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GESNERIACEAE OF THE OLD WORLD
I. New and little-known species of *Cyrtandra* from Malesia

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Cyrtandra sect. *Dissimiles* C. B. Cl., sect. *Radicicaules* Kraenzlin and sect. *Radiciflorae* Kraenzlin are lectotypified. Two varieties are raised to specific rank: *C. dispar* var. *glabriflora* B. C. Stone to *C. stonei* (Malay Peninsula), *C. decurrens* var. *polyneura* C. B. Cl. to *C. polyneura* (Sulawesi). Nineteen new species are described (11 from Sarawak, 1 from Sarawak and Kalimantan, 7 from Sabah—6 of them from Mt Kinabalu). Annotations are provided on 6 previously known species: *C. calycina* Benth. (New Guinea), *C. debilis* Kraenzlin (Kalimantan), *C. farinosa* C. B. Cl. (Sarawak), *C. ligulifera* C. B. Cl. (New Guinea), *C. rubropicta* Kraenzlin (Kalimantan and Sarawak), and *C. russa* C. B. Cl. (Sarawak).

This paper commences a new series on the Gesneriaceae of the Old World. The previous series, Studies in the Gesneriaceae of the Old World, was closed with paper LII consisting of an index to that series, published in the last part of *Notes from the Royal Botanic Garden Edinburgh* (vol. 46 part 3: Feb. 1990).

The descriptions and notes published here have been extracted from a long paper on *Cyrtandra*, the completion of which has been much delayed. When publishing on this genus previously, I have made no reference to sections. The delayed paper will deal with sectional classification at some length; now, therefore, it has seemed appropriate to refer species to their sections in the few cases when this can be done with safety. Many species are not yet classifiable into sections.

All the sections proposed by C. B. Clarke (in A. & C. DC., *Mon. Phan.* 5(1): 202, 1883) contain a mixture of species that would not now be classified together. This is to be expected in view of the very inadequate material that he was studying. However several of these sections are named after an included species, which is therefore automatically (ICBN Art. 22.4) the type of the section (e.g. sects *Disparès*, *Cuneatae*, *Decurrentes*, *Coccineae*, *Aureae*). One section that requires lectotypification is sect. *Dissimiles*; the species *Cyrtandra dissimilis* C. B. Clarke does not belong here and was placed by Clarke in sect. *Whitia* (Bl.) C. B. Clarke. For reasons to be set out at greater length in the later paper, I am choosing as lectotype of sect. *Dissimiles*, *C. trisepala* C. B. Clarke; it is the only species illustrated by Clarke and has well-marked characters including strongly unequal leaves, a zygomorphic calyx (the three upper segments united almost to their tips, the lower two free almost to the base), and a characteristic short somewhat fleshy but almost translucent corolla. Three other species showing the same features were described in the section by C. B. Clarke (*C. anisophylla*, *C. beccarii* and *C. multibracteata*), two species were described by Kraenzlin (*C. impar* and *C. rubropicta*) and four more are added here (*C. bryophila*, *C. iliasii*, *C. stonei* and *C. weberi*), so that there are at least ten species in the section, which is known from Sumatra (2), Malay Peninsula (1), and Borneo (7). In Borneo the two names *C. trisepala* and *C. multibracteata* are at present being used to cover a wide range of

material: it is likely that more detailed study will permit the recognition of additional species.

Subsequent to C. B. Clarke's work, only two new sections of *Cyrtandra* have been described for Western Malesia. These resulted from Kraenzlin's treatment of the Gesneriaceae collected by Prof. Hans Winkler in central Borneo in 1924–1925 (see *Mitt. Inst. Bot. Hamburg* 7: 81–113, 1927). Kraenzlin's section *Radiciflorae* is based on a group he had previously called *Decurrentes Heteroblastae* (in *J. Linn. Soc. Bot.* 37: 278, 1906), which was in turn based on one species, *C. rhizantha* Kraenzlin from Sulawesi. Kraenzlin made it quite clear that *C. radiciflora* C. B. Clarke did not belong to this group. He first used the name *Radiciflorae* in another paper on Philippine species (in *Philipp. J. Sci.* 8: 311–333, 1913), but without any diagnosis: it was validated only in the Bornean account. Nevertheless, in view of the citations given there, it is clearly correct to take *C. rhizantha* as the type of the section. This species is the same as *C. coccinea* var. *celebica* C. B. Cl. and certainly belongs to Clarke's sect. *Coccineae*. The four Bornean species that Kraenzlin placed in sect. *Radiciflorae* belong to as many different affinities (one being a species of *Agalmyla*). The basal flowers that Kraenzlin used as the main feature of this section occur in several groups otherwise unrelated.

Kraenzlin's other Bornean section took its name, and chief characteristic, from the occurrence of adventitious roots even on the leafy part of the stem: he called it sect. *Radicicaules*. This again is a feature to be found in species of widely different affinity and the five species he included here are not all closely allied. The sectional description includes vegetative and floral characters, but nothing about fruits. Two species *C. poikilophylla* Kraenzlin and *C. longicarpa* Merr. are known only in fruit and therefore scarcely qualify as potential lectotypes. *C. foveolata* Kraenzlin may well belong to the *C. sarawakensis* affinity, but that group is properly characterized by its fruits, and fruits of *C. foveolata* are not yet known: I am reluctant to take this species as lectotype and create future problems about how the sectional name should be applied. *C. dajakorum* Kraenzlin is probably a synonym of *C. latens* C. B. Cl., placed by Clarke in sect. *Stellatae*: the eventual coverage of this section is at present uncertain. The last species, *C. strictipes* Kraenzlin, certainly belongs to sect. *Decurrentes*, characterized (amongst other things) by the large densely sericeous corolla. However the long petiolate leaves distinguish *C. strictipes* from the more typical species of the section, which may well eventually require subdivision. *C. strictipes* fits the description of sect. *Radicicaules* as well as any of the other species and is here chosen as the lectotype of the section, which accordingly becomes, at least temporarily, a synonym of sect. *Decurrentes*. The lectotypifications discussed here may be set out formally:

Cyrtandra sect. **Coccineae** C. B. Cl. in A. & C. DC., Mon. Phan. 5: 202 (1883). Type: *C. coccinea* Bl.

Syn.: *C.* sect. *Decurrentes Heteroblastae* Kraenzlin, J. Linn. Soc. Bot. 37: 278 (1906), based solely on *C. rhizantha* Kraenzlin.

C. sect. *Radiciflorae* Kraenzlin, Mitt. Inst. Bot. Hamburg 7: 100 (1927). Lectotype: *C. rhizantha* Kraenzlin.

Cyrtandra sect. **Decurrentes** C. B. Cl. in A. & C. DC., Mon. Phan. 5: 202 (1883). Type: *C. decurrens* De Vriese.

Syn.: *C.* sect. *Radicicaules* Kraenzlin, Mitt. Inst. Bot. Hamburg, 7: 107 (1927). Lectotype: *C. strictipes* Kraenzlin.

Cyrtandra sect. **Dissimiles** C. B. Cl. in A. & C. DC., Mon. Phan. 5: 202 (1883). Lectotype: *C. trisepala* C. B. Cl.

Cyrtandra albibracteata B. L. Burtt, **species nova** *C. phoenicolasiae* Lauterb. affinis sed setis rubro-brunneis nitidis omnino destituta, bracteis ovatis albidis distinguenda. **Fig. 1.**

Plant 25–30cm high; stems decumbent at the base, on steep ground putting out prop roots, with short spreading hairs in the upper part, becoming glabrous below. *Leaves* opposite, subequal, or one distinctly smaller than the other; petiole poorly defined from the lamina, at first almost absent, that of the mature leaves at length 1.5cm long, sulcate above, shortly pilose on the back; lamina obovate-elliptic, c.12 × 4 to 17 × 6.5cm, apex acute, base cuneate, margins serrate, upper surface at first brown-pilose soon glabrescent, finally with only the bases of fallen hairs, the lower surface with persistent crisp brown hairs on the nerves; lateral nerves 6–7 on each side, ascending, inconspicuous above, slightly prominent below, tertiary nerves also slightly prominent below. *Inflorescence* axillary, subsessile or shortly pedunculate, crowded, c.3–6-flowered; bracts ovate, 10–12 × 6–8mm, whitish; pedicels 2–4mm long, pilose. *Calyx* segments divided almost to the base, 6mm long, pubescent. *Corolla* 17mm long, sparsely pubescent outside; tube constricted below the middle, widened upwards, c.14mm long; palate marked by two yellow ridges; mouth dorsoventrally compressed; dorsal lobes 2 × 2.5mm, laterals 2.5 × 3mm, median 2.5 × 4mm, all subtruncate. Stamens arising 6mm above base of corolla, filaments c.2mm long, curved and slightly twisted, glabrous; anthers more or less triangular, 2.5mm long, cohering at their tips.

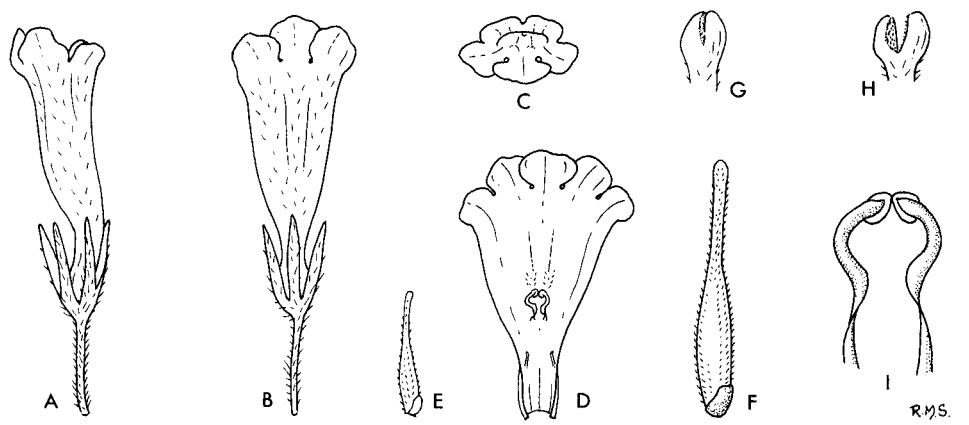

FIG. 1. *Cyrtandra albibracteata.* A, flower from the side × 2; B, flower, ventral view × 2; C, flower from the front × 2; D, corolla, dissected × 2; E, gynoecium × 2; F, gynoecium × 4; G,H, stigma × 9; I, stamens × 6. From living material of *Burtt & Martin* B5143.

Disc unilateral, 2 × 2mm, tip obtusely trilobed. *Ovary* cylindrical, 11mm long, shortly pubescent, gradually passing into the 5mm long pubescent style; stigma with 2 short thick lobes. *Fruit* c.6 × 2mm, acute, rugulose.

Type: Sarawak, Seventh Div., SE end Hose Mts, Ulu Melinau falls, c.2°6′N 113°42′E, 3400ft, dripping wet cliffs, leaves like B.4948 [*C. phoenicolasia*] but lacking bristly hairs on bracts and stem, bracts white, 18 viii 1967, *Burtt & Martin* 4952 (holo. E, iso. SAR).

SARAWAK. Seventh div., Kapit distr., extreme headwaters of Batang Balleh, Ulu Sungai Sedampa, 1°34′N 114°30′E, c.1500ft, 2 vii 1969, *Anderson & Paie* S.28360 (E); *ibidem*, 1°35′N 114°32′E, c.1000ft, 16 vii 1969, *Anderson* S.28854 (E); S. Hose Mts, W of Bukit Sanpandai, c.4000ft, 1 iv 1989, *Burtt* 12765 (E); Sungai Melinau, Rumah Ungkah, 27 viii 1967, *Burtt* 5143 (flowered in cult. RBGE 17 vii 1968, C.5982). Belaga distr., Linau-Balui divide, near camp on Sungai Dema, c.2000ft, 6 ix 1978, *Burtt* 11470 (E); *ibidem*, Sungai Nawai, c.2600ft, 5 ix 1978, *Burtt* 11465 (E).

The field observation that *C. albibracteata* had a similarity to *C. phoenicolasia*, despite lacking its indumentum of shining, red-brown bristles, proves to have been well-founded. By the deeply divided calyx, form and size of corolla, and unilateral disc-gland the two species clearly belong to the same general affinity, which also includes a number of other small-flowered species. This suggests that the conspicuous, shining bristles are not a character of high taxonomic value above the species level.

Cyrtandra (sect. **Decurrentes**) **antuana** B. L. Burtt, **species nova** *C. strictipedi* Kraenzlin affinis, sed foliis obovato-ellipticis basi in petiolum longe attenuatis (nec foliis late ellipticis basi abrupte vel subabrupte angustatis), ovario glabro (nec piloso) distinguenda.

Plant with unbranched woody stem c.12cm high, leafy towards the top. *Leaves* long-petiolate; petiole 8–11cm long, pubescent, grooved above; lamina up to 17 × 6cm, obovate-elliptic, apex obtuse or acute, base gradually narrowed into the petiole, upper surface of mature leaf glabrous (young leaves not present), minutely rugulose, lower surface brown-pubescent on veins and veinlets elsewhere densely provided with stomatal turrets, margins serrulate or subentire, lateral veins 7–8 on each side. *Flowers* several on short axillary peduncle; bracts not seen; pedicels c.10mm long, elongating to 17mm in fruit, densely brown-pubescent. *Calyx* densely brown-pubescent outside; tube 6mm long; lobes 13mm long, narrowly lanceolate, attenuate to the tip, the margins hyaline and cohering at the base. *Corolla* 4mm long, with long silky hairs outside; tube 3cm long; the basal 1cm narrow, widened in upper 2cm, glabrous inside; intact lobes not seen, c.1cm long, the upper ones probably smaller. *Disc* cupular, 2mm high, undulate. *Stamens* arising 15mm above base of corolla; filaments 10mm long, more or less flattened, glabrous, apparently straight; anthers 3.25mm long, cohering face to face, thecae parallel. *Ovary* barely 10mm long, glabrous except at the tip, gradually passing into the 15mm shortly and sparsely glandular-pilose style; stigma 2mm diam. *Fruit* 17–22 × 4–5mm, rugulose.

Type: Sarawak, Second div., Lubok Antu distr., Ulu Sungai Engkari, near Nanga

Tibu school, in secondary forest near river bank, on litter, 23 iii 1974, *P. Chai* S.34100 (holo. E, iso. SAR).

SARAWAK. Second div., Lubok Antu distr., Lanjak-Entimau P.F., Sungai Jelok near Bukit Sengkajang, c.2100ft, on boulders on stream bank, 18 iii 1974, *P. Chai* S.34029 (SAR).

The collector's colour notes on the type specimen read: 'leaf stalk, lower venation, pedicels and calyx scarlet, corolla tube and lobes white, yellow at inside throat flushed dark purple, filaments purple, anthers brown, pistil white'. In S.34029 it is noted that the filaments were 'coiled, brown'. This is frequently seen in sect. *Decurrentes*; after the anthers have dehisced the filaments coil and pull the anthers away from the stigma back into the tube and then quickly turn brown and decay; this specimen has a 3-layered hypodermis with long osteosclereids and with astrosclereids in the mesophyll.

In *Cyrtandra antuana* and *C. poiensis*, species that both have a longish petiole in mature leaves, the lamina is probably at first fully decurrent to the base of the petiole. However the petiole elongates late in development and it seems likely that the narrow laminar wing is then no longer meristematic. Consequently the elongation of the petiole results in the rupture of this narrow wing and pieces of it can be seen adhering here and there in the mature leaf thus forming a 'pseudopetiole'.

The attenuate base of the leaf-blade and the glabrous ovary sufficiently distinguish *C. antuana* from its ally, *C. strictipes*, which came from Bukit Raja in the Schwaner Mts of Kalimantan, some 250km to the south-east of *C. antuana* across the valley of the Kapuas River.

Cyrtandra athrocarpa B. L. Burtt, **species nova** fortasse *C. dilatatae* C. B. Cl. affinis sed pedunculis brevioribus, bracteis liberis venosis basi subcordata quam fructibus brevioribus distinguitur. **Fig. 2.**

Plant 30–150cm high; stem apparently simple, glabrous. *Leaves* of a pair subequal, rather variable in size and shape; in the type c.16 × 3.7 to 24 × 5.8cm, more or less narrowly elliptic or oblong-elliptic, on a petiole 0.5–1cm; in other specimens 13 × 3

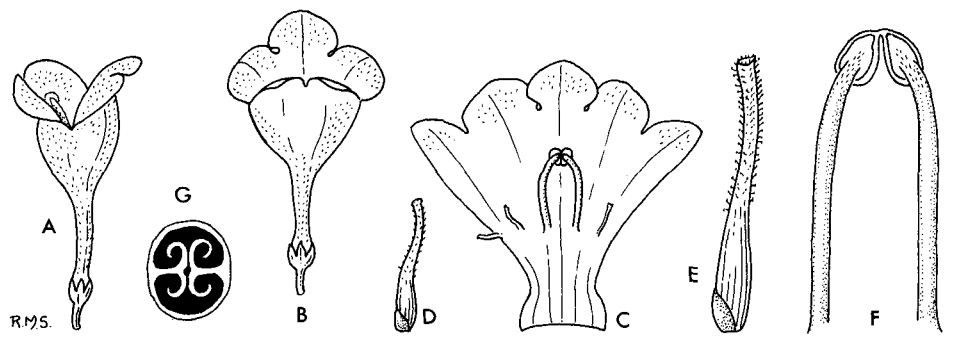

FIG. 2. *Cyrtandra athrocarpa*. A, flower from the side × 2; B, flower, dorsal view × 2; C, corolla, dissected × 2; D, gynoecium × 2; E, gynoecium × 4; F, stamens × 6; G, fruit in T.S., ovules removed × 6. A-F from spirit material of *Burtt* B2643; G from dried material of *Burtt* 11469.

to 30 × 4.5 or 30 × 10.5cm, narrowly elliptic-oblanceolate or broadly elliptic, on petiole 0.75–4cm; all at first very shortly pubescent, soon glabrate, with acuminate apex, narrowed to the base, margins inconspicuously crenate-serrate or subentire, lateral nerves ascending usually 9–12 on each side. *Inflorescences* axillary on short peduncle 4–5mm long; primary bracts two, green, free, subcordate-ovate, c.12–18 × 12–18mm, veined, falling before the fruit is ripe; flowers c.5–8, with pedicels 3–5mm. *Calyx* short; lobes 1–2mm long, triangular, shortly united at the base, glabrous, caducous in fruit. *Corolla* c.20mm long; tube 15mm, in the middle narrowly cylindric, inflated at the base particularly on the lower side, suddenly expanded upwards; dorsal lobes 3 × 2mm, laterals 2 × 2mm, the median 3.5 × 2mm, all rounded. *Stamens* arising 13mm above the base of the corolla; filaments 5mm long; anthers 1mm long. *Staminodes* 2–2.5mm long. *Disc* unilateral, below the ovary, 1.5mm long, convex outside, grooved inside. *Ovary* c.5mm long, papillose, passing into the 5mm long glandular-pubescent style; stigma bilobed. *Fruit* cylindric, c.15 × 3mm; placentae not meeting centrally; funicles c.3 times as long as seeds.

Type: Sarawak, Seventh div., Kapit distr., Sungai Bena, tributary of S. Sut, c.1°56′N 113°8′E, to 3ft on stream-gully bank, flowers white with yellow on lower lip and palate, 23 iv 1980, *Burtt* 12939 (holo. E).

SARAWAK. First div., Sungai Sebal Tepang, foot of Bukit Gaharu (mile 70 on Kuching–Simanggang road), 1 viii 1962, *Burtt* B.2643 (E). Second div., Lubok Antu distr., Lanjak-Entimau P.F., Sungai Jelok near Bukit Sengkajang, 2000ft, 18 iii 1974, *P. Chai* S.33997 (E); *ibidem*, 2100ft, 18 iii 1974, *P. Chai* S.34026 (E). Fourth div., Sungai Mayeng, Tau Range, 700ft, 2 vi 1956, *Purseglove* P.5321 (E, L); Bintulu distr., foot of mountain NE of Bukit Kana, 50–150m, 22 ix 1963, *Hotta* 15519 (KYO). Seventh div., Kapit distr., Ulu Sungai Sedampa, extreme headwaters of Batang Balleh, 1°34′N 114°30′E, 1500ft, 2 vii 1969, *Anderson & Paie* S.28299 (E); S. Bena, tributary of S. Sut, 28 vii 1962, *Burtt* B.2608 (E); Pelagus rapids on Batang Rejang, 21 vii 1962, *Burtt & Woods* B.2594 (E); S. Apa, tributary of S. Sut, between Bukit Goram and B. Bakak, c.335m, *P. Chai* S.36199 (E). Belaga distr., Linau–Balui divide, near camp on S. Dema, c.2000ft, 6 ix 1978, *Burtt* 11469 (E); Teneong, 1000ft, 2 ix 1954, *Brooke* 9140 (L); Sungei Iban, Ulu Belaga, 11 xi 1982, *B. Lee* S.45494 (E).

Cyrtandra athrocarpa takes its name from the characteristic clusters of small fruits (Greek *athroos*—clustered). The species has frequently been collected, but nearly all the specimens are in fruit. I have placed within this species a range of essentially similar material, but it shows some considerable variety of leaf size.

Apart from the differences between *C. athrocarpa* and *C. dilatata* in morphological characters (*C. athrocarpa* has almost entire leaves, shorter peduncles, free and distinctly veined, subcordate-ovate bracts which are shorter than the fruits), they differ sharply in habitat. *C. dilatata* is perhaps the only Bornean *Cyrtandra* that is a true rheophyte and it always grows on rocky river banks; *C. athrocarpa*, favours earth cliffs or banks in stream gullys or grows on the forest floor.

One or two specimens are just a little too discordant from the type to permit their inclusion here without question. One, collected by P. S. Ashton (S.19006) at the base of Bukit Temedu in the Hose Mts, has petioles up to 6.5cm long, which help to give it a decidedly different appearance. Another (*P. Chai* S.36044, Ulu Sungai Kapit) is markedly anisophyllous, the small leaf of each pair being reduced to a bladeless point

only 8mm long. Until we know more about these in their natural habitats, know whether typical *C. athrocarpa* is present in the same area, and have an opportunity to make a critical examination of flowering material, no decisions can be taken and I have left them in the herbarium as 'near *C. athrocarpa*'.

It may be noted that petiole length in *C. athrocarpa* is not a very satisfactory character; in the first place it elongates as the leaf matures and only if fairly old leaves have survived are long petioles seen; secondly, the lamina is gradually attenuate into the petiole, so that its basal part is merely a narrow wing; this tends to disintegrate giving an apparent increase in petiole length.

Cyrtandra (sect. **Aureae**) **aurantiaca** B. L. Burtt, **species nova** ex affinitate *C. smithianae* B. L. Burtt, sed statura humiliore, foliis basi non connato-vaginatis, petiolis primum dense sericeis, lamina utrinque pilosa (nec glabra), bracteis liberis (nec connatis), corolla aurantiaca ore rubro- vel purpureo-notata, stylo inferne dense piloso facile distinguitur. **Fig. 3.**

Herb with woody stem, 0.3–0.7m high. *Leaves* opposite, both members of a pair well-developed but somewhat unequal in size; petiole usually c.7–10cm long, but up to 18cm, densely sericeous when young; lamina ovate, 8 × 4cm to 23 × 19cm, acute at apex, unequally cordate at base, closely serrulate on the margins, densely sericeous on both sides at first, the fully grown leaf very thinly so, lateral nerves arcuate-ascending about 9 pairs. *Inflorescences* subsessile in leaf-axils; c.4cm diam.; peduncle 5mm; outer bracts c.2 × 1cm, green, overlapping at margins but not connate; pedicel c.3mm long. *Calyx* thin, green, thinly pilose outside, 15mm long including the 4 × 4mm lobes with thickened pointed tips. *Corolla* orange-yellow with red or purple mark in the mouth; tube 20mm long, c.2mm wide, ± cylindric, pilose outside, glabrous inside except around the mouth where there are stalked glands; lobes subequal (median 5 × 4mm, lower laterals 4.5 × 5mm, upper 5 × 3mm) with stalked glands all over the inner surface of upper and median lobes, and only near the base on the lower laterals. *Stamens* arising 1.3cm above corolla base; filaments 3mm glabrous; anthers 2.5mm.

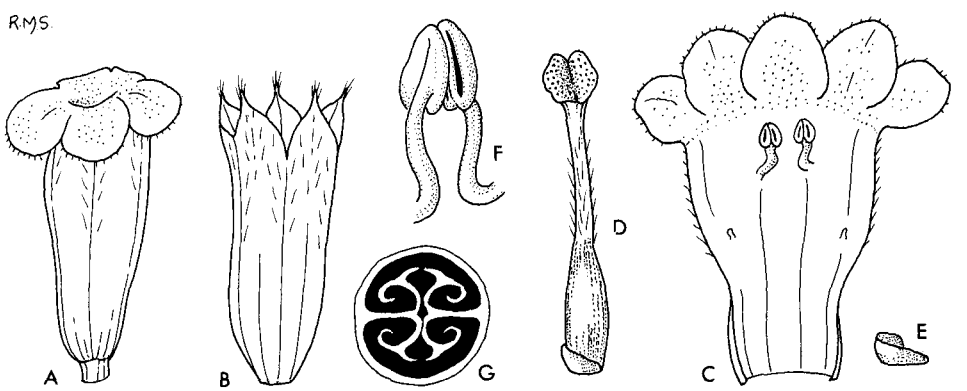

FIG. 3. *Cyrtandra aurantiaca*. A, flower × 2; B, calyx × 2; C, corolla, dissected × 2; D, gynoecium × 2; E, gland × 2; F, stamens × 6; G, fruit in T.S., ovules removed × 3. From spirit material of *RSNB* 2820.

Disc barely 1mm high. *Ovary* 5mm long, glabrous; style 10mm, lower part densely pilose, hairs shorter just above ovary and at top; stigma biflabellate c.3.5mm across. *Fruit* at first enclosed in persistent calyx, c.14 × 7mm, ellipsoid with a short blunt top; median section of fruit showing parietal placentae joined in the centre but free at the Y-shaped tips; young seeds very numerous.

Type: Sabah, Mt Kinabalu, Ulu Liwagu and Ulu Mesilau, 6°N c.116°35′E, 5000ft, on steep cleared banks by road but in forest shade, 1ft herb, corolla orange-yellow, the throat inside red on lower side, glandular hairy, calyx and bracts green, stigma finally blocks mouth of corolla, 6 ix 1961, *Chew, Corner & Stainton* RSNB 2820 (holo. K, iso. E).

> SABAH. Mt Kinabalu, Penibukan, 4000–5000ft, petals orange with darker basal portions, 4 i 1933, *Clemens* 30690 (BM, K, L); Dallas, 3000ft, fl. dull orange, stem limp and fleshy, 20 xi 1931, *Clemens* 27045 (BM, K, L); Penibukan, Dahobong falls, 5000ft, 2ft, fl. yellow with purple eye, 11 ix 1933, *Clemens* 40313 (BM, K, L). Crocker Range, Kimanis to Keningau road, c.5°50′N 116°05′E, 1200m, 18 ii 1980, *Argent* 1316 (E).

All collectors have recorded the orange-yellow or dull yellow corolla, usually also noting the red or purple mark at the mouth. This colour pattern is unusual in *Cyrtandra*. The leaves of *C. aurantiaca* have a 1–2-layered hypodermis, but lack sclereids. The silky hairs on the young leaf are drawn out into a long fine point; as the leaf matures this long point falls off leaving only the thicker lower third of the hair to form the adult indumentum.

Cyrtandra beamanii B. L. Burtt, **species nova** inter species ovario apice penicillato circum *C. radicifloram* C. B. Cl. aggregatas foliis maximis (usque ad 36 × 17cm, nec ad summum 25 × 9cm plerumque minora) et venis lateralibus c.14 (nec c.9) tertiariis fere horizontalibus magis conspicuis, calyce extra pubescente tantum (nec brunneo-villoso) distinguenda.

Plant to 1m high, stem woody, 1cm diam. in lower part, apparently simple, at first densely velvety-pubescent soon glabrescent, naked from leaf-fall in lower part. *Leaves* of a pair both well-developed but a little unequal, c.25 × 8.5 to 36 × 17cm, more or less broadly elliptic, widest a little above the middle, cuneate to the base, subsessile, the tip generally broken acute(?), margins serrate, lateral nerves about 20 on each side, glabrous above, at first densely sericeous below on the veins, at length glabrous. *Flowers* arising from a swelling on the stem; pedicels c.10–14mm, pilose. *Calyx* 11–14mm long, with short acute spreading hairs on the outside, verrucose within, with 5 acuminate teeth c.4mm long. *Corolla* 25–32mm long, pilose outside; tube 20–25mm long, broadened above; lobes subequal(?), c.5 × 5mm, the median slightly longer, all rounded. *Disc* cupular, c.1.5mm high, undulate. *Stamens* arising 8mm above the base of corolla; filaments decurrent, 5mm long; anthers 2mm long, somewhat narrowed towards the tip. *Ovary* cylindric, 5mm long, clad with short thick hairs, at the top (at the base of the style) densely penicillate; style 6mm long, densely pilose; stigma bilobed, lobes thick spatulate 2.5mm long 1.25mm broad in the middle. *Fruit* (according to collector) 2cm long, brownish-red.

Type: Sabah, Ranau distr., Crocker Range, Bukit Lugas, Kg. Himbaan 8.5km SE

Tenompok, 5°57′N 116°34′E, 1250m, disturbed montane dipterocarp forest, Trusmadi Formation, 29 xii 1983, *Beaman* 8127 (holo. E, iso. MSC).

SABAH. Tambunan distr., Crocker Range, km 59.5 on Kota Kinabalu–Tambunan road, 5°47′N 116°20′E, 1400m, 10 viii 1983, *Beaman* 6819 (MSC).

Cyrtandra beamanii appears to differ from *C. radiciflora* in habit, having a much more woody stem and apparently growing singly, whereas *C. radiciflora* forms a patch by branching from the decumbent lower parts of the stems. It also differs in colour, *C. beamanii* having white flowers, whereas those of *C. radiciflora*, white or cream, are strongly marked with red in the mouth. However the corollas are pilose outside (not densely sericeous), the flowers are borne on the old leafless part of the stem, and the ovary is densely penicillate at the top, three characters that indicate its affinity to the *C. radiciflora* group.

Cyrtandra (sect. **Dissimiles**) **bryophila** B. L. Burtt, **species nova** *C. iliasii* B. L. Burtt (vide infra) affinis sed cortice striato (nec squamoso), foliis latitudine ter (nec sexies) longioribus recedit. A *C. trisepalo* C. B. Cl. ramulis et foliis setosis facile distinguitur.

Herb to 30cm high, strongly anisophyllous; stems at first setose, soon glabrescent, bark grey striate. *Leaves* of a pair very unequal; larger leaf with setose petiole 10–20mm long, lamina elliptic or oblong-elliptic, 8–11.5 × 2.5–4.5cm, acuminate, abruptly narrowed at the base, glabrous above, shortly setose below especially on the midrib, elsewhere thinly and (when dry) inconspicuously setose-pubescent, margins slightly revolute entire or with a few teeth in the upper half; smaller leaf not strictly opposite the larger, the lower half erect and appressed to the stem, upper part spreading or reflexed, setose on the back in the middle, caducous before the larger leaf. *Inflorescence* small, subsessile, axillary, conspicuously bracteate; outer bracts ovate or broadly elliptic, c.12 × 6 to 15 × 9mm, slightly setose outside, glabrous within, the inner ones rather smaller; flowers c.5, congested on very short but densely long-setose pedicels. *Calyx* bilabiate; lower lip of two segments free to the base, c.14 × 3.5mm; upper lip 15 × 5mm, 3-lobed at the tip, lobes 3mm long; all with a few short setae towards the slightly cucullate tips. *Corolla* c.15mm long; tube scabrid outside, inside glabrous in the lower part but glandular above; lobes, except the parts that are covered in aestivation, with spreading setae, subequal, c.2 × 2mm. *Stamens* arising 2.5mm above the base of corolla; filaments 1.5mm long, becoming thicker upwards, glandular; anthers 1.5mm long, with a few glands on the back, joined at their tips. *Disc* cupular, 1mm high. *Ovary* 2mm long, glabrous, passing into the 2mm style beset with thick glandular hairs; stigma bilobed. *Fruit* not seen.

Type: Sarawak, Seventh div., Kapit distr., S. Hose Mts, Camp VI, c.2°8′20″N 113°43′E, c.4500ft, 13 iv 1980, *Burtt* 12880 (holo. E).

SARAWAK. Seventh div., Kapit distr., S. Hose Mts, Camp V c.2°8′N 113°42′E, E of Bukit Sanpandai, E side of valley, c.4750ft, 6 iv 1980, *Burtt* 12822 (E).

Cyrtandra bryophila, on both occasions when it was found, was growing in moss patches at the foot of trees, and from this it takes its name. The corolla was white with a yellow palate, the leaves reddish below.

Cyrtandra bullifolia B. L. Burtt, **species nova** fortasse *C. elmeri* Merrill affinis sed foliis angustioribus sessilibus basi auriculatis (nec late ellipticis manifeste petiolatis) paullum bullatis facile distinguenda. **Fig. 4.**

Plant generally 15–30cm high; stem woody, villous with long spreading hairs; internodes often 4–6cm longis. *Leaves* opposite, both well-developed but slightly unequal, bullate, oblanceolate-oblong, 16 × 3 to 27 × 7cm, acuminate at the apex, gradually narrowed to the base and there suddenly auriculate, sessile, margins serrate, upper surface glabrous or with a few scattered long hairs especially on the midrib when young, thinly pilose on the nerves and near the margins below, lateral nerves about 12 slightly prominent below. *Flowers* axillary, fascicled; pedicels pilose 10mm long at flowering, elongating to c.20mm in fruit; bracts linear inconspicuous. *Calyx* divided to the base into 5 triangular pilose segments 3mm long. *Corolla* white, pale yellow in the throat and marked with interrupted red lines, c.4cm long, with short spreading glandular hairs outside, glabrous inside; tube with lower cylindric part 12 × 3mm, upper part widening 18 × 10mm; lobes all rounded, dorsal ones 7 × 7mm, laterals 9 × 8mm, median anterior 9 × 9mm. *Disc* cupular, 2mm high, entire. *Stamens* arising 14mm above corolla base; filaments 11mm long curved in the middle, glabrous; anthers 2mm long, face to face and cohering at their tips. *Staminodes* 6mm long. *Ovary* c.15mm long, clad with sessile glands, attenuate into style; style 15mm long, also clad with sessile glands but a few other stalked ones intermixed especially towards

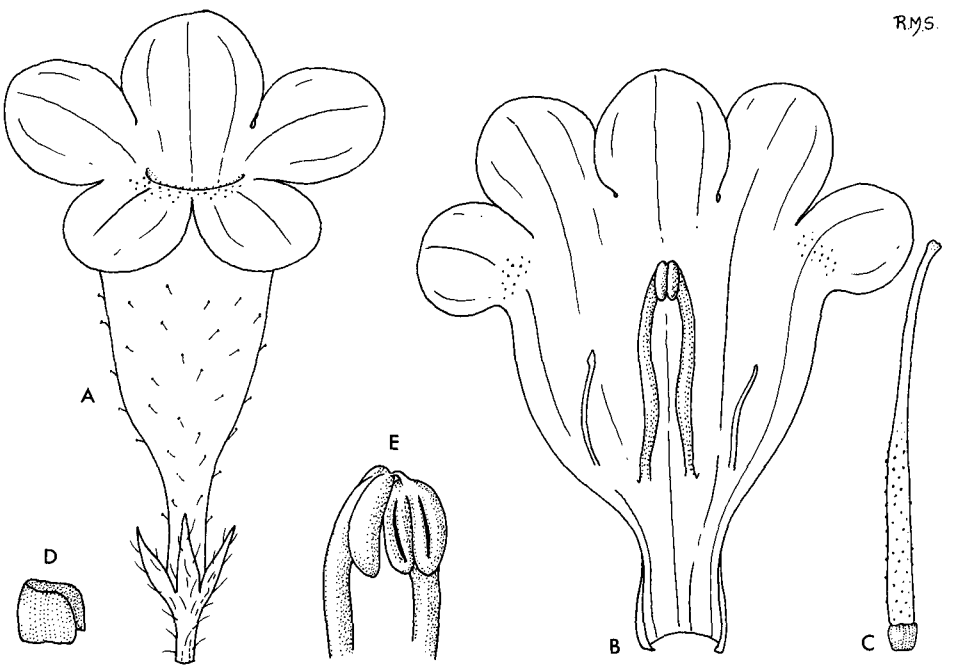

FIG. 4. *Cyrtandra bullifolia*. A, flower, dorsal view × 2; B, corolla dissected × 2; C, gynoecium × 2; D, gland × 4; E, anthers and upper part of filaments × 4. From spirit material of *Burtt & Martin* 4884.

the top; stigma shortly bilobed. *Fruit* (mature?) c.6.5–7.5cm long, bilocular in the middle by union of parietal placentae.

Type: Sarawak, Seventh div., Kapit distr., SE end Hose Mts, Bukit Pantoh due east of B. Nibong, c.2°6′N 113°42′E, 3600ft, pure white flowers except for very pale yellow in throat and a few red broken lines in it, 10 viii 1967, *Burtt & Martin* B.4884 (holo. E, iso. SAR).

SARAWAK. Seventh div., Kapit distr., SE Hose Mts, Bukit Salong, c.2°7′N 113°40′45″E, 28 iii 1980, *Burtt* 12724 (E); Balang-Balleh watershed ridge, extreme headwaters of Balleh river, foothills of Bukit Batu Tibang, 1°35′N 114°33′E, 3100ft, 6 vii 1969, *Anderson* S.28451 (E).

The following specimen probably belongs to this species, considerably extending its range:

BRUNEI. Tembrong, en route from Bukit Subok to Bukit Batu-Api, 100–300m, 21 i 1964, *Hotta* 13505 (E, KYO).

Cyrtandra calycina Benth. in Hooker, Lond. J. Bot. 2: 229 (1843); C. B. Cl. in A. & C. DC., Mon. Phan. 5(1): 250 (1883); Schlechter, Bot. Jahrb. Syst. 58: 365 (1923).

Type: New Guinea [probably near Wewak, 3°34′S 143°48′E], *Hinds* (K).

Schlechter saw no specimen of *Cyrtandra calycina* and left it unplaced. He attributed the species to Clarke and seems to have relied on Clarke's description, which is peculiarly uninformative. Bentham, however, was quite explicit: the upper lip of the corolla is 4-lobed, the lower lip entire, and there is a membranous outgrowth in the throat between the stamens. The correct position of this species in Schlechter's arrangement is therefore in subgen. *Glossophora* sect. *Centrosiphon*.

Schlechter remarked (*Bot. Jahrb. Syst.* 58: 353. 1923) that the outgrowth in the throat of the corolla had not been mentioned in any of the species previously described; but that was not so. Bentham was the first to report it in his description of *C. calycina* in 1843. G. W. Gillett (*Kew Bull.* 30: 406, 407. 1975) referred to these flaps of tissue as 'nectary scales': but he gave no reason for this new nomenclature and I have found no evidence that they are connected with the secretion of nectar from the annular nectary (the disc) at the base of the ovary. It is just possible that Gillett observed that nectar had run down from the disc and accumulated behind the scale; but he does not say so.

Cyrtandra debilis Kraenzlin in Fedde, Repert. Spec. Nov. Regni Veg. 24: 219 (1928).

Lectotype (chosen here): Kalimantan, SE Borneo, zwischen M. Uja und Kundim Baru, 6 vii 1908, *Winkler* 2678 (lecto. WRSL).

Syn.: [*Cyrtandra radiciflora* auct. non C. B. Cl.; Lauterbach, Bot. Jahrb. Syst. 44: 541 (1910)].

Lauterbach also cited *Winkler* 2831 and 3213 as *C. radiciflora* (putting a query against the determination of all three specimens). Kraenzlin also cited all three under his *C. debilis*, but Lauterbach's herbarium contains only a fragment of *Winkler* 2678. Perforce this is taken as lectotype, but it consists only of two detached leaves and an inch of stem bearing an imperfect withered flower. This is not enough to permit identi-

fication of the species. The lectotype should be changed if a more complete specimen of any of these numbers is found, as Kraenzlin presumably did not see Lauterbach's fragment.

Cyrtandra diplotricha B. L. Burtt, **species nova** *C. velutinae* C. B. Cl. affinis sed caulibus patenter brunneo-setosis, foliis utrinque appresse albo-pilosis sed insuper marginibus et costa in pagina inferiore conspicue patenter brunneo-setosis, calycis segmentis linearibus longioribus (5–6mm, nec 3mm), fructu juvenili pubescente (nec glabro) differt.

Shrublet up to 75cm high (fide collector), branched; branches 2–3mm diam., at first with double indumentum of conspicuous brown spreading setae up to 7mm long and inconspicuous white appressed hairs, at length glabrate. *Leaves* of a pair both developed but distinctly unequal (e.g. 18.5:12mm; 20:9mm; 21:16mm long); petiole of the smaller leaf 5–10mm, of the larger 15–30mm, like the branches both spreading setose and appressed pilose; lamina narrowly elliptic, very slightly falcate, that of the smaller leaf 4–16 × 1.2–2.5cm, that of the larger up to 21 × 4cm, long acuminate to the tip, gradually narrowed to the unequal-sided base, margins serrulate above the middle entire below it, upper surface appressed pilose and with a few brown setae, the lower appressed pilose with conspicuous brown setae on the midrib and veins, margins setose, lateral nerves up to 15. *Flowers* axillary, solitary, on pedicels 5–10mm long with appressed hairs and one or two setae or glandular hairs. *Calyx* divided almost to the base into 5 linear segments, 5–6mm long, 0.75mm wide at the base, with setae up to 3mm long occasionally gland-tipped. *Corolla* almost 10mm long, shortly pubescent outside; tube 8mm long; lobes subequal, c.1.5 × 1.5mm, the palate having two bosses below the sinuses. *Stamens* arising 4.5mm above the base of the corolla; filaments straight in lower 1.5mm and glabrous in upper 2mm, curved and with a few glandular hairs; anthers obtusely triangular, 1mm long, face to face and cohering by their tips. *Disc* cupular, 1mm high. *Gynoecium* 7mm long; ovary 4.5mm, cylindric, shortly pubescent and with a few glands, gradually narrowed into the style 2.5mm long with more numerous glands and fewer hairs; stigma bilobed. *Fruit* immature, c.23mm long, barely 1.5mm broad, shortly pubescent, with persistent calyx.

Type: Sarawak, Seventh div., Kapit distr., Nanga Balang, extreme headwaters of Batang Balleh, 1°35′N 114°30′E, 950ft, 18 vii 1969, *Anderson* S.28899 (holo. E).

> SARAWAK. Seventh div., Kapit distr., Nanga Balang, extreme headwaters of Batang Balleh, 950ft, 29 vi 1969, *Anderson* S.28313 (E).

Cyrtandra diplotricha was recorded by Dr J. A. R. Anderson as a shrublet up to 30 inches growing on a cliff-face of sandstone of the Belaga series. The affinity with *C. velutina* is clear, but the correct placing of these species within the genus is uncertain. Another *Cyrtandra* (unnamed) belongs to the same group: it was collected by Hallier (no. 2500) on Mt Lianggagang and by Hans Winkler (no. 1522) on nearby Bukit Tilung, two hills draining from opposite sides into Sungai Raun, a tributary of S. Mandai which itself flows into the Kapuas: the area is approx. 0°30′N 113°25′E. These plants differ from *C. velutina* of SE Borneo (Bandjermasin area), and from *C.*

diplotricha in having flowers in shortly pedunculate inflorescences enclosed in a pair of bracts. A very similar plant was collected in Sarawak on the headwaters of Batang Balleh (1°35′N 114°33′E) by Dr Anderson (S.28652); these three specimens almost certainly represent a third species in the group, but available material is scarcely adequate for description.

These three species are jointly characterized by thin rather twiggy branched stems, small flowers with long hairs on the calyx lobes, and a unilateral disc. All have somewhat unequal leaves, but both leaves of a pair are well developed. A fourth species differs in this respect, being strongly anisophyllous with the smaller leaf of each pair reduced to little more than an auricle. This plant (*Meijer* 2265 from Nunukan, an island just off the coast near the Kalimantan border with Sabah) has the same twiggy habit and approaches *C. diplotricha* in indumentum; it has similar calyx and fruits but unfortunately the flowers (described in the field notes) are not present on the Leiden sheet.

Cyrtandra farinosa C. B. Clarke in A. & C. DC., Mon. Phan. 5: 238 (1883); Burtt, Notes RBG Edinb. 30: 21, 31 (1970). **Fig. 5.**

Type: Sarawak, Busso prope Kuching, *Beccari* 229 (holo. FI, photo. E).

Although C. B. Clarke knew only a single specimen of *C. farinosa*, it is a common species on the limestone in the First Division of Sarawak, inland from Kuching. Clarke invariably cited the locality as 'Kuteing', but this was simply his misreading of Beccari's italianized spelling 'Kutcing'; Clarke also was inclined to omit part of the locality as given by Beccari. Busso is a village and limestone hill on the south side of Sungei Sarawak Kanan.

I have cited the material under two 'forms'. Form A, to which the type belongs, grows on limestone cliffs; it is a short-stemmed plant, the stem growing out more or less horizontally, and the close set leaves arrange themselves in a fan; the blades tend to be slightly falcate and the longer ones are pendulous on the lower side of the fan. Form B is an erect, terrestrial plant, up to c.45cm tall, the internodes well-developed, the leaves not falcate and a little larger than in Form A. For a long time I tried to

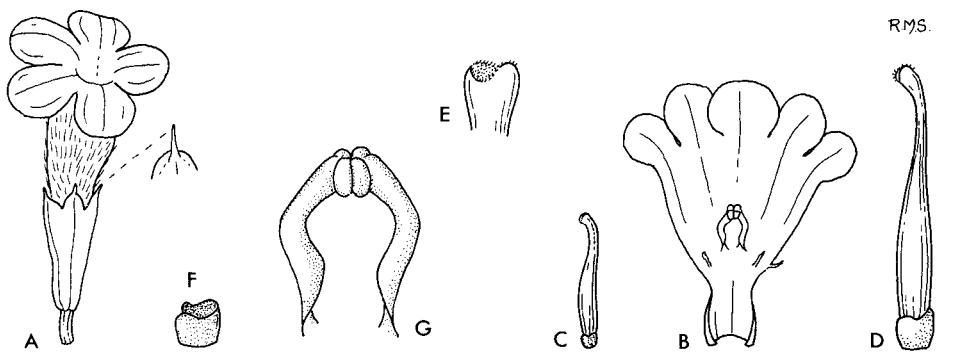

FIG. 5. *Cyrtandra farinosa*. A, flower × 2; B, corolla, dissected × 2; C, gynoecium × 2; D, gynoecium × 4; E, stigma × 9; F, gland × 4; G, stamens × 6. From spirit material of *Burtt* 8107.

convince myself that these two forms represented distinct species, but I am now fairly certain that this is not so. Florally I can find no difference. The habits are induced by the habitat. Exactly the same differences may be observed in *Hexatheca fulva* C. B. Clarke, a related gesneriad. In this species they were first noticed in cultivation. Only cliff-dwelling plants, with fan-like leaves, had been seen in the wild and one of these was brought back into cultivation in Edinburgh. Planted upright in a pot it developed an erect stem with well-marked internodes and equal, non-falcate leaves. On a subsequent visit to Sarawak, the two habits were found to occur in the same population, the fan of leaves on a short stem on cliff-dwelling plants, the erect stem with internodes on terrestrial plants at the foot of the cliff. I therefore have very little hesitation in including the two forms of this *Cyrtandra* in *C. farinosa*, although comparable observations to those for *Hexatheca fulva* have not yet been made. Both forms have a 1-layered (rarely 2-layered) hypodermis but lack sclereids in both hypodermis and mesophyll.

Cyrtandra farinosa belongs to a group of small-flowered species with the flowers enclosed in an involucre formed by the union of the two primary bracts, which are fused marginally for half their length. Other allied species are *C. megalocrater* Kr. (also without sclereids) and *C. incrustata* B. L. Burtt.

Form A (forming fan on cliffs).

SARAWAK. First Div., Bau distr., Bukit Buan, S of Busso, c.200ft, 27 v 1975, *Burtt* 8201 (E); Gunung Jambusan, 7 x 1977, *B. Lee* S.38610 (E); Bukit Jebong, 250ft, 6 vii 1970, *Lehmann* S.30133 (E); Gunung Meraja (G. Langyang), S of Bidi, 17 v 1975, *Burtt* 8153 (E). Penrissen road, near Kampong Segu, 26 v 1975, *Burtt* 8194 (E). Padawan distr., between Kampong Braang Wah and K. Braang Payang, 9 v 1975, *Burtt* 8107 (E); Bukit Angob, Padawan road 38 miles from Kuching, 6 iii 1969, *Anderson* S.27507 (E). Serian road, 21st mile, 13 iii 1966, *Anderson* S.20998 (E).

Form B (terrestrial, erect).

SARAWAK. First Div., Bau distr., Gunung Tongga, E of Krokong, 21 v 1975, *Burtt* 8180 (E); Gunung Krian to Seburan Mine, 23 v 1962, *Burtt & Woods* B1901 (E). Padawan distr., Gunung Manok, 13 v 1975, *Burtt* 8123 (E); Tiang Bekap, 11 i 1979, *B. Lee* S.40025 (E). Upper Sadong distr., Gunung Selabor, 29 v 1975, *Burtt* 8212 (E).

Cyrtandra geesinkiana B. L. Burtt, **species nova** *C. splendenti* C. B. Cl. affinis, sed foliis minoribus ellipticis (nec ovatis apice acuminatis) inter se remotioribus, corolla alba in fauce luteo-notata (nec in lobis rubro-notata) differt. **Fig. 6.**

Woody herb up to 60cm high; stems simple, decumbent and rooting below, 3–4mm diam., at first densely pilose, the lower parts becoming glabrous. *Leaves* in about 5–7 pairs, subequal, separated by internodes c.3–5cm long, with hirsute petioles c.1cm long; lamina elliptic, 9–15 × 2.5–4.5cm, narrowed at both ends, margins closely serrate-dentate, upper surface mamillate, the tips ending in short acute hairs, the lower surface correspondingly invaginated rather densely pubescent. *Flowers* 1–3 in the axils of fallen leaves on the decumbent part of the stem and among adventitious roots; peduncle very short, but in the type up to 3cm long, spreading-pilose; pedicels c.2cm long, spreading-pilose. *Calyx* with 5 free linear segments nearly 10mm long, united at base for 2mm, spreading pilose. *Corolla* 40–45mm long, widening smoothly

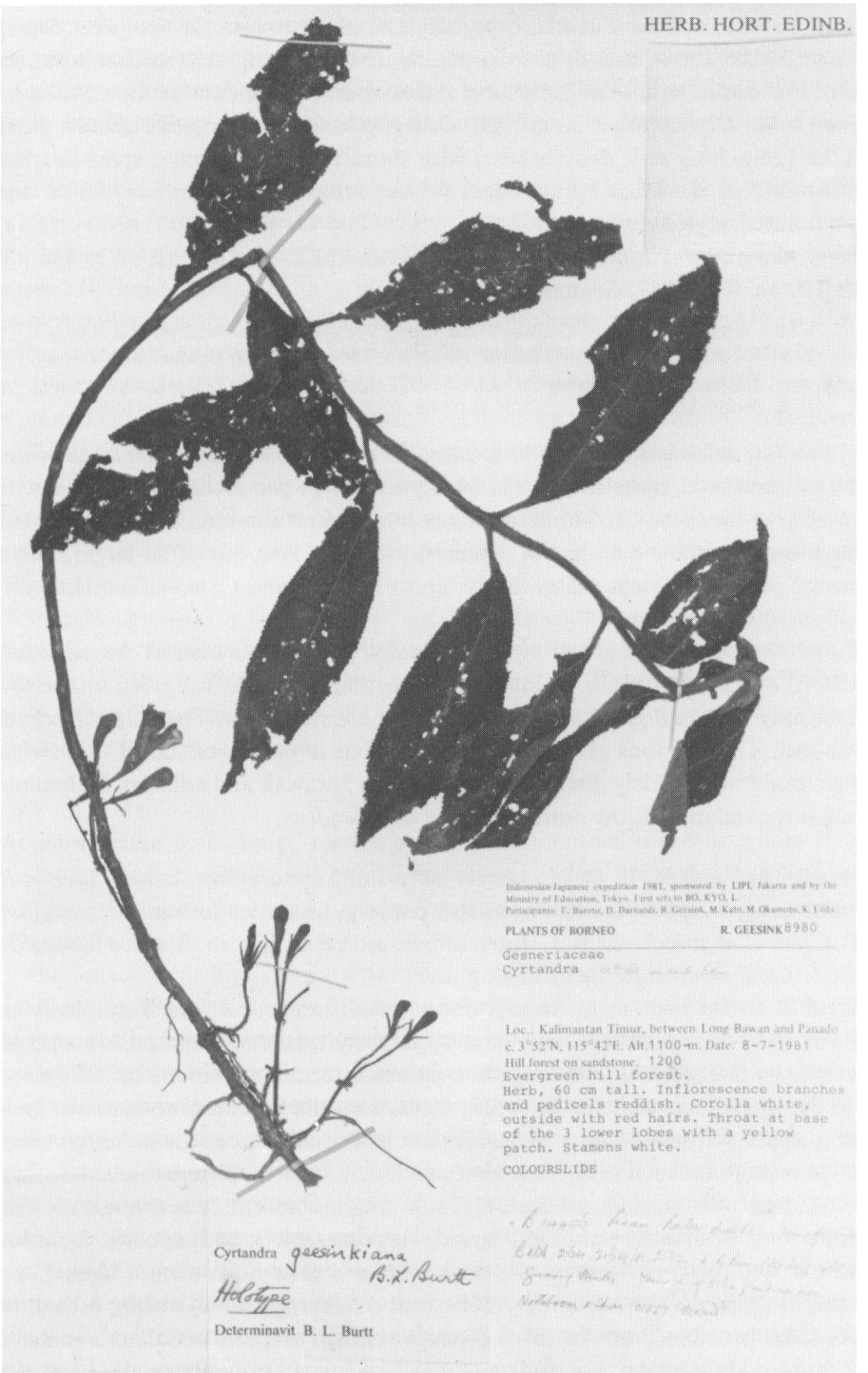

FIG. 6. *Cyrtandra geesinkiana*. Holotype.

to the mouth about 10mm diam.; lobes subequal, c.5 × 6mm, rounded; whole corolla shortly glandular-pilose outside, especially towards the base of the tube. *Stamens* arising c.20mm above base of corolla; filaments 12mm long, flattened in lower part, twisted in the middle; anthers 2mm long, face to face, coherent at their tips. *Staminodes* 2, 6mm long. *Disc* cupular, 2mm high. *Ovary* 6mm long with sessile glands, passing into the 12mm long style densely beset with short, mostly glandular, spreading hairs; stigma bilobed, the lobes blunt, thick, 0.5mm long. *Fruit* (immature) 30 × 3mm, sharp pointed, style subpersistent.

Type: Kalimantan Timur, between Long Bawan and Panado, c.3°52′N 115°42′E, 1100–1200m, 8 vii 1981, *Geesink* 8980 (holo. E).

SARAWAK. Fourth Div., Gunung Mulu, Camp V, c.4500ft, 17 vi 1962, *Burtt & Woods* 2132 (E), 2164 (E). Fifth Div., Kelabit Highlands, Mt Murud east, Belapan river–Dapo river, 1100m, 1 iv 1970, *Nooteboom & Chai* 01827 (L). Seventh Div., Belaga distr., Linau-Balui divide, Sungei Jellini, c.2°26′N 114°10′E, 2700–2800ft, 2 ix 1978, *Burtt* 11406 (E).

In *Cyrtandra splendens* the corolla is white or cream-coloured with a large crimson patch on each lobe, more rarely it is wholly red; in *C. geesinkiana* it is white, with a yellow bar in the throat. In habit, too, there is a marked difference, *C. splendens* being a much coarser plant with leaves commonly c.24 × 9cm but often larger, and the prostrate part of the stem more woody, up to 15mm diam. *C. mamillata* Hall. f. is a synonym of *C. splendens*.

Cyrtandra geesinkiana grows on forest banks, going up as high as the moss-forest (c.4500ft) on Gunung Mulu; as in *C. splendens* plants with leaves green on the lower surface may be found growing with others that are red below. There are no sclereids in the leaf. The citations given above suggest that in course of time *C. geesinkiana* will be found to be widely distributed in northern Sarawak and adjacent Kalimantan: it may not overlap with the more southerly *C. splendens*.

Cyrtandra hansenii B. L. Burtt, **species nova** nulli arcte affinis, calycis lobis dorso cornutis insignis. Ob flores magnos extra parce pubescentes fortasse *C. radiciflorae* C. B. Cl. et *C. digitaliflorae* B. L. Burtt affinis, sed caule lignoso, floribus fasciculatim caulifloris, calyce cornuto facile distinguitur.

Shrublet to 2m high; stem woody, unbranched, simple, c.1.5cm diam., leafy only towards the top, and the young part apparently quadrangular. *Leaves* opposite, separated by internodes c.3cm long, with petiole c.12cm long; lamina broadly elliptic, up to 31 × 13.5cm, acute at the apex, cuneate to the base, glabrous above, below densely appressed sericeous on the nerves but glabrous between them, margins serrulate, nerves c.18 on each side, somewhat prominent below. *Flowers* fasciculate on the defoliated part of the stem; pedicels c.12mm long, pubescent; bracts not seen. *Calyx* c.12mm long, appressed pubescent outside; tube narrowly campanulate, 8mm long; lobes c.4 × 3mm, provided on the back with a hollow horn c.3mm high. *Corolla* c.4.5cm long, shortly and sparingly pubescent outside, glabrous within; tube almost 3.5cm long, broadened above; lobes c.1cm, rounded, margins undulate-crenulate(?). *Disc* 3mm high, dentate or undulate. *Stamens* arising 12mm above the base of the corolla; filaments 13mm long, glabrous; anthers 4mm long, narrowly triangular, with

sparse, short, more or less conical hairs on the sides, with an apiculus 0.5mm long and coherent together. *Ovary* 6mm long, cylindric, densely beset with short conical hairs, crowned at the top with a tuft of long hairs radiating in all directions; style 10mm long with ascending hairs; stigma bilobed, with thick lobes almost 2mm long, shortly and densely pilose on the back, the inner faces coarsely papillose. *Fruit* not seen.

Type: Sarawak, Fourth div., Gunung Mulu National Park, 4°05′N 114°54′E, Camp 4, 1750m, moss forest in upper montane rainforest, open place by dry stream bed, 2m high, leaves only at top, cauliflorous with flowers at middle of stem, 19 iii 1978, *C. Hansen* 510 (holo. C).

The type material is scanty and the above description leaves something to be desired: the leaf measurements are from one leaf! Nevertheless the horn-like outgrowths on the calyx lobes are so distinctive that it has seemed desirable to publish a name for the plant. Disregarding the calyx-horns, the affinity seems to be with *C. radiciflora* C. B. Cl. and *C. digitaliflora* B. L. Burtt—two species that also show, though not quite so strongly, the brush of hairs where ovary and style meet. In *C. hansenii* this brush effectively fills the corolla tube at this point and must prevent small insects and mites crawling further inside; in fact the dissected flower showed a number of mites trapped at this point.

It may be unusual for *C. hansenii* to survive long enough to reach a height of two metres. *C. subgrandis* is often only 0.5m or so high, but I collected a specimen once in the Hose Mts (B.5000) which had a stem 2.4m tall. This is mentioned here as a warning that the normal height of *C. hansenii* may prove to be much less than that recorded for the type specimen.

Cyrtandra hottae B. L. Burtt, **species nova** ob setas nitidas rubro-brunneas *C. phoenicolasiae* Lauterb. affinis, sed habitu graciliore validius anisophyllo, folio minore utriusque paris c.10mm tantum longo, bracteis omnibus ovatis (nullis linearibus) distinguenda. **Fig. 7.**

Plant up to 35cm high, beset with shining red-brown bristles all over, strongly anisophyllous; the stem woody, appressed setose. *Leaves* separated by internodes 2–3cm long; the larger leaf with a petiole 2–3mm long or subsessile; lamina 12–14 × 3–4cm, widest below the middle, with apical acumen 10mm long, cuneate to the base, setose-pilose on both sides, margins crenate-serrate, conspicuously setose-ciliate; the smaller leaf 10mm long, ovate, very shortly acuminate, conspicuously setose. *Inflorescence* arising from the axils of fallen leaves, crowded, c.2–2.5cm diam.; peduncle short, barely 1cm long, setose; bracts c.12 × 5mm, ovate, acute or shortly acuminate, setose especially on the margins and on the nerves on the lower surface; pedicels 3mm long, setose. *Calyx* 2–2.5mm, split to the base in 5 narrowly triangular segments, glabrous. *Corolla* 12mm long, with a few subsetose hairs outside, glabrous within; lobes 0.75 × 0.75mm, obtuse. *Disc* unilateral, 0.5mm long. *Stamens* arising about 3mm within the corolla throat; filaments arcuate, glabrous, barely 2mm long; anthers 5mm long. *Ovary* 3.5mm long, with a few rather thick hairs; style 5mm long, glabrous;

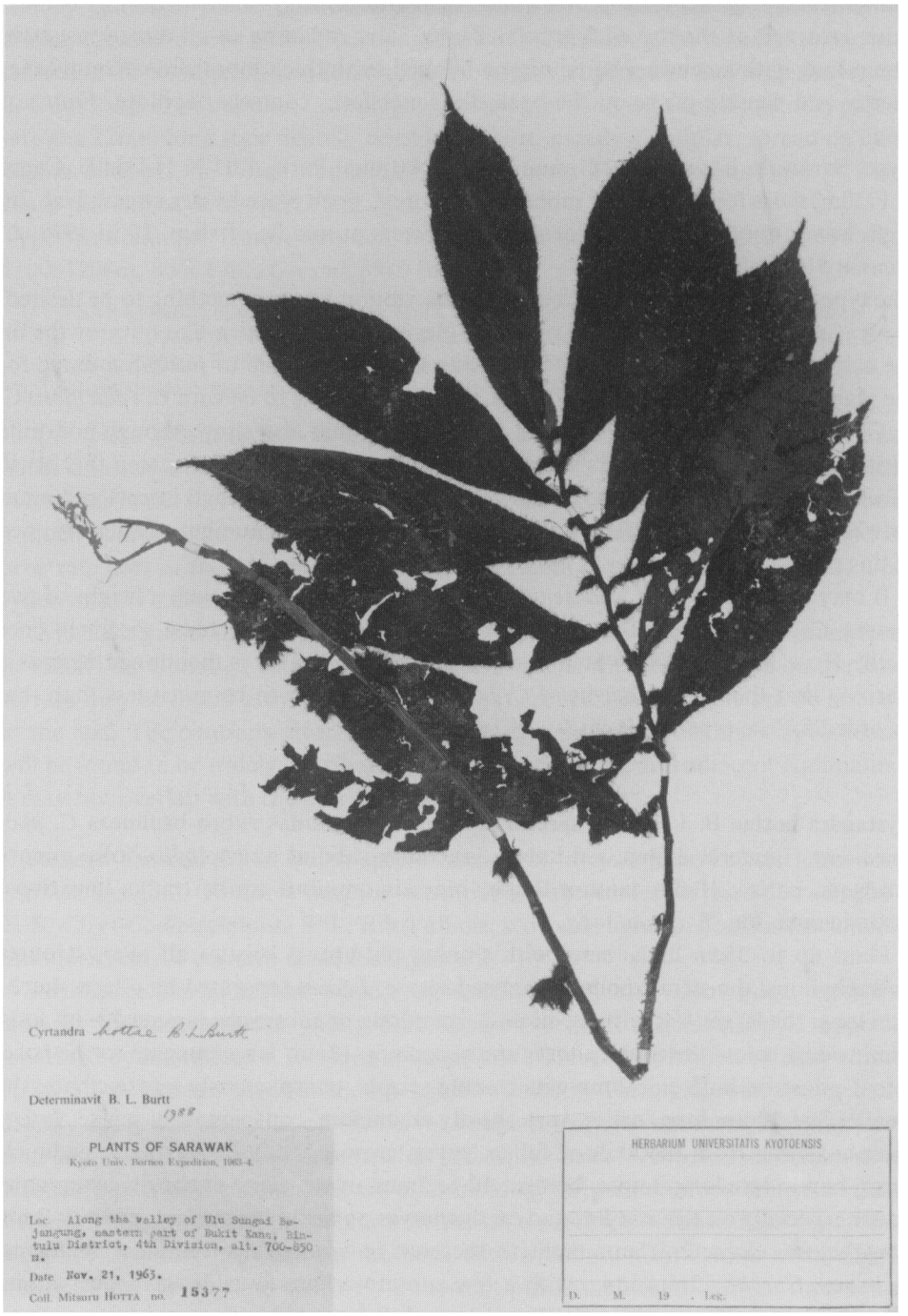

FIG. 7. *Cyrtandra hottae*. Holotype.

stigma bilobed. *Fruit* ellipsoid, 6–7mm long (including the 1mm beak) and 2.5mm broad.

Type: Sarawak, Fourth Div., Bintulu distr., eastern part of Bukit Kana, along valley of Ulu Sungai Bejangung, 700–850m, 21 xi 1963, *Hirano & Hotta* 15377 (holo. KYO, iso. E).

> SARAWAK. Fourth Div., Bintulu distr., along Ulu Sungai Kakus from S. Mubong to S. Latai, 12 xi 1963, *Hirano & Hotta* 1137 (E, KYO). Seventh Div., Ulu Belaga, Sungai Semawat, 3°N 113°54′E, 250m, stem dark purple, leaves green above dark purple below, bracts green thin almost hyaline, flowers whitish with a spot in throat on lower lip, 15 x 1981, *C. Hansen* 610 (C).

This species is named in honour of Prof. Mitsuru Hotta, now of Kagoshima University, who made the Gesneriaceae of his Bornean collections available to me for study.

Cyrtandra hottae is linked to *C. phoenicolasia* Lauterb. by its indumentum of shining bristles, dense inflorescence, small calyx divided to the base, small white corolla with the filaments arising high in the corolla tube not far from its mouth, and unilateral disc. Like *C. phoenicolasia*, *C. hottae* lacks sclereids in the leaves. It is sharply distinguished from *C. phoenicolasia* by being strongly anisophyllus, the smaller leaf of each pair being only 1cm long; in *C. phoenicolasia* both leaves are well developed.

Cyrtandra (sect. **Dissimiles**) **iliasii** B. L. Burtt, **species nova** inter species trisepalinas habitu saepe scandente, foliis lineari-oblongis longitudine latitudinem sexies superantibus calycis lobis acutis (nec obtusis) facile distinguitur.

Plant erect, epiphytic or scandent; stems a little below the current leaves 3mm diam., the bark greyish and tending to flake; lower internodes of current leaves c.2cm long. *Leaves* opposite, strongly anisophyllous; major leaf with short petiole 0.8–1.5cm long, pilose; lamina linear-oblong, 14–21 × 2–3.5cm, tip acuminate c.1cm, base unequal-sided the upper side abruptly narrowed the lower side subcordate, glabrous above, thinly pilose below especially on the nerves, glabrescent; minus leaf auriculiform, ovate-acuminate, 12–15mm long, the lower half appressed to the stem, the upper half spreading or deflexed. *Flowers* about 6, in small tight axillary inflorescences; outer bracts ovate, gradually and bluntly acuminate, 12 × 8mm, thinly pilose with scattered sessile glands towards the base; pedicels very short but densely covered with long brown setae. *Calyx* bilabiate, shortly pilose with acute spreading hairs; lower lip of 2 free segments 10mm long, 2mm wide at base; upper lip 10mm long, 4.75mm broad in the middle, 3-lobed, lobes 4 × 1mm, narrowly triangular, the margins revolute and meeting at the tip in a solid point c.0.75mm long. *Corolla* 10mm long to tip of upper lip, 13mm to tip of lower lip; tube with lower part 5 × 3mm glabrous, then expanding and hairy like the calyx but hairs shorter, length to lateral sinus 8mm; sinus between dorsal lobes only 1mm deep; lateral lobe (intact?) very small, tooth-like, 1mm long; median lobe 5mm long, 3mm broad at base, more or less oblong, acute, palate with rugose thickenings in the middle. *Stamens* arising 5mm above corolla-base; filaments 3mm, thickened and twisted in the upper part with a few thick glandular hairs there and on back of connective; anthers face to face, 1mm long. *Staminodes* 3, the median

straight 1mm long, laterals a little longer, hooked. *Disc* just over 1mm high. *Ovary* conical, 3 × 2mm, glandular in upper part; style 3mm with short glandular hairs; stigma 1mm, bifid, lobes blunt. *Fruit* (immature) c.8 × 4mm.
Type: Sarawak, 7th div., SE end Hose Mts, c.2°6′N 113°42′E, c.4000ft, above Ulu Melinau falls, 20 viii 1967, *Burtt & Martin* B5012 (holo. E, iso. SAR).

> SARAWAK. Seventh div., Kapit distr., Hose Mts, Bukit Sampadai, Ulu Sampurau, 1119m, mossy forests on ridge, epiphyte 4m up tree, 4 iv 1980, *Ilias bin Paie* S.41186 (E, SAR); W of Bukit Sampadai, c.2°7′30″N, 113°41′30″E, climbing to 15ft, 31 iii 1980, *Burtt* 12751 (E, SAR).

I name this interesting species in grateful memory of the late Ilias bin Paie who so efficiently organized several Forest Department field trips in which I participated between 1962 and 1980. I owe him a considerable debt of gratitude for his constant help and good companionship. These trips included two visits to the Hose Mts, on one of which he himself also collected this species.

Cyrtandra iliasii is at present known only from the Hose Mts, as is its closest ally *C. bryophila*, described above. In characters of corolla and calyx they are unhesitatingly placed in sect. *Dissimiles*, but the other members of this section usually have completely glabrous adult leaves, though they may be clad in golden-brown silky hairs when young. The hairs on the leaves of *C. iliasii* and *C. bryophila* are somewhat rough and scurfy.

Cyrtandra iliasii may grow as an erect plant on forest slopes, but is commoner in the moss forest where it may be an epiphyte. On both occasions when I myself found it, it was trying, quite successfully, to climb up mossy saplings and was producing adventitious roots on the stem. *Burtt* 12751 was noted as climbing to at least 15ft.

My herbarium specimens unfortunately do not include the full length of stems, but it seems that there are usually about 6–9 leaves towards the top, the rest of the stem being bare; the oldest leaves have a thick covering of epiphyllous liverworts etc. and it seems probable that these contribute to the death of the leaf and its fall.

Cyrtandra kermesina B. L. Burtt, **species nova** *C. clarkei* Stapf affinis sed floribus 4–6 subumbellatim dispositis (nec solitariis), bracteis caducis (nec magnis persistentibus ad medium coalitis) distinguitur.

Plant woody, to 1m high; stem simple, c.5mm diam. at base, at first appressed brown-pilose, at length glabrous, with grey striate bark; internodes up to 10cm long. *Leaves* opposite, subequal; petiole 3–4cm long, channelled above, appressed pilose; lamina elliptic, 10–15 × 3.5–6.5cm, shortly acuminate, narrowly cuneate at the base, upper surface at first sericeous soon glabrate but rough with persistent hair bases, undersurface persistently sericeous on the veins, glabrous between them, lateral nerves 9 on each side, margins sharply denticulate, teeth conspicuous through bearing a tuft of hairs. *Peduncles* axillary, brown-pilose, c.2–2.5cm long, bearing 2–6 subumbellate scarlet flowers. *Bracts* not seen, presumably falling early. *Pedicels* c.1m long, sericeous with brown hairs. *Calyx* 12mm long, appressed outside, sparingly pilose inside especially in the upper part; tube 8mm long; lobes lanceolate, 4mm long, the margins

revolute and fused at the tip which then appears in side view to be spathulate. *Corolla* c.33mm long, with dense silky appressed hairs outside; tube c.20mm long, gradually widened from the base upwards; posticous lobes 6.5 × 5mm, laterals 7.5 × 6.5mm, median anterior 7.5 × 6.5mm, all with rounded tips and glabrous inside. *Stamens* arising 16.5mm above base of corolla; filaments 7mm long, slender at base, upper part thicker; anthers 2.5mm long, thecae parallel, connective thick. *Disc* cupular, 2mm high, lobulate on the rim. *Ovary* 8mm long, glabrous, gradually attenuate into the style; style 15mm long, sparsely pubescent and glandular puberulous; stigma 2.5mm diam., papillose. *Fruit* 25mm long including 5mm beak, 7mm diam., rugulose.
Type: Sabah, Ranau distr., Mt Kinabalu, E Mesilau river between golf course site and Mesilau cave, 6°03′N, 116°36′W, 1700–1900m, 26 iii 1984, *Beaman* 9094 (holo. E, iso. MSC).

SABAH. Ranau distr., Mt Kinabalu, ravine of Kadaimaian river, 6500ft, 6 ii 1962, *Meijer* SAN 29124 (L, SAN); *ibidem*, near Kadaimaian river, 6500ft, 8 ii 1962, *Djanthusi* SAN 29181 (E); *ibidem*, above right bank of eastern tributary of Sungai Mesilau, near Mesilau cave, c.1980m, 29 viii 1963, *Fuchs & Collenette* 21396 (L); *ibidem*, mountain trail, 6500ft, 20–27 ix 1977, *Gardner* 136 (E); *ibidem*, Mesilau River, c.6°N, 116°35′E, 1900m, 25 ii 1980, *Argent & Lamb* 1370 (E); Silau basin, 6–7000ft; 18–19 v 1932, *Clemens* 29740 (BM); Kinataki R., 8–9000ft, ii 1933, *Clemens* s.n. (BM).

Cyrtandra kermesina is well-marked by its shortly pedunculate subumbellate inflorescence, bractless at flowering, and bright red flowers. It is these large bright red flowers with silky hairs on the outside that proclaim the affinity of *C. kermesina* with *C. clarkei* Stapf. The latter, however, differs sharply in having solitary flowers enclosed in a pair of partially connate bracts. *C. clarkei* may itself include more than one species (differing chiefly in size), but however that may be the *clarkei/kermesina* group, with bright red corollas silky-hairy on the outside, is at present known only from Mt Kinabalu.

Cyrtandra ligulifera C. B. Cl. in A. & C. DC., Mon. Phan. 5: 252 (1883); Schlechter, Bot. Jahrb. Syst. 58: 361 (1923).
Lectotype (chosen here): [W Irian] Arfak Mts, Putat, *Beccari* 884 (FI; photo E).
Clarke cited two specimens, *Beccari* 740 & 884, under *Cyrtandra ligulifera*. Both numbers are written up by Clarke himself in Beccari's herbarium, but only 884 is noted as *'Exemplum typicum'*. It is therefore taken as the lectotype.

Schlechter placed this species in his subgen. *Glossophora* sect. *Centrosiphon*, but without any comment on floral characters. However, any attempt to use Clarke's description of the corolla is confusing. He wrote: *'labium alterum subrectum, breviter 3-lobum, lobis lateralibus rotundatis, lobo medio bipartito laciniis lanceolatis falcatis; lobium alterum patens, 2-lobum lobis in unum coalitis'*: [one lip suberect, shortly 3-lobed, lateral lobes rounded, the median bipartite with linear falcate divisions; the other lip spreading, 2-lobed the lobes united into one]. Here Clarke is clearly attempting to make his description fit the unusual pattern of the upper lip 3-lobed, the lower two-lobed. However, if the upper *'lobo medio bipartito'* is in fact two separate lobes, and the lower *'lobis in unum coalitis'* is really a single lobe, then the corolla is typical of subgen. *Glossophora*: the upper lip 4-lobed, the lower 1-lobed.

Cyrtandra mesilauensis B. L. Burtt, **species nova** *C. areolatae* (Stapf) B. L. Burtt affinis sed foliis vix areolatis, calycis segmentis anguste triangularibus 3mm longis (nec filiformibus 8–10mm longis) corollae tubo e basi ampliato subcampanulato (nec parte inferiore cylindrico superne tantum ampliato) recedit.

Woody herb or weak shrub, probably sparsely branched, 1–1.5m high; stems densely appressed pilose when young, becoming glabrous with age and then up to 7mm diam. with greyish longitudinally striate bark. *Leaves* opposite, subequal, on primary stem up to (incl. petiole) 23 × 6.5cm, on the branches 11 × 2.5cm, all elliptic or narrowly elliptic, apex gradually and shortly acuminate, gradually attenuate towards the base into an ill-defined petiolar region 1–2cm long, margins serrulate, upper surface rather densely appressed pilose, lower surface appressed pilose on the nerves, tomentose between them, lateral nerves c.12 on each side. *Flowers* fasciculate in congested axillary cymes; pedicels at flowering c.1cm long, densely appressed pilose, after flowering elongating to 1.5cm and hairs irregularly somewhat spreading. *Calyx* densely pilose, divided to the base into narrowly triangular segments 4mm long. *Corolla* obliquely subcampanulate, nearly 20mm long, glandular-pubescent outside; tube broad, 14mm long to the lateral sinus; posticous lobes 6 × 6mm with sinus 5mm deep between them, anticous lobes subequal c.6 × 6mm. *Stamens* arising 2.5mm above base of corolla; filaments with lower 3.5mm straight, upper 3mm strongly arcuate, flattened, glabrous; anthers 1.5mm. *Ovary* 6mm long with sessile glands, passing into 4mm long style beset with spreading glandular hairs; stigma bilobed. *Fruit* (immature) 17.5mm long, with persistent calyx.

Type: Sabah, Ranau distr., East Mesilau river, between Kinabalu golf course site and Mesilau cave, 6°03′N, 116°36′E, 1700–1900m, oak-laurel forest, Trusmadi formation and intrusives, weak shrub, corollas white, 26 iii 1984, *Beaman* 9080 (holo. MSC, iso E).

> SABAH. Mt Kinabalu, Mesilau river, 6000ft, 13 v 1964, *RSNB* 7131 (E, K); Mesilau cave, 6000ft, 14 iii 1964, *RSNB* 4603 (E, K); Bembangan river, 5000ft, 26 ii 1964, *RSNB* 4546 (E, K); West Mesilau river, valley above waterworks dam, 19 ii 1984, *Beaman* 8673 (MSC); Pinosuk plateau, E bank of East Mesilau river, 1720m, 5 ii 1984, *Beaman* 8500 (E); E Mesilau river between golf course site and Mesilau cave, 1700–1900m, 20 xii 1984, *Beaman* 7970 (MSC).

The description of *Cyrtandra mesilauensis* is based entirely on the type material; *Beaman* 8500 has fruits 25 × 3mm, perhaps still immature. The other material is cited with reasonable confidence, but there are one or two specimens in herbaria that are not easy to place and give rise to a suspicion that *C. mesilauensis* and *C. areolata* may occasionally meet and hybridize. The specimens concerned show rather short calyx segments but with corollas that have the narrow tubular part of the corolla distinctly longer than in *C. mesilauensis*. There may be a tendency for *C. mesilauensis* to grow at a slightly higher altitude than *C. areolata*, its lower limit of c.1700m being rather the upper limit of *C. areolata*, but many of the labels have printed altitudes which are probably less than precise for individual specimens. The doubtful sheets are:- Colombon river, 8500ft, 28 vi 1933, *Clemens* 33764 (L); calyx segments 4mm; corolla 20mm, narrow part of tube 7–8mm; Mesilau river, 5000ft, 22 i 1964, *RSNB*

4064 (E, K); calyx segments 3.5mm; corolla 18mm, lower part of tube narrower than in *C. mesilauensis*, broader than in *C. areolata*.

Cyrtandra (sect. **Decurrentes**) **pedicellata** B. L. Burtt, **species nova** a *C. adnata* B. L. Burtt foliis obtusis in sicco valde discoloribus, pedicellis longioribus, ovario in parte superiore villoso infra glabro (nec omnino glabro), stylo villoso (nec tenuiter piloso) differt. A *C. poiensi* B. L. Burtt (vide infra) foliis subsessilibus, ovario superne villoso (nec glabro), stylo villoso (nec breviter pubescente sub stigmate parce glanduloso-piloso) facile distinguitur.

Plant to 25cm high; stem simple, woody, leafy towards the top, sometimes the basal part horizontal and putting out woody prop roots. *Leaves* subsessile, occasionally the basal parts of the attenuate lamina eventually destroyed so that a pseudopetiole c.1cm is formed; lamina discolorous, paler below, more or less oblanceolate-oblong, c.10 × 3 to 21 × 6.3cm, upper surface glabrous from the start, lower surface at first densely silky-woolly at length brown-furfuraceous only on the veins with inconspicuous very short hairs between them, margins serrulate, lateral veins 6–9 on either side, tertiaries only conspicuous towards the margins. *Flowers* several in the leaf axils; pedicels 15–20mm long, pilose; bracts narrowly lanceolate, acuminate, c.1.5cm long, soon disappearing. *Calyx* in bud with the tips of the lobes forming a straight beak 4mm long, appressed pilose outside, glabrous within; tube 10mm long; lobes 5mm long, narrowly lanceolate, attenuate, the very tips obtuse. *Corolla* c.3–3.5cm long, densely sericeous outside, with a few long slender hairs within particularly near the insertion of the stamens; tube c.2–2.5cm long, lobes probably denticulate. *Disc* cupular, 2mm high. *Stamens* arising 13mm above the base of the corolla; filaments flat, for the most part glabrous but below the anther minutely glandular on the back and with short acute hairs on the sides, mid-vein conspicuous in dried specimens, scarcely narrowed upwards; anthers 2.75mm long, obtusely triangular, coherent by their tips. *Ovary* 10mm long, glabrous in lower part, villous above; style 7mm long, villous; stigma 1mm diam. *Fruit* not seen.

Type: Sabah, Mt Kinabalu, Mesilau, c.4200ft, flowers white with red stripes at entrance, 21 vii 1963, *Meijer* SAN 38559 (holo. E, iso. K, SAN).

> SABAH. Mt Kinabalu, Dallas-Tenompok spur, 3500ft, 31 xii 1931, *Clemens* 27565 (KL); *ibidem*, Silau basin, 6000–7000ft, 19–20 v 1932, *Clemens* 30051 (K); Penosok plateau, Sungai Muanan to Sungai Mesilau 21 vii 1963, *Fuchs et al.* 21102 (K); W Mesilau river, valley above waterworks dam, 1600–1700m, 19 ii 1984, *Beaman* 8657 (US).

Cyrtandra pedicellata, like a number of other Kinabalu plants, was first collected by J. & M. S. Clemens in 1931, and has been found several times since. All specimens show the distinctly long pedicels which give it its name and which serve as a good distinguishing feature amongst the species of sect. *Decurrentes* found on Mt Kinabalu. *C. pedicellata* differs from its two closest allies, *C. adnata* and *C. poiensis*, in having an ovary which is villous in the upper part, whereas in the other two species it is glabrous.

Cyrtandra adnata and *C. poiensis* have the pattern of leaf-sclereids which is most

common in sect. *Decurrentes*: osteosclereids in the hypodermis, astrosclereids in the mesophyll. *C. pedicellata* is somewhat anomalous in having no sclereids in the hypodermis. In this it comes closer to *C. basiflora*, but *C. pedicellata* shows no sign of the ridged calyx which is so characteristic of *C. basiflora* and its ally *C. simplex*.

The stamens of *C. pedicellata* have distinctly flat filaments, no median knee, and appear not to recoil after dehiscence.

A specimen related to *Cyrtrandra pedicellata* was collected on Gunung Murud in Sarawak (*Burtt* 5377), but it differs sharply in having very short-stalked fruits (it is not in flower); also the leaves have longer petioles and are attenuate to the base, as in *C. poiensis*. This specimen, like *C. pedicellata*, lacks sclereids in the hypodermis, but has astrosclereids in the mesophyll. It cannot be described until better, and flowering, material is available.

Cyrtandra (sect. **Decurrentes) poiensis** B. L. Burtt, **species nova** *C. pedicellatae* B. L. Burtt (vide supra) et *C. antuanae* B. L. Burtt (vide supra) affinis, ab ambabus foliis subtus conspicue reticulatis differt. A *C. pedicellata* etiam foliis longe petiolatis (nec subsessilibus); a *C. antuana* pedicellis et calycis tubo lobisque brevioribus distinguenda. **Fig. 8.**

Low-growing plant with unbranched woody stem up to 7cm high. *Leaves* opposite, both well-developed but somewhat unequal; petiole 3–6(–10)cm long, shortly pilose; lamina 8–17 × 3–6cm, elliptic or obovate-elliptic, obtuse at apex, gradually narrowed

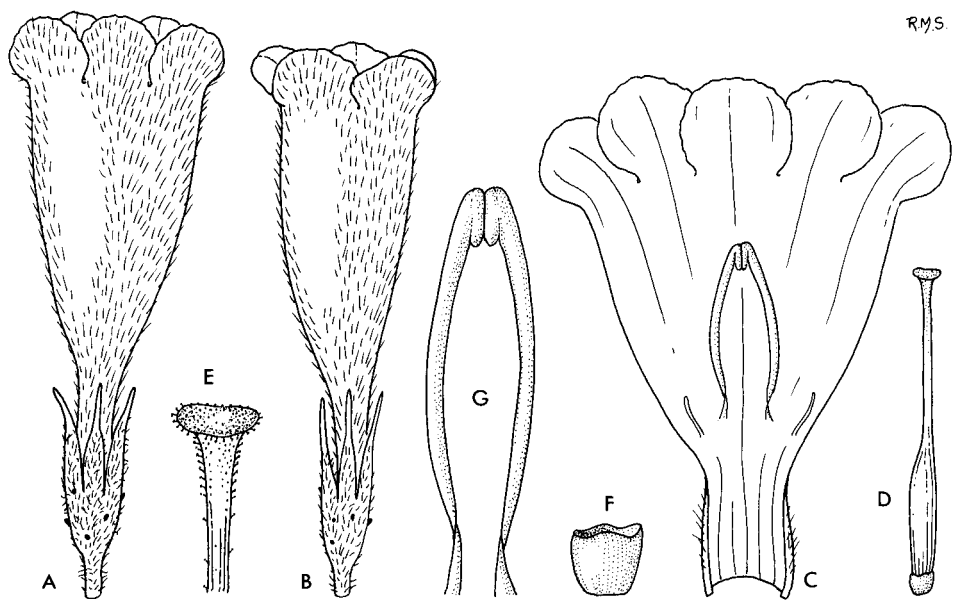

FIG. 8. *Cyrtandra poiensis*. A, flower, ventral view × 2; B, flower from the side × 2; C, corolla, dissected × 2; D, gynoecium × 2; E, stigma and upper part of style × 4; F, gland × 4; G, stamens × 4. From spirit material of *Burtt & Woods* B2780.

into petiole at the base, upper surface glabrous and when dry, minutely rugulose and puncticulate (rugulae on the very young leaf light brown and distinctly elevated, later inconspicuous), lower surface on and between veins shortly and closely furfuraceo-pubescent, stomatal turrets numerous, margins serrulate or serrate, the teeth tipped with hairs, lateral veins about 6 on each side, tertiary veins forming conspicuous reticulation below. *Flowers* axillary, crowded; pedicels densely pilose about 1cm long, elongating to 1.5cm in fruit. *Calyx* shortly pilose outside; tube 5mm long; lobes lanceolate, attenuate, 5mm long, the tips themselves obtuse. *Corolla* 3.5–4cm long, sericeous outside; tube c.2cm long, narrow below, widening above the middle, glabrous within; lobes 5, rounded, laterals and median c.8 × 6mm, 2 posticous a little smaller. *Disc* cupular, 2mm high, obtusely undulate. *Stamens* arising 12mm above the base of corolla; filaments 11mm long, flattened, glabrous; anthers 2mm long, cohering at the tips, thecae parallel. *Ovary* 7mm long, glabrous, cylindric; style c.18mm long, 0.75mm diam., scarcely thinner than the ovary, shortly and sparsely pubescent with, in addition, a few glandular hairs especially just below the stigma; stigma 1.75mm diam. *Fruit* c.20 × 5mm, with subpersistent calyx.

Type: Sarawak, First Div., Poi Range, Gunung Berumput, c.4000ft, purplish red calyx, corolla white with 2 pale yellow lines in throat, 12 viii 1962, *Burtt & Woods* 2780 (holo. E).

SARAWAK. First Div., Gunung Matang, c.1°38′N, 110°8′E, 15 vii 1962 (young fruit only), *Burtt & Woods* B. 2514 (E).

Cyrtandra poiensis has a 1–2-layered hypodermis with osteosclereids and astrosclereids in the mesophyll: a common pattern in sect. *Decurrentes*. The specimen from Mt. Matang (B. 2514) differs slightly from the type in having petioles up to 10cm long; however it seems to have been growing in litter and part of this length may have been covered.

Cyrtandra (sect. **Decurrentes**) **polyneura** (C. B. Cl.) B. L. Burtt **comb. et stat. nov.**

Syn.: *Cyrtandra decurrens* De Vriese var. *polyneura* C. B. Cl. in A. & C. DC., Mon. Phan. 5: 233 (1883).

Type: Sulawesi [Celebes], Minahassa, Tondano, April 1840, *Forsten* (86 in Herb. Mus. Lugd.; sheet no. 903. 307–520, L).

SULAWESI (Celebes). Minahassa, W slope of Mt. Masarang, 20 vi 1954, *Alston* 15952 (BM); Tanggari, 5 vii 1954, *Alston* 16223 (BM); Gunung Manembo-nembo, 28 vii 1954, *Alston* 16576 (BM). Central Region, c.0°30′S, 119°30′E, Sopu valley, c.80km SSE of Palu, 1000m, 26 iv 1979, *van Balgooy* 3005 (E, L); c.1°10′S, 120°10′E, E of Tongoa, 700m, *Johansson, Nybom & Riebe* 135 (E, L).
PULAU TALAUD. Karakenlangi, S slope Gunung Duata, 100m, 30 iv 1926, *Lam* 2697 (K).

C. B. Clarke cited the type simply as 'Celebes (Forster in h. Mus. Lugd. n. 86)'. The collector was E. A. Forsten (not Forster) and the specimen is further labelled Tondano, April 1840. There are four sheets of this collection at Leiden, but C. B. Clarke wrote the name only on one of these, that cited above as the type; he presumably did not

see the others, one of which bears a ticket with the no. 62, this being perhaps the collector's number whereas 86 was the herbarium number.

Cyrtrandra polyneura differs from *C. decurrens* in its leaves being much longer, broadest above the middle and very gradually attenuate to the base; in the inflorescence, which has broad, partially united, bracts (warty on the outside towards the base as they often are in sect. *Decurrentes*), and more numerous flowers (c.20 in an inflorescence). The calyx too is different being very sparingly pilose on the outside and more or less equally 5-lobed; the lobes have a distinct apical acumen but it is only 1mm (not 3–4mm) long.

Cyrtrandra (sect. **Dissimiles**) **rubropicta** Kraenzlin, Mitt. Inst. Bot. Hamburg. 7: 98 (1927). **Fig. 9.**

Type: Kalimantan, W Borneo, Schwaner Geberge, Bukit Bidang Menabai, 700m, 12 xii 1924, *Winkler* 783 (HBG).

SARAWAK. Seventh div., Kapit distr., S. Hose Mts., E of Bukit Sanpandai, 4500ft, 2 iv 1980, *Burtt* 12770 (E).

Kraenzlin described *C. rubropicta* and *C. impar* on consecutive pages without making any comparison. *C. impar* has already been recorded from Sarawak (*Notes RBG Edinb.* 30: 33, 1970): it was collected as an erect plant growing on granite boulders: the minus leaf of each pair was persistent and the flowers were white except for short red hairs and the bark was remarkably flaky (as in the Malayan *C. dispar*).

C. rubropicta was fairly common over a small area in a stream-valley and was always epiphytic (as Winkler recorded for the type specimen). The minus leaf of each pair seems to fall early (Kraenzlin said it was absent), the colour notes read 'pale pink corolla with red marks on the floor of the tube', and the bark is rough, not flaky. Both species had trisepalous calyces (not described by Kraenzlin) and belong to the sect. *Dissimiles*. They are very closely allied but apparently distinct.

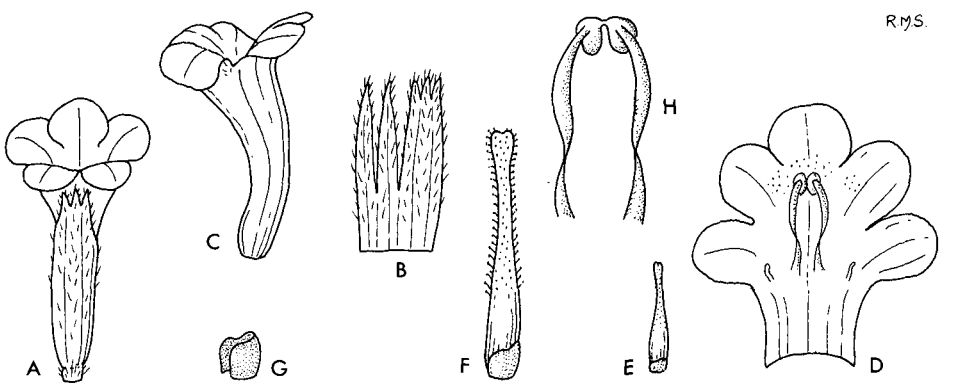

FIG. 9. *Cyrtandra rubropicta*. A. flower, dorsal view × 2; B, calyx, dissected × 2; C, corolla from the side × 2; D, corolla, dissected × 2; E, gynoecium × 2; F, gynoecium × 4; G, gland × 4; H, stamens × 4. From spirit material of *Burtt* 12770.

Cyrtandra russa C. B. Clarke in A. & C. DC., Mon. Phan. 5: 238 (1883).
Type: Sarawak, [Second div.] prope Banting, xi 1865, *Beccari* 498 (holo. FI, photo. E).

> SARAWAK. Second Division, Lingga, Gunung Lesung, 1°14′N, 111°09′E, 650m, ridge-top in hill dipterocarp forest, on moss-covered humus; semi-woody, leaves very thick, dark green above, whitish green below, bracts and calyx reddish green, corolla white with a very slight reddish tinge and a yellow spot in throat, stamens and pistil white, 1 xii 1981, *C. Hansen* 1083 (C); Lingga, Bukit Senyandang, 550m, clusters of sandstone rocks, corolla pinkish white tinged with yellow, 28 xi 1981, *B. Lee* S. 44019 (E).

Banting and Lingga are close together, on the south side of Batang Lupar, so that this species is still known only from a restricted area, but now from three separate locations.

The field notes accompanying *Hansen* 1083 are especially interesting in recording the colour of the living leaf; in the dried specimen it is reddish-brown on both surfaces, as it is in *Beccari* 498 and S. 44019). The colour of the dried leaf is clearly the basis of the specific epithet.

Cyrtandra sandakanensis B. L. Burtt, **species nova** *C. simplici* Merr. affinis, sed foliis magis coriaceis acute serrato-dentatis (nec crenato-serratis) pilis grossis supra tenuiter indutis glabrescentibus basibus pilorum persistentibus (nec pilis gracilibus indutis basibus non persistentibus), bracteis longius persistentibus, calyce pilis appresssis plerumque densius vestito differt. A *C. basiflora* C. B. Clarke (specie anisophylla) foliis utriusque paris aequalibus vel subaequalibus insuper distinguenda. **Fig. 10**.

Plant about 40–60cm high; stem simple or branched from the base, soon leafless in the lower part, young parts densely clad with appressed brown hairs, glabrescent below. *Leaves* opposite, those of a pair subequal, the upper ones 13 × 4 to 17 × 7cm, the lower ones sometimes much smaller, more or less obovate-elliptic, acute at the apex, gradually attenuate at the base and petiole virtually absent, upper surface thinly but coarsely pilose, glabrescent but the hair bases persistent as small discs, brown pilose on veins and margins below, margins (except on the attenuate base) acutely serrate-dentate each tooth with a tuft of hairs, lateral veins 6–9, inconspicuous above, slightly raised below, tertiary venation not visible. *Inflorescences* arising from axils of fallen leaves on the lower parts of the stem; peduncle 3–10mm long, shortly pilose; bracts 2, free, 15–20 × 5–7mm, somewhat folded, with short appressed brown hairs outside; flowers usually 3. *Calyx* tubular, ridged below the lobes, grooved below the sinuses, c.12mm long, appressed pilose; lobes 4mm long, acuminate. *Corolla* c.40mm long, narrowly tubular in lower part, expanded above, densely pilose outside with thin weak hairs, glabrous within; lobes probably less than 10mm long, broadly rounded at tips. *Stamens* arising 20mm above corolla base; filaments 9mm long glabrous; anthers 2mm long, with parallel thecae, not bearded at the base. *Disc* tubular, 2mm high. *Ovary* c.3mm long, glabrous, scarcely wider than the style; style 21mm, glabrous in lower part, upper 3mm and base of capitate 2mm diam. stigma pilose with rather thick hairs. *Fruit* c.17 × 4–5mm, light brown when dry, verrucose.

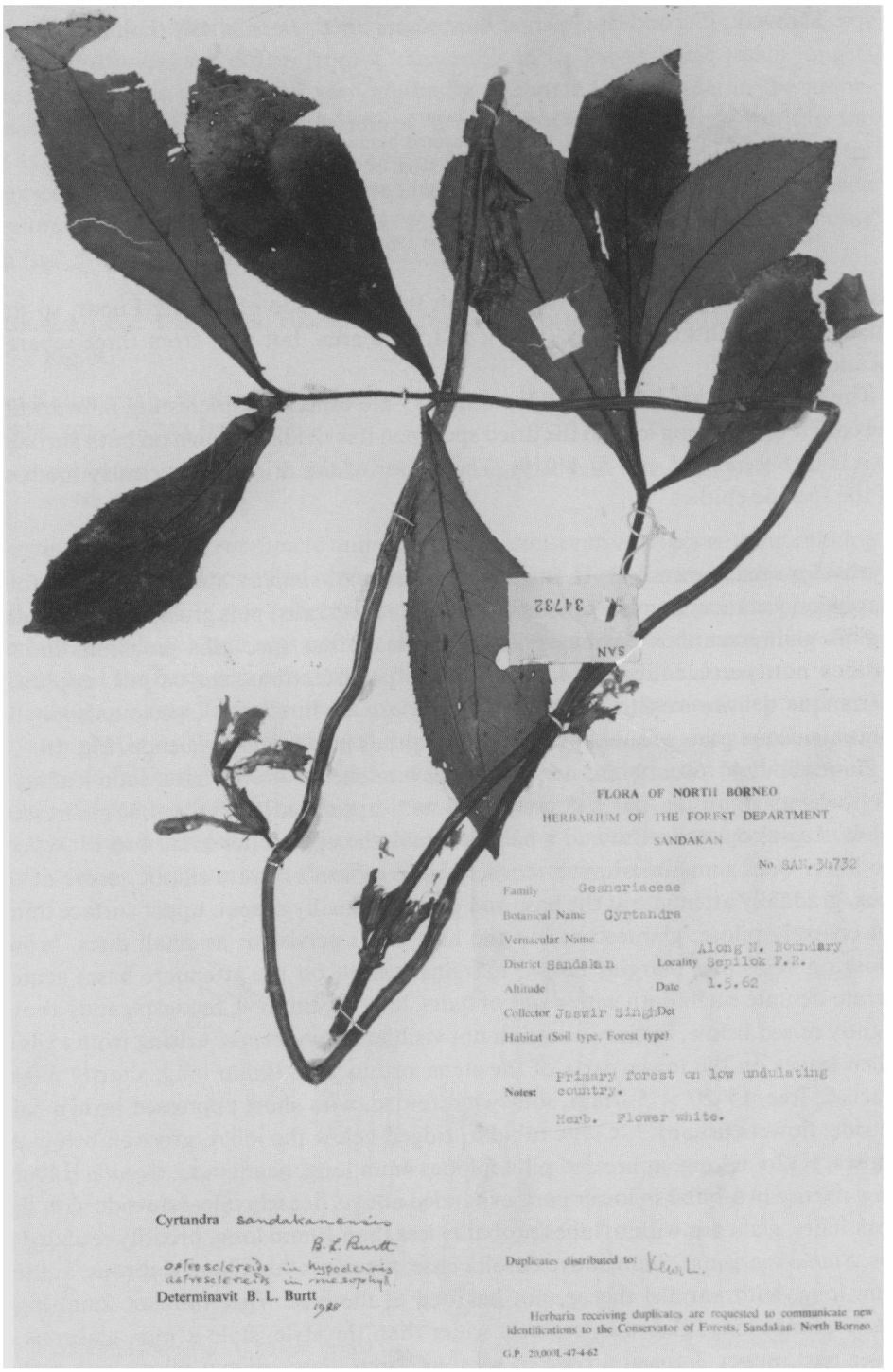

FIG. 10. *Cyrtandra sandakanensis*. Holotype.

Type: Sabah, Sandakan distr., N boundary Sepilok F.R., primary forest in low undulating country, 1 v 1962, *Jaswir Singh* SAN 34732 (holo. L; iso K, SAN).

SABAH. Sandakan distr., ix–xii 1920, *Ramos* 1676 (K, L), 1708 (K, L); Sepilok ext. F.R. mile 11, south, 18 iv 1961, *Meijer* SAN 24867 (SAN); Ulu Dusun, 50ft, 3 iii 1978, *Kodoh Tarodop* SAN 87548 (K).

Ramos 1676 and 1708 were mentioned by Merrill (*J. Malayan Branch Roy. Asiat. Soc.* 1: 26, 1923) as closely related to *C. simplex*, but differing in 'thicker sharply toothed shortly petiolate or subsessile leaves and much shorter infructescences the flowers being sessile or subsessile in groups of 2–4 at apex of short peduncles'. These two specimens were later, but wrongly, determined by Kraenzlin as *C. radiciflora*. Both are in fruit only and their description as an independent species is made possible by the subsequent collection of flowering material. The species may prove to have a very restricted distribution; it has not yet been found outside the Sepilok peninsula, NW of Sandakan.

It is now becoming clear that *C. basiflora* C. B. Clarke is not an isolated species but has a group of close allies. These are *C. simplex* Merr., *C. sandakanensis*, *C. tenebrosa* B. L. Burtt (see below) and some specimens from southern Sumatra which have yet to be identified. The outstanding character of the group lies in the calyx which is strongly ridged, the 5 ridges running to the tips of the calyx lobes. The pilose corolla has less silky hairs than those characteristic of sect. *Decurrentes*, to which, however, this group is clearly allied. C. B. Clarke placed *C. basiflora* in sect. *Dissimiles* but that is now typified by the very different *C. trisepala* (see introductory note).

Cyrtandra basiflora, *C. simplex* and *C. tenebrosa* lack sclereids in the hypodermis of the leaf, but have astrosclereids in the mesophyll. The leaves of *C. sandakanensis* also have astrosclereids in the mesophyll but in addition they have osteosclereids in the hypodermis: this probably accounts for their tougher texture.

Cyrtandra (sect. **Dissimiles**) **stonei** B. L. Burtt, **species nova** *C. anisophyllae* C. B. Cl. (speciei sumatrensi) et *C. multibracteatae* C. B. Cl. (speciei borneensi) affinis sed foliis minoribus cujusque paris evolutis sed majora haud aequantibus (nec auriculiformibus), sepalis inferioribus apice acuminato-corniculatis distinguenda.
Type: Malaya, Pahang, Ulu Kali, 5200ft, path to G. Lari Tembakau, 18 iii 1979, *Stone* 10451 (holo. KLU n.v., iso. K).

Syn.: *Cyrtandra dispar* DC. var. *glabriflora* B. C. Stone, Malay. Forester 43(2): 262 (1980). Type as above.

Tall suffruticose plant to 2m tall, stems square, angles sharp, to 15mm thick, green. *Leaves* opposite, unequal, the small member of each pair one-half to one-tenth as large as the big member, the latter asymmetrically elliptic-oblanceolate, up to 30 × 9cm, of which the petiole is 2.5–5.5cm long; blades rounded with an abruptly acuminate tip, cuneate-decurrent at base, margins almost entire or distinctly to obscurely rather remotely dentate, with teeth up to 0.5mm long, 7–15mm apart; lateral nerves 8–12 pairs, alternate, upcurved, the tertiary nerves rather obscure. *Inflorescence* axillary, dense, bracts free 12–15mm long, ovate-acuminate, tips hornlike, flowers about 6

together, interior of bracts at base with sparse appressed reddish hairs to 0.25mm long; bracteoles ... pedicel bases densely hairy, hairs reddish, c.1mm long; pedicel 5mm long, 1.5mm thick, glabrous. *Calyx* 3-lobed, two smaller lobes ovate-acuminate-apiculate, 10mm long, 5mm wide, midrib distinct; third larger lobe 11 × 6mm, ending in 3 teeth, these the projections of 3 distinct nerves. *Corolla* white, straight, 16mm long, the tube 12mm, lobes 4mm almost equal, rounded, entirely glabrous. *Stamens* 2, short included white glabrous, filament 1.3mm, anther 1.6mm, ovate-rounded. *Ovary* about 2.5mm long, gradually narrowed into the straight cylindric style 9.5mm long ending in bilobed stigma, lobes 1mm long, spreading; style sparsely pubescent with scattered glandular reddish hairs 0.2mm long; ovary surrounded at base by glabrous cup 2mm high, shallowly 5–6-lobed or crenellated.

The English description given above is that provided by Professor Stone when describing the plant as a variety of *Cyrtandra dispar*, a species with which *C. stonei* has little in common. It lacks the characteristic flaky bark and the sharp leaf-teeth of that species, and is not nearly so strongly anisophyllous. The trisepaline calyx, correctly described by Stone, is quite different from the 5-toothed calyx of *C. dispar*.

Cyrtandra stonei is of particular interest as it is the first record of sect. *Dissimiles* (lectotype *C. trisepala* C. B. Cl.) from the Malay Peninsula and emphasises the type of representation that *Cyrtandra* has in the Malay Peninsula. There are about 12 species in six sections—none of the sections endemic nor showing much local differentiation. In contrast, Borneo has probably more than 150 species, with some sections (e.g. sect. *Decurrentes* C. B. Cl.) showing a considerable number of closely related species. Clearly the Malay Peninsula is marginal to the major area of differentiation of this great genus.

Cyrtandra tenebrosa B. L. Burtt, **species nova** *C. basiflorae* C. B. Clarke proxime affinis sed foliis fuscis acutius serratis, bracteis acuminatis, calyce latiore c.4.5mm lato (nec 3.5mm tantum) minus sulcato, antheris basi haud barbatis connectivo dorso sulcato (nec convexo) distinguenda. **Fig. 11.**

Plant 50–60cm high, branched from base or several stems from branched rootstock; stem at first appressed pilose, becoming glabrous. *Leaves* on lower part of stem often much reduced, c.10 × 2mm but very variable, higher up they are very unequal, the smaller 1–2cm long; developed leaves with petiole (2–) 2.5–4cm long, lamina (10–) 13–21 × (4.5–) 5–8cm, dark, obliquely elliptic, acuminate at tip (acumen 1.5–3cm long), cuneate at base, margins acutely serrate especially in the upper part and on the acumen, glabrous above (or with a few scattered brown appressed hairs when very young) shortly appressed pubescent below, lateral nerves 6–8 on each side. *Inflorescences* borne towards the base of the stem, axillary to the reduced (now fallen) leaves; peduncles solitary or 2–3 from one axil, shortly pubescent, 1.5–2cm long; bracts white, c.1.7–2.5cm, shortly pubescent on the sides, united for 3/4 of their length, the free part acuminate, subtending a single flower, pedicel c.3mm long. *Calyx* 12–14mm long, the tube c.4.5mm wide, slightly ridged below the lobes, dark when dry, shortly appressed pubescent outside, glabrous inside; lobes 5–7mm long, margins infolded at tips to form a solid point, points twisted together in young bud. *Corolla*

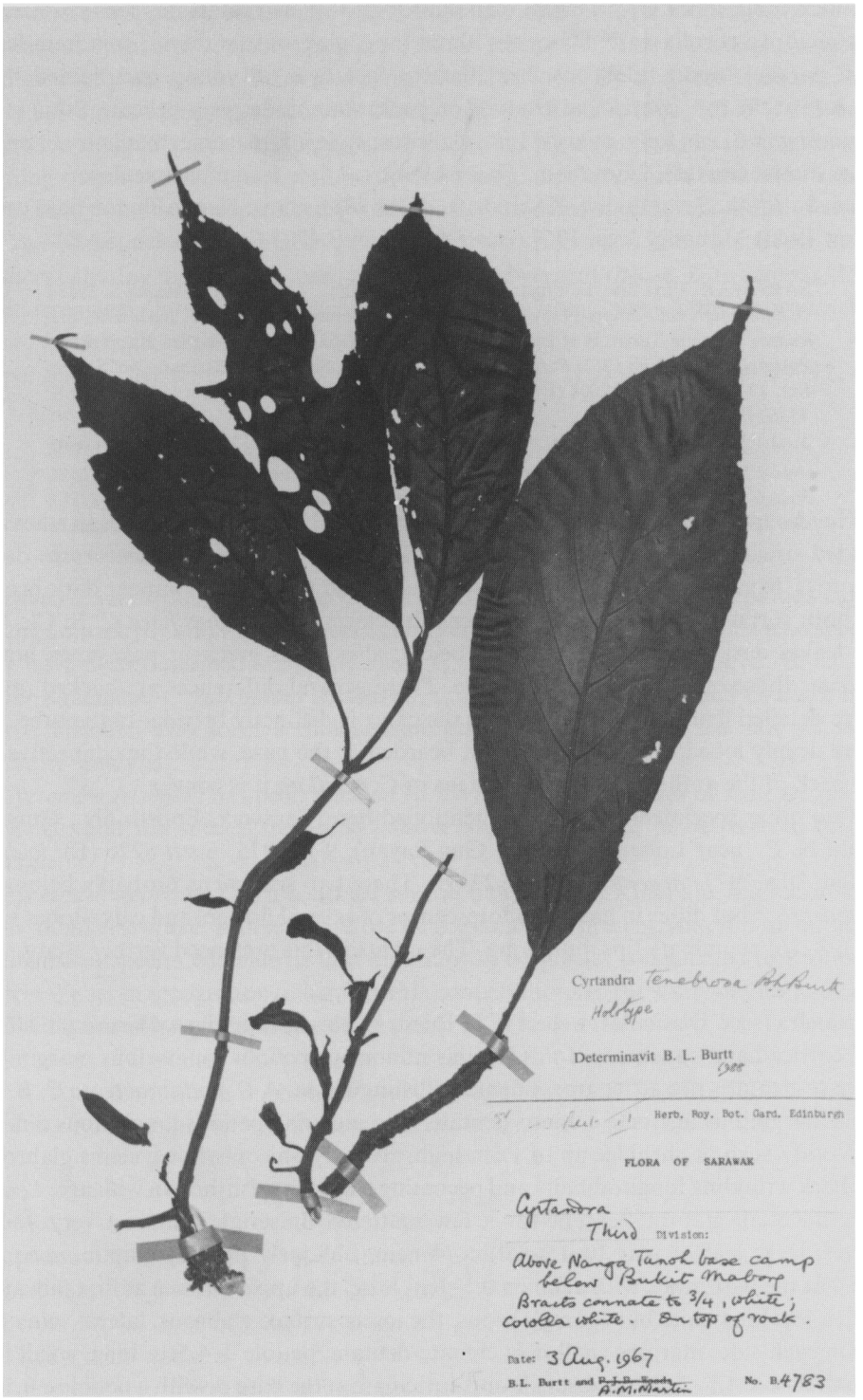

FIG. 11. *Cyrtandra tenebrosa*. Holotype.

4.5–5cm long, lobes c.7 × 6mm, clad with long soft hairs outside. *Stamens* arising 22mm above corolla-base; filaments 10mm long, glabrous; anthers 3.5–4.5mm long, with parallel thecae, glabrous, held face to face even in young bud, joined by a ligature at the top, connective grooved on back; staminodes very delicate, 2mm long. *Gynoecium* c.3.5cm long; ovary c.1cm, glabrous; style 2.5cm, somewhat hairy in upper part; stigma capitate, 3mm diam. *Fruit* oblong, c.2.5 × 0.5cm, verruculose.
Type: Sarawak, Seventh div., Kapit distr., Hose Mts, above Nanga Tunoh base camp below Bukit Mabong, 3 viii 1967, *Burtt & Martin* B.4783 (holo. E, iso. SAR).

SARAWAK. First div., Bau distr., Bukit Jebong, 300ft, 7 viii 1970, *Lehmann* S. 29432 (E); *ibidem*, S end Gunung Doya above Kampong Seromah, 23 v 1975, *Burtt* 8192 (E); *ibidem*, Gunung Tabai, E of Bidi, 18 v 1975, *Burtt* 8161 (E). Seventh div., Kapit distr., Pelagus rapids, 21 vii 1962, *Burtt & Woods* B. 2582 (E); Sungai Bena, tributary of Sungai Sut, 23 vii 1962, *Burtt* 2604 (E). Belaga distr., Sungei Iban, Linau, 30 x 1982, *B. Lee* S. 45360 (E).
KALIMANTAN. W. Koetai, no. 37, near Mt Kemoel, 1000m, 2 x 1925, *Endert* 3749 (L).

Cyrtandra tenebrosa is found in the darkest parts of the forest, sometimes in a heavily shaded stream gully, and it takes its name from this habitat (latin *tenebrosus* dark, gloomy). My field notes record the dark leaves, and they always appear dark brown on both surfaces in herbarium specimens. Its closest ally, *C. basiflora* C. B. Cl., has the leaves dark green above but pale below; also it has green or pale green bracts whereas those of *C. tenebrosa* are white. These general differences are backed up by more detailed features. In *C. tenebrosa* the calyx is distinctly broader in the tube and more deeply lobed; the anthers are not bearded at the base, while the connective on the back of the anther is grooved whereas in *C. basiflora* it is convex.

Two other specimens need to be mentioned here: Sarawak, Fourth div., Gunung Mulu N. P., near Lobang Rusa (= Gua Payau), 9 vi 1975, *Burtt* 8226 (E); *ibidem*, c.70m, 30 x 1977, *Argent & Kerby* 622 (E). These two specimens probably belong to *C. tenebrosa* but differ in having inflorescences of several flowers and calyx-lobes with (in B 8226) acuminate tips 4mm long. The plants in this area need further study.

Cyrtandra (sect. **Dissimiles**) **weberi** B. L. Burtt, **species nova** *C. impari* Kraenzlin affinis sed cortice haud squamoso, foliis laminis minoribus petiolis longioribus marginibus crenato-dentatis nec acute grosse dentatis distinguenda. A *C. multibracteata* C. B. Cl. foliis marginibus distincte crenato-dentatis (nec integris), petiolis longioribus differt.

Woody herb or shrublet up to 1.5m high, strongly anisophyllous; stems glabrous, the bark wrinkling longitudinally and becoming a light greyish-brown with age. *Leaves* very unequal; glabrous except for a few scattered uniseriate hairs on very young leaves; large leaf of pair 10–15(–20) × 4–6cm, obliquely broadly elliptic, unequal-sided at the base, apex with acumen 0.5–1cm long, the upper surface at first (always?) with a few long hairs but soon glabrous, the lower surface glabrous, lateral veins 10–11 on each side, margins shallowly crenate-dentate; petiole 3–4.5cm long; small leaf of pair 3–4 × 1.5–2.3cm, subsessile and auriculate at the base or with a petiole c.0.5cm long; blade c.4–5.5 × 1.5–2.5cm. *Inflorescence* axillary on short 2–5mm peduncle,

flowers c.5, congested in a head c.2.5cm diam.; outer bracts ovate, more or less cordate at base, and acute at apex, free, c.2 × 1.5cm, the inner ones slightly shorter and distinctly narrower. *Calyx* glabrous, bilabiate; lower lip of 2 free segments, c.9–15 × 3.5–8mm; upper lip 11–16 × 8–12mm, bluntly trilobed, lobes 3.5–5 × 3.5–8mm (the wide range of calyx measurements is due to taking them from late bud and early fruiting stages). *Corolla* (not yet open) 16mm long; roof of corolla tube and bases of lobes richly studded with stalked glands, palate (in dried specimen) orange. *Stamens* (at this stage) arising 5mm above base of corolla; filaments 5mm, glandular hairy; anthers cohering face to face, 2mm across widely divergent thecae. *Disc* cupular, 2mm high, irregularly lobulate. *Gynoecium* (at this stage) 7mm; ovary 3mm glabrous; style 4mm, densely glandular hairy.

Type: Sabah, Mt Kinabalu, Kiau view trail, 1100m, 21 ix 1979, *Weber* 790921-1/6 (WU).

> SABAH. Mt Kinabalu, Marai Parai, Kinataki river forest, 5000ft, 29 iii 1933, *Clemens* 32427 (BM); *ibidem*, Colombon river basin, base of great wall, 9500ft, 30 vi 1933, *Clemens* 33758 (BM, L); *ibidem*, Colombon river, 4500ft, 19 vii 1933, *Clemens* 33993 (BM); *ibidem*, Mahandui river, *Carr* SFN 26330 (SING); *ibidem*, Bembangan river, 5200ft, 19 iv 1964, *Royal Society North Borneo Expedition* 4956 (E, K).

Cyrtandra weberi belongs to a group of allied species that has a trisepalous calyx, strong anisophylly and white flowers as unifying characters. The other Bornean species that have been described are *C. trisepala* C. B. Cl., *C. multibracteata* C. B. Cl., *C. impar* Kraenzlin, *C. rubropicta* Kraenzlin, *C. bryophila* B. L. Burtt and *C. iliasii* B. L Burtt. The first two form a difficult intergrading complex that has not yet been critically analysed.

Cyrtandra trisepala has been selected (p.201) as the type species of sect. *Dissimiles* C. B. Cl. and the species mentioned above are therefore all to be referred to this section.

Cyrtandra weberi has been collected several times on Mt. Kinabalu, but has not yet been found elsewhere. It must therefore be presumed, at present, that it is an addition to the list of species endemic to that mountain. The species is dedicated to Professor Anton Weber in recognition of his valuable contributions to the study of Gesneriaceae and of his friendly collaboration at all times.