

expressed by Massee and Salmon (*supra*) as to the wide distribution of individual species of coprophilous fungi.

It only remains for the writer to acknowledge his indebtedness to Miss A. Lorrain Smith for much assistance in determining species, and to Mr. G. Massee for assistance in the genus *Coprinus*.

EXPLANATION OF PLATE 36.

- Fig. 1. *Coprinus Cheesmani*, Gibbs. Group of plants, nat. size.
 Fig. 2. Plants marked "a" and "b" in fig. 1, $\times 3$.
 Fig. 3. Section slightly magnified.
 Fig. 4. Cells of epidermis and hairs, $\times 200$.
 Fig. 5. Spores, $\times 400$.

Gardenia Thunbergia and its Allies.

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(PLATE 37.)

[Read 18th June, 1908.]

THE small group of plants which forms the subject of this paper is represented in the 'Flora of Tropical Africa,' vol. iii. pp. 100 & 101, by two species: *Gardenia Thunbergia*, L. fil., and *G. Jovis-tonantis*, Hiern; but under the former not less than five names originally intended for as many distinct species appear in the list of synonyms. As *Gardenia Thunbergia* was described from a Cape plant, and the reduced species from material collected mainly in the northern parts of Tropical Africa, the area of *G. Thunbergia* was assumed to cover practically the whole of Africa, with the exception of the temperate north. Guided by this assumption, subsequent authors were frequently led to refer to this apparently common and widely spread species, plants which differ from it at least as much as *G. Jovis-tonantis* does, and in some cases indeed much more. Thus *G. Thunbergia* grew more and more into a collection of incongruous forms. More recently three new species, evidently closely allied to *G. Thunbergia*, were described. They were not split off from that species, and in so far did not touch its composition; but, on the other hand, they made the incongruity of its components still more glaring, at least to those who had an opportunity of mustering a considerable accumulation of specimens of "*G. Thunbergia*." Ample opportunity of this kind was given to Mr. Hutchinson, who during the last two years, under my direction, sorted and named the Rubiaceæ of the large African collections which had accrued to Kew. We therefore

conceived the idea of revising the whole group, and of placing its constituents on a more equal basis. For that purpose we studied, in the first place, the material at Kew ; but we had also, of course, to direct our attention to the valuable material in the herbarium of the British Museum ; we asked for and had, thanks to the courtesy of Dr. De Wildeman, the loan of the "*Gardenia Thunbergia*" specimens of the Congo State collections ; and finally we availed ourselves of Mr. Casimir De Candolle's ever ready help for the elucidation of some critical species, the types of which were in the Candollean herbarium. We might have extended the field of our investigation, but for want of time and the conviction that after all the time had not yet come for attaining anything like finality. What we can and ought to do, in cases like the present, is to revise our knowledge from time to time and clear the basis for a further advance. Our paper is an attempt in this direction. The *Gardenias* of the "*Thunbergia*" group are rather striking objects when in flower, and it may be hoped that the collectors and field-students will, in the future, pay more attention to them, and supply us with more complete material and their own observations on the mode of growth, the range of individual variation, and any biological conditions which may influence their morphological characters.

The genus *Gardenia*, in the sense of Bentham and Hooker's '*Genera Plantarum*,' consists of three sections: *Eu-Gardenia*, *Ceriscoides*, and *Rothmannia*. The first section ranges over the whole of the palæotropic region, and is represented in Africa by the *Gardenia Thunbergia* group—the subject of the present paper—and two more species which are characterised by long, almost cylindrical fruits. From the Indian, Malayan, and Polynesian species the "*Thunbergia*" group differs on the whole in the number of the placentas, which rarely falls below six, and the more or less abundant development, in the mesocarp, of sclerotic fibres, which in the endocarp fuse into a very hard woody shell, and finally in the more xerophilous structure of the leaves. The species forming this group are very closely connected. This and the very considerable variation in the size and shape of the leaves, the size of the flowers, and the degree of development of the calyx-teeth or lobes—even in the same individual—make the discrimination of the species very difficult if the specimens are scrappy or badly selected. The number of parts in the plan of the flower, though also subject to a certain amount of variation, is much more constant, and the same may be said of the surface condition and the nervature of the leaves, and the shape of the calyx-teeth or lobes. The very copious material of *G. Joris-tonantis* which we had before us was most instructive in this respect. Then there are certain species which stand out from the rest on account of some special peculiarity, as the cucullate and more or less petioled sepals of *G. Thunbergia*, the cuff-like prolonged calyx-tube of *G. cornuta*, with its laterally attached segments, the

small flowers and ribbed fruits of *G. Aqualla*, and the almost entirely suppressed overground stems of *G. subacaulis* and *G. Tinnee*. The two last-named species are interesting instances of adaptation of arborescent types to the peculiar edaphic conditions of the savannas.

With our present knowledge of *Gardenia* it would be idle to speculate on the phylogeny of the "*Thunbergia*" group. They certainly represent a distinct branch of the greater phylum of *Eu-Gardenia*, from which they must have become differentiated a very long time ago. We know nothing about the dispersal of their seeds except what can be inferred from the structure of their fruits and seeds, and the casual observations of the collectors. It seems that the fruits of some of them, at any rate, are eaten by elephants and antelopes, and probably other animals, evidently for the succulent pulp in which the seeds are embedded. The seeds would in this way get into the intestinal canals of those animals, and might finally be carried to great distances from the mother plant; but no means of transport across the seas suggest themselves, and it is evident that the *Eu-Gardenias* must have reached their areas, in so far as they are separated by water, at a time when those areas were still connected by land, that is in pre-Tertiary times.

In the following enumeration of the species of the "*Thunbergia*" group we have confined ourselves to describing only those which are new or were imperfectly known, the key which precedes the enumeration including sufficient characters for the determination of the others. In the key we have placed together two acaulescent species for purely practical reasons. They have no doubt descended independently from each other, *G. subacaulis* probably being more intimately connected with *G. asperula*, and *G. Tinnee* with *G. lutea* and *G. ternifolia*. (OTTO STAPF.)

Key to the Species.

Subacaulis; flos solitarius cum foliis in rosulam dispositis.

Folia scabrida; corollæ tubus 4-8 cm. longus 1. *subacaulis*.

Folia lævia; corollæ tubus circiter 3-5 cm. longus 2. *Tinneæ*.

Arbores vel frutices.

Corolla 8-9-mera.

Ovarium 9-merum.

Calycis tubus ultra 5 mm. longus, lobis oblongis 3. *Jovis-tonantis*.

Calycis tubus infra 3 mm. longus, lobis subfiliformibus
demum reflexis 4. *Volkenzii*.

Ovarium 3-6-merum.

Calycis lobi spatulati, infundibuliformes 5. *Thunbergia*.

Calycis lobi oblongi (non spatulati).

Calycis lobi lateraliter complanati, equitantes et
decurrentes 6. *Saundersiæ*.

Calycis lobi dorsaliter complanati, non decurrentes .. 7. *asperula*.

Corolla 6-7-mera (raro 9-mera in *G. spatulifolia*).

Calycis tubus ultra loborum insertiones productus. 8. *cornuta*.

Calycis tubus non ultra loborum insertiones productus.

Calycis lobi non filiformes; calyx et corolla fere glabra vel breviter pubescentia.

Folia lævia.

Folia late obovato-cuneata, nervis lateralibus $\pm$ flabel-
latis 9. *spatulifolia*.

Folia oblanceolata ad obovata, nervis lateralibus magis
patulis quam in præcedente.

Folia arcte reticulata; fructus ellipsoideus, sæpe
 $\pm$ obtusus vel utrinque angustatus 10. *ternifolia*.

Folia laxè reticulata; fructus oblongo-ellipsoideus,
 $\pm$ stipitatus 11. *lutea*.

Folia scabrida.

Corollæ tubus quam lobi vix duplo longior 12. *tricantha*.

Corollæ tubus quam lobi triplo longior 13. *Goetzei*.

Calycis dentes filiformes; calyx et corolla magis minusve
tomentosa.

Folia scabrida; fructus 3-4 cm. longus, multicostatus .. 14. *Aqualla*.

Folia lævia; fructus 6-9 cm. longus, ecostatus 15. *erubescens*.

1. GARDENIA SUBACaulis, *Stapf et Hutchinson* (sp. nov.).

Suffrutex subacaulis, uniflorus. *Folia* sessilia, oblanceolata, basi longe attenuata, usque ad 15 cm. longa et 7 cm. lata, coriacea, apice rotundata, utrinque scabrida, marginibus undulatis, nervis lateralibus utrinque 9-14 patulis prominentibus, venis arcte anastomosantibus utrinque conspicuis; stipulæ late ovatæ, obtusæ, circiter 4 mm. longæ, coriaceæ, extus parce pilosæ. *Receptaculum* oblongum, circiter 1 cm. longum, puberulum. *Calyx* tubulosus, 6-9-lobus; tubus 8-10 mm. longus, extus fere glaber, intus parce pubescens; lobi oblongi vel lineares, obtusi, incrassati, a latere compressi, interdum subfoliacei, in tubo decurrentes, 2.5-8 mm. longi. *Corolla* alba, demum flava; tubus 4-8 cm. longus, medio 3-4 mm. diametro, extus minute pubescens, intus superne pubescens; lobi 6-8, oblique obovati vel elliptici, 2-3.5 cm. longi, 1-2 cm. lati, supra basin parce pubescentes. *Anthere* 11-12 mm. longæ, inclusæ. *Stylus* 4.5-8 cm. longus, supra medium tenuiter pubescens, apice incrassatus, inæqualiter 6-lobatus, lobis latis obtusis circiter 2 mm. longis. *Ovarium* placentis 6. *Fructus* ambitu ellipticus, circiter 5 cm. longus, medio 3 cm. diametro; pericarpium fibroso-lignosum, 2 mm. crassum. *Semina* matura ignota.

Northern Rhodesia, and throughout Nyasaland:—Broken Hill, *Küssner*, 2020 feet (Herb. Mus. Brit.)! Kondome to Karonga, 2000-6000 feet, *Whyte*! plains near South Rukuru, 4000 feet, *McClounie*, 114! Upper Loangwa River, *Nicholson*! Mt. Malosa, 4000-6000 feet, *Whyte*! Namasi,

Cameron, 77! Manganja Hills, *Waller*! Eastern Nyasaland, *Archdeacon Johnson*, 498!

K. J. Cameron states that the flower of this species is pure white, but only remains so for a day, when it turns yellow and withers.

PLATE 37.

1. Whole plant in fruit (n. s.). 2. Plant in fruit, from collector's sketch (reduced to $\frac{1}{3}$).
3. Calyx cut open ($\times 2$). 4. Section of ovary ($\times 5$). 5. Mature fruit (n. s.).

2. G. TINNEÆ, *Kotschy et Heuglin*, in *Bot. Zeit.* (1865) p. 173, t. 8; *Kotschy et Peyr. Pl. Tinn.* p. 6, A, B.

Bahr-el-Ghazal; Bongo-land, *Tinne* and *Heuglin*.

3. G. JOVIS-TONANTIS, *Hiern*, in *Flora Trop. Afr.* iii. p. 101; *Ficalho*, *Pl. Uteis*, p. 198; *Hiern*, *Welw. Cat. Afr. Pl.* ii. p. 461.

Decameria Jovis-tonantis, *Welw. Apont.* p. 579, Nota 12, et *Synops. Explic.* p. 10, no. 20, et p. 18, no. 44.

From the Shari and Bahr-el-Ghazal to Uganda and Angola:—Central Shari; swamps of Baseli, *Chevalier*, 8582! Jur-land, *Schweinfurth*, 13! 1339! 1750! 2888! Wayo, in Muro Territory, *Petherick*!—Uganda; scattered woods near Changu, at the mouth of the Katonga River, *Scott Elliot*, 7472! without precise locality, in the jungle, *Wilson*, 146! Buddu, *Dawe*, 240! German East Africa; Marungu, *Volkens*, 2145! (Herb. Mus. Brit.).—Congo State; Lower Congo, without precise locality, *Smith*, 72! (Herb. Mus. Brit.), Mayombe, *Laurent*! Boma, *Laurent*! Matabi, *Ducoffre*! Cataract District; Bingila (?) *Dupuis*! without precise locality, *Laurent*! Luvituku, *Pynaert*, 79! Stanley Pool District; Stanley Pool, *Desmeuse*, 192! *Laurent*! N'Dembo, *Gillet*! Kisantu, *Gillet*! Leopoldville, *Pynaert*, 162! Lake Leopold District; Fini, *Laurent*! North East District; Route Guruza to Mangara (near Suronga), *Seret*, 389! Mapussi to Koko, *Seret*, 389! Lualaba District; Luila River, *Descamps*! Luluabourg, *Cambiers*! *Lescrauwaet*, 314! Eastern Province; Katanga, Lukofu, *Verdick*!—Angola; Catomba, *Welwitsch*, 2573! district of Malange, *Gossweiler*, 1237!

All the specimens quoted above from the Congo State, excepting that by *Smith*, are in the Brussels Herbarium, and were kindly lent us for examination by Dr. E. De Wildeman.

An interesting superstition exists amongst the natives of Angola regarding this species. *Ficalho*, in *Fl. Uteis*, p. 198, states:—"It is a small tree not exceeding 5-9 feet in height, but it has a relatively large trunk, and inhabits the stony, rather dry lands of Cazengo, Golungo Alto, and Ambaca. The wood is of a clear yellow colour, extremely hard, and of a notably fine grain. It is like boxwood—for which it might be substituted for many purposes,

perhaps even in engraving. The same species is met with in Huilla, particularly in the woods near the lake of Iabantala, where it attains larger dimensions. In those parts it is called *mulábi*. It is one of the *fetish* plants. The negroes of the interior of Angola believe that it is a protection from lightning—perhaps in virtue of the great hardness of its wood, as Welwitsch observes—and are in the habit of putting the branches on the tops of their huts, believing that they thus obtain shelter from electrical discharges. From this supposed virtue Welwitsch derived the specific name of *Jovis-tonantis*, dedicating it to the God of Thunders.”

According to Seret, the seeds yield a black dye for painting the skin. The wood is very hard, and is used for the manufacture of knife-handles.

Flowering specimens much resembling this species were collected by H. Waller at the foot of Morambala Hill, where the fruits form the favourite food of the elephants.

4. *G. VOLKENSII*, *K. Schum.*, in *Engl. Bot. Jahrb.* xxxiv. (1904) p. 332.

German East Africa; sandy creeks of the coast; *Engler*, 2199, *Kirk!* (fruit in Kew Museum).

5. *G. THUNBERGIA*, *Linn. fil. Suppl.* p. 162 (descr. emend.).

Bot. Mag. t. 1004; *Drapiez*, *Herb. Amat.* Fl. vii. t. 554; *Wood*, *Natal Plants*, t. 40; *Sims*, *For. Fl. Cape Col.* t. 78. *Gardenia verticillata*, *Lam. Encycl.* 11. p. 607 (1786). *G. speciosa*, *Salisb. Prod. Stirp. Hort. Chap. Allert.* p. 63 (1796). *G. crassicaulis*, *Salisb. Parad. Londin.* i. t. 46 (1806). *Bergkias*, *Sonnerat, Voy. N. Guin.* p. 47, tt. 17, 18 (1776). *Thunbergia capensis*, *Montin in K. Vet.-Akad. Handl. (Stockholm)* xxxiv. (1773) p. 289, t. 11. *Piringa Caquepiria*, *A. L. de Juss. in Mém. Mus. Par. vi.* (1820) p. 399.

Arbuscula, 2·5 m. alta, vel frutex; rami cortice griseo vel albido tecti, etiam juniores glabri. Folia cum floribus coëtanea, rotundato-ovata vel obovata, breviter vel longius acuminata, acumine plerumque obtuso, basi cuneatim attenuata lamina magis minusve in petiolum brevem decurrente, 5–7 cm. longa, 3–4 cm. lata, papyracea, fere concoloria, glabra nisi in nervorum axillis pilosa, nervis lateralibus utrinque 5–7 tenuibus obliquis, venis laxis inconspicuis; petiolus 2–4 mm. longus; stipulæ in tubum connatæ, scarioso-membranaceæ, unilateraliter fissæ, demum circumscissiles, summæ ad 12 mm. longæ. Flores ad ramulorum breviorum apices, solitarii, sessiles inter ramulos orti. *Receptaculum* obconicum, 10–12 mm. longum, tenuiter sericeo-pubescent. *Calyx* tubulosus, 5–8-lobus; tubus superne uno latere fissus, extus glaber vel magis minusve appresse pilosus, intus densissime appresse tomentosus, ultra loborum insertionem breviter productus; lobi foliacei, breviter vel longiuscule petiolati, laminis spatulatis vel obovato-

oblongis vel ovatis basi infundibuliformibus 5–12 mm. longis, petiolis sæpe in tubo breviter decurrentibus. *Corollæ* albæ tubus cylindricus, 4–8 cm. longus, medio 3–4 mm. diametro, extus glaber, intus superne pubescens; lobi 8 (raro 9), oblique obovati vel obovato-oblongi, 2·5–4·5 cm. longi, 1·5–2·5 cm. lati, glabri. *Antheræ* medio affixæ, 22–23 mm. longæ, 4–5 mm. exsertæ. *Stylus* 5·5–9 cm. longus, a medio pubescens, sursum multo densius vestitus; stigmatis lobi obovato-oblongi, 6–7 mm. longi. *Ovarium* placentis 3–5. *Fructus* ellipsoideus, 4–5·5 cm. longus, 2·75–3·5 cm. diametens, albidus; pericarpium durum, fibris lignosis crassiusculis creberrimis. *Semina* ∞, lenticularia, maiora 6–7 mm. diametro, nigra.

South Africa from Port Elizabeth to Natal:—Cape Colony, without precise locality, *Masson*! (Herb. Mus. Brit.). Port Elizabeth Div., Krakamma, *Harvey*, 556! Somerset Div., *Bowie*! Bathurst Div., between Theopolis and Port Alfred, *Burchell*, 4127. East London Div., in woods near the mouth of Buffalo River, *Leighton* in herb. Norm. Aust. Afr. no. 99! Natal; Inanda, *Wood*, 439! near Durban, *Wood*, 20! (Herb. Mus. Brit.). Without precise locality, *Cooper*, 2467! *Gerrard*, 50! Cult. in Hort. *Burchell*, 749! Hort. *Malcolm* (1797)! (Herb. Mus. Brit.).

6. G. SAUNDERSIÆ, *N. E. Brown*, in *Kew Bull.* 1906, p. 104.

South East Africa:—Gazaland; Lebombo Mountains, *Saunders*! Delagoa Bay; Rikaltu, *Junod*, 218!

7. G. ASPERULA, *Stapf et Hutchinson* (sp. nov.).

Frutex vel arborescens, spinis validis (ramis commutatis). *Rami* juniores pubescentes, demum fere glabri. *Folia* lanceolato- vel elliptico-oblonga, rarius subobovata, sessilia, 4–6·5 cm. longa, 2–3 cm. lata, obtusa vel subacuta, tenuiter coriacea, utrinque puberula, nervis lateralibus utrinque 8–10 obliquis intra marginem arcuatis, utrinque prominentibus, venis conspicuis; stipulæ scariosæ, 2 mm. longæ, pubescentes. *Receptaculum* oblongo-obconicum, 5–10 mm. longum, brevissime pubescens. *Calyx* tubulosus, 6–9-lobus; tubus sæpe superne uno latere fissus, 9–12 mm. longus, extus brevissime pubescens, intus infra medium appresse tomentosus; lobi subfoliacei, oblongi vel spatulati, obtusi, ad 15 mm. (raro 20) longi et ad 4 mm. lati, interdum parte coaliti. *Corolla* alba, suaveolens; tubus cylindricus, 4–6 cm. longus, medio circa 3 mm. diametro, extus parce longe pilosus, intus fere glaber; lobi 6–9, oblique obovati, 2–3 cm. longi, 1–1·5 cm. lati. *Antheræ* 1–2 cm. infra faucem insertæ, medio affixæ, 10–13 mm. longæ. *Stylus* 4·5–8 cm. longus, supra medium pubescens, infra medium fere glaber; stigmatis lobi exserti, complanati, oblanceolati, obtusi. *Ovarium* placentis 6. *Fructus* pyriformis, durus (fide *Swynnerton*).

Nyasaland to South-East Rhodesia :—British Central Africa ; Lake Shirwa, *Meller* ! Shire Highlands, *Buchanan*, 174 ! Portuguese Nyasaland ; between Unango and Mt. Mtonia, *Archdeacon W. P. Johnson* ! South-East Rhodesia, Melsetter District, open woods at Chirinda, *Swynnerton*, 56 ! (Herb. Mus. Brit. ; fruit in carp. coll.). Chihere Hills, 3500 ft., *Swynnerton*, 56 ! (Herb. Mus. Brit.). Chindas name, 'Chindharara' ; Singum name, 'Isivaluangwhii.'

A specimen collected by the Hon. Mrs. E. Cecil in Matabeleland near Enkeldoorn, no. 88, has quite the facies of *G. asperula*, excepting the more obovate leaves and narrow calyx-lobes. It is described by her as a bush 8–10 feet high, with ivory-white or pale-yellow flowers.

8. *G. CORNUTA*, *Hemsl.*, in *Hook. Ic. Plant.* t. 2809.

South-East Africa :—Gazaland, Lebombo Mountains, *Saunders* ! Natal and Zululand, *Gerrard*, 1620 !

9. *G. SPATULIFOLIA*, *Stapf et Hutchinson* (sp. nov.).

G. Thunbergia, K. Schum. in Baum Kunene-Samb. Exped. p. 385 (non Linn. f.).

Arbor circiter 7 m. alta. *Rami* glabri. *Folia* obovato-spatulata, basi cuneata, 3–9 cm. longa, 2–5 cm. lata, apice rotundata, vel breviter obtuse acuminata, chartacea, utrinque glabra vel leviter scabrida, nervis lateralibus 5–11 fere flabellatim divergentibus utrinque prominentibus, venis utrinque conspicuis ; stipulæ latæ, scarioso-pubescentes, circiter 2 mm. longæ. *Receptaculum* oblongum, 1 cm. longum, breviter pubescens. *Calyx* tubulosus ; tubus spathaceus vel cylindricus, 7–14 mm. longus, extus glaber vel breviter pubescens, intus pilosus ; lobi 7–9, spatulati et tunc foliacei vel magis minusve reducti et lineares, usque ad 1.5 cm. longi et 8 mm. lati, interdum minuti, in eodem calyce variabiles, glabri. *Corolla* primo pallide, demum saturate flava ; tubus cylindricus, 5–7.5 cm. longus, medio circiter 3 mm. diametro, extus glaber, intus glaber vel superne parce pubescens ; lobi 6–7 (raro 9), elliptici vel oblique obovati, 2–5 cm. longi, 1.5–3 cm. lati, glabri. *Antheræ* 2 cm. longæ, 1.5 cm. infra faucem insertæ. *Stylus* 5–8 cm. longus, pubescens ; stigmatibus lobi 6, 4–7 mm. longi, obtusi. *Ovarium* placentis 6. *Fructus* ignotus.

Tropical South Africa, from the Cunene to Gazaland :—Mossamedes ; Bumbo, *Welwitsch*, 2579 ! (Herb. Mus. Brit.). Cunene River, *Johnston* ! Chihinde, *Baum*, 39 ! Bechuana Land ; Lake Ngami, *Atherstone*, 34 ! Botletle River, *Lugard*, 7 ! South Africa, without precise locality, *Chapman & Baines* ! Rhodesia ; Sebakere tree 15–20 feet, flowers cream-coloured, sweet-scented, alt. 4000 ft., *Eyles*, 175 ! (Herb. Mus. Brit.). Gazaland ; Sabi River, *Swynnerton*, 715 ! (Herb. Mus. Brit.).

Baum (Kunene-Sambesi Exped. p. 19) observes that this tree is frequent from the Lower Kunene to the Kuito River, mostly growing in the valleys of the rivers. The tree attains rarely more than 15–18 feet, having a short stem with a greenish bark, and a large dense and rounded top. The fruits are eaten by the Kudu Antelope, and the hard wood is used by the natives for making handles, &c. The tree is known to the Boers as ‘stumpdorn.’

10. *G. TERNIFOLIA*, *Schum. et Thonn. Beskr. Guin. Pl.* p. 147 (descr. emend.).

Arbor vel frutex divaricatus, 2–5 m. altus. *Rami* glabri. *Folia* oblanceolata vel obovata, sessilia, subacuta vel rarius rotundata, basi cuneata, 4–9 cm. longa, 2–4·5 cm. lata, subcoriacea, utrinque glauca, glabra, nervis lateralibus utrinque 7–11 obliquis, venis utrinque prominentibus arcte anastomosantibus; stipulæ late ovatæ, 2 mm. longæ, glabræ. *Receptaculum* oblongum vel oblongo-obconicum, 6–10 mm. longum, glabrum. *Calyx* tubulosus, subtruncatus vel 6-lobus; tubus 8–15 mm. longus, utrinque glaber; lobi oblongi, usque ad 5 mm. longi, obtusi, glabri, interdum minuti. *Corolla* flava; tubus cylindricus, 4·5–9 cm. longus, medio 2–3 mm. diametro, utrinque glaber; lobi 6, oblongo-elliptici, 2·5–5 cm. longi, 1–2·5 cm. lati, utrinque glabri. *Antheræ* 1·5 cm. longæ, 1·5 cm. infra faucem insertæ. *Stylus* 5–9 cm. longus, breviter pubescens; stigmatis lobi 5–6, usque ad 5 mm. longi, exserti. *Ovarium* placentis 6. *Fructus* ambitu oblongo-ellipticus, 5–7 cm. longus, usque ad 5 cm. diametro; pericarpium fibrosum, 1 cm. crassum. *Semina* subglobosa, maiora circa 4 mm. diametro, fulva.

Nigeria to the Gold Coast:—Northern Nigeria; Kuka, Bornu, *E. Vogel*, 92! Katagum District, *Dalziel*, 162! 161 (in part; fruiting specimen)! Zungeru, low bush, *Elliott*, 30! *Dalziel*! Nupe Country, *Baikie*! *Barter*, 1205! Southern part of N. Nigeria, without precise locality, *Kentish-Rankin*! Southern Nigeria; Oloke Meji, 6 feet high, flowers white, *Dodd*, 401! Gold Coast; Accra (Gah) and Adampi, *Thonning*! (Herb. DC.).

11. *G. LUTEA*, *Fresen. in Mus. Senckenb.* ii. (1837) p. 167 (descr. emend.).

G. Thunbergia, *Engl. Hochgeb. Fl. Trop. Afr.* (non Linn. f.).

Arbor vel frutex magnus. *Rami* tenuiter pubescentes. *Folia* 3–4-na, verticillata, sessilia, obovato-oblonga, obtusa, basin versus angustata, 4–13 cm. longa, 2–5 cm. lata, coriacea, glabra, fere concoloria, utrinque nitida, nervis lateralibus 8–12 patulis vel interdum leviter obliquis, venis laxis utrinque conspicuis (præcipue subtus); stipulæ scariosæ, late ovatæ, pubescentes, usque ad 4 mm. longæ. *Receptaculum* oblongo-obconicum, 5–8 mm. longum, glabrum vel pubescens. *Calyx* tubulosus, 6–7-lobus; tubus cylindricus, sæpe superne uno latere fissus, extus glaber vel pubescens, intus glaber vel

breviter pilosus; lobi 6-7, lineares, in tubo breviter decurrentes, usque ad 5 mm. longi, glabri. *Corolla* flava; tubus cylindricus, apicem versus leviter dilatatus, 5-9 cm. longus, medio 1.5-3 mm. diametro, utrinque glaber; lobi 6-7, elliptici vel obovato-oblongi, 2.5-3.5 cm. longi, 1-2 cm. lati, utrinque glabri. *Antheræ* 1.8 cm. longæ, 1.5 cm. infra faucem insertæ. *Stylus* inferne minute pubescens, apice incrassatus, 5.5-9 cm. longus; stigmatibus lobi oblongi, obtusi. *Ovarium* placentis 6. *Fructus* ambitu oblongo-ellipticus, 4-6 cm. longus, breviter stipitatus, 2-3 cm. diametro; pericarpium fibroso-lignosum, circiter 5 mm. crassum. *Semina* ellipsoidea, 4 mm. longa, glauca.

From Abyssinia and the Sudan to S.W. Uganda and East Africa:—Sudan; 'Upper Nile,' *Freeman & Lucas*, 64! Blue Nile, near Abon Shendi, *Muriel*, 27! Bahr-el-Ghazal Prov., *Broun*! 'Aethiopia,' *Kotschy*, 540! Abyssinia; Hamedo, *Schimper*, 883! (Herb. Mus. Brit.); near Adde Bahara, *Schimper*, 523! mountains near Djeladjeranne, *Schimper*, 1821! without precise locality, *Quartin-Dillon & Petit*, 128! Foggara Prov., *Steudner*, 903! Gallabat, *Schweinfurth*, 1457! Matamma, *Schweinfurth*, 1459! (Herb. Mus. Brit.). Fasokl, *Kotschy*, 540! Uganda; Madi, *Speke & Grant*, 762! Ankole Hills (fruit spec.), *Dawe*, 240! between Lake Rudolph and Gondokoro, *Donaldson Smith*! (Herb. Mus. Brit.). German East Africa; Kilwa, *Kirk*!

According to Capt. Speke ('Nile Journal,' Append. p. 636) the roots of this species boiled with the flour of *Andropogon Sorghum* are considered by the 'Wanyamwezi' to be a cure for hæmaturia; the contorted branches make an impenetrable fence.

12. *G. TRIACANTHA*, DC. *Prod.* iv. p. 382; *Williams*, *Florula Gambica*, in *Bull. Herb. Boiss. sér. II. vii.* (1907) p. 377.

G. macrocarpa, Carey, ex Voight, Hort. Suburb. Calcutt. p. 379.

From the Senegal to Sierra Leone:—Senegambia; *Roger*! *Leprieur & Perrottet*! (Herb. DC.); north bank of Gambia, *Ozanne*, 7! *Whitfield* (in part)! (Herb. Mus. Brit.). Sierra Leone, *Smythe*, 1!

We are much obliged to M. Cas. De Candolle for the loan of the type which enabled us to confirm Mr. Williams's conception of it as a distinct species.

According to Voight the plant described by Carey as *G. macrocarpa* was raised at Sibpure from seed received from Loddiges & Co. in 1822. This was the year when (Feb. to April) G. Don collected in Sierra Leone for the Horticultural Society of London, and it is very probable that Loddiges obtained the seeds from him.

13. *G. GOETZEL*, *Stapf et Hutchinson* (sp. nov.).

Frutex vel arborescens. *Rami* dense tomentosi, deinde cortice flavescente tecti. *Folia* sessilia, obovata, apice rotundata, 2–6 cm. longa, 1·5–4 cm. lata, tenuiter coriacea, utrinque scabridula, nervis lateralibus utrinque 8–11 subpatulis utrinque prominentibus, venis arcuatis anastomosantibus; stipulæ breviter vaginantes, truncatæ, extus tomentosæ. *Receptaculum* oblongum, 5 mm. longum, dense pubescens. *Calyx* tubulosus, 6-lobus; tubus superne uno latere fissus, 1 cm. longus, utrinque tenuiter pubescens; lobi oblanceolati, obtusi, ad 1 cm. longi et 2 mm. lati, glabri, in tubo decurrentes. *Corollæ* tubus cylindricus, 3–5 cm. longus, medio 3 mm. diametro, utrinque tenuiter pubescens; lobi 6, ovato-elliptici, obtusi, 1–1·5 cm. longi, 5–10 mm. lati, utrinque parce pilosuli. *Antheræ* circiter 1 cm. longæ, 8 mm. infra faucem insertæ. *Stylus* 3–4 cm. longus, parce pubescens; stigmatibus lobi 8 mm longi, fere inclusi. *Ovarium* placentis 6. *Fructus* ignotus.

German East Africa :—Ulunguru, Kissaki-Steppe, *Goetze*, 44 !

14. *G. AQUALLA*, *Stapf et Hutchinson* (sp. nov.).

Frutex ramosissimus, 1–2·5 m. altus, ramis subprostratis (*vide* Schweinf.). *Folia* magnitudine valde variabilia, oblanceolata vel (minora) elliptica, 2·5–18 cm. longa, 1–5 cm. lata, apice rotundata, rarius obtuse subacuminata, supra scabrida, subtus hispidula, coriacea, nervis lateralibus utrinque 14–17 præcipue subtus distinctis; stipulæ late triangulares, 4 mm. longæ, pilosæ. *Receptaculum* oblongum, 6 mm. longum, dense appresse pubescens. *Calyx* tubulosus, 6-lobus; tubus cylindricus, 8 cm. longus, utrinque appresse pubescens; lobi lineari-subulati, 3–4 mm. longi, subacuti, pubescentes. *Corolla* alba, demum citrina; tubus cylindricus, 2·5–4 cm. longus, medio 2 mm. diametro, extus dense appresse pubescens, intus tenuiter pilosus; lobi 6, oblique ovati vel elliptici, 2–2·5 cm. longi, 1–1·5 cm. lati, extus parce pubescentes, intus glabri. *Antheræ* 5 mm. infra faucem insertæ, 1 cm. longæ. *Stylus* 4·5 cm. longus, pubescens; stigmatibus lobi brevi, obtusi. *Ovarium* placentis 6. *Fructus* ambitu ellipticus, costatus, 3·5–4 cm. longus, 1·5–2 cm. diametro; pericarpium durum, 3 mm. crassum, brunneo-maculatum.

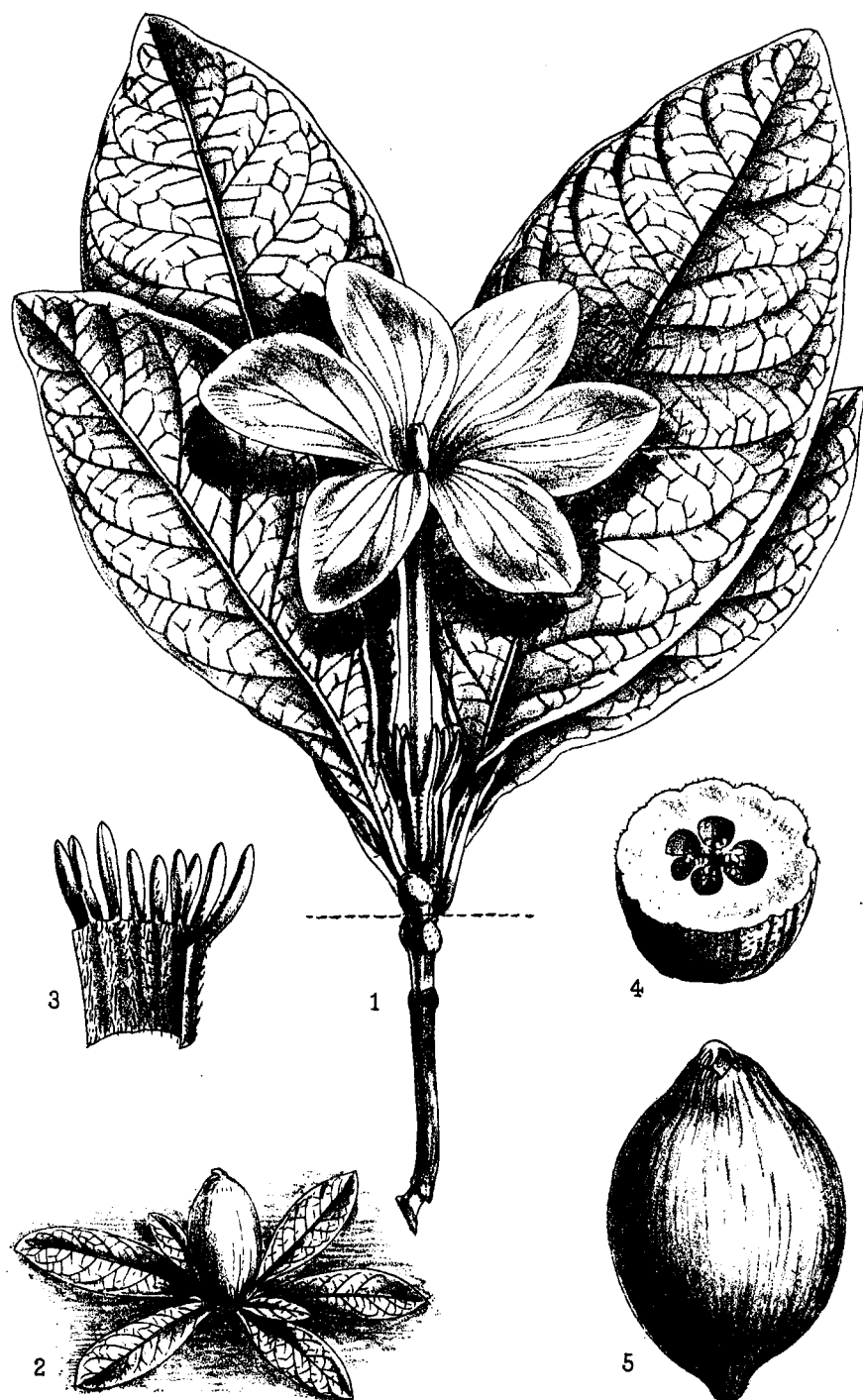
From the Bahr-el-Ghazal to Yoruba :—Jur-land; Seriba Kurschuk Ali, *Schweinfurth*, 1751! Seriba Ghatta, *Schweinfurth*, 1769! at Okel, *Schweinfurth*, 1761! (Herb. Mus. Brit.). Upper Ubangi; Snussi Country, Ndelle, *Chevalier*, 8071! Nigeria; Katagum and district, *Dalziel*, 352! Yoruba, low spreading shrub, not frequent (fruit spec. only), *Barter*, 1234!

15. *G. ERUBESCENS*, *Stapf et Hutchinson* (sp. nov.).

G. triacantha, DC. var. *parvilimbis*, Williams, in Bull. Herb. Boiss. sér. II. vii. (1907) p. 378.

Arbor 5-6.5 m. altus, cortice platanoideo (*fide* Schweinf.). *Rami* juniores dense sericeo-tomentosi. *Folia* late obovata vel oblanceolata, basi cuneata, 4.5-16 cm. longa, 2-9 cm. lata, chartacea, utrinque glabra, supra interdum purpurascentia, subtus glauca, nervis lateralibus 6-8, venis supra sæpius distinctis subtus inconspicuis; petioli usque ad 4 mm. longi; stipulæ latæ, 3 mm. longæ, tomentosæ. *Receptaculum* oblongum, 4-8 mm. longum, dense tomentosum. *Calyx* tubulosus; tubus 6-12 mm. longus, dense tomentosus, demum subglaber, intus longe pilosus, dentibus 6 filiformibus 6-10 mm. longis. *Corolla* pallida, demum citrina (*fide* Schweinf.); tubus cylindricus, 2.5-7.5 cm. longus, medio circa 3 mm. diametro, utrinque tenuiter pilosus; lobi 6, elliptici, 2-3 cm. longi, 1.5 cm. lati. *Antheræ* 6, fere inclusæ, 7 mm. infra faucem insertæ, supra medium affixæ, 2 cm. longæ. *Stylus* 3-7 cm. longus, breviter pilosus; stigmatibus lobi oblongi, obtusi, 3-5 mm. longi. *Ovarium* placentis 6. *Fructus* ambitu oblongo-lanceolatus vel fere ellipticus, 5-8 cm. longus, 2.5-3 cm. diametro.

From the Bahr-el-Ghazal to the Senegal:—Mittu-land; at Reggo, *Schweinfurth*, 2792! French Sudan; Nigalia, *Chevalier*, 160! Northern Nigeria; Kontagora, common in the bush, *Dalziel*, 224! Katagum District, *Dalziel*, 161 (in part; flowering specimen)! French Guinea; Samu Country, near Tombia, in bush near the village, *Scott Elliot*, 4370! near Wallia, *Scott Elliot*, 4574! Gambia; *Whitfield* (in part)! (Herb. Mus. Brit.).



J. H. del.
J. N. Fitch lith.

West, Newman imp.

GARDENIA SUBACaulis, Stapf & Hutch.