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Malayan Membracidae.

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(Contribution from the Entomological Laboratory of Cornell University.)

Through the courtesy of Professor C. F. Baker, Dean of the College of Agriculture at Los Banos, Philippine Islands, I have been permitted to study a very interesting series of insects of the family Membracidae collected during the Summer of 1917 at Singapore and the Island of Penang.

The collection contains twelve new species and records of a number of species of Walker, Distant, Melichar and Bierman which form a valuable addition to our knowledge of the distribution of the Indian homopterous fauna.

All of the species listed were collected by Professor Baker.

1. **Xiphistes orientalis,** sp. nov.

Uniform reddish-brown; thick bodied; horns heavy and blunt; tegmina opaque; scutellum largely exposed.

Head dark brown with faint median ferruginous line, rugous, closely and finely punctate, sparingly pubescent with brownish hairs; eyes large, prominent, gravish-white; ocelli prominent, pearly, about equidistant from each other and from the eyes and situated on a line drawn through centers of eyes; clypeus much longer than wide, extending for more than half its length below inferior margin of face, pubescent, tip rounded.

Prothorax black-brown, rough, very pubescent with short, reddish-brown hairs which almost entirely conceal the weak punctuation; humeral angles very large, heavy, triangular and blunt, projecting directly laterad, suprahumeral horns short, very stout, about as long as their width at base and about as far apart at their bases as the basal width of one horn, projecting upward, outward and slightly forward, upper surfaces very rough and nodulose with irregular carinae, tips blunt, rounded and somewhat deflexed; median carina strongly percurrent; posterior process long, almost straight, slightly deflexed at tip, strongly centrally carinate, base laterally carinate on each side, tip gradually acute and extending about half way between internal angles and tips of tegmina, base only lightly touching scutellum; scutellum plainly visible on each side.

Sides of thorax thickly pubescent with reddish hairs. Tooth of prothorax very prominent; that of mesothorax very weak.

Tegmina opaque, reddish-brown, slightly pubescent and punctate at base, veins prominent, tip acute, marginal border very narrow or lacking. Hind wings with four apical areas.

Undersurface of body very dark brown, almost black. Ovipositor black. Ventral surface of abdomen somewhat pubescent with whitish tomentose patches at base.

Legs dark brown; femora swollen and smooth; tibiae triangular and finely spined; tarsi ferruginous.

Length 8 mm.; width between extremities of suprahumeral horns 4 mm.

Type: female (Baker's duplicate No. 9084).

Locality: Singapore.

2. **Centrochares horrificus,** Westwood.

1837.	Centrotus horrificus	Westw. Proc. Zool. Soc. 130.
1841.		Guer. Mag. Zool. Ser. 2. III. Ins. Pl. 82.
1842.		Lefebvre Ann. Soc. Fr. Bull. 1842. p. xxi.
1851.	Pterygia horrificus	Walker List Hom. Brit. Mus. 500. 9.
1852.		Walker List Hom. IV. Tab. 4. figs. 4 and 5.
1866.	Centrochares horrificus	Stal Analect. Hem. 386.
1870.		Stal Hem. Phil. 731. 1.
1903.	Pterygia horrifica	Buckt. Mon. Memb. 73. Pl. 12. fig. 5.
1903.	Pterygia spinula	Buckt. Mon. Memb. 73. Pl. 12. fig. 4.
1903.	Centrochares horrificus	Buckt. Mon. Memb. 266.
1914.		Funkh. Journ. Ent. & Zool. VI: 2. p. 69. 6.
1915.		Dist. Ann. Mag. Nat. Hist. 16: 94. p. 327.
1915.		Funkh. Rev. Phil. Memb. 370.
1918.		Funkh. Notes Phil. Memb. 23.

One specimen taken at Singapore and bearing Baker's duplicate No. 8779. Apparently this species has a wide distribution throughout eastern Asia and the East Indies. The variation shown in examples studied does not warrant the splitting up of the species.

3. **Leptocentrus leucaspis,** Walker.

1858.	Centrotus leucaspis	Walk. List. Hom. B. M. Suppl. 158.
1903.	Leptocentrus leucaspis	Buckt. Mon. Memb. 235. Pl. 53. figs. 3a. b.
1907.		Dist. Fauna Brit. Ind. 30. 2139.
1915.		Funkh. Rev. Phil. Memb. 379.
1918.		Funkh. Notes Phil. Memb. 37.

One specimen bearing Baker's duplicate No. 8771 taken at Singapore.

4. **Leptocentrus obortus,** Distant.

1916.	Leptocentrus obortus	Dist. Fauna Brit. Ind. App. 154. 3347.

Two specimens (Baker's duplicate numbers 8772 and 8976) collected at Singapore.

5. **Leptocentrus longispinus,** Distant.

1907.	Leptocentus longispinus	Dist. Fauna Brit. Ind. 31. 2141.

One male and three females all collected at Singapore.

6. **Centrotypus asmodeus,** Distant.

1907. Centrotypus asmodeus Dist. Fauna Brit. Ind. 36. 2150.
One female (Baker's duplicate No. 8978) taken at Singapore.

7. **Nilautama minutispina,** sp. nov.

Black, punctate, pubescent; posterior process very short and slender; tegmina smoky-hyaline, wrinkled; eyes red; scutellum white tomentose.

Head twice as broad as long, black, finely punctate, densely pubescent with short golden hairs; base sinuate; eyes red; ocelli not prominent, gray, equidistant from each other and from the eyes and situated on a line above centers of eyes; clypeus twice as long as wide, extending for two-thirds its length below the inferior margin of the face, tip pubescent and rounded.

Prothorax narrow, black, finely punctate, sparingly pubescent with golden hairs; metopidium narrow, much sunken below supra-humeral horns; humeral angles short, blunt, not prominent; supra-humeral horns strong, very wide as seen from above, extending almost directly outward, somewhat upward and slightly backward, triquerate, tips blunt and recurved; posterior process very slender and short, extending not farther than tip of scutellum, arising well above base of pronotum, tricarinate, acute, nearly straight, tip

very slightly upraised. Scutellum entirely exposed, triangular, as long as its width at base; base thickly covered with white tomentose pubescence; tip rounded in general outline, notched with the point on each side of notch extended into a fine tooth.

Tegmina long, narrow, smoky-hyaline, much wrinkled; base white and punctate; costal margins ferruginous; veins prominent, somewhat hairy; tips rounded, extending well beyond extremity of abdomen.

Sides and undersurface of the thorax white tomentose; undersurface of abdomen brown.

Legs reddish-brown, slender, hairy; tarsi flavous.

Length 7 mm.; width between tips of suprahumerals 4 mm.

Type: female (Baker's duplicate No. 9086).

Locality: Island of Penang.

8. **Anchonoides variegatus,** sp. nov.

Golden brown with white tomentose stripes; tegmina smoky-hyaline with broad, clear band across centers and with bases brown; posterior process strongly sinuate with two elevations behind suprahumeral horns.

Head wider than long, rugose, brown with white tomentose patches, finely and closely punctate, densely pubescent; base sinuate; eyes brown, reflexed; ocelli prominent, brown, farther from each other than from the eyes and situated above a line passing through centers of eyes; clypeus much longer than wide, sublobate, extending for more than two-thirds its length below the interior margin of the face, densely white pubescent, tip rounded; interior margins of genae produced in blunt angles; antennae prominent.

Prothorax brown, finely punctate, sparingly pubescent; metopidium somewhat nodulate; four white tomentose lines on cephalic prothorax, one arising above each eye, extending dorsomesad to meet the line from the other side at the median carina at a point about even with the bases of the suprahumeral horns; another originating beneath each humeral angle and extending upward between the suprahumeral horns and backward to base of posterior process; a narrower line extending along lateral margin of pronotum from beneath the suprahumeral horn to base of posterior process. Humeral angles prominent, blunt, triangular, extending outward about half as far as the suprahumeral horns. Suprahumeral horns heavy, sinuate, extending outward and a little upward, upper middle portion much elevated and nodulate, tips obliquely truncate with posterior angle produced. Median carina strongly percurrent. Posterior process heavy, nodulate, thrown upward in two strong loops, one above the scutellum and one above the internal angles of the tegmina, the anterior elevation about twice as high as the

posterior; tip extending almost as far as the end of the abdomen but not reaching the extremities of the tegmina. The entire dorsal outline as seen from the side showing three elevations, one between the suprahumeral horns, one above the scutellum and one above the internal angles of the tegmina. Scutellum entirely exposed, sinuate, white tomentose, tip truncate.

Tegmina divided into four color areas, the transverse bands being about equal in length. The base is brown, entirely opaque, punctate and slightly pubescent; the second band is smoky-hyaline; the third band entirely clear; the remainder of the tegmen amber-hyaline. The veins are prominent, those in the apical area somewhat nodulate.

Sides and undersurface of thorax uniform dark brown with white tomentose patches; tibiae ferruginous shading to flavous at distal extremities; tarsi flavous.

Length 5 mm.; width between tips of suprahumerals 4 mm.

Type: female (Unique type in Professor Baker's collection).

Locality: Singapore.

This species shows a much higher posterior elevation on the posterior process and much shorter and less elevated suprahumeral horns than *A. typicus* Distant, the type of the genus.

9. **Ebhul varius,** Walker.

1858.	Centrotus varius	Walk. List Hom. Brit. Mus. Suppl. 162.
1869.	Leptobelus varius	Stal Bid. Memb. Kan. 285. 6.
1885.		Atkins J. A. S. B. 54. p. 82.
1907.	Ebhul varius	Dist. Fauna Brit. Ind. 59. 2189.
1914.		Lamborn Trans. Ent. Soc. Lond. 1913. p. 470.
1915.		Funkh. Rev. Phil. Memb. 393.
1916.		Dist. Fauna Brit. Ind. App. p. 169.

Five specimens, all females. Two taken at Singapore and three collected from the Island of Penang.

10. **Sipylus dilatatus,** Walker.

1851.	Centrotus dilatatus	Walk. List Hom. B. M. 630. 74.
1914.	Sipylus nodipennis	Funkh. Journ. Ent. & Zoo. VI: 72. 15. fig. 5.
1915.		Funkh. Rev. Phil. Memb. 392. Pl. 2. fig. 15.

1916.	Sipylus dilatatus	Dist. Rhynchotal Notes. 330.
1918.		Funkh. Notes Phil. Memb. 29.

Two females and one male, all from Singapore.

11. **Tricentrus assamensis,** Distant.

1907.	Tricentrus assamensis	Dist. Fauna Brit. Ind. 57. 2186.

Three specimens, all females. Two from the Island of Penang and one from Singapore.

12. **Tricentrus albomaculatus,** Distant.

1907.	Tricentrus albomaculatus	Dist. Fauna Brit. Ind. 56. 2183.
1914.		Kershaw Ann. Soc. Belg. 37. 191-201 pp. figs. 1-13.
1916.		Dist. Fauna Brit. Ind. App. 166.

Four specimens. One female from the Island of Penang; one female and two males from Singapore.

13. **Tricentrus resectus,** Distant.

1916.	Tricentrus resectus	Dist. Fauna Brit. Ind. App. 167. 3370.

Three specimens. One male and one female from Singapore; one female from the Island of Penang.

14. **Tricentrus gibbosulus,** Walker.

1858.	Centrotus gibbosulus	Walker Ins. Saund. 80.
1886.		Atkins J. A. S. B. 55. p. 198.
1906.		Oshan. Pal. Hem. 43. 159.
1907.	Tricentrus gibbosulus	Dist. Fauna Brit. Ind. 53. 2178.
1914.		Funkh. Journ. N. Y. Ent. Soc. XXII: 3. 238.
1916.		Dist. Fauna Brit. Ind. App. 167.

Six specimens. Three males from Singapore; two males and one female from the Island of Penang.

Walker described a second *Centrotus gibbosulus* in 1868 (Journ. Linn. Soc. Zoo. X: 187) which Distant has made the type of his new genus *Maurra* (Ann. and Mag. Nat. Hist. Ser. 8. Vol. 17. p. 326. April, 1916).

15. **Tricentrus spinicornis,** sp. nov.

Black, punctate, pubescent; suprahumeral horns thin, sharp and spinelike; posterior process extending beyond tip of abdomen; tegmina fuscous-hyaline, base black; legs brown.

Head broader than long, black, densely pubescent with silvery hairs which conceal the fine punctuation; base sinuate, much higher in middle; eyes prominent, black-brown; ocelli prominent, amber-colored, shining, glassy, somewhat farther from each other than from the eyes and situated slightly above a line drawn through centers of eyes; clypeus about as broad as long, projecting for about half its length below inferior margin of face, tip rounded and very hairy.

Prothorax uniform black, finely punctured, thickly pubescent with silvery hairs; humeral angles weak, triangular, blunt; suprahumeral horns long, slender, sharp, ridged, extending about equally upward and outward and slightly turned backward at tips, distance between bases 1.7 mm., upper surface of horn centrally longitudinally carinate; median carina percurrent; posterior process long, gradually acuminate, tricarinate, extending slightly beyond tip of abdomen and well beyond internal angles of tegmina.

Tegmina fuscous-hyaline, base black and punctate, costal margin somewhat pubescent, veins prominent.

Undersurface of body very dark brown, almost black. Legs light brown; tibiae finely spined; hind trochanters armed with strong teeth.

Length 6 mm.; width between tips of suprahumerals 5 mm.

Type: female (Baker's duplicate No. 8775). Type in author's collection; two paratypes in Professor Baker's collection.

Locality: Singapore.

Three specimens were examined, all females. Two were from Singapore and one from the Island of Penang.

16. **Tricentrus brunneus,** sp. nov.

Near the preceding but smaller and differing particularly in the size and shape of the suprahumeral horns.

Uniform golden brown, finely punctate and pubescent with silvery hairs; suprahumeral horns short, blunt, tricarinate; posterior process reaching tip of abdomen; tegmina smoky-hyaline with base black.

Head wider than long, brown, completely covered with fine white pubescence; base rounded; eyes very large, prominent, brown; ocelli protruded, pearly, about equidistant from each other and from the eyes and situated slightly above an imaginary line drawn through centers of eyes; clypeus very long, projecting for almost its entire length below inferior margin of face, tip covered with long, straight, white hairs; inferior margin of face only slightly sinuate, almost truncate; antennae very slender.

Prothorax uniform brown, finely punctate, closely pubescent with short silvery hairs; humeral angles prominent, triangular, extending outward almost half as far as the suprahumeral horns; suprahumeral horns short, slender, tips blunt, anterior, dorsal and posterior surfaces carinate, extending outward and upward, about as far apart at bases as the length of one horn; posterior process long, slender, straight, extending almost to tip of abdomen, closely impinging on scutellum, tip darker.

Tegmina smoky-hyaline, wrinkled, base black-brown and punctate, veins prominent, slight dark brown marking at apicalcostal margin.

Undersurface of body very dark brown, almost black. Hind trochanters armed with strong teeth. Legs uniform light brown; femora smooth; tibiae triquerate and bearing at edges fine spines.

Length 5.5 mm.; width between extremities of suprahumeral horns 3.5 mm.

Type: female (Baker's duplicate No. 8774).

Locality: Singapore.

17. **Tricentrus truncaticornis,** sp. nov.

Short, heavy-bodied, black; pronotum as seen from above about as broad as long; suprahumeral horns very long, equal in width throughout length, tips squarely truncate; tegmina ferruginous-hyaline, bases black, veins slightly nodulate.

Head much wider than long, black, thickly punctate, closely pubescent; base strongly sinuate; eyes white tinged with reddish which makes them very prominent as compared with the black head and body; ocelli pearly, about equidistant from each other and from the eyes and situated slightly above a line passing through centers of eyes; clypeus as wide as long, tip rounded and practically continuing the sinuate inferior marginal outline of the face.

Thorax black; punctate, sparingly pubescent; metopidium wider than high; humeral angles very inconspicuous, almost hidden under the large suprahumeral horns; suprahumeral horns long, broad, flattened, as far apart at their bases as the width of the head, longitudinally striate above, tips squarely cut off at right angles leaving a truncate end as wide as the base; posterior process short, barely reaching internal angles of tegmina, base wide, extremity suddenly narrowed to form an acute tip.

Tegmina ferruginous-hyaline, so wrinkled between veins as to be almost opaque; base black and punctate; veins prominent and bearing scattered nodules.

Legs and undersurface of body uniform black with scattered pubescence. Hind trochanters armed with strong, prominent teeth.

Length 6 mm.: width between extremities of suprahumeral horns 6 mm.

Type: female (Baker's duplicate No. 8773).

Locality: Singapore.

The foregoing species is close to *T. auritus* which Buckton described as *Otaris auritus* from Sumatra (Buckton, Monograph of the Membracidae, p. 429, Pl. 59, figs. 1, 1a, 1903), but differs decidedly in size and in the comparative proportions of the suprahumeral horns and the posterior process.

18. **Centruchus laticornis,** sp. nov.

Resembling the preceding species in general appearance but differing in having unarmed hind trochanters which I believe is a sufficient generic character to distinguish the genera *Tricentrus* and *Centruchus* which are in other respects very similar.

Body subtriangular; suprahumeral horns broad and flat with truncate tips; posterior process short and narrow; tegmina ferruginous with faint median white band; entire body largely marked with white tomentose patches.

Head wider than long, black, rugose, finely punctate, sparingly pubescent; base regularly and evenly rounded; eyes prominent, brown; ocelli conspicuous, pearly, a little farther from each other than from the eyes and situated well above a line passing through centers of eyes; clypeus longer than wide, trilobed at apex, extending well below the inferior margin of the face, tip rounded and bearing long, stiff, white hairs.

Prothorax black, finely punctate, sparingly pubescent, decorated with irregular white tomentose patches; metopidium much broader than high; humeral angles weak, triangular, inconspicuous; suprahumeral horns long, broad, flattened dorsoventrally, tips squarely truncate, dorsal surface with longitudinal carina slightly behind middle, horns about as far apart at bases as the width of the head; median carina percurrent; posterior process short, uniformly narrow, tricarinate, largely tomentose, tip acute, extending just to the internal angles of the tegmina; scutellum broad, notched, tomentose.

Tegmina ferruginous, wrinkled, subopaque; base brown and punctate; a faint whitish band extending across the central part of tegmina just below the tip of the posterior process; veins prominent and slightly nodulose in apical region.

Undersurface of body black with white tomentose patches. Legs uniformly light ferruginous brown.

Length 6 mm.; width between extremities of suprahumeral horns 6 mm.

Type: female (Unique type in Professor Baker's collection).

Locality: Singapore.

19. **Gargara piceola,** Melichar.

1903. Gargara piceola Melich. Hom. Ceylon 122. 1.
1907. Dist. Fauna Brit. Ind. 60. 2190.
One female from Singapore.

20. **Gargara rubrogranulata,** Bierman.

1910. Gargara rubrogranulata Bier. Notes Mus. Leiden 33. 45.
One female from Singapore.

21. **Gargara nitidipennis,** Funkhouser.

1914. Gargara nitidipennis Funkh. Jour. Ent. & Zoo. VI: 71. 14.
1915. Funkh. Rev. Phil. Memb. 399.
1918. Funkh. Notes Phil. Memb. 32.

Three males and one female from Singapore: one male from the Island of Penang.

The species shows considerable minor variations but I can find no specific characters to separate the Malay material from the type specimens from the Philippine Islands.

22. **Gargara projecta,** sp. nov.

Distinguished by the position of the head which is not deflexed or vertical as in most Membracidae but is projected well forward at the inferior margin.

Uniform brown, punctate, pubescent: head extending more or less forward, not deflexed: tegmina smoky-hyaline, very slightly brown and punctate at base.

Head projected, clypeus farther cephalad than base as seen from a side view, entire frontal outline of head continuing slope of metopidium: brown, smooth, thickly pubescent with fine, short, yellowish hairs: base weakly sinuate: eyes prominent and brown, their inferior margins continuing the almost straight line formed by the inferior margins of face and clypeus: ocelli not prominent, pearly, farther from each other than from the eyes and situated very slightly above an imaginary line passing through centers of eyes: clypeus swollen, convex in front, about as wide as long, tip rounded, somewhat hairy and continuing the general outline of the inferior margin of the face: antennae very thin and inconspicuous.

Prothorax uniform brown, punctate, pubescent: metopidium sloping, somewhat flattened, slightly rugose, broader than high as

seen from the front; humeral angles not prominent, smooth, blunt at tips; posterior process long, slender, gradually acuminate, carinate above with median ridge which does not extend over the metopidium, tip extending well beyond the internal angles of the tegmina, darker in color than the rest of process, slightly depressed; scutellum distinct on either side of posterior process but closely impinging upon it.

Tegmina uniform smoky-hyaline, wrinkled, base narrowly brown and punctate, veins prominent, tips rounded and extending just beyond the extremity of the abdomen.

Undersurface of body darker brown, pubescent. Legs the same color as the pronotum; hind trochanters unarmed; tibiae finely spined; tarsi shading to flavous; claws brown.

Length 5 mm.; width between extremities of humeral angles 2.3 mm.

Type: female.

Type locality: Singapore.

Described from six specimens: two females and two males from Singapore and one female and one male from the Island of Penang.

Type (Baker's duplicate No. 8981) and one paratype (No. 8979) in author's collection; allotype and three paratypes in Professor Baker's collection.

23. **Gargara penangi,** sp. nov.

Uniform brown; tegmina slightly mottled; posterior process narrow at base, swollen in middle and acute at apex; sides of thorax white tomentose.

Head much deflexed, as wide as long, brown, thickly covered with yellowish pubescence which almost entirely conceals the faint punctuation; base broadly sinuate; eyes large, prominent, mottled brown, extending almost as far lateral as humeral angles; ocelli prominent, shining, pearly, almost twice as far from each other as from the eyes and situated well above a line drawn through centers of eyes; inferior margin of face sinuate and projected; clypeus longer than wide, extending for half its length below inferior margin of face, tip broadened, rounded, very hairy; antennae very long and very slender.

Prothorax uniform brown, finely punctate, thickly pubescent with yellowish hairs; metopidium convex, slightly depressed above base of head; humeral angles prominent, sub-conical, blunt; highest part of pronotum above humeral angles almost flat; median carina not visible over front of pronotum; posterior process short, not reaching internal angles of tegmina, narrow and constricted at base, swollen and strongly carinate above in middle, suddenly narrowed to acute apex; scutellum well exposed, tomentose at base.

Tegmina amber-hyaline; base brown, punctate and pubescent; irregular brown fascia just behind internal angles.

Sides of head and thorax white tomentose; undersurface of thorax and abdomen brown, tip of ovipositor slightly ferruginous.

Legs brown, femora darker than tibiae which shade into flavous at distal ends; tarsi luteus; claws brown.

Length 4.5 mm.; width between tips of humeral angles 2.1 mm.

Type: female. Male somewhat smaller and darker.

Locality: Island of Penang.

Described from a pair from Penang. Type in Professor Baker's collection; allotype in author's collection.

24. **Gargara triangulata,** sp. nov.

Short, thick, heavy-bodied species; brown with white pubescence; pronotum almost triangular as seen from above; tegmina ferruginous, semi-opaque.

Head wider than long, brown, covered with dense white pubescence; base weakly sinuate; eyes large, prominent, brown; ocelli small, white, shining, glassy, farther from each other than from the eyes and situated well above a line passing through centers of eyes; inferior margined of genae sinuate; clypeus almost as broad as long, extending for half its length below inferior margin of face, tip broadly rounded and only slightly pubescent.

Prothorax uniform brown but so irregularly covered with long white pubescence as to give a fasciate appearance, very finely punctate; humeral angles prominent, swollen, triangular, tips blunt; posterior process heavy and short, extending just beyond internal angles of tegmina, lighter in color at base than at tip, strongly carinate above, tip blunt and slightly deflexed; median carina not extending forward over metopidium; metopidium swollen in front, nearly flat on top.

Tegmina uniform ferruginous, nearly opaque, much wrinkled, very hairy at base and along veins.

Sides of thorax densely pubescent; undersurface of thorax and abdomen brown; legs entirely brown.

Length 3.7 mm.; width between humeral angles 2.5 mm.

Type: female (Baker's duplicate No. 8782).

Type locality: Singapore.

Described from two females, one from Singapore and one from the Island of Penang. Type in author's collection; paratype in Professor Baker's collection.

25. **Gargara nervosa**, sp. nov.

Apparently near *G. venosa* Walker from the Celebes (Walker, Journ. Linn. Soc. Zool. X: 189, 1868) and *G. caelata* Distant from the Nilgiri Hills (Distant, Fauna British India App. 172, 3389, 1916).

Uniform brown, punctate, pubescent; tegmina mottled brown and white with veins very large and prominent.

Head wider than long; dark brown, closely punctate, finely pubescent; base irregularly sinuate; face sculptured; eyes large, brown; ocelli inconspicuous, amber-colored, about equidistant from each other and from the eyes and situated a little above a line drawn through centers of eyes; clypeus a little longer than wide, extending for more than half its length below inferior margin of face, tip truncate, slightly pubescent.

Prothorax brown, darker on metopidium and posterior process, closely and finely punctate, sparingly and irregularly pubescent; humeral angles weak, blunt; metopidium very convex as seen from above; median carina not percurrent but appearing only on the posterior process; posterior process short, extending just to the internal angles of the tegmina, slightly depressed at base, carinate above, tip blunt, dark and slightly depressed.

Tegmina hyaline, wrinkled; base brown and punctate; transverse brown fascia just behind base and another just below internal angles; veins very large, strong and prominent; tips more or less pointed, extending just beyond apex of abdomen.

Sides of thorax white tomentose; undersurface of body brown; legs brown.

Length 4.7 mm., width between humeral angles 2.4 mm.

Type: female (Baker's duplicate No. 8980).

Locality: Singapore.

Described from two females, both from Singapore. Type in author's collection; paratype in Professor Baker's collection.

26. **Gargara sordida**, sp. nov.

Dark, heavy-bodied; tegmina more or less blackened; posterior process extending just to internal angles of tegmina; sides of thorax more or less tomentose.

Head wider than long, black, sculptured, finely and closely punctate, sparingly pubescent with golden hairs; base irregularly sinuate; eyes very large, brown; ocelli small, white, glistening, farther from each other than from the eyes and situated far above a line drawn through centers of eyes, almost as high as tops of eyes; inferior margins of genae regularly sinuate; clypeus longer

than wide, extending for nearly half its length below inferior margin of face, tip rounded, hairy.

Prothorax very dark brown, almost black, punctate, densely pubescent with golden hairs; humeral angles prominent, swollen, blunt; metopidium convex; posterior process short, heavy, blunt, extending just to internal angles of tegmina, carinate above, pubescent; median carina prominent on posterior process, very faint behind center of pronotum and not visible on metopidium.

Tegmina dark, translucent, wrinkled; base black and punctate; white tomentose patch of thorax showing through just behind base; dark brown fascia just beneath internal angles and dark brown patch behind apex of posterior process; veins strong and prominent.

Sides of thorax more or less white tomentose. Undersurface of body black. Legs brown.

Length 4.8 mm.; width between humeral angles 2.5 mm.

Type: female. Male considerable smaller and darker.

Locality: Singapore.

Described from two males and two females, all from Singapore. Type, allotype and one paratype in Professor Baker's collection; one paratype in author's collection.

21. **Periaman sp.**

One specimen from the Island of Penang which belongs to the genus *Periaman* and is apparently new. The specimen is, however, considerably mutilated and does not warrant being made the type of a new species.

Some Peculiar Papuan Customs.

By Miss L. S. Gibbs.

In 1913, in the course of Phytogeographical work at about 7 to 8,000 ft. in the Arfak Mountains, of Dutch N. W. New Guinea, my carriers, both men and women, were drawn chiefly from the Wariap and Stari, small "campongs" on the S. W. coast of Geelvink Bay.

While on the March these people collected the leaves of Laportea or Fleurya, sp., tying them neatly into bundles. As soon as climbing began they constantly rubbed these leaves on forearms and legs to the knees with great zest and evident enjoyment. On another occasion during the ascent, the grandson of the "Korano" or headman of Wariap, a most active and intelligent young fellow, stood stoically while the skin of his calves was sliced in spirals, deep enough to let blood flow freely from each cut. This operation was performed by the Malay, or rather Timorese, sergeant (in charge of the escort kindly provided by the Dutch authorities) who thoughtfully explained beforehand what was about to happen. Beyond the fact that it was a peculiarity of the "Papuas" to suffer in the head, I unfortunately did not gather the further drift of his remarks.

On the return journey, a young woman of Stari was brought up as "sakit prut" and given a good dose of Glauber's Salts. She appeared next morning to thank me for her recovery—her forearms and legs to the knees thickly smeared with fæces and accompanied by several companions similarly treated.

It would be interesting if readers of the "Asiatic Journal" could parallel similar instances amongst other native tribes, or possibly those ethnologically conversant with the customs of primitive peoples may be able to elucidate these examples.

Appendix I.

I have read with interest Miss Gibbs' note on "Some peculiar Papuan Customs" and amongst them I have noticed a Papuan Custom which corresponds with much similarity to a custom of the Arawaks and Macusi Indians of British Guiana.

During several surveying journeys in that Colony, I have noticed that when on long journeys especially if carrying heavy baggage, the natives have often rubbed themselves with a kind of

nettle (KAMARI ?) in order they said to stimulate themselves, and give quicker action to the blood, and the same after a time gives them a most soothing effect, which enables them to carry on their work.

It is also done I understand for anyone suffering from backache, when the back is beaten with the nettle, until it sometimes bleeds.

W. R. HUMPHREYS, F.R.G.S.,

LIEUT. R. F. A.

APPENDIX II.

Giraldus Cambrensis states that the Roman nettle *Urtica pilulifera* was introduced into Great Britain by the Romans under Julius Caesar. The soldiers brought some seed of it and sowed it at Romney for their use to rub and chafe their limbs when through extreme cold they should be stiff and benumbed, being told before they came from home that the climate of Britain was so cold that it was not to be endured without some friction to warm their blood. I cannot get any confirmation of this from any of the Greek and Latin authors, but it seems to be a parallel to the accounts of Miss Gibbs and Lieut. Humphreys, as to the use of urtication for relieving chill and stiffness in the limbs.

H. N. RIDLEY.

Hoseanthus Merrill, n. gen.

By H. N. Ridley, f.r.s., c.m.g.

In Journal No. 76, p. 114, Mr. Merrill gives as a New Genus *Hoseanthus* for my genus *Hosea* (Verbenaceae) on the ground that Dennstedt had previously published a genus *Hosea*. This is quite unnecessary additional synonym. Dennstedt got hold of a copy of Rheede's Hortus Malabaricus a work in several volumes of rather poor drawings of South Indian plants, and published a Schluessel zum Hortus Indicus Malabaricus in 1818.

In cases where the drawing was so poor as to be not identifiable he gave it a new generic and specific name, but as no description whatever was published by him or even any suggestion as to the order of the plant these names rank as *nomina nuda* and are valueless. One of these plants was apparently a shrub which was so ill done that it is impossible to certainly identify it and to this sketch Dennstedt gave the name in his list of *Hosea*. Whatever the picture was intended to represent, it has doubtless long ere this received a properly accredited name and description, but I cannot find that any one has ever identified it and I do not know what it is meant for. Where the drawings in this work have been later identified Dennstedt's name has sometimes been retained, though as he did not ever describe one of them, the names were mere *nomina nuda* and might have been dropped. This being the case it is quite unnecessary to add to the ever increasing synonyms by substituting *Hoseanthus* for *Hosea* to retain the latter name for a plant which no one has ever identified and probably never will identify, and which the author Dennstedt never saw in his life nor I expect, would have recognized if he did see it. Dennstedt was evidently not so much a botanist as a compiler of lists; after publishing a Flora of Weimar in Germany he published about 4 compilations of lists of cultivated plants and the above mentioned Schluessel, and nothing else. One cannot protest too strongly against the unnecessary increase of synonyms for plants. Scientifically it has no value at all and only adds to confusion, and bulk of literature for no useful purpose.

The Bornean Species of Eugenia, Schefflera, and Saurauia, represented in the Singapore Herbarium.

By E. D. Merrill.

Bureau of Science, Manila, P. I.

Through the kindness of Mr. I. H. Burkill, Director of the Botanic Garden, Singapore, I was recently loaned the Bornean material of the genera *Eugenia*, *Schefflera*, and *Saurauia* in the herbarium of that institution for study. My original request for this material was prompted chiefly by the idea that through a study of it I would be able specifically to determine a number of specimens of these three genera in the herbarium of the Bureau of Science which were inadequate or incomplete. On receiving the material, however, I found that although most of it comes from Sarawak, from the same general regions whence I have received most of my own Bornean material, comparatively few of the specimens match unidentified material in the herbarium of the Bureau of Science, and a number of sheets represent species entirely different from any of the named species in the latter herbarium. This fact impresses me with the belief that as yet the extant Bornean botanical material represents a relatively small part of the species that actually occur in Borneo, and that intensive field work in botany will add several thousand species to the list of those already recorded from this relatively little known Island. The results of my study of the Singapore material of the three genera under discussion are given below.

Eugenia, Linnaeus.

An examination of the Bornean material representing this genus in the Singapore herbarium has induced me to propose and describe six new species, and to enumerate the specimens representing other species so far as I have been able to identify them. In addition to the twenty-seven species listed below at least eleven others are represented, but in most cases the material is scarcely sufficient to determine whether or not they represent described forms, and if described to which species they appertain. There are now about eighty-five species of the genus credited to Borneo; but the list will certainly be greatly extended. There are, in addition to the eleven Bornean species in the Singapore herbarium

that I cannot specifically determine, twenty others represented in the herbarium of the Bureau of Science by collections which I have not as yet found expedient to determine except generically; more than one-half of the known Bornean species are represented by named specimens in the latter herbarium.

Eugenia kuchingensis, Merr. in J., S. B., R. A. S. **77** (1917) 213.

SARAWAK, *Haviland s.n.*, January, 1889, June, 1888; Rejang, *Haviland 2021*, August, 1893.

Eugenia javanica, Lam., Encycl. **3** (1789) 209.

SARAWAK, Matang, *Ridley 12264*, August, 1905.

Eugenia saligna, (Miq.) C. B. Rob. in Philip. Journ. Sci. **4** (1909) Bot. 332.

LABUAN, January, 1886, collector not indicated; Kuching, *Haviland 2031*, March 1, 1893, a form with relatively broad leaves.

Eugenia rufo-tomentosa, (Gibbs) Merr. in J., S. B., R. A. S. **77** (1917) 224.

SARAWAK, Kuching, *Haviland 1698*, September, 1892, *970*, the latter with rather larger leaves and longer flowers. Both of these specimens have larger leaves and shorter hairs than has Mrs. Clemens's Kinabalu material.

Jambosa conferta, Korth. in Nederl. Kruidk. Arch. **1** (1848) 202.

SARAWAK, Kuching, *Haviland s.n.*, March 27, 1893. The identification has been made from the rather imperfect description alone. The species as I have interpreted it can scarcely be distinguished from *Eugenia reticulata*, Wight.

Eugenia zeylanica, (Linn.) Wight, Ic. **1** (1840) 73.

SARAWAK, *Haviland 67*; British North Borneo, Sandakan, *Ridley 9050*, December, 1897.

Eugenia lineata, (Blume) Duthie in Hook. f., Fl. Brit. Ind. **2** (1876) 487.

SARAWAK, *Haviland 67*, *s.n.*, May 20, 1893, *2027*, and a specimen collected in August, 1884, collector not indicated.

Eugenia coralina, Merr. in J., S. B., R. A. S. **77** (1917) 207.

SARAWAK, near Kuching, *Haviland d. t. q. a.*, November, 1892, two sheets, one in flower, the other in fruit.

Eugenia elliptilimba, Merr. in J., S. B., R. A. S. **77** (1917) 211.

SARAWAK, Kuching, *Haviland 1987*, December, 1892.

Eugenia densiflora, (Blume) DC., Prodr. **3** (1828) 287.

BORNEO, without definite locality but probably from Sarawak, *Ridley 12388*, on river banks.

Eugenia chlorantha, Duthie in Hook. f., Fl. Brit. Ind. **2** (1876) 487.

SARAWAK, Kuching, *Haviland 2924, 2936*, March, April, 1893, and three sheets without numbers.

Eugenia grandis, Wight, Ill. **2** (1841-50) 17.

SARAWAK, Rejang, *Haviland 2920*, June, 1893.

Eugenia ampullaria, Stapf in Trans. Linn. Soc. Bot. **4** (1894) 153, *t. 11, f. c 13*.

BRITISH NORTH BORNEO, Mount Kinabalu, *Haviland 1096*, a cotype.

Eugenia besukiensis, (Hassk.) Merr. in J., S. B., R. A. S. **77** (1917) 226.

SARAWAK, near Kuching, *Haviland 2091*, January 11, 1893.

Eugenia operculata, Roxb., Fl. Ind. ed. 2, **2** (1832) 486.

SARAWAK, *Haviland*, 1893, the number illegible.

Eugenia myrtillus, Stapf in Trans. Linn. Soc. Bot. **4** (1894) 153.

BRITISH NORTH BORNEO, Mount Kinabalu, *Haviland 1109*, a cotype.

The form I credited to Mount Kinabalu as *Eugenia ugoensis*, C. B. Rob., in *J., S. B., R. A. S.* **77** (1917) 226, proves to be a fruiting specimen of Stapf's species. I can see no reason for distinguishing the two species and now believe that *E. ugoensis*, C. B. Rob. is identical with *E. myrtillus*, Stapf.

Eugenia baramensis, Merr. in J., S. B., R. A. S. **77** (1917) 218.

SARAWAK, Kuching, *Haviland 1884*, October, 1892.

Eugenia rugosa, (Korth.) Merr. in J., S. B., R. A. S. **77** (1917) 224.

SARAWAK, Braang, *Haviland 164*, December 21, 1888, on lime-stone.

Eugenia castanea, Merr. in J., S. B., R. A. S. **77** (1917) 212.

SARAWAK, Bergark, *Haviland 122*, January 8, 1889. The specimens differ from the type in having terete branchlets, while the bark is not at all flakey. These specimens much resembles Koorders's figure of *Eugenia amplifiora*, Koord. & Val.

Eugenia caudatilimba, Merr. in J., S. B., R. A. S. **77** (1917) 216.

SARAWAK, Kuching, *Haviland 2025*, April 13, 1893.

Eugenia alcinae, Merr. in Philip. Journ. Sci. **10** (1915) Bot. 216.

SARAWAK, Brooketon, *Haviland 518*, June 21, 1892; BRUNEI, *Haviland 1738* without date.

Eugenia kingii, sp. nov. § *Jambosa*.

Species *E. plumbeae* affinis, differt foliis minoribus, nervis utrinque 5 vel 6.

A glabrous shrub, the branches terete, cinereous, the branchlets reddish-brown, rather slender, distinctly 4-angled, each internode thickened upward. Leaves opposite, chartaceous to subcoriaceous, lanceolate, 5 to 8 cm. long, 1.5 to 2.5 cm. wide, above brownish-olivaceous, smooth, shining, beneath paler, not punctate, narrowed upward to the rather slenderly acuminate apex and below to the obtuse to subacute base; lateral nerves 5 or 6 on each side of the midrib, prominent on the lower surface, somewhat ascending, anastomosing with the equally distinct marginal nerves about 2 mm. from the edge of the leaf, the reticulations distinct; petioles 2 to 3 mm. long. Cymes terminal, subsessile, 3- to 5-flowered, the rachis and very short branches 6 mm. long, or less. Flowers white, about 3 cm. in diameter, the calyx turbinate-infundibuliform, about 1.5 cm. long, narrowed below into a very short pseudostalk, the throat about 1.5 cm. in diameter; lobes reniform, coriaceous, 7 to 9 mm. wide. Styles slender, about 3.5 cm. long.

SARAWAK, Bongaya, *Ridley 9071*, December, 1897, "shrub, flowers white."

This specimen is mentioned by King[1] as being allied to *Eugenia plumbea*, King, from which it differs, however, in its smaller leaves, the lateral nerves being but one-half as many as in King's species.

Eugenia monantha, sp. nov. § *Jambosa*.

Arbor glabra, ramis teretibus, ramulis ultimis tenuibus, distincte 4-angulatis; *foliis* lanceolatis, epunctatis, chartaceis, usque ad 20 cm. longis, subolivaceis, nitidis, sursum gradatim

angustatis, longe et tenuiter subcaudato-acuminatis, interdum leviter falcatis, basi angustatis, acutis vel subobtusis; nervis lateralibus utrinque 12—17, subtus perspicuis, prominulis, anastomosantibus; *floribus* terminalibus, solitariis, circiter 5 cm. diametro, pedicellatis; calycibus late infundibuliformibus, tubo circiter 2 cm. longo.

A glabrous tree the branches slender, terete, the ultimate internodes distinctly 4-angled, slender, 2 mm. in diameter or less. Leaves lanceolate, sometimes slightly falcate, chartaceous, subolivaceous, 12 to 20 cm. long, 2 to 4.5 cm. wide, gradually narrowed upward to the long and slenderly acuminate apex, the acumen often distinctly caudate and up to 2.5 cm. in length, and below to an acute or somewhat obtuse base; primary lateral nerves 12 to 17 on each side of the midrib, prominent on the lower surface, somewhat curved, anastomosing with the equally distinct marginal nerves 3 to 4 mm. from the edge of the leaf, the latter slightly arched between the anastomoses, the reticulations rather close, distinct under a lens; petioles 4 to 8 mm. long. Flowers terminal, solitary, rather large, in anthesis about 5 cm. in diameter, their pedicels 1 to 2 cm. long, distinctly jointed to the calyx. Calyx broadly funnel-shaped, the throat about 1.5 cm. in diameter, the lobes suborbicular-reniform, subcoriaceous, about 8 mm. in diameter, the tube rather abruptly narrowed below forming a short pseudostalk. Style slender, about 3.5 cm. long.

SARAWAK, Rejang, *Haviland 2146*, November, 1892.

This species is strongly characterized by its lanceolate, slenderly acuminate leaves which distinctly resemble those of *Eugenia jambos*, Linn.; its slender terete branches and distinctly 4-angled ultimate internodes of the branchlets; and the large, solitary, terminal, pedicelled flowers. It apparently belongs in the group of *Eugenia jambos*, Linn., but is not closely allied to that species.

Eugenia subracemosa, sp. nov. § *Jambosa*

Arbor glabra, ramulis rugosis, distincte angulatis; *foliis* oppositis, coriaceis, in siccitate utrinque purpureo-brunneis, nitidis, coriaceis, oblongis vel oblongo-obovatis, utrinque subaequaliter angustatis, petiolatis, basi acutis vel acuminatis, apice acuminatis, usque ad 18 cm. longis, margine recurvatis, supra impresso-puncticulatis, nervis utrinque circiter 10, adscendentibus, perspicuis, juxta marginem anastomosantibus, reticulis obsoletis; *inflorescentiis* brevibus, subracemosis, pauciflоris, fasciculatis, e tuberculis in ramis vetustioribus, usque ad 3 cm. longis; *floribus* brevissime pedicellatis; *calycis* tubo turbinato, circiter 3 mm. longo et 4 mm. diametro, deorsum angustato; *petalis* 4, liberis, circiter 4 mm. longis.

A glabrous tree, the branches and branchlets grayish to reddish-brown, rugose, the latter distinctly 4-angled, 3 to 3.5 mm. in diameter. Leaves opposite, coriaceous, when dry purplish-brown on both surfaces, shining, the upper surface smooth, minutely impressed-puncticulate, the lower epunctate, oblong to oblong-obovate, 14 to 18 cm. long, 6 to 7 cm. wide, subequally narrowed to the acute or somewhat acuminate base and to the acuminate apex, the margins recurved; lateral nerves about 10 on each side of the midrib, distinct but only slightly projecting on the lower surface, ascending, anastomosing directly with the equally distinct marginal nerves 2 to 3 mm. from the edge of the leaf, the latter slightly arched between the anastomoses, the reticulations obsolete; petioles thickened, nearly black, rugose, up to 1 cm. in length. Inflorescences up to 3 cm. in length, subracemose, simple, fascicled, each usually 5-flowered, on the older branches, at least always below the leaves, each rachis usually with two lateral and three terminal flowers, the pedicels very short, not exceeding 2 mm. in length. Flowers, including the stamens, 10 to 12 mm. in diameter and about 8 mm. long. Calyx turbinate, the tube narrowed below, about 3 mm. long, the throat about 4 mm. in diameter; lobes 4, ovate, rounded, 2 mm. long. Petals 4, free, about 4 mm. long, elliptic to elliptic-obovate. Stamens very numerous.

SARAWAK, Kuching, *Haviland 2928*, March 14, 1893.

In aspect this species somewhat resembles *Eugenia polycephala*, Miq., but is not closely allied to that species, differing radically in its vegetative characters and in its short, fascicled, few-flowered inflorescences.

Eugenia subsessilifolia, sp. nov. § *Jambosa*

Arbor glabra, ramis ramulisque laevibus, teretibus, subcastaneis; *foliis* oppositis, coriaceis, oblongis, epunctatis, usque ad 13 cm. longis, apice perspicue sed obtuse acuminatis, basi late rotundatis, distincte cordatis, subamplexicaulibus, sessilibus vel subsessilibus, supra in siccitate obscure olivaceis, subtus rubro-brunneis; nervis primariis utrinque circiter 12, subtus distinctis, anastomosantibus; *inflorescentiis* cymosis, axillaribus terminalibusque, brevibus, circiter 2.5 cm. longis, axillaribus pauciflоris, terminalibus densiflоris; *floribus* circiter 1.8 cm. longis, 4-meris; *calycis* tubo deorsum gradatim angustato.

A glabrous tree, the branches and branchlets smooth, subcastaneous, somewhat shining, terete, the nodes somewhat thickened. Leaves oblong, coriaceous, not punctate, the upper surface dark-olivaceous somewhat shining, the lower reddish-brown when dry, sessile or subsessile, 10 to 13 cm. long, 4 to 5 cm. wide, apex rather prominently but bluntly acuminate,

base broadly rounded and distinctly cordate, subamplexicaul; midrib impressed on the upper surface, prominent beneath; lateral nerves about 12 on each side of the midrib, somewhat curved, slender, distinct, slightly projecting on the lower surface, anastomosing with the subequally distinct and slightly arched marginal nerves about 5 mm. from the edge of the leaf. Inflorescences short, cymose, axillary and terminal, the rachis of the lateral inflorescences solitary, less than 1 cm. long, usually 2- or 3-flowered, the terminal inflorescences about 2.5 cm. long, including the flowers, dense, the whole inflorescence about 4 cm. in diameter, the branches about 1 cm. long, each usually 3-flowered. Flowers about 1.8 cm. long and nearly as wide in anthesis, when dry dark-brown. Calyx-tube at least 1 cm. long, gradually narrowed below forming a pseudostalk, sessile, in bud clavate. Sepals orbicular-reniform, about 4 mm. wide. Petals ovate, about 5 mm. long. Filaments numerous, up to 8 mm. in length.

SARAWAK, near Kuching, *Haviland 2923*, February 6, 1893 "petals and sepals caducous."

The alliance of this species is apparently with the Javan *Eugenia hypericifolia*, (Blume) Koord. & Val., from which it is distinguished not only by the shape and apparently less distinct venation of its leaves, but also by its many-flowered inflorescences and clavate eglandular buds.

Eugenia lunduensis, sp. nov. § *Jambosa*

Arbor glabra, ramis ramulisque teretibus vel ramulis leviter compressis vel sulcatis: *foliis* sessilibus vel brevissime petiolatis, chartaceis, oblongo-ellipticis, usque ad 20 cm. longis, acuminatis, basi rotundatis, leviter cordatis, epunctatis, supra olivaceo-brunneis, laevibus, nitidis, subtus pallidis; nervis utrinque circiter 15, subtus valde prominulis, leviter curvatis, cum nervis marginalibus valde distinctis anastomosantibus; inflorescentiis terminalibus, brevissimis, depauperato-cymosis, pauciforis; *floribus* confertis; *calyce* circiter 1 cm. longo, deorsum angustato, lobis patulis; *petalis* suborbicularibus, liberis.

A glabrous tree, the branches and branchlets terete, smooth, pale-brownish, or the ultimate branchlets somewhat compressed or sulcate, never angled, about 3 mm. in diameter. Leaves opposite, chartaceous, oblong-elliptic, sessile or subsessile, 18 to 20 cm. long, 7 to 9 cm. wide, epunctate, subequally narrowed upward to the acuminate apex and below to the rounded and somewhat cordate base, the upper surface olivaceous-brownish, smooth, somewhat shining, the nerves usually slightly impressed, the lower surface pale, shining; lateral nerves about 15 on each side of the midrib, very prominent, slightly curved, anastomosing with the equally distinct, nearly straight

or slightly arcuate marginal nerves about 5 mm. from the edge of the leaf. Cymes depauperate, terminal, the axis and very short branches 5 mm. long or less, the base with several pairs of lanceolate, acuminate, stiff, 5 mm. long bracts, the bracteoles subtending the flowers oblong-ovate, 1.5 mm. long; the pedicels about 2 mm. long. Calyx-tube about 1 cm. long, the limb somewhat spreading, and 8 to 9 mm. in diameter, excluding the lobes, narrowed below, somewhat funnel-shaped; lobes ovate, rounded, sparsely punctate, 4 to 5 mm. long. Petals 4, free, orbicular, about 6 mm. long. Filaments about 6 mm. long (from unopened buds). Styles about 1.5 cm. long.

SARAWAK, Lundu, Mount Gadug, *Haviland 985*, 1892.

The alliance of this species is manifestly with *Eugenia pseudo-formosa*, King, from which it differs chiefly in its somewhat smaller, fewer-nerved leaves and in its distinctly smaller flowers. Another allied species is *Eugenia sexangulata*, (Miq.) Koord. & Val., which differs from the present species, among other characters in its angular branchlets.

Eugenia rhynchophylla, sp. nov. § *Syzygium*.

Arbor glabra, ramis ramulisque tenuibus, teretibus, pallidis; *foliis* chartaceis vel subcoriaceis, oblongis vel oblongo-ellipticis, usque ad 10 cm. longis, perspicue subcaudato-vel rostrato-acuminatis, basi acutis vel leviter acuminatis, in siccitate olivaceis vel brunneo-olivaceis, nitidis, supra minute impresso-puncticulatis, subtus sub lente perspicue punctatis, nervis primariis utrinque circiter 10, irregularibus, distantibus, patulis, leviter curvatis, anastomosantibus, reticulis obsoletis vel subobsoletis; *inflorescentiis* depauperato-cymosis, pauciforis, solitariis vel fasciculatis, axillaribus et terminalibus, usque ad 5 mm. longis; *floribus* obovoideis, circiter 3 mm. longis, sessilibus vel subsessilibus; *petalis* connatis, calyptratim deciduis.

A glabrous tree with slender, terete, pale, smooth branches and branchlets 1.5 to 2 mm. in diameter. Leaves opposite, chartaceous or subcoriaceous, brittle, olivaceous to brownish-olivaceous on both surfaces and somewhat shining when dry, oblong to oblong-elliptic, 8 to 10 cm. long, 3 to 4 cm. wide, the apex conspicuously subcaudate- or rostrate-acuminate, the acumen blunt, about 1 cm. long, the base acute to somewhat acuminate, the upper surface minutely impressed-puncticulate, the lower distinctly punctate under a lens; lateral nerves about 10 on each side of the midrib, spreading, slightly curved, prominent and projecting on the lower surface, usually impressed on the upper surface, distant, rather irregular, anastomosing with the equally distinct marginal nerves 2 to 4 mm. from the edge of the leaf, the lateral nerves somewhat arched between the anastomoses, the reticulations obsolete or subob-

solete: petioles 5 to 8 mm. long. Cymes depauperate, few-flowered, axillary and terminal, solitary or few in a fascicle, 5 mm. long or less, the rachis short, usually with two short lateral branchlets, each bearing one flower. Flowers obovoid, about 3 mm. long, sessile or subsessile, the limb very slightly produced, truncate. Petals wholly united into a deciduous calyptra about 1.5 mm. in diameter. Stamens numerous, their filaments very short.

SARAWAK, Kuching, *Haviland 2930*, May 19, 1893.

This species is especially well characterized by its slender, terete, pale branches and branchlets, the internodes 3 to 9 cm. in length, and its very short, few-flowered, depauperate, axillary and terminal cymes, which do not exceed the petioles in length. It differs radically from *Eugenia baramensis*, Merr., another Bornean species that has very short, few-flowered cymes not only in its vegetative characters but also in its pale, terete, not 4-angled branches and branchlets.

Schefflera, Forster.

Six species of this genus were definitely known from Borneo, and an examination of the material in the Singapore herbarium has enabled me to increase the list to ten. Of the previously described species I was able to match but two in the Singapore herbarium, these being *Schefflera tetrandra*, Merr., represented by *Ridley 12251* from Matang, and *Haviland s.n.* from Kuching, and *S. borneensis*, Merr., represented by a Kuching specimen probably collected by *Haviland*. There are four additional species in the Singapore herbarium, and five in the Bureau of Science herbarium, making a total of nineteen Bornean species; however, as the material representing these additional nine species is decidedly inadequate in each case, I do not consider it advisable to attempt to carry the classification beyond the genus at the present time.

Schefflera borneensis, sp. nov.

Arbor parva, inflorescentiis perspicue brunneo-furfuraceis: *foliis* longe petiolatis, 8- vel 10-foliolatis, foliolis oblongis, integris, coriaceis, usque ad 26 cm. longis, breviter acuminatis, basi obtusis vel acutis, nervis utrinque circiter 12, utrinque cum reticulis distinctis; inflorescentiis ut videtur terminalibus, ramis primariis numerosis, confertis, racemose dispositis, usque ad 20 cm. longis; *umbellis* numerosis, tenuiter pedunculatis, 15—20-floris; *floribus* parvis, 5-meris; *petalis* extus parcissime et minutissime furfuraceis, ovatis, circiter 2 mm. longis; *fructibus* circiter 4 mm. longis, subellipsoideis, acute 5-angulatis, sulcatis.

A small tree, glabrous except the conspicuously brown-furfuraceous inflorescences. Branches apparently thickened.

Leaves palmately 8- to 10-foliolate, their petioles up to 43 cm. long; leaflets coriaceous, pale or pale-brownish when dry, somewhat shining, oblong, 18 to 26 cm. long, 6 to 8 cm. wide, apex shortly acuminate, base obtuse to acute; primary lateral nerves about 12 on each side of the midrib, rather distinct although but slightly projecting on both surfaces as are the rather close reticulations, curved, anastomosing; petiolules 3.5 to 8 cm. long, somewhat thickened at their apices. Inflorescence apparently terminal, consisting of numerous, elongated, racemosely arranged, crowded primary branches about 40 cm. in length, each subtended by a coriaceous, lanceolate to ovate-lanceolate, acuminate, 3 cm. long, furfuraceous bract. Umbels numerous, 15- to 20-flowered, their peduncles slender, in anthesis 1.5 to 2 cm. long, each subtended by an oblong, about 5 mm. long, deciduous, bract, the pedicels up to 4 mm. in length, all parts brown-furfuraceous. Flowers 5-merous; the calyx funnel-shaped, about 1.8 mm. in diameter, 5-toothed, the teeth lanceolate-acuminate from a broad base, about 0.5 mm. long. Petals ovate, 2 mm. long, externally minutely and sparingly furfuraceous. Fruits ellipsoid, about 4 mm. long, prominently and sharply 5-angled, 5-sulcate.

SARAWAK. Kuching, *Haviland 2948* (type), January 25, 1893, "small tree, flowers yellow; *Native collector 1060 Bur. Sci.*

This species is strongly characterized by its numerous, coriaceous, entire leaflets, the petioles being unusually long, and its numerous, crowded, greatly elongated primary branches of the inflorescences which are conspicuously brown-furfuraceous throughout and about 40 cm. in length. Haviland's specimen presents ten of these primary branches, manifestly but a part of those from a single inflorescence.

Schefflera burkillii, sp. nov.

Frutex glaber; *foliis* 5—3-foliolatis, foliolis coriaceis, olivaceis, oblongis ad oblongo-ellipticis, integris, usque ad 10 cm. longis, acutis vel leviter acuminatis, basi acutis, nervis utrinque circiter 10, tenuibus, reticulis distinctis; *inflorescentiis* terminalibus, brevissime pedunculatis, circiter 5 cm. longis, ramis primariis usque ad 4, subumbellatim dispositis; *umbellis* in ramis singulis usque ad 3, pedunculatis, 10—15-floris; *floribus* pedicellatis, 6-meris, petalis circiter 2.8 mm. longis.

A glabrous shrub, the branches rugose when dry, about 5 mm. in diameter, dark-colored. Leaves 5- to 3-foliolate, their petioles about 4 cm. long, inflated at the base, the narrow margins of the inflated part somewhat recurved, not appressed to the branches. Leaflets coriaceous, olivaceous when dry, oblong to oblong-elliptic, 8 to 10 cm. long, 3.5 to 4 cm. wide, entire, base acute, apex acute to somewhat acuminate, mar-

gins entire: lateral nerves about 10 on each side of the midrib, slender, nearly straight, anastomosing, the reticulations rather close and distinct; petiolules 1 to 1.5 cm. long. Inflorescences very shortly peduncled, terminal, about 5 cm. long, the primary branches up to 4, subumbellately disposed near the apex of the peduncle, each bearing up to 7 umbels, in some the umbels mostly near the tips of the branchlets, in others racemosely disposed. Umbels 10- to 15-flowered, their peduncles 8 to 12 mm. long. Flowers 6-merous, their pedicels 2 to 4 mm. long. Calyx somewhat funnel-shaped, truncate, 2.4 mm. in diameter. Petals oblong, acute, about 2.8 mm. long. Anthers 6.

SARAWAK, Matang road, *Native collector 802 Bur. Sci.* (type). August 11, 1911; Matang, June 14, 1893, from the Sarawak Museum, apparently collected by *Haviland*.

Among the Bornean species this is apparently most closely allied to *Schefflera polita*, (Miq.) Viguier, but differs in numerous characters, notably in its entirely different stipules, which in this species are reduced to a recurved narrow rim distant from the branchlet.

Schefflera havilandii, sp. nov.

Frutex vel arbor parva, glabra: *foliis* longissime petiolatis, foliolis 7—9, oblongis, coriaceis, in siccitate brunneo-olivaceis, nitidis, laevibus, usque ad 18 cm. longis, integris, abrupte et breviter acuminatis, basi acutis vel rotundatis, nervis utrinque circiter 7, tenuibus, curvatis vel adscendentibus, saepe indistinctis, reticulis obsoletis; *inflorescentiis* ut videtur terminalibus, ramis primariis (numerosis?) valde elongatis, usque ad 45 cm. longis; *umbellis* numerosis, in ramis primariis racemose dispositis, pedunculatis, circiter 8-floris; *fructibus* junioribus obovoideis, truncatis, circiter 3 mm. longis, deorsum angustatis, basi acutis, irregulariter rugosis, 6-locellatis.

A shrub or a small tree, glabrous. Leaves palmately 7- to 9-foliolate, their petioles at least 30 cm. long; leaflets coriaceous, oblong, entire, brownish-olivaceous, shining, smooth, the apex rather abruptly and shortly acuminate, base acute to rounded, 16 to 18 cm. long, 5 to 7 cm. wide; primary nerves about 7 on each side of the midrib, slender, often indistinct, ascending or curved, the reticulations obsolete; petiolules 3 to 6 cm. long. Inflorescences apparently terminal and composed of several (many?) greatly elongated primary branches, these up to 45 cm. in length, the lower parts naked, the upper two-thirds to three-fourths of each with numerous, racemosely disposed, about 8-flowered umbels, their peduncles 1 to 1.5 cm. in length. Pedicels about 5 mm. long. Young fruits obovoid, truncate, narrowed below to the acute base, irregularly rugose, about 3 mm. long, 6-celled.

SARAWAK, near Kuching, *Haviland's collector 192*, November 23, 1892; *Haviland 2947*, March 22, 1893.

At first glance this species resembles *Schefflera borneensis*, Merr., but is readily distinguished by its smooth leaflets in which the reticulations are obsolete, and its glabrous inflorescences. It probably has the same type of inflorescence as the latter, but the specimens available do not show its true characters, the primary branches being detached.

Schefflera racemosa, sp. nov.

Frutex, inflorescentiis floribusque cinereo-puberulis; *foliis* longissime petiolatis, 6-foliolatis, foliolis in siccitate pallidis, subcoriaceis, oblongis, usque ad 25 cm. longis, acuminatis, basi obtusis, margine perspicue distanter serratis vel subintegris, nervis utrinque circiter 6, subtus valde prominulis, curvatis, arcuato-anastomosantibus, reticulis laxissimis; *inflorescentiis* breviter pedunculatis, ramis circiter 3, circiter 25 cm. longis; *floribus* in fasciculis distantibus dispositis, breviter pedicellatis, plerumque 8-meris; *petalis* oblongo-ovatis, circiter 3 mm. longis, extus puberulis.

A shrub, glabrous except the cinereous-puberulent inflorescences and flowers, the branches up to 1 cm. in diameter. Leaves 6-foliolate, their petioles 35 to 40 cm. in length, the petiolules 2 to 8 cm. long, the exterior ones shorter than the central ones; leaflets pale when dry, subcoriaceous, oblong, 18 to 25 cm. long, 5 to 10 cm. wide, narrowed below to the obtuse base and above to the rather slenderly acuminate apex, the margins distantly and rather prominently serrate to subentire; lateral nerves about 6 on each side of the midrib, distant, lax, curved, arcuate-anastomosing, very prominent on the lower surface, the reticulations very lax. Inflorescences apparently in the uppermost axils, usually 3-branched, shortly peduncled, the peduncles 3 cm. long or less, the branches usually about 25 cm. long. Flowers in distant fascicles on the primary branches, usually six or less in a fascicle, each fascicle subtended by an ovate-lanceolate, acuminate, puberulent, deciduous bract 5 mm. long or less; the pedicels puberulent, 2 mm. long or less. Calyx funnel-shaped, truncate or obscurely denticulate, about 3 mm. in diameter and 2 mm. long, puberulent. Petals 7 to 9, usually 8, oblong-ovate, acute, about 3 mm. long, externally puberulent. Stamens as many as the petals. Fruits unknown.

SARAWAK, Bau, *Ridley 11775* (type), July, 1893, *Anderson 49*, August, 1912; Braang, *Haviland 35*, November, 1888; Mount Sudan, *Native collector 2042 Bur. Sci.*

This species is well characterized by its long-petioled leaves, prominently nerved leaflets, and by its characteristic

inflorescences, the primary branches usually three in number, cinereous-puberulent, and the shortly pedicelled, usually 8-merous flowers being arranged in distant, few-flowered fascicles, not in umbels.

Saurauia, Willdenow.

Saurauia planchonii, Hook. f. in Trans. Linn. Soc. **23** (1860) 161.

SARAWAK, near Tegora, *Haviland 2048* and a sheet without number indicated as "= *2048*": Kuching, *Haviland*, indicated as "= *764*" (inflorescences immature); Matang, *Ridley*; Bau, *Ridley 11785*, "epiphyte, flowers red"; Tambusan, *Ridley*.

A characteristic endemic species.

Saurauia heterosepala, Merr. in Philip. Journ. Sci. **13** (1918) Bot.

SARAWAK, near Kuching, *Haviland 27* and *s.n.*, March, 1893. The specimens differ in a few minor details from the type but I think represent this species.

Saurauia oblancifolia, Merr. nom. nov.

Saurauia oblanceolata, Merr. in Philip. Journ. Sci. **13** (1918) Bot. 92, non Ridley, 1916.

SARAWAK, Bongaya, *Ridley 9076*, December, 1897, "shrub, flowers white, said to be irritating." The specimen agrees closely with the type.

Saurauia ferox, Korth., Verh. Nat. Gesch. Bot. (1839-42) 132, *t. 30*.

SARAWAK, *Haviland s.n.* Apparently typical of this endemic species.

Saurauia amoena, Stapf in Trans. Linn. Soc. Bot. **4** (1894) 134.

BRITISH NORTH BORNEO, Mount Kinabalu, *Haviland 1361*, a cotype of this endemic species.

In addition to the above and those described below, there is in the herbarium also a species indicated under an as yet unpublished name proposed by Stapf, represented by four specimens, and an apparently undescribed species represented by a rather inadequate specimen from Gaya, collector not indicated but probably Ridley.

Saurauia glabra, sp. nov.

Frutex glaber; *foliis* coriaceis, in siccitate olivaceis, nitidis, subtus brunneis vel castaneis, plerumque oblongis, usque

ad 18 cm. longis, breviter acuminatis, basi acutis, margine crenulatis, nervis utrinque 8—10, distinctis; *floribus* e ramis defoliatis, solitariis vel binis, glabris, longe pedicellatis; *sepalis* valde inaequalibus, exterioribus ellipticis, circiter 6 mm. longis, interioribus latissime ovatis vel suborbicularibus, circiter 8 mm. longis; *ovario* glabro; stylis 3, circiter 9 mm. longis, basi leviter connatis.

A shrub, glabrous throughout, or the very youngest parts slightly furfuraceous, soon becoming entirely glabrous. Leaves mostly oblong, coriaceous, 10 to 18 cm. long, 4 to 7 cm. wide, usually olivaceous when dry, the lower surfaces brownish to castaneous, shining, the apex shortly and rather obtusely acuminate, base acute, margins crenulate; lateral nerves 8 to 10 on each side of the midrib, prominent; petioles 2 to 3 cm. long. Flowers on the branches below the leaves, solitary or in pairs, their pedicels ultimately 3 cm. in length (in young fruit) in bud shorter, each with one or two ovate, obtuse bracts in the lower part 1 mm. long or less. Sepals glabrous, unequal, the outer two elliptic, about 6 mm. long and 3.3 mm. wide, the inner three broadly ovate to suborbicular, about 8 mm. long. Corolla about 12 mm. long, the lobes 9 by 6 mm., the apex truncate-rounded and retuse. Stamens about 30. Ovary glabrous; styles 3, glabrous, about 9 mm. long, united for the lower 1 to 2 mm.

SARAWAK. Matang, *Haviland s.n.*, August, 1888 (type). Penkuku, *Haviland s.n.*, near Kuching, *Haviland 1004*, January 19, 1892 (with some of the leaves obovate). *Native collector 256, 555, 2495 Bur. Sci.*

This species greatly resembles *Saurauia nudiflora*, DC., of the Malay Peninsula, Sumatra, and Java, but is at once distinguished from it by its 3, not 5 styles; it differs also in various other characters.

Saurauia spinuloso-setosa, sp. nov.

Frutex vel arbor parva, ramis et foliis utrinque et inflorescentiis perspicue curvato-spinuloso-setosis, setis plerumque subpatulis, ferrugineis vel subferrugineis; *foliis* chartaceis, ellipticis vel ovato-ellipticis, usque ad 17 cm. longis, in siccitate supra castaneis, subtus pallidioribus, apice tenuiter caudato-acuminatis, basi saepe leviter inaequilateralibus, obtusis vel rotundatis, margine perspicue spinulosis, nervis utrinque circiter 15, perspicuis; *cymis* axillaribus, solitariis vel fasciculatis, subsessilibus vel breviter pedunculatis, pauciforis; *bracteis* linearibus, 4 ad 6 mm. longis, setosis; *sepalis* setosis, oblongo-ovatis, acutis, circiter 5.5 mm. longis; *antheris* circiter 30; *ovario* glabro, stylis 3, liberis, glabris, 3 mm. longis.

A shrub or small tree, all parts prominently spinulose-setose with brownish to ferrugineous, usually spreading, curved

setae 2 to 5 mm. in length. Leaves chartaceous, elliptic to ovate-elliptic, 11 to 17 cm. long, 5.5 to 8 cm. wide, the apex slenderly caudate-acuminate, the acumen usually about 2 cm. in length, the base often somewhat inequilateral, obtuse to rounded, the margins prominently spinulose-setose, the upper surface castaneous, with numerous, scattered, curved, rather short setae, the lower surface pale-brownish, densely setose on the midrib and nerves, with fewer and smaller setae on the reticulations; lateral nerves about 15 on each side of the midrib, prominent, curved; petioles 1 to 2 cm. long, densely setose. Cymes axillary, solitary or fascicled, few-flowered, 2 cm. long or less, all parts prominently setose, the peduncles 8 mm. long or less, the pedicels slender, 6 to 10 mm. long; bracts linear, 4 to 6 mm. long, densely setose. Sepals about 5.5 mm. long, setose, oblong-ovate, acute. Corolla-lobes oblong, about 6 mm. long, 2.5 mm. wide, apex truncate-rounded, not or but obscurely retuse. Stamens about 30. Ovary glabrous; styles 3, free, glabrous, 3 mm. long.

SARAWAK, Kalaka, April 17, 1893, collector not indicated, but probably *Hariland*.

This species is prominently characterized by its numerous, slender, usually spreading, curved setae which are present on all the vegetative parts; its slenderly caudate-acuminate, prominently spinulose leaves which are castaneous above when dry and pale-brown beneath; and its few-flowered, axillary cymes. It is probably as closely allied to *Saurauia acuminata*, Merr., as to any other described form but is radically different from that species.

Saurauia ridleyi, sp. nov.

Frutex vel arbor parva, ramis teretibus, glabris, ramulis junioribus densissime longe subadpresse setosis; *foliis* chartaceis, oblongis, oblongo-obovatis, vel oblongo-oblanceolatis, plerumque utrinque subaequaliter angustatis, apice tenuiter acuminatis, basi acutis vel obtusis, usque ad 37 cm. longis, margine spinulosis, supra glabris, subtus ad costam nervosque spinulosis, nervis utrinque 15 ad 20, perspicuis; *floribus* fasciculatis, axillaribus vel e ramis vetustioribus, pedicellis ciliato-hirsutis; *sepalis* extus parce hirsutis, circiter 4 mm. longis; *petalis* oblongis, obtusis; *ovario* glabro; *stylis* 3, tomentosis, circiter 3 mm. longis, in ½ inferiore parte connatis.

A shrub or a small tree, the tips of the branchlets and the younger petioles densely subappressed-setose with slender, brownish to fulvous setae up to 5 mm. in length, the branches terete, glabrous. Leaves chartaceous, oblong, oblong-obovate, or broadly oblong-oblanceolate, for the most part subequally narrowed to base and apex, 15 to 37 cm. long, 7 to 11 cm. wide, the apex slenderly acuminate, the base acute to somewhat

obtuse, the upper surface entirely glabrous, pale-olivaceous, shining, the lower rather prominently curved-setose on the midrib and lateral nerves and otherwise somewhat hirsute, the margins spinulose, the slender teeth appressed or incurved; lateral nerves 15 to 20 on each side of the midrib, prominent, curved, the reticulations distinct, subparallel; petioles 1.5 to 4 cm. long, when young rather densely curved-setose like the branchlets, in age glabrous or nearly so. Flowers fascicled, axillary and on the older branches below the leaves, few to as many as 15 in a fascicle, the slender pedicels up to 12 mm. in length, ferruginous-hirsute. Sepals elliptic-oblong to ovate, acute, about 4 mm. long, externally slightly hirsute. Corolla-lobes oblong, obtuse or rounded, equilateral, about 4 mm. long and 2 mm. wide. Stamens about 20, the anthers 2.5 to 3 mm. long. Ovary glabrous. Styles 3, tomentose, about 3 mm. long, united for the lower 1 mm.

SARAWAK, Lundu, *Ridley 12459* (type), September, 1894 ?; Matang, *Hullett, s.n.*, *Ridley 12269*, August, 1893.

This species is well characterized by its rather densely incurved-setose branchlets and petioles, the midrib and lateral nerves on the lower surface of the leaves with similar setae, and its fascicled, slenderly pedicelled flowers with glabrous ovaries and tomentose styles.

Saurauia havilandii, sp. nov.

Frutex vel arbor parva, partibus junioribus inflorescentiisque exceptis glaber vel subglaber; ramis teretibus, glabris, ramulis parce adpresse squamosis; *foliis* chartaceis, oblongis vel oblongo-ovatis, usque ad 25 cm. longis, tenuiter acute acuminatis, basi acutis, margine breviter subadpresse serratis, supra glabris, subtus pallidis, glabris, vel ad costa parcissime adpresse squamosis, nervis utrinque 15—18, perspicuis; petiolo 3 ad 4 cm. longo; *paniculis* terminalibus vel ex axillis superioribus, pedunculatis, solitariis, pedunculatis, multifloris, usque ad 20 cm. longis, dense adpresse squamoso-setosis, squamis vel setis brevibus; *floribus* parvis; *sepalis* 2.5 ad 3 mm. longis, exterioribus extus adpresse setosis; *antheris* 10; *ovario* glabro; *stylis* 3, distincte tomentosis, ad basi leviter connatis, 2 mm. longis.

A shrub or small tree, glabrous or nearly so except the very young parts and the inflorescences. Branches terete, dark reddish-brown, glabrous, the branchlets with few, closely appressed, short, thick scales. Leaves chartaceous, oblong to oblong-ovate, 11 to 25 cm. long, 6 to 10 cm. wide, narrowed upward to the slenderly and acutely acuminate apex, the acumen sometimes subcaudate and up to 2.5 cm. long, the base acute to subobtuse or broadened as to be almost rounded, the margins with small, closely appressed, short, thickened, sharp

teeth, the upper surface blackish when dry, glabrous, the lower pale, glabrous, or the midrib with very few appressed scales; lateral nerves 15 to 18 on each side of the midrib, prominent, curved, anastomosing, the reticulations subparallel, distinct; petioles 3 to 4 cm. long, glabrous or nearly so. Panicles solitary, terminal or in the uppermost axils, pedunculed, up to 20 cm. long, many-flowered, the peduncles 4 to 6 cm. long, with few, appressed scales, the lower branches up to 7 cm. in length, these with the branchlets and the rachis rather densely appressed setose-scaly, the setæ or scales brownish, short. Flowers numerous, small, their pedicels 2 to 3 mm. long, the bracts linear-lanceolate, 2 mm. long or less, appressed-setose. Sepals thin, elliptic-ovate, acute to obtuse, externally sparingly appressed-setose, 2.5 to 3 mm. long. Corolla-lobes elliptic, rounded, 3.5 to 4 mm. long, not retuse. Anthers 10, about 2 mm. long. Ovary globose, glabrous: styles 3, distinctly tomentose, about 2 mm. long, slightly united below.

SARAWAK, Braang, *Haviland s.n.*, November, 1888.

In general appearance this species resembles *Saurauia planchonii*, Hook. f., and is manifestly allied to it. It can be readily distinguished by its leaves being entirely glabrous beneath or at most with but few, closely appressed scales on the midrib.

The Circumstances attending the Murder in 1859, of the Botanist James Motley.

By I. H. Burkill.

In Britten and Boulger's useful *Biographical Index of British and Irish Botanists* (London, 1893) the following is the entry regarding James Motley, its abbreviations expanded for clearness:—

> Motley, James, (fl. 1847-55). Murdered in Borneo by Mohammedan settlers. Of Aberafon, Glamorganshire, and afterwards of Labuan. Contrib.[utor] to Phyt.[ologist] ii. (1847) and Journ.[al of] Bot.[any], 1847 and [of] Carmarthen plants to Top.[ographical] Bot.[any], (551). Collected in Malaya, 1852-55. [Published] "Contrib.[utions] to [the] Nat.[ural] Hist.[ory] of Labuan" (with L. L. Dillwyn), 1855. Plants [collected by him are] at Kew. [Vide] Linn.[ean Society's] Trans.[actions], xxiii, 157; R.[oyal] S.[ociety's] C.[atalogue], iv, 495. [Commemorated in] Barclaya Motleyi, Hook. f.

The statement that he was murdered by Mohammedan settlers is derived from the *Transactions of the Linnean Society*, loc. cit., where Sir Joseph Hooker in dedicating to him the jungle waterlily, *Barclaya Motleyi*, states that the examination of it was almost the last botanical work that he did. The implication that the murder was done in 1855 arises from want of evidence as to the date. But the events which led up to his death are recorded in the Singapore Free Press for 1859; and as apparently there appears to be only one file of the paper existing, it seems desirable to recall them. The word "settlers" disappears from the story.

James Motley was a Civil Engineer, who about 1852 went to Labuan in connection with coal-mining there, and became later the Superintendent of the coal-mining operations of a private company upon a concession in the territory of the Sultan of Banjermassin. This concession was along the Sungei Banyu Irang at two or three days journey to the south of Banjermassin town. There he was in 1859. In the very commencement of that year sinister whispers of sedition brewing in Banjermassin reached the Dutch Government in Batavia; but so badly was the Government served by their Resident at the Sultan's court that they were told in answer to their immediate enquiries that it was nothing. It was in fact a court-intrigue to replace the ruler by his brother, and, in doing so, to overthrow Dutch authority by which the reigning

Sultan was maintained. The plotters played upon religious fanaticism, producing for their purpose a man who claimed to have come from heaven, and instigated the Dyaks to rise. They rose on April 28th,§ and attacked the mines at Pengaron which is on the east of Banjermassin, about as remote from it as the Sungei Banyu Irang is to the south. Though they were beaten off, they succeeded in arresting the messenger sent to Banjermassin to report, and killed him.

Three days later § they attacked Motley's mines, killing Motley at a place called Bangkal,† and Motley's wife and three children at a place called Kalangan;† where also they murdered the rest of the company's staff, their wives and children, all except a few infants. They murdered also about the same date in the same region a Dutch political officer and several missionaries. They all but got possession of the country, so that the fighting extended to Banjermassin itself, and it was not for two years that there was quiet again.

§ Singapore Free Press of 2nd. June, 1859.
† Singapore Free Press of 30th. June, 1859.

Notes on Dipterocarps.

No. 3. The seedling of *Shorea robusta*, Roxb., and the conditions under which it grows into pure forests.

By I. H. Burkill.

In this *Journal*, 1917, pp. 163—167, outline figures of the seedlings of some Malayan Shoreas were given; and the remark was made that the Indian *Shorea robusta*, well known as *Sal*, differs from them in the elongation of the stalks of its cotyledons. It is now possible to illustrate the remark by an outline figure of the seedling of *Shorea robusta* at the same stage as the Malayan species: and if the reader, after glancing at it, will turn back to the pages named, he will see at once how wide is this difference.

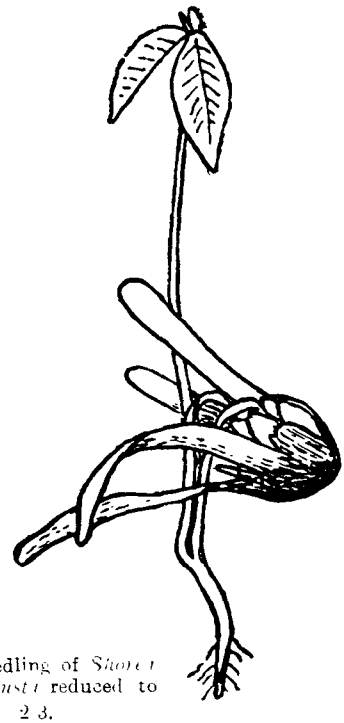
In my material of *S. robusta* the stalks of the cotyledons attained 6 cm. in length: whereas those of the Malayan species figured before never exceeded 1 cm.

I owe the material to the kindness of Mr. R. S. Hole of the Indian Forest Service, Botanist at the Imperial Forest Research Institute, Dehra Dun.

Shorea robusta is one of the most important of Indian Forest trees: for instance, Pearson estimated in 1913 that the annual production exceeded eight million cubic feet (Economic Value of Shorea robusta, *Indian Forest Memoirs*, ii. part 3, 1913, p. 70); and while the Government conserves large forests of it, there are also considerable areas privately owned and worked. The distribution of the Government forests may be gathered easily from Caccia's paper entitled "Development of Sal" in the *Indian Forest Records*, vol. 1, part 2, 1908, p. 85, to which a map is appended. The privately owned forests lie in the same regions, which may be summarised thus:—

(i) a belt, extending along the base of the Himalaya, and up its slopes to about 4000 feet (in favoured localities somewhat higher) between the Kangra valley on the west and the Darrang district in Assam on the east.

(ii) the country east of the Bengal plains comprised in the Garo, Khasi and Jaintea hills, and the hilly district of Nowgong to the north.



Seedling of *Shorea robusta* reduced to 2/3.

(iii) the hills south west of the Bengal plains, westward to Pachmarhi, and southward into the Circars, as far as Jeypur.

In a general way these three areas are together the rim of the cup into which the monsoon current from the Bay of Bengal pours its moist air from May to September, with precipitations from June. At the extreme western points the average annual rainfall is reduced to below 40 inches. In other places the precipitation is upward of five times as much. On the hills and also to some extent in the plains, Sal withstands frost. Everywhere it demands good drainage.

The Sal tree flowers in March or April when the dry season is on, changing its leaves rapidly just previously or at the same time; and this in every year; but a good seed crop is only yielded about once in three years. McIntyre (*Notes on Sal in Bengal*, Forest Pamphlets Series, 1909, p. 2) attributes to unfavourable weather the failure to yield annually; but this is a point which demands investigation. The seeds are ripe in the commencement of the rains, and are ready for immediate growth; in fact they often germinate on the tree (vide Brandis, *Forest Flora of the North-west and Central India*, 1874, p. 27, and also earlier writers); if drought follows their fall to the ground, they are likely to die.

They are starchy (about 60 per cent of starch on dry weight); but they fail as a food on account of tannins present to the extent of 8 per cent. These tannins act on man as poisons causing indigestion, constipation and ultimately death (see Reinherz, in *The Agricultural Ledger*, 1904, No. 5, pp. 33—36). It is obvious that they serve to protect the seed, but not altogether;* for many animals feed on them†: and, as with all vegetation, there are specialised insect-enemies.‡

The seeds of the Malayan Shoreas seem very similar in being relatively rich in tannins: and to have similar enemies.

The parent Sal tree many attain 20—25 feet in girth, but it is recorded that it may be a seed-bearer with as little girth as 7½ inches (Troup in *Forest Bulletins*, New Series, No. 8, 1912). Troup was unable to show any laws of variation relating to the viability of seed got from trees of different sizes, of different degrees of soundness, of different localities, or of seed ripened in the beginning, middle or end of the seed-time, but he suspected a possible law in regard to the last, the middle of the season being best. Haines (*A Forest Flora of Chota Nagpur*, 1910, p. 178), has said that the earliest are generally bad.

There is no albumen around the embryo plant in the seed, but all its store of food is in its gorged bilobed cotyledons. It has been shown for *S. leprosula* (this *Journal*, 1917, p. 161) how the lobes of the cotyledons, enwrapping in their growth the placentae and the sterile cells of the ovary, push themselves into the apex of the fruit. In *S. robusta* the two lobes of the inner cotyledon alone attain it, shutting out the outer, as suggested in the illustration above.

The seeds, upon falling to the ground, thrust the radicle to the soil chiefly by the growth of the stalks of the cotyledons, the cotyledons themselves remaining loosely apposed, and scarcely functioning as assimilatory organs. Herein is a great divergence from what is to be found in those Malayan Shoreas that are known to me, a divergence which carries *S. robusta* to a position in the order close to the genus *Dipterocarpus;* for the cotyledons in *Dipterocarpus* remain imprisoned within the wall of the fruit, do not assimilate, and as the young plant grows are depleted of their food through their stalks which elongate, although not exactly to plant the radicle as those of *S. robusta,* but accomodatingly to the elongation of the hypocotyl.

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* Tannins are present also in the bark of the Sal tree to the extent of 8—10 per cent (vide Pearson, Economic value of Shorea robusta, in *Indian Forest Memoirs,* ii. part 3, 1913).

‡ In Mr. Hole's experiments porcupines were troublesome (*Indian Forest Records,* v, part 4, 1916, p. 52).

† E. B. Stebbing describes the Indian insect enemies of *Shorea robusta* in a paper entitled *some Assam Sal insect pests,* Forest Bulletin Series, 1907.

This relationship of *S. robusta* to the genus *Dipterocarpus* finds confirmation in the anatomy as determined by Heim. Heim, (*Recherches sur les Dipterocarpacees*, Paris, 1890, p. 40), having divided *Shorea* into nine sections, and having put *S. robusta* into the first of them, called *Eu-Shorea*, wrote of it, "This section seems to make connection with the genus *Dipterocarpus* especially by reason of the distribution of its vascular bundles in the leaf-stalk, and in the number of resin canals: but in the shape of the stamens it diverges more than do other sections such as *Antho-Shorea*."

Unfortunately of Heim's Eu-Shoreas there are many species yet to study.

S. robusta at its best, where the drainage is excellent and the soil is deep, makes pure forests, of a beautiful dark green, and often with the ground coated by seedlings struggling up under the parent trees. Hole (*Indian Forest Records*, v., part 4, p. 52) has found that the seedlings will grow healthily under an artificial shade which reduces the light to .015, demonstrating so how well the species is able to tolerate, when young, the deep shade those forests, wherein it asserts itself continuously against other trees. This power of making pure forests is possessed by some other Dipterocarps. *Dipterocarpus* itself possesses it, and *Dryobalanops Camphora*, and *Shorea assamica*, none in competition against another, but each in its own particular geographic region:—*S. robusta* round the rim of the Bengal plains, *S. assamica* in Upper Assam, *Dipterocarpus* chiefly through Burma, Siam and Indo-China, and *Dryobalanops* in Sumatra, Borneo and the Malay Peninsula.

Some observers have written of the success of *Shorea robusta* as connected with forest fires. Gamble pointed out that it drops its seeds after the season of fires is over, and shares the profit got thereby in its less pure forests with *Stereospermum chelonoides*—a rather constant companion which sheds its seeds at the same time. Brandis (*Forest Flora* XIII, p. 53) remarked that the reproduction of Sal may be materially increased by the circumstance that the seed falls after the fires have passed. Many foresters, the last Troup (*Indian Forester*, 1916, p. 57), have pointed out that if fire is withheld the coating of dead leaves on the forest floor prevents the sprouting seeds from sending their roots down, and betrays them by drying rapidly when a dry spell comes. Others have pointed to the way in which a coating of grasses and other herbs may hold the seed from off the ground by its wings, so that it germinates in the air, to be dried up soon: and that as these leaves and grasses are destroyed by the fires, a way is thereby prepared for the seed.

Haines (*Indian Forester*, 1917, p. 311) has stated that fires are advantageous in another direction, namely that they diminish the abundance in the forests of the fungi which attack Sal.

But if the fires be repeated too soon any occasional advantage is lost*. And after all what is the advantage where conditions are favourable to Sal, for there considerably over ninety-nine per cent of the seeds which fall must fail for want of room.

It cannot be that the liability of Sal or Dipterocarpus forests to fires assists at all in maintaining pure forest other than perhaps as Haines suggests in destroying fungi. So much is this recognised that every Indian forester of experience advocates fire protection, as a principle. But fire applied not more frequently than, say, triennially beyond the edge of pure forest may assist the Sal or Dipterocarpus in extending by clearing the way for the seed and damaging the competitors. Unfortunately forest fires where likely to occur, are annual. And under this view, the failure of the Malayan Shoreas to make pure forests is scarcely to be ascribed to their freedom from them.

It is on deep open soils that Sal makes the pure forests—soils such as happen to be peculiarly well developed by rapid rivers from out of the rocks of the Himalaya, soils where the water may sink in dry periods in such a way† as to injure many plants which compete elsewhere. Sal finds on these soils the combination of yet unanalysed conditions ideal to it: and obviously it has a peculiar physiological adaptation to their nature to which its success may be ascribed. This physiological adaptation it shares somewhat with *Shorea assamica*: for *Shorea assamica* makes its pure forests on just the same kinds of soil.

Sal seedlings have a wonderful power of replacing the primary stem if it be lost, even right from the axils of the cotyledons. So far I have seen nothing like it in the Malayan Shoreas. Not once only can the seedling make good the leader, but it may renew it again and again through some years. Hole has illustrated this process in three places (*Indian Forest Records*, v, part 4, 1916, plate 1; *Indian Forester*, 1916, plate 23, p. 336; and *Agricultural Journal of India*, Indian Science Congress Number, 1916, plate 1.)

This loss of the leader is usually caused by something which is not a forest fire, though forest fires may of course cause it; and in at least ninety per cent of cases it comes from some underground influence acting through the root. Hole finds that the mixing with the soil of leaves, especially of Sal leaves, increases it, and he suggests that a toxic body is produced in the process of their decomposition directly or indirectly. If this be so, then light forest fires by removing the leaves on the forest floor may do good.

For the destruction of the Sal forests at the foot of the Himalaya between the rivers Gandak and Teesta, by repeated firing, see my note in the Journal of the Asiatic Society of Bengal, 1916, p. 267.

†Cf. Milward's statement (*Indian Forester*, xxviii, 1803, p. 411) that under excellent Sal in Oudh the water may be 40 feet down.

This dying back of Sal seedlings is most intense in the rains: the seedling in appearance dies back exactly as it does also from drought, as if the plethora of water at the roots works in the same way as its want. But Sal seedlings can be grown in water cultures, and therefore contact with water itself has nothing to do with it. It would rather seem to be something shut out from or brought to the roots (Hole's toxic body for instance) by the water. Death can be caused in pots without the neighbourhood of other plants, and and therefore by no toxic excretion of another plant (Hole in *Indian Forester*, 1916, p. 337). The Malayan Shoreas too die in wet periods, as far as I have observed, but there is this difference that Sal dies back only, whereas they die out. Herein is a difference between the two, perhaps connected with the greater success of the Sal (within its area),—a difference which demands investigation.

For the purpose in hand, namely to form a sound classification of the order to which these trees belong, two facts may be useful. (i) that the Indian species *S. robusta* and *S. obtusa*, are more able to make pure forests than any of our many Malayan Shoreas, and (ii) that *S. robusta*, at any rate, is in its seedling more similar to the genus *Dipterocarpus* which also forms pure forests, than are the Malay Shoreas, *S. leprosula*, Miq., *S. rigida*, Brandis, *S. macroptera*, Dyer, *S. bracteolata*, Dyer, and *S. gibbosa*, Brandis. The pure forests are not the creation of man through firing: but the mixed forests may carry his impress.

A new Dendrobium, D. gracilipes, from the Rhio Archipelago.

By I. H. Burkill.

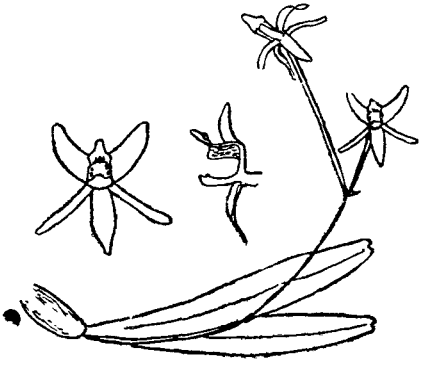


Figure of *Dendrobium gracilipes* reduced to ½: the flower in section and in face view natural size.

Dendrobium (Sarcopodium) gracilipes. *Rhizoma* longum, seu pennae corvinae crassum. *Pseudobulbi* juniores bracteis scariosis vaginati, deinde nudi, 4 cm. disparsi, oblique ovoidei, circa 3 cm. longi, politi, viridissimi, nitentes, diametro ad 14 mm., bifoliati. *Folia,* glabra, sessilia, lineari-elliptica, ad 16 cm. longa, ad 2.5 cm. lata, polita nitentia, saturate viridia, pagina inferiori pallidiora, apice bidentata dentibus rotundatis. *Pedicellus* glaber, capillaris inter folia natus, biflorus, viridis. *Ovarium* pallidum, longum. *Sepala* eburnea, lanceolata; dorsale cum ovario angulum rectum faciens; lateralia ad pedem gynostemii decurrenta mentum rectangulare 5 mm. longum formantia, leviter curvata; omnia 15 mm. longa, 5 mm. lata, acuta. *Petala* linearia, sepalis aequilonga, 1.5 mm. lata, eburnea, leviter curvata, acuta. *Labellum* trilobatum; lobi laterales velut parietes antri erecti, margine superiori admodum recti, intus purpureo-puncticulati, apice purpurei, etiamque in marginibus superioribus purpurei, in margine inferiori saturate crocei; lobus medius subdeltoideus ex basi lata apice subacuminatus, marginibus et apice eburneus, versus fauces croceus, tri-carinatus. *Columna* ex ovario prorsa, eburnea, equilateralis, ad basi infra rufobrunnea.

RHIO. Colitur in Singapur a B. K. Saheb, florunt mense Octobri et mense Novembri.

This species is near *Dendrobium longipes*, Hook. f. and *D. macropodium*, Hook. f., the former especially. It is much more slender than either, and indeed is a really graceful little orchid. From *D. longipes* it differs also in its narrow petals and the straighter side to the lateral lobes of the labellum. These lateral lobes are folded upwards so as to make the walls of the rectangular tunnel into which insects are invited that they may fertilise the flowers. The mid lobe of the labellum is very much as in *D. longipes* (vide Hooker's *Icones plantarum*, plate 2617): its bright yellow centre set off by the purple at its back on the side lobes and the reddish brown in the back under the column. The rest of the flower is ivory white. The long slender ovaries are as in *D. longipes*, and as in *D. macropodium*.

On the whole the flower superficially suggests a *Coelogyne*.

The Cannibal King in the "Kedah Annals."

By C. O. Blagden.

The story of the cannibal king on pp. 71-77 of the "Hikayat Marong Mahawangsa" (*J. R. A. S., S. B., No. 72, May, 1916*), differs a good deal in setting and incident from the similar tale in Number 537 of Fausboll's series of the "Maha-Sutasoma-Jataka" (vol. V. p. 246 seq. of the translation by Francis in Cowell's edition): but these two tales have so many points of agreement that it is difficult to suppose they are unconnected. I shall mention a few of the chief differences, as they occur in the course of the narrative: but my main purpose will be to draw attention to points of resemblance.

The openings differ. In the Indian story the king of Benares developes cannibal propensities in accordance with Buddhist ideas of transmigration, because in a previous existence he has been a Yakkha or ogre: and he has occasion first to taste human flesh, because one day a dog steals his plate of meat and the king's cook (a man) dishes up instead a portion of flesh cut from a fresh corpse in the cemetery.

In the Malay story, the cannibal king of Kedah is the son of an ogress or *Gĕrgasi*, and he first tastes human blood, when one day his cook, a woman, cutting her finger by accident lets the blood drip into a vegetable curry and there is no time to prepare another dish.

Incidentally one may surmise that the detail of the "fresh corpse" in the Indian version is an instance of the old Buddhist custom (similar to the Parsi habit) of exposing corpses to be eaten by birds of prey: and one may compare Groeneveldt's "Notes on the Malay Archipelago and Malacca," *s.v.* Tun-Sun, in "Essays Relating to Indo-China, Second Series," vol. I, p. 240, where however the dying are so exposed.

After the opening the two stories agree in many details. In both, the king takes great pleasure in his horrid meal, even before he is aware of its ingredients. In both, the cook is threatened with death in default of confession as to the *recipe!* In both, the cook confesses, and the king, so far from being shocked, orders more of the gruesome fare, battening first on prisoners from the gaol and later kidnapping the bodies of innocent people to supply the royal table: until at last there is uproar in the realm.

In the Indian tale the cook is caught taking flesh from the body of a woman he has just killed: in the Malay, the king is attacked by a bravo and a great fight ensues. In both tales, the king's

ministers, moved by popular clamour, warn their master: and he rejecting the warning is expelled from his country, peaceably in the Indian version and taking his sword and cook with him, ignominiously in the Malay story after a desperate onslaught on the palace, whence he escapes by a private door.

In the Indian story, the king after a number of adventures in the jungle is converted from cannibalism by Sutasoma, an incarnation of the Buddha in a previous existence—for the "Jatakas" purport to be stories of the Buddha's earlier births: he is brought to Benares a changed man, and is welcomed by the son who reigns in his stead. In the Kedah version, the king mates with a girl of good family in a remote part of the country and, after once more escaping his enraged pursuers, is lost sight of: but the son of that union is restored to reign in the capital by virtue of the magical sagacity of an elephant in detecting the royal infant and by virtue of the king of Siam's warrant.

When it is remembered that in Buddhist countries the "Jatakas" are known not only to the literate but in popular folk-lore, it becomes reasonable to infer that the Kedah tale has been borrowed from a Siamese source. Man-eating ogres are usual enough: but in the two tales considered, coincidence of small detail seems to demand explanation more particular than the common uniformity of the human mind in the invention of folk-tales.

For a parallel in Sinhalese legendary history those interested may consult p. 234 of my "Catalogue of European Manuscripts in the India Office Library, vol. I. part I."

The Hadramaut Saiyids of Perak and Siak.

By R. O. Winstedt.

On pp. 2-5 of *Law Part II, The Ninety-Nine Laws of Perak*, in *Papers on Malay Subjects*, published by the F. M. S. Govt., Mr. R. J. Wilkinson pointed out the great influence a certain Sayid family exercised on the history of Perak in the XVIIIth century. The family acquired the highest state offices, those of Orang Kaya Bĕsar and of Mantĕri, and one of its members acted even as Bĕndahara. Scions of this Sayid house were sought for eagerly in marriage and married into the families of all the greater Perak chiefs. One married the sister of Sultan Iskandar,—Marhum Kahar (whose reign is described in the *Misa' Mĕlayu*) and was the father of a Perak Sultan. Another married a daughter of the raja of Siak and from their union were descended the rulers of Siak. Several were accounted saints.

How came this family to win such prestige and power?

Their genealogical tree copied by a former *mufti* of Perak, Raja Haji Yahya who in his youth gave Sir William Maxwell some Perak royal genealogies (*J. R. A. S., S. B. XIV*, p. 305) explains the matter. They were of the great house of Ahmad bin Esa al-Mohajir, the founder of the Sayid house of Hadramaut, which considers its nobility better established than that of all the other descendants of the Prophet's daughter, and refuses the hands of its daughters, even its half-caste daughters to Sherifs and Sayids come from other places. Van den Berg's "Hadramaut and the Arab colonies in the Indian Archipelago" gives the following particulars of this family: I quote from Sealy's translation (Bombay, 1887).

"The founder of the Sayids of Hadramaut is a certain Ahmad bin Isa, surnamed al-Mohajir who, according to tradition, established himself in the country about ten centuries ago. He was a native of Bassora..... His genealogy is as follows: bin Esa bin Muhammad an-Nakib bin Ali al-Oraidthi bin Ja'far as-Sadik bin Muhammad al-Bakir bin Ali Zainu'l-abidin bin al-Husain. To distinguish themselves from other Sayids those of Hadramaut call themselves *al-Alawiyin* descendants of 'Alawi, grandson of Ahmad bin Esa. Seven generations after Ahmad bin Esa the genealogical tree of the Sayids branches off with the two sons of Muhammad surnamed Sahib a'r-Robat. After this division, we see the genealogical tree of the Sayid divide itself more and more into separate families. I will give the names of the families so far as they exist in our days and their descent is generally acknowledged authentic:—

Al-a's-Sakkaf
— Akil
— al-'Aidarus
— Moshavvakh
— Taha
— a's-Safi
— ba-'Umar
— Munawwar
— Shihabu'd-din
— al-Hadi
— al-Mashhur
— a'z-Zahir
— a's-Sulaibiyya
— bin-Kitban
— al-Musawa
— al-Baiti
— Ismail
— Maknun
— bin Barahim
— ba-Shumailh
— Tawil
— Akil bin Salleh
— al-Attas
— a'sh-Shaikh Bubakr
— al Haddar
— bu-Fotaim
— Maula-a'd-Dawila
— Mukaibil
— Maula Khlih
— bin Sahl
— bin Yahya
— ba-Abud
— al-Hindwan
— al-Muhajjab
— Abdu'l-Malik
— Hashim
— Simait
— Nidhir
— Tahir
— Husain al-Kara

Al-al-Haddad
— ba-Fakih
— ba-Faraj
— ba-Surra
— al-Hodaih
Ahdal
— Jonaid
— a'sh-Shibh
— Burum
— al-Monathir
— Hamid
— Mutahhar
— Midhar
— Marzak
— Mudihij
— a'bu-Nomai
— Fad'ak
— Khirid
— ba-Barak
— Khinaiman
— ba-Husain
— ba-Ali
— al-Hut
— al-Ghaidtha
— al-Hamil
— al-Bar
— al-Kaf
— ba-Rakba
— al-Jifri
— al-Bidth
— bil-Fakih
— al-Kadri
— Siri
— ba Harun
— al-Habshi
— a'sh-Shatiri
— a'sh-Shanbal
— ba'sh-Shaiban
— Jamal-al-lail
— al-Mihdthar

Among these families there are some which at this day no longer exist in Hadthramut but that does not mean they are extinct. Thus the family of Abdu'l-malik still exists in British India under the name of Al Athamat Khan. In the same way that of Ba'sh-Shaiban exists in Java and that of al-Kadri at Pontianak."

Below I give the leading names in the Perak genealogical tree.

After the name of Sayid Ahmad bin Esa, the Malay genealogist has noted how he was a native of Bassorah.

The Perak family calls itself *bangsa Jamal-al-ail*: after the father of Sayid Husain al-Faradz, it is said. Sayid Husain al-Faradz bin Jamal-al-ail is reputed to have been the religious teacher of the first Sultan of Perak. ("Notes and Queries, R. A. S., S. B., No. 3, (1886), p. 70). He is recorded as having had a brother Sayid Yusuf and a sister Siti Kĕpayan, but that is all we hear of them. Judging by the genealogies, he must have flourished in the first half of the XVIIth century.

Siti Fatimah

Saidina Husain

Saidina Zainu'l-abidin

Saidina Musa al-Kathim

Saidina Ali a'z-Zahir

Saidina Muhammad Bakir

Saidina Jaffar a's-Sadik

Saidina Ali a'z-Zahir

Saidina Muhammad a'n-Nakib

Saidina Esa

Saidina Ahmad al-Mohajir

Saidina Muhammad

Saidina Alwi

Saidina Ali Khali-kasam ba' Alwi

Saidina Muhammad Sahib Mirbat

Saidina Muhammad al-Fakih[1]

Saidina Maula'd-dawilah Muhammad

Saidina Abdu'r-rahman Sakaf[2]

Saidina Abdu'llah Jamal-al-ail

Saidina Alwi

Saidina Abdullah

Saidina Maulana
al-Sharif Jamal-al-ail al-Jafri

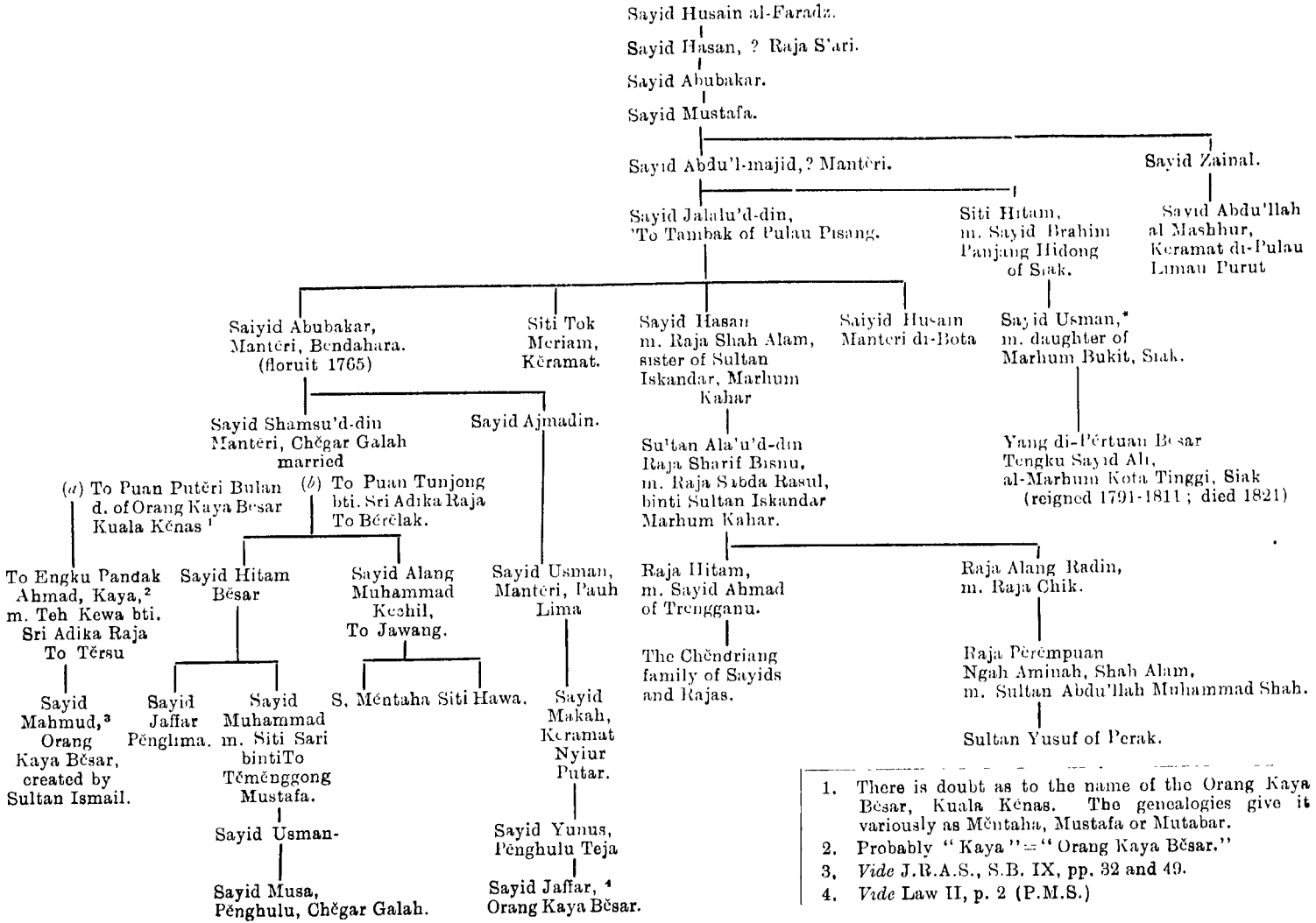
Saidina Sharif
Hasan al-Faradz

(He was the first to come to Perak.)

Of the above,[1] Saidina Muhammad al-Fakih had another son Alwi, whose descendants went to Terengganu and one of them Sayid Ahmad returned to Perak and married Raja Hitam daughter of Sultan Ala'u'd-din Raja Sharif Bisnu of Perak, his descendants being the rajas and sayids of Chenderiang in Batang Padang, Perak. The pedigree of this branch is recorded: Sayid (or Raja) Ahmad bin Muhammad bin Yassin bin Akil bin Ahmad bin Yahya bin Hasan bin Ali bin Alwi bin Saidina Muhammad al-Fakih

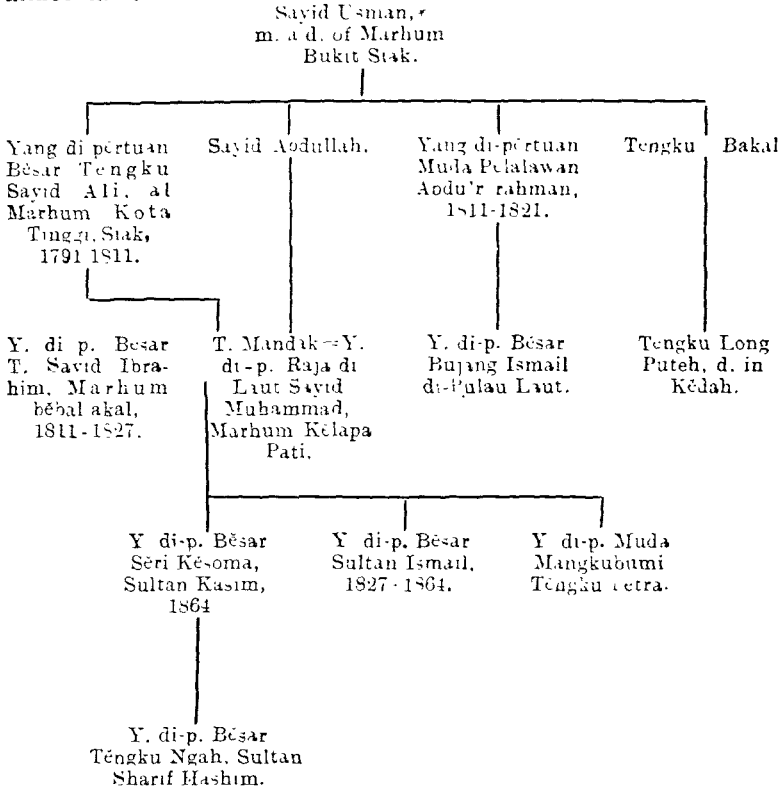
[1] Saidina Abdu'r-rahman had a number of children: Jamal-al-ail, al-Akil, al-Aidarus, Al-Abubakar, Salim, al-Hadr, Yahya, al-Mathar. Al-Aidarus begot a son Sayid Hasan, who went to Kedah and in his turn begot Sayid Husain of Kuala Muda.

The main Perak branch then runs as follows:—

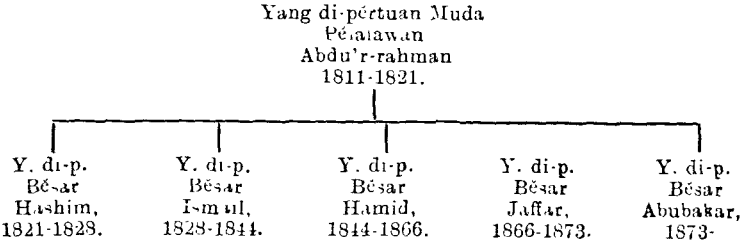


1. There is doubt as to the name of the Orang Kaya Bĕsar, Kuala Kĕnas. The genealogies give it variously as Mĕntaha, Mustafa or Mutabar.
2. Probably "Kaya" = "Orang Kaya Bĕsar."
3. *Vide* J.R.A.S., S.B. IX, pp. 32 and 49.
4. *Vide* Law II, p. 2 (P.M.S.)

The Siak family is given by our genealogist as follows: omitting minor names:—



We can add to this from Dutch sources, whence also I have taken the above dates. The Siak family styled their rulers Sultans. Sayid Usman was of the family bin Khihab. The Pelalawan branch runs further, according to Dutch sources:—



This last looks a very doubtful genealogy.

It was from the Siak royal Sayid family that Sultan Ismail of Perak war notoriety was descended. His father Raja Sayid Hitam was of this Siak family and was given in marriage by Sultan Abdullah Muadzam Shah (*marhum khalilu'llah*) of Perak one Raja Mandak, daughter of Marhum Bon su, his relative.

Some Perak Pedigrees.

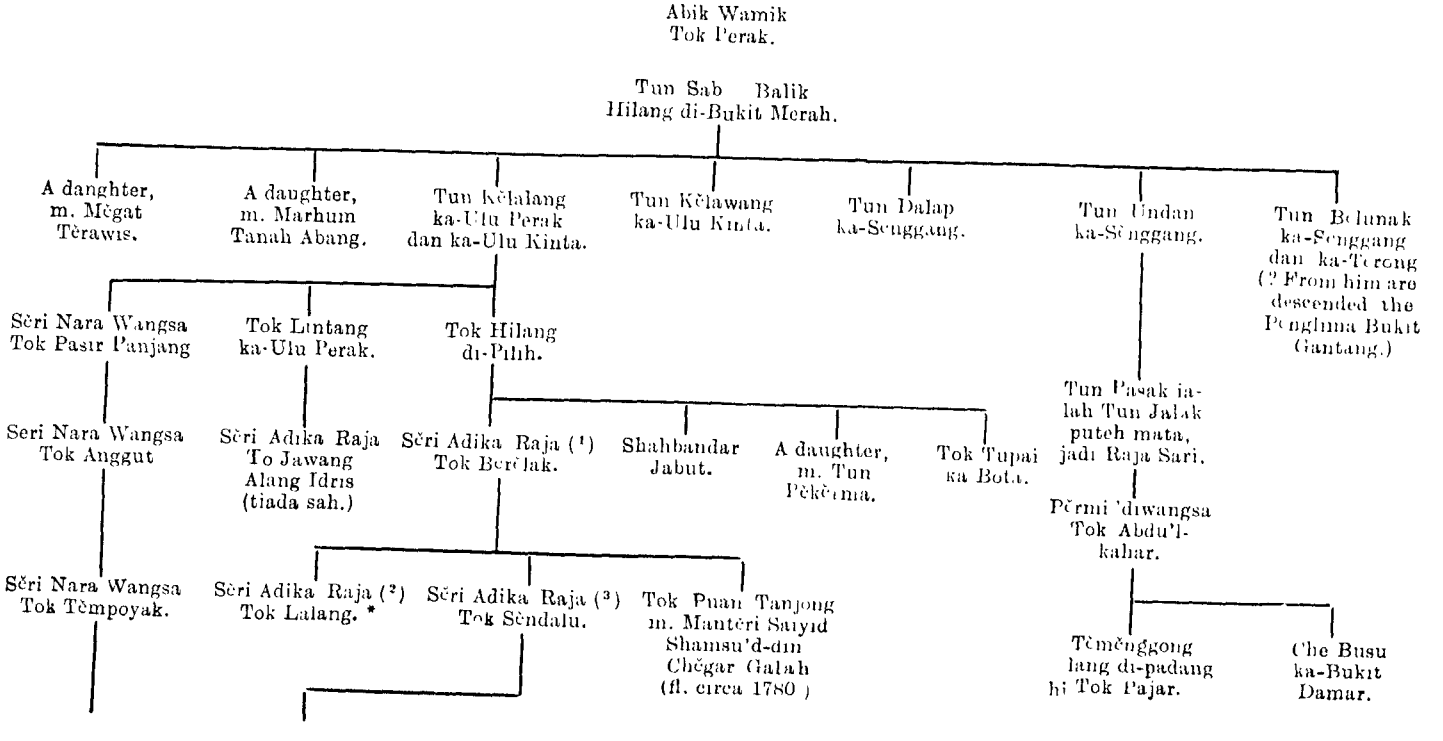
By R. O. Winstedt.

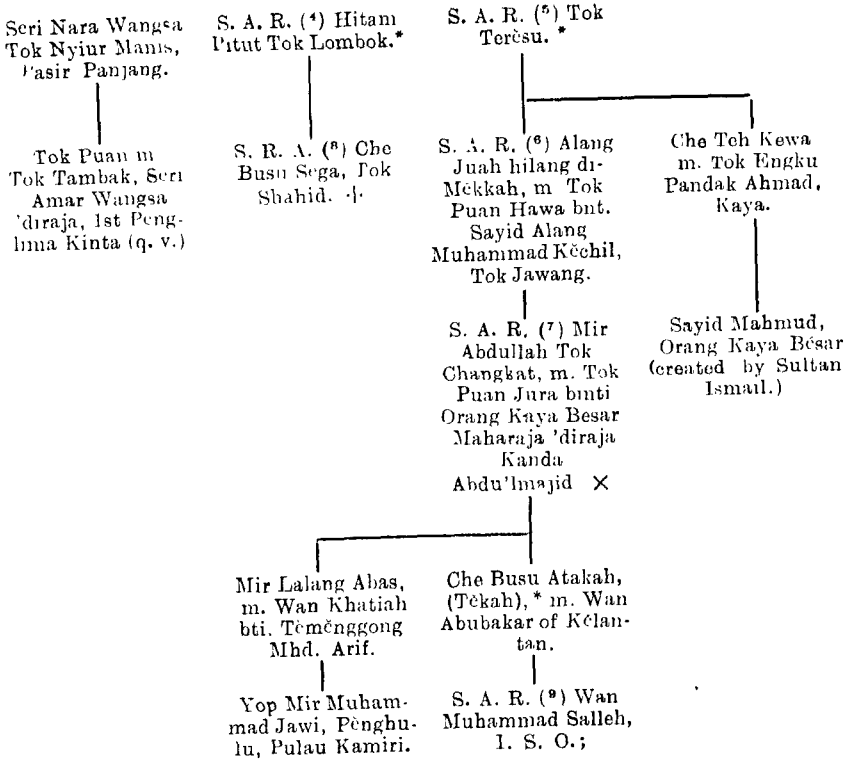
These pedigrees are interesting because comparison of sufficient genealogies of the royal and noble families of a country enables one to fix approximately the main dates of its history: and this is necessary in dealing with Malay history, whose records as a rule entirely lack chronological *data*.

The genealogies following are copied from MS. by that enthusiatic genealogist, Raja Haji Yahya, late *mufti* of Perak.

Tun (or Tan) Saban from whom these great house of the Sri Adika Raja (Wilkinson's "History I." pp. 80-81, in "Papers on Malay Subjects") and the lesser house of the Sri Amar Diraja (*id.* p. 86) are descended, is the earliest name in the history of Perak (*id.*, pp. 71-73, J. R. A. S., S. B., and Winstedt's "Malay Literature, II." pp. 40-42 or J. R. A. S., Vol. XIII, Part IV, pp. 501-507): from comparative study of the Perak genealogies one might doubt if he flourished earlier than the end of the seventeenth century, but the more reliable genealogy of the Perak Sayids would lead one to ascribe the founding of the Perak dynasty to the beginning of that century.

The Family of the Seri Adika Raja.





* J. R. A, S., S. B. IX. p. 37. Evidently To' Tĕrĕsu (or Torsoh), flourished about 1800 A. D.

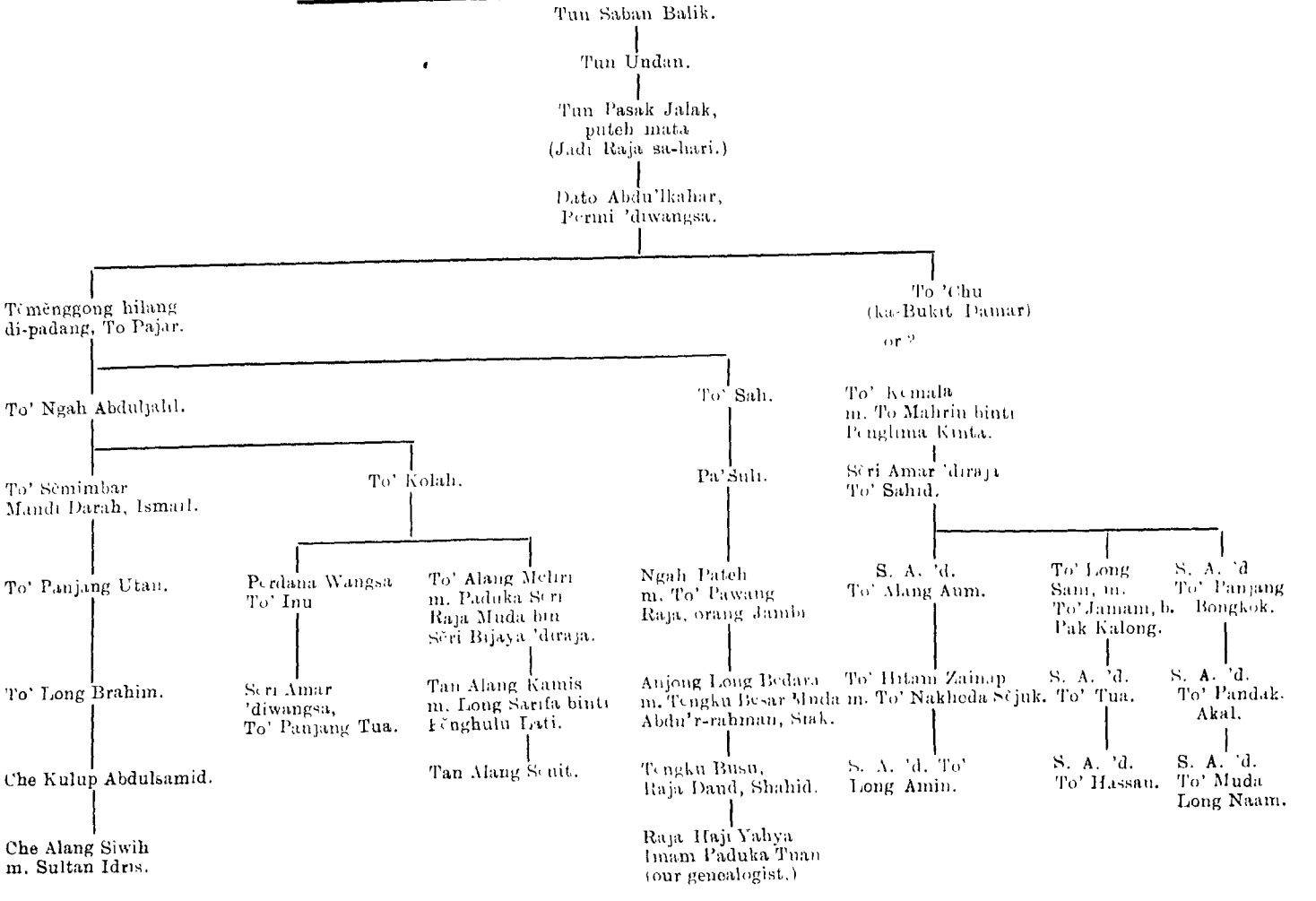
† Murdered in Upper Perak, during the Perak war, 1876. hence *Tok Shahid*. See J. R. A. S., S. B. IX, pp. 17-18, 23. Died old and was the youngest child of his parents.

× Abdu'l-majid was the immediate predecessor of Sayid Mahmud in the office of Orang Kaya Bĕsar.

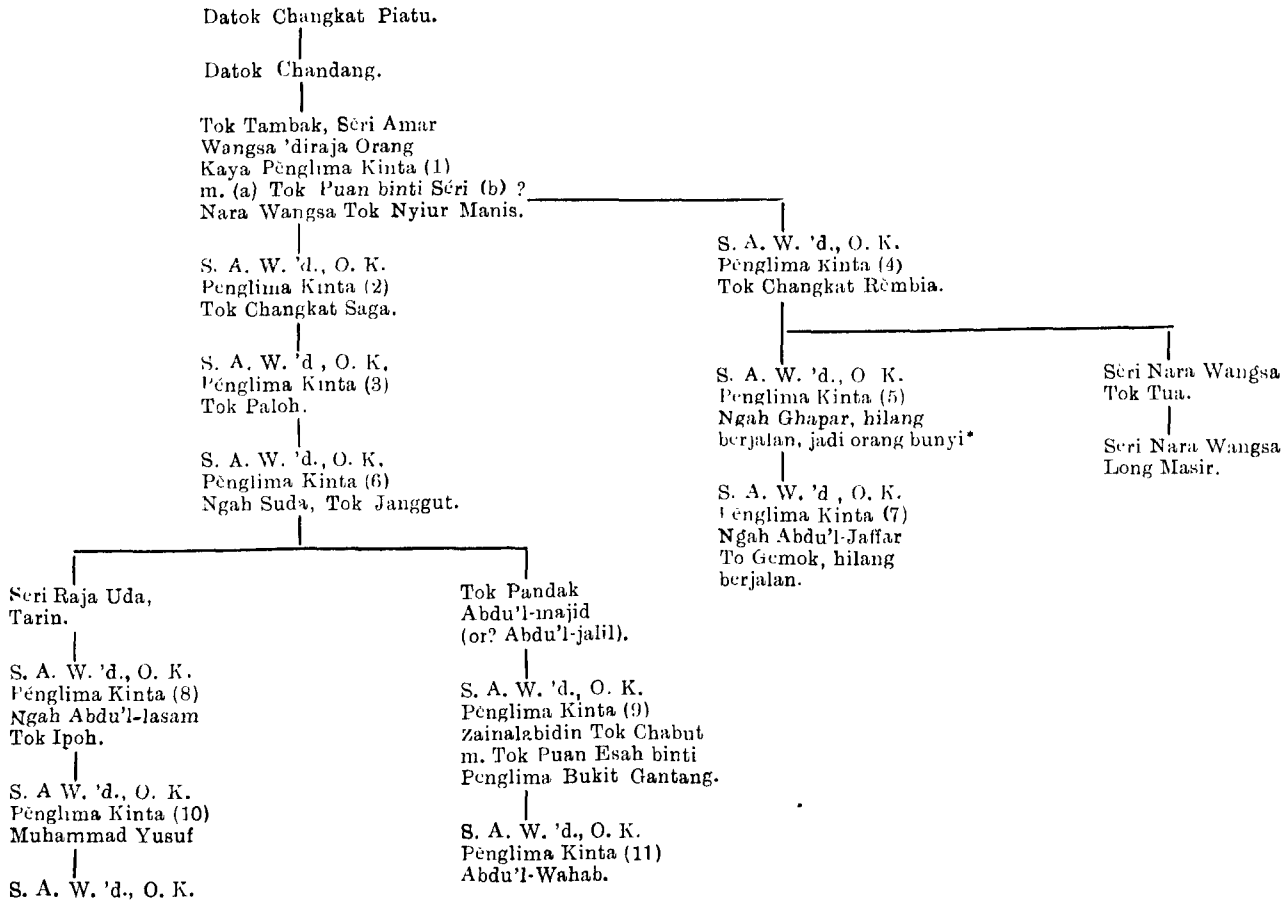
* *Che Busu* "The Youngest"—of nine children. For an account of Wan Abubakar see J. R. A. S., S. B. IX, pp. 12-13.

Small members indicate the member of the holder in descĕnt.

The Family of the Sĕri Amar 'diraja

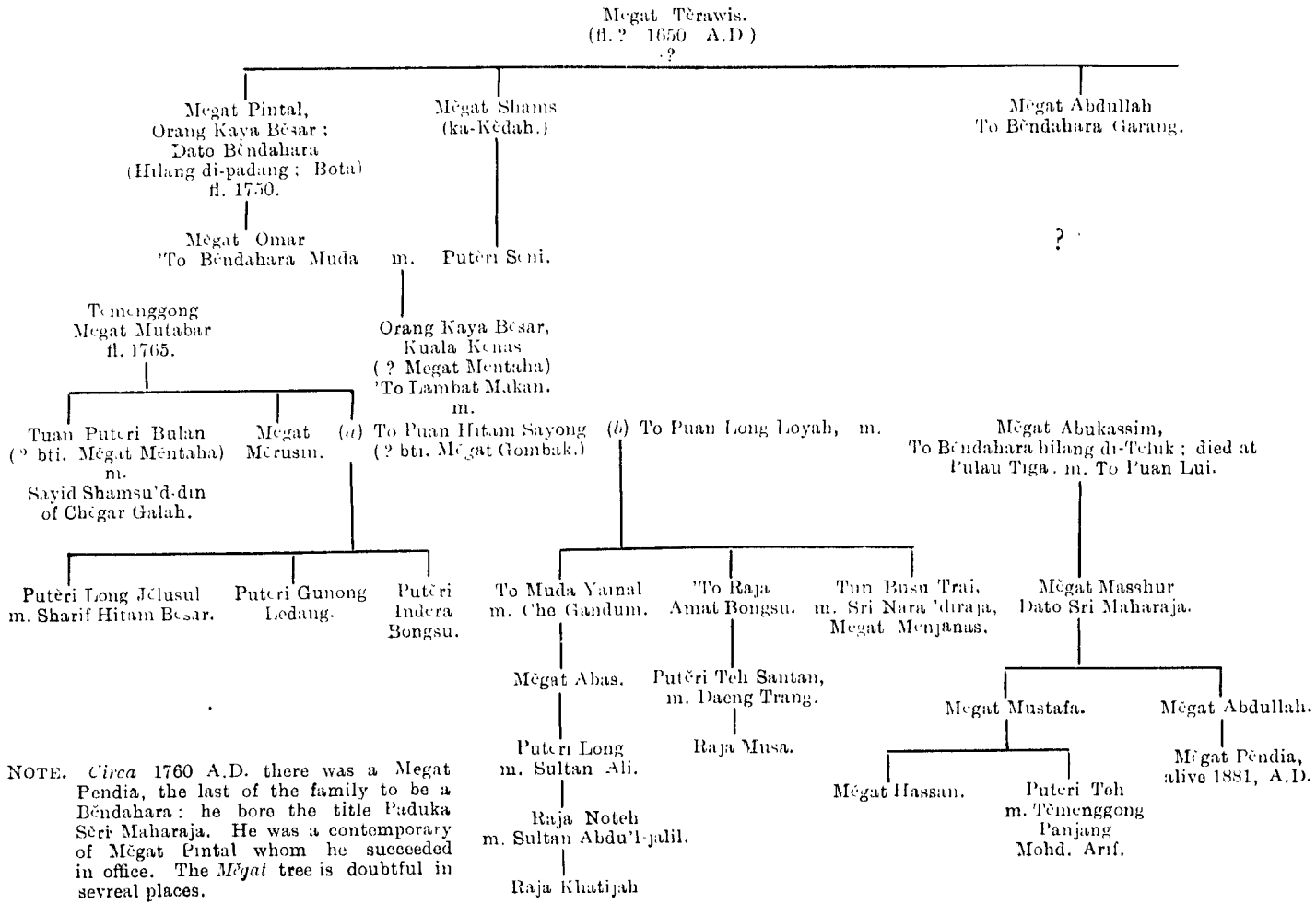


The Family of the Penglima Kinta.



* Vide "Notes and Queries," R.A.S., S.B. No. 3 (1886), p. 81.

Family of the Megats who held the offices of Bendahara till 1770 A.D.

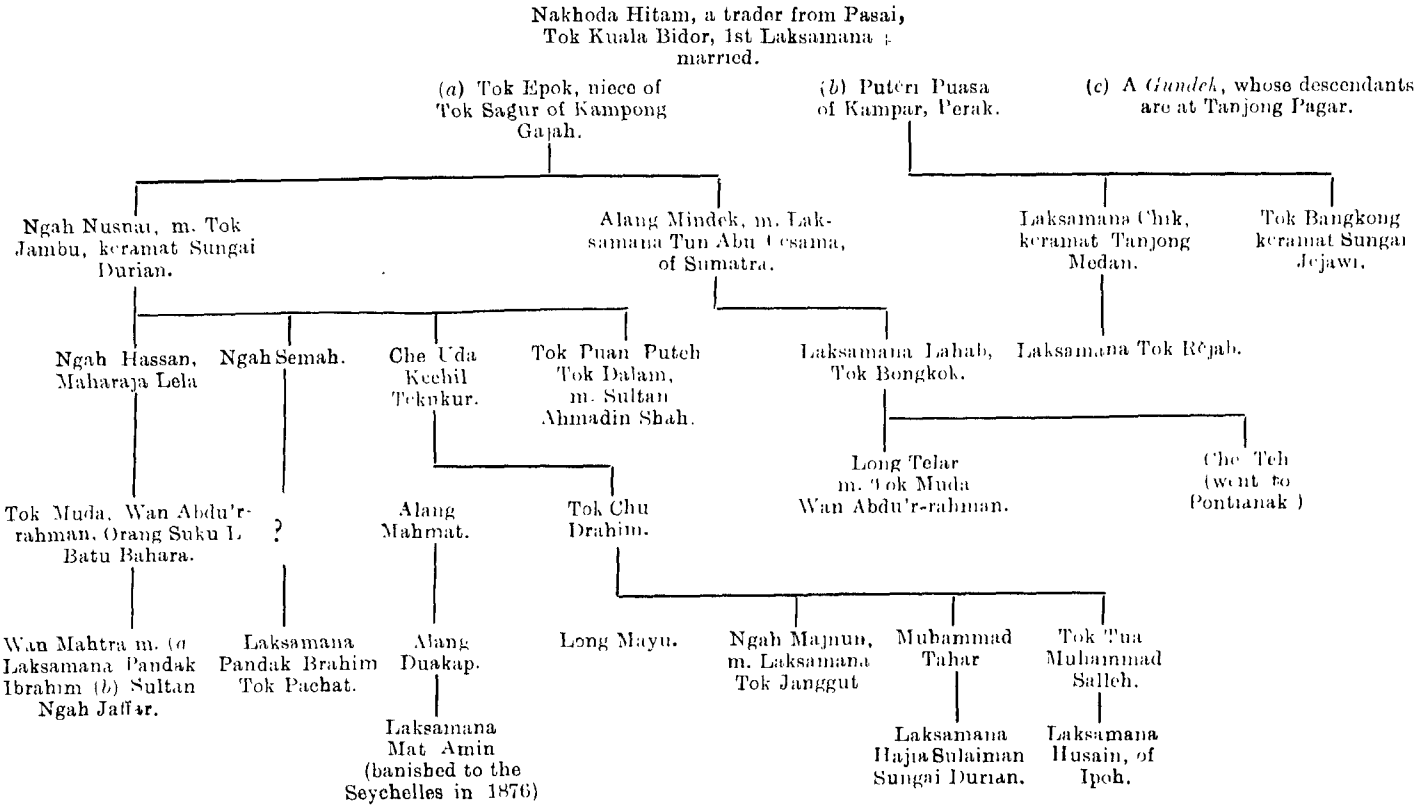


NOTE. *Circa* 1760 A.D. there was a Megat Pendia, the last of the family to be a Bĕndahara: he bore the title Paduka Sĕri Maharaja. He was a contemporary of Mĕgat Pintal whom he succeeded in office. The *Mĕgat* tree is doubtful in several places.

Note.

The Sri Nara 'diraja family claim two holders of the office of Orang Kaya Bĕsar, Perak before the Orang Kaya Bĕsar, Kuala Kĕnas its third holder. The first was a son of Sri Nara 'diraja Samah and a grandson of S. N. 'd. Pandak: the second was Orang Kaya Bĕsar Pendek, son of a Tan Dewi.

The Family of the Laksamana.



* Vide Notes and Queries, R.A.S., S.B. No. 2 (1885), p. 47: Also *Misa Mĕlayu*. Floruit, 1765 A.D.

New and Rare Malayan Plants

Series X.

By H. N. Ridley, C.M.G., F.R.S.

During the continuation of my studies of the Malay Peninsula flora I continue to find a good many species which have not been described, or have been for various reasons confused with others. In this series which is a continuation of the preceding ones, it is noteworthy that there are no less than four species quite common in the country but which are nameless, these are *Memecylon Wallichii*, n. sp. confused with *M. amplexicaule*, Roxb. *Morinda elliptica*, n. sp. one of our very commonest trees, confused with *M. citrifolia*, L.: *Fagraea gigantea*, n. sp. confused with *F. fragrans*, Roxb. and *F. speciosa*, Bl. and *Allomorphia malaccensis*, n. sp. confused with *A. exigua*, Bl. In some cases the cause of the error was due to the badness of specimens sent home: often the commoner the species the more seldom is it collected, as the botanist is apt to think it has been frequently sent home and neglects to collect it. In other cases the mistake is due to Botanists not having sufficiently carefully compared the type specimens and the description. Thus both in the case of the *Memecylon* and *Allomorphia*, the types or co-types are preserved and readily accessible and in good condition yet early botanists have confused with the original species totally different plants, and have been followed by later botanists to the present day.

Other new species are due to more recent discoveries in our flora.

STERCULIACEAE.

Sterculia brachycarpa, n. sp.

A tree 50-60 feet tall, stem 8-12 in. through. Leaves chartaceous, dull, deep green, elliptic or obovate-elliptic abruptly acuminate, base blunt or shortly narrowed, glabrous above except the red pubescent midrib, beneath midrib and nerves 9 pairs and reticulations distinctly elevate and covered with stellate hairs, red on the midrib, 6-11 in. long and 3.5-5.5 in. wide, petiole 1.5 to 2 in. long, hairy. Racemes 3-3.5 in. long, slender dense, dark red velvety. Pedicels .25 in. long, red, velvety. Sepals oblong lanceolate narrowed a little to tips, densely hairy 2 in. long. Androecium half as long glabrous, anthers 7. Female flowers not seen. Carpels 3-4 ovate shortly pointed 1.5-2 in. long and as wide, densely velvety red. Seed 2 to a carpel, oblong .75 in. long, black.

SELANGOR, Sempang mines. (Ridley 15635). PERAK. Batang Padang district 300 to 500 ft. (*Kunstler* 7972).

This has been confused with *S. rubiginosa*, Vent., but is very distinct in its much larger leaves, much longer petioles, broader sepals, and short, broad 2 seeded carpels. It is also much less hairy and the pedicels much shorter and the flowers are in a simple raceme.

MYRTACEAE.

Eugenia formosa, Wallich. In the Materials for a Flora of the Malay Peninsula, King gives this species as occurring in Perak, the only specimens however, so labelled by him that I have seen are certainly the much smaller plant, *E. pseudo-formosa*.

E. formosa, Wallich, is a big tree with axillary red flowers borne below the leaves on the branches while *pseudo-formosa* is a shrub or at most a small straggling tree with white terminal flowers, the venation of the leaves quite different and the thick white corky petiole is very characteristic. The very narrow-leaved form which grows in Penang, by Richmond pool is the *Jambosa lanceolata* of Miquel, it is also my *E. nemoricola* but is I think now only a form of *pseudo-formosa*.

An Eugenia I collected in Selangor at Klang (No. 10200) more nearly resembles Wallich's *formosa* than anything else I have seen from the Malay Peninsula, but as it differs from the type in many respects I prefer to leave it doubtful until further specimens of the plant should be obtained.

Eugenia limnoea, n. sp.

Tree with red flaky bark. Leaves elliptic coriaceous, base very shortly narrowed, tip long, acuminate, blunt, nerves very fine and numerous distinctly raised beneath inarching close to the edge, 5.5 in. long, 2 in. wide, petiole .3-.4 in. long. Panicle terminal 2 in. long, 2.5 in. wide, dense, many flowered on a peduncle 1.5 in. long. Calyx campanulate with a slender pseudo-stalk .2 in. long and as wide; lobes short rounded. Petals free, orbicular glandular .1 in. long. Stamens .3 in. long.

Open low lying, damp country. PROVINCE WELLESLEY, Nibong Tebal (*Ridley* 12783) Krian (*Ridley* 9378). PERAK (*Scortechini*). PENANG, Batu Ferringhi (*Ridley* 12576).

This plant has been identified as *E. densiflora*, Duthie by King and what appears to be identical is *E. oblongifolia* var. *robusta*, King, collected in Perak by Scortechini.

It has nothing to do with *E. oblongifolia*, Duthie. *E. limnoea* is allied to *E. densiflora* and appears to replace it in the northern part of the Peninsula. It differs in the flowers being only half as long, and the nerves, nervules and reticulations being very fine and close. The intra-marginal nerve lies close to the edge of the leaf, instead of a long way from it,

with a second intramarginal between it and the leaf-edge as in *E. densiflora* the base of the leaf is broader and more rounded and the leaves are generally more ovate. As in *E. densiflora* the midrib is deeply sunk above, prominent beneath, and the whole surface of the leaf beneath is pustular.

Eugenia pauper, n. sp.

A small tree, branches rather slender, bark light reddish. Leaves thinly coriaceous, punctate above, pustulate beneath, elliptic, abruptly cuspidate, base cuneate, nerves 10 to 12 pairs depressed above, elevate beneath marching to form an intramarginal nerve .1 in. from the edge, midrib channelled above, elevate beneath 5.5 to 6 in. long 2.5 in. wide, petiole .4 in. long, slightly thickened, black. Cymes axillary solitary in each axil .5 to .75 in long with 2 or 3 flowers on the ends of the 2 or 3 branches. Bracts minute at the base of the flowers. Calyx cup-shaped, truncate, suddenly narrowed to a slender pseudo-stalk .1 in. long, pustular. Petals calyptrate.

Johor, in Gunong Pulai and Gunong Pantai (*Ridley* 12175 and 4200).

This is nearest to *E. oblata*, Duthie which it exactly resembles in the inflorescence, but the venation and shape of leaves is quite different.

Eugenia cyrtophylloides, n. sp.

A tree with pale reddish bark. Leaves stiffly coriaceous, lanceolate, acute or cuspidate, base narrowed, decurrent on the petiole, black-dotted beneath, nerves very numerous, fine, visible above, very inconspicuous beneath; midrib strongly elevate, 3.5-4 in. long 1-1.5 in. wide, petiole .2 in. Panicle terminal 2 to 3 in. long, peduncle 1-2 in. long, branches 1 in. long terete, thick branchlets, 3 terminal on the branches, ending in 3 sessile flowers. Bracts caducous. Calyx .1 in. long gradually narrowed to a broad base, the lower part cylindric; lobes ovate, short. Corolla calyptrate. Stamens very short and few.

Pahang, Wray's Camp, Gunong Tahan (*Ridley* 16274).

This belongs to the group of *E. punctulata*, with an urn-shaped calyx and calyptrate corolla and few stamens.

Eugenia Klossii, n. sp.

A tree. Branchlets terete, black. Leaves in distant pairs, elliptic, acuminate, acute, base cuneate, thinly coriaceous, nerves about 20 pairs, elevate beneath, secondary nerves nearly as conspicuous, inarching .1 from the edge, reticulations wide conspicuous beneath, all inconspicuous above 5.5 in. long 2.25 in. 2.5 in. wide, petiole .2 in. long. Panicles 1-2 terminal 3 in. long or less, branches few, short with 1 to 3 terminal

flowers. Calyx broad, campanulate .2 in. across, truncate edge recurved, base abruptly narrowed to a slender pseudo stalk .3 in. long. Petals calyptrate. Stamens .4 in. long. Style .5 in. long.

SELANGOR, Rantau Panjang, July, 1914 (*C. B. Kloss*).

This is perhaps most nearly allied to *E. inophylla*, Roxb. but the nerves of the leaves are fewer and the panicle shorter, laxer and fewer flowered.

Eugenia cordifoliata, n. sp.

Branches terete, pale coloured. Leaves elliptic with a short, blunt point, base narrowed, blunt, slightly cordate, membranous, drying blackish above, paler beneath, nerves about 18 pairs nearly invisible above, slightly elevate beneath inarching .1 in. from the edge, 4 in. long 1.5 in. wide, petiole short, thick .1 in. long. Panicle terminal lax, 6 in. long, peduncle 2 in. long, branches angled, the lowest 3 in. long, branchlets crowded at the tip with pear-shaped buds narrowed to a slender pseudo-stalk. Calyx lobes ovate.

PERAK: without locality (*Scortechini*).

This is one of the two quite distinct plants quoted and labelled by King as representing his *Eugenia Swettenhamiana*. The other species which as represented in Herb. Kew. (all I have seen) collected in Larut by Kunstler, No. 7590, is very poor specimen in bad condition, and does not appear to be an *Eugenia* at all. The description of *E. Swettenhamiana* however, applies better to this specimen than to Scortechini's plant which is only in young bud. This latter plant is very distinct from any species I have seen in the rounded, cordate almost peltate leaf-base. It may perhaps be allied to *E. densiflora* but more developed specimens are required before deciding on its affinities.

MELASTOMACEAE.

Melastoma scabrum, n. sp.

Shrub about 5 ft. tall, branchlets sparingly covered with small ovate lanceolate acuminate scales, very varied in size from minute irregular ones to lanceolate subulate ones, very short and appressed, on the leaves almost reduced to slight roughness, rather longer on the petiole. Leaves narrow, lanceolate, subacute, base rounded or shortly cuneate, above scabrid with short thornlike processes, nerves 5 with larger scales, 4-4.75 in. long, 1.25 to 1.50 in. wide; petiole .6 in. long. Flowers as big as those of *M. decemfidum*, pedicels .4 in. long. Calyx .4 in. long, campanulate, sparsely covered with lanceolate, acuminate scales, longest at the top, lobes linear acuminate with scales, long linear subulate outside.

Petals glabrous 1.5 in. long, pale rose pink. Stamens half the length of the petals, unequal, long ones 1.2 in. long. Style rather stout 1 in. long, ovary with long bristle-like hairs on the top.

KEDAH. Lankawi at Burau near Telayah Tujoh, April (*Ridley* 15813).

Osbeckia perakensis, n. sp.

Shrub about 8 feet tall much branched, twigs angled, young parts, petioles, leaves above and the nerves beneath covered with stiff bristly hairs. Leaves elliptic to ovate blunt base, round nerves 5 elevate beneath 1.25 in. long, .75 in. wide, petiole .15 in. long. Flowers 3 to 5 in a terminal head sessile in the terminal pair of leaves, in fruit a short pedicel .1 in. long is developed. Calyx .4 in. long, ovoid eventually semi-oblong, entirely covered with short, stiff bristles and star-shaped whorls of bristles on a distinct pedicel, lobes lanceolate, acuminate, fringed and keeled with simple bristles about 2 in. long. Petals obovate 1 in. long, deep pink-rose. Stamens 10, filaments slender, anthers .3 in. long, shortly acuminate. Style long and stout. Capsule semi-oblong .4 in. long .3 in. through, densely covered with stellate-hairy processes.

PERAK, Taiping Hills on Gunong Hijau at 5,500 ft., first obtained by *Mrs. Bland*, in 1905, later by *J. W. Anderson*.

Perhaps nearest to *O. buxifolia,* Thw. of Ceylon.

OXYSPOREAE.

The sorting out of the species of Oxysporeae of the Malay Peninsula into genera, is, it proves, a somewhat difficult task. I attempted it in vol. 57 of the Journal of the Straits Branch of the Royal Asiatic Society, but in the further light of later discoveries and investigations I find a modification is necessary. The following are the genera as I now propose them:—

Oxyspora, Woody, often tall shrubs with large stiff leaves and big terminal panicles of fairly large flowers. The stamens in the original species of De Candolle are 8 in number but of two forms four long and purple and four alternating shorter and yellow. In the Malay Peninsula we have only one species which exactly agrees with this viz. *O. stellulata*, King, a beautiful tree-like shrub with great panicles of light rose pink flowers. The other species which have the same habit and general structure have all the 8 stamens yellow and the two series almost or quite as long and similar. The capsule in the type species and in some others is long and funnel-shaped, but in *O. microcarpa* it is subglobose and small, and in *O. collina* short and cup-shaped. The following are our species:—

Oxyspora stellaulta. King
" *acutangula*. King
" *hirtcalyx*, Ridl. *Allomorphia hirtcalyx*. Ridl
" *Curtisii*, King
macrophylla. Triana *Anerincistus floribundus* King
" *collina*. Ridl. *Anerincistus collinus*, Ridl
" *microcarpa*. Ridl. *Allomorphia rosea*, Ridl. Journ Fed Mal. States Mus. ii. 14 Not of Trans Linn Soc.
" *rosea*, Ridl. *Allomorphia rosea*, Ridl. Trans. Linn. Soc. ii iii 301.
" *hispida*. Ridl.

Allomorphia. Bl. includes the shrublets with small inconspicuous flowers and small elliptic fruits. I excluded from King's species *A. Wrayi* under the genus *Campimia* (a plant allied to *Dreissena*) in the paper above referred to, leaving the type species *A. exigua*, and *A. alata*, Scort. with *A. porphyranthera*, Ridl. *A. exigua*, Jack. Trans. Linn. Soc., xxviii. 74, a native of Penang. It is a low shrublet with white flowers and violet stamens, and is the *A. exigua* var. *minor*, King, but it is quite distinct from the common plant of the South of the Malay Peninsula, a shrub about 6-12 feet tall with greenish flowers in a large panicle. This plant has been confused with it by Clarke, Cogniaux, King, and in fact nearly all botanists since Jack's time. My *Allomorphia capillaris* seems to be a form of *A. exigua*, Bl. It is a native of Perak and the Dindings and differs from the Penang plant in the extremely slender, long branches of the panicle, and is perhaps better classed as a variety of *A. exigua*. The typical plant is confined to Penang where it grows on rocky spots near the waterfall. To this species belongs Wallich's 4048a of his Catalogue (there is no No. 4048 in the herbarium) but 4048b seems distinct in its rather larger flowers and quite round based ovate leaves. It was from Herb. Finlayson without locality. Many of Finlayson's plants are from Siam. I have never seen anything quite like it from Penang or elsewhere.

A. porphyranthera, Ridl. Journ. Roy. As. Soc. Straits Br. 51, p. 39 from Ulu Temengoh resembles *A. exigua*, but the panicle is scurfy and the flowers larger. There remains now the commonest species of all, the *exigua* of the later botanists but not of Blume. King and Cogniaux give as a synonym *Melastoma impubes*, Roxb. Flor. Ind. ii. p. 105, but the description hardly fits this plant to which is also given the Moluccas as a habitat.

In Griffith's Notulae is a description of a *Sonerila bullata* which Cogniaux makes a species of *Allomorphia* under the name *A. bullata*. The description is very incomplete and though some parts of it would fit the common plant which he must have been familiar with and indeed collected, I do not think it can have been what he intended.

I cannot find in fact that this common and conspicuous plant has ever received any name at all. I therefore propose for it the name *Allomorphia malaccensis* as it is particularly common in Malacca and give a description of it.

Allomorphia malaccensis, n. sp.

A tall plant, usually about 6 feet tall and often more with a slender, woody stem, glabrous all over except for a reddish (when dry) meal over the panicle and petioles. Leaves ovate acuminate, dark green, edge entire, base very shortly cuneate, nerves 5 from base 3 very prominent and 2 outer ones very slender, the transverse nervules conspicuous, elevate, 10 in. long and 6 in. wide, petiole 3-4 inches long. Panicle 6 to 12 inches long and nearly as wide pyramidal, branches lax spreading subwhorled. Flowers umbelled on the ends of the branchlets about 10, or in distant pairs of umbels sessile on the main branches. Flowers small .2 in. long. Bracts lanceolate .1 in. long, caducous. Calyx funnel-shaped, short with 4 short, ovate lobes. Petals smaller, white or greenish. Stamens yellow .1 in. long, anthers acuminate, bases divaricate. Capsule .1 in. long, ovoid narrowed below the dilated calyx limb.

Malacca, common in woods; Negri Sembilan, Tampin hill; Selangor, Rantau Panjang and Sungei Buloh; Perak, Gunong Kerbau at 4,000 ft. (*Robinson*). A form with leaves more lanceolate.

Allomorphia subsessilis, Craib of Siam also belongs to this genus, but I should exclude *A. umbellulata*, Hook. fil. of Tenasserim. *A. setosa*, Craib (Siam) *A. hispida*, Kurz and *A. Beccariana*, Cogn. and *A. Griffithii*, Hook. fil., both of the latter seem to be species of *Phyllagathis*.

Anerincleistus, Korth.

The type of this genus is *A. hirsutus*, Korth. to which I add *A. macranthus*, King, and *A. pauciflorus*, Ridl. They are all small trees or tree-like shrubs with a few umbelled flowers in the axils. The venation of the leaves is quite peculiar. The outer slender pair of nerves rises from the base of the blade, the second pair rises from the midrib as much as an inch from the base in *A. pauciflorus* and occasionally the lowest pair does the same. This nervation occurs also in *Pomatostoma*. *A. sublepidotus*, King, is very different from the other species in its panicle of many flowers in whorls but the inflorescence is axillary and the venation of the leaves identical, so I retain it in the genus as well as *A. glomerulatus*, King and *A. Beccari*. *A. cordata*, Stapf, and *A. anisophyllus*, Stapf of Borneo, though some of these may be *Pomatostomas*. I exclude all the rest included under this genus by King and myself formerly.

The section *Coriaceae*. (Journ. Roy. As. Soc. Str. Br. 57, p. 45) forms the genus *Oritrephes*, Ridl. and *A. collinus*, Ridl. is referred to *Oxyspora*. *A. fruticosus*, Ridl. which seems most nearly allied to *Oritrephes*, but has a fruit more resembling that of a *Sonerila* cannot be fitted into any of these genera and I separate it into a distinct genus under the name of *Perilimnastes*.

Perilimnastes, gen. nov.

Shrub, leaves subcoriaceous lanceolate acuminate, flowers 1-3 subumbellate calyx tube little dilate, lobes subulate. Petals 4 lanceolate acute stamens 8 anthers unequal acuminate base emarginate not appendaged, capsule obconic 4 angled smooth, with 4 inflexed valves, as in *Sonerila*. Species 1, *Anerincleistus fruticosus*, Ridl.

PAHANG.

Sonerila patula, n. sp.

A much branched spreading shrub about 12 in. tall, branched from the base, stems hairy with dense appressed hairs. Leaves lanceolate, acute with base acute, appressed hairy all over, subequal nerves 3, lowest leaves biggest 1.75 to 2-5 in. long, .3-.5 in. wide, petiole .1 in. Cymes chiefly solitary axillary in leaf axils and between the branches, peduncle 1 in. Flowers small, white 2-3 in a cyme. Calyx campanulate, lobes lanceolate acute, subulate. Petals triangular acuminte .1 in. Stamens 3, anthers elliptic blunt. Capsule trigonous turbinate, smooth, .2 in. long, pedicel stout .4.

PAHANG: in forest at Wray's Camp Gunong Tahan at 3,300 ft. alt.

The leaves of this are occasionally markedly unequal in size. It is allied to *S. albiflora*, Stapf, but its narrow leaves and spreading branches make it unlike anything in the Malay Peninsula.

Sonerila belluta, n. sp.

A delicate unbranched herb, 2-4 in. tall, base creeping quite glabrous. Leaves crowded at the top, narrow, lanceolate, subacute, narrowed to the base spine-toothed on the margin, dark green above, pale beneath .75 to 1.25 in. long .2 in across, nerves pinnate ascending about 4 pairs, petiole very slender, .3 in. long or less. Flowers about 5 cymose on a slender peduncle .75 in. long. Calyx slender cylindric, campanulate teeth short, triangular, green. Petals oblong cuspidate rose-pink .2 in. long. Anthers short, acuminate. Capsule smooth, obconic gradually narrowed to the pedicel .2 in. long, pedicel .1 in.

JOHOR, on rocks on Gunong Banang near Batu Pahat (*Ridley* 11102).

Allied to *S. saxosa* of Penang Hill, but the leaves are much narrower, the fruit smaller and it is quite glabrous.

Sonerila setosa, n. sp.

Stem over 8 in. tall, densely bristly, hairy as are the petioles nerves beneath, and edge of leaf, inflorescence and calyx, slightly woody. Leaves very dissimilar, large one elliptic, oblong, acuminate base narrowed, unequally cordate, sprinkled with coarse hairs above membranous, nerves ascending from the lower third of the midrib, transverse nervules fine, conspicuous, 4.5 to 5 in. long, 1.5-2 in. wide. Petiole 1-1.5; small, leaves orbicular, reniform 1 in. long. Cymes dense, many flowered in all the axils of the small leaves and terminal about an inch long, densely setose, with red bristles. Flowers small, white. Calyx 1 in. long cylindric, campanulate, red. Petals small, linear, oblong, acute, bristly. Stamens 3, anthers oblong obtuse. Capsule campanulate, muricate, bristly .1 in. long, .2 in. wide, narrowed to its peduncle .2 in. long.

PAHANG, on Gunong Tahan (*Ridley* 16036).

Allied to *S. caesia* for a form of which I first mistook it.

Medinilla rubicunda, Bl. was based on Jack's *Melastoma rubicunda* which is Pogonanthera *pulverulenta*. Bl.

No type specimen of Jack's seems to exist but in Wallich's collection No. 4086, is a specimen of *Pogonanthera* collected at Cape Rachado in Malacca (not Penang as Cogniaux gives it) which is queried for *Melastoma rubicunda*, Jack, by Wallich, as also is a *Medinilla* from Silhet. Jack's plant was collected at Singapore. Cogniaux gives *Medinilla rubicunda*, Bl. as a species and compounds it of the Sylhet plant *M. erythrophylla*, Lindl. (*Melastoma erythrophylla*, Wall. Cat. 4085) and Jack's species. *M. rubicunda*, Bl. therefore goes out as a synonym of *Pogonanthera pulverulenta* and the Sylhet plant which does not occur in the Malay Peninsula, retains the name of *M. erythrophylla*, Lindl.

Medinilla venusta, King is apparently a somewhat variable plant. King described it as having 8 stamens and acute petals. His type specimens in the Herb. Kew have 8 stamens but I would not call the petals acute, they seem to be rounded. Stapf in Kew Bulletin, 1906, p. 73 describes under *M. chionantha*, a plant which was sent from Perak by Curtis and cultivated at Kew. It has round petals and 10 stamens, but except for the latter character it is quite like King's. *M. venusta* from Perak, I conclude it is a variety.

Memecylon Cantleyi, n. sp.

A large shrub, bark of branches pale. Leaves thin, coriaceous drying greenish, elliptic, acuminate to both ends equally; nerves 5 pairs, very faint on both sides, 3.5-4.5 in. long, 2-2.3 in. wide, petiole 4 in. long. Flowers few in axillary simple cymes .5 in. long. Peduncle .15 to .2 in. long, rather thick pedicels half as long. Calyx wide cupped, rather flat when expanded, narrowed to base, truncate or very minutely dentate .1 in. long, .15 in. wide, white with a pale violet tinge. Petals (cuspidate in bud) pale blue subquadrate shortly apiculate below apiculate above, nearly .3 in. across. Stamens deep violet, ovary with 12 ovules crowned by an elongate punctate style. Fruit not seen (there is some in a capsule with one of Maingay's specimens (which are all in flower but being detached it is probable that they do not belong).

SINGAPORE: (Cantley): Garden jungle (*Ridley* 13012). MALACCA (Maingay).

This was named *M. laevigatum*, Clarke and *M. garcinoides* by King in Herb. Kew, but it seems to me abundantly distinct, not only in the longer, narrower leaves but in the much larger flower. I have taken part of the description from Maingay's mss. notes. He adds that it is a remarkably elegant, large shrub in flower.

Memecylon longifolium, n. sp.

Tree, branches with grey bark. Leaves elliptic, lanceolate, long, cuspidate tip blunt, narrowed to the rounded base nerves about 20 pairs, the secondary ones being nearly as prominent as the primary ones, but all slender and not prominent marching 4 in. from the margin, thinly coriaceous, light green when dry, 7-8 in. long, 2-2.25 in. wide, petiole very short .05 or less. Flowers in very short .2 in. axillary sessile fascicles about 10 in. a fascicle, very small pink, pedicels .05. Calyx at first subpyriform with four short rounded lobes eventually campanulate, truncate .1 in. long. Petals ovate triangular subobtuse.

Dindings, Lumut (Ridley 9475). Referred by King to *M. amplexicaule*, Roxb., but the leaves are not cordate and the flowers much smaller. It is certainly allied to this species as also to *heteropleurum*.

Memecylon gracilipes, n. sp.

Small tree with slender, grey twigs, slightly winged below the nodes. Leaves thinly coriaceous drying green, almost sessile ovate, cuspidate base round, midrib beneath elevate as are 4-5 pairs of conspicuous nerves depressed above marching .25 in. from the edge 2.5 to 3 in. long, 1.5 in. wide. Cymes very slender 1-1.5 in. long, lower ones once branched, upper

ones simple, peduncle very slender .5 in. long, pedicels .2 in. long, very slender. Flowers umbelled, 3. Calyx .1 in. long, the base subglobose, the limb wide saucer-shaped .2 in. across, teeth minute, petals ovate, acute .1 in. Style rather long. Fruit globose .5 in. through on a pedicel .45 in. long. Seed globose testa brown shining.

PERAK, Waterloo Estate 1,000 ft. (*Curtis* 1295).

The only plant at all like this is *M. arnottianum*, Thw. of Ceylon but that has 3-nerved leaves. The petals appear to have been white, the calyx tinted red.

M. terminale, Dalz. of Southern India also resembles it but shows no nerves.

Memecylon floridum, n. sp.

Tree 40 to 50 feet tall, branches subterete, fuscous. Leaves thin, coriaceous, lanceolate acuminate, nearly equally to both ends, tip blunt, nerves very faint on both sides, a faint intramarginal nerve along each edge rising from base, laterals about 7 pairs 3-4 in. long by a 125 wide, petiole winged nearly to base .3 in. long. Cymes 1-3 in the axils of each leaf, peduncles thick .3 in. long, bearing an umbel of three or more flowers on thick .1 in. pedicels, with lanceolate, blunt bracts at base. Calyx base cylindric obconic limb broad, in bud widely cupular, in flower .1 across. Petals ovate, in bud conic blunt. Style long and stout.

PERAK, Larut 500-1,000 ft. Nov. 1882 (*Kunstler* 3551).

I cannot fit this plant into any described species, the larger flowers, and short, dense cymes and the long acuminate leaves showing a distinct pair of intramarginal nerves, seem to keep it distinct from anything.

Memecylon malaccense, Clarke mss.

M. amabile, Bedd. var. *malaccensis*, Clarke Flor. Brit. Ind. ii, 555.

Probably a shrub, with slender, grey angled and faintly winged branches. Leaves ovate, lanceolate, base rounded tip acuminate, blunt, fleshy coriaceous opaque, drying brown above reddish beneath with no visible nerves on either surface, 2-2.75 by 1-1.25 in. wide, sessile or with a minute petiole. Cymes very short, .3 in. long, peduncle .15 or much shorter. Flowers 4-5 umbelled on the end of the peduncle. Calyx cup-shaped, truncate with a broad base, fleshy (drying black). Petals forming a blunt cone in bud, ovate.

MALACCA (*Maingay* 2531, 2528) "Nepus Kolite" (Nipis Kulit).

The specimens of this are very poor, and King puts it under the doubtful species. In the branches and form of the flowers it suggests an affinity with *M. fruticosa* but its opaque nerveless small leaves make it quite distinct. I cannot place it under any of our known species.

Memecylon laxiflorum, Wall. Cat. 4472. A large shrub with grey branches. Leaves stiffly coriaceous ovate, obtuse or acuminate, base round, nerves very faint and slender about 8 pairs when dry, dark above, reddish below 4-4.5 in. long, 2-3 in. across, petiole .4-.5 in. long, stout. Cymes 1-4 from axil of fallen leaves. Peduncle .3 in. long bearing a number of cymules on short pedicels .1 in. long with longer, slender pedicels .2 in. long. Calyx campanulate, base hemispheric, limb larger, truncate. Petals 8, short, subacute, blue. Fruit globose with very little trace of the calyx limb, .25 in. through on a cyme 2.5 in. long.

SINGAPORE (*Wallich* 4472). JOHOR: Minyak Buku (*Ridley* 11092) and Pinerong (*Ridley* 15396). PENANG: Beach behind Muka Head (*Curtis* 723).

This seashore shrub differs from *M. oleaefolium*, Bl. in its stiffer, round leaves with a longer petiole and fewer pedicels with shorter cymes. The nerves though slender and not elevate are quite visible, they inarch into a lateral nerve close to the margin.

Memecylon amplexicaule, Roxb. Fl. Ind. ii. p. 260.

A specimen of this plant so labelled by Roxburgh occurs in the British Museum, and is certainly *M. microstomum*, Clarke. Roxburgh's description agrees perfectly with the specimen and does not at all agree with the plants put under this name by Wight, Clarke, King or other botanists. Roxburgh states that his species is veinless which is the case in *microstomum* but the species named *amplexicaule* by other botanists has peculiarly strongly developed veins on the leaf. Wight's plant so named in Icones 279, is not Roxburgh's and may be *M. Wightii*, Thw. of Ceylon. *M. depressum*, Benth. Wall. Cat. 4101 was never described. There are 2 or three plants mixed under the number 4101 and it is impossible to guess which Bentham intended, nearly all Wallich's specimens labelled *M. amplexicaule*, Roxb. are the correct plant. His only sheet of the Penang plant *M. amplexicaule*, King, etc.) is labelled doubtfully as *M. grande*, Retz. which it is not. There therefore appears to be no name for this plant, and as King's description is apparently mixed, I separate and describe this plant under the name of *M. Wallichii*. A small tree, branchlets 4-angled, leaves lanceolate acuminate or ovate, base minutely cordate, coriaceous, nerves about 18 pairs inarching .1-.15 in. within the margin, very nearly sessile the thick petiole concealed by the lobes of the leaf at the base, 7-8 in. long,

2.75-3 in. wide. Cyme axillary peduncle .1 stout. Flowers numerous, crowded. Calyx cup-shaped, base blunt, edge truncate, not lobed but minutely-irregular, pedicel stout nearly as long .1 in. long. Petals white or pinkish, broad, ovate, blunt. Style rather stout, short. Fruit black, globose .2 in. through.

M. amplexicaule, King and others not of Roxburgh.

PENANG; (*Wallich* 4101C.) Experimental Nursery; (*Curtis* 965 and 457); Moniot's Road (*Ridley*). PERAK; (*Scortechini* 231); Larut, 800-1,000 ft. (*Kunstler, M. heteropleurum* var. *olivaceum*, King! and 3058 Kunstler), Waterloo (Curtis 1294).

The Penang plants have long, narrow lanceolate leaves, while those of Perak have shorter, broader, ovate ones, but there are intermediate forms. Generally speaking the plant resembles *M. heteropleurum*, Miq. but that has the leaves very shortly cuneate, never rounded or cordate and the flowers about half as big.

M. costatum, Miq. Verh. Ned. Inst. 1850, p. 29 is recorded by King from Perak (Kunstler 10785); I have not seen this specimen and there is no specimen of Miquel's species from the Peninsula at Kew. King's description differs from Miquel's in "base of leaves rounded or slightly narrowed, not cordate" whereas Miquel's species had cordate leaves, and in "flowers in axillary glomeruli" instead of widely spreading panicled cymes. So it seems clear that King's *M. costatum* is not Miquel's.

RUBIACEAE.

Uncaria parviflora, n. sp.

Uncaria lanosa var. *parviflora*, Ridl. Journ. Roy. As. Soc. Str. Br. lix. p. 109.

Climber with 4 angled stems, .2 in. through, sparsely hairy, branches more densely hairy with short rough hairs. Leaves lanceolate, acuminate, base broad, membranous, scabrid hairy above, beneath velvety hairy; nerves about 7 pairs, slender elevate beneath, 2.75 in. long, 1.25 in. wide; petiole .1 in. Stipules linear acuminate, bifid, hairy .1 is. long. Peduncles rather slender narrowed upwards, sparsely hairy 1 in. long. Peduncles rather slender, narrowed upwards, sparsely hairy 1. in. long. Heads globose .5 in. through. Calyx sessile, silky, obconic, very small with short oblong obtuse lobes about half the length, glabrous within. Corolla sparsely silky, hairy; tube very slender .2 in. lobes oblong ovate blunt, glabrous within.

PERLIS, Chupeng in open country, forming large bushes (*Ridley* 15019).

On further examination I find that this plant is specifically distinct from *U. lanosa*.

Coptosapelta parviflora, n. sp.

Lofty climber, nearly glabrous. Leaves elliptic rather long, sharply acuminate, base cuneate, dark shining green, glabrous except for a few rather long hairs on the midrib, nerves 4 prs, fine, reticulations visible on both sides, 3-5 in. long 1.5 in. wide; petiole white-hairy .3-.4 in. Stipules triangular acute, .1 in. long. Panicle terminal 2.5 in. long in flower, with thin branches, lax, sparsely white-hairy. Bracts narrow, linear, lanceolate acuminate .1 in. long. Flowers green. Pedicels white-hairy .1 in. long. Calyx .1 in. obconic ridged, white-hairy, limb campanulate about as long with 5 ovate lobes. Corolla-tube cylindric .2 in. long, white, silky, lobes linear, oblong, nearly as long, glabrous keeled, mouth of tube white-hairy. Stamens hairy. Fruit panicle 3 in. long 6 in. across. Branches angled, nearly glabrous. Fruit .2 in. long, globular, ovoid.

SINGAPORE, Bukit Timah (*Ridley* 14117). PENANG: (Curtis) BORNEO: Sarawak (*Beccari* 2518).

This species differs in being subglabrous and having the flowers much smaller in a short terminal panicle. The fruit is also smaller and quite glabrous.

Argostemma rugosum, n. sp.

Stem fleshy, branched, erect 4 inches or more, transversely rugose as are the petioles and midrib, hairy. Leaves very unequal, larger one oblong or elliptic, shortly acute, base rounded or cuneate, unequal glabrous above, nerves hairy beneath 10-11 prs., reticulations conspicuous 2-3 in. long, 1-1.5 in. long, petiole .2 in. long. Small leaf, lanceolate, subacute .2 in. long. Stipules lanceolate acute, as long. Peduncle 1 in. or less with an umbel of several large flowers on pedicels .5-.75 in. long. Bracts at base of umbel lanceolate. Calyx-tube short, campanulate, with lanceolate acute lobes, much longer, .2 in. long. Corolla .8 in. across lobes oblong, lanceolate subacute. Staminal column shorter curved.

SELANGOR; Gunong Mengkuang 3,600 ft. (*Kloss*).

I took this at first for an abnormal specimen or variety of *A. spinulosum*, Clarke, but in view of the greater size of calyx lobes and corolla, which is longer, not shorter than the staminal column, I conclude it is a distinct species.

Argostemma nervosum, n. sp.

Stem rather woody ascending for 8 inches, dense, hairy, rather stout. Leaves very unequal, large ones subsessile, oblong, oblanceolate, abruptly acute, narrowed to the unequal rounded base, membranous above with pale hairs scattered sparsely and thicker on midrib; nerves 11-12 prs., conspicuous both sides much elevate parallel and hairy beneath, reticula-

tions hardly visible 2.5 in. long, 1.25 in. wide, small leaf, sessile, ovate acute sessile .5 in. long 13 in. wide edges hairy.

Stipules similar smaller. Cymes terminal and in upper axils densely hairy up to calyx. Peduncle .25 in. long, pedicels 1.5 in. long. Flowers in pairs. Calyx campanulate, dense, hairy lobes short, toothlike. Corolla .6 in. across lobes narrow, lanceolate, acuminate, hairy on the back. Staminal cone slightly longer. Fruit globose campanulate .2 in. long, hairy.

SELANGOR, Semp ang, Mines (*Ridley* 15658).

Near *A. elatostemma*, Hook. fil., but a much stouter plant very hairy all over, with stiffer leaves, larger, sessile, and strongly nerved but not reticulate. Cymes with short peduncle, long pedicels and flowers hairy.

Argostemma grandiflora, n. sp.

Ascending herb. 5 in. tall, glabrous, entirely except a little hairiness on stem. Leaves unequal, larger ones lanceolate, fleshy or ovate lanceolate, narrowed to both ends, nerves invisible .-1.4 in. long, .3-.4 in. wide; petiole slender .1, small leaves ovate lanceolate .2 in. long, .1 in. wide. Stipules similar. Flowers solitary, terminal, and in upper axils peduncle 1.5 in. long with 2 pairs of bracts, one obcuneate toothed and .2 in. long and one smaller, three-toothed, ovate .1 in. long above. Calyx tube short, obconic, lobes narrow, linear, lanceolate acuminate .15 in., glabrous. Corolla .7 in. across, lobes ovate acute .2 in. across. Staminal column shorter .2 in. long, thick.

PERAK: Gunong Kerbau 4,500 ft. (*Robinson*) a single specimen.

I took this for an abnormally glabrous specimen of *A. involueratum*, Hemsl., but it differs so markedly in its nerveless fleshy leaves, the curious involucral bracts, all toothed conspicuously, and the large broad lobed corolla that it must be considered distinct.

Argostemma trichanthum, Ridl.

Whole plant 4 inches long, stem ascending, hairy, with curled viscid hairs. Leaves very unequal, larger one lanceolate, subacutely acuminate narrowed or not to unequally cordate base, membranous, glabrous above, sparsely hairy beneath, more so on the midrib and on the seven pairs of slender nerves 1.75 in. long, to 3 in. long, 1-1.5 in. wide; petiole hairy .1, small leaf ovate, acute, base round .12 in. long. Stipules resembling the small leaf. Cymes several in the uppermost axils 1.5-2 in. long, hairy all over, peduncle .5 in. and branches several, slender. Bracts oblong, lanceolate .1 in. long, glabrous. Calyx campanulate, lobes short, ovate, triangular, hairy. Corolla lobes narrow, lanceolate, acuminate, backs hairy, .2 in.

long. Stamens nearly as long, acuminate. Fruit campanulate, hairy.

SELANGOR. Ulu Langat (*Kloss*).

The leaves appear to have a white longitudinal fascia as in *A. elatostemma* and other species.

Nearest to *elatostemma*, but the leaves acuminate, lanceolate, the flowers more numerous and smaller and the whole inflorescence more hairy.

Mussaenda spectabilis, n. sp.

Shrub. Branches hairy with many linear lenticels. Leaves chartaceous ovate—oblong base round abruptly short, acute cuspidate, above glabrous except the midrib, beneath thickly sprinkled with short hairs, midrib and nerves about 10, slender rather faint pairs, appressed-hairy, 5-6 in. long, 2.25-2.75 in. wide: petiole 1.25. Stipules triangular, setaceous densely hairy: Cymes terminal several, densely hairy, peduncles about 1 in. long, generally two branched. Bracts lanceolate acuminate, hairy. Calyx-lobes lanceolate acuminate, subfalcate 1 in. long unequal, hairy .1 in. across or less. Corolla tube densely hairy 1 in. long, limb 2.25 across, lobes 1.1 long .5 inches across pubescent on the back, puberulous velvety above, the mouth with short dense yellow hairs running from the centre up to the midrib of each petal.

PAHANG: Pulau Tioman (*C. B. Kloss,* June, 1916).

A very fine species allied to *M. mutabilis* var. *hirsuta* but the flowers are considerably larger and much more hairy and the calyx lobes are very much longer and as long as the corolla tube. The leaves though usually round at the base are occasionally narrowed.

Urophyllum coriaceum, n. sp.

Small branched tree with white corky bark. Leaves coriaceous elliptic or oblong acuminate, cuspidate, base very shortly narrowed quite glabrous; nerves about 12 pairs, elevate as are the reticulations on both sides; midrib depressed above 3.5-6 inches long 1.5-2 in. wide; petiole .5 in. long. Stipules short lanceolate acuminate blunt. Cymes few-flowered about .4 in. long including .2 in. long peduncles. Calyx widely cupular .05 in. long, .1 in. wide truncate, entire. Corolla .15 in. long coriaceous, tube very short, lobes 5, splitting nearly to the base, acute, hairy within at the mouth; Anthers narrow, linear, acute. Style very short, stigma fusiform.

PAHANG; Gunong Tahan at Wray's Camp, (*Ridley* 16247, 16070).

This shrub or small tree had much the habit of an elder-bush with stout branches from the base covered with white

corky bark. It was about 8 or 10 ft. tall. In life the leaves and flowers suggested those of *C. glabrum* but they are much more coriaceous, the flowers larger and rigid, the edges of the petals run down nearly the whole length of the corolla as ridges, and are separate or nearly separate for most of the way. The whole plant is almost completely glabrous.

Randia (Ceriscus) oocarpa, n. sp.

Shrub. Branchlets slender, long, white-barked, spines on the lower part only, 1 in. or less, terminal branchlets short, distant 1 in. long, knotted. Leaves membranous ovate to oblong, obtuse or subacute base narrowed or lanceolate 1-3.5 in. long, .5-1.25 in. across; nerves about 4 pairs, slender elevate beneath, thickly sprinkled by short hairs on both sides, especially hairy on midrib both sides and nerves, bigger leaves becoming glabrescent; petiole hairy .1 or less. Stipules ovate, acuminate keeled. Flowers 1-2 terminal, white, becoming orange; pedicel .05 in. hairy. Calyx .3 in densely rather long hairy lobes, ovate, less than half as long, in flower. Corolla as long as calyx-tube, short, thick, hairy, white becoming orange-coloured. Fruit obovoid 2 in. long, 1.75 in. wide, rough when dry, glabrous.

PAHANG: Pekan (*Ridley*). PERAK: Relau Tujor (*Wray* 2599a); Taiping (*Scortechini*). KEDAH: Lankawi, Kwah (*Curtis*), Burau (*Ridley* 15016). PERLIS: Kanga (*Ridley* 15007).

This plant was identified by King with *Randia Dumetorum* Lam., a native of India, and following the Flora of British India he gives as synonyms a large number of what I should consider distinct species. The nearest species to this is *R. stipulosa*, Miq. of Java, which he gives as a synonym, but that has smaller leaves and larger flowers with larger calyx lobes. From the true *R. dumetorum* of Lamark, this species differs in the thinner, larger leaves, and smaller flowers, more lax habit and smaller and scantier thorns.

Randia incurva, n. sp.

A tree. Leaves thinly coriaceous, elliptic, shortly acuminate, base cuneate, nerves 9 pairs, the lowest very fine from the base, the others widely inarching .2-.4 in. from the edge, reticulations wide 7.5-8 in. long, 2.75-3.25 in. wide; petiole .3 in. long, stipules triangular mucronate. Cymes panicled terminal 2.5 in. long and wide, peduncle .3 in. long and like the branches, woody. Flowers numerous, fragrant. Pedicels .1-.2 in. long, pubescent. Bracts small, ovate. Calyx campanulate, pubescent .2 in long with very short teeth. Corolla cylindric, rather narrow .3 in. long, lobes oblong rounded .1 in. long. Anthers linear. Stigma cylindric, thick, shorter than lobes.

PENANG: West Hill at 1,000 ft. (*Curtis* No. 818).

This is one of the species included under *R. Forbesii*, King, by King and Gamble in the materials, but it is utterly different from the other plants on which the species is based. It is an unarmed tree, *Forbesii* a climber. The foliage is quite different, that of *Forbesii* being coriaceous with only the primary nerves visible, those of *R. incuria* are thin, large with very conspicuous, marching veins. The calyx of *Forbesii* is cylindric truncate, the corolla tube nearly twice as long, the lobes narrower and smaller.

R. longiflora, Lam. Dict. ii. p. 221. Ill. t. 156 f. 3.

Though there can be little doubt as to which species Lamarck intended, there has been a great mixture made under this name in the Flora of British India. This appears to have been due in the first instance to De Candolle, who thought that *Posoqueria longiflora*, Roxb. was Lamarck's *R. longiflora*. To this species Hooker in Flora of British India has added (1) *R. scandens*, Dec. *Tocoyena scandens*, Bl. and (2) *Gardenia patula*, Horsfield, both utterly different plants. *R. longiflora*, Lam. is the thorny, half scandent bush, so common in the tidal swamps of the Malay Peninsula. It occurs also in Borneo, and is absent entirely from India. The Indian plant is totally different, and does not seem to have any name. The only evidence of its occurring in the Malay Peninsula is Wallich's specimen numbered 8284 D, collected by him in Singapore in 1822.

Randia Roxburghii, n. sp.

A glabrous, woody climber with numerous recurved spines .5 in. long in pairs at each node, bark whitish. Leaves coriaceous, elliptic, shortly acuminate, blunt, base cuneate, nerves 4 pairs depressed above, raised beneath slender, secondary nerves and reticulations invisible, 4 in. long, 1.75 in. 1.8 in. wide; petiole .2 in. long. Cymes nearly all axillary lax, peduncle .3 in. long branches spreading few about as long. Bracts small, ovate, persistent. Pedicel nearly .1 in. long. Calyx urn-shaped, narrowed at the base with triangular, short teeth .2 in. long. Corolla tube 1 in. long, cylindric, lobes broad, oblong, subacute .4 in. long, .1 in. wide. Fruit globose, ribbed, about .5 in. long, crowned with the remains of the calyx.

SINGAPORE: (*Wallich* 8284 D), (Lobb). *Chittagong*. ASSAM (Jenkins). *Silhet* (Wallich 8284 B).

It is quite possible that Wallich's plant came from Chittagong and another specimen in Herb. Hooker is labelled "Chittagong (Wallich) 8284 D." but there is a ticket on the specimen in Wallich's own herbarium saying *he got* it in Singapore. It has not been met with in the Peninsula since.

Gardenia elata, n. sp.

A very big tree nearly 100 ft. tall. Leaves subcoriaceous oblanceolate, apiculate, base cuneate, nerves 17 pairs, subhorizontal, with transverse nervules all elevate beneath, 9 in. long, 3.5 in. wide, petiole 1 in. long. Stipules connate in a tube with a bifid unequal limb, .2 in long. Flowers solitary, terminal subsessile. Calyx tube funnel-shaped .3 in, limb spathaceous prolonged on one side into an oblong lobe .5 in. long. Corolla tube 3 in. long, lobes oblong spathulate tip rounded, orange color. Stigma thick fusiform clavate.

SINGAPORE, Bukit Timah (*Ridley* 11332). PERAK, Selama (*Wray* 4266). BORNEO, Baram (*Hose* 229).

Entirely glabrous except the very young leaves which are pubescent.

Petunga conifera, n. sp.

A slender tree about 30 ft. with few spreading horizontal branches 4-angled. Leaves coriaceous, dark green, elliptic cuspidate, shortly narrowed at the base, nerves prominent beneath 7-9 pairs, nervules very fine and inconspicuous, 6-9 in. long, 3-5 in. wide, petiole thick .5 in. Raceme dense .5 in., few flowered, cone-like, 4-angled heads. Bracts ovate, coriaceous ciliate along the edge, nearly as long as sessile flowers. Calyx obconic with 5 short broad triangular lobes densely woolly hairy at tips .15. Corolla .15 in. long tube short, thick glabrous outside, pubescent within, lobes oblong blunt as long as the tube, hairy at tips. Anthers linear, sessile on the mouth of tube. Style as long as calyx lobes, stigmas 2, thick linear blunt, all pubescent.

Apparently rare. SINGAPORE in the Garden Jungle. (*Ridley* 10722).

Timonius hirsutus, n. sp.

Small shrub with slender purplish brown twigs, young parts with long white hairs. Leaves membranous on the ends of bare shoots, lanceolate acuminate, base rounded, nerves 7 prs, elevate beneath sparsely short-hairy on nerves above, and sparsely hairy beneath, nerves and midrib with dense appressed hairs 3-4 in. long, .5-1.25 in. wide, petiole very hairy .12 in. long. Stipules triangular elongate, acuminate, setaceous, glabrous .1 in. Cymes hairy axillary in the uppermost axils .6 in. long. Peduncle slender .25 in. long. Cymes in pairs 3-flowered, outer flowers, with pedicel .1 in. long, central flower sessile. Calyx very small, campanulate, lobes linear as long as tube. Corolla white .25 in. long, tube very slender, lobes very short oblong, blunt, white, silky all over but the back of the lobes long-bearded.

Curtis collected this without fruit or flowers in the Lankawi Islands (No. 2544) I made a note on it in Journ. Roy. As. Soc. Str. Br. 59, p. 115. Now good flowering specimens come from Pulau Dayang Buntng collected by H. C. Robinson, No. 6229 of his collection labelled "small bush flowers, white." The hairs on this plant are described by me as red, the foliage was however, older. In Robinson's specimens the leaves are mostly hardly developed and the hairs are white and silky.

Coffea viridiflora, n. sp.

Shrub glabrous 12-14 ft. tall. Leaves fleshy, membranous elliptic, oblong, cuspidate (cusp blunt 1 in. long) nerves 8-9 pairs, slender ascending, midrib channelled above, base cuneate decurrent on the channelled petiole, 8 in. long, 3 in. wide; petiole rather thick .5 in. Stipules caducous. Flowers in axillary heads in each leaf axil, sessile or shortly peduncled, few green. Calyces connate in a head sessile gummy. Corolla .2 in. long, tube cylindric, lobes linear acuminate 4, contort half as long. Anthers shortly projecting, rather large. Fruit globose .3 in. through crowned with circular calyx scar. Seeds 2 semi-oblong, back round, front flat .2 in. long.

Selangor: Batu Caves (*Ridley*). Perak: Waterloo (*Curtis* 1304).

Ixora montana, n. sp.

A shrub with pale bark. Leaves coriaceous, oblong ovate base round, nerves over 12 pairs, strongly elevate beneath as are the reticulations, over 6 in. long, 3.5 in. wide, petiole .2 in. Corymb dense, many-flowered, 4 in. across, peduncle 6 in. long with a pair of sessile ovate acuminate leaves 2.5 in. long, 1 in. wide at base. Bracts linear, acuminate. Branches hairy. Calyx glabrous, tubes subglobose small with shorter ovate acute teeth. Corolla light red, tube .75 in. long, lobes broad, oblong, rounded.

Perak, Gunong Kerbau (*Aniff*).

The specimen is very imperfect but it seems quite distinct from *I. opaca* which is the nearest thing to it.

Ixora grandifolia, Zoll & Moritz Verz. 65.

Under this name Hooker and King have collected a variety of species forming a group of species rather than a single one. Among the plants thus included by King are *Ixora grandifolia,* Zoll. and Mor. a big tree with white flowers, of which he describes a variety *gigantea*, but I see no difference between this variety and his type-species (which is not Zollinger's plant) and is described below. Next comes his variety *coriacea* in which following Hooker he includes at least two distinct

species, one the comparatively thin leaved plant with rose-pink flowers, the *I. coriacea* of Brown in Wallich's Herbarium No. 6151 the other a thick leaved plant with dense corymbs of white flowers collected by Griffith in Malacca. All the species want describing.

Ixora coriacea, Br. in Wall. Cat. 6151.

Apparently a tree. Leaves coriaceous, elliptic acuminate acute base shortly narrowed and blunt, nerves about 12 pairs sunk above, elevate beneath, 10 in. long, 3.5 in. wide; petiole thick .5 in. long. Stipules broad, coriaceous, ovate truncate rounded, mucronate. Cyme panicles 3 terminal, peduncles 2.5 -3 in. long, panicle 4 in. across, 3 in. long, branches puberulous. Calyx tubular, urn-shaped .05 in. with very short teeth. Corolla rose-pink, tube slender, .4 in. long, lobes oblong deflexed. Style fairly long, slightly clubbed. Fruit bilobed 2-seeded .25 in. through.

PENANG (and SINGAPORE) Wallich 6151; Phillips and I believe that *I. elliptica*, Br. PENANG. Wallich 6153 is the same species.

Ixora crassifolia, n. sp.

Tree. Leaves very thick coriaceous and smooth, shining, elliptic lanceolate, blunt base, narrowed, nerves about 10 pairs, often deep-sunk above, elevate beneath, midrib stout, 8-9 in. long, 3-3.5 in. wide, petiole thick .25 in. Stipules broad, triangular mucronate. Inflorescence of several stout branches, thickly short, hairy with dense umbellate cymes of white flowers crowded together 3 inches long, 4 in. wide primary peduncles very short. Calyx subcampanulate with small rounded lobes. Corolla .4 in. long, tube slender, lobes narrow nearly as long, white, base red.

MALACCA. Ayer Panas heavy jungle (*Griffith*).

All the specimens are in bud or fruit.

Ixora patens, n. sp.

Leaves elliptic, lanceolate, acuminate, acute, base narrowed, thin coriaceous, nerves fine about 18 pairs, secondaries nearly as prominent, midrib elevate 7 in. long, 2 in. wide, petiole .25 in. long. Corymb spreading, 5 branches, 2 lower ones with peduncle 2 in. long, spreading horizontally, the upper 3.1 in. from them, forming an umbel with small lanceolate bracts at base, peduncles one inch, all the cymes of several branches about one inch long, many-flowered, branchlets very short. Flowers sessile. Calyx suburceolate with very small teeth. Corolla tubes slender .3, lobes half as long, rounded at tip.

SELANGOR: Gunong Mengkuang Lebar 5,000 ft. (*Robinson*).

I am not sure of the color of this but it seems to have been red. All this set differs entirely from King's *grandifolia* and his variety *arborescens*, in having the base of the leaf narrowed to a point. The variety *arborescens*, Hook. fil. has as a Synonym Hasskarl's. *I. arborescens*, Retzia I. p. 22 which is a distinct species. *I. gigantea*. *Ixora grandifolia*, Hook. fil. and King not of Zollinger.

Tree to 60 to 80 feet tall, 15-20 in. through with spreading branches. Leaves very coriaceous, elliptic, tip round, base round, 10 in. long, 5.5 in. wide or less, nerves prominent about 6 pairs, petiole thick 1 in. long. Panicles 2 lax, peduncle 2 in. or more long, pubescent as are branches. Corymb 2 in. long and wide. Flowers shortly pedicelled. Calyx campanulate, 5- toothed. Corolla not seen. Fruit globose, pea-shaped, .15 in. through, bright red.

PERAK, Larut, (*Kunstler* 5609, 5466; Wray 2973).

The leaves of the true plant of Zollinger are less coriaceous much smaller and narrowed at the base, the inflorescence much smaller. In fruit the inflorescence of *gigantea* becomes stout and woody and is as much as 8 inches long, the peduncle nearly .25 in. thick.

Ixora fluminalis, n. sp. *I. grandifolia* var. *arborescens*, King not *I. arborescens*, Hassk.

A tidal river tree, leaves coriaceous, stiff, oblong blunt, base rounded sometimes nearly cordate 4-6 or 7 in. long, 2-4 in. wide, nerves 10 pairs, prominent, midrib prominent beneath: petiole thick .25 in. Panicles 3, central one rebranched peduncle 2 in. long, whole inflorescence 5 in. long, 6 in. across, puberulous. Bracts at base ovate, acuminate .25 in. long. Flowers pedicelled, yellow. Calyx urceolate shortly 5-toothed. Corolla tube cylindric, slender, .24 in. lobes oblong, rounded .12 in., reflexed. Stigma bifid. Fruit globose pea-shaped, in a much thickened and enlarged corymb.

Tidal rivers, Common. JOHOR, Kota Tinggi (*Ridley* 4165). MALACCA (Griffith, *Cuming* 2332, *Maingay* 1297). PERAK, Goping (*Kunstler*). KEDAH, Lankawi, Gunong Rava, (*Aniff*).

The true *arborescens* of Hasskarl, of which there is a cotype in Herb. Kew, has thinner leaves narrowed at the base. The inflorescence more slender and lax. Calyx lobes larger. Corolla more slender with narrower lobes and said to be white. In fruit the panicle though longer is not so thick as in *I. fluminalis*. The bracts at base of inflorescence are more lanceolate.

Lasianthus bractescens, n. sp.

A shrub. Branches, midrib above and nerves beneath and inflorescence hairy. Leaves oblong, long-acuminate, often abruptly, base rounded, sometimes slightly unequal, thinly membranous, sparsely hairy above, more densely beneath, nerves 12 pairs, fine elevate beneath, 6 in. long, 1.5 in. wide, petiole .05 in. long. Stipules lanceolate, acuminate, densely hairy. Heads .2 in. across, surrounded by lanceolate acuminate bracts, hairy on both sides .3 in. long. Calyx lobes narrow, lanceolate, acuminate, hairy. Corolla white, much longer, glabrous except the mouth, white-hairy, tube slender, cylindric .25 in. long, lobes short, blunt.

SELANGOR, Batu Caves.

var. *rosulatus*. Leaves oblong sessile, broad, bases unequal. Bracts ovate acute forming a rosette round the flowers, each 1 in. or more long.

PERAK, Telok Pinang, Lenggong, Temengoh.

This closely resembles *Lasianthus pilosus* but differs in the large and conspicuous bracts.

Lasianthus crassifolius, n. sp.

A stout woody shrub. Young branches puberulous. Leaves stiff, coriaceous, above glabrous and shining, elliptic lanceolate, acuminate cordate, blunt, base short, narrowed, nerves 9-12 pairs, thin, elevate, puberulous when young, reticulations conspicuous 7 in. long, 2 in. wide, petiole .4 in. long, pubescent. Stipules small, triangular. Cymes few-flowered on woody peduncles .2 in. long. Bracts small, ovate, hairy. Flowers sessile .15 in. long. Calyx very short shallow, lobes small spreading hairy. Corolla silky-hairy, lobes short. Fruit ovoid narrowed at base, tip hairy .1 in. long when dry.

MALACCA: (Maingay). SELANGOR; Sempang mines (*Ridley* 15689).

Lasianthus politus, n. sp.

Shrub. Branches entirely covered with dense tomentose hair as are the petioles, midrib and nerves beneath and inflorescence. Leaves coriaceous, bright shining green above, hairy beneath lanceolate acuminate, base shortly acuminate, nerves faintly depressed above, elevate beneath 6 pairs, reticulations also elevate conspicuous 3-5 in. long, .75 in. wide; petiole thick .1 in. Stipules narrow lanceolate, densely hairy soon disappearing. Heads dense, .2 in. long. Bracts linear, long, hairy. Flowers sessile. Calyx tube short globose, lobes 5 lanceolate linear acuminate densely hairy. Corolla not seen. Fruit globose obscurely 5-lobed, hairy at top terminated by the connivent sepals, .2 in. long.

SELANGOR: Sempang mines (*Ridley*).

Lasianthus villosus, n. sp.

A hairy shrub. The branches petioles, stipules, bracts midrib on both sides and nerves beneath villous. Leaves elliptic, long-cuspidate acuminate, base narrowed, cuneate or more commonly rounded, blunt, glabrous above except the midrib, beneath villous-hairy, nerves 18 pairs, elevate beneath, nervules undulate transverse with some reticulations, 4-6 in. long, 1.5 to 2 in. wide, petiole .1 in. long. Stipules lanceolate, acuminate golden-villous, .2 in. long. Flowers few on a stout peduncle 2 in. long with lanceolate acuminate bracts .15 in. long. Calyx villous, tube subglobose, lobes 4, triangular short, glabrous inside. Corolla glabrous .15 in. long, tube short cylindric, lobes 4 lanceolate as long, a mass of hairs in the mouth. Fruit globose, hairy.

PERAK, Tapah (*Ridley* 14074).

Lasianthus (§ Mephitidia) **glaberrimus,** n. sp.

A fetid shrub with slender branches quite glabrous. Leaves membranous, lanceolate acuminate caudate, base cuneate drying black, nerves faint, very fine about 9 pairs, inarching boldly .1 in. from the edge, reticulations wide, hardly conspicuous 3.4-4 in. long, 1-1.25 in. wide, petiole .05 in. long. Stipules lanceolate, caducous. Flowers very small two or three in axillary fascicles sessile. Calyx lobes very short, tube campanulate. Corolla .05 in. long, tube slender, lobes valvate, ovary trilocular with 1 ovule in each cell. Style simple, stigma bifid. Fruit blue obconic .1 in. through Pyrenes 2.

SELANGOR; Semangkok Pass (*Ridley* 8574). MALACCA; (*Maingay*). PENANG; West Hill and Moniot's Road (*Curtis* 964). KEDAH: Kedah Peak (*Ridley* 5549).

Clarke suggested that this was a *Saprosma* and says it is not a *Mephitidia* but it does not seem to me to resemble a *Saprosma* at all.

Morinda elliptica, n. sp. *M. citrifolia* var. *elliptica*. King and Gamble in Materials.

It seems most extraordinary that this plant by far the commonest species in the Malay Peninsula, and most abundant in newly cleared ground should be up to the present time nameless, but indeed it is so common and well-known in its habitats that hardly any botanist has troubled to collect specimens. There are only one or two poor specimens in the Kew herbarium and I think none at the British Museum. These specimens have been mistaken for the very different *Morinda citrifolia*, L. or of a variety of it *M. elliptica* a small tree or shrub with pale bark about 12-14 feet tall occasionally larger.

Leaves narrow elliptic or oblanceolate shortly acuminate and long narrowed to base, dull green rather fleshy drying black, nerves about 7 pairs: 5 in. long, 1.25 in. wide, petiole .4 in. long. Peduncles slender 1.25 in. long. Head of flowers .25 in. long, green, flowers white. Fruit head oblong green hardly pulpy .5 in. long, common all over the Peninsula in cleared ground among lalang, and more bushy on rocks by the sea to complete the account of this plant additional specimens are badly needed. It is quite different from *Citrifolia* which has large ovate round leaves, much larger heads of flowers, and oblong white pulpy fruit as big as the fist. This species I have never seen really wild. It is common in Campongs, and is the true Mengkudu of the Malays. It may be a native of India.

Coelospermum biovulatum, Clarke MSS. Herb. Kew.

Leaves thin, coriaceous, not fleshy elliptic abruptly cuspidate acute or shortly acuminate, base cuneate unequal, glabrous, shining above 6 in. long, 2.75 in. wide, nerves hardly visible above, beneath conspicuously elevate inarching .2 in. from edge, reticulations elevate, petiole .7 in. long. Stipules short acute. Peduncle 1.5 in. long with 4 or 5 branches .25 in. long bearing 5-6 terminal umbellate flowers. Calyx puberulous, campanulate with rather a wide rim .12 in. across. Corolla in bud clubbed fusiform, .4 in. tube .3 in. slightly dilate upwards lobes linear recurved, more than as half as long, yellow. Stamen filaments long, projecting. Anthers long, linear curved ovary 2-celled, ovule one in each cell on the middle of the septum.

MALACCA: (*Maingay* No. 3053).

This has been referred by Hooker to *C. scandens,* Bl. and to *C. truncatum* by King. It totally differs from either species in which the texture of the leaves is so fleshy that they dry black and hardly show the nervation. It is apparently a very rare plant as no one but Maingay has collected it.

Psychotria rudis, n. sp.

Shrub, not branched. Leaves elliptic lanceolate, long acuminate, long narrowed to base, membranous sparsely hairy on nerves and nervules above thickly sprinkled with hairs on back, nerves 10 pairs elevate beneath 6-8 in. long, 2-2.5 in. wide, petiole slender, hairy .75 in. Panicle terminal, hairy branches in fruit, slender. Drupe black, oblong 4 angled when dry .24 in. long pyrenes inner face elliptic, flat, back rounded with a keel. Flowers not seen.

KEDAH: Kedah Peak 2,800-4,000 alt. (*Robinson*).

This has the habit of *P. Griffithii* but the leaves are thinner and quite hairy.

Psychotria setistipula, n. sp.

A shrub. Bark pale. Leaves coriaceous lanceolate, glabrous narrowed to both ends, the acumination longest at base from the middle of the leaf, underside paler than upper, nerves 12 pairs, faint, 4-5 in. long, 1.5 in. wide, petiole .5 in. long. Stipules broad oblong truncate with a long setiform cusp rising from the back. Cymes terminal 3, peduncle 2 in. long glabrous branches .5-1 in. long puberulous, bearing 1-3 globose umbelled cymules at the tip .3 in. through. Bracts lanceolate acuminate. Bracteoles usually blunt.

SELANGOR, Gunong Mengkuang Lebar (*Robinson*).

This plant (only in young bud unfortunately) resembles *P. angulata*, Korth., but the stipules are quite different, the leaves more coriaceous and the inflorescence puberulous.

Psychotria minutiflora, n. sp.

Stems glabrous. Leaves membranous elliptis, lanceolate acuminate, base long, narrowed, drying black, nerves 13 pairs conspicuous elevate beneath 6-7 in. long, 1.5-2 in. wide, petiole slender 1.5-2 in. long. Stipules broad, oblong, abruptly blunt acuminate, connate edge ciliate .6 in. long. Cyme panicled sessile, many-flowered, 1.5 in. long, 2 in. wide. Calyx short cup-shaped, narrowed below the broad short toothed limb. Corolla .05 tubular, short, lobes as long as tube, 5 reflexed, mouth tomentose. Anthers short, filament in mouth of tube projecting. Style longer bilobed with thick lobes at apex. Ovary 2-celled, 2-seeded.

SELANGOR: Ginting Sempah (*Ridley*).

Cephaelis.

The Malayan species of this genus have been much confused in the Flora of British India and especially in King's Materials. The succulence of the plants makes them often difficult to dry properly and consequently specimens are often troublesome to make out.

C. cuneatum, Korth. This plant a native of Mount Singalan in Sumatra cannot possibly be the narrow leaved plant of Mount Ophir, as it is described by Korthals as having obovate leaves. It is however, so identified in both the works above referred to. I propose for the Mount Ophir plant the name of *Cephaelis angustifolia*, n. sp.

Herbaceous plant, stem slender, not or hardly branched. Leaves linear lanceolate acuminate, long—narrowed to the base, and to the apex from the middle, fleshy membranous, nerves fine, about 15 pairs, slender curved ascending, 6-9 in. long, 1-1.5 in. wide, petiole 1.5 in. long. Stipules connate in a tube with two acuminate points .2 in. long. Peduncle slender

2-3 in. long. Capitulum .75-1 in. across. Bracts ovate orbicular rounded truncate .4 in. long and as wide. Calyx truncate. Corolla honey yellow, tube cylindric curved. Fruit oblong .5 in. long when dry, light blue.

Malacca, Mount Ophir (all collectors). Johor, Gunong Pantai and Negri Sembilan, Gunong Tampin, a form with broader leaves.

Cephaelis Ridleyi, King and Gamble. This seems to have been based on a plant collected by me at Bukit Kutu in Selangor, a remarkably stout species about 2 feet tall, the stem thick and fleshy, with the leaves all deeply tinted with purple. The flowers also purple. To this I would add a plant collected at Gunong Inas by Yapp at an altitude of 3,500 feet. But the plants collected in Singapore and Curtis's plant from Penang appear to me to be totally different though King and Gamble call these also *C. Ridleyi*.

I would separate them under the name of *C. singapurensis*. Whole plant about 2 feet tall, stem moderately slender. Leaves elongate lanceolate acuminate long-narrowed to base nerves 16 pairs, 9 in. long, 2.5 in. wide, petiole 1 in. long. Stipules connate into a tube with 2 blunt points .15 in. long. Peduncle 1-2.5 in. long. Head about 1 in. across. Bracts outer pair broad, ovate subacute or blunt, inner ones oblong. Calyx very short, truncate. Corolla 1.25 in. long, tube thick, lobes ovate obtuse, all honey yellow. Fruit light blue.

In damp woods. Singapore: Bajau. Johor: Gunong Pulai and Gunong Pantai.

Cephaelis elliptica, n. sp. *C. cuneata* var. *elliptica*, Ridl.

Shrubby, stem rather slender. Leaves membranous, not fleshy, elliptic apex caudate, acuminate base narrowed decurrent on petiole, nerves 11 pairs 4.5 in. long, 1.5 in. wide. Peduncle 1.5-2 in. long, terminal and axillary. Flowers not seen. Fruit oblong, rounded at tip and base with a strong rib on each side .4 in. long, .3 in. wide (dry).

Pahang, Telom (*Ridley* 13636).

I have not seen flowers of this plant but the foliage in texture and shape is very different from any other species and the fruit is much less pulpy.

Cephaelis triceps, n. sp.

About a foot or more tall. Leaves somewhat or very unequal in size, rather fleshy, membranous, elliptic, shortly blunt acuminate, base shortly cuneate, nerves about 12 pairs, slightly prominent beneath, 5.5 to 6 in. long, 2.1 in. wide, petiole not

winged .5 in. long. Stipules coriaceous connate with short ovate points .25 in. long. Peduncle 1.75 in. bearing 3 pedunculate heads, peduncles thick .5 in. long. Involucral bracts coriaceous connate, boat-shaped, acuminate, involucre 1 in. across. Bracts of heads broad, oblong .5 in. Heads .5 in. across of few flowers. Colyx .2 in. long, limb cup-shaped, entire. Buds subglobose. Corolla tube cylindric .25 in. long.

SELANGOR; Sempang mines, Semangkok about 3,000 ft. (*Ridley*).

This is very distinct from any other of our species in the 3 peduncled heads on a common peduncle.

Cephaelis elongata, n. sp.

Stem woody 14 in. tall, rather slender, internodes 1.5 in. long. Leaves narrow lanceolate, long, acuminate, base narrowed, slightly fleshy, membranous, nerves faint 8 pairs, 4-5 in. long, 1 in. wide, petiole winged .1 in. long. Stipules ovate lanceolate, blunt, connate .1 in. Peduncle .4 in. long. Heads .25 in. across of 5 or 6 flowers and 2 lanceolate bracts .25 in. long. Floral bracts ovate, boat-shaped, blunt, .12 in. long. Flowers nearly sessile. Calyx cup-shaped, entire, .05 in. long. Corolla tube cylindric, dilate at mouth .3 in. long, lobes ovate lanceolate acute .1 in. long. Fruit oblong .2 in. long 4-ridged crowned with the calyx.

SELANGOR, Semangkok Pass. (*Ridley*).

COMPOSITAE.

Erigeron sumatrense, Retz. Obs. v. p. 28. The plant formerly identified for me at Kew as *Conyza semipinnatifida,* Wall. (Journ. Roy. As. Soc. xlix, p. 18). I find on comparison does not belong to that species, but is an *Erigeron* allied to *E. linifolius*, Willd. a plant of unknown origin, to which it has also been referred, but it more distinctly fits the description of *E. sumatrense*, Retz., only known from his description however. It is a hairy weed from 3-6 feet tall. Leaves membranous lanceolate strongly sparsely toothed, gradually narrowed to the base of the petiole 3.5 in. long and .5 in. across. The upper leaves among the inflorescence-branches are linear 1 in. long .05 in. wide and entire. All are coarsely white; hairy. The terminal panicle is large, much branched and hairy. Heads in flower .1 in. long, yellowish on pedicels .25 in. long in fruit they are .4 in. across. The involucral bracts very narrow, hairy and shorter than the white pappus. The outer flowers are very narrow, 2 lipped with 2 minute staminodes quite sterile. The inner (disk) flowers tubular, whitish green, lobes acute, short sepaline hairs as long as the tube, anthers projecting brown-yellow turning brown after fall of pollen.

I is a common weed in clearings, in SINGAPORE, JOHOR, PAHANG, MALACCA, SELANGOR, PERAK, DINDINGS and PENANG and also occurs in SIAM, JAVA and the PHILIPPINES at Benguet (*Loher* 3615).

It is known as Sari Bulan and Sumbong Jantan.

Erigeron oreophilum, n. sp.

A simple unbranched leafy herb, 6-8 inches tall softly pubescent. Leaves oblong lanceolate entire obtuse (the upper ones smaller and narrower and acute and narrowed to the base of the petiole .4 in. long .12 in wide or less, all white, hairy. Heads racemose or with 1 or 2 short branches at the base of the raceme .1 in. long in flower .20 in. across in fruit, on short slender peduncles .12 in. long. The involucral bracts very narrow linear acuminate pubescent or glabrous, not imbricating. Outer florets with a minute oblong ligule. Achene unripe glabrous pappus white.

PERAK, Gunong Kerbau at 6,600 ft. (*Robinson*).

Referred by me formerly to *E. linifolius*, but the foliage will not suit that plant as it seems to be always entire, and I do not think it can be a mountain form of that. It does not appear to be closely allied to any other species.

VACCINIACEAE.

Vaccinium ardisiflora, Ridl. I find that V. *ardisiflora* is a name already occupied and substitute V. *ardisiflora* for it.

Vaccinium loranthifolium, n. sp.

A stunted tree with thick black branches. Leaves stiff coriaceous obovate rounded narrowed to petiole, gland dotted beneath, nerves obscure 3 pairs rising from the midrib 2-2.75 in. long, 1-1.35 in. wide, petiole thick .2 in. long.

Racemes thick subterminal 2.5 in. long, rachis red. Flowers close-set, on very short curved pedicels. Bracts (caducous) oblong obtuse broad .2 in. long. Calyx cupular pubescent with broad ovate lobes. Corolla fleshy globose ovoid glabrous outside, hairy within. Stamens 10 short, filaments very short, hairy, anthers short, tubes nearly as long as anther cylindric, no dorsal or basal appendage. Style little longer than the stamens, thick, glabrous. Fruit fleshy, subglobose terminated by the broad calyx lobes .15 in. long, on short thick pedicel .1 in. long.

PERAK: Gunong Kerbau 4,500 ft. (*Robinson*) at 7,000 ft. (*Aniff*).

Allied to V. *riscifolium*, King and Gamble but with much larger fruit with large sepals, and a larger ovoid fleshy corolla.

V. Teysmanni, Miq. Fl. Ind. Bat. II .p. 1062. The plants referred to this species by King and Gamble, cannot I think be this Javanese species, which was ovoid, not cylindric corollas. I propose the name of *V. perakense* for the plant so described by King in the Materials.

Vaccinium Wrayi, n. sp.

A tree. Leaves small elliptic slightly narrowed at both ends stiffly coriaceous, nerves faint but visible when dry as are reticulations, 6 pairs, 1.25-2 in. long .75-1 in. wide, petiole thick .1 in. long. Racemes 3 inches long, flowers scattered, all puberulous. Pedicels decurved .15 in. Calyx flat saucer-like with 5 large triangular lobes spreading. Corolla reddish pink, conoid-cylindric .15 in. long puberulous outside, hairy within, lobes short, rounded. Stamens very short, filaments very short with long hairs. Anthers small ellipsoid, the tubes short curved forwards, shorter than anther, a dorsal filiform process on the back of the anther. Style shorter than the corolla, little longer than the stamens pubescent. Disc hairy. Fruit globose minutely puberulous disc short hairy hemispheric. Sepals as long as disc, acute.

PERAK: Camp on Ulu Batang, Padang 4,900 ft. (*Wray* 1528). "Tree, flower reddish-pink, fruit green, leaf-stalks crimson."

Erroneously referred to *V. bancanum*, Miq. by King, which it is perhaps allied to as it has the same peculiar trumpet-shaped spurs to the anther. In all other points however, it is quite different.

Vaccinium Kunstleri, King, appears to me to be a form only of *V. bancanum*, Miq.

MYRSINEAE.

Ardisia singaporensis, n. sp.

A small tree. The young parts densely red scurfy. Leaves thinly coriaceous elliptic lanceolate acuminate acute base narrowed edge slightly wavy closely gland-dotted, glabrous above scurfy beneath chiefly on the midrib on young leaves, nerves about 18 pairs fine and inconspicuous, secondary nerves nearly as conspicuous 4.5 to 7 inches long, 1.75-2 in. wide, petiole .5 in. long. Panicles in terminal axils scurfy, of several umbels on peduncles 1 in. long, secondary peduncles .5, pedicels .2 dilate upwards. Flowers bright pink .1 in. long. Buds ovoid. Calyx and lobes small oblong ovate scurfy. Corolla lobes ovate acute glabrous. Drupe globose .2 in. through, black.

SINGAPORE. Pulau Ubin (*Ridley* 2816) Changi Road (*Ridley* 2833).

This pretty tree was by some error referred by numbers at least to *A. villosa* by King and Gamble. It is most nearly allied to *A. ferruginea*, Mez. of Johor, and to *A. Miqueliana*, Teysm, but the leaves are larger and narrowed to the base.

SAPOTACEAE.

Palaquium calophylloides, n. sp.

A big tree 50 to 60 feet tall. Leaves stiffly coriaceous obovate, shortly blunt acuminate base cuneate, nerves very fine and inconspicuous about 10 pairs, nearly parallel horizontal forking at the tips, the secondary nervules and reticulations as visible, midrib flat above strongly elevate acute beneath 4 inches long and 2.5 in. wide, petiole 1 in. long thickened and rugose at base. Flowers in fascicles of 3 or 4 on tubercles on the branch below the leaves, pedicels thick .25 in. long pubescent. Calyx-lobes .1 in. long, outer three ovate, rounded finely hairy, inner ones narrower, shorter lanceolate subacute. Corolla .2 in. long, lobes oblong lanceolate subacute, tube much shorter, all glabrous. Style a little longer than the petals.

KEDAH: Kedah Peak at 1,000 ft. (*L. M. Bell and Mhd. Aniff*).

This differs from *P. Ridleyi*, King and Gamble in the faint obscure nerves and the two pairs of calyx lobes being dissimilar. The pedicels are also thicker and the corolla tube very short. The set of Palaquiums to which this species belongs are generally very scantily represented in herbaria on account of the immense height of the trees usually 80 ft. to the first branch and the small inconspicuous flowers. They include *P. bancanum*, *P. Ridleyi*, *P. Harveyi* and *P. microphullum*.

Payena lanceolata, n. sp.

A tree. The branchlets petiole and midrib in young leaves red tomentose. Leaves thin coriaceous lanceolate shortly cordate acuminate base narrowed drying pale greenish, nerves very fine 11-12 pairs, horizontal with the reticulations conspicuous below, midrib prominent 3 in. long, 1 in. wide, petiole slender 1 in. long. Flowers in fascicles of 2-4 in the leaf axils, pedicels stout .5 in. long, minutely pubescent. Calyx glabrous outer lobes .2 inches thick ovate blunt, inner valvate not meeting, edge ciliate. Corolla .5 in. long, tube as long as the calyx, lobes oblong rounded, blunt. Filaments very short 18, anthers conic ovate, appendage very short, hairy. Style and ovary glabrous. Style .4 in. long.

KEDAH, Langkawi on Gunong Raya (*Aniff*).

Allied to *P. lucida*, but the leaves are very narrow more stiff exactly lanceolate, and flowers nearly glabrous.

Payena utilis, n. sp.

A very large tree. Leaves small oblanceolate tip round or blunt-pointed, base long narrowed thinly coriaceous drying green, shining above pale beneath, nerves 8 pairs, faint but visible above and midrib elevate beneath, broad, flat above 3 in. long, 1-1.5 in. wide, petiole slender 1 in. long glabrous or with a few red hairs. Flowers numerous in the uppermost leaf axils forming a subterminal tuft, pedicels slender, glabrous or sparsely pubescent. Calyx subcylindric, lobes lanceolate blunt and narrow, pubescent .25 in. long, inner pair oblong and narrower. Corolla-tube cylindric .25 in. long hairy inside, lobes linear narrow blunt, recurved shorter than the tube. Stamens 16 filaments long slender exsert as long as the lobes, anthers linear-oblong, appendage minute. Seed very large 1.5 in. long 1 in. wide, .5 inches through, elliptic base round tip subacute yellow-brown, hilum half the width of the seed.

The "Betis" or "Bilian" of the Malay Peninsula (not of course The Borneo Bilian) I partly described this in the Agricultural Bulletin, vol. v, p. 39, but at that time had only leaves and seeds. In the Kew Herbarium are specimens with flowers from Ulu Selangor collected by Mhd. Hashin for the Forest Department.

OLEACEAE.

Linociera spicifera, n. sp.

Tree. Bark of branches white. Leaves coriaceous elliptic abruptly acute acuminate base shortly cuneate, nerves 7-8 pairs faintly depressed above, slightly elevate beneath, inarching at apices, midrib prominent on both sides 4-4.5 in. long, 1.5 in. wide, petiole .15 in. long thick pale papillose. Flowers sessile in short racemes .24 inches long with persistent coriaceous ovate bracts. Calyx campanulate with 4 very short rounded lobes. Corolla tube very short, lobes narrow linear .25 in. dilate at base, narrowed upwards and edges incurved. Stamens, anthers ovoid obtuse with very short filaments, ovary oblong with a sessile stigma.

SELANGOR: Rawang, Forest reserve (*Kloss*).

Linociera parvifolia, n. sp.

Apparently a glabrous bush with strict black branches. Leaves coriaceous lanceolate or subrhomboid or oblanceolate blunt, midrib depressed above, elevate beneath, nerves about 6 pairs, very fine almost invisible above and faint beneath, 1-1.75 inches long, .5-.75 in. wide, petiole slender .12 in. long. Cymes panicled base spreading .5 in. long, flowers in threes at the end of branches, pedicels .1 in. long. Calyx shortly cup-shaped with 4 small ovate teeth. Corolla .1 long tube

very short, lobes 4 ovate triangular, blunt. Stamens 2, oblong with very short filaments. Ovary conic with a short style and small capitate stigma.

SELANGOR: Gunong Mengkuang at 5,000 ft. (*Robinson*).

APOCYNACEAE.

Alstonia micrantha, n. sp.

Branches slender. Leaves opposite, coriaceous oblong abruptly short, caudate, base shortly cuneate, nerves very fine parallel very numerous, secondary ones as conspicuous joining in a fine intramarginal vein close to the edge 4-4.5 in. long, 1.5-1.5 in. wide, petiole .25 in. long. Panicles axillary slender 3 inches long, branches distant 3 or 4, about an inch long either bearing at the tip secondary branches or simple umbellate with numerous small flowers, very shortly pedicelled. Bracts small, ovate. Calyx-tube very short, campanulate lobes rounded, ciliate. Corolla .05 in. long, tube cylindric slightly dilate in the middle, lobes oblique, oblong lanceolate more than half as long as tube, glabrous (apparently pink) 5 oblong scales deflexed in mouth of tube. Stamens just below the mouth 4, anthers ovate lanceolate shortly sagittate and filaments short. Disc thin, flat annular undulate. Ovary simple conical, glabrous, style very slender cup-shaped.

SELANGOR: Rantau Panjang (*Kloss*).

Micrechites.

In King's and Gamble's description of this genus in the Materials p. 504, two species are given, viz. *M. polyantha,* Miq. and *M. elliptica,* Hook. fil. Of the latter the Malay form is given as a variety *Scortechinii,* based on a plant of which I have only seen a poor specimen. It seems however, to be quite different from the Himalayan species *M. elliptica* and so I separate it as *M. Scortechinii* both leaves and flowers are considerably bigger than in Melliptica. *M. polyantha,* Miq. as described by King and Gamble appears to comprise at least 3 species exclusive of the true plant of Miquel.

M. furcata, Ridl. n. sp.

A rather stout climber, stems slightly angled. Leaves chartaceous, coriaceous elliptic or elliptic lanceolate, bluntly acuminate, base narrowed, nerves 14-18 pairs, secondary nerves nearly as conspicuous, all fine, slightly elevate inarching close to the edge, reticulations fairly conspicuous 3.5-5 in. long, 1.5-2 in. wide, petiole .25 in. long. Cymes axillary and terminal on the lateral branches, when fully developed about 2 in. long and about 1-2 in. wide, dense-flowered, peduncles and branches angled, glabrous, terminal branches pubescent.

Flowers cream-color, nearly sessile. Bracts ovate dense (reddish) pubescent. Calyx-tube narrow, campanulate, lobes ovate lanceolate, .1 in. long. Corolla urceolate or obovoid with rather long unequally bilobed lobes, lobules linear obtuse all glabrous, anthers acuminate. Ovary densely villous with low lobed saucer-like disc. Style short. Follicles unripe linear acute terete, 6 in. long.

PERAK: Relau Tujor (*Wray* 2604) overhanging Bernam River (*Kunstler* 8859).

This certainly has the habit of the Javanese *M. polygantha* Miq., but the leaves are broader, and more coriaceous, the inflorescence denser; the calyx very much larger with broader lobes and the petals bilobed not entire.

Micrechites brachypetala, n. sp.

A rather slender woody climber. Leaves thinly coriaceous elovate bluntly short acuminate, base shortly narrowed, nerves 7-8 pairs, reticulations fine, close, 2.5 in. long, 1.5 in. wide; petiole .25 in. Panicles terminal 2.5 in. long subglabrous, the branches in pairs 1 in. long, branchlets .5 in. long again branched lax, final branches .1-.2 in. long with several pairs of persistent bracts whence flowers have fallen Calyx cup-shaped with very short teeth slightly pubescent. Corolla cylindric urceolate, lobes very short, tooth-like, entire straight.

PENANG: Penara Bukit (*Curtis* 850).

Micrechites tenuifolia, n. sp.

Straggling climber. Leaves rather thin almost membranous broadly elliptic, lanceolate, narrowed to both ends, tip blunt, base subacute, nerves very fine about 10 pairs, 2 in. long, 1.5 in. wide, petiole slender .3 in. long. Cymes small about 1 inch long, axillary and by fall of the leaves in a lax simple panicle of short distant branches, 1-6 in. long, branches puberulous. Bracts ovate, acute persistent as in preceding. Calyx lobes ovate-round puberulous. Corolla glabrous .05 in. long, tube cylindric, lobes short oblong linear, entire.

MALACCA: (*Maingay*). SELANGOR, Gintung, Bidai (*Ridley* 7142) and Kwala Lumpur (*Ridley* 1851, 1905).

Like the last but calyx lobes rounded, corolla lobes much larger, leaves smaller thin.

ASCLEPIADACEAE.

Dischidia fruticulosa, n. sp.

Epiphytic shrub. Stem stout, woody over .12 in. through base, swollen, branches slender, herbaceous, light green. Leaves when dry rather thin texture elliptic obtuse, narrowed to the base slightly, nerves invisible 2-3 in. long, .75-1.10 in. wide, petiole .1 in. long. Racemes sessile solitary or in pairs

lengthening to .5 in., .05 in. thick. Pedicels very short. Calyx lobes oblong, ovate, blunt. Corolla base of tube subglobose abruptly narrowed into a cylindric tube above, .1 in. long, lobes short, acute fleshy, with a deflexed tuft of hairs between each at its base. Coronal scales, claw linear, limb broad hastate round at the top. Stamen column thick, short, appendages blunt, rather thick. Pollinia oblong with short caudicles and a linear oblong carrier rather large.

PERAK: Gunong Kerbau at 4,200 ft. (*Robinson*).

I do not know any *Dischidia* as woody a shrub as this, the stem being quite stout with grey bark, the branchlets light green and herbaceous. The very thick racemes are quite sessil, and floriferous from the base, the flowers falling off as the raceme grows.

Dischidia rosea, Ridl. Journ. Roy. As. Str. Br. p. 31.

I find Schlechter has used this name for a Philippine plant a few years earlier. I therefore substitute the name *rhodantha* for *rosea*.

Dischidia astephana, King and Gamble. This plant is described as having white flowers, mainly on the strength of this apparently. Schlechter described his *Conchophyllum angulatum* as a distinct plant with red flowers. As a matter of fact the flowers are sealing-wax red entirely, except the spaces between the prominent ridges which are blue black.

Dischidia nummularia, Br. Prodr. Fl. Nov. Hall. 1 p. 461. On examining the type of this plant and the excellent original drawing of J. Miller in the British Museum Herbarium it is difficult to imagine how this plant could have been confused with the common Malayan plant so identified by most botanists to the present day. The true plant has ovate flat leaves somewhat like those of *albida* of Griffith, considerably larger umbels of white flowers tipped with yellowish apparently (certainly not scarlet as given by King and Gamble). It is confined as far as I know to North Australia. The leaves of the Malayan Peninsula plant are about a quarter of the size, elliptic to ovate in outline, very fleshy nearly as thick as they are wide, glaucous and mealy, usually yellow. The flowers are white, fewer and small than in *nummularia*. The plant seems to be quite identical with *D. Gaudichaudii*, Decne, and occurs through the Malay Islands to Amboyna, and all through the Malay Peninsula to Tenasserim.

LOGANIACEAE.

Fagraea (Cyrtophyllum) **caudata,** n. sp.

A tree thirty feet tall, branches slender. Leaves coriaceous lanceolate caudate, base narrowed to the petiole and de-

current thereon, nerves about 4 pairs widely inarching .05-.1 from the edge, slightly elevate beneath and nearly or quite invisible above, midrib sunk above, raised beneath, 4 in. long, 1 in. wide, petiole .5 in. long. Inflorescence axillary in upper axils and lower down, peduncle very slender 2 in. long bearing 3 flowers on pedicels as long and as slender. Calyx small .12 in. tube very short, lobes ovate subacute. Corolla yellow, tube narrow cylindric .4 in. long, limb .5 across, lobes ovate, rounded, .2 in. across. Stamens exsert about .4 in. beyond corolla. Style from base 1 in. long, filiform. Stigma small capitate.

BORNEO, Lobb 1853 in Herb. Kew. "Tree 30 feet, yellow."

This species is allied to *F. Wallichii* of Penang Hill, differing in the more coriaceous lanceolate cordate leaves, and extremely slender peduncles and pedicels, cylindric corolla tube and shorter stamens. It would probably be best to keep up the genus *Cyrtophyllum* for the Tembusu trees, which differ so much from the epiphytic true *Fagraeas* with their fleshy leaves and flowers, and included stamens, from the tall trees with their leaves and flowers and long projecting stamens. The genus *Cyrtophyllum* would thus contain *C. fragrans*, Malay Peninsula to S. Siam and Cambodia, *C. giganteum*, Malay Peninsula and Sumatra, *C. Wallichii*, Penang, *C. caudatum*, Sumatra and Borneo, *C. speciosum*, Bl., Java and Borneo. This however, has much smaller flowers and thicker leaves.

Fagraea gigantea, Ridl. *F. speciosa*, Ridl. Journ. Roy. As. Soc. S. Br. 50, p. 122 not of Blume.

Since writing my account of the Tembusu Fagraeas in Journ. Roy. As. Soc. Str. Br. vol. 50, I have seen at Kew specimens of the true *F. speciosa*, Bl. agreeing entirely with Blume's figure in Rumphia. It is quite a different plant from our Tembusu tembaga which is confined to the Malay Peninsula and Sumatra. This plant is unnamed, and I therefore give it the name of *Fagraea gigantea* on account of the great size to which it attains. It is fully described in the Journal at the page quoted.

Gaertnera acuminata, Benth. Journ. Linn. Soc. i p. 112 was based on a plant collected by Wallich in Singapore (No. 8342). It was reduced to a variety of *Koenigii* of Ceylon, a much larger plant, with large leaves and flowers, by Clarke and following him by King and Gamble. It is obviously a different plant and I retain the name *acuminata* for it. Wallich also (8374) got a somewhat different looking plant narrower leaves in Singapore which he called *Psychotria oxyphylla*. Bentham separated this also into a distinct species *G. oxyphylla*.

It seems however, to pass into *G. acuminata* and had better perhaps be kept as a variety of that species. Besides these lowland plants we have a whole series of specimens from our mountain regions which differ in their more compact habit, more coriaceous leaves, dense cymes and short, thick pedicels. They seem to be mountain forms of *oxyphylla* and could be classed as sub var. *Montana*. An allied plant which was obtained by Mr. Robinson on Tampin hill, differs in having the flowers sessile in small heads, and a truncate corolla. This I propose to separate under the name of *G. sessiliflora*.

Gaertnera sessiliflora, n. sp.

A glabrous shrub. Leaves chartaceous, lanceolate acuminate, cuspidate, long narrowed at the base, nerves 7 pairs, slender, elevate beneath 4.5-5.5 in. long, 1.10-1.25 in. wide, petiole .1 in. long. Stipules forming a tube with 2 setaceous points .5 in. long. Cymes 3 of about 6-10 sessile flowers in dense heads .2 in. long, peduncle thick, .3 in. long. Bracts at base of peduncle ovate, long—setaceous. Calyx campanulate limb truncate entire .05 in. Corolla .24 inches long, tube cylindric, lobes as long, round, ovate mouth very woolly. Fruit globose 2-seeded .3 in. through.

Negri Sembilan, Tampin Hill (*Robinson*).

Gaertnera pedicellata, n. sp.

Slender shrub. Leaves lanceolate cordate acuminate long, narrowed to base, nerves slender 4-6 pairs 3-3.5 in. long, .5 in. wide, petiole .6 in. long, slender. Stipules .25 in. long, tubular with short setaceous points. Cymes terminal lax spreading sessile 1.5 in. long, branches few .5 in. long bearing one to three flowers, pedicels .25 in. long. Calyx wide campanulate .06 in. long, truncate. Corolla 4 in. long, tube rather stout, lobes elliptic, obtuse .15.

Selangor: Gunong Mengkuang Lebar (*Robinson*).

This is a slender shrub with a short lax panicled cymes and much longer pedicels than any form of *G. oxyphylla* and longer petioles.

PONTEDERIACEAE.

Monochoria elata, n. sp.

An aquatic plant 6-8 feet tall, stem thick. Leaf petiole 24 in. long, blade hastate, linear 4 in. long, .3 in. wide slightly narrowed to the tip. Lobes at base linear acuminate blunt 1 in. long. Sheathing leaf of inflorescence with a sheath 3 in. long over 1 in. wide, petiole 6-7 in. long, blade spear-shaped 2 in. long, .1 in. wide, base slightly broader, cuneate. Raceme many flowered 3.5-5 in. long. Pedicel slender .4 in. long.

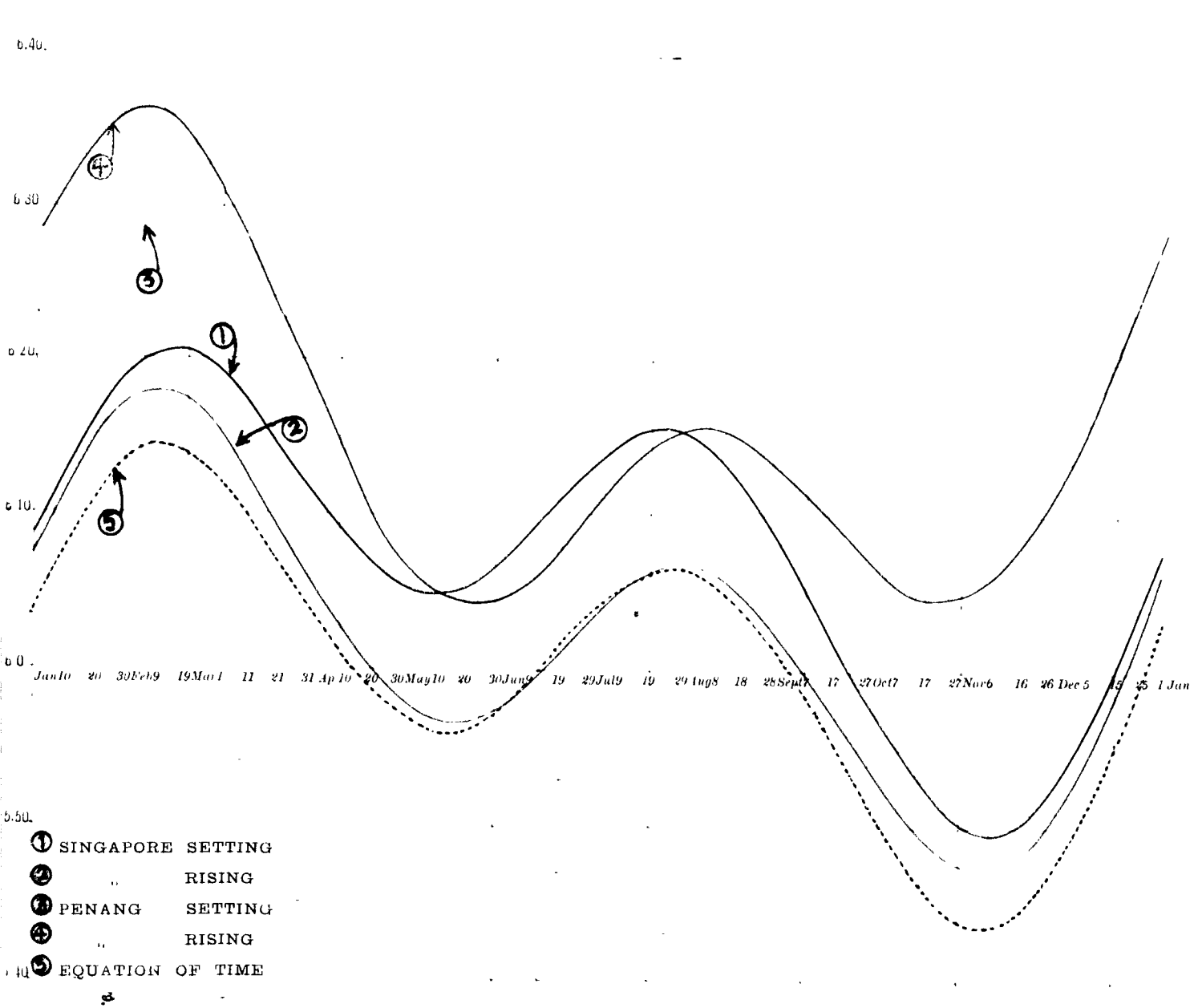
Flowers blue. Sepals and petals .15 in. long, .2 in. wide lanceolate acuminate, petals a little the larger. Stamens 6, filaments rather slender, anthers linear, blunt .2 in. long. Ovary conic passing into the rather stout style. Fruit I have not seen ripe but it appears to be small and oblong. *M. cuspidalis*, Prest. var. Mohammed Haniff in Gardens Bulletin i, 1916, p. 354-355.

KEDAH: Jenun, common in rice fields, flowers blue 6-8 feet high (*Mohammed Aniff*) 1208.

In its great height and narrow hastate leaves and raceme this differs from any of the few species of this genus. The only plant at all resembling it is an undescribed species from Port Darwin in Australia collected by Mr. C. E. F. Allen, which may be named as follows:—

M. australasica apparently a submersed plant about 18 inches long. Leaves linear 18 in. long, .15 inches wide. Raceme in the axil of a pair of sheathing leaves, sheath 3 inches long, .6 in. wide, blade linear acuminate, not petiolate nor hastate 1.5 in. long, .1 in. wide. Flowers scattered about 8, blue, pedicels .1 in. long. Sepals and petals oblong lanceolate, narrowed to the tip .4 in. long, .2 in. at base. Stamens short, oblong .05 in. long, blunt at both ends, yellow. Capsule ellipsoid, .5 in. long, .25 in. through, acuminate. Seed oblong, truncate, black with 15 fine ribs running from top to base .05 in. long.

NORTH AUSTRALIA: near Darwin S. (*C. E. F. Allen*, Nov. 1914.)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1 SINGAPORE SETTING
2 " RISING
3 PENANG SETTING
4 " RISING
5 EQUATION OF TIME

Time of Sunrise and Sunset at Singapore and Penang throughout the Year.

By H. Marriott.

Accompanying this note is a chart showing the times of sunrise and sunset at Singapore and Penang throughout the year.

Each space on the chart represents horizontally an interval of five days and vertically one minute.

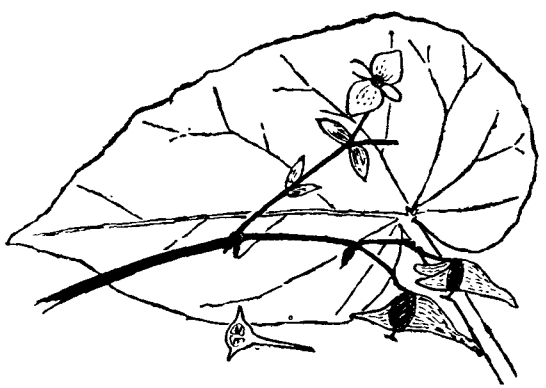
A dotted curve shows the 'equation of time' (*i.e.* the difference between apparent solar time as indicated by a sun-dial and mean-time as recorded by the clock). Bearing in mind that by using the standard time of the 105th degree of longitude instead of that of our own longitude of 103° 50', our clocks in Singapore are 4 minutes 10 seconds ahead of the true time, this dotted line shows how very small is the variation due to our small northern latitude. In Penang the corresponding amount of 'daylight saving' is 18 minutes 36 seconds, but in addition there is quite an appreciable variation on account of latitude. In Singapore the difference between the lengths of the longest and shortest days in the year is only about 9 minutes, in Penang the difference is 36½ minutes. At both places there are two maxima and two minima in the curves, but while in Singapore the longest evenings are in February and are entirely caused by the 'equation of time,' in Penang the effect of latitude is sufficient to make the evenings longer in July than in February.

The times calculated are the Singapore standard times at which the centre of the sun's disc is visible on the horizon to an observer at the sea level, allowance being made for the fact that owing to refraction the sun is visible when in reality it is 36' below the horizon.

Begonia Haniffii, a small tuberous species of the Islands of Lankawi.

By I. H. Burkill.

In 1896 Mr. Curtis obtained at Kasoom in the Siamese Malay States a tuberous Begonia which Mr. Ridley described in this Journal (No. 50, 1911, p. 196) as *Begonia Curtisii*. The new species here to be described is its counterpart from the islands of Lankawi. Both Kasoom and Lankawi are limestone regions, and both Begonias grow on the limestone rocks, dying down before November and surviving to February, when they sprout, by underground tubers.



Begonia Haniffii was obtained some five years ago by Mr. Mohamed Haniff, and brought into the Waterfall Gardens, Penang, where it persists. From the underground tuber it attains a height at about eight inches: if a weak plant it may have one stem only; if a strong plant it may have up to six. These stems carry 2-4 leaves of which the largest appears to be one with the cordate half to the right of the midrib. The leaves in outline are as drawn here: they are of a dark green thickly covered with small silvery spots, each spot a patch of 40-100 air-containing cells often but not always around the base of a short air-containing hair. Such spots in this species often touch the larger veins. The stem is slightly translucent, crimson, with a little entangled dark hair here and there, but chiefly below: it zigzags at the nodes. The colour, translucency and slight hairiness extend to the petioles. The stipules are pale with a little of the crimson colour along their nerves. The flowers

are segregated, the females occupying the best places, the males on lateral branches. The flowers are white with a slight amount of the crimson pigment along the veins. The male flowers may be ¾ inch across and 1 inch from top to bottom. The stamens are about 120 in a globose cluster, not having the connective extended. The female flowers are 5-merous, about ¾ in. across. The style bifurcates close to the base, and each half with a considerable amount of fullness ends in a dull yellow typically marginal stigma. The ovary has two cells with the placenta in each as two plates. The wings of the fruit outside these two cells make nearly equilateral triangles; but the unpaired wing is much elongated, and slightly hooked at the point. The surface of the capsule before maturity is somewhat mealy by reason of sloughing cells.

Begonia Haniffii, species in sectione Platycentro, ad *B. Curtisii*, Ridl., maxime affinis; differt praecipue fructu longe alato, et foliis magis longioribus.

Radix tuberosa. *Caules* erecti, 20 cm. alti, coccinei, hinc inde pilis fuscis tortis tecti, subtranslucentes. *Folia* tenuissime herbacea, inaequilateralia, ad 15 cm. longa, ad 8 cm. lata, 6—7-nervia dense argenteo-maculata maculis ad 2 mm. diametro, praeter pilos perparvos emortuos in medio macularum glabra: petiolus ad 8 cm. longus, colore caulis similis; stipulae 10 mm. longae, ovatae ex basi lata, acutae, 5-nerves, pallidae, in nervis coccineo-tinctae. *Flores masculini* in ramis lateralibus, albi, in nervis coccineo-tincti: petala majora 10 mm. longa, petala minora 8 mm., majora ovata obtusa, minora anguste obovata. *Antherae* circa 120, apice rotundatae. *Flores feminei* 5-meri, albi, 10 mm. diametro. *Stylus* prope basi bifidus: rami plicati. *Fructus* ob cellulas emortuas subfarinosus, biloculatus, trialatus ala majori ad 20 mm. longa, apice fere hamata, alis minoribus subaequilateralibus 10 mm. longis. *Semina* numerosissima, pallide umbrina, angulata.

Planta haec ex vivo descripta habitat in rupibus calcareis insularum Lankawi. Folia vigescent mense Martio; caules marcent mense Octobri.

The Hindu Element in Malay Marriage Ceremony.

By R. O. Winstedt.

It is well-known that a Malay raja when marrying a secondary wife of inferior rank often does not appear in person but is represented by his *kĕris*. As one might expect, this would appear to be a custom of Indian origin. Among the Tottiyans a caste of Telugu cultivators, who are probably descendants of the soldiers of the Nayakkan kings of Vijayanagar—"if a man belongs to a Zamindar's family, he is said to be of the Raja Kambala caste..... If a marriage is contracted with a woman of an inferior class, the bridegroom does not personally take part in the ceremony: a dagger (*kattar*) or rude sword is sent to represent him and the *tali* is tied in the presence thereof. In a Zamindar's suit, details of which are published in the Madras Law Reports, Vol. XVII, 1894 the judge found that the plaintiff's mother was married to the plaintiff's father in the dagger form; that a dagger is used by the Saptur Zamindars who are called Kattari Kamaya, in the case of inequality in the caste or social position of the bride; that though the customary rites of the Kambala caste were also performed, yet the use of the dagger was an essential addition; and that though she was of a different and inferior caste to that of the plaintiff's father, yet that did not invalidate the marriage." (E. Thurston's *Castes and Tribes of Southern India*, Vol. VII, p. 190).

Diet Nutrition and Excretion of the Asiatic Races in Singapore.

No. 2. MANUAL WORKERS.

By J. Argyll Campbell.

This is the continuation of the work published in August, 1917, when the diet, nutrition and excretion of the local medical students were dealt with (1). In the present paper, manual workers are under observation.

As might be expected considerable difficulty has been experienced in obtaining material from labourers, but with the faithful co-operation of several of the medical students and of others, a number of analyses were possible. It is hoped that more will be done in the future.

Methods.

Kidney Excretions.—The same methods were employed for the estimations of nitrogen, ammonia, urea and chloride, as those used in the previous research (1).

In addition, quantitative estimations of the phosphates and uric acid were carried out. Phosphates were estimated by titration with uranium nitrate in a solution of acetic acid, which precipitates all the phosphate. The end reaction is either the brown colour which is produced by an excess of uranium nitrate in the presence of potassium ferrocyanide or the green colour formed by tincture of cochineal with a surplus of uranium nitrate.

The Hopkins-Wörner method was used to estimate the amount of uric acid present.

Diet.—In some cases details, of the kinds and amounts of food allowed to their workers, were obtained from employers.

In other cases it was possible to weigh the food before each meal.

The compositions of the foods and their heat values have been taken from standard books on the subject (2).

Various Workers.

Chinese Bakers.—Two Chinese bakers, employed by the father of one of the students, supplied material for eight observations. The average figures for the kidney excretions will be seen in Table I. The amount was scanty, 803 c.c. This was due to perspiration

whilst in the bakery. The total nitrogen was 8.3 grammes. The ammonia, 1.04 grammes, was high and therefore, so was the ammonia co-efficient, 10.3%. The reason for this is not clear. Probably further experiments will elucidate the problem. The amount of chloride was 5.1 grammes and of uric acid 0.48 gramme.

The diet consisted of rice with small quantities of pork, beef and fish.

Tamil Gardeners.—Fourteen observations were made from material furnished by two Tamil gardeners, working at the Medical School Hostel. The average amounts of kidney excretions were nitrogen 7.2 grammes, urea 13.4, uric acid 0.49, ammonia 0.73, chloride 7 and phosphate 1.25 (Table I). Their average weight was 101 lbs. and their average age 23½ years. The average diet consisted of bread 224 grammes, condensed milk 2, sugar 12, butter 13, boiled rice 1376, fish 84, green vegetables 213. This contains 76 grammes of protein, 19 of fat and 468 of carbohydrate. The heat value is 2407 kilocalories. Judging from their nitrogen excretion they metabolised only 45 grammes of protein, so that they did not metabolise all their food (Table II).

Malay Gardener.—This man worked at the school; two observations were made with his kidney excretions. His average figures were nitrogen 7.9 grammes, urea 15, uric acid 0.6, ammonia 0.61, chloride 5 and phosphate 1.5 (Table I). Rice was his chief food, but no details were obtained. He weighed 120 lbs.

Chinese Rickshaw Runner.—This runner was employed privately by the author. One specimen of kidney excretion was obtained when a full day's running (about 15 miles) was done. His figures were, nitrogen 9.8 grammes, urea 20.4 uric acid 0.54, ammonia 1.06, chloride 2 and phosphate 1.8 (Table I). His diet consisted chiefly of rice with small quantities of beef, pork and fish, but no details were obtained.

Chinese Rubber Estate Coolies.—Five weeders and tappers working on a local rubber estate, owned by a student's father, supplied material for fifteen observations. On an average they excreted by the kidney 10.4 grammes of nitrogen, which is equivalent to the metabolism of 65 grammes of protein. Their daily allowance of food contained 86 grammes of protein, 17 grammes of fat and 611 grammes of carbohydrate, the diet being rice (weighed uncooked) 728 grammes, pork 14, fat 7, fish 112, dried peas 56, green vegetables 224. This gives a heat value of 3015 kilocalories (Table II). It is evident that they did not metabolise all this allowance, only 65 out of 86 grammes of protein in the food being accounted for in the kidney excretion.

The figures for the other excretion were urea 19.1 grammes, uric acid 0.65, ammonia 1.09, chloride 6.6 and phosphate 1.78 (Table I). The average age was 32 years and the average weight 122 lbs.

Chinese Prisoners.—Six first class prisoners at the gaol were next employed, under the supervision of the assistant surgeon. They furnished material for 36 observations. Their daily diet, which is fixed by statute and which is considered to be generous for local labourers, consists of cocoanut oil 28 grammes, fresh meat (with bone) 112, rice (weighed uncooked) 448, salt 7, fish (with bone) 84, vegetables 336 and bread 112. This contains 84 grammes of protein, 50 of fat and 432 of carbohydrate, the heat value being 2580 kilocalories.

The average age of the prisoners was 40 years and the average weight 137 lbs. The average length of time on the above diet was 3 years 4 months. The prisoners were all employed in the prison kitchen. Before their confinement they were variously employed—fisherman, rubber estate coolie, tapioca estate coolie, bullock cart driver, shopkeeper and shop coolie.

The average figures for the kidney excretions were nitrogen 11.4 grammes, urea 24, uric acid 0.43, ammonia 0.75, chloride 5.5 and phosphate 1.8 (Table I).

Judging from the nitrogen excretion they metabolised on an average only 71.2 of the 84 grammes of protein of the food (Table II).

Commentary.

Looking at the average figures for the kidney excretions (Table I) it will be seen that there is considerable variation for different occupations, after making allowance for the weight. The amount of nitrogen excreted per kilogram of body weight is shown in one column of Table I. The average figures usually given in text books of Physiology for Europeans in Europe are appended. These figures are the standard figures used for teaching purposes, and the figures for manual labourers in Europe are higher than these. A glance will show that the figures for the nitrogen and urea are much lower in the case of the Asiatic labourer in Singapore. This is due to the fact that he metabolises less protein than the European. He also has less energy. Our local gardeners cannot be regarded as hard workers from a European point of view. The estate coolies and rickshaw runner rank amongst our hardest muscular workers. McCay (3) has shown that a European possesses better physique and greater muscular energy than an Asiatic because the former metabolises a larger quantity of protein. Looking at Table II it will be seen that my figures support this view. The average figure for a European doing moderate labour in Europe is 125 grammes, whereas 71.2 is the highest figure obtained in my experiments with the local labourer. On the other hand the carbohydrate part of the diet is increased in amount, relatively and absolutely, in the case of the Asiatic.

Judging from the amount of protein of the diet, accounted for in the kidney excretion the calorific value of the Asiatic labourer's metabolised food (Table II) is a good deal below that of the European, allowance being made for the difference in weight.

The former does less work. Gentlemen, who have controlled labour both in this city and in Europe, have no doubt that the European labourer has better physique and is capable of heavier work than the tropical Asiatic. Undoubtedly climate plays an important part in this matter. The continuous heat and moisture of the atmosphere in Singapore, do not readily allow escape of heat from the body. Work and food increase body heat, so that the natural remedy is to lessen these. One does occasionally see coolies doing very heavy work but they do not keep this up for any length of time.

Returning to Table I, it will be observed that the uric acid, phosphate and chloride are also present in smaller quantities in the local labourer's kidney excretion than in that of the European. This is due to the fact that the diet of the former contains smaller quantities of the substances from which these are derived.

In all cases the ammonia co-efficient for the local Asiatic is higher than that of the European. This is due to the fact that the former excretes a smaller amount of nitrogen.

No reference has been made to the nitrogen excreted by the skin. This is not sufficient to interfere greatly with the results obtained.

Conclusions.

I. As far as these experiments go, the figures obtained show that on the whole the amounts of kidney excretions for local labourers differ considerably from the standard amounts given for Europeans in Europe.

II. The total nitrogen varies from 7.2 to 11.4 grammes, the urea from 13.4 to 21, the uric acid from 0.43 to 0.65, the ammonia from 0.61 to 1.09, the chloride from 2 to 7, and the phosphate from 1.25 to 1.8.

III. The local labourer uses less protein and fat, but more carbohydrate than the European. The metabolised food of the former has a smaller calorific value. Two reasons, closely connected with one another may be given for this. They live in a continuously hot and moist climate. They do less work.

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Table I. — Kidney Excretions (Average figures).

Subjects	Age in Years.	Height in inches.	Weight in lbs.	Number of observations.	Total Nitrogen.	Urea.	Uric Acid.	Ammonia.	Ammonia Coefficient.	Chloride.	Phosphate. P_2O_5	Amount.	Specific Gravity.	Nitrogen per kilogram of body weight.
Two Chinese Bakers.	27.5	63	112.5	8	8.3 gm.	17.1 gm.	0.48 gm.	1.04 gm.	10.3 %	5.1 gm.	—	807 c.c	1021	0.169 gm.
Two Tamil Gardeners.	23.5	63	101	14	7.2 ,,	13.4 ,,	0.49 ,,	0.73 ,,	8.3 ,,	7.0 ,,	1.25 gm.	1113 c.c	1016	0.164 ,,
One Malay Gardener.	45	60	120	2	7.9 ,,	15.0 ,,	0.60 ,,	0.61 ,,	6.3 ,,	5.0 ,,	1.50 gm.	680 ,,	1026	0.152 ,,
One Chinese Rickshaw Runner.	—	—	—	1	9.8 ,,	20.4 ,,	0.54 ,,	1.06 ,,	8.9 ,,	2.0 ,,	1.80 ,,	815 ,,	1019	—
Five Chinese Rubber Estate Coolies.	32	—	122	15	10.4 ,,	19.4 ,,	0.65 ,,	1.09 ,,	8.6 ,,	6.6 ,,	1.78 ,,	1122 ,,	1018	0.196 gm.
Six Chinese Prisoners.	40	64	137	36	11.4 ,,	21.0 ,,	0.43 ,,	0.75 ,,	5.5 ,,	5.5 ,,	1.80 ,,	1145 ,,	1018	0.192 ,,
European in Europe. (Standard figures.)	—	—	160	—	16.0 ,,	35.0 ,,	0.75 ,,	0.65 ,,	3.3 ,,	11.0 ,,	3.50 ,,	1500 ,,	1020	0.228 ,,

Table II. — Diet and Metabolism (Average figures).

Subjects.	Diet.	Weight in lbs.	Protein in food.	Protein from nitrogen in urine.	Fat in food.	Carbohydrate in food.	Kilocalories in food.	Kilocalories in metabolised food per Kilogram of body weight.	Remarks re Food.
Two Tamil Gardeners.	Mixed.	101	76	45	19	168	2407	32	Food weighed before each meal.
Five Chinese Rubber Estate Coolies.	,,	122	86	65.0	17	611	3015	43	Daily food allowance.
Six Chinese Prisoners.	,,	137	84	71.2	50	432	2580	36	Daily food allowance.
European in Europe.	,,	160	125	125.0	125	400	3324	47	Average diet for European doing moderate muscular work.