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Report of Entomologist,

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PLATES XII.-XIV.

REPORT OF THE ENTOMOLOGIST.

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Plates xii.-xiv.

Systematic work on the mosquitoes of tropical Australia has only been attempted up to the present, and this only with regard to mosquitoes from Queensland by Dr. T. L. Bancroft; his results being embodied in the annals of the Queensland Museum, Bulletin No. 8, 1908, and based on F. V. Theobald's detailed descriptions in his monograph of the Culicidae.

Our work comprises mosquitoes collected, for the most part, in the neighbourhood of Townsville, and will form part of a complete mosquito survey of Northern Australia.

A survey of Northern Australia is urgently needed since mosquitoes, as is well known, act as carriers of certain diseases, and the presence or absence of certain species accounts for the existence or non-existence of these diseases, and affords a definite clue which diseases might, if once introduced, gain a firm foothold and are likely to spread far afield.

Our short experience of the prevalence of different species of mosquitoes in the limited area over which the observations extended, proved that there are cyclical and seasonal changes. During the summer months of 1911 *Culex fatigans* and *Stegomyia fasciata* were ubiquitous, in the summer of 1912 *Culicella vigilax* was frequently met with in and around the town, while *Culex fatigans* was only occasionally seen.

Bancroft's work has already shown that, on the whole, the mosquitoes found are peculiar to Australia; but species commonly found in other parts of the tropics, as *Culex fatigans*, *Stegomyia fasciata* and *Taeniorhynchus uniformis* are equally prevalent wherever looked for.

As may be expected, representatives of genera common in the East are met with in tropical Australia, as *Finlayia*, *Taeniorhynchus*, *Skusea* and *Scutomyia*.

Two species, *Myzorhynchus bancrofti*, Giles, and *Toxorhynchites speciosa*, Skuse, have been re-described on account of the existent descriptions being based on imperfect specimens; four species, new to science, are described in detail and additional localities given for several species.

The microphotographs have been prepared by Dr. W. B. Nisbet, to whom we are greatly indebted.

Myzorhynchus bancrofti, Giles.

Handbook Gnats (2nd ed.), p. 511, 1902; Theobald, Mon. Culicid iii., p. 88, 1903; Bancroft. Ann. Queensland Mus., No. 8, p. 14, 1908.

Head black, clothed with brown upright forked and narrow curved scales; thorax black with fairly long pale golden hairs, golden brown towards the sides. Abdomen clothed with golden brown hairs. Legs brown, the front femora with the basal half club-shaped.

Female.—Head black, clothed with brown narrow curved and upright forked scales, a few upright forked ones in front with pale hairs overhanging the eyes from the centre; palpi brown densely clothed with black scales, scarcely as long as the

proboscis, the latter black with the basal half densely black scaled; eyes deep blue black; antennae blackish brown, clothed with short white pile, basal lobe with a few flat pale scales at its apex, second segment about twice the length of the third, light brown at the base, densely clothed with brown scales, third short and pale at the apex. (Pl. xii., Fig. 1.)

Thorax dark brown to black, covered with rather long dense pale golden hairs, anterior margin with pale narrow curved scales in the centre, with broad brown upright ones on the edges above the prothoracic lobes, the latter brown and prominent, clothed with pale golden hairs and broad upright brown scales on their inner edges; scutellum with the sides creamy yellow, with pale yellowish hair-like scales, centre black, nude, fringed with pale brown hairs; metanotum brown; pleurae mottled black and brown, with a few scattered white scales.

Abdomen black clothed with golden brown hairs; venter brown, black towards the apex, clothed with flat white scales and brown hairs, the apical half of the seventh segment tufted with dark scales.

Wings (Pl. xii., Fig. 2) with the veins clothed with black and creamy white lanceolate scales; costa deep black with a creamy white spot opposite the middle of the stems of the fork cells, and a slightly larger apical patch at the junction of the first long vein, the basal half of the latter mottled with creamy white scales, anterior branch of the second long vein with the apex creamy white, and a similar spot towards the base of the posterior branch, the apical end with a greyish white patch, the third long vein with a creamy white patch towards the apex, rest of vein mottled, anterior branch of fourth long vein with a patch of creamy scales, mottled towards the apex, posterior branch mottled, anterior branch of fifth vein with an apical and basal creamy spot, rest of vein densely mottled, sixth long vein usually with one prominent white apical area, with a short double row of black scales near its centre; fringe with pale areas where the veins join the costa except at the junction of the posterior branch of the second, third and sixth long veins. Halteres with ochraceous stem and black knob.

Legs: coxae and tronchanters brown with patches of white scales; fore, mid and hind femora pale beneath, brown scaled above, with the pale ground colour showing through, the fore femora with the basal half club-shaped; tibiae dark brown, with the apex dilated and with a white spot, a fairly dense line of white scales above; first tarsi black with creamy white apical banding, second tarsi brown with creamy apical banding, remaining tarsi brown; second tarsi of mid legs black with a white apical spot, third and fourth black, fifth brown; the second to fourth tarsi of hind legs black with creamy white apical banding, the fourth with basal banding also fifth tarsi; first tarsi of hind legs slightly longer than the tibiae.

Length.—5-6 mm excluding proboscis.

Habitat.—Caboolture to Enogerra, Lower Burdekin district, and Townsville, Badu Island, Torres Straits, widely distributed in the Northern Territory.

This species seems to be prevalent all through Northern Australia, and is a vicious biter, the irritation lasting a considerable time. It possesses the peculiar habit of continuing to suck up blood, even after being gorged, the blood passing out of the anus.

Postscript.—After a careful examination of a large series of specimens in conjunction with specimens of *M. barbirostris*, from the Philippine Islands, it has been found impossible to retain the above as a distinct species, and it must be sunk to varietal rank.

Toxorhynchites speciosa Skuse.*Megarhinus speciosus* Skuse.

Skuse, *Proc. Linn. Soc. N.S.W.*, p. 1722, 1888; Theobald, *Mon. Culicid.*, 1, p. 228, 1901; iii., p. 124, 1903; v., p. 108, 1910; Bancroft, *Ann. Q. Mus.*, No. 8, p. 16, 1908.

Thorax black, clothed with iridescent flat spindle-shaped scales, lateral edges with yellowish scales (in some lights showing black and blue as well); pleurae densely clothed with creamy scales. Abdomen above clothed with deep azure blue scales, with golden lateral patches to most of the segments. Legs deep blue-black. (Pl. xii., Fig. 3.)

Male.—Head black clothed with mixed yellowish and pale greenish blue flat scales, in some lights showing lilac patches, four stout brown bristles projecting over the eyes; a thin fringe of narrow black upright scales at the base; antennae with the basal joint black with white tomentum, second joint black with creamy white flat scales, about twice as long as one of the following joints, basal half of segments three to thirteen broadly banded white, segments two to twelve with a narrow apical band also; segments fourteen and fifteen very long and slender, each about four times the length of one of the preceding segments, last segment black and clothed with short fine pale hairs; palpi black clothed on outer edge with black flat scales, except the upper surface of the second segment, which is entirely clothed by creamy scales, under surface covered by mixed creamy and black ones, inner edge of segment three clothed with creamy scales forming into a patch in front of the middle, apex with a patch of bluish green scales, fourth segment with the inner edge clothed with yellow and black iridescent scales, terminal segment black scaled; proboscis black with a downward curve near the centre, the top, sides and outer surface of curve covered with bluish green scales; under surface of basal half clothed with black iridescent and deep blue scales, apical half clothed with black iridescent scales.

Thorax black clothed with black iridescent flat spindle-shaped scales; the fore, hind and lateral margins with blue green opalescent scales; the sides from the scutellum towards the centre with a black fringe of hairs; sides below the blue green scales densely clothed with flat creamy white scales; prothoracic lobes prominent and clothed with pale bluish scales with yellowish reflections and a row of short black hairs on front edge; scutellum densely clothed with iridescent scales, the lateral edges with creamy reflections and moderately long brown hairs; metanotum brown; pleurae with a naked blue-black elongate horizontal stripe, below densely clothed with broad creamy scales and hairs.

Abdomen black clothed with deep azure blue scales with the lateral margins bright golden, except the apical half of the sixth and whole of the seventh segments; segments six to eight heavily tufted, sides of abdomen fringed with golden hairs; first segment densely clothed with bright golden scales with the centre clothed with broad greenish ones, anterior and posterior lateral border, the fourth of hairs, segments two and three with a narrow golden lateral border, the fourth without the lateral golden border, fifth with the lateral border forming an obtuse angle in the centre, the basal half of the sixth segment with a narrow golden lateral border, the apical half tufted with long golden and a few dark blue hairs, the seventh with a few golden scales at the basal end of the border, and heavily tufted with long dark blue hairs, eighth segment clothed with golden scales with a narrow central stripe of deep blue, densely tufted with long dark golden hairs; genitalia with the outer edges with golden scales, the inner edges with short golden and black hairs; venter black, first segment brownish, remainder clothed with broad golden scales, with a median longitudinal stripe of

azure blue scales, on segment four the blue stripe is much broader than on the others; eighth segment clothed with green and azure blue scales, laterally bordered with broad flat golden scales, with an apical border of dark hairs, segments two to six apically fringed with short golden hairs; genitalia brown.

Legs: coxae and trochanters brownish clothed with scattered flat golden scales; fore femora deep blue above, beneath with the basal two-thirds golden, apical third deep blue, mid and hind femora deep blue above, golden beneath, fore and hind tibiae deep blue, mid tibiae deep blue with a patch of creamy scales extending from the centre towards the apex; first and second tarsi white scaled, except basal third of former, which is deep blue, remaining tarsi deep blue; first tarsi of mid-leg with a narrow basal blue band, then a broad white band, the rest blue; second tarsi white, third white with a narrow apical deep blue band, fourth and fifth blue black; hind tarsi blue black, except the second, which is white with narrow apical and basal blue black bands; fore and mid ungues unequal, the larger with a single tooth, hind ungues equal and simple.

Wings (Pl. xii., Fig. 4) brownish with the costal, first, third and fifth long veins clothed with violet blue scales; the rest clothed with brown scales; first, sub-marginal cell very short and narrow about half the length of the second posterior cell; supernumerary cross vein vertical about four and a-half times its length nearer the apex of the wing than the mid cross vein, the latter short forming an obtuse angle with the posterior cross vein. Halteres, knob pale yellow, stalk creamy.

Length.—9 to 10.5 mm., excluding proboscis.

Female.—Head clothed with iridescent flat scales with a border of pale blue around the eyes, with three stout black bristles projecting over the eyes from the vertex; antennae black, basal lobes clothed with whitish scales on apical half, second segment clothed with short black hairs and white pile, remaining segments clothed with whitish pile; palpi three-jointed about one-fourth the length of the proboscis, clothed with black scales, scales on second and third segments iridescent, deep violet blue in some lights; proboscis curved downward in the middle, black scaled, in some lights bright blue; eyes black.

Thorax black clothed with black iridescent flat spindle-shaped scales; fore, hind and lateral margins with greenish yellow reflections below this edge of coloured scales, the sides are clothed with white flat scales, which form a broad patch behind the prothoracic lobes, the latter clothed with broad flat yellowish green scales, the lower edge with broad white ones, with a fringe of brownish black hairs on front edge; scutellum black clothed with iridescent flat scales; sides and apical edge with broad flat yellowish ones, apical margins of lobes clothed with numerous black hairs; metanotum brown; pleurae as in *male*.

Abdomen black, the first segment golden-yellow with the central portion greenish blue, with apical and basal fringe of golden hairs, second and third segments clothed with dark green scales, with a lateral border of golden scales; the remaining segments as in *male*.

Legs: femora deep blue above, golden-yellow beneath with a small patch of blue scales at the apex, hind femora with a golden basal band; fore and hind tibiae deep blue, mid tibiae deep blue with a central patch of yellowish scales; first tarsi of fore leg white with a narrow basal blue band, second white, third, fourth and fifth with creamy ground colour, and clothed with deep blue scales; mid tarsi; first with basal half white, apical half blue black, second and third white scaled, fourth with mixed blue black and white scales, fifth blue black; hind tarsi, first deep blue with a small patch of lemon-coloured scales near the base, second white scaled with a narrow deep blue basal band, remaining tarsi deep blue. Ungues equal and simple.

Wings with the veins clothed with deep blue scales mixed with brown ones on the subcostal, first, second, fourth and fifth long veins; supernumerary cross vein vertical and about four times its length nearer the apex of the wing than the mid cross vein, the latter forming an acute angle with the posterior cross vein (one specimen has the posterior cross vein nearly its own length nearer the apex of the wing than the mid cross vein). Halteres creamy.

Length.—12 mm., excluding the proboscis.

Habitat.—Brisbane, Queensland.

The above description is founded on perfect specimens bred from pupae kindly sent by Dr. Elkington, Public Health Commissioner of Queensland.

Culicelsa abdominalis, n.sp. ✓

Thorax dark umber brown, clothed with narrow curved scales. Abdomen dark brown with blackish brown and ochraceous scales, apically banded with ochraceous scales. Legs dark brown.

Female.—Head dark brown, with dark brown narrow curved scales and blackish upright forked ones; a row of dark brown bristles around the eye, a patch of flat white scales on the sides; antennae dark brown clothed with short white hairs, basal lobes blackish, base of second segment pale yellowish; proboscis covered with brownish black scales, a creamy yellow band on its middle third; palpi short, about one-fifth the length of the proboscis, first three segments clothed with dark scales, mottled with pale creamy ones, last segment creamy yellow scaled with a narrow dark brown band; eyes black and silvery; clypeus dark brown.

Thorax dark umber brown, clothed with dark brown narrow curved scales and three rows of black bristles extending from the front of the mesothorax to the scutellum, densely clothed with long black bristles from the root of the wings to the scutellum; scutellum dark brown clothed with dark brown narrow curved scales; border bristles long and dark brown, twelve on the mid lobe, lateral lobes with two rows, six in front and four behind; metanotum dark brown; pleurae brown with patches of creamy white scales and brown bristles, with a few pale ones at the base of the wings.

Abdomen dark brown, with a moderately dense lateral fringe on either side; first segment pale and clothed with ochraceous scales and yellowish brown hairs, remaining segments clothed with blackish brown scales mottled with ochraceous ones, with narrow ochraceous apical bands, posterior borders with a fringe of short yellowish hairs, apical band on seventh segment not as wide as segment; apical band on segments four to six expanded into a moderately broad lateral patch, last segment with basal banding at well; venter densely mottled with blackish brown and ochraceous scales.

Legs yellowish brown with brownish black scales; coxae and tronchanters creamy yellow, coxae clothed with pale flat scales and a patch of brown ones on the front, the hind coxae with a row of brown bristles on the hind edge and a few at the apex in front; mid and hind femora pale beneath, femora and tibiae faintly mottled with pale scales; first, second and third tarsi with narrow creamy white basal and apical banding, the fourth with basal banding only, fifth covered with brown scales, pale at the base. Ungues equal and simple.

Wings (Pl. xii., Fig. 5) with the veins clothed with moderately long dark brown scales, with a few creamy ones towards the base of the first and fifth long veins; first sub-marginal cell slightly longer and narrower than the second posterior cell, the stem of the former not quite one-fourth the length of its cell, that of the latter half the length of its cell, their bases almost opposite each other; posterior cross vein slightly longer and about twice its own length distant from

the mid cross vein ; junction of sub-costal vein almost level with the base of the first sub-marginal cell. Fringe brown. Halteres with basal half of stalk creamy, the remainder dark brown.

Length.—6.5 to 7 mm, excluding the proboscis.

Habitat.—Ayr, Townsville, N.Q.

A striking species an account of its abdominal markings, the ochraceous scales being very conspicuous.

Culicella consimilis, n.sp.

Thorax chocolate brown with yellowish and bronze-coloured narrow curved scales. Abdomen brown, with narrow white basal bands. Legs brown, the tarsi with basal and apical banding.

Female.—Head dark brown, clothed with narrow curved pale scales, and dark brown upright forked ones, with flat creamy white ones at the sides; pale yellowish hairs overhanging the eyes from the centre, and with a fringe of brown ones behind the eyes, the latter black and silvery; proboscis deep brown with a creamy white, almost median band; palpi dark brownish black, the last two segments thinly mottled with white scales, the last segment clothed with dark brown hairs and the apex white scaled; antennae brown covered with short white pile, basal lobe dark yellowish brown, inner edge dark brown covered with small flat white scales, basal half of second segment pale yellowish brown; clypeus dark brown.

Thorax brown covered with yellowish and bronze-coloured narrow-curved scales, with four rows of dark brown bristles, and a dense lateral border of brown ones on each side, denser above the origin of the wings; prothoracic lobes fairly prominent, clothed with bronzy narrow curved scales and dark brown bristles; scutellum brown clothed with pale narrow curved scales, mid lobe with ten border bristles, lateral lobes with four; pleurae brown with pale hairs and patches of white flat scales.

Abdomen brown clothed with brown scales; first segment light brown clothed with two patches of brown scales in the middle, and with a fairly dense covering of yellowish hairs, second segment with a basal white patch of scales, and posterior border of pale yellowish hairs, segments three to eight with narrow white basal banding and with an apical fringe of pale yellowish hairs, seventh segment with an apical patch of white scales, with the central white scales extending to the lateral edges; venter brown densely clothed with white scales, the seventh segment with a brown apical band, segments five to eight clothed with short brown hairs.

Legs: coxae and trochanters pale clothed with white scales; femora dark brown above, white scaled beneath, with a small brown apical patch above, and a few pale creamy scales at the apex; fore tibiae dark brown scaled with a pale ground colour showing through, pale scaled beneath, mid and hind tibiae brown, the latter with the apex dilated, with basal and apical banding of creamy white scales forming a knee spot with the femoral band; tarsi brown, the first, second and third with basal and apical white banding, fourth with basal banding only, the fifth pale brown and unbanded.

Wings with the veins clothed with small median and moderately long linear scales; first sub-marginal cell longer and slightly narrower than the second posterior cell, their bases level, stem of the former not quite half the length of its cell, that of the latter half the length of its cell; posterior cross vein about two and a half times its length distant from the mid cross vein; cross veins pale. Halteres with the stem pale creamy, the knob light brown.

Length.—5 to just under 6 mm., excluding the proboscis.

Male.—Head as in the *female* (Pl. xii., Fig. 6); palpi longer than the proboscis, black scaled, two creamy bands on the first joint, one towards the base, the other towards the apex, second and apical segments with creamy basal bands, last segment with the apical third creamy; hair tufts dark brown; proboscis black with a pale creamy narrow band towards the basal end of the apical third.

Abdomen slightly narrower than in the *female* densely covered with brown hairs on the lateral edges; venter densely clothed with pale golden and brown hairs; claspers dark brown clothed with brown hairs on their outer edges.

Legs as in the *female*, but with the banding pale creamy white; fore and mid unguis unequal, the larger with a large tooth, the smaller with a small one, hind unguis equal and simple.

Wings (Pl. xii., Fig. 7) narrower, scales brown, except costa, which is black, shorter and less dense than in the *female*; fork cells with their bases almost level, stem of the first sub-marginal cell about half the length of the cell, stem of the second posterior cell nearly as long as its cell; posterior cross vein longer than the mid cross vein, and about one and a half times its own length distant from it; fringe pale brown.

Length.—4 to 4.5 mm., excluding the proboscis.

Habitat.—Ayr.

Resembling *C. abdominalis*, n.sp., but the abdominal markings of the latter render it quite distinct.

Culicelsa paludis, n.sp.

Thorax blackish brown covered with narrow curved golden brown scales; abdomen black scaled, with narrow white basal banding. Legs brown.

Female.—Head brown clothed with white and brown narrow curved, and upright brown forked scales, with flat white ones on the sides, a thin fringe of brown hairs behind the eyes, the latter silvery and violet black; palpi black scaled, with the apex pale; clypeus brownish black; antennae black covered with silvery pile, basal lobe pale yellowish brown on the outer edge, darker on the inner edge, covered with small flat white scales, second joint pale at the base; proboscis black scaled, with a narrow creamy white band slightly above the centre.

Thorax blackish brown covered with dark golden brown narrow curved scales, with a few pale white ones on the posterior end of the mesonotum, a lateral border of dark brown bristles moderately dense above the origin of the wings; prothoracic lobes dark brown, prominent, clothed with brown bristles and narrow curved scales; scutellum dark brown clothed with pale narrow curved scales, border bristles dark brown, eight on the mid lobe and five on the lateral lobes with a few pale golden hairs behind them; pleurae mottled light and dark brown, with a few patches of white flat scales and pale yellow hairs.

Abdomen brown clothed with black scales segments with narrow white basal banding, first segment brown clothed with brown hairs and two median patches of dark brown scales, the basal band on the seventh produced into a small lateral patch; venter with the first four segments black scaled with narrow white basal bands, the rest densely clothed with white scales.

Legs: coxae and trochanters yellowish brown, with a few pale scales on the coxae; femora pale scaled beneath, with the apex brown scaled, above dark brown scaled, apex creamy, tibiae black above, mottled with white scales beneath with creamy white basal and apical banding forming a creamy knee spot with the femoral speck; first tarsi brownish black, with basal and apical banding, second to fourth of the fore and mid legs brownish black, with creamy basal banding,

fifth brown, unbanded; second and third of hind legs dark brown, with white basal banding, fourth and fifth dark brown, unbanded; unguis equal and simple; those of the hind legs rather short.

Length.—5 to 6 mm., excluding the proboscis.

Habitat.—Townsville, in mangrove swamps.

This species is somewhat similar to *Culicelsa vigilax* Skuse, but can be easily separated from it by its banded proboscis, leg banding and the fore and mid unguis.

Pseudohowardina linealis, n.sp.

Head clothed with brown and yellowish flat lateral scales, the centre with golden narrow curved ones. Thorax black with bronzy black narrow curved ones. Abdomen with basal patches of creamy yellow scales. Legs dark brown.

Female.—Head black clothed with a median patch of golden narrow curved and upright golden and brown forked scales, the sides with brown and golden patches of flat scales and upright forked brown ones, a few golden hairs overhanging the eyes from the centre, and a thin row of brown ones behind the eyes, the latter black and silvery; palpi black scaled; proboscis with the base and apex darker; clypeus dark brown; antennae dark brown, clothed with white pile, basal lobe and basal half of second segment light brown.

Thorax black clothed with bronzy black narrow curved scales on the posterior half of the mesothorax, lateral and anterior borders with a dense and moderately broad stripe of golden narrow curved scales; prothoracic lobes brownish black, fairly prominent and clothed with brown bristles; a patch of golden bristles at the base of the wings, and a lateral row of dark brown ones below the golden border of narrow curved scales; scutellum brownish black, the mid lobe clothed with golden yellow narrow curved scales and border bristles, the latter eight in number; lateral lobes with brown narrow curved scales, border bristles brown, in a double row, four in front and three behind; metanotum blackish brown; pleurae dark brown with patches of pale scales and a few dark hairs.

Abdomen black, first segment mottled with brown and creamy yellow scales, and covered with pale yellowish hairs; segments two to eight clothed with brown opalescent scales and with basal patches of creamy yellow ones to each of the segments; posterior borders fringed with pale yellow hairs, last segment clothed with brown opalescent scales; venter dark scaled.

Legs: coxae and trochanters pale, femora pale beneath, dark brown above; tibiae blackish brown, hind tibiae slightly longer than the first tarsi; tarsi brown; unguis of fore and mid legs equal and uniseriated, hind ones equal and simple and somewhat straighter than the fore and mid ones.

Wings clothed with brown scales, the median ones small, the lateral ones linear; first sub-marginal cell longer and slightly narrower than the second posterior cell, the base of the latter nearer the base of the wing than that of the first sub-marginal cell, stem of the latter scarcely half the length of its cell; that of the second posterior cell almost as long as its cell; posterior cross vein about the length of the mid cross vein, and about twice its length from it; costa black scaled; fringe light brown; halteres with stem black, knob black.

Length.—5 to 5.5 mm., excluding the proboscis.

Habitat.—Ching Do and Townsville, N.Q.

This species is easily separated from its congeners by its bright golden head and thoracic marking.

Nyssorhynchus annulipes Walker.

Ins. Saund., i., p. 433, 1850; Theobald, *Mon. Culicid.*, i., p. 164, 1901; iii., p. 104, 1903; iv., p. 97, 1907; Skuse, *Proc. Linn. Soc., N.S.W.*, p. 1754, xiii., 1888.

This mosquito is found in small numbers in the coastal districts of North Queensland. (Pl. xiii., Fig. 8.)

Additional localities.—Proserpine, Merinda, Lower Burdekin, Cairns, Townsville and Badu Island, Torres Straits.

Mucidus alternans Westwood.

An. Soc. Ent. Fr., iv., p. 681, 1835; Skuse, *Proc. Linn. Soc. N.S.W.*, xiii., p. 1726, 1888; Theobald, *Mon. Culicid.*, i., p. 269, 1901; iii., p. 134, 1903; iv., p. 162, 1907. (Pl. xiii., Figs. 9, 10.)

Additional localities.—Mackay, Ayr and Townsville.

Time of capture.—February and March.

Stegomyia fasciata Fabr.

Syst. Antl., 36, 13, 1805; Theobald, *Mon. Culicid.*, i., p. 289, 1901; iii., p. 141, 1903; iv., p. 176, 1907; v., p. 158, 1910; *Rec. Ind. Mus.*, ii., pt. iii., No. 30, p. 291, 1908.

This mosquito occurs throughout the whole year all along the Queensland coast.

Pseudokusea similis Theob.

Mon. Culicid., v., p. 188, 1910.

Specimens from Badu Island, Torres Straits, and Lucinda Point, agree well with Theobald's description, the main differences being that none of them show the dull golden thoracic scales.

Culicelsa vigilax Skuse.

Proc. Linn. Soc. N.S.W., xiii., p. 1731, 1888; Theobald, *Mon. Culicid.*, i., p. 396, 1901; iii., p. 178, 1903; iv., p. 382, 1907; v., p. 317, 1910.

Additional localities.—Proserpine, Mackay, Townsville and Badu Island. (Pl. xiii., Fig. 11.)

Culicelsa annulirostris Skuse.

Proc. Linn. Soc. N.S.W., xiii., p. 1737, 1888; Theobald, *Mon. Culicid.*, i., p. 365, 1901; iii., p. 162, 1903; iv., p. 382, 1907.

Specimens from Townsville agree with Theobald's description in all details but the thoracic scales, which are narrow curved instead of flat spindle-shaped. The base of the first sub-marginal cell is also slightly nearer the base of the wing.

Additional localities.—Lower Burdekin, Townsville.

Time of capture.—Lower Burdekin (October), Townsville (May).

Culex fatigans Wiedemann.

Aus. Zweifflug, Ins., p. 10, 1828; Theobald, *Mon. Culicid.*, ii., p. 151, 1901; iii., p. 225, 1903; v., p. 383, 1910.

This mosquito, like *Stegomyia fasciata* Fabr., is a very ubiquitous species, and is the common house mosquito.

Culex tigripes Grandpre and Charmoy.

Les. Moust. (Planters Gaz. Press) 1900; Theobald, *Mon. Culicid.*, ii., p. 34, 1901; iii., p. 227, 1903; D'Emmery de Charmoy, *Ann. Trop. Med. and Par.*, ii., No. 3, p. 262, 1908.

Additional localities.—Ayr and Townsville.

Time of capture.—May in Townsville.

Chrysoconops acer Walker.

List. Brit. Mus. Dipt., p. 7, 1848; Theobald, *Mon. Culicid*, ii, p. 211, 1901.

This species enjoys a wide range of distribution, being found in Darwin, throughout Queensland, and has been recorded from New Zealand.

Additional locality.—Townsville.

Time of capture.—May.

Taeniorhynchus uniformis Theob.

Mon. Culicid, i., p. 180, 1901; ii., p. 87; *Rec. Ind. Mus.*, ii, pt. iii., No. 30, p. 300, 1908.

The specimens in our collection show slight variation from the type, and also from Giles' description of *Panophilites australiensis*, but without doubt belong to this species.

It enjoys a very wide distribution, being found from Africa, throughout India, to the Phillipine Islands, New Guinea, across to Port Darwin, and extending through Queensland to Newcastle, N.S.W. (Dr. R. Dick).

Aedeomyia venustipes Skuse.

Proc. Linn. Soc. N.S.W., xiii., p. 1761, 1888; Theobald, *Mon. Culicid*, ii., pp. 218, 223, 1901.

The squamose characters of this mosquito agree with Theobald's description of the genus *Aedeomyia*, and also with Skuse's description of the species. (Pl. xiii., Fig. 12-13.)

It has been originally described by Skuse from a single female from Elizabeth Bay, Sydney, and was met with again last year in the Northern Territory.

Additional locality.—Townsville.

Time of capture.—May.

TABANIDAE.

The family of Tabanidae is an important group of flies economically. Very little is known about their occurrence and distribution in tropical Australia. Throughout the world nearly 2,000 species have been described, the typical genus *Tabanus* claiming about half of them. Up to now about 100 distinct species have been described from Australia and Tasmania, mostly collected in the southern parts of Australia.

These blood-sucking flies are commonly called "March Flies" in Australia, and are common in some localities throughout the summer, sometimes appearing in countless numbers, and becoming a severe pest on account of the savage way they attack man and beast in the bush.

Numerous species of Tabanids are represented in Northern Australia; no less than eight different species of *Tabanus* have been collected in the vicinity of Darwin by Dr. C. L. Strangman.

Some species have a wide distribution; f.e., *Tabanus gregarius* Er., originally described from Tasmania, is found at Brisbane and Darwin. *T. nigratarsis*, n.sp., was found in the Lower Burdekin district and Darwin. *T. abstersus* Walk. occurs in the southern parts of New South Wales and in the Cairns hinterland.

When systematically collected, especially in the North, it is probable that a large number of new and interesting forms will be found, closely related to species from the Oriental region.

One species from Cairns has already been found, *T. pseudourdens*, closely related to the Javanese *T. ardens* Wied.

We are greatly indebted to Mr. W. W. Froggatt, Government Entomologist, New South Wales, who has assisted us with his valuable advice, and has presented named specimens for comparison.

Tabanus abstersus Walker.

Insecta Saund. Dipt., i., p. 58, 1856; Schiner, *Novara Reise*, Dipt., 85, 14, 1868.

Female.—Length just under 15 to 17 mm.; width of head just over 5 to 5.5 mm. width of front at vertex under .5 to .5 mm.; length of wing 14 to 15 mm. (Pl. xiv., Fig. 14.)

A black robust species; dorsum of abdomen with a median line of white spots; venter brown, with white apical bands; legs deep black.

Head.—Front black sparsely clothed with short erect black hairs; face and jowls covered with white bloom, jowls sparsely clothed with short erect black hairs; base of head clothed with moderately long white hairs. Eyes (dried specimens) dull bronzy black, the inner margins sloping inwards towards the vertex; sub-callus black covered with grey bloom. Frontal callus glossy black, tapering to a fine point, about two-thirds the length, and its base almost as broad as the front; palpi white, ground colour black, clothed with mixed black and white hair on the upper margin and outer edge, except the base which is clothed with fairly long white hairs. Antennae black, first and second segments clothed with moderately long black hairs, the upper edge of the second segment produced into a sharp moderately long point; terminal segment with expanded portion moderately broad, and the angle on its upper margin prominent.

Thorax.—Black clothed with black appressed hairs, with a few mixed golden and white hairs at the base of the wings, a few golden ones at the base of the thorax: humeral calli with a long black fringe; pleurae slaty grey clothed with long white hairs, denser at the base of wings; scutellum, with similar ground colour to rest of thorax, clothed with black appressed hairs, with lateral border of bright golden hairs.

Abdomen.—Black, except the first segment which is greyish, clothed with black appressed hairs; first segment with a patch of bright creamy hairs in the centre of the apical edge with a patch of white ones on either side towards the base, and with a broad lateral grey spot; segments two to six with a median apical white spot clothed with white hairs; segments two to four with broad lateral white spots. Venter brown clothed with black appressed hairs; all the segments, except the first, with white apical bands; segments two to five have the bands clothed with white appressed hairs; bands on sixth and seventh are clothed with black appressed hairs.

Wings.—Veins dark brown, with the cells mostly clouded brown along the veins. Stigma dark brown, elongate; squamae oblong, light brown, with dark brown edges.

Halteres.—Knob dark brown, base and stem above brown.

Legs.—Coxae and femora blackish clothed with mixed white and black hairs; tibiae and tarsi black (in one specimen the tarsi are dark brown) clothed with black hairs.

This is a very distinct species; it does not entirely fit into Walker's description, but, for the present, it is left under his name.

The following is Walker's description:—

“Nigro-cinereus, thoracis lateribus, pectore abdominisque segmentorum marginibus posticis ferrugineis, antennis ferrugineis apice piceis, pedibus ferrugineis, tibiis anticis apice tarsisque piceis, tarsis anticis nigris, alis cinereis.

“Body black, head adorned with a hoary covering, which is interrupted by a black, shining, club-shaped mark on the crown; under side clothed with white hairs; eyes bronzed, facets as usual; sucker black, lancets and palpi pale ferruginous, a hoary tinge on the palpi; feelers dark ferruginous, seated on a ferruginous tubercle, third joint forming above an extremely obtuse and shallow angle, whose fore side is slightly concave; its hind side slightly convex; compound joint pitchy, very slightly curved upwards, much longer than the third joint; chest tinged with grey, sides and breast pale ferruginous, thinly coated with hoary hairs; abdomen slightly obconical, much longer than the chest thinly coated with short hoary and black hairs; hind borders of the segments pale

ferruginous ; legs ferruginous ; hips and thigh tinged with grey ; feet and tips of the fore shanks pitchy ; claws of the fore feet black ; foot cushions tawny ; wings grey ; wing ribs ferruginous, veins black ; ferruginous towards the base, angle of the top cross vein slightly obtuse, very distinct, its stump as long as its shorter side, scales grey ; poisers tawny with pitchy tips. Length of the body five lines ; of the wings ten lines. New South Wales."

Habitat.—S. Queensland (H. Tryon), Kuranda (F. P. Dodd), and Mourilyan Harbour.

Tabanus fuscipes, n.sp.

Length, *male*, 13 mm. (1 specimen) ; *female*, 14 to 15 mm. (5 specimens) ; width of head, *male*, just under 5 mm. ; *female*, 5 to 5.5 mm. ; width of front of *female* at vertex .5 to just under 1 mm. ; length of wing, *male*, 12 mm. ; *female*, 13 to 14 mm. (Plate xiv., Fig. 15.)

Dorsum of thorax, with ground colour blackish brown, and covered with yellowish bloom ; dorsum of abdomen yellow changing to yellowish brown towards the apex. Legs clove brown.

Head.—Frontal triangle in *male*, pale yellow ; front of *female* golden yellow, sparsely clothed with appressed black hairs ; face and jowls in both sexes pale yellow, ground colour blackish with the base of the head greyish clothed with creamy white hairs, jowls sparsely clothed with erect black hairs ; sub-callus ground colour blackish, covered with yellow bloom. Eyes (dried specimen) black, with a coppery tint in some lights. Frontal callus dark reddish brown, gradually tapering to a point, its base about two-thirds of the width of the front and about half its length. Palpi cream coloured in both sexes, in the *male*, clothed with fairly long creamy white erect hairs, terminal segment cylindrical, in the *female*, basal half of terminal segment swollen, and ending in a sharp point, the upper and outer edges clothed with black appressed hairs, its base clothed with mixed creamy and black ones. Antennae golden yellow, first segment clothed with creamy hairs, with black ones on dorsal edge, the second segment with the sides clothed with mixed creamy and black hairs and with its upper edge produced into a point projecting over the base of the terminal segment, expanded portion of the latter moderately broad, with the angle on the upper margin fairly prominent, terminal annuli same colour as the rest of the antennae with a few scattered black hairs.

Thorax.—Dorsum of thorax with black ground colour clothed with golden yellow bloom, and mixed appressed black and creamy hairs ; humeral calli clothed with mixed creamy and black hairs ; pleurae creamy white clothed with fairly long creamy hairs ; scutellum similar in colour to rest of thorax, clothed with creamy and black appressed hairs.

Abdomen.—Segments one to four of dorsum clove brown, remainder brown clothed with black appressed hairs, the basal edge of segment one in *male*, partly black ; in some specimens there is a creamy apical band to the segments, lateral edges yellowish with creamy hairs in both sexes ; first segment with a median patch of creamy hairs ; two specimens have median triangular patches on segments two to six ; *male* genitalia clove brown clothed with black appressed hairs, the apex with golden hairs ; venter in the *male*, with the first three segments yellowish brown, the remainder clove brown, genitalia shining yellowish brown, sparsely clothed with black appressed hairs, the apical edges with creamy ones, inner margin of basal lobes of genitalia clothed with fairly long mixed creamy and black hairs, outer margins with moderately long black ones ; segments two to five with creamy apical bands.

Wings.—Dusky brown, veins dark brown, base of anterior branch of third longitudinal vein without an appendix. Stigma yellowish brown, elongate, inconspicuous. Squamae light brown. Halteres with the knob cream the base and stalk light brown.

Legs.—Coxae cream coloured, clothed with white hairs; femora and tibiae clove brown, former clothed with mixed cream and black hairs, the latter with black ones; fore tarsi black covered with black hairs; mid and hind tarsi dark brown, with apex of each segment black, clothed with black hairs.

Habitat.—Magnetic Island, off Townsville.

Close to *T. nigritarsis*, n.sp., but its dusky brown wings, yellowish abdomen, and its slighter build will easily separate it.

Tabanus gregarius Erich.

Archiv. f. Naturgesch., 1, 271, 1842; Walker, *List. Dipt. Brit. Mus.*, v., 252, 437 1854.

Female—Length 13.5 to 15 mm.; width of head, 4.75 to 5.5 mm.; width of front at vertex .5 to just under 1 mm.; length of wing, 12 to 13 mm. (Plate xiv., Fig. 16.)

Somewhat stout elongate species; dorsum of thorax black, with two longitudinal grey stripes; dorsum (anterior portion) of abdomen yellowish brown, last three segments black; venter yellowish with last three segments dusky; in one specimen all but the first two segments are dusky.

Head.—Front creamy white with black ground colour, clothed with cream and black appressed hairs; face and jowls creamy clothed with white hairs, denser towards base of head, sub-callus creamy yellow. Eyes (dried specimen) black, inner margins parallel. Frontal callus shining black, basal third broad and about half the width of front, apical two-thirds drawn out into a fine line. Palpi yellowish, proximal segment clothed with long white hairs, terminal segment clothed with mixed black and white appressed hairs on outer edges. Antennae first segment yellowish, covered with cream-coloured tomentum, clothed with fairly long whitish hairs on the lower half of outer edge, upper half of upper, outer and inner edges clothed with short black appressed hairs, the upper apical edge produced into a blunt black point; second segment yellowish with an apical fringe of black hairs, terminal segment reddish brown, covered with pale tomentum, terminal annuli brown, expanded portion moderately broad with the angle on its upper margin prominent.

Thorax.—Ground colour of dorsum black, covered with greyish white tomentum, and clothed with erect black hairs with a median longitudinal brown stripe from the centre to the apex; humeral calli light brown clothed with moderately long black hairs; pleurae slaty gray clothed with fairly long white hairs, creamy at the roots of the wings; scutellum with similar ground colour to thorax, the sides greyish white.

Abdomen.—Dorsum clothed with mixed black and pale appressed hairs on the first three segments, clothed with black appressed ones on the rest, first three segments brown with a median black stripe, basal half of first segment greyish, third to fifth segments with a median creamy longitudinal stripe, segments four to the end black, segments three to six with apical creamy bands expanded to form a lateral patch, apical segment with a creamy lateral patch; venter, first segment grey, apical segment black, clothed with erect black hairs; remaining segments yellow clothed with appressed pale hairs, sixth segment with black appressed hairs mixed with pale ones.

Wings.—With the bases of cubital to discoidal cell and the whole of the anal cell light brown; rest of wing hyaline, veins dark brown. Stigma yellowish brown, elongate, conspicuous; squamae light brown; halteres, knob creamy yellow, base and stalk light brown.

Legs.—Coxae and femora slaty grey, apex of femora brownish, clothed with white hairs, basal half of fore, mid and hind tibiae yellow; apical half of fore tibiae dark brown, clothed with creamy white hairs; fore, mid and hind tarsi blackish brown, clothed with black hairs.

Habitat.—Bowen, Queensland.

This species was originally described by Erickson from Tasmania. It is very distinct.

Tabanus brevidentatus Macquart.

Dipt. Exotic Suppl., v., 28, 1855.

Female.—Length 8 to 8.5 mm.; width of head just over 3 to 3.5 mm.; width of front at vertex .5 to just over .5 mm.; length of wing 8.5 to 9 mm.

Somewhat small and dingy species; dorsum of thorax black; dorsum of abdomen black segments apically banded brown; legs brown.

Head.—Front blackish brown, covered with golden bloom and clothed with appressed black hairs; face and jowls golden with black ground colour, lower half of face yellowish brown ground colour, base of head densely covered with erect creamy white hairs; sub-callus golden with reddish brown ground colour. Eyes (dried specimen) black; inner margins almost parallel, gently sloping towards the vertex. Frontal callus shining deep reddish brown, about half the length and two-thirds the width of front. Palpi golden yellow, proximal segment clothed with erect white hairs, terminal segment with the base and under surface clothed with erect creamy white hairs, outer edge clothed with short black appressed hairs, anterior end swollen and tapering to a fine point; first and second segments of antennae golden, clothed with appressed black hairs, terminal segment bright reddish brown, terminal annuli slightly darker, clothed with golden pubescence, expanded portion moderately broad, no angle formed on its upper margin.

Thorax.—Dorsum black, sparsely clothed with appressed black hairs; humeral calli clove brown, clothed with erect black and creamy hairs. Pleurae blackish brown, clothed with creamy white hairs; scutellum black clothed with black appressed hairs and creamy ones on the edges.

Abdomen.—Dorsum black with apical and lateral brown banding to the segments clothed with black and white appressed hairs; venter black, covered with creamy yellow bloom, and clothed with black appressed hairs; segments four to the end each with a lateral yellowish apical spot.

Wings.—Tinted with yellowish brown, costal, sub-costal and radial cells yellowish brown; veins on the basal half of the wing light brown, dark brown on apical half. Stigma yellowish brown, elongate, inconspicuous; base of anterior branch of third longitudinal vein with an appendix. Squamae yellowish brown, with brown margin.

Legs.—Fore legs clove brown, apical third of the tibiae and the tarsi black, under surface of femora clothed with erect black hairs, rest of leg clothed with appressed black hairs; coxae and basal third of mid femora brownish, apical two-thirds and tibiae clove brown, femora clothed with white appressed hairs, coxae and femora of hind legs yellowish brown, clothed with creamy hairs, tibiae and basal half of first tarsus yellow, remaining tarsi blackish brown, tibiae and tarsi clothed with black appressed hairs.

Habitat.—Darwin, Northern Territory (Dr. C. L. Strangman.)

Tabanus lineatus, n.sp.

Female.—Length 11 to 12.5 mm.; width of head, 3.75 to 4.5 mm.; width of front at vertex, .5 to just under 1 mm.; length of wing, 9 to 10.5 mm. (Pl. xiv., Fig. 17.)

Somewhat narrow bodied elongate species; dorsum of thorax greyish white, with blackish ground colour, dorsum of abdomen black, with a median and two lateral grey stripes. Legs with coxae and femora grey-white; tibiae creamy, tarsi blackish.

Head.—Front moderately broad, creamy white, with blackish ground colour, clothed with white appressed hairs; sub-callus cream coloured; face creamy white, clothed with white hairs, denser towards the base. Eyes (dried specimens) black; inner margin parallel. Frontal callus shining black, divided into two by a narrow area of creamy white bloom, lower portion nearly a square, upper portion oblong, the base of the lower portion almost as wide as front and resting on apical edge of sub-callus. Palpi creamy white, first segment clothed with moderately long white hairs, terminal clothed with short appressed black and white hairs, the base with fairly long white hairs.

Antennae with the first two joints deep brown to black, clothed with black semi-erect hairs, terminal segment yellowish brown, clothed with minute pale pubescence, terminal annuli darker, the expanded portion moderately broad, with the angle on its upper margin fairly prominent.

Thorax.—Dorsum slaty grey, clothed with short appressed yellowish hairs, with two short median longitudinal slaty stripes, and two lateral slaty ones, extending the whole length of the thorax; humeral calli with a pale reddish tint near the origin of the wings, clothed with short erect black hairs. Pleurae grey, clothed with fairly long white hairs; scutellum similar in colour to rest of thorax, the median portion with a faint reddish tint.

Abdomen.—Dorsum black, with a broad median and two lateral longitudinal creamy white stripes, terminating on the penultimate segment, covered with black appressed hairs, except on the longitudinal stripes, where they are creamy white; posterior margins of the segments pale, expanding to patches on the lateral edges; venter black, clothed with grey bloom; posterior margins of the segments pale yellowish.

Wings.—Hyaline, veins brown; stigma yellowish brown, elongate, conspicuous; base of anterior branch of third long-vein with an appendix. Squamae pale yellow. Halteres, knob creamy yellow, base brown with the stalk light brown.

Legs.—With the fore, mid and hind coxae slaty grey, and clothed with fairly long greyish white hairs, fore femora slaty clothed with greyish appressed hairs and a few black appressed ones at the apex, mid and hind femora with the basal third slaty, rest clove brown, fore tibiae with the basal half clove brown, apical half black, clothed with mixed pale and black appressed hairs, mid and hind tibiae clove brown, the latter black at the apex, clothed with black and a few white appressed hairs; tarsi all black, and clothed with black appressed hairs.

Habitat.—Bowen and Ayr, Queensland.

This is a very marked and striking species, apparently belonging to the same group as *T. gregarius* Er.

Tabanus pseudoardens n.sp.

Female.—Length 12 to 13.5 mm.; width of head just over 4 to 4.5 mm.; width of front at vertex just under .5 to .5 mm.; length of wing 11 to just over 12 mm. (Plate xiv., Fig. 18.)

Dorsum of thorax pale golden, with reddish brown ground colour, clothed with mixed black and golden hairs; dorsum of abdomen clove brown, changing to brown towards the apex; venter clove brown, and becoming darker towards the apex.

Head.—Front creamy yellow, greyish at the vertex, sparsely clothed with short black appressed hairs; face pale golden; jowls and base of head greyish, the latter clothed with fairly long greyish hairs; sub-callus golden yellow. Eyes (dried specimens) black. Frontal callus amber brown, tapering to a fine point about the middle of the front; its base almost as broad as the base of the front. Palpi golden, terminal joint clothed with black hairs, mixed with a few pale ones, except on the inner edge. Antennae with the first two segments golden yellow, the first clothed with black hairs, the second clothed beneath, and the apical half above with black hairs, terminal segment reddish brown, the expanded portion moderately broad, the angle on the upper margin of expanded portion not conspicuous.

Thorax.—Pale golden, with reddish brown ground colour, and clothed with mixed golden and black hairs; humeral calli clothed with fairly long black hairs. Pleurae with the yellowish ground colour covered with white bloom and creamy white hairs, which are denser at the base of the wings; scutellum similar in ground colour to rest of thorax, and clothed with golden and a few scattered black appressed hairs.

Abdomen.—First three segments and last segment clove brown, remainder clove brown, with irregular black patches, clothed with black appressed hairs, a median pale stripe composed of triangles extends from segments two to six; venter with the first three and basal half of segment four clove brown, the apical half of the fourth and remaining segments brown; all but last segment sparsely clothed with black appressed ones.

Wings.—Hyaline with a creamy tint, veins dark brown; stigma yellowish brown elongate, conspicuous. Squamae dusky brown; halteres, knob brown, stalk yellowish.

Legs.—Reddish brown ground colour, with creamy bloom and white hairs, a few black ones on mid coxae; fore, mid and hind femora and tibiae reddish brown, clothed with black and creamy hairs; fore and mid tarsi blackish brown, clothed with black hairs; hind tarsi dark reddish brown, clothed with black hairs.

Habitat.—Kuranda, Queensland. In open scrub, 28/11/1911.

Close to *T. ardens* Wied., from Java and Solomon Islands, but a larger and more robust species. The thorax of *T. ardens* Wied. has also a distinctly reddish appearance.

Tabanus nigritarsis, n.sp.

Female.—Length, 15 to 17 mm.; width of head 5 to 6 mm.; width of front at vertex .5 mm. to just under 1 mm.; length of wing 13 to 14.5 mm.

Somewhat broad species; dorsum of thorax pale golden yellow; dorsum of abdomen dull yellowish brown; venter yellowish, with a brown longitudinal stripe running through the centre; femora slaty black, with greyish bloom, tibiae partly reddish brown, front tarsi black, middle and hind tarsi reddish black. (Pl. xiv., Fig. 19)

Head.—Front golden yellow, clothed with black and golden hairs; face and jowls creamy clothed with fine whitish hairs. Eyes violet black (green in living specimens), inner margins parallel. Frontal callus dark brown, shining; its base almost as broad as front, and tapering to a fine point, about half the length of the callus. Palpi creamy yellow, clothed with black and golden hairs on the dorsal surface, sides with golden hairs only, terminal joint swollen and ending in a blunt point; first joint of antennae golden clothed with short black and yellow hairs, second and third joints reddish brown, the former with an apical ring of short black hairs, the latter with the expanded portion moderately broad, and with a few minute black hairs on the tip of the curve, terminal annuli dark brown.

Thorax.—Dorsum clothed with black and golden erect hairs, a fringe on sides composed of black hairs near base of wing, creamy near head; pleurae slaty grey, clothed with creamy hairs, tufted at the root of wings; scutellum agreeing in ground colour with that of remainder of dorsum, thinly covered with short erect golden and black hairs, a fringe of yellowish hairs on the edge; the hairs on the scutellum are somewhat longer than on the thorax; when denuded the thorax and scutellum are black.

Abdomen.—Dorsum clothed with short black hairs; first segment and part of second yellow, remaining segments brownish yellow, with the lateral edges of segments two to five yellowish; all the segments except the sixth with a lateral border of short yellowish hairs; venter creamy yellow, thinly clothed with short erect greyish hairs, a longitudinal brown stripe extending from the middle of the first segment to the sixth; the stripe clothed with short erect black hairs.

Wings.—Faintly tinged with black, almost hyaline, base yellow; veins dark brown, sub-costal area yellowish; base of anterior branch of third longitudinal vein with an appendix. Stigma pale yellow, elongate, inconspicuous. Squamae creamy white. Halteres stalk brownish, knob yellowish brown.

Legs.—Trochanters and femora black, clothed with grey hair, front tibiae brown, with the apical third blackish, clothed with short pale black hairs, mid and hind

tibiae clove brown, clothed with short black hairs; fore and mid first tarsi reddish black, remaining tarsi black; apical border of last tarsus of fore, mid and hind legs with moderately long black hairs.

Habitat.—Ching Do on the Houghton River (December, 1911) Queensland; Darwin, Northern Territory (Dr. C. L. Strangman), October, 1911).

This species is closely related to *T. fuscipes*, n.sp., but can be easily told from it by its hyaline wings, etc.

Tabanus tetralineatus, n.sp.

Female.—Length, 17 to 18.5 mm.; width of head 6.5 to just under 7 mm.; width of front at vertex just under 1 mm. to 1 mm.; length of wing, 16.5 to 17.5 mm. (Pl. xix, Fig. 20.)

A robust species; dorsum of thorax greyish, with four longitudinal lines, two median and two lateral; dorsum of abdomen chestnut brown, becoming dark towards the apex with two lateral grey stipes (composed of globular patches extending towards the apical edge of each segment). Venter clothed with white bloom.

Head.—Front golden, dark reddish brown when denuded, face creamy yellow, clothed with creamy white hairs; sub-callus creamy yellow; eyes black. Frontal callus reddish brown, elongate, spear shaped, slightly raised; palpi yellow, terminal joint clothed on its outer side with short black appressed hairs, with a few creamy lateral hairs at its base, swollen, gradually tapering to a fine point. Antennae with first and second joints reddish brown; first joint with creamy yellow bloom and clothed with short black appressed hairs, second joint with an apical ring of short black appressed hairs, expanded portion of terminal segment red brown, rest of segment brown, expanded portion not particularly broad, and the angle on its upper margin not prominent.

Thorax.—Greyish yellow, with four longitudinal brown stripes, the median pair only extending to the centre separated by a narrow grey stripe, lateral stripes the entire length of the thorax, sparsely clothed with short appressed creamy hairs, a dense border of pale cream coloured hairs above root of wings, border in front of wings mostly composed of black hairs; pleurae slaty grey, clothed with greyish white erect hairs, denser at the base of legs and root of wings; scutellum similar in ground colour to rest of thorax, clothed with black appressed hairs and edged with creamy yellow hairs.

Abdomen.—Dorsum, except last segment, which is creamy yellow, chestnut brown, clothed with short black appressed hairs, with two lateral grey stripes (composed of globular grey patches, which are almost as long as the segments); lateral margins of segments three, four and five with a creamy yellow lateral border; venter clothed with white bloom, and moderately long white appressed hairs, except the sixth segment, which is clothed with erect black hairs mixed with creamy ones, the apical edges of all the segments tinted with creamy yellow.

Wings.—Faintly dusky, veins light brown; stigma pale creamy yellow, elongate, inconspicuous; base of anterior branch of third longitudinal vein without an appendix. Halteres, knob yellowish brown, stalk yellow to yellowish brown.

Legs.—Coxae clothed with white hair, femora and tibiae reddish brown, clothed with white hair; tarsi reddish brown, clothed above with black appressed hair.

Habitat.—Darwin, Northern Territory (Dr. C. L. Strangman, October, 1911).

Tabanus parvus, n.sp.

Female.—Length, 8.5 to 10 mm.; width of head, 3 to 3.5 mm.; width of front at vertex just under .5 to .5 mm.; length of wing, 7.5 to 8.5 mm.

Somewhat short and slender species. Dorsum of thorax golden mottled with patches of dark brown; dorsum of abdomen yellow changing to yellowish brown towards the apex; venter creamy yellow, brownish towards the apex; coxae, femora and tibiae clove brown, tarsi brownish black.

Head.—Front golden, greyish at vertex, clothed on upper half with minute black hairs, face white, base clothed with moderately long white hair, sub-callus cream coloured. Eyes (in dried specimen) deep black. Frontal callus brown, situated just above the sub-callus, its base about half the width of front and drawn out to a fine point about half the length of the front. Palpi cream coloured, sparsely covered on outer edge with short black hairs, mixed with cream coloured ones on basal half of terminal joint, the latter swollen and tapering to a point. Antennae, first and second segments golden yellow, first segment thinly covered with creamy and black hairs, second segment with a narrow apical fringe and third segment reddish brown, with the extreme tip brown, expanded portion moderately broad, and the angle on the upper margin not prominent.

Thorax.—Dorsum golden, with black patches showing beneath, sparsely clothed with black and cream coloured hairs; area immediately above root of wing clothed with moderately long greyish white hairs, lateral fringe in front of wings mainly composed of black hairs; pleurae slate grey, clothed with white hairs, denser on the sides beneath the wings; scutellum agreeing in ground colour with the rest of the thorax, and clothed with appressed black hairs, with a few scattered golden ones on the edges.

Abdomen.—First three segments golden yellow, remainder clove brown, clothed with black appressed hairs (in some specimens all but the three first segments have a blackish brown appearance); the lateral and apical edges of segments four to seven golden yellow; venter covered with greyish white bloom; ground colour of segments one to four yellow, with the edges darker; the remainder of the segments with dark brown ground colour and yellowish apical edges, sparsely clothed with greyish hairs, except segment seven, which is clothed with erect black ones.

Wings.—Hyaline, veins dark brown. Stigma elongate, yellowish, inconspicuous; anterior branch of third longitudinal vein with a moderately long, slightly curved, appendix. Halteres, knob pale brown, base paler, stalk creamy yellow.

Legs.—Coxae and femora clothed with whitish hairs; tibiae clothed with black hairs; mid and hind tarsi brown, first tarsi with apex black, remainder with basal half brown and apical half black, all clothed with black hairs.

Habitat.—Darwin, Northern Territory (Dr. C. L. Strangman, October, 1911).

TICKS.

The number of species recorded to date from Australia and Tasmania is comparatively small, only twenty-three being recorded. The genera *Ixodes* and *Amblyomma* having most representatives, as they contain more than half of the known species.

The super-family *Ixodoidea* is divided into two families, the *Argasidae* and *Ixodidae*, which are easily distinguished from each other by their habits and external structure. In the *Argasidae* the capitulum is on the ventral surface, and completely hidden, in the adult, when viewed from above.

The most striking distinction between the two families is the possession of a shield or scutum in the *Ixodidae*, which covers the whole body in the male, and which forms a small patch on the anterior part of the dorsum of the female. There is no scutum in the *Argasidae*, but they are covered with fairly uniform leathery integument.

The differences also extend to their habits as well as structure. The *Argasidae* when fully fed show a dorso-ventral thickening, while in the *Ixodidae* the females show great increase in size when gorged, and their coxae widely separated. The *Argasidae* live for several years, and generally lay comparatively few eggs at a time; pass through two or more nymphal stages, and are capable of moulting after attaining maturity. The *Ixodidae* are comparatively short-lived, lay a very great number of eggs, and only moult twice, after leaving the larval and nymphal stages.

The nymphs and adults in the *Argasidae* are seldom carried from their habitats as they feed rapidly, mostly by night, and hide during the day in dark crevices as they would appear to shun the light, especially when waiting for a host.

The habits of the *Ixodidae* differ in a marked degree from those of the *Argasidae*. They are slow feeders, and remain attached to their host for several days, or in the case of cold-blooded hosts, for a considerable period; thus species of *Amblyomma*, *Aponomma* and *Hyalomma* occurring on Reptilia may remain attached to the host for a considerable time. There are cases as in *Ixodes* where the male is unknown, or is only recorded as being found in the host's habitat.

Argas vespertilionis Latreille is recorded for the first time from Australia, being represented by two larvae taken from a bat.

Haemaphysalis leachi var. *australis* Neumann is also of great interest, as the species transmits *Piroplasma canis* in Africa.

Ixodes holocyclus Neumann, 1899.

Female (partially fed) body oval, broadest about the middle. Scutum dark reddish yellow, almost as broad as long, the cervical grooves well marked in front; lateral grooves very distinct; punctuations very numerous, equal and confluent in places; porose areas large, oval, longer than broad; palpi much longer than the hypostome, first segment broad, salient outward nearer the base, segment two long, the entire palpi broadened dorsally, concave outside. Hypostome long, lanceolate with numerous small teeth, followed by six rows of large ones. Coxae large, an external lower spur, decreasing in size from coxa one to four; long white hairs on the lower half of each coxa; claws short, the pad nearly reaching to their tips.

Length.—Two specimens, long., 4 to 8 mm.; lat., 2.5 to 5 mm.

Habitat.—Kamerunga, Cairns district, Queensland and Sydney, N.S.W.

The scrub tick of New South Wales, found on man and animals.

Boophilus annulatus Say, var. *australis* Fuller.

Agric. Journ. Cape Town, No. 9, p. 5, 1899; Neumann, *Mem. Soc. Zool., Fr.*, v., 14, p. 280, 1901.

This is an extremely common tick in Queensland, and is too well known to require description.

Hyalomma aegyptium L.

Syst. Nat., Ed. 10, p. 615, 1758; Neumann, *Das Tierreich, Ixodidae*, p. 50, 1911.

Dorsal shield brown, with numerous unequal punctuations. Eyes hemispherical. Hypostome spatulate, with six rows of teeth.

Male.—Adanal shields nearly rectangular (they do not quite agree with the figure given by Neumann); the internal edge longer than the posterior; accessory shields small. Dorsal shield with a short lateral groove, situated close to the edge, ending posteriorly at the last festoon.

Female.—Dorsal shield oval, hexagonal, laterally grooved, almost as long as broad, edges curved.

Length.—*Male*, L., 3 to 4.5 mm.; la., 1.5 to 2 mm.; *female*—L., 6-11 mm.; la., 3.5 to 6 m.m.

This species closely resembles Neumann's description of *H. aegyptium* L., the main differences being the shape of the adanal shield and the length.

On dogs—Townsville.

Amblyomma moreliae, L. Koch.

Verh. Ges. Wiss. Wien. v., 17 Abh., p. 241, 1867; Neumann, *Mem. Soc. Zool., Fr.*, v. 12, p. 258, 1899; *Das Tierreich, Ixodidae*, p. 85, 1911.

Male.—Eyes flat, dorsal shield reddish brown, punctuations lateral and deep, numerous in the scapular angles. Hypostome with eight rows of teeth. Coxa one with two sub-equal short spines, as broad as long; the other coxae each with a single spine, that on the fourth coxa longest; the dorsal shield with a marginal groove commencing behind the eyes, arrested by the last festoon, without encircling the posterior margin. L., 3.75 to 4.5 mm.; la., 3 mm.

Host.—The green spinifex snake.

Habitat.—Northern Territory (Hodgson Downs Station).

Amblyomma australiense Neumann.

Arch. Parasitol., v. 9, p. 227, 1905.

Eyes flat; dorsal shield dark brown without spots, punctuations small: hypostome with eight rows of teeth. Coxa one with two spines, the external about twice as long as broad; remaining coxae each with a spine, that on the fourth the longest. Tarsi ending bluntly with two spurs.

Male.—Dorsal shield, with a lateral groove, commencing level with the eyes, terminating at the last festoon without encircling the posterior margin. Festoons well marked. *Female.*—Dorsal shield cordiform, slightly broader (2.5 mm.) than long (just over 2 mm.); eyes towards the middle of its length; lateral grooves distinct. Porose areas oval and small. Palpi slightly longer than the hypostome, the latter with eight rows of teeth.

On *Tachyglossus aculeatus* Shaw.

Townsville district.

Haemaphysalis leachi Aud., var. *australis* Neumann.

Arch. Parasitol., v. 9, p. 238, 1905.

Palpi triangular, the second segment broadly expanded on its posterior edge forming a sharp external angle, with a short reversed spine near this angle, and another stouter one on its lower edge. Hypostome with eight rows of teeth; dorsal shield with numerous small deep and equal punctuations. Coxae with a short spine slightly decreasing in size from one to four. Tarsi without dorsal protuberances.

Male.—Dorsal shield with a distinct long lateral groove, in some specimens terminating at the last, in others at the penultimate festoon. Tarsi four, not ending abruptly.

Female.—Dorsal shield oval, longer than broad. Tarsi four, not ending abruptly.

Male.—L., 2.5 mm.; la., just over 1 mm.; *female*—L., 5 mm.; la., 3 mm.

On *Macropus agilis* Gould.

Ching Do, North Queensland.

Aponomma trimaculatum, H. Lucas.

Ann. Soc. Ent. Fr., ser. 5, v. 8 Bull, p. 77, 1878 (Ixodes); Neumann, *Mem. Zool. Soc., Fr.*, v. 12, p. 187, f. 41, 1899.

Female.—Dorsal shield, cordiform, as broad as long, deep red with numerous unequal punctuations, and three green patches situated at the angles. Hypostome with eight rows of teeth. Porose areas small.

L., 5 mm.; la., 4 mm.

On *Varanus varius* Merr.

Townsville, North Queensland.

Aponomma decorosum, L. Koch.

Neumann, *Mem. Soc. Zool., Fr.*, v. 12, p. 194, f. 46-48, 1899.

Male.—Body longer than broad. Dorsal shield brown, mottled creamy white, with numerous deep punctuations. Hypostome with six rows of teeth. Coxa one with two short spines, a short spine on each of the other coxae. Tarsi with a dorsal protuberance. Dorsal shield with a slight marginal groove, encircling the posterior border; punctuations equal, more numerous towards the posterior margin, where some are unequal. L., 3 mm.; la., 2.5 mm.

On *Tachyglossus aculeatus* Shaw.

Townsville.

Argas vespertilionis Latreille.

Neumann, *Mem. Soc. Zool., Fr.*, v. 9, p. 19, f. 22-26, 1896.

Larva.—Body short, oval, 1.5 to 2 x 1 to 1.5 mm. Dorsum with fine radiating furrows on the posterior half. Hypostome narrow, long, pointed, with eight rows of teeth. Palpi slender, segment one nearly as broad as long, segments two, three and four twice as long as wide; legs slender, the coxae almost contiguous, the interval between the coxae of the two sides broad.

On *Vesperugo* sp.

Townsville.

Argas persicus, Fisch-Waldh.

Neumann, *Mem. Soc. Zool., Fr.*, v. 9, p. 12, 1896.

This tick is so well known that it scarcely requires description.

In a fowl house.

Townsville.

Family Chironomidae (Midges).

Sub-family Ceratopogoninae.

Culicoides, Latreille.

Genera Crustaceorum et Insectorum, T. iv., p. 251, 1809.

Culicoides ornatus, n.sp.

Female.—Head black; antennae yellowish, clothed with minute pale hairs, basal lobe large, more than twice as wide as the second segment, the latter creamy, slightly swollen, and longer than the following segment, the first nine segments slightly globular, paler than the apical five, the latter elongate and cylindrical; palpi brown, four jointed, third joint swollen and moderately long, the fourth slightly curved; proboscis brown, about the same length as the palpi; eyes black.

Thorax grey brown, with two lateral patches of blackish brown on the middle third, a few short dark bristles on the lateral and anterior margins; pleurae brown; scutellum grey brown.

Abdomen black, sparsely clothed with dark hairs, lateral edges with a thin fringe of dark hairs; venter black, with a fairly dense clothing of dark hairs.

Legs yellowish, with a creamy pubescence; hind femora stouter than fore and mid ones; tibiae with a thin short fringe on the outer margin, moderately long on the hind tibiae, the latter with a narrow white band near the base, the legs with dark knee spots, hind metatarsi about the same length as the four following tarsi.

Wings longer than the abdomen, infusate and with hyaline spots; costal vein darker than the wing, with two hyaline spots at the basal and apical ends of the middle third. Rest of the wing with eleven irregular hyaline spots. Halteres with the stem, and knob pale creamy white. Length, 1 mm.

Habitat.—Townsville, in mangrove swamps, July, 1911.

A small species and a very vicious biter, settling on the hands and wrists, and causing considerable irritation; it was not seen to crawl up the arms. Immediately on settling it commences to suck blood, the "bite" being very noticeable.

EXPLANATION OF PLATES.

PLATE XII.

Fig. 1.— <i>Myzorhynchus barbirostris</i> , Van de Wulp, var. <i>bancrofti</i> , Giles...	Female head.
Fig. 2.— <i>M. barbirostris</i> , v. de Wulp, var. <i>bancrofti</i> , Giles...	Female wing.
Fig. 3.— <i>Toxorhynchites speciosa</i> , Skuse	Male.
Fig. 4.— <i>T. speciosa</i> Skuse	Female wing.
Fig. 5.— <i>Culicelsa abdominalis</i> , n.sp.	Female wing.
Fig. 6.— <i>C. consimilis</i> , n.sp.	Male head.
Fig. 7.— <i>C. consimilis</i> , n.sp.	Male wing.

PLATE XIII.

Fig. 8.— <i>Nyssorhynchus annulipes</i> , Walk.	Female wing.
Fig. 9.— <i>Mucidus alternans</i> , Westwood	Female.
Fig. 10.— <i>M. alternans</i> , Westwood	Female wing.
Fig. 11.— <i>Culicelsa vigilax</i> , Skuse	Female wing.
Fig. 12.— <i>Aedeomyia venustipes</i> , Skuse	Male head.
Fig. 13.— <i>A. venustipes</i> , Skuse	Male wing.

PLATE XIV.

Fig. 14.— <i>Tabanus abstersus</i> , Walker...	Female.
Fig. 15.— <i>T. fuscipes</i> , n.sp.	Male.
Fig. 16.— <i>T. gregarius</i> (?) Frichson	Female.
Fig. 17.— <i>T. lineatus</i> , n.sp.	Female.
Fig. 18.— <i>T. pseudoardens</i> , n.sp.	Female.
Fig. 19.— <i>T. nigrilaris</i> , n.sp.	Female.
Fig. 20.— <i>T. tetralineatus</i> , n.sp.	Female.

PLATE XII.



Fig. 1.



Fig. 3.

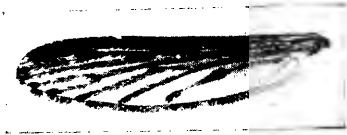


Fig. 2.



Fig. 4.



Fig 6.



Fig. 5.



Fig. 7.

PLATE XIII.



Fig. 9.



Fig. 10.



Fig. 8.



Fig. 12.



Fig. 11.

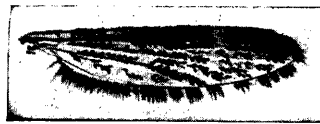


Fig. 13.



Fig. 19.



Fig. 14.

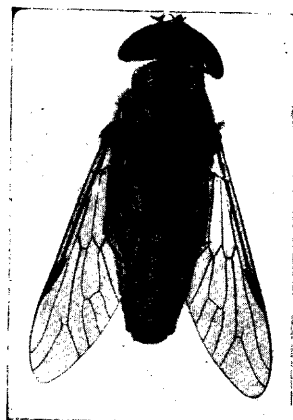


Fig. 17.



Fig. 18.

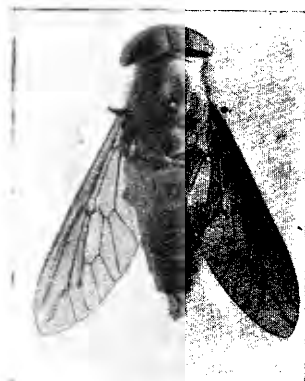


Fig. 15.



Fig. 16.



Fig. 20.