but the specimen in question is incomplete and in very poor condition, and I prefer to leave it unnamed until more adequate material is available. A similar practice has been adopted in the case of other species by Marks (1951*a* and *in the press*) in an extensive review of the *Aedes scutellaris* group. The combination of pale-scaled proboscis, interrupted pale basal band on the first hind tarsal, uninterrupted band at the base of the fourth hind tarsal, and dark anterior surface of the mid femur distinguishes the present species from all members of the group so far described, except *A. pernotatus* Farner and Bohart from the New Hebrides, *A. tongae* Edwards from the Tonga Islands, *A. horrescens* Edwards and *A. pseudoscutellaris* Theobald from Fiji, and *A. quasiscutellaris* Farner and Bohart from the Solomon Islands. The presence of pale scales on the antero-lateral edges of the scutum, if this could be established, would provide a distinguishing character from the first three of these species, and conversely the absence of such scales, if this were certain, would serve to separate the species from the last two. All the five species mentioned above occur in the eastern part of the range of the *A. scutellaris* group, unlike the present species, which is by a long way the most westerly member yet to be described, the next in order being a species from the Andaman Islands, unless the suggestion by Mattingly (1953) to include the aberrant *A. granti* Theobald from Socotra be accepted. The shape of the basal lobe on the male coxite of the present species cannot be ascertained exactly, since the terminalia are mounted under a cover-slip. It is, however, clearly different in this respect from any of the five species named, being much closer to *A. scutellaris* and *A. andrewsi* Edwards. *A. scutellaris* is not at present known from further west than Ceram and Amboina, but the precise identity of members of the group known to occur in the islands of the Malay archipelago westwards from there has yet to be established. Hence, it is theoretically possible that *A. scutellaris* has a westward extension as far as Sumatra. The species from the Andaman Islands described under this name by Barraud (1934) is undoubtedly distinct, although insufficient material is at present available for naming it. *A. andrewsi* is at present known only from Christmas Island, but for the same reason the possibility remains that it may occur in the larger islands to the north. In my view the present species is probably related to *A. scutellaris* and *A. andrewsi*, and to other species which may possibly await discovery in Indonesia. It may be noted that the only external difference from *A. scutellaris* so far established is the presence of pale scales on the under side of the proboscis. It seems possible, therefore, that the Maldive Islands form may be no more than a subspecies of *A. scutellaris*. It must, however, be remembered

that specific and subspecific differences between members of this group tend to be very slight (see, e.g., Marks, 1951*b*; Woodhill 1949*a*, 1949*b*, 1950). External differences from *A. andrewsi* are more considerable. They include the presence of pale scales on the proboscis, uninterrupted fourth hind tarsal, and interrupted first hind tarsal.

The description which follows is based on a specimen from Madaveli, Suvadiva Atoll, Maldive Islands, collected by M. O. T. Iyengar in February, 1951. The specimen was bred out from a larva found in a leaf-base of *Alocasia indica*, together with larvae of *A. albopictus* Skuse.

ADULT MALE. Proboscis dark above, the under surface rubbed but with a number of pale scales remaining towards the tip. Palps with well-developed white scale patches at the bases of each of the four distal segments, the two basal patches forming complete rings, the two apical ones interrupted above. Clypeus bare. Tori each with a patch of flat white scales on the inner surface. Vertex with the usual wedge-shaped white mark. Anterior pronotum with broad white scales and black bristles. Posterior pronotum with broad white

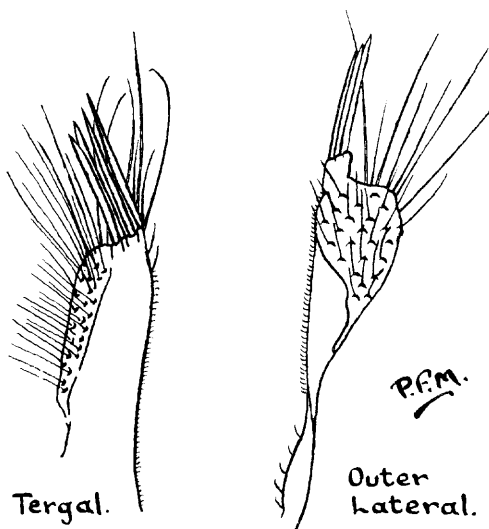


FIG. 1. *Aedes (Stegomyia)* sp. in *A. scutellaris* group. Basal lobe of male coxite.

scales below and narrower dark ones above. Pleurae rubbed and distorted, but with the longitudinal bands of white scales characteristic of most members of the group clearly discernible. Scutum showing remnants of the usual white median stripe and with a well-marked curved band of white scales above the wing root, which appears to stop well short of the posterior edge. Antero-lateral edges of scutum largely denuded. A single pale scale appears to be present on one side, but it could easily have been transferred from the median stripe in the course of rubbing. Scutellum entirely white-scaled, except for a very small patch of black scales at the apex of the median lobe. Fore femur with a pale stripe on the posterior surface reaching from base to apex, knee-spot very small. Mid femur dark in front, pale below on the posterior surface, knee-spot well developed. First two fore and mid tarsals narrowly pale at base. Remaining tarsals on these legs dark. The extent of pale scaling on the anterior and posterior surfaces of the hind femur cannot be ascertained exactly, owing to shrinkage and twisting, but it appears to be somewhat less than in *A.*

scutellaris. It is felt, with Marks (1951a), that the posterior surface of the hind femur deserves attention in this group. The femoral knee-spot is well developed. Hind tibia entirely dark. First hind tarsal pale-banded on about the basal $1/3$ above. This band is very broadly interrupted throughout its length below. Second hind tarsal pale all round on about the basal $2/5$; third pale all round on about the basal half; fourth pale all round on about the basal $2/3$; fifth entirely pale. Abdomen with first tergite dark above; second with pale lateral patches, dark above; third and fourth apparently with traces of pale dorsal bands in addition to the lateral patches, but the whole abdomen is very much shrunken and twisted and therefore difficult to interpret. Posterior segments missing. Male terminalia with the style very long, slender, except at the apex, where it is expanded and bears three setulae and a blunt, very slightly expanded, appendage. Basal lobe with four modified setae placed very close together and arising from a small projection at the apico-lateral angle (fig. 1). Ninth tergite detached and broken, its central portion apparently smooth and rounded, the small lateral lobes each with three setulae.

Aedes (Stegomyia) sp. in the Aedes africanus Theobald Group

The following description is based on a unique female adult kindly sent to me by Dr. D. S. Bertram as part of a collection from the Gambia. Dr. Bertram also gave me the following data concerning it: 'Numerous test tubes and cotton wool were issued to the chief of Jali village at 8 a.m. on 9/9/52 for distribution to the villagers to catch mosquitoes which landed on them. We collected these tubes on 10/9/52 at 8 a.m. from the chief. Collection 130 is in my card index of my own identifications and includes specimens as follows: *C. tritaeniorhynchus*, *A. furcifer*, *T. (M.) uniformis*, *A. punctothoracis*, *A. aegypti* and the single specimen in question. Jali is about the centre of Kiang West District and a mile or a little more from the nearest intrusion of mangrove from the main River Gambia to the north.'

This is clearly a species of the *A. africanus* group closely related to *A. pseudoafricanus* Chwatt. The specimen is incomplete, but can be seen to differ very clearly from *A. pseudoafricanus*, as from all other known members of the group, in having a number of relatively broad silvery scales at the sides of the prescutellar bare space. Minor differences are the slightly wider basal bands on the mid tarsals, the less extensive silvery scaling on the anterior surface of the mid and hind femora, and the rather broader basal pale ring on the hind tibia. It seems probable that when more material is available it will prove to be a subspecies of *A. pseudoafricanus*. The breeding-places are unknown, but the resemblance to *A. pseudoafricanus* strongly suggests that it will be found breeding mainly in rot-holes in mangrove, and to a less extent in other trees in the vicinity of the mangrove zone (see Mattingly and Bruce-Chwatt, 1954).

ADULT FEMALE. Proboscis entirely dark. Palps white-tipped. Clypeus devoid of scales. Tori each with a conspicuous spot of silvery scales on the inner face. Eyes rimmed with silvery scales. Occipital region dark, except for a median posterior yellow spot which spreads laterally behind. Anterior pronotum with broad silvery scales and golden bristles. Posterior pronotum wholly or largely covered with broad silvery scales. Scutum with median anterior spot composed of broad silvery scales; its length cannot be ascertained owing to rubbing. Silvery antero-lateral patches set at an acute angle, long, narrow, wedge-shaped, their posterior edges more or less straight, as in *A. pseudoafricanus*. Supra-alar

patches composed of broad silvery scales, their inner edges destroyed by rubbing. Postero-lateral lines of narrow golden scales extending to the ends of the antero-lateral patches. Median line of narrow golden scales destroyed by rubbing, except at its extreme posterior end. Prescutellar bare space bordered by rather abundant narrow curved golden scales, with some broader silvery ones posteriorly. Scutellum entirely clothed with broad silvery scales, except for the usual patch of black scales posteriorly on the mid lobe. Knobs of halteres largely dark, their stems pale. Abdomen with a rather ill-defined median yellow spot on tergite I; II apparently dark; III-V with very shallow basal yellow bands; VI rubbed. Fore legs missing. Middle femur with a small but conspicuous silvery white spot at about $\frac{1}{3}$ the distance from the base to the apex on the anterior surface, and a single white scale at about half way. The tip apparently entirely dark, but somewhat rubbed. Middle tibia narrowly pale above at base, dark below. First mid tarsal pale-banded on about the basal $\frac{1}{3}$; second similar; third with two small pale scales at extreme base; fourth and fifth dark. Hind femur entirely dark behind, anteriorly with a few very broad scattered silvery scales in the region of half way, the tip apparently entirely dark, but rubbed. Hind tibia with a very conspicuous pale ring at base, which is drawn out into a pale line below. This ring is about $\frac{1}{11}$ of the tibial length above, $\frac{3}{11}$ below. First hind tarsal broadly pale above at base, more narrowly so below; second hind tarsal narrowly pale-ringed at base; third uniformly pale, except at tip; fourth narrowly pale above at base, entirely dark below; fifth entirely dark.

A. luteocephalus Newstead, the only other member of the *A. africanus* group known to occur in the Gambia, can be distinguished from the present species by the absence of white or silvery scales from the prescutellar area, and by having the posterior surface of the hind femur extensively pale at base (see Mattingly, 1952, fig. 2). It is likely also to be separable on most of the characters listed by Edwards (1941) for separating it from *A. africanus*, although these are somewhat variable.

Aedes (Stegomyia) patriciae sp. nov.

I have named this species in honour of Dr. Elizabeth Marks, of the University of Queensland, who has done much valuable work on the subgenus *Stegomyia* and who likes to be called Patricia because of the Irish that is in her. It is the species described by Barraud (1934) as *A. flavopictus* Yamada. Dr. Alan Stone, of the Bureau of Entomology in Washington, some time ago noted in a letter to Dr. John Smart, then of the British Museum, that Barraud's species was probably distinct, and I have recently been able to confirm this. Dr. Nanzaburo Omori, of the University of Nagasaki, has very kindly sent me a set of male terminalia of *A. flavopictus*, the first material of this species to reach the British Museum. In addition, a full description has recently been published by La Casse and Yamaguti (1950), based on Japanese material. Barraud's species is certainly very distinct.

The description which follows is based on the holotype male, allotype female, four paratype males and four paratype females from 7,000 feet on Krol Mountain, near Solan, in the western Himalayas, collected by P. J. Barraud on July 20th, 1923; also, on three larval pelts, with associated pupal pelts, and four whole larvae with similar data, except that they are dated July 4th, 1930; and on one larval pelt, with associated pupal pelt, with similar data but dated August 16th, 1930. There are, in addition, in the British Museum an adult male and female from Murree in the western Himalayas, collected by C. A. Gill in 1922, but I have not included these in the type series, because the male has no abdomen. They are discussed separately below.

ADULT MALE. Proboscis entirely dark. Palps with white scale patches at the bases of each of the four distal segments, the two most distal patches incomplete above. Clypeus bare. Tori each with a conspicuous white scale patch on the inner face. Occipital region dark, except for two white lateral patches and a median wedge-shaped white patch. Anterior pronotum with broad silvery white scales and black bristles. Posterior pronotum with a large patch of broad white scales. Pleural ornamentation as in *A. albopictus* Skuse. Scutum with a median longitudinal stripe of narrow white scales, narrowing abruptly just in front of the prescutellar bare space, round the edges of which it is continued as a very narrow border. Postero-lateral pale lines reaching forward about as far as the point of narrowing of the main median stripe. A small patch of yellowish scales present just behind the scutal angle, and a narrow line of pale scales above the wing roots, reaching back nearly to the posterior edge of the scutum. With the exception of the main median line, which is pure white, the markings are whitish or very pale yellow. Scutellum with broad white scales on all three lobes and a small patch of black scales distally on the median lobe. Postnotum bare. Knobs of halteres dark, with a few small whitish scales, their stems pale. Wings with a small white spot at extreme base of costa. Front femur pale below from base to apex, with a small square white spot at tip above. Tibia indistinctly pale below. First two tarsals very narrowly pale-ringed at base, remaining tarsals dark. Middle femur entirely dark anteriorly, pale below for its whole length, pale at base behind, with a conspicuous square white spot at apex above. Tibia dark. First two tarsals narrowly pale-banded at base, remainder dark. Hind femur pale in front on about the basal $4/5$ and with a well-developed apical knee-spot, pale behind on about the basal half. Tibia entirely dark. First and second tarsals pale-ringed on about the basal quarter; third on about the basal $1/3$; fourth on about the basal $3/5$; fifth pale to tip. The pale band at the base of the first tarsal is interrupted by dark scales below. Tergite I of abdomen with a very small median basal pale spot and large lateral pale patches; tergites II-VI with shallow basal pale bands and discontinuous lateral pale patches. Terminalia well figured by Barraud (1934). Style long and slender, expanded at the distal end, where it bears a rather long appendage and about 2-4 setulae. Basal lobe with numerous hairs and flattened clavate setae. Central portion smoothly rounded, convex, the corners not produced into lobes but provided with about 3-4 small setae.

ADULT FEMALE. Palps short, pale above on about the distal half. Otherwise much as in the male.

PUPA (fig. 2). The pupa has not previously been described. The following description embodies the setal nomenclature of Belkin (1952), as modified by Belkin (1953).

Cephalothorax. Trumpets short. Meatus about $2/3$ of the total length. Setae 1, 2 and 3 single; seta 4 single or bifid; seta 5 bifid or trifid; seta 6 single; seta 7 single to trifid; seta 8 trifid to pentafid; seta 9 single. Metanotum: seta 10 single to tetrafid; seta 11 single; seta 12 single to tetrafid.

Abdomen. Segment I. Seta 1 with about 8-14 primary and numerous secondary branches; seta 2 single; seta 3 single, plumose; seta 4 trifid or tetrafid; seta 5 with 4-6 branches; seta 6 single, plumose or simple; seta 7 single; seta 10 single, plumose or simple, or, on one side of one pelt, with about 8 branches.

Segment II. Seta 1 with 4-6 branches, plumose or with the branches secondarily divided; setae 2 and 3 single; seta 4 single to bifid; seta 5 bifid to tetrafid; seta 6 single or bifid; seta 7 single; seta 10 single or bifid.

Segment III. Seta 1 with 2-6 plumose branches ; setae 2 and 3 single ; setae 4 and 5 single or bifid ; setae 6 and 7 single ; seta 8 bifid or trifid ; seta 10 trifid to pentafid ; seta 11 single or bifid ; seta 12 single.

Segment IV. Seta 1 single or bifid ; seta 2 single ; seta 3 single to trifid ; seta 4 single ; seta 5 single to trifid ; setae 6 and 7 single ; seta 8 single to trifid ; seta 10 single to tetrafid ; seta 11 single or bifid ; seta 12 single.

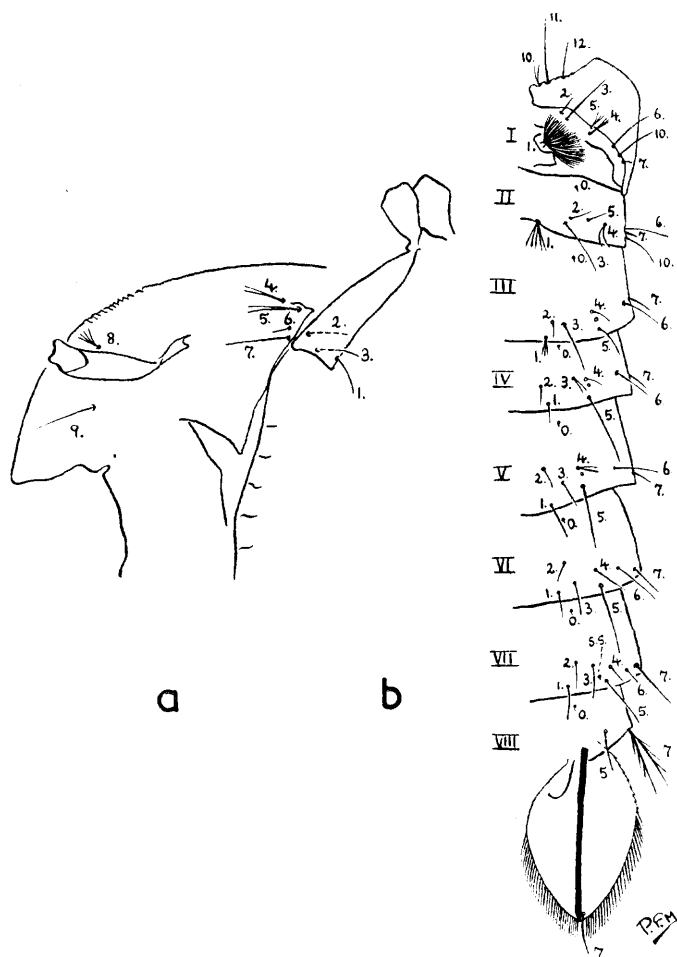


FIG. 2. *Aedes patriciae* sp. nov. Pupa: a.—cephalothorax ; b.—abdomen and metanotum (shown in dorsal view only) (s.s. = supernumerary microseta).

Segment V. Setae 1, 2 and 3 single ; seta 4 single or bifid ; seta 5 single to trifid ; setae 6 and 7 single ; seta 8 single to trifid ; seta 10 with 2-7 branches ; setae 11 and 12 single.

Segment VI. Setae 1, 2 and 3 single ; seta 4 single or bifid ; setae 5, 6 and 7 single ; seta 8 bifid to tetrafid ; setae 10, 11 and 12 single.

Segment VII. Seta 1 single; seta 2 single or, on one side of one pelt, bifid; seta 3 single; seta 4 single to trifid; setae 5 and 6 single; seta 7 single, plumose or simple; seta 8 single to trifid; setae 10, 11 and 12 single. On this segment a very minute supernumerary microseta is present on both sides of one pelt and on one side of another, near the base of seta 5. Its presence on the other pelts cannot be confirmed.

Segment VIII. Seta 5 single; seta 7 single or bifid, plumose.

Paddles. Narrow and strongly tapered, the mid rib strongly pigmented. Apical fringe long and delicate, extending from about $2/5$ the distance from the base on the outer edge to about half way on the inner edge. Seta 7 single.

LARVA. The larva has been figured by Barraud (1934).

Head. Antenna smooth. Antennal seta single, arising at about $5/9$ to $2/3$ the distance from base to apex. Seta A bifid or trifid; setae B and C single or split distally into two; seta *d* with about 10 branches. *Thorax.* With stellate setae, spines at bases of pleural setae extremely small.

Abdomen. With stellate setae. Comb of 6-12 narrow sharply pointed spines broadly expanded and fringed with delicate secondary denticles at the base. Siphonal index (crushed) about 2 : 1. Pecten of 7-14 spines, each with 1-2 large basal ventral denticles and other smaller ones. All spines, or only the basal ones, also with small dorsal denticles. Siphonal tuft with 3-5 branches (usually 4-5) arising well beyond the point of insertion of the terminal pecten spine. Dorsal subterminal seta of siphon rather strongly developed. Upper caudal seta single or double, lower single. Saddle-hair bifid in all cases (Barraud says that it is often 3-branched). Setae of ventral brush single, except that one of the small proximal ones may be bifid.

VARIATION. The specimens from Murree, referred to above, differ from those of the type series in having more numerous pale scales at the scutal angle and above the wing root, those above the wing root forming a conspicuous supra-alar patch. The pale scales round the prescutellar bare space are also more numerous in both sexes. The third fore tarsal of the male has a rather conspicuous pale spot at the base above. It seems unlikely that these differences from the topotypical material are taxonomically significant.

Aedes (Stegomyia) cretinus Edwards

The only topotypical material of *A. cretinus* known to have been collected comprises the holotype female, formerly in the Lichtwardt collection and now believed to be in the Berlin-Dahlem Museum, and an incomplete female in the Budapest Museum. The latter specimen was recently obtained on loan (Mattingly, 1953), and it has now been possible to compare it with *A. lindtropi* Shingarew. During a recent visit to Hamburg it was possible to obtain much valuable material for the British Museum from Martini's collection at the Tropical Institute. Among this material, the bulk of which will be listed and described elsewhere, is a series of adults of *A. lindtropi* from the Georgian coast of the Black Sea (collected by Rhoudkhadze). *A. lindtropi* has been treated by all recent authors as a synonym of *A. cretinus*, but previous descriptions are very incomplete. The following description is based on five female adults from Hamburg, the single dwarfed male from Hamburg described by Martini (1931), and the female from Amari, in Crete, lent to me by Dr. Soos, of the Budapest Museum.

ADULT FEMALE. Proboscis entirely dark. Clypeus bare. Tori with large white scale patches on the inner and anterior faces (partly obliterated in the Budapest specimen).

Palps white-scaled above on about the distal half. Occipital region dark, except for a large, almost square, white patch in the middle, a very narrow white rim round the eyes, and a narrow lateral white stripe. Anterior pronotum with broad white scales, its bristles mainly dark but one or two of them pale. Scutum with ornamentation almost entirely obliterated in the Budapest specimen. In the series from Hamburg the median longitudinal pale stripe is composed of narrow scales and is apparently continued right back, to fork round the edges of the prescutellar bare space, although a short distance in front of the bare space it has been rubbed away. Scales round the edges of the prescutellar bare space and those of the postero-lateral lines white or very pale-yellowish. Two small spots of narrow whitish scales are present a short distance behind the scutal angles half way between the median line and the edges of the scutum. The paratergite bears a great abundance of very large broad white scales, some of which spread forwards along the edge of the scutum to the scutal angle, while others spread backwards over the wing root. Many of the pale scales in the latter area are, however, very narrow. Shoulders and antero-lateral edges of scutum with abundant narrow white scales. Posterior pronotum with narrow dark scales above and a patch of very large flat white scales below. Another small patch of broad white scales arises just below the postero-ventral corner of the posterior pronotum. This patch is quite distinct from the pronotal patch and from the subspiracular patch, which is also present. The Budapest specimen shows this patch, but in this specimen most of the other pleural patches have been destroyed. In the series from Hamburg they are as in *A. albopictus*. Scutellum with ornamentation largely obliterated in the Budapest specimen. In the Hamburg series all three lobes bear large broad white scales, and there is a small patch of small dark scales at the apex of the median lobe. Knob of halteres mainly dark, but with a conspicuous white spot, the stem pale (not clearly seen in the Budapest specimen). Wing with a small pale spot at the base of the costa. Postnotum bare. Front femur of the Hamburg specimens narrowly pale above at base, the pale area prolonged as an attenuated streak on the anterior surface to about half way; posterior surface pale to tip. Knee-spot truncated, without backward prolongation, but large and very conspicuous. Tibia entirely dark. First two tarsals narrowly pale all round at base; third with or without a small basal pale spot above; fourth and fifth dark. Both claws toothed. In the Budapest specimen the femoral knee-spot is smaller, and the pale stripe on the hind surface of the femur is reduced to an attenuated streak, leaving rather more than the distal quarter dark. The front claws are missing (possibly mounted on a slide). They are stated by Edwards (1921) to be toothed. Middle femur of the Hamburg specimens with anterior surface dark, except at extreme base and at the apex, where the knee-spot is large and truncated; pale below and on the postero-ventral surface for about the basal $3/4$ or rather more or less. Tibia entirely dark. First tarsal pale above on about the basal quarter or a little more or less, second pale above on about the basal $2/5$; both these segments more narrowly pale below. Remaining segments dark. Claws both toothed. The Budapest specimen differs in having the mid femur pale below and behind for only a little more than half, and the second mid tarsal a little more narrowly pale. Both claws appear to be toothed, although one is very difficult to observe. Hind leg of Hamburg specimens with femur entirely pale on about the basal $3/5$ of the anterior surface. This pale area prolonged forward as an attenuated streak to about $4/5$. Knee-spot large and conspicuous, truncated. Posterior surface wholly pale on about the basal $1/5$, pale beyond this almost to half way, except for a narrow dark dorsal stripe. Tibia entirely dark. First tarsal pale all round on about the basal $1/3$; second

pale all round on about the basal $2/5$; third pale all round on about the basal half; fourth pale above on about the basal $4/5$, more narrowly pale below; fifth pale above except at extreme tip, rather more extensively dark below (in the only specimen in which this segment is preserved). The Budapest specimen has the anterior surface of the hind femur rather less extensively pale (about the basal $7/10$ in all), knee-spot smaller, and posterior surface pale on only about the basal $2/5$. The hind tarsi are missing, except for a part of the first one. *Abdomen*. First tergite with a small ill-defined median pale spot; remainder with shallow but conspicuous basal white bands, which are somewhat expanded laterally but in no case reach the basal lateral triangular white patches.

ADULT MALE. The adult male is not available from the type locality. The following description is based on the unique specimen from Georgia referred to above. Palps with pale rings at the bases of the four distal segments, those on the two apical segments incomplete above. Otherwise apparently much as in the female, but very badly rubbed and with the tarsi incomplete. The terminalia have been figured by Martini (1931) and by Stackelberg (1937). Style long and slender, strongly dilated at the apex, where it bears a number of delicate setulae and a long slender subterminal appendage. This appendage is markedly longer and more slender than in *A. albopictus*. The inner tergal surface of the coxite bears a small papilla, from which arises a group of long setae, with sinuous filiform tips. Certain Ethiopian *Stegomyia* have a group of setae in this position, but there is none, so far as I am aware, in which they arise from a well-defined papilliform base. This structure is shown in Martini's drawing, but not in Stackelberg's. Basal lobe triangular, narrowing apically, very closely applied to the coxite, the whole setigerous area facing inward towards the middle line. No specialized setae appear to be present, but those towards the base are conspicuously longer and stouter than those towards the apex, while those towards the apex are slightly longer than those in the middle. Ninth tergite convex, smoothly rounded, its distal edge rather strongly pilose, the small lobes at the corners strongly sclerotized and bearing 2-3 delicate setulae.

PUPA. Unknown.

LARVA. The larva has been described by Montschadsky (1936, 1951). His description appears, however, to have been based solely on a previous description and figure by Séguy (1924) of the larva of *A. delta* Séguy from Macedonia, which is known from the larva only but is commonly considered to be synonymous with *A. cretinus*. Through the kindness of Monsieur Séguy I was recently able to examine a series of about half a dozen whole larvae of *A. delta* in the Paris Museum. It would appear that they are the only larvae referable to *A. cretinus* which have been preserved. A fuller description than those previously published follows.

Head. Antenna smooth. Antennal seta minute, unbranched, arising at about $4/7$ to $3/5$ the distance from base to apex. Head seta A double; seta B or C single; remainder not seen. Mentum with 11-15 teeth on either side of main central tooth. *Thorax.* Spines at bases of pleural setae extremely small.

Abdomen. Comb of 9-13 teeth with exceedingly minute basal denticles (clearly visible only under $1/6$ -inch objective and $\times 10$ eyepiece). Pecten of 10-13 spines, which are as figured by Séguy except that in some cases the main denticle is longer and more finely drawn out. Siphonal tuft with 3 branches. Distal edge of saddle smooth. Saddle-hair single or bifid. Upper caudal seta bifid or trifid, lower single. Some setae of ventral brush single, others bifid. The multibranching tufts in the ventral brush figured by Séguy

seem to be apocryphal. In this, as in other respects, the larva is typical of group C and shows only small differences from those of *A. albopictus* and *A. unilineatus*, to both of which it is clearly related.

Examination of the adults from Hamburg, however, strongly confirms my previous impression (Mattingly, 1953) that *A. cretinus* is more closely related to *A. unilineatus* than to *A. albopictus*, and should be grouped with the former. Thus, the shape of the white patch on the vertex, the scutal markings, the pleural scaling, the toothed claws, the rather more extensive pale bands on the hind tarsals (especially on the fourth), the shape of the male ninth tergite, and the subapical appendage of the style, all recall *A. unilineatus*, while the only differential character shared with *A. albopictus* is the absence of a pale spot from the anterior surface of the middle femur. A closer affinity with *A. unilineatus* is also well in accordance with the distribution.

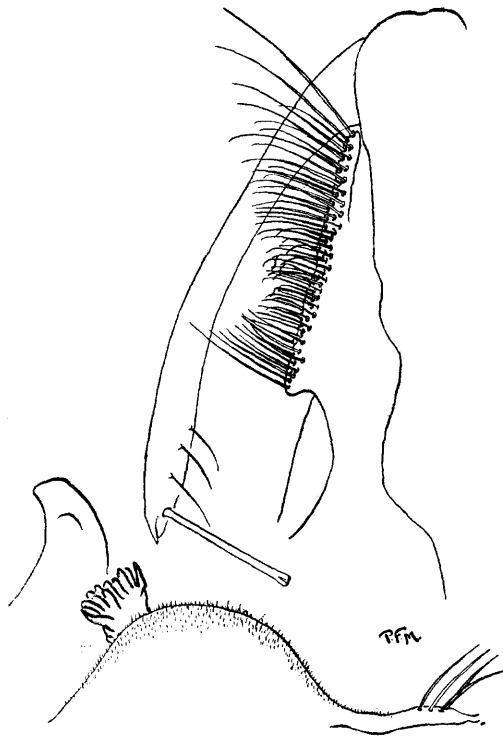


FIG. 3. *Aedes granti*. Male terminalia, in tergal view.

Aedes (Stegomyia) granti Theobald

The male terminalia of *A. granti* were briefly described by Leeson and Theodor (1948), but were not figured. This is therefore one of the very few known species of *Stegomyia* for which no figure of the terminalia is available. A figure (fig. 3) and description follow, based on a slide of terminalia from Mouri, Socotra, kindly presented to the British Museum by Major H. S. Leeson.

Terminalia. Style long and slender, markedly clavate at the apex, the swollen portion

with the usual delicate setulae and a long slender subapical appendage, which is placed rather nearer the tip than in some other species of the group. The basal lobe of the coxite is in the form of a long narrow elevated ridge, the stem being much shorter and wider than in most species. There are no specialized setae, but it has longer setae at the base and still longer ones at the apex. There is no trace of a papilliform lobe on the tergal surface of the coxite. Ninth tergite convex, smoothly rounded, strongly pilose, the small setigerous lobes at the corners strongly sclerotized and bearing 3-4 conspicuous setae. Phallosome and paraprocts as for the group, the paraprocts without ventral arm.

Aedes (*Stegomyia*) *brevitibia* Edwards and *Aedes* (*Stegomyia*) *treubi* De Meijere

A. treubi was placed by Bonne-Wepster and Brug (1932) in the subgenus *Stegomyia* of *Aedes*. It was retained in the subgenus, together with *A. brevitibia*, by Brug and Bonne-Wepster (1947). Edwards (1932) placed both species in a separate group (group B) of the typical subgenus of *Armigeres*, and Barraud (1934) followed Edwards in assigning *A. treubi* to *Armigeres*. I have named both species as *Stegomyia* in the heading to the present section because they are listed as such in the most recent work which deals with them (Brug and Bonne-Wepster, 1947), but in my opinion there is no justification for including them in this subgenus. With reference to major characters only, they differ from *Stegomyia* in having a recurved proboscis, dark legs, undivided phallosome, and deeply bilobed female postgenital plate (a character not examined by previous authors). According to Edwards (1932), the pupa has the edges of the paddles devoid of a fringe, and this character would furnish a further distinction. The larva has a number of features which recall *Stegomyia*, but it can be separated readily by the narrow anal papillae and on the character of the subventral seta of the siphon, which is short and spine-like and is placed much nearer the tip of the siphon than in any *Stegomyia* larva known to me.

It would seem that the best solution to the problem presented by these two species would be to place them in a third subgenus of *Armigeres* (as tentatively suggested by Edwards, 1932). This question can, however, best be discussed elsewhere. The two main objections would appear to be that the adult of *A. brevitibia* is to most outward appearances a typical member of the subgenus *Armigeres* sens. str., so that adults of both sexes of the two subgenera could only be separated on the length of the hind tibia and the character of the terminalia, while the larvae of both species have a well-developed pecten on the siphon, a character unknown elsewhere in *Armigeres* and one which considerably increases the difficulty of separating larvae of that genus from those of *Aedes*.

DISTRIBUTION RECORDS

All available distribution records of the species of *Stegomyia* occurring in the Ethiopian region have been summarized in a recent series of papers by the present author. Since the appearance of the last of these (Mattingly and Bruce-Chwatt, 1954) the following additional records have come to hand.

A. pseudoafricanus Chwatt. Gambia : Jali (doubtful record ; see above).

A. simpsoni Theobald. Angola : Luanda (Colaço, 1952).

A. vittatus Bigot. France : Banyuls-sur-Mer (Callot, 1951 ; Hamon and Remmert, 1952).
Morocco : unnamed localities (Gaud, 1953). Tunisia : source of the Oued el Abiod (Cheika de Takelsa, Cape Bon area) (Vermeil, 1953). Pakistan : Dacca (Nasir-ud-din, 1952).

A. schwetzi Edwards. Angola : Sambo (Colaço, 1952).

REFERENCES

- BARRAUD, P. J. (1934). The fauna of British India, including Ceylon and Burma. Diptera, vol. V : Family Culicidae, tribes Megarhinini and Culicini. Lond. : Taylor and Francis.
- BELKIN, J. N. (1952). The homology of the chaetotaxy of immature mosquitoes and a revised nomenclature for the chaetotaxy of the pupa (Diptera, Culicidae). *Proc. Ent. Soc. Wash.*, **54**, 115.
- (1953). Corrected interpretations of some elements of the abdominal chaetotaxy of the mosquito larva and pupa (Diptera, Culicidae). *Ibid.*, **55**, 318.
- BONNE-WEPSTER, J., and BRUG, S. L. (1932). The subgenus *Stegomyia* in Netherland India. *Geneesk. Tijdschr. Ned.-Ind.*, Bijbl. 2.
- BRUG, S. L., and BONNE-WEPSTER, J. (1947). The geographical distribution of the mosquitoes of the Malay archipelago. *Chron. Nat.*, **103**, 179.
- CALLOT, J. (1951). Notes faunistiques sur quelques espèces des moustiques et de Nématocères piqueurs. *Bull. Ass. Philom. Als. Lorr.*, **2**, 72.
- COLAÇO, A. T. F. (1952). Contribuição para o conhecimento dos Culicidae de Angola (Luanda, Sambo e Nova Lisboa). *Ann. Inst. Med. Trop., Lisboa*, **9**, 511.
- EDWARDS, F. W. (1921). A revision of the mosquitos of the Palaearctic region. *Bull. Ent. Res.*, **12**, 263.
- (1932). Diptera, fam. Culicidae. *Genera Insect.*, fasc. 194.
- (1941). Mosquitoes of the Ethiopian region. III : Culicine adults and pupae. Lond. : Brit. Mus. (Nat. Hist.).
- GAUD, J. (1953). Notes biogéographiques sur les culicidés du Maroc. *Arch. Inst. Pasteur Maroc*, **4**, 443.
- HAMON, J., and REMMERT, H. (1952). Capture dans les Pyrénées-Orientales d'*Aedes (Stegomyia) vittatus* Bigot et d'*Aedes (Ochlerotatus) pullatus* Coquillet. *Vie et Milieu*, **3**, 441.
- IYENGAR, M. O. T., and MENON, M. A. U. (*In the press*). Mosquitoes of the Maldive Islands. *Bull. Ent. Res.*
- LA CASSE, W. J., and YAMAGUTI, S. (1950). Mosquito fauna of Japan and Korea. Office of Surgeon, H.Q., 8th Army.
- LEESON, H. S., and THEODOR, O. (1948). Mosquitos of Socotra. *Bull. Ent. Res.*, **39**, 221.
- MARKS, E. N. (1951a). A study of variation in the mosquito *Aedes (Stegomyia) pseudoscutellaris* (Theobald). Ph.D. thesis : Univ. of Cambridge.
- (1951b). The vector of filariasis in Polynesia : a change in nomenclature. *Ann. Trop. Med. Parasit.*, **45**, 137.
- (*In the press*). A review of the *Aedes scutellaris* subgroup, with a study of variation in *Aedes pseudoscutellaris* (Theobald). *Bull. Brit. Mus. (Nat. Hist.)*, Ent.
- MARTINI, E. (1931). Culicidae. In Lindner's 'Die Fliegen der Palaearktischen Region,' 11-12. Stuttgart : Schweizerbart'sche Verlagsbuchhandlung.
- MATTINGLY, P. F. (1952). The sub-genus *Stegomyia* (Diptera, Culicidae) in the Ethiopian region. I : A preliminary study of the distribution of species occurring in the West African sub-region, with notes on taxonomy and bionomics. *Bull. Brit. Mus. (Nat. Hist.)*, Ent., **2**, 235.
- (1953). The sub-genus *Stegomyia* (Diptera : Culicidae) in the Ethiopian region. II : Distribution of species confined to the East and South African sub-region. *Ibid.*, **3**, 1.
- and BRUCE-CHWATT, L. J. (1954). Morphology and bionomics of *Aedes (Stegomyia) pseudoafricanus* Chwatt (Diptera, Culicidae), with some notes on the distribution of the subgenus *Stegomyia* in Africa. *Ann. Trop. Med. Parasit.*, **48**, 183.
- MONTSCHADSKY, A. (1936). Les larves des moustiques (fam. Culicidae) de l'URSS et des pays limitrophes. (In Russian.) *Tabl. Anal. Faune U.R.S.S.*, **24**.
- (1951). ——— 2nd ed. *Ibid.*, **37**.
- NASIR-UD-DIN, M. (1952). Mosquitoes breeding in tree-holes and bamboo stumps in Dacca (East Pakistan). *Pakistan J. Hlth*, **2**, 110.
- SÉGUY, E. (1924). Les moustiques de l'Afrique mineure, de l'Égypte et de la Syrie. Paris : Lechevalier.
- STACKELBERG, A. A. (1937). Faune de l'URSS : insectes diptères. Vol. 3, no. 4 : Fam. Culicidae (subfam. Culicinae). (In Russian.) *Inst. Zool. Acad. Sci. URSS*, no. 11.
- VERMEIL, C. (1953). *Aedes vittatus* Bigot 1861, culicide nouveau pour la Tunisie. *Bull. Soc. Path. Exot.*, **46**, 338.
- WOODHILL, A. R. (1949a). A new subspecies of *Aedes (Stegomyia) scutellaris* Walker (Diptera, Culicidae) from northern Australia. *Proc. Linn. Soc. N.S.W.*, **74**, 140.
- (1949b). A note on experimental crossing of *Aedes (Stegomyia) scutellaris scutellaris* Walker and *Aedes (Stegomyia) scutellaris katherinensis* Woodhill (Diptera, Culicidae). *Ibid.*, **74**, 224.
- (1950). Further notes on experimental crossing within the *Aedes scutellaris* group of species (Diptera, Culicidae). *Ibid.*, **75**, 251.