FLORA OF SOUTHERN AFRICA

VOLUME 16, PART 2

EDITED BY

J. H. ROSS

Price R16 Other Countries R20

Post Free

Printed in the Republic of South Africa by the Government Printer, Pretoria.
Obtainable from the Department of Agricultural Technical Services, Private Bag X144, Pretoria, 0001

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID-AFRIKA

DEPARTMENT OF AGRICULTURAL TECHNICAL SERVICES
DEPARTEMENT VAN LANDBOU-TEGNIESE DIENSTE

FLORA OF SOUTHERN AFRICA

VOL. 16, PART 2

ISBN 0 621 03832 6

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FLORA OF SOUTHERN AFRICA

which deals with the territories of

THE REPUBLIC OF SOUTH AFRICA, LESOTHO,
SWAZILAND AND SOUTH WEST AFRICA

VOLUME 16, PART 2

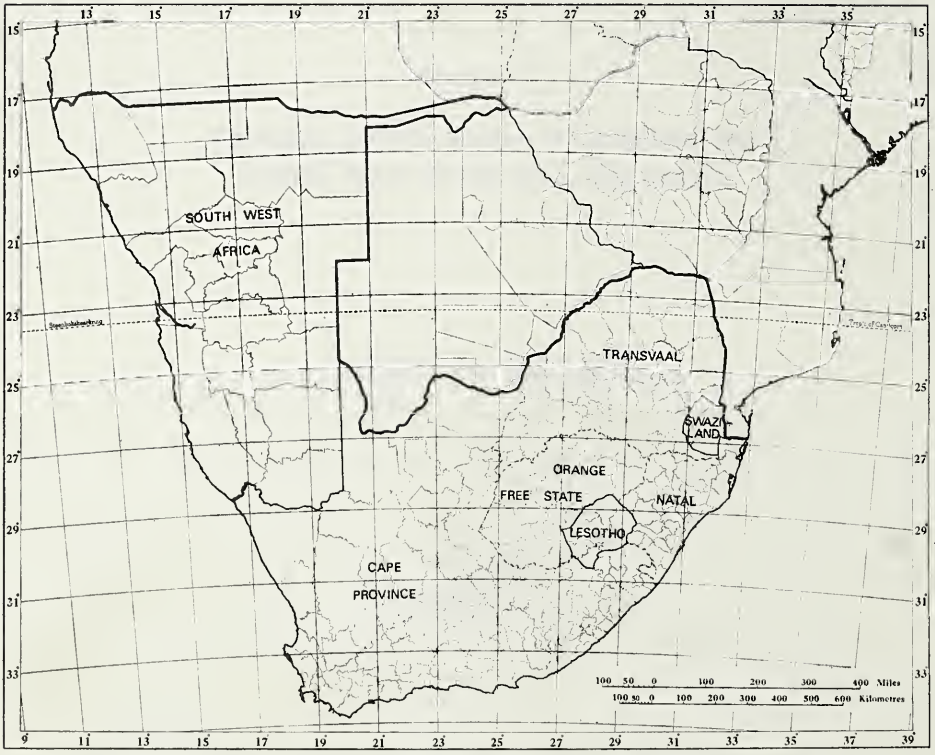
Edited by
J. H. ROSS

Editorial Committee: B. de Winter, D. J. B. Killick,
O. A. Leistner and J. H. Ross

Botanical Research Institute,
Department of Agricultural Technical Services

1977

THE TERRITORIES DEALT WITH IN THIS FLORA



This volume went to press before October 1976 and Transkei is not yet treated as a separate territory.

INTRODUCTION

For a key to the families, the Flora should be used in conjunction with Phillips's Genera of South African Flowering Plants, ed. 2 (1951) and Dyer's Genera of Southern African Flowering Plants, Vol. 1 (1975) and Vol. 2 (1976), which are arranged on the lines of the Engler system. The genera are numbered according to the list published by De Dalla Torre and Harms in their Genera Siphonogamarum (1900–1907) in order to facilitate reference, though genera in the Flora are not necessarily arranged in this sequence.

As in previous volumes, generally accepted abbreviations are used for literature references, except in the following cases which appear frequently and are, therefore, considerably condensed:

C.F.A.	Conspectus Florae Angolensis
F.C.	Flora Capensis
F.C.B.	Flore du Congo et du Rwanda-Burundi
F.S.W.A.	Prodromus einer Flora von Südwestafrika
F.T.A.	Flora of Tropical Africa
F.T.E.A.	Flora of Tropical East Africa
F.W.T.A.	Flora of West Tropical Africa
F.Z.	Flora Zambesiaca
Phill., Gen. ed. 2	The Genera of South African Flowering Plants by E. P. Phillips, ed. 2 (1951)
Burtt Davy, Fl. Transv.	Manual of the Flowering Plants and Ferns of the Transvaal and Swaziland, Vol. 1 (1926) and Vol. 2 (1932).

As before, the abbreviation "l.c." is used for previously cited references even though "op. cit." or "tom. cit." would in certain cases be more correct.

In citing specimens the grid reference system has been used. The spelling of the names of some localities has been brought into line with the findings of the Committee on Standardisation of Place Names.

In the text, species which show evidence of becoming naturalized are treated in the same way as indigenous species. In the Index, synonyms are in italics while exotic species are signified by an asterisk*.

A change in the existing Flora format is being introduced shortly and in future families or sections of large families will be published separately as they are completed.

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Subfamily 2. CAESALPINIOIDEAE

DC., Prodr. 2: 473 (1825), as suborder *Caesalpinieae*.

by J. H. ROSS*

Trees, shrubs, sometimes climbers or lianes, or rarely herbs, unarmed or often armed in the tribe *Caesalpinieae*. *Leaves* mostly alternate, usually pinnate, sometimes bipinnate (tribes *Dimorphandreae* and *Caesalpinieae;* a condition considered by Dormer, in Ann. Bot. n.s. 9: 141–153 (1945), to be more primitive than pinnate), rarely unifoliolate or simple. *Stipules* paired, often caducous. *Inflorescences* usually of spikes or panicles of racemes, rarely of spikes or capitate; racemes sometimes (by reduction of the main axis) represented by umbelliform fascicles. *Flowers* usually small to medium or large, rarely very small, usually ± irregular, mostly bisexual and 5-merous. *Sepals* usually imbricate, rarely valvate, rarely open from an early stage of bud, free or sometimes ± connate; rarely calyx entire in bud and splitting afterwards (tribe *Swartzieae*). *Petals* imbricate in bud, usually with the dorsal one within and overlapped by the adjacent lateral ones, free or sometimes connate below, usually 5, sometimes ± reduced, even to only 1 or altogether absent. *Stamens* usually 10 or fewer, rarely numerous, free or ± united below; anthers various, but lacking the apical gland often seen in *Mimosoideae;* pollen-grains usually simple. *Ovary* free or when stipitate the stipe sometimes more or less adnate to the calyx-tube; ovules anatropous. *Pods* various. *Seeds* generally without areoles (see below), with an apical or subapical hilum; embryo with a generally straight radicle.

The subfamily Caesalpinioideae seems best placed taxonomically between the Mimosoideae, whose floral characters are in general relatively less advanced, and the relatively more advanced Papilionoideae. Within the Caesalpinioideae the tribe *Dimorphandreae* shows a very close approach to the Mimosoideae, and it is difficult to decide whether the tribe *Swartzieae* should be included in the Caesalpinioideae or in the Papilionoideae. Thus *Erythrophleum* and *Burkea* in the tribe *Dimorphandreae* link Mimosoideae and Caesalpinioideae, and *Swartzia* and *Cordyla* in the tribe *Swartzieae* link Caesalpinioideae and Papilionoideae.

Although some authors treat the three subfamilies of Leguminosae as separate families, this really only reflects a slight difference of opinion. If emphasis is laid on the borderline tribes mentioned above, then subfamily is a suitable rank; if, on the other hand, they are discounted in view of the vast majority of genera about whose position there is no doubt, then the subfamilies are reasonably considered as families. The three groups, however, remain unaltered in general content irrespective of the taxonomic rank assigned to them.

The limits to the Caesalpinioideae accepted here result in all the genera of Leguminosae with more than 10 stamens being either in the Mimosoideae or Caesalpinioideae, as well as all of those genera with regular flowers (except for *Cadia* Forsk. and its relatives).

In the account of Mimosoideae attention was drawn to the areole on each face of the seed, also known as the pleurogram, which occurs so commonly in that subfamily. In the subfamily Caesalpinioideae areoles are also found in *Burkea, Cassia* and *Tamarindus*. The areoles of *Tamarindus* are closed, i.e. with continuous margins, and reflect a small change in the level or surface-marking of the testa, thus differing from those of Mimosoideae. The areoles of *Cassia* are similar to those of Mimosoideae but are usually closed. Only in *Burkea* is the areole comparable with those found in Mimosoideae.

Brenan in F.T.E.A. Legum.-Caesalp. : 2 (1967) discussed certain special investigations which have illustrated the naturalness of the Caesalpinioideae as a group and its relationship with the other subfamilies of Leguminosae.

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* The account of *Cassia* by Dr Kathleen D. Gordon-Gray (Bews Botanical Laboratories, University of Natal, Pietermaritzburg), and the accounts of *Adenolobus, Bauhinia, Piliostigma* and *Tylosema* written in collaboration with Mr L. A. Coetzer (Department of General Botany, University of Pretoria).

Genera 152, with about 2 800 species, mainly tropical and subtropical, especially numerous in tropical America and tropical Africa. 25 genera and 90 species occur in our area of which 21 genera and 54 species are considered to be indigenous in Southern Africa.

The arrangement of genera is intended to be natural and the genera are grouped under a number of tribes. In the tribes *Cynometreae* and *Amherstieae*, the genera are arranged according to the revision by J. Léonard in Mém. Acad. Roy. Belg., Classe Sci. 30,2 (1957). The exact position of the genus *Umtiza* Sim in the Caesalpinioideae is not known, but for convenience it has been placed in the tribe *Cynometreae*. The sequence of genera within the remaining tribes follows the numerical system of De Dalla Torre & Harms in their Genera Siphonogamarum (1900–1907). A conspectus of the tribes is given below:

A. Leaves bipinnate (except in *Haematoxylum* and in *Caesalpinia pearsonii* in *Caesalpinieae*):

1. Tribe **Dimorphandreae** *Benth.* in Hook., J. Bot. 2 : 74 (1840). Unarmed. Flowers small, in elongate spikes or dense spike-like racemes, often paniculately aggregated. Calyx-lobes ± united below into a short tube (sometimes very short) extending beyond the hypanthium. Genera Nos. 1–2.

2. Tribe **Caesalpinieae** (*Eucaesalpinieae* Benth. in Hook., J. Bot. 2 : 72 (Mar. 1840); *Caesalpinieae* Endl., Gen. Pl. 1310, Oct. 1840). Unarmed or armed. Flowers usually medium to large, sometimes small, in racemes or panicles of racemes. Sepals 5, free to the hypanthium. Genera Nos. 3–8.

B. Leaves simply pinnate, or sometimes simple or unifoliolate:

3. Tribe **Cassieae** *Bronn*, De Formis Pl. Legum. 130 (1822); DC., Prodr. 2 : 478 (1825). Leaves normally simply pinnate. Bracteoles usually small and caducous or absent. Sepals distinct in bud, usually 5, free to the base. Anthers characteristically firm in texture, often large and with comparatively short filaments, usually dehiscing by pores, which may be prolonged into short slits; sometimes slits extending the entire length of the anther, anthers then basifixed. Genera Nos. 9–10.

4. Tribe **Cynometreae** *Benth.* in Hook., J. Bot. 2 : 74 (1840), emend. J. Léon. in Mém. Acad. Roy. Belg., Classe Sci. 30,2 : 54 (1957). Leaves simply pinnate, rarely unifoliolate or simple. Bracteoles small or large, usually caducous, not enclosing the flower-buds, or enclosing them but then never valvate. Sepals distinct in bud, free to the base. Anthers dorsifixed, dehiscing by slits. Genera Nos. 11–16.

5. Tribe **Amherstieae** *Benth.* in Hook., J. Bot. 2 : 73 (1840), emend. J. Léon. in Mém. Acad. Roy. Belg., Classe Sci. 30,2 : 163 (1957). Leaves simply pinnate, rarely unifoliolate. Bracteoles well-developed, enclosing the flower-buds, valvate, usually persistent. Sepals distinct in bud, free to the base, or very small or absent. Anthers dorsifixed, dehiscing by slits. Genera Nos. 17–18.

6. Tribe **Cerceae** *Bronn*, De Formis Pl. Legum. 131 (1822) (*Bauhinieae* Benth. in Hook., J. Bot. 2 : 74, 1840). Leaves usually simple, bilobed or entire, or sometimes with 2 separate leaflets. Calyx gamosepalous above the hypanthium, campanulate or tubular, shortly toothed or lobed, sometimes more deeply divided into valvate lobes. Stamens 10 or fewer. Anthers dorsifixed, opening by longitudinal slits, rarely by pores. Genera Nos. 19–22.

7. Tribe **Swartzieae** *DC.*, Prodr. 2 : 422 (1825). Leaves simply pinnate, rarely unifoliolate. Calyx entire in bud, closed, not divided into sepals, becoming variously lobed or split as the flower opens. Stamens 9-many (numerous in our area). Genera Nos. 23–24.

It is often difficult to identify some of the genera of this subfamily without complete material, including flowers and fruits. As either flowers or fruits are frequently absent, two alternative keys have been constructed, one for flowering and the other for fruiting specimens.

Although the genus *Brachystegia* Benth. has not been recorded from our area, provision for it has nevertheless been made in the following keys as there is a possibility that the genus may yet be found in the Caprivi Strip or perhaps even in the northern Transvaal. Previous reports of the occurrence of *Brachystegia* in the Caprivi Strip appear to have been based on a sterile specimen (*Curson* 910) of *Afzelia quanzensis* Welw.

Key to genera based mainly on vegetative and floral characters

Leaves simple, emarginate apically to deeply bilobed, sometimes with a single pair of leaflets:

Petals 0; leaves with a single pair of leaflets:

Stamens (8)10(12); inflorescence an axillary or terminal panicle; leaflets with a midrib and lateral nerves or without a midrib but with 3–6 conspicuous nerves arising from the base ..... 4. **Guibourtia**

Stamens 20–25; inflorescence a slender raceme or panicle; leaflets with 7–12 prominent nerves arising from the base, without a midrib .... 3. **Colophospermum**

Petals 5; leaves emarginate apically to deeply bilobed, occasionally with a single pair of leaflets:

Plants with trailing or climbing mostly herbaceous stems arising from a large underground tuber; tendrils usually present; fertile stamens 2, accompanied by staminodes; calyx with the 2 upper sepals partly or completely fused, the rest free.....14. **Tylosema**

Plants growing as shrubs or small trees, seldom scandent or climbing but then woody and without tendrils:

Flowers normally unisexual and dioecious; female flowers with the stigma sessile on the ovary, capitate, flattened-globose; male flowers with 10 fertile stamens; calyx turbinate with 4–5 short broad lobes.....13. **Piliostigma**

Flowers hermaphrodite; style elongate; fertile stamens 1–10; calyx spathaceous or campanulate with 5 short lobes or teeth:

Calyx spathaceous, splitting to the base down one side only, with the sepals fused or sometimes partly separated; fertile stamens 1–10, sometimes accompanied by staminodes.....11. **Bauhinia**

Calyx campanulate, with 5 short teeth or lobes; fertile stamens 10; plants often conspicuously glandular.....12. **Adenolobus**

Leaves pinnately or bipinnately compound, with > 2 leaflets, very seldom leaves reduced to green, ± terete, "needle-like", pinna-rhachillae with or without minute inconspicuous leaflets, or the rachillae laterally winged and appearing flattened, "± phyllodial", with numerous pairs of small leaflets:

Leaves reduced, the pinna-rhachillae green, ± terete and "needle-like", with or without minute inconspicuous leaflets, or the rhachillae laterally winged and appearing flattened, "± phyllodial", with numerous pairs of leaflets up to 9 × 3 mm; plant armed with stout spines.....17. **Parkinsonia**

Leaves not reduced, pinna-rhachillae not "needle-like" or "± phyllodial"; plant unarmed or armed with recurved prickles, rarely armed with spines:

Leaves bipinnate:

Plant unarmed:

Leaflets alternate; flowers small (petals 2–5 mm long, white to cream or pale green); sepals open from a very early stage, leaving the petals covering the flower until anthesis:

Flowers pedicellate; with narrow petals which are ± densely pubescent, at least on the margins; anthers 0,5–0,75 mm long; stigma minute, cup-shaped-punctiform on a narrow conical style; stamen-filaments pubescent or tomentose to near the apex; hairs (when present) on vegetative buds and young branchlets grey-grown to yellowish.....1. **Erythrophleum**

Flowers sessile; petals glabrous or almost so; anthers 1,5–2 mm long; style very short, ending in a funnel-shaped stigma slit down one side; stamen-filaments glabrous; hairs on vegetative buds, young branchlets and inflorescence axes rusty-red.....2. **Burkea**

Leaflets opposite; flowers usually medium to large (petals 7–32 mm long, seldom smaller, yellow, orange, red or magenta); sepals valvate or imbricate:

Leaves imparipinnate; herb or low shrub up to 0,5 m high; stems, leaves and calyces with numerous dark sessile glands; petals up to 9 mm long.....20. **Hoffmannseggia**

Leaves paripinnate (rarely in the cultivated *Caesalpinia gilliesii* imparipinnate but then plant a large shrub and glands on stems, leaves and calyces stalked); tree or large shrub; petals 7–32 mm long:

Stigma broadly peltate; inflorescence-axes, calyces and ovaries rusty-tomentose; petals yellow; stipules up to 1,4 cm long, linear-subulate with up to 7 linear alternate lateral appendages up to 6 mm long ..... 22. **Peltophorum**

Stigma not broadly peltate; inflorescence-axes, calyces and ovaries not rusty-tomentose; petals yellow, pink, red or magenta; stipules not as above ..... 21. **Caesalpinia**

Plant armed with prickles or spines:

Petals 2–3 mm long; pods samaroid, with a basal seed-containing portion whose upper suture is greatly extended beyond the seed-containing part and is broadly winged on its lower side ..... 19. **Pterolobium**

Petals 6–25 mm long; pods unwinged ..... 21. **Caesalpinia**

Leaves simply pinnate:

Plant armed with spines:

Leaves with (3)5–9(12) pairs of subopposite or irregularly alternate leaflets; inflorescence a short lax panicle; petals white, up to $3,5 \times 1,5$ mm; ovary eglandular; large shrub or tree ..... 6. **Umtiza**

Leaves with 3 pairs of opposite leaflets; inflorescence a relatively few-flowered lateral or terminal raceme; petals yellow, $8–10 \times 5–7$ mm; ovary glandular; low shrub ..... 18. **Haematoxylum**

Plant unarmed:

Calyx closed, entire and undivided in bud, becoming divided into 2–5 lobes or irregularly torn as the flower opens; bracteoles very small and caducous, or absent; stamens always numerous (12–126):

Petals 0; leaflets (7)11–28 per leaf, with numerous pellucid glands; stamen-filaments confluent basally with the hypanthium ..... 23. **Cordyla**

Petal 1, large; leaflets (3)5–11 per leaf, without pellucid glands; stamen-filaments free or nearly so; disc and hypanthium absent (filaments inserted round base of gynophore or ovary) ..... 24. **Swartzia**

Calyx clearly divided into lobes or separate sepals in bud; stamens 10 or fewer (very rarely up to 20 in *Brachystegia* but then bracteoles large, enclosing the flower-bud and usually persistent):

Bracteoles paired, valvate throughout, well-developed, completely enclosing the flower-bud, usually persistent:

Bracteoles enclosing the young flower-bud but soon caducous, exposing the bud enclosed by the calyx; stamen- and staminode-filaments all united basally for $\pm$ half their length; fertile stamens 3, alternating with 5 sterile teeth or short filaments; larger petals 3, subequal, gold with red veins ..... 8. **Tamarindus**

Bracteoles enclosing the flower-bud and persistent below the open flower; stamens not as above and $>$ 3 fertile; petals or tepals not coloured as above:

Perianth clearly differentiated into 5 obvious petals and 5 sepals ..... 10. **Julbernardia**

Perianth 0 or of 1–7(11) parts, usually 4–7 all sepaloid and of similar form, grading inwards from broader to narrower ..... **Brachystegia**

Bracteoles non-valvate, often caducous or absent, seldom enclosing the flower-bud, but, if so, then one or both margins of one bracteole overlapping the other at least at the base and the flowers with only 1 petal:

Petals 0 or sometimes petals present but reduced to minute linear inconspicuous filaments and apparently absent:

Stamens 5–10, filaments free; sepals 5, fulvous or rusty-brown puberulous outside; ovary densely ferruginous-hirsute; inflorescence a many-flowered panicle.....15. **Dialium**

Stamens 10, filaments united basally for 1,5–3,5 mm, tube entire or split down one side; calyx leathery, 4-(rarely 5-) lobed, red or scarlet, glabrous or sparingly puberulous; ovary glabrous; inflorescence a dense congested subglobose panicle, usually cauliflorous on older branches but occasionally terminal.....5. **Schotia**

Petals 1–5, well-developed:

Petals 1–4:

Petals 1, pubescent and green outside, dark red inside, 2,5–4,5 cm long, with a long claw suddenly widened into a deeply bilobed lamina 2,2–3,1 cm wide; fertile stamens usually 7 (rarely 9).....9. **Afzelia**

Petals 1–4, pale pink or red throughout, smaller than above and not widened above into a deeply bilobed lamina; fertile stamens 10.....5. **Schotia**

Petals 5:

Anthers opening by terminal or basal pores or short slits, usually basifixed; petals mostly yellow; glands often (but by no means always) present on petiole or leaf-rhachis.....16. **Cassia**

Anthers opening by longitudinal slits which are as long as the anther, usually dorsifixed; petals pink, red, mauve, magenta or sometimes yellow; conspicuous glands not present on petiole or rhachis:

Petals yellow; small shrub to 2 m high; leaves up to 1,2 cm long, with 3 pairs of obcordate or broadly obovate to obovate-suborbicular leaflets.....18. **Haematoxylum**

Petals pink, red, mauve or magenta; large shrub or tree; leaves much larger than above:

Inflorescence a short raceme or panicle; calyx glabrous or almost so; petals pink, red or scarlet; ovary glabrous or almost so.....5. **Schotia**

Inflorescence a stout raceme up to 35 cm long; sepals densely fulvous-tomentose outside; petals pink, mauve or magenta; ovary fulvous-tomentose.....7. **Baikiaea**

Key to genera based mainly on vegetative and fruit characters

Leaves simple, emarginate apically to deeply bilobed, sometimes with a single pair of leaflets:

Leaves with a single pair of leaflets; pods 1-seeded, reniform, obliquely semi-circular, ovate or ovate-oblong, valves not woody, dehiscent or indehiscent:

Pods pale yellowish-brown, reniform or obliquely ± semi-circular, indehiscent; seed reniform, ± flattened, corrugated and with numerous small sticky reddish resin-glands, exarillate; leaflets with 7–12 prominent nerves arising from the base, without a midrib.....3. **Colophospermum**

Pods brown or reddish-brown, obliquely semi-orbicular, ovate or ovate-oblong, dehiscent or indehiscent; seed not as above, with or without an aril; leaflets with a midrib and lateral nerves or without a midrib but with 3–6 conspicuous nerves arising from the base.....4. **Guibourtia**

Leaves emarginate apically to deeply bilobed; rarely divided to the base to form 2 leaflets but then pods with more than 1 seed, pods oblong or oblanceolate-oblong, valves ± woody, dehiscent, mostly > 6 cm long:

Plants with trailing or climbing mostly herbaceous stems arising from a large underground tuber; tendrils usually present; pod 1–2-seeded.....14. **Tylosema**

Plants growing as shrubs or small trees, seldom scandent or climbing but then woody and without tendrils and pods usually with > 2 seeds:

Pods up to 3,5 cm long (excluding the stipe), semi-orbicular or falcate, valves thin, ± papery, with or without stalked glands, dehiscent; calyx persistent and enclosing the stipe basally.....12. **Adenolobus**

Pods > 3,5 cm long, oblong or oblanceolate-oblong, valves woody or ± woody, without stalked glands, dehiscent or indehiscent; calyx seldom persisting:

Pods < 3 cm wide, dehiscent, thinly woody.....11. **Bauhinia**

Pods 3–6 cm wide, indehiscent, woody.....13. **Piliostigma**

Leaves pinnately or bipinnately compound, with > 2 leaflets, very seldom reduced to green, ± terete, "needle-like" pinna-rhachillae with or without minute inconspicuous leaflets, or the rhachillae laterally winged and appearing flattened, "± phyllodial", with numerous pairs of small leaflets:

Leaves reduced, the pinna-rhachillae green, ± terete and "needle-like", with or without minute inconspicuous leaflets, or the rhachillae laterally winged and appearing flattened, "± phyllodial", with numerous pairs of leaflets up to 9 × 3 mm; plant armed with stout spines.....17. **Parkinsonia**

Leaves not reduced, pinna-rhachillae not "needle-like" or "± phyllodial"; plant unarmed or armed with recurved prickles, rarely armed with spines:

Leaves bipinnate:

Plant unarmed:

Leaflets alternate:

Pod indehiscent, coriaceous, elliptic, 4–7 cm long, 1-seeded; seed with an areole on each face; hairs on vegetative buds and young branchlets conspicuously rusty-red.....2. **Burkea**

Pod dehiscent, woody or thinly woody, oblong or elliptic-oblong, (5)7–17 cm long, 2–11-seeded (rarely 1-seeded by abortion); seed without an areole: hairs (when present) on vegetative buds and young branchlets grey-brown to yellowish.....1. **Erythrophleum**

Leaflets opposite:

Leaves imparipinnate; herb or low shrub up to 0,5 m high; stems, leaves and usually pods with numerous dark sessile glands; pods sparsely to densely clothed with plumose setae.....20. **Hoffmannseggia**

Leaves paripinnate (rarely in the cultivated *Caesalpinia gilliesii* imparipinnate but then plant a large shrub and glands on stems, leaves and pods stalked), tree or large shrub; pods without plumose setae:

Pods narrowly elliptic to elliptic, compressed, acuminate at both ends, with a wing 2–6 mm wide down each margin, 1–2-seeded, indehiscent; stipules up to 1,4 cm long, linear-subulate with up to 7 linear alternate lateral appendages up to 6 mm long.....22. **Peltophorum**

Pods not as above, dehiscent; stipules not as above.....21. **Caesalpinia**

Plant armed with prickles or spines:

Pod samaroid, with a basal seed-containing portion whose upper suture is greatly extended beyond the seed-containing part and is broadly winged on its lower side, unarmed.....19. **Pterolobium**

Pod not as above, unwinged, armed or unarmed.....21. **Caesalpinia**

Leaves simply pinnate:

Plant armed with spines:

Leaves with (3)5–9(12) pairs of subopposite or alternate leaflets; pods dehiscing longitudinally along the marginal sutures; large shrub or tree.....6. **Umtiza**

Leaves with 3 pairs of opposite leaflets; pods splitting longitudinally almost along the middle of each valve; low shrub.....18. **Haematoxylum**

Plant unarmed:

Pod splitting longitudinally almost along the middle of each valve; leaves up to 1,2 cm long, with 3 pairs of leaflets; small shrub.....18. **Haematoxylum**

Pod dehiscing longitudinally along the marginal sutures or indehiscent; leaves larger than above:

Pod flattened or markedly compressed, longitudinally dehiscent (except in *Dialum* and *Schotia*):

Pod indehiscent, ovoid-ellipsoid, up to 3,5 cm long, densely brown velutinous-puberulous, brittle; seed surrounded by a pulpy orange-brown or red mesocarp.....15. **Dialium**

Pod dehiscent (except in *Schotia*), usually $>$ 3,5 cm long; indumentum, if present, not as above, valves woody to thinly woody or subcoriaceous; seed not surrounded by a pulpy orange-brown or red mesocarp:

Pod densely rusty-pubescent to -tomentose (indumentum sometimes wearing off partially with age), valves woody, becoming spirally twisted after dehiscence:

Pod 1,8–3,2 cm wide; margins of leaflets usually with a conspicuous fringe of whitish hairs.....10. **Julbernardia**

Pod 3,5–4,5(5) cm wide; margins of leaflets without a fringe of whitish hairs.....7. **Baikiaea**

Pod glabrous to sparsely pubescent, seldom $\pm$ densely pubescent but then indumentum not rusty and valves not woody:

Valves of pod subcoriaceous or thin and papery, usually $<$ 1,8 cm wide but occasionally up to 2,5 cm wide; seed small, up to 9×5 mm, often areolate, without a basal aril; petiole and/or rhachis of leaves often with one or more conspicuous sessile or projecting or stalked glands on the centre line of the upper side; often herbaceous or small shrubs.....16. **Cassia**

Valves of pod woody, (1,8)2,5–6,5 cm wide; seed large, $>$ 10 $\times$ 5 mm, often with a large cupular basal aril, exareolate; petiole and rhachis without conspicuous glands; large shrub or tree:

Pod with a hard margin or wing along the upper suture which persists, often with the seeds attached, after the eventual dehiscence of the valves; seeds pale brown, mostly with a conspicuous basal yellow aril.....5. **Schotia**

Pod without a wing along the upper suture; seeds without an aril or aril present but then orange, red or vermilion and seeds black:

Pod 4,5–6,5 cm wide, valves not twisting spirally after separation; seeds embedded in a white pith, with a large orange, red or vermilion cupular basal aril.....9. **Afzelia**

Pod < 3,5 cm wide, valves twisting spirally after separation; seeds not embedded in white pith and without an aril.....**Brachystegia**

Pod not markedly compressed, round or nearly so in section, sometimes sausage-like, indehiscent:

Pod ellipsoid to subglobose or spherical, less than twice as long as wide:

Pod 1,4–2,5 cm long, with a densely brown velutinous-puberulous exocarp; seeds surrounded by a red or reddish-brown pulpy mesocarp; leaflets 7–13 per leaf, opposite to alternate.....15. **Dialium**

Pod 2,5–8 cm long, green or yellow when ripe, ± glabrous; seeds embedded in pulp; leaflets (7)11–28 per leaf, mostly alternate.....23. **Cordyla**

Pod elongate, sausage-shaped or cylindrical, sometimes irregularly constricted, more than twice as long as wide:

Leaflets asymmetric basally, with their proximal side sessile on the rhachis, < 1 cm wide; pod closely covered with brown scales or scurf.....8. **Tamarindus**

Leaflets distinctly petiolulate, usually > 1 cm wide; pod usually black to blackish-brown and glabrous or nearly so, sometimes pod densely tomentellous but without brownish scales:

Leaves paripinnate; leaflets up to 12 pairs per leaf, opposite or some alternate.....16. **Cassia**

Leaves imparipinnate; leaflets all alternate, (3)5–11 per leaf...24. **Swartzia**

Conspectus of the pod differences

1. Pod dehiscing longitudinally along the marginal sutures into two separate valves:

Valves woody:

Afzelia
Baikiaea
Bauhinia
Brachystegia
Erythrophleum
Julbernardia
Tylosema

Valves papery to rigidly coriaceous:

Adenolobus
Bauhinia
Cassia
Caesalpinia
Erythrophleum
Guibourtia
Hoffmannseggia
Parkinsonia
Umtiza

2. Pod splitting longitudinally almost along the middle of each valve:
Haematoxylum

3. Pod subdehiscent, the valves ultimately breaking up and falling away from the hard margin or wing along the upper suture:
Schotia

4. Pod indehiscent:
Valves flattened or compressed:
Burkea
Caesalpinia
Colophospermum
Dialium
Guibourtia
Parkinsonia
Peltophorum
Piliostigma
Pterolobium
Valves round or nearly so in section, sometimes sausage-like:
Cassia
Cordyla
Dialium
Swartzia
Tamarindus

Exotic species

Several exotic species of Caesalpinioideae are planted in our area and most of them are mentioned under their appropriate genera. In addition to these, however, the genera *Ceratonia, Delonix* and *Gleditsia* occur only as exotics and are dealt with briefly below. To assist in naming they are artificially grouped on the basis of obvious vegetative characters.

1. Leaflets conspicuously crenate or crenulate-denticulate on margins; leaves usually simply pinnate and bipinnate on the same shoot.

Gleditsia triacanthos *L.*, Sp. Pl. 1 : 1056 (1753).

Tree or shrub, usually armed with stout straight or branched thorns. Leaves usually simply pinnate and bipinnate on the same shoot; leaflets 1–3,5 cm long, 0,4–0,9 cm wide, usually appressed-pubescent at least along the midrib, margins conspicuously crenate or crenulate-denticulate. Flowers greenish, small, in axillary, slender, drooping racemes. Calyx campanulate, the lobes slightly shorter than the petals. Stamens 3–10, filaments free. Ovary densely pubescent. Pods 15–30 cm long, 2,5–3,5 cm wide, usually slightly falcate but often twisting with age, indehiscent, compressed, with many seeds embedded in a puply tissue.

G. triacanthos, the well-known Honey Locust, a native of North America, is fairly widely grown in our area. Transvaal: Johannesburg district, Johannesburg, *Mogg* 33909. Pretoria district, garden of Division of Botany, *Phillips sub PRE* 1585; Prinshof, *Story* 1451; Van der Byl's farm, Irene, *Grobbelaar* 1340. Waterberg district, Rhenosterfontein, Nylstroom, *Neyehuis s.n.* O.F.S.: Bloemfontein, *Potts* 3214. ? Cape, between Flagstaff and Port Edward, *Grobbelaar* 74.

2. Leaflets with entire margins; leaves all simply pinnate.

Ceratonia siliqua *L.*, Sp. Pl. 1 : 1026 (1753); Brenan in F.T.E.A. Legum.-Caesalp. : 16 (1967); Chamberlain in Fl. Turkey 3 : 7 (1970).

Evergreen unarmed shrub or tree. Leaves simply pinnate; leaflets 2–8 pairs, coriaceous, elliptic to orbicular, 3–6 cm long, 2,5–4 cm wide, dark glossy green above, pale green below. Flowers unisexual or hermaphrodite, greenish, small, in dense many-flowered racemes

which are axillary or arise from the older wood. Calyx caducous. Petals 0. Stamens 5, free, exserted. Pods dark brown, 10–30 cm long, 1,5–2,2 cm wide, laterally compressed, coriaceous, pulpy, many-seeded, indehiscent.

C. siliqua, the Carob Tree, Locust Bean or St. John's Bread, a native of the Mediterranean region, is fairly widely grown in our area. S.W.A.: Grootfontein district, Grootfontein show grounds, *Van Wyk* 614. Transvaal: Pretoria district, Prinshof Experimental Station, *Codd* 6633; Pretoria, corner of Valley Rd. and Burke St., *De Winter* 802; Skeerpoort, *Pretorius s.n.*; S. side of Meintjies Kop, grounds of Union Buildings, *Mogg s.n.* Natal: Alfred district, Harding, *Van der Merwe s.n.* Cape : Albany district, 1820 Settlers Nature Reserve, *Troughton* 230.

The pods of *C. siliqua* are nutritious and are used as fodder.

3. **Leaflets with entire margins; leaves all bipinnate.**

Delonix regia (*Boj. ex Hook.*) *Raf.*, Fl. Tellur. 2 : 92 (1836) (=*Poinciana regia* Boj. ex Hook. in Bot. Mag. 56 : t. 2884, 1829).

Unarmed deciduous tree with ± smooth greyish-brown bark. Leaves bipinnate: leaflets 10–32 pairs per pinna, 4–12 mm long, 2–5 mm wide, oblong. Stipules pinnately compound, often ± persistent. Inflorescences racemose. Petals 5, 3,5–6,5 cm long, subequal but the upper one slightly longer than the others, all scarlet or sometimes (especially the upper one and the claws of the others) ± yellow to whitish. Stamen-filaments shorter than the petals. Pods woody, 20–50 cm long, 3,5–5,5 cm wide, the seeds sunk in transverse depressions in the woody endocarp.

D. regia, the well-known Flamboyant, a rare native of Madagascar, is grown for ornament in the eastern Transvaal and in Natal. Transvaal: Nelspruit district, Kruger National Park, Pretoriuskop, *Van der Schijff* 1150. Letaba district, Tzaneen, *Marais* 95. Pretoria district, Union Building Gardens, *Schlieben* 10557. Natal: Durban, *Hutchinson* 1862, *H. L. Forbes s.n.* (K, NH).

In Durban many streets are lined with *D. regia* and in summer the scarlet flowers present a magnificent sight. The plants are unfortunately susceptible to the ravages of the white ant and, as trees have been known to collapse without warning, they are no longer so popular as street trees.

Delonix elata (*L.*) *Gamble*, Fl. Madras 1,3 : 396 (1919); Brenan in F.T.E.A. Legum.-Caesalp. : 23, fig. 3, (1967).

D. elata differs from *D. regia* in having small subulate deciduous stipules; white, yellow or orange petals which are only 1,6–3,8 cm long; stamen-filaments which exceed the petals; and smaller pods, 13–26 cm long, 2,1–3,7 cm wide.

D. elata is recorded from cultivation at Windhoek in South West Africa (*Rogers* 29779).

3471 1. ERYTHROPHLEUM

Erythrophleum *Afzel.* [ex R.Br. in Tuckey, Exped. River Zaire 430 (1818) nomen nudum; ex G. Don in Edinb. Phil. J. 11 : 343 (1824) nomen nudum] *ex R.Br.* in Denham, Clapperton & Oudney, Trav. N. & Centr. Afr., J. Excurs. 235 (1826), nomen subnudum; G. Don, Gen. Syst. 2 : 424 (Oct. 1832) cum descr. ampl.; Benth. & Hook.f., Gen. Pl. 1 : 588 (1865); Oliv. in F.T.A. 2 : 320 (1871); Taub. in Pflanzenfam. 3,3 : 126 (1892); Harms in Engl., Pflanzenw. Afr. 3,1 : 428 (1915); Bak.f., Leg. Trop. Afr. 3 : 777 (1930); Phill., Gen. ed. 2 : 393 (1951); Wilczek in F.C.B. 3 : 242 (1952); Brenan in Taxon 9 : 193 (1960); Rickett in Taxon 13 : 181 (1964); Hutch., Gen. Fl. Pl. 1 : 259 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 318 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 18 (1967); Schreiber in F.S.W.A. 59 : 13 (1967). Type species: *E. suaveolens* (Guill. & Perr.) Brenan.

Fillaea Guill. & Perr. in Guill., Perr. & A. Rich., Fl. Seneg. Tent. t.55 (July 1832), p.242 (Oct. 1832); Benth. in Hook., J. Bot. 4 : 328 (1841).

Mavia Bertol.f., Ill. Piante Mozamb. 1, in Mem. Accad. Bologna 2 : 570, t.39 (1850).

Laboucheria F. v. Muell. in J. Linn. Soc. Bot. 3 : 158 (1859).

Unarmed trees. *Leaves* bipinnate, with 2–5 pairs of pinnae; leaflets alternate, petiolulate, eglandular. *Stipules* very small, soon deciduous. *Inflorescences* of pedunculate spike-like racemes usually ± aggregated into panicles; bracts very small, falling as or before the flowers open. *Flowers* hermaphrodite. *Calyx-lobes* 5, ± united below or almost free to the base, slightly imbricate but open from an early stage. *Petals* 5, equal, free, ± imbricate, pubescent or tomentose, oblong to oblanceolate-spathulate. *Stamens* 10, often alternately longer and shorter; filaments free, glabrous or hairy; anthers dorsifixed, dehiscing by longitudinal slits; connective not projecting beyond the anther. *Ovary* stipitate, tomentose or densely pubescent, containing several ovules, tapering into a narrowly-conical style; stigma minute, punctiform, cup-shaped and minutely ciliolate. *Pods* stipitate, ± oblong, flattened, straight or slightly curved, coriaceous to woody, dehiscing along one or both margins, usually 2–11-seeded. *Seeds* without areoles, compressed, with endosperm, arranged transversely in the pod.

A genus of ± 10 species in the tropical regions of Africa, Madagascar, Asia, Malesia and Australia.

The generic name *Erythrophleum* is derived from the Greek words for red and sap; in allusion to the red sap of *E. suaveolens* (Guill. & Perr.) Brenan (= *E. guineënse* G. Don), the type species of the genus. On account of its red sap, *E. suaveolens* is commonly referred to as the Redwater Tree.

Leaflets obtuse or rounded apically but not acuminate, usually appressed-pubescent on both surfaces or on lower only, rarely glabrous on both surfaces except for pubescence on the midrib, coriaceous; petioles and rhachides densely pubescent or tomentose; pods coriaceous..... 1. *E. africanum*

Leaflets with a pronounced acumen apically, glabrous on both surfaces, rarely the midrib slightly pubescent on the lower surface, chartaceous; petioles and rhachides glabrous or almost so; pods thinly woody .....2. *E. lasianthum*

1. **Erythrophleum africanum** (*Welw. ex Benth.) Harms* in Feddes Repert. 12 : 298 (1913); De Wild., Contr. Fl. Katanga, Suppl. 1 : 23 (1927); Bak.f., Leg. Trop. Afr. 3 : 777 (1930); Brenan, Checklist Tang. Terr. 103 (1949); Wilczek in F.C.B. 3 : 244 (1952); O. B. Miller in J. S. Afr. Bot. 18 : 32 (1952); Pardy in Rhod. Agric. J. 52 : 513 (1955); Torre & Hillc. in C.F.A. 2 : 252 (1956); Keay in F.W.T.A. ed.2, 1 : 484 (1958); F. White, For. Fl. N. Rhod. 124, fig. 20B (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 20 (1967); Schreiber in F.S.W.A. 59 : 14 (1967); Ross in Bothalia 10 : 44 (1969); Palmer & Pitman, Trees S. Afr. 2 : 831 (1973); Schreiber in Mitt. Bot. Staatssamml. München 11 : 129 (1973). Syntypes: Angola, Huila, Mumpula, *Welwitsch* 591 (BM!); and Pungo Andongo, Calundo, *Welwitsch* 573 (BM!, K!).

Gleditsia africana Welw. ex Benth. in Trans. Linn. Soc. Lond. 25 : 304 (1865), as *Gleditschia;* Oliv. in F.T.A. 2 : 265 (1871); Hiern, Cat. Afr. Pl. Welw. 1 : 289 (1896). Syntypes as above.

Erythrophleum pubistamineum Hennings in Gartenflora 38 : 39, t.8 (1889). Type: Angola, Malange, *Mechow* 185 (B, holo.). *E. pubistamineum* var. *parvifolium* Schinz in Mém. Herb. Boiss. 1 : 119 (1900). Type: Angola, Omupanda in Uukuanjama, *Wulfhorst* 31 (Z, holo.!). *E. africanum* var. *stenocarpum* Harms in Notizbl. Bot. Gart. Berl. 13 : 414 (1936); Brenan, Checklist Tang. Terr. 103 (1949). Type: Tanzania, Lindi District, Lake Lutamba, *Schlieben* 6536 (BM, iso.!).

Caesalpinioides africanum (Welw. ex Benth.) Kuntze, Rev. Gen. 1 : 167 (1891). Type as for *Erythrophleum africanum.*

Tree up to 15 m high. *Bark* grey or grey-brown, ± rough or smooth; young branchlets usually densely pubescent or tomentose with grey-brown hairs, sometimes glabrescent. *Leaves*: petioles, rhachides and rhachillae usually densely pubescent or tomentose, seldom glabrescent (in our area); petiole 1,5–5 cm long (in our area); rhachis 3–10 cm long (in our area), with a small gland at the junction of each pinna pair; pinnae (2)3–4(5) pairs (in our area most leaves have 3 pairs); rhachillae 4–12 cm long (in our area); leaflets (6)8–15 per pinna, 1,1–5(6) cm long, 0,9–2,5(3) cm wide (in our area), narrowly elliptic to elliptic, or with an ovate to rhombic tendency, usually somewhat asymmetric, obtuse or sometimes rounded and ± emarginate apically, not acuminate, coriaceous, with conspicuous venation, usually appressed-pubescent above and below, sometimes

glabrous above or glabrous above and below except for pubescence on the midrib; petiolules 1–2 mm long. *Racemes* 3,5–8 cm long including the peduncle (in our area); axis and peduncle densely pubescent or tomentose with spreading hairs. *Flowers* cream to greenish-yellow, on pedicels 0,5–1 mm long. *Calyx* 1–2,5 mm long, the lobes free almost to the base, densely grey-brown pubescent. *Petals* (2)2,5–3,5 mm long, pubescent. *Stamens* up to 9 mm long, filaments pubescent or tomentose to near the apex, rarely subglabrous. *Pods* brown, (5)7–17 cm long, (2)2,4–3,5 cm wide (in our area), ± straight, rounded, obtuse or acute apically, (1)2–5-seeded, coriaceous, dehiscing simultaneously along both margins; stipe 1–1,5 cm long. *Seeds* brown, 10–14 mm long, 8–12 mm wide, 3–4 mm thick, suborbicular to ± lenticular, with endosperm.

Widespread in tropical Africa from Senegal to the Sudan and Tanzania (absent from Uganda and Kenya), southwards to South West Africa, Botswana, Rhodesia and Mozambique. Occurs in deciduous woodland.

S.W.A.—1716 (Enana) : 10 km S.W. of Oshandi Mission Station, *De Winter & Giess 7017*. 1718 (Kuring-Kuru) : 1,6 km W. of Katwitwi, *De Winter 3848*. 1724 (Katima Mulilo) : Katima Mulilo, Zambesi flood plain, *Von Breitenbach 1205*. 1821 (Andara) : Shitangadimba camp, near Andara Mission Station, *De Winter & Wiss 4269*; Andara, *Merxmüller & Giess 2039*; Bagani Camp, *Le Roux 126*.

E. africanum is an extremely variable species, particularly in the degree of pubescence. One of the syntypes, *Welwitsch* 591, is densely pubescent, while the other, *Welwitsch* 573, is subglabrous.

The bark, roots and leaves of *E. africanum* are said to be poisonous.

2. **Erythrophleum lasianthum** *Corbishley* in Kew Bull. 1922 : 27 (1922); Torre in Contr. Conhec. Fl. Moçamb. 2 : 86 (1954); Von Breitenbach, Indig. Trees S. Afr. 3 : 319 (1965); Gomes e Sousa, Dendrol. Moçamb. 1 : 244 (1966); Ross in Bothalia 10 : 44 (1969); Fl. Natal 194 (1973); Palmer & Pitman, Trees S. Afr. 2 : 833 (1973). Type: Natal, Ingwavuma, *District Magistrate* sub PRE 1228 (K, holo.!, FHO!, PRE!).

E. guineënse G. Don var. *swaziense* Burtt Davy, Fl. Transv. 2 : xxii, 330 (1932); Von Breitenbach, Indig. Trees S. Afr. 3 : 319 (1965). Type: Swaziland, unlocalised, *B. Nicholson s.n.* (K, holo.!; PRE!). *E. guineënse* sensu Henkel, Woody Pl. Natal 236 (1934). *E. suaveolens* sensu Compton in J. S.Afr. Bot., Suppl. 6 : 46 (1966); De Winter et al., 66 Transv. Trees 163 (1966), non (Guill. & Perr.) Brenan.

Tree up to 14 m high with a ± rounded crown. *Bark* greyish-brown, rough, fissured; young branchlets glabrous or sometimes thinly pubescent. *Leaves* glabrous: petiole 3,5–5,6 cm long; rhachis 3–15 cm long; pinnae 2–4 pairs; rhachillae 6–15 cm long; leaflets (4)9–13 per pinna, (1,8)2,5–5(6,5) cm long, 1–3,5 cm wide, obliquely ovate to ovate-elliptic, slightly asymmetric basally, usually ± acuminate apically and slightly emarginate, chartaceous, venation relatively inconspicuous apart from the midrib, glabrous on both surfaces or rarely the midrib slightly pubescent on the lower surface; petiolules up to 5(7) mm long, glabrous. *Racemes* 5–10 cm long including the peduncle, ± aggregated; axis and peduncle densely puberulous to pubescent with appressed or shortly spreading rusty-brown hairs, seldom glabrescent. *Flowers* cream to greenish-yellow, on pedicels 1,5–3 mm long, rusty-pubescent. *Calyx* 2–3 mm long, fused basally for ⅓–½ of its length, rusty-pubescent. *Petals* 3–4 mm long, rusty-pubescent on margins only or throughout. *Stamens* up to 8 mm long, filaments woolly tomentose to near the apex. *Pods* dark brown, (7)10–16 cm long, 2,9–4,2 cm wide, ± straight to slightly curved, rounded, obtuse or acute apically, thinly woody, dehiscing simultaneously along both margins, several-seeded; stipe 1–2 cm long. *Seeds* brown, 12–15 mm long, 10–13 mm wide, 4–6 mm thick, suborbicular to lenticular. Fig. 1.

Found in the eastern Transvaal, southern Mozambique, Swaziland and Natal (Zululand). Occurs in forest and woodland. In some parts of Tongaland it is locally dominant on sandy soils in dry sandforest.

TRANSVAAL.—2330 (Tzaneen): Mashishimale, *Stanford sub TRV 19423*. This is the only record of the species from the Transvaal and confirmation of its occurrence in this province is required. Presumably the locality is correct.

SWAZILAND.—2631 (Mbabane): Stegi, *Assistant Commissioner sub PRE 30333*; Stegi, Murray's farm, Ubombo Mts., *Miller S/59*; Stegi, *Steward sub PRE 30334*.

NATAL.—2632 (Bela Vista): Natal/Mozambique border, 8 km E. of Ndumu Game Reserve, *Ross & Moll 5095*; Maputa, *Bayer 744*. 2732 (Ubombo): 3,2 km E. of Ingwavuma P.O., *Codd & Dyer 2840*; Mangenene forest, N.E. of Tete Pan, *Tinley 216*; False Bay Park, *Ross 2336*; *Ward 3003*. 2832 (Mtubatuba): near Hluhluwe Game Reserve, *Ward 2629*; Isizalo stream near Hluhluwe Game Reserve, *Ward 2692*.

FIG. 1.—**Erythrophleum lasianthum.** 1, branchlet with inflorescences and mature leaf, × ⅔; 2, flower, × 10; 3, corolla opened out (bottom cut off), × 10; 4, gynoecium, × 10, all from *Ward* 2692; 5, pod, × ⅔, from *Edwards* 2574; 6, seed, × ⅔, from *Ward* 3003.


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FIG. 2.—**Burkea africana**. 1, part of branchlet with inflorescences and immature leaves, × ⅔; 2, pinna of mature leaf, × ⅔; 3, basal part of mature leaflet, lower surface, × 3; 4, flower-bud showing imbricate petals, × 4; 5, flower, × 4; 6, two calyx-segments, × 4; 7, petal, × 4; 8, single stamen enlarged, × 4; 9, 10, ovary, × 6; 11, pod, showing single seed, × ⅔; 12, seed, showing areole, × ⅔. 1, 4–9 from *Semsei* 1862; 2 and 3, from *Eggeling* 5776; 10, from *Aylmer* 27/17; 11 and 12, from *Gillman* 1543. Reproduced by permission of the Editor of Flora of Tropical East Africa.

Burtt Davy, Fl. Transv. 2 : 330 (1932), records that in Swaziland the dried bark is ground up and made into a snuff which is used in small quantities to cure headaches; it is said to be very potent and to cause a violent fit of sneezing. The bark contains a toxic agent, erythrophleine, and the seeds are said to be poisonous to man.

3474 **2. BURKEA**

Burkea *Benth.* in Hook., Icon. Pl. 6 : t.593–4 (1843); Harv. in F.C. 2 : 271 (1862); Benth. & Hook.f., Gen. Pl. 1 : 587 (1865); Harv., Gen. Pl. ed. 2 : 90 (1868); Oliv. in F.T.A. 2 : 319 (1871); Taub. in Pflanzenfam. 3,3 : 128 (1892); Bak.f., Leg. Trop. Afr. 3 : 776 (1930); Phill., Gen. ed. 2 : 393 (1951); Wilczek in F.C.B. 3 : 237 (1952); Hutch., Gen. Fl. Pl. 1 : 265 (1964); Gomes e Sousa, Dendrol. Moçamb. 1 : 241 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 21 (1967); Schreiber in F.S.W.A. 59 : 6 (1967). Type species: *B. africana* Hook.

Unarmed trees with rusty-tomentose young shoots. *Leaves* bipinnate, with (1)2–5(7) pinnae pairs, alternate; leaflets alternate, eglandular. *Stipules* very small, soon deciduous. *Inflorescences* of elongated spikes, simple or often paniculately aggregated; bracts very small, persistent until the flowers open. *Flowers* hermaphrodite. *Calyx* connate below into a short tube, 5-lobed, lobes slightly imbricate but almost open from an early stage. *Petals* 5, imbricate, equal, glabrous, without claws. *Stamens* 10, subequal; filaments glabrous; anthers dorsifixed, dehiscing by longitudinal slits; connective shortly projecting beyond the anther. *Ovary* subsessile, densely rusty-tomentose, 1–2-ovulate; style very short, thick; stigma funnel-shaped, slit down one side. *Pods* stipitate, coriaceous, elliptic, flattened, indehiscent. *Seeds* compressed, with an areole on each face (as in most *Mimosoideae*), with endosperm.

A monotypic genus, widespread in tropical Africa, except for the forest regions, and extending southwards to South West Africa, Botswana and the Transvaal.

The characteristic areole on each face of the seed is very similar to those found in most of our *Mimosoideae*. Except for the genera mentioned in the discussion on areoles on p.1 they do not otherwise occur in the *Caesalpinioideae* of South Africa.

The genus is named in honour of Joseph Burke who collected plants in the Magaliesberg area of the Transvaal in the 1840's.

Burkea africana *Hook.*, Icon. Pl. 6 : t.593–4 (1843); Harv. in F.C. 2 : 271 (1862); Oliv. in F.T.A. 2 : 320 (1871); Harms in Engl., Pflanzenw. Afr. 3,1 : 431, fig. 237 (1915); Bak. f., Leg. Trop. Afr. 3 : 776 (1930); Burtt Davy, Fl. Transv. 2 : 331 (1932); Hutch., Botanist in S. Afr. 470, 481 (1946); Brenan, Checklist Tang. Terr. 94 (1949); Codd, Trees & Shrubs Kruger Nat. Park 61 (1951); Wilczek in F.C.B. 3 : 238 (1952); O. B. Miller in J. S. Afr. Bot. 18 : 29 (1952); Pardy in Rhod. Agr. J. 49 : 170 (1952); Torre & Hillc. in C.F.A. 2 : 250 (1956); Palgrave, Trees Cent. Afr. 89–92 (1956); Keay in F.W.T.A. ed. 2,1 : 483 (1958); Palmer & Pitman, Trees S. Afr. 171, tt.7,52, XIV (1961); F. White, For. Fl. N. Rhod. 118, fig. 20A (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 320 (1965); De Winter et al., 66 Transv. Trees 62 (1966); Gomes e Sousa, Dendrol. Moçamb. 1 : 241 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 21, fig. 2 (1967); Schreiber in F.S.W.A. 59 : 7 (1967); Flow. Pl. Afr. 38 : t.1505 (1967); Van Wyk, Trees Kruger Nat. Park 1 : 182 (1972); Palmer & Pitman, Trees S. Afr. 2 : 837 (1973); Schreiber in Mitt. Bot. Staatssamml. München 11 : 128 (1973). Type: Transvaal, Magaliesberg, *Burke* 274 (K, holo.!).

B. africana var. *andongensis* Oliv. in F.T.A. 2 : 320 (1871); Hiern, Cat. Afr. Pl. Welw. 1 : 304 (1896); Bak.f., Leg. Trop. Afr. 3 : 776 (1930). Type: Angola, Cuanza Norte, Pungo Andonga, *Welwitsch* 574 (LISU holo.; BM!, K!). *B. africana* var. *cordata* Welw. ex Oliv. in F.T.A. 2 : 320 (1871); Hiern, Cat. Afr. Pl. Welw. 1 : 304 (1896); Bak.f., Leg. Trop. Afr. 3 : 777 (1930). Type: Angola, Huila Distr., between Lopolo and Monhino, *Welwitsch* 589b (LISU holo., BM!).

Widespread in tropical Africa, except for the forest regions, and extending southwards to South West Africa, Botswana and the Transvaal. Occurs in sandy soils in deciduous woodland and bushveld.

S.W.A.—1718 (Kuring-Kuru) : 15 km W. of Kuring-Kuru on road to Katwitwi, *De Winter 3832*. 1719 (Runtu) : near Runtu, by the Okavango River, *Rodin 9135*. 1720 (Sambio) : Diyona Camp just beyond Nyangana Mission Station, *De Winter 4168*. 1722 (Chirundi) : Bwabwata Rest Camp, *Watt 14*. 1724 (Katima Mulilo) : Katima Mulilo, Zambesi flood plain, *Von Breitenbach 1203*. 1819 (Karakuwisa): 27 km S. of Runtu on road to Karakuwisa, *De Winter 3763*. 1917 (Tsumeb) : 16 km E.N.E. of Otavi on road to Tsumeb, *De Winter 3000*. 1921 (Aha Mountains): western foot of Aha Mountains, *Story 6317*. Grid ref. unknown : Otjiwarongo district, Waterberg plateau, *De Winter 2792*.

TRANSVAAL.—2229 (Waterpoort): farm Zoutpan 193, *Obermeyer, Schweickerdt & Verdoorn 319*. 2230 (Messina): Georgenholz, P.O. Makonde, *Westphal sub TRV 29116*. 2231 (Pafuri): Kruger National Park, 9,6 km N.E. of Punda Milia, *Codd & Dyer 4573*. 2330 (Tzaneen): Doringboom, *Scheepers 2403*. 2428 (Nylstroom): immediately N. of Warmbaths, *Story 5968*. 2429 (Zebediela): Percy Fyfe Nature Reserve, *Huntley 1296*. 2526 (Zeerust): Zeerust, *Thode A 1400*. 2527 (Rustenburg): Hartebeespoort Dam, *Prosser 1632*. 2528 (Pretoria): Wonderboom, *Phillips 3016*. 2529 (Witbank): Loskopdam, *Theron 1560*. 2627 (Potchefstroom): Jack Scott Private Nature Reserve, *Wells 2341*.

B. africana is a common and characteristic tree of sandy soils in dry deciduous woodland and bushveld, sometimes gregarious and locally dominant, but often in association with *Sclerocarya caffra*, *Terminalia sericea* and *Faurea saligna*. *B. africana* bears a resemblance to the introduced Seringa, *Melia azedarach* L., whence the common names Wild Seringa and Wildesering.

B. africana is a useful timber tree producing a hard coarse-grained wood which varies in colour from pale yellow through brown to reddish-mahogany. The heartwood is durable, takes a fine polish, and works easily.

The larvae of the moth *Cirina forda* often feed on the leaves of *B. africana*. They usually appear in late spring or early summer and frequently defoliate entire plants, only the leaf-petioles,-rhachides and -rhachillae remaining intact. The larvae, which are extremely nourishing, are considered a delicacy by some Africans.

Tree up to 15 m high with a rounded or flattened spreading crown. *Bark* grey-brown to blackish, rough, fissured, flaking; young branchlets often rather stout, rusty-tomentose. *Leaves* clustered towards the ends of the branchlets, petioles and rhachides rusty-tomentose or -pubescent when young, often becoming ± glabrous with age: petiole (1,5)4–10 cm long (in our area), eglandular; rhachis (0)1–15 cm long (in our area), eglandular; pinnae (1)2–3(5) pairs (in our area); rhachillae 4–14 cm long (in our area); leaflets alternate, 5–15 per pinna, mostly 1,2–5,5 (7,5) cm long, 0,7–3,6(4,2) cm wide, elliptic or sometimes ovate-elliptic or ± obovate, asymmetric basally, obtuse or rounded and somewhat emarginate apically, usually silvery-sericeous when very young, thinly appressed-puberulous on both surfaces or sometimes ± glabrous at maturity; petiolule 2–5 mm long, pubescent. *Inflorescences* spicate; spikes (5)8–25 cm long (including the peduncle), pendulous, simple or sometimes branched, usually ± clustered at the tips of the young branchlets; peduncle and axis pubescent to tomentose with appressed or spreading hairs. *Flowers* white, cream or pale green, sessile. *Calyx* 1,5–2 mm long, pubescent at least basally, lobes rounded apically and ciliate on the margins. *Petals* 3,5–5 mm long, 2–2,5 mm wide, obovate-oblong, rounded apically, ultimately reflexed. *Stamens* 3–4 mm long, glabrous; anthers ± 2 mm long. *Ovary* subsessile, densely rusty-tomentose. *Pods* brown, stipitate, 4–7 cm long, 2–3 cm wide, elliptic or narrowly elliptic, usually 1-seeded, indehiscent, flattened, venose, finely puberulous. *Seeds* brown, ± 9–12 × 7–8 mm, elliptic to suborbicular, compressed; areoles ± 7–8 × 3,5–4 mm. Fig. 2.

3490a **3. COLOPHOSPERMUM**

Colophospermum *Kirk ex J. Léon.* in Bull. Jard. Bot. Brux. 19 : 390 (1949); Phill., Gen. ed. 2 : 393 (1951) pro parte; J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 159 (1957); Hutch., Gen. Fl. Pl. 1 : 255 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 324 (1965); Schreiber in F.S.W.A. 59 : 12 (1967). Type species: *C. mopane* (Kirk ex Benth.) Kirk ex J. Léon.

Unarmed tree or shrub. *Leaves* alternate, with a single pair of large leaflets; leaflets opposite, asymmetric, with 7–12 prominent nerves arising from the point of attachment, without a midrib, with numerous pellucid gland-dots. *Stipules* small, soon deciduous. *Flowers* hermaphrodite, small, pedicellate, in slender racemes or panicles; bracts minute; bracteoles absent. *Sepals* 4 (2 outer and 2 inner). *Petals* 0. *Stamens* 20–25; filaments free; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* ± sessile, free, compressed, glabrous; ovule 1, lateral; style lateral. *Pods* compressed, usually reniform, 1-seeded, indehiscent, with numerous scattered glands. *Seed* compressed, reniform, corrugated, with numerous small reddish resin-glands. *Cotyledons* much corrugated.

A monotypic genus occurring in Angola, South West Africa, Botswana, Zambia, Rhodesia, Malawi, Mozambique and the northern Transvaal.

The generic name *Colophospermum* is a Greek compound meaning "resinous seed"; in allusion to the numerous scattered resin-glands which cover the seed.

Colophospermum mopane (*Kirk ex Benth.*) *Kirk ex J. Léon.* in Bull. Jard. Bot. Brux. 19 : 390 (1949); O. B. Miller in J. S. Afr. Bot. 18 : 30 (1952); Pardy in Rhod. Agric. J. 50 : 152 (1953); Torre & Hillc. in C.F.A. 2 : 239 (1956); Palgrave, Trees Cent. Afr. 101–106 (1957); Palmer & Pitman, Trees S. Afr. 173, tt. 53, 143, 144, XV (1961); F. White, For. Fl. N. Rhod. 121, fig. 21 A, B (1962); Von Breitenbach, Indig. Trees. S. Afr. 3 : 324 (1965); De Winter et al., 66 Transv. Trees 64 (1966); Gomes e Sousa, Dendrol. Moçamb. 1 : 250, t.53 (1966); Tinley, Moremi Wildlife Res. Botswana 67, tt.25, 29–37 (1966); Schreiber in F.S.W.A. 59 : 13 (1967); Jarman & Thomas in Kirkia 7 : 103 (1969); Giess in Dinteria 4 : 10, tt.28–30 (1971); Van Wyk, Trees Kruger Nat. Park 1 : 184 (1972); Palmer & Pitman, Trees S. Afr. 2 : 842 (1973). Syntypes: Mozambique, Shiramba, *Kirk* (K!); Lupata, *Kirk* (K!).

Copaifera mopane Kirk ex Benth. in Trans. Linn. Soc. Lond. 25 : 317, t.43A (1865); Benth. & Hook.f., Gen. Pl. 1 : 585 (1865); Oliv. in F.T.A. 2 : 315 (1871); Schinz in Verh. Bot. Ver. Prov. Brandenb. 30 : 170 (1889); Harms in Warb., Kunene-Samb. Exped. 248 (1903); Sim, For. Fl. P.E. Afr. 51 (1909); Harms in Engl., Pflanzenw. Afr. 3,1 : 443, fig. 244 (1915); Dinter in Feddes Repert. 16 : 241 (1919); Bak.f., Leg. Trop. Afr. 3 : 750 (1930); Hutch. in Kew Bull. 1931 : 226–229 (1931); Burtt Davy, Fl. Transv. 2 : 326 (1932); Greenway in E. Afr. Agric. J. 6 : 246 (1941); Hutch., Botanist in S. Afr. 314, 327, 353, 456, 458, 483, 538, 547, 664 (1946); Pole Evans in Mem. Bot. Surv. S. Afr. 21 : 14, 24, 30, tt.25– 27, 30–32, 44–46, 48, 68–72 (1948); Codd, Trees & Shrubs Kruger Nat. Park 63, fig. 59, 62c, d (1951). Syntypes as above.

Copaiba mopane (Kirk ex Benth.) Kuntze, Rev. Gen. 1 : 172 (1891); Gilg in Engl., Pflanzenw. Ost-Afr. B : 305, 419 (1895); Taub. in Engl., Pflanzenw. Ost-Afr. C : 197 (1895); Hiern, Cat. Afr. Pl. Welw. 1 : 303 (1896); Schinz in Mém. Herb. Boiss. 1 : 119 (1900); Dinter, Deutsch-Südwest-Afrika Flora Forst- und landwirtschaft. Frag. 79 (1909). Syntypes as above.

Small to medium-sized tree usually 5–12 m high with an erect narrow crown, occasionally up to 22 m high under favourable conditions, or very often a shrub, irregularly deciduous. *Bark* dark grey or brown, rough, longitudinally fissured. *Leaves* alternate, with a single pair of large leaflets: petiole (0,6) 1,5–4(4,8) cm long, glabrous; leaflets articulated basally, asymmetric, semi-cordate-ovate, (3) 4,5–9(12) cm long, (1,4)2,5–5(6,5) cm wide, inner margin slightly convex, outer margin cordate or truncate basally and strongly convex, acute or obtuse apically, coriaceous, with 7–12 prominent nerves arising from the point of attachment, without a midrib, with numerous scattered pellucid gland-dots, smelling of turpentine when crushed; terminal appendage sessile, articulated, up to 5 mm long and 3 mm wide. *Stipules* up to 5 × 3,5 mm, ovate, soon deciduous. *Inflorescence* a slender raceme or panicle up to 7 cm long. *Flowers* small, greenish-white or greenish-yellow, on pedicels 4–8 mm long; bracts minute; bracteoles absent. *Flower-buds* globose, 3–4 mm in diameter. *Sepals* 4, the 2 outer ± 6 × 5 mm, the 2 inner ± 5,5 × 4,5 mm, reflexed in flower. *Petals* 0. *Stamens* 20–25; filaments free, filiform, up to 6 mm long, exserted; anthers 2,5–3 mm long. *Ovary* ± 2 mm long, compressed, glabrous; style lateral; stigma expanded. *Pods* yellowish-brown, compressed, very shortly stipitate, 3,5–6 cm long, 2–3,2 cm wide, reniform or obliquely ± semi-circular, lightly reticulate, with numerous scattered resin-glands, indehiscent. *Seed* large, compressed, ± 2,5 × 1,4 cm, usually

FIG. 3.—**Colophospermum mopane.** 1, flowering twig, × ¾; 2, flower, × 3; 3, gynoecium, × 6, all from *Codd* 4827; 4, fruiting twig, × ⅓; 5, seed, × 1, both from *Schlieben & Hartmann* 2229.

reniform, corrugated, with numerous small sticky reddish resin-glands. Fig. 3.

Found in Angola, South West Africa, Botswana, Zambia, Rhodesia, Malawi, Mozambique and the northern Transvaal. Gregarious and often dominant, forming almost pure stands in hot dry low rainfall areas on various soil-types.

S.W.A.—1712 (Posto Velho): near Kunene, *Story 5855*. 1715 (Ondangua): bordering Angola near Oshikango, *Rodin 2623*. 1716 (Enana): Olukonda, *Schinz s.n.* (K). 1725 (Livingstone): Mpilila Island, confluence of Zambesi and Chobe Rivers, *Killick & Leistner 3338*. 1813 (Ohopoho): Otju, *Merxmüller & Giess 1422;* near Ohopoho, *De Winter & Leistner 5293*. 1816 (Namutoni): Ondonga, *Rautanen 524* (K). 1914 (Kamanjab): farm Kakatswa-Onguati, *Walter 1049* (M). 1915 (Okaukuejo): farm Westfalen, 51 km E.S.E. of Kamanjab, *De Winter 3066*. 2014 (Welwitschia): 24 km W. of Welwitschia, *Giess 3858*. 2015 (Otjihorongo): Gainatseb, *Volk 2881* (M). 2016 (Otjiwarongo): Outjo, *Volk 2421* (M).

TRANSVAAL.—2228 (Maasstroom): farm Illovo, near Tugela, *Van Graan & Hardy 469*. 2229 (Waterpoort): farm Rosenthal, near Dongola, *Codd 4827;* 29 km S. of Messina on road to Louis Trichardt, *De Winter 8673*. 2230 (Messina): Messina, *Rogers 22549*. 2231 (Pafuri): Kruger National Park, between Punda Milia and Pafuri, *Schlieben & Hartmann 12007*. 2328 (Baltimore): 4 km from crossroads near Villa Nora on road to Overysel, *Coetzee & Stephen 1089*. 2330 (Tzaneen): Hans Merensky Nature Reserve, *Oates 221*; Beacon Ranch, Rubbervale, *Brothers 80*. 2331 (Phalaborwa): Kruger National Park, Shingwedzi Camp, *Codd & De Winter 5570*. 2431 (Acornhoek): Timbavati Private Game Reserve, farm Nederland, *Porter 340*.

C. mopane, commonly known as Mopane, is a gregarious species which often forms almost pure stands and is dominant over extensive areas. *C. mopane* forms an open parkland of small to medium sized trees or dense thickets of low shrubs. Plants have the ability to coppice vigorously and sometimes the thickets are almost impenetrable. Although growing on various soil types, *C. mopane* is usually regarded as an indication of high temperatures, low rainfall and shallow, poorly-drained, often alkaline soil.

The leaves resemble the wings of a butterfly and give off a distinct smell of turpentine when crushed, whence the common names "Butterfly Tree" and "Turpentine Tree". The leaflets are articulated basally and fold together during the heat of the day thus conserving some water loss by transpiration. Trees consequently cast very little shade during the heat of the day.

The green leaves and young branches are relished by elephants, but the various antelope seem to prefer eating the dry fallen leaves. When cattle become accustomed to the aromatic odour they browse the leaves readily, the aromatic resin apparently not tainting the milk or flesh.

The sapwood is yellow and the heartwood is dark red, very hard, heavy, durable and termite-resistant. The timber is valued for fencing posts and mine-props, but is too difficult to work for furniture. The wood is resinous and burns well, although with a lot of smoke. Because of the resinous leaves and wood, *C. mopane* is very susceptible to fire and burns even when green.

The sticky seeds are dispersed by adhering to the hooves of passing animals.

The larvae ("mopane worms") of the moth *Gonimbrasia belina* feed on the leaves of *C. mopane*. These worms, 5–8 cm long and about as fat as the little finger, are roasted and eaten by Africans and Bushmen, or dried and stored. They have a high protein content and form an extremely nourishing food. Africans consider them to be a delicacy and some are said to eat them in preference to beef. A jam tin full of "mopane worms" currently sells for 40–50 cents.

The palatability of the plant is believed to be considerably increased by the secretions of an insect (*Arytaina mopane*), the larvae of which feed on the leaves. The adult insect resembles a miniature cicada but the larva is very small, flat and reddish and secretes a fluid which forms a protective covering over it. The secretions form fairly large, translucent, quite hard 'drops' which adhere firmly to the leaves and are ingested with them.

The flowers of *C. mopane* are apparently anemophilous (C. J. Ward, pers. comm.), an unusual feature in a family whose flowers are predominantly entomophilous. The relatively inconspicuous flowers, small greenish recurved sepals, lack of petals, long slender exserted stamen-filaments which move even in light breezes, and the enlarged stigmas, support this view.

3490b 4. GUIBOURTIA

Guibourtia *J.J. Benn.* in J. Linn. Soc. 1 : 149 (1857); J. Léon. in Bull. Jard. Bot. Brux. 19 : 400 (1949); in Bull. Jard. Bot. Brux. 20 : 269 (1950); in F.C.B. 3 : 359 (1952); in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 137 (1957); Hutch., Gen. Fl. Pl. 1 : 256 (1964); Von Breitenbach, Indig. Trees S.Afr. 3 : 322 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 136 (1967); Schreiber in F.S.W.A. 59 : 14 (1967). Type species: *G. copallifera* J.J. Benn.

Gorskia Bolle in Peters, Reise Mossamb. Bot. 1 : 15 (1862).

Pseudocopaiva Britton & Wilson, Trop. Woods 20 : 28 (1929).

Unarmed evergreen or deciduous trees or shrubs. *Leaves* alternate, with a single pair of leaflets, or rarely (but not in our area) with a single leaflet; leaflets opposite, asymmetric, usually with numerous pellucid gland-dots. *Stipules* usually small and soon deciduous, free.

Inflorescences paniculate. *Flowers* hermaphrodite, sessile or pedicellate, spirally arranged along the spicate or racemose ultimate branches; bracteoles small, persistent or falling before the flowers open. *Sepals* 4 (2 outer and 2 inner), imbricate. *Petals* 0. *Disc* present, ± fleshy. *Stamens* (8)10(12, fide Léonard); filaments free, glabrous; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* stipitate or sessile; ovules (1)2(4); style elongate, ending in a capitate stigma. *Pods* ± stipitate, obliquely elliptic or semi-orbicular, indehiscent or dehiscing along one suture, compressed or ± dilated, coriaceous or ± membranous. *Seeds* solitary, large.

A genus of 16 species, 13 in tropical Africa, and 3 (one of them doubtfully a *Guibourtia*) in the West Indies and South America.

The genus is named in honour of N. J. B. Guibourt, a learned French pharmacologist who wrote a history of drug plants.

Petiole 0,8–1,8 cm long; leaflets obliquely ovate, scarcely falcate, with 3–6 conspicuous basal nerves; flower-buds globose, 2–3 mm in diameter; flowers subsessile or very shortly (up to 2 mm) stipitate; pods 3,3–5(5,5) cm long, 2,2–3 cm wide, ± flattened, indehiscent; seed flattened, ± circular, 20–24 × 17–19 mm, without an aril ..... 1. *G. conjugata*

Petiole 1,5–3,5(4) cm long; leaflets ovate-falcate, with a distinct midrib and 7–11 pairs of primary lateral nerves; flower-buds ellipsoid, up to 5 mm long, 2,5–3 mm wide; flowers on pedicels 2–5 mm long; pods 2–3,3 cm long, 1,6–2 cm wide and up to 1 cm thick when mature, dehiscing along one suture; seed oblong, 12–19 × 7–12 × 4–8 mm, with a conspicuous scarlet aril ..... 2. *G. coleosperma*

1. **Guibourtia conjugata** (*Bolle*) *J. Léon.* in Bull. Jard. Bot. Brux. 19 : 402 (1949); in Bull. Jard. Bot. Brux. 20 : 274 (1950); Pardy in Rhod. Agric. J. 51 : 111 (1954); J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 140, 149, t. 14 C, pl. 14 (1957); F. White, For. Fl. N. Rhod. 124 (1962); Von Breitenbach, Indig. Trees S.Afr. 3 : 323 (1965); Gomes e Sousa, Dendrol. Moçamb. 1 : 253, t.55 (1966); Van Wyk, Trees Kruger Nat. Park 1 : 187 (1972); Palmer & Pitman, Trees S.Afr. 2 : 839 (1973). Type: Mozambique, vicinity of Sena and Tete, *Peters* (B, holo. †, K!).

Gorskia conjugata Bolle in Peters, Reise Mossamb. Bot. 1 : 16, t.3 (1862). Type as above.

Copaifera gorskiana Benth. in Trans. Linn. Soc. Lond. 25 : 317 (1865); Oliv. in F.T.A. 2 : 315 (1871); Sim, For. Fl. P.E. Afr. 51 (1909); Bak.f., Leg. Trop. Afr. 3 : 751 (1930). Type as above. *C. gorskia* Schinz in Verh. Bot. Prov. Brandenb. 30 : 172 (1889) sphalm. *C. conjugata* (Bolle) Milne-Redh. in Kew Bull. 1934 : 400 (1934). Type as above.

Copaiba conjugata (Bolle) Kuntze, Rev. Gen. 1: 172 (1891). Type as above.

Small to medium-sized deciduous tree usually 4–12 m high, occasionally up to 18 m under favourable conditions, sometimes many-stemmed or a shrub. *Bark* grey or yellowish-brown, fairly smooth; young branchlets slender, sparingly to densely puberulous or pubescent, sometimes becoming glabrescent. *Leaves* alternate, with a single pair of leaflets: petiole 0,8–1,8 cm long (in our area), glabrous or sparingly to densely puberulous, sometimes indumentum coarse and spreading; leaflets subsessile, asymmetric, 2,5–5(7) cm long, 1,7–3,6 cm wide (in our area), obliquely ovate, scarcely falcate, the outer margin strongly convex, the inner margin nearly straight or slightly convex, rounded or obtuse apically, with 3–6 conspicuous nerves arising from the base, prominent and raised on the lower surface, reticulate venation fairly conspicuous on both surfaces, coriaceous, with scattered pellucid gland-dots, glabrous throughout or sometimes sparsely to fairly densely pubescent along the nerves near the base beneath, margins sometimes very shortly ciliate. *Inflorescence* an axillary or terminal panicle up to 14 cm long, lateral branches up to 6 cm long, glabrous or sparingly to densely puberulous or pubescent. *Flowers* white or cream, subsessile or very shortly pedicellate; flower-buds nearly globose, 2–3 mm in diameter; bracteoles rapidly deciduous and shed before the flowers open. *Sepals* 4, unequal, 2 ovate, 3,5–4 × 2,5–2,75 mm, 2 ± elliptic, ± 3,5 × 2 mm, glabrous outside except for the margins, finely pubescent inside. *Petals* 0. *Stamens* 10; filaments free, 5–7 mm long, glabrous, alternating long and short; anthers 1,25–1,5 mm long. *Disc* glabrous. *Ovary* compressed, semi-orbicular, up to 1,5 × 1 mm, glabrous, very shortly stipitate, stipe clothed with spreading hairs basally at least; ovules 2; style 3–4,5 mm long, glabrous. *Pods* brown, stipitate, semi-orbicular or obliquely ovate- or obovate-oblong, shortly apiculate apically, 3,3–5(5,5) cm long, 2,2–3

FIG. 4.—**Guibourtia coleosperma.** 1, flowering twig, × ⅔; 2, flower, × 4; 3, gynoecium, × 4, all from *De Winter* 3809; 4, fruiting branch, × ⅔, 5, dehisced pod showing attached seed, both from *Codd* 7069. **Guibourtia conjugata.** 6, leaf, × ⅔, from *Van der Schijff* 3338.

cm wide, ± flattened, indehiscent; valves glabrous, coriaceous, brittle, venose. *Seeds* solitary, reddish, flattened, ± circular, 20–24 × 17–19 mm, without an aril. Fig. 4 : 6.

Found in southern Zambia, Rhodesia, Mozambique and the north eastern Transvaal. Occurs in mixed woodland or bushveld on sandy soils or rocky areas.

TRANSVAAL.—2231 (Pafuri): Kruger National Park, Punda Milia, *Lamont 51*; *Van der Schijff 1028*; *3338*; 4 km N.E. of Punda Milia, *Codd & Dyer 4562*; S.E. of Klopperfontein on Mozambique border, *Van der Schijff 2901*.

The degree of pubescence of the young branchlets, petioles and inflorescence axes varies. The isotype in the Kew herbarium exhibits a coarse spreading indumentum, but more frequently the indumentum is finely puberulous.

The timber of *G. conjugata* is hard and heavy but, owing to the limited distribution of the species, little use appears to be made of it. The sapwood is pale yellowish-white and the heartwood dark brown.

2. **Guibourtia coleosperma** (*Benth.*) *J. Léon.* in Bull. Jard. Bot. Brux. 19 : 403 (1949); in Bull. Jard. Bot. Brux. 20 : 274 (1950); in F.C.B. 3 : 364, pl. 13, fig. 28B (1952); Pardy in Rhod. Agric. J. 49 : 171 (1952); O. B. Miller in J. S. Afr. Bot. 18 : 32 (1952); Torre & Hillc. in C.F.A. 2 : 242 (1956); J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 142, 150, t.14E, pl. 15, 16 (1957); F. White, For. Fl. N. Rhod. 124, fig. 21, C,D,E (1962); Von Breitenbach, Indig. Trees S.Afr. 3 : 323 (1965); Schreiber in F.S.W.A. 59 : 14 (1967); Palmer & Pitman, Trees S. Afr. 2 : 841 (1973); Schreiber in Mitt. Bot. Staatssamml. München 11 : 129 (1973). Type: Zambia, Batoka highlands, *Kirk* (K, holo.!).

Copaifera coleosperma Benth. in Trans. Linn. Soc. Lond. 25 : 316 (1865); Oliv. in F.T.A. 2 : 314 (1871); Harms in Warb., Kunene-Samb. Exped. 246, pl. 99 (1903); Sim, For. Fl. P.E. Afr. 52 (1909); Harms in Engl., Pflanzenw. Afr. 3,1 : 441, fig. 243 (1915); Dinter in Feddes Repert. 16 : 241 (1919); Bak.f. in J. Bot. 66, Suppl. Polypet. : 150 (1928); Bak.f., Leg. Trop. Afr. 3 : 752 (1930); Hutch., Botanist in S.Afr. 476, 479 (1946). Type as above.

Copaiba coleosperma (Benth.) Kuntze, Rev. Gen. 1 : 172 (1891). Type as above.

Copaiva coleosperma (Benth.) Britton in Sc. Surv. Porto Rico & Virgin Islands 6 : 542 (1930). Type as above.

Tree up to 20 m high with a somewhat rounded drooping crown, seldom completely leafless; bole sometimes slightly buttressed. *Bark* greyish, yellowish- or pale reddish-brown to black, fairly smooth or sometimes roughish on old plants; slash blood-red; young branchlets glabrous, lenticellate. *Leaves* alternate, with a single pair of leaflets, glabrous: petiole 1,5–3,5(4) cm long; leaflets subsessile, asymmetric, (3,4)4–10 cm long, 1,5–4,2 cm wide (in our area), ovate-falcate, the outer margin strongly convex, the inner margin nearly straight or slightly convex, obtuse or acuminate apically, midrib prominent and raised on the lower surface, with 7–11 pairs of primary lateral veins, reticulate venation conspicuous on both surfaces, coriaceous, glabrous or sometimes very sparingly pubescent basally when young, with scattered pellucid gland-dots. *Stipules* linear-lanceolate, 1–2 cm long, 0,2 cm wide, rapidly deciduous (fide Léonard in F.C.B. 3 : 364). *Inflorescence* an axillary or terminal panicle up to 16 cm long, lateral branches up to 9 cm long, glabrous or sometimes very sparingly pubescent when young. *Flowers* white or cream, on glabrous pedicels 2–5 mm long; flower-buds ellipsoid, up to 5 mm long, 2,5–3 mm wide; bracteoles up to 4 mm long, rapidly deciduous and shed before the flowers open. *Sepals* 4, unequal, 2 ovate, 5–6 × 3–3,75 mm, 1 elliptic, ± 5 × 2,5 mm, 1 lanceolate, ± 5 × 1,5 mm, glabrous outside except for the margins, densely fulvous-pubescent inside. *Petals* 0. *Stamens* 10; filaments free, up to 7 mm long, glabrous, alternating long and short; anthers up to 1,75 mm long. *Disc* glabrous. *Ovary* compressed, semi-orbicular, up to 2 × 1,5 mm, glabrous, on a stipe up to 2 mm long, stipe clothed with long spreading hairs basally at least; ovules 2; style lateral, 4–5 mm long. *Pods* reddish-brown, stipitate, semi-orbicular, shortly apiculate apically, 2–3,3 cm long, 1,6–2 cm wide, up to 1 cm thick when mature, dehiscing along one suture; valves glabrous, coriaceous, rugulose or finely tuberculate. *Seeds* usually solitary, reddish-brown, oblong, 12–19 mm long, 7–12 mm wide, 4–8 mm thick, with a conspicuous scarlet aril; seeds hanging from the dehisced pods. Fig. 4 : 1–5.

Found in Zaire, Angola, South West Africa, Botswana, Zambia and Rhodesia. Almost confined to Kalahari sands; occurs in woodland.

S.W.A.—1719 (Runtu): 35,2 km W. of Runtu on road to Sambusu, *De Winter 3814*. 1721 (Mbambi): near Shamvura Camp, 19,2 km E. of Nyangana Mission Station, *De Winter & Wiss 4201*. 1722(Chirundi): Bwabwata Rest Camp, *Watt 13*. 1723 (Singalamwe): 96 km from Katima Mulilo on road to Singalamwe, *Killick & Leistner 3197*. 1819 (Karakuwisa): Seven Miles Dune, 32 km S. of Runtu, *De*

Winter 3809; Omuramba bed, 27,2 km S. of Runtu on road to Karakuwisa, *De Winter 3768;* Bumbi, *Merxmüller & Giess 1850.*1820 (Tarikora): Omuramba Omatako near Kapupahedi, *Giess 10012.* 1821 (Andara): Botswana border near Okavango River, 19 km N. of Shakawe, *Wild & Drummond 7095* (K). 1920 (Tsumkwe): near Samangeigei, *Story 6099.*

The timber is hard and heavy and is used for furniture and for various other purposes. The heartwood is attractive, reddish-pink and fine-grained.

The seeds and arils are edible and are eaten in times of famine or scarcity of food. The arils are also made into a drink which is said to be very nourishing.

3506 5. SCHOTIA

Schotia *Jacq.*, Coll. 1 : 93 (1787), nom. conserv.; Lam., Tabl. Encycl. 2 : t. 331 (1797); Bodin in Thunb., Nov. Gen. Pl. 9 : 129 (1798), as *Scotia*; Willd., Sp. Pl. ed. 4, 2 : 537 (1799); Thunb., Fl. Cap. ed. Schult. 388 (1823); DC., Prodr. 2 : 507 (1825); G. Don, Gen. Syst. 2 : 454 (1832); E. Mey., Comm. 161 (1836); Eckl. & Zeyh., Enum. 2 : 261 (1836); Harv., Gen. Pl. ed. 1 : 92 (1838); Walp. in Linnaea 13 : 539 (1839); Endl., Gen. Pl. 2 : 1316 (1840); Harv. in F.C. 2 : 273 (1862); Benth. & Hook. f., Gen. Pl. 1 : 581 (1865); Oliv. in F.T.A. 2 : 309 (1871); Harms in Engl., Pflanzenw. Afr. 3,1 : 451 (1915); Marloth, Fl. S. Afr. 2 : 56 (1925); Bak. f., Leg. Trop. Afr. 3 : 708 (1930); Burtt Davy, Fl. Transv. 2 : 325 (1932); Phill., Gen. ed. 2 : 394 (1951); Léon. in F.C.B. 3 : 330 (1952); Codd in Bothalia 6,3 : 516 (1956); Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 97 (1957); Hutch., Gen. Fl. Pl. 1 : 240 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 326 (1965); Schreiber in F.S.W.A. 59 : 18 (1967). Type species: *S. afra* (L.) Thunb. (*S. speciosa* Jacq.).

Guajacum L., Sp. Pl. 1 : 382 (1753) pro parte quoad *G. afrum.*

Theodora Medik., Theod. 16, t.1 (1786); Eckl. & Zeyh., Enum. 2 : 261 (1836); Harv., Gen. Pl. ed.1 : 91 (1838); Taub. in Pflanzenfam. 3, 3 : 138 (1892); in Pflanzenw. Ost-Afr. C : 198 (1895).

Omphalobium Jacq.f. ex DC., Prodr. 2 : 508 (1825).

Unarmed trees or shrubs. *Leaves* simply paripinnate, alternate; leaflets usually 3–18 pairs, coriaceous, the lower usually smaller than the upper. *Stipules* small, deciduous. *Inflorescence* a short lateral or terminal panicle or raceme, sometimes produced from the old wood, many-flowered. *Flowers* red or pink, showy, hermaphrodite; bracts and bracteoles small, membranous, deciduous. *Calyx* leathery; tube turbinate, subcampanulate or cylindrical, persisting in fruit; lobes 4 (rarely 5), imbricate, often unequal, longer than the receptacle, broad and not reflexed at flowering, deciduous. *Petals* 5 or, in *S. brachypetala*, some or all of the petals reduced to linear filaments, imbricate, inserted inside the mouth of the receptacle, deciduous. *Stamens* 10, inserted with the petals; filaments linear, free or united basally, usually alternately long and short; anthers versatile, dehiscing by longitudinal slits. *Ovary* stipitate, the stipe attached to one side of the receptacle, ovules several to many; style elongate; stigma small, terminal. *Pods* oblong or broadly linear, sometimes ± falcate, compressed, woody, subindehiscent, beaked, with a hard margin or wing along the upper suture which persists, often with the seeds attached, after the eventual dehiscence of the valves. *Seeds* ovoid to globose, slightly compressed, with or without a yellow cupular aril.

A small genus restricted to Africa south of the Zambesi River. Some of the specimens examined exhibit floral characters of both *S. afra* (L.) Thunb. and of *S. latifolia* Jacq. One group shows a similarity to *S. latifolia* in general appearance but, unlike that species, has the stamen filaments free to the base; the other group resembles *S. afra* in general appearance, but the stamen filaments are united basally to a variable extent. The two groups are themselves not very uniform and, following Codd in Bothalia 6, 3 : 515–533 (1956), are treated as hybrids of *S. afra* and *S. latifolia*. No advantage is seen in giving these specimens any formal taxonomic rank until they have been studied in detail in the field in an attempt to evaluate their status. Both groups occur in areas where both *S. afra* and *S. latifolia* are found. Despite a plea by Codd that these intermediate specimens should be subjected to detailed study in the field, no attempt appears to have been made. As the hybrids are poorly represented in herbaria it would appear that they are relatively infrequent. 4 species, two groups of intermediate specimens, and one further entity are recognized. Many of the problems within this genus will only be resolved by detailed field studies.

The 3 tropical species from the Guinea-Congo Region with tubular calyx tubes and reflexed sepals have now been transferred to the genus *Leonardoxa* Aubrev. in Adansonia 8, 2 : 178 (1968).

The genus is named in honour of Richard van der Schot, Chief Gardener of the Imperial Garden of Schönbrunn, and friend and travelling companion of Jacquin's, during the latter's travels in America.

The name Boerboon (Farmer's bean) was given by the early European settlers to certain trees with edible seeds. All of the *Schotia* species have acquired this common name, even although some species have inedible seeds.

Stamens free to the base:

Leaflets usually exceeding 5 pairs per leaf and less than 1 cm wide:

Leaflets usually 6–11 pairs per leaf, 4–10 mm wide, oblong to elliptic or ± ovate ..... 1a. *S. afra* var. *afra*

Leaflets 12–18 pairs per leaf, 1–3 mm wide, linear or linear-oblong, sometimes slightly falcate ..... 1b. *S. afra* var. *angustifolia*

Leaflets 3–5 pairs per leaf, usually exceeding 1 cm in width ..... 5. *S. latifolia* × *S. afra, Form A*

Stamens united basally:

Petals 5, normally developed, very rarely 1 slightly reduced but then inflorescence a relatively lax terminal or lateral panicle:

Inflorescence a congested subglobose panicle usually borne on short lateral branchlets or sometimes terminal, seldom inflorescence lax and terminal but then leaves with > 4 pairs of leaflets; calyx tube 3–6 mm long; leaflets 4–10 pairs per leaf:

Flowers scarlet, sessile or on pedicels up to 1,5 mm long; staminal tube forming a distinct sheath which projects as a narrow irregular rim above the junction of the filaments; leaflets 3–5(6) pairs per leaf ..... 2. *S. capitata*

Flowers pink to red, on pedicels 3–3,5 mm long; staminal tube not forming a distinct sheath; leaflets 4–10 pairs per leaf ..... 6. *S. latifolia* × *S. afra, Form B*

Inflorescence a relatively lax terminal or lateral panicle; calyx tube up to 2,5 mm long; leaflets 3–5 pairs per leaf:

Petals 9–11 mm long; petioles 5–20 mm long; leaflets (1,5)2,5–6,5 cm long, (1)1,4–3,5 cm wide, margins usually glabrous or almost so ..... 3. *S. latifolia*

Petals 6–7 mm long; petioles 1–4 mm long; leaflets 0,7–3,2 cm long, 0,4–2,25 cm wide, margins typically ± densely ciliate ..... 7. *S. sp.*

Petals all, or some, reduced to linear filaments; inflorescence usually a dense ± congested subglobose panicle, usually cauliflorous on older branches but occasionally terminal ..... 4. *S. brachypetala*

1. **Schotia afra** (*L.*) *Thunb.*, [Prodr. Pl. Cap. 79 (1794) nomen nudum] Nov. Gen. Pl. 9 : 130 (1798), as *Scotia*; Codd in Bothalia 6,3 : 517 (1956); Palmer & Pitman, Trees S. Afr. 177, t.55 (1961); Von Breitenbach, Indig. Trees S. Afr. 3 : 327 (1965); Palmer & Pitman, Trees S. Afr. 2: 851 (1973). Type: *Herb. Linnaeus* 532.4 (LINN, lecto.!).

Much-branched shrub or small tree up to 7 m high with a somewhat spreading crown; trunk often gnarled. *Bark* usually rough, brown or greyish-brown; young branchlets glabrous to finely pubescent, sometimes festooned with lichens; lateral branchlets sometimes rigid and ± pointed apically. *Leaves* glabrous to finely pubescent: petiole 2–4 mm long; rhachis 2–8,5 cm long, channelled above, rarely narrowly winged; leaflets 6 (very rarely fewer) – 18 pairs, usually opposite, sessile, linear or oblong to elliptic or ± ovate, sometimes slightly falcate, 5–17(20) mm long, 1–10 mm wide, often oblique basally, apex obtuse, usually mucronate, glabrous throughout or finely pubescent. *Stipules* ovate, acuminate, up to 2 mm long, deciduous. *Inflorescence* a many-flowered congested subglobose panicle, borne on short lateral branchlets or, rarely, terminal; branches of inflorescence abbreviated, usually hidden by the flowers, glabrous to finely pubescent. *Flowers* on pedicels 3–9 mm long; bracts small, scale-like, deciduous. *Calyx* red, leathery; tube obconical to cylindrical, 3–8 mm long, 3–5 mm wide; lobes usually 4, sometimes one lobe emarginate apically or rarely divided to the base to give 5 lobes, obovate to oblong, 6–11 mm long, 5–10 mm wide. *Petals* 5, red to pink, oblanceolate, slightly clawed, 10–18 mm long, 3–7 mm wide, veined, often pubescent on the inner surface. *Stamens* 10; filaments free to the base, 15–20 mm long, exceeding the corolla by 3–8 mm; anthers elliptic, 2 mm long. *Ovary* obliquely-oblong, compressed

5–7 mm long, ± 2 mm wide, on a stipe 5–6 mm long; style 8–14 mm long. *Pods* as in generic description, (3,1)5–15 cm long, (1,8)3–4,5(6) cm wide. *Seeds* pale brown, ovoid to roundish, 12–18 mm long, 8–16 mm wide, 5–7 mm thick, aril very small or absent.

Found in the southern portion of South West Africa and in the Cape Province. Linnaeus, Sp. Pl. 1 : 382 (1753), recorded the habitat of *Guajacum afrum*, the basionym of *S. afra*, as Ethiopia, while in Sp. Pl. ed.2 : 547 (1762) the habitat was recorded as Ethiopia and China. This is certainly in error.

S. afra occurs chiefly in dry karroid valley bushveld and scrub and in dry broken country, but it occupies a diverse range of habitats. A very variable species in which two varieties are recognized. A few specimens from the Cape show floral characters intermediate between those of *S. afra* and *S. latifolia* and are treated as hybrids. The one group resembles specimens of *S. latifolia* in general appearance but, unlike this species, has the stamen filaments free to the base (see p. 31), while the other group resembles specimens of *S. afra* var. *afra* in general appearance, but has the stamen filaments united basally to a variable extent (see p. 32).

The binomial *Schotia afra* was validly published in Thunberg's Gen. Pl. 9 : 130 (1798). Although the name of Thunberg's student, N. G. Bodin, appears on the title page together with Thunberg's, modern convention treats Thunberg as the author. Consequently, the author citation is taken as *S. afra* (L.) Thunb.

(a) var. **afra**.

Codd in Bothalia 6,3 : 517, figs. 1 & 2 (1956).

Guajacum afrum L., Sp. Pl. 1 : 382 (1753); Mill., Gard. Dict. ed.8 (1768). Type as above.

Theodora speciosa Medik., Theod. 16, t.1 (1786); Eckl. & Zeyh., Enum. 261 (1836); Harv., Gen. Pl. ed. 1 : 92 (1838); Taub. in Pflanzenfam. 3, 3 : 138 (1892). Type: It is not known whether the specimen on which t.1 was based exists; in the absence of a specimen t.1 will suffice as the type.

Schotia speciosa Jacq., Coll. 1 : 93 (1787); Icon. Pl. Rar. 1 : 8, t.75 (? 1787); Schreb., Gen. Pl. 279 (1789); Willd., Sp. Pl. ed.4, 2 : 537 (1799); Andr., Bot. Rep. 5 : t.348 (1804); Ait., Hort. Kew. ed.2,3 : 33 (1811); Thunb., Fl. Cap. ed. Schult. 388 (1823); DC., Prodr. 2 : 508 (1825); Harv. in F.C. 2 : 274 (1862); Sim, For. Fl. Cape Col. 207, t.57 (1907); Harms in Engl., Pflanzenw. Afr. 3, 1 : 451 (1915); Marloth, Fl. S. Afr. 2 : 56, 57, t.20B (1925). Type: It is not known whether the specimen on which Icon. Pl. Rar. 1 : t.75 was based exists; if no specimen exists, t.75 will suffice as the type. *S. tamarindifolia* Afzel. ex Sims in Bot. Mag. 29 : t.1153 (1809); Ait.f., Hort. Kew. ed.2, 3 : 33 (1811); DC., Prodr. 2 : 508 (1825); E. Mey., Comm. 161 (1836); Pappe, Silva Cap. 15 (1854). Type: Bot. Mag. 29 : t.1153 (1809). *S. parvifolia* Jacq., Fragm. 85, t.136 fig. 4 (1809). Type: Jacq., Fragm. t.136 fig. 4 (1809). *S. speciosa* var. *tamarindifolia* (Afzel. ex Sims) Harv. in F.C. 2 : 274 (1862). Type as for *S. tamarindifolia*.

Leaflets usually 6–11 pairs per leaf, 10–17(20) mm long, 4–10 mm wide, oblong to elliptic or ± ovate.

Var. *afra* is confined to the Cape Province.

CAPE.—3320 (Montagu): Ratelfontein, between Dobbelaarskloof and Karreevlakte, *Hall 881* (NBG); Anysberg, *Stokoe 8390* (BOL, SAM). 3321 (Ladismith): Seven Weeks Poort, *De Jager sub BOL 25610*. 3323 (Willowmore): Keurbooms River, *H. C. Taylor 29* (BOL). 3324 (Steytlerville): Klein Winterhoek, *Drege s.n.* (P). 3325 (Port Elizabeth): Addo Bush, *Gill 10* (BOL); Kenkelbos, *Shantz 115* (K); Perseverance, *Rodin 1282* (BOL, K); at Uitenhage by Swartkops River, *Burchell 4425* (K). 3326 (Grahamstown): near Grahamstown, *Compton 23358* (NBG); 28,9 km E. of Grahamstown, *Codd 9237;* Port Alfred, *Rogers 16637* (K); 72 km S.W. of Grahamstown, *Compton 24051* (NBG). 3421 (Riversdale): Gouritz River, *Drege s.n.* (P); Skilpadgat, 8 km N.W. of Albertinia, *H. C. Taylor 209* (NBG); Still Bay Strand, *H. C. Taylor 92* (BOL). 3422 (Mossel Bay): Mossel Bay, *Guthrie 4303* (NBG). 3424 (Humansdorp): Jeffreys Bay, *L. E. Taylor 3134* (NBG). Grid ref. unknown: Alexandria Distr., Debega valley, *Galpin 10661* (BOL); Oudtshoorn Distr., between Oudtshoorn and Calitzdorp, *Barker 628* (NBG); Robertson Distr., along Komas River, 33,6 km from Montagu, *Acocks 8618*; Swellendam Distr., Eierpoort, *Compton 11920* (NBG).

The plants included in var. *afra* may be subdivided again into two groups on the basis of the shape of the calyx, one group with the calyx tube obconical in shape while, in the other group, the calyx tube is cylindrical, although the distinction between the two groups is not absolute. The form with an obconical calyx tube tends to have a predominantly western distribution centred mainly in the Little Karoo, but with outliers as far east as the Knysna district.

The second group with a cylindrical calyx tube was described as *S. tamarindifolia* Afzel. ex Sims, but was subsequently placed as *S. speciosa* var. *tamarindifolia* by Harvey. As this second group is vegetatively indistinguishable from the preceding group, there seems to be no advantage in separating it even as a distinct variety. This second group tends to occupy an area mainly to the east of the group with obconical calyces, but there are western outliers so that there is no clear geographical discontinuity between the two groups.

Codd l.c. : 518 cited the type specimen of *S. tamarindifolia* as a specimen in the British Museum (Natural History) collected by Masson in the Cape. Unfortunately I have not succeeded in locating this specimen. There are three *Schotia* specimens in the British Museum collected by Masson, but none of them could be the specimen on which Bot. Mag. 29 : t.1153 was based. In two specimens the leaflets are far too small, have the wrong shape, and are distinctly mucronate apically, while the third specimen (referable to *S. latifolia* Jacq.) is clearly the third species mentioned by Sims in Bot. Mag. 29 : t.1153 "with four pair of obcordate leaflets, and a legumen much less curved." Consequently, in the absence of a specimen, I have cited t.1153 as the type of *S. tamarindifolia*.

S. tamarindifolia was described as having five calyx lobes. Although this is unusual, it is not unknown. There are usually four lobes but, occasionally, the largest lobe is split apically. Rarely and only in extreme cases, this apical split continues to the base of the lobe with the result that five lobes instead of four are present.

Codd l.c. : 521 hesitantly referred *S. parvifolia* Jacq. to synonymy under var. *angustifolia*. The plate of *S. parvifolia* is difficult to place with certainty, but as the leaves have a maximum of 8 pairs of leaflets, and as the leaflets are 2,5–4,5 mm wide, it is felt that *S. parvifolia* is perhaps better placed in synonymy under var. *afra*.

(b) var. **angustifolia** (*E. Mey.*) *Harv.* in F.C. 2 : 274 (1862); Codd in Bothalia 6,3 : 520, figs. 4 & 7 (1956); Schreiber in F.S.W.A. 59 : 18 (1967); Codd in Flow. Pl. Afr. 42 : t.1665 (1973). Type: Cape, 3226 (Fort Beaufort), between Kunap and Kat Rivers, *Drège* (BM, lecto.!, P!).

S. angustifolia E. Mey., Comm. 161 (1836). Type as above. *S. venusta* Mason in J. R. Hort. Soc. 39 : fig. 14 (1913) nomen nudum. *S. speciosa* var. *tamarindifolia* sensu L. Bol. in Ann. S. Afr. Mus. 9 : 258 (1915), non (Afzel. ex Sims) Harv.

Leaflets 12–18 pairs per leaf, 5–17 mm long, 1–3 mm wide, linear or linear-oblong, sometimes slightly falcate.

Var. *angustifolia* is found in the southern portion of South West Africa and in the Cape Province.

S.W.A.—2816 (Oranjemund): Lorelei, *Merxmüller & Giess 2430* (M); Kupfermine Lorelei, *Giess, Volk & Bleissner 5427* (M). 2818 (Warmbad): farm Eendoorn, *Galpin s.n.* (BOL); 20 km W. of Raman's Drift, *Pearson 4540* (BM, K); Skunsbergs-Quelle, S. of Warmbad, *Dinter 5133*.

CAPE.—2816 (Oranjemund): S.E. of Sendelings Drift, *Pillans 5085* (BOL). 2820 (Kakamas): Augrabies, *L. E. Taylor 3466* (NBG); Aughrabies Falls, *Esterhuysen 23557* (BOL). 2919 (Pofadder): 11,2 km W. of Pofadder, *Thorne sub SAM 57360*. 2920 (Boomrivier): Groot Rozynbosch, *Pearson 3824* (BM, BOL, K). 2922 (Prieska): farm Witfontein, ± 32 km N.W. of Prieska, *Bryant sub BOL 25612*. 3127 (Lady Frere): near Bolotwa, *Thorns s.n.* (NBG); Cofimvaba, Quamatapoort valley, *Mundell s.n.* (NBG). 3224 (Graaff-Reinet): near Graaff-Reinet, *H. Bolus 621* (BOL). 3225 (Somerset East): Blyde River, *Burchell 2964* (K). 3226 (Fort Beaufort): N. side of Mitchell's Pass, *Esterhuysen 13235* (BOL). 3227 (Stutterheim): Kei Bridge, *Codd 9242*; near Komgha, *Flanagan 1322* (BOL, SAM); 6,4 km from Mt. Coke on road to Reed's Camp, *Comins 1575*. 3326 (Grahamstown): Robber station, between Blue Krantz and Kowie River, *Burchell 3883* (K); 8 km S.W. of Breakfast Vlei on road to Grahamstown, *Lewis sub SAM 66637*.

Var. *angustifolia* occurs in two disjunct areas. The first extends from Victoria East to Butterworth and inland to Queenstown and Graaff-Reinet. The second area extends from Prieska westwards to northern Namaqualand and the Warmbad district of southern South West Africa.

2. **Schotia capitata** *Bolle* in Peters, Reise Mossamb. Bot.1 : 18 (1861); Oliv. in F.T.A. 2 : 310 (1871); Sim, For. Fl. P.E. Afr. 51 (1909); Bak.f., Leg. Trop. Afr. 3 : 710 (1930); Codd in Bothalia 6,3 : 521, fig. 3 (1956); Letty, Wild Flow. Transv. 164, t.82 : 3 (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 330 (1965); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966); Palmer & Pitman, Trees S. Afr. 2 : 853 (1973); Ross, Fl. Natal 194 (1973); in Bothalia 11 : 285 (1974). Type: Mozambique, Inhambane, *Peters* s.n. (B, holo.†; BM, sketch!); Mozambique, Lourenço Marques Prov., Goba, rio Maivavo, *Balsinhas* 204 (K, neo.!).

S. tamarindifolia Afzel. ex Sims var. *forbesiana* Baill. in Adansonia 6 : 197 (1866). Type: Mozambique, Delagoa Bay, *Forbes* 32 (K, iso.!). *S. transvaalensis* Rolfe in Kew Bull. 1906 : 248 (1906); Burtt Davy, Fl. Transv. 2 : 326 (1932); Henkel, Woody Pl. Natal 219 (1934); Phillips in Flow. Pl. Afr. 15 : t.574 (1935) excl. descr. "up to 30 ft high"; Codd, Trees & Shrubs Kruger Nat. Park 68, fig. 63 b, c (1951). Type: Transvaal, Barberton Distr., Barberton, *P. Orange* s.n. (K, holo.!).

Theodora capitata (Bolle) Taub. in Pflanzenw. Ost. Afr. C : 198 (1895). Type as for *Schotia capitata*.

Many-stemmed shrub or slender tree up to 7 m high, often sub-scandent or scandent, sometimes forming a large spreading bush. *Bark* pale grey and smooth when young, but rough and dark brown when old; young branchlets glabrous to ± densely pubescent. *Leaves* glabrous to ± densely pubescent: petiole 1–6 mm long; rhachis 3–8 cm long, narrowly winged especially apically; leaflets 3–5(6) pairs, opposite or subopposite, sessile, elliptic, sub-rotund or obovate, (1)1,5–3,5 cm long, (0,6)1–1,8(2) cm wide, obtuse or acute basally, often oblique, obtuse or acute and usually mucronate apically. *Stipules* obliquely ovate, up to 6 mm long and 3 mm wide, deciduous. *Inflorescence* a congested subglobose panicle, borne on short lateral branchlets or sometimes terminal; inflorescence branches much abbreviated, semi-woody, glabrous or pubescent. *Flowers* scarlet, sessile or on pedicels up to 1,5 mm long; bracts scale-like, less than 1 mm long, deciduous. *Calyx* leathery, tube obconical, 3–6 mm long, persistent; lobes 4, subequal, obovate to elliptic, 6–9 mm long, 3–4 mm wide. *Petals* 5, oblanceolate, clawed, 10–14

mm long, 3–4 mm wide, veined. *Stamens* 10, united basally for 2–4,5 mm and forming a sheath around the stipe of the ovary, sheath split open on the side to which the stipe of the ovary is attached to the calyx receptacle, projecting as a narrow irregular rim ± 1 mm above the junction of the stamen-filaments; one or two filaments often free to the base on the split side; filaments linear, 12–16 mm long, exceeding the corolla by 3–5 mm; anthers elliptic, 1,5–2 mm long. *Ovary* oblong, 4–5 mm long, ± 2 mm wide, compressed, on a stipe 4–5 mm long and ± 1 mm thick, adnate to one side of the calyx receptacle; style 13–15 mm long. *Pod* as in generic description, 4–16 cm long, 2,5–3,9 cm wide. *Seeds* pale brown, ovoid, 8–12 mm long, 8–12 mm wide, 5–6 mm thick, with a large compressed yellow basal aril.

Found in Mozambique, the eastern Transvaal, Swaziland and Natal (Zululand). Occurs in dry thornveld and bushveld.

TRANSVAAL.—2431 (Acornhoek): Kruger National Park, 12 km N.E. of Skukuza on Lower Sabie road, *Codd & De Winter 5063*; Kruger National Park, Tshokwane, *Kloppers sub PRE 32226*. 2531 (Komatipoort): Kruger National Park, 33,6 km from Pretoriuskop on Skukuza road, *Story 3934*; Komatipoort, *Rogers 22150*; 25,6 km S. of Komatipoort, *Strey 4023*.

SWAZILAND.—2631 (Mbabane): near Bulunga Poort, *Compton 32171*. 2632 (Bela Vista): Ingwavuma Poort, *Dlamini s.n.* 2731 (Louwsburg): near Gollel, *Karsten s.n.*

NATAL.—2632 (Bela Vista): Ndumu Hill, *Pooley 99* (NH, NU). 2731 (Louwsburg): between Pongola Poort and Transvaal road bridge, *Dyer & Verdoorn 5844*. 2732 (Ubombo): Mkuzi Game Reserve, *Ward 4466* (NH); 27,2 km N. of Hluhluwe on Mkuze road, *Ross 1981*. 2831 (Nkandla): Umfolozi Game Reserve, road from Tobothi to Ngoloti, *Ross 2015*; Umfolozi Game Reserve, *Ward 1468* (NH); Corridor, *Hitchins 197* (NH); Black Umfolozi valley, near Mahlabatini, *Acocks 11666*.

S. capitata is a fairly variable species and, in the absence of flowers, it is sometimes difficult to separate some forms of it from *S. brachypetala* as the size of the leaflets in the two species overlaps. However, in the field the two species can be distinguished by the difference in habit.

S. capitata shows a superficial resemblance to some of the specimens referred to "*S. latifolia* × *S. afra*, Form B", but is distinguished from this group by the characteristic staminal sheath which encloses the stipe of the ovary. The sheath is usually composed of 8 stamens united basally for 2–4,5 mm with a slit on the side to which the stipe is attached to the calyx receptacle. The sheath is smooth on the inside and is projected as an uneven rim ± 1 mm above the junction of the stamen filaments. One or two stamens are usually free to the base on the open side of the sheath.

In the Umfolozi Game Reserve in Zululand there is a ± densely pubescent variant of *S. capitata*, for example, *Ward* 1468 (NH), *Ross* 2015, *Moll* 5728. This variant often grows into a large several-stemmed bush which may attain a height of 7 m and a spread of up to 20 m with stems up to 25 cm in diameter. The more usual semi-scandent form of *S. capitata* is also found in apparently ecologically similar situations. The significance of these different growth forms is not understood and further field observations are required.

3. **Schotia latifolia** *Jacq.*, Fragm. 23, t.15 fig.4 (1801): DC., Prodr. 2 : 508 (1825); E. Mey., Comm. 162 (1836); Eckl. & Zeyh., Enum. 262 (1836); Harv., Gen. Pl. ed. 1 : 92 (1838); Jacq.f., Eclog. Pl. Rar. 2 : 6, t.126 (1844); Pappe, Silva Cap. 15 (1854); Harv. in F.C. 2 : 274 (1862); Sim, For. Fl. Cape Col. 206, t.57 (1907); Marloth, Fl. S. Afr. 2,1 : 56–58, t.20A (1925); Codd in Bothalia 6,3 : 523, figs. 5 & 8 (1956); Palmer & Pitman, Trees S. Afr. 179 (1961); Von Breitenbach, Indig. Trees S. Afr. 3 : 332 (1965); Palmer & Pitman, Trees S. Afr. 2 : 855 (1973). Type: It is not known whether the specimen on which Jacq., Fragm. t.15 fig. 4 was based exists; in the absence of a specimen t.15 fig. 4 will suffice as the type.

Omphalobium schotia Jacq.f. ex DC., Prodr. 2 : 508 (1825) in synonymy.

Schotia diversifolia Walp. in Linnaea 13 : 541 (1839). Syntypes all from the Cape Province: Uitenhage and Albany districts, *Ecklon & Zeyher* 1701 (GRA!, K!, P!, PRE!, SAM!); 3227 (Stutterheim): Zandplaat, *Drège* (not traced); 3326 (Grahamstown): Glenfilling, *Drège* (BM!, K!, P!); 3327 (Peddie): Keiskamma, *Drège* (P!). *S. cuneifolia* Gand. in Bull. Soc. Bot. Fr. 60 : 462 (1913). Type: Cape Province, *Penther* 2516 (not traced, but see note below).

Theodora latifolia (Jacq.) Taub. in Pflanzenfam. 3,3 : 138 (1892). Type as for *Schotia latifolia*.

Tree up to 10(15) m high with a somewhat rounded crown. *Bark* smooth, dull grey to reddish-brown; young branchlets glabrous to shortly pubescent. *Leaves* glabrous to shortly pubescent: petiole 0,5–2 cm long; rhachis (2)4–8(10) cm long, slightly channelled above, winged in the juvenile state; leaflets 3–5 pairs, usually opposite, sessile, elliptic-oblong to obovate, (1,5)2,5–6,5 cm long, (1)1,4–3,5 cm wide, cuneate to rounded basally, oblique, rounded to acute apically, rarely mucronate, the upper leaflets the largest. *Stipules* ovate, up to 4 mm long, deciduous. *Inflorescence* a terminal or lateral panicle, usually relatively open; branches of inflorescence patent, glabrous to shortly pubescent. *Flowers* on pedicels

less than 2 mm long; bracts scale-like, deciduous. *Calyx* reddish-brown, leathery; tube very short, turbinate, 1,5–2 mm long, persistent; lobes 4, subequal, obovate, 5–8 mm long, 4–5 mm wide. *Petals* 5, equal or, occasionally, 1 slightly reduced, pink to flesh-coloured, veined, oblanceolate, 9–11 mm long, 2,5–3 mm wide. *Stamens* 10; filaments united basally for 0,5–5 mm, the staminal sheath split open on the side to which the stipe of the ovary is attached to the calyx receptacle, filaments linear, 10–14 mm long, exceeding the corolla by 2–3 mm; anthers elliptic, 1,5–2 mm long. *Ovary* oblong, 4–5 mm long, ± 2 mm wide, compressed, on a stipe ± 2 mm long, stipe adnate to one side of calyx receptacle; style 10–12 mm long. *Pods* as in generic description, 5–14 cm long, 3–4,5 cm wide. *Seeds* pale brown, 11–14 mm long, 7,5–10 mm wide, 5–7 mm thick, with a large yellow basal aril. Fig. 5:6.

Found in the Cape Province, although three gatherings from the eastern Transvaal (see note below) are also apparently referable to *S. latifolia*. Occurs on forest margins and in dry scrub and bushveld.

TRANSVAAL.—2429 (Zebediela): S.E. of Chuniespoort, *Plowes 2190*. 2430 (Pilgrim's Rest): 1,6 km S.E. of Steelpoort station, *Codd 9778*; 1,6 km N.W. of Burgersfort, *Codd 9828*.

CAPE.—3225 (Somerset East): on Bosch River near Somerset East, *Burchell 3130* (K). 3226 (Fort Beaufort): Brambledene, between Alice and Seymour, *Barker 2898* (BOL, NBG). 3227 (Stutterheim): Dohne, *Acocks 9501*; 11,2 km from Mt. Coke Hotel on road to King William's Town, *Comins 1574*; near Komgha, *Flanagan 712* (BOL, SAM). 3325 (Port Elizabeth): Uitenhage, *Thode A2644, Gill 16* (BOL); near Blockhouse, *Burchell 4332* (K); around Krakakamma, *Burchell 4550* (K). 3326 (Grahamstown): 24 km N.W. of Grahamstown, *Maguire 661* (NBG); Howison's Poort near Grahamstown, *MacOwan 77* (BM, BOL, K); Port Alfred, *Rogers 28603* (K). 3327 (Peddie): Ebb-and-Flow, *Maguire 619* (NBG); Hamburg, 3,2 km from Keiskamma Hotel, *Comins 1611*. 3423 (Knysna): Plettenberg Bay, *Pappe s.n.* (K); Keurbooms River, *Compton 4457* (BOL, NBG); Keurbooms River Pass, *Fourcade 1992* (BOL, K).

As mentioned by Codd l.c. : 525, Jacquin's plate (Fragm. t.15 fig.4) consists of a vegetative shoot and was made from an immature plant said to be five years old, grown from seed collected by Georg Scholl, who collected in the Cape Province from 1785 to 1797 for the Imperial Gardens at Schönbrunn. Scholl apparently did not travel further east than East London and therefore would not have entered the distributional range of *S. brachypetala* Sond., a species which is vegetatively indistinguishable from *S. latifolia*. This is not the only evidence relating to the identity of Jacquin's plate. De Candolle, Prodr. 2 : 508 (1825), provided a description of the flowers of *S. latifolia* based on an unpublished plate (later published in Eclog. Pl. Rar. 2 : t.126, 1844) by Jacq.f., who had given it the manuscript name *Omphalobium schotia*. Presumably this was the same plant as that figured by the elder Jacquin.

As discussed by Codd l.c. : 525, the type specimen of *S. cuneifolia* was cited by Gandoger as *Penther* 2516. All attempts to trace *Penther* 2516 have failed, but in the Naturhistorisches Museum, Vienna, there is a sheet of *S. latifolia* labelled *Penther* 2561 from the East London district. The possibility exists that *Penther* 2516 is a typographical error for *Penther* 2561, and that the latter is actually the type specimen. In any event, the type description of *S. cuneifolia* does not suggest that this species is distinct from *S. latifolia*.

In the Cape Province *S. latifolia* is known from as far east as the Kentani and Engcobo districts, while *S. brachypetala* is known to occur as far south as Umtata. Present evidence suggests that the distributional ranges of these two species do not overlap, but further collecting is required in the Transkei and in Pondoland to establish whether or not this impression is correct.

Three flowering specimens from Sekukuniland in the eastern Transvaal, namely *Codd* 9778, 9828 and *Plowes* 2190, merit special mention. These specimens have relatively open terminal or lateral inflorescences, pink flowers, and the same overall facies as *S. latifolia*. The number of petals developed per flower varies among the specimens, but no more than one appears to be reduced to a linear filament. Vegetatively the specimens are not uniform. *S. brachypetala* is the only species known to occur in Sekukuniland but these three gatherings do not have the same facies as this species. Although separated from the nearest population of *S. latifolia* by a large geographical discontinuity, and although not quite typical of it, the specimens cannot be distinguished satisfactorily from *S. latifolia* and are therefore provisionally included in this species. The occurrence of these specimens so far away from the nearest population of *S. latifolia* is difficult to explain. Field studies and more material are required.

There are 2 specimens, *Thorncroft* s.n. (NBG), from a plant of *S. latifolia*, cultivated at Kirstenbosch which is said to have come from Barberton in the eastern Transvaal. As *S. latifolia* was not recorded from the Transvaal, it has been assumed in the past that the Kirstenbosch plant was of garden origin in Barberton. However, because of these anomalous specimens from Sekukuniland, the possibility can no longer be excluded that *S. latifolia* may occur indigenously near Barberton. This requires investigation.

A few specimens from the Cape show floral characters intermediate between those of *S. latifolia* and *S. afra* and are treated as hybrids. The one group resembles specimens of *S. latifolia* in general appearance but, unlike this species, has the stamen filaments free to the base (see p. 31), while the other group resembles specimens of *S. afra* var. *afra*, but has the stamen filaments united basally to a variable extent (see p. 32).

4. **Schotia brachypetala** *Sond.* in Linnaea 23 : 39 (1850); Harv., Thes. Cap. 1 : 21, t.32 (1859); in F.C. 2 : 274 (1862); Wood, Natal Plants 4 : t.390 (1906); Sim, For. Fl.

FIG. 5.—**Schotia brachypetala.** 1, flowering twig, × ⅔; 2, flower, × 1; 3, flower with sepals removed, × 1; 4, gynoecium, × 2, all from *Codd* 6695; 5, pod and arillate seed, × ⅓, from *Howes* 20. **Schotia latifolia.** 6, part of flowering twig, × ⅓, from *Harvey* 1839.

P. E. Afr. 51, t.55B (1909); Harms in Engl., Pflanzenw. Afr. 3,1 : 452 (1915); Marloth, Fl. S. Afr. 2 : 56, 58, t.20c (1925); Bak.f., Leg. Trop. Afr. 3 : 709(1930); Burtt Davy, Fl. Transv. 2 : 326 (1932); Dyer in Flow. Pl. Afr. 20 : t.777 (1940); Codd, Trees & Shrubs Kruger Nat. Park 66, t.3, fig. 63a (1951); Pardy in Rhod. Agric. J. 49 : 173 (1952); Codd in Bothalia 6,3 : 526, fig.6 (1956); Palgrave, Trees Centr. Afr. 119–120 (1957); Palmer & Pitman, Trees S. Afr. 178, t.56, XII (1961); Von Breitenbach, Indig. Trees S. Afr. 3 : 328 (1965); Gomes e Sousa, Dendrol. Moçamb. 1 : 262, t.61 (1966); De Winter et al., 66 Transv. Trees 66, 68 (1966); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966); Van Wyk, Trees Kruger Nat. Park 1 : 189 (1972); Ross, Fl. Natal 194 (1973); Palmer & Pitman, Trees S. Afr. 2 : 855 (1973). Type: Natal, Durban [Port Natal], *Gueinzius* 33 (S, holo., K, photo., SAM, ? iso.!).

S. brachypetala var. *pubescens* Burtt Davy, Fl. Transv. 2 : XXX, 326 (1932). Type: Transvaal, Letaba Distr., Shiluvane, *Junod* 635 (K, holo.! , PRE!). *S. rogersii* Burtt Davy, Fl. Transv. 2 : XXX, 326 (1932). Type: Transvaal, Soutpansberg Distr., Waterpoort, *Rogers* 21246 (K, holo.!, GRA!, PRE!, SAM!). *S. latifolia* sensu Henkel, Woody Pl. Natal 219 (1934), non Jacq. *S. semireducta* Merxm. in Mitt. Bot. Staatssamml. München 6 : 199 (1953). Type from Rhodesia.

Tree up to 16 m high with a somewhat rounded crown. *Bark* greyish- to reddish-brown, rough or smooth; young branchlets glabrous to shortly pubescent. *Leaves* glabrous to shortly pubescent: petiole 0,5–2,5 cm long; rhachis 2,5–14(18) cm long, slightly channelled above, often narrowly winged especially apically; leaflets 4–7(8) pairs, opposite or subopposite, sessile or with petiolules up to 2 mm long, elliptic, oblong, ovate-oblong, ovate or obovate, 2,5–8,5 cm long, (0,8)1,2–4,5 cm wide, obtuse or rounded basally, oblique, rounded apically, rarely mucronate, the upper leaflets largest. *Stipules* ovate, 4–5 mm long, deciduous. *Inflorescence* a dense ± congested subglobose panicle, usually cauliflorous on older branches but occasionally terminal; inflorescence branches woody, abbreviated, glabrous or pubescent. *Flowers* deep red or scarlet, pedicellate; pedicels 5–12 mm long, glabrous or pubescent; bracts ovate, up to 6 × 4 mm, soon deciduous. *Calyx* leathery; tube obconical to subcampanulate, 3–9 mm long, glabrous or sparingly pubescent; lobes 4, subequal, ovate to elliptic, 8–12 mm long, 4–6 mm wide, the largest often emarginate apically. *Petals* 5, all reduced to linear filaments 2–6 mm long, or 1–4 petals developing per flower and then red, spathulate to oblanceolate, clawed, 1,3–1,8 cm long, 3–6 mm wide. *Stamens* 10, filaments united basally for 1,5–3,5 mm, tube entire or split down one side; filaments linear, 1,8–2 cm long, exceeding the calyx by 8–10 mm; anthers elliptic, 2–2,5 mm long. *Ovary* oblong, 4–6 mm long, ± 2 mm wide, compressed, tuberculate along the margins, on a stipe up to 4 mm long which is adnate to one side of the calyx receptacle; style 9–11 mm long. *Pods* as in generic description, 5–17 cm long, 3,5–4,7 cm wide. *Seeds* light brown, ovoid, oblong or oblique, 10–15 mm long, 8–15 mm wide, 5–6 mm thick, with a large yellow basal aril. Fig. 5 : 1–5.

Found in Rhodesia, Mozambique, Transvaal, Swaziland, Natal and the eastern Cape Province. Occurs in dry thornveld, bushveld, woodland or scrub forest; often found on river banks or on termite mounds.

TRANSVAAL.—2229 (Waterpoort): farm Hamilton 621, *Codd 4453*; 17,6 km N. of Louis Trichardt near Wyllie's Poort, *Codd 4443*. *Codd 4444*. 2231 (Pafuri): Kruger National Park, Punda Milia, *Rowland Jones 23*. 2328 (Baltimore): Leipzig, *Leipoldt 2*. 2329 (Pietersburg): 44,8 km W. of Louis Trichardt, *Codd 4442*. 2330 (Tzaneen): Tzaneen, *Pole Evans sub PRE 15819*. 2427 (Thabazimbi): 13,6 km S.E. of Hermanusdoorns on road to Vaalwater, *Codd 4426*. 2429 (Zebediela): Chuniespoort, *Acocks & Hafstrom 722*. 2430 (Pilgrim's Rest): 16 km S. of Penge Mines, *Codd 6695*; near Morone, *Codd 9781*. 2431 (Acornhoek): Kruger National Park, 2,4 km N.E. of Skukuza, *Codd 4386*. 2531 (Komatipoort): Kruger National Park, Numbi, *Van der Schijff 63*; Kruger National Park, 28,8 km N. of Malelane Camp, *Codd 4375*.

SWAZILAND.—2631 (Mbabane): Malinda, *Compton 30131*; Ranches, *Compton 27025*; 29 km E. of Manzini, *Reynolds 9689*; Timbutini, *Dlamini s.n.*

NATAL.—2730 (Vryheid): Utrecht, *Thode A1287* (K, NH). 2732 (Ubombo): Mkuze, *Galpin s.n.* (BOL). 2829 (Harrismith): Klip River, *Sutherland s.n.* (K). 2830 (Dundee): 19,2 km from Muden on Weenen road, *Moll 3248*. 2831 (Nkandla): Umfolozi Game Reserve, *Ward 4386* (NH). 2832 (Mtubatuba): 4,8 km N. of Mtubatuba on Hluhluwe road, *Ross 1367* (K, NH, NU). 2930 (Pietermaritzburg): Umkomaas River valley near Richmond, *Howes 20* (K). 2931 (Stanger): Verulam, *Wood 1367* (K). 3030 (Port Shepstone): Dumisa, *Rudatis 685* (BM, K).

CAPE.—3128 (Umtata): Umtata Commonage, *Miller B/955*; Buntingville, *Conservator of Forests 2058*. 3129 (Port St. Johns): E. of Welsh Bridge, *Acocks 13844*; 8 km from Welsh Bridge on Cwehaland road, *Story 4211*; between Mateku waterfall and Msikaba drift, *Strey 8508* (NH).

S. brachypetala is the most widespread of all of the *Schotia* species. It is rather a variable species,

particularly in the degree of pubescence, number, shape and size of leaflets, and the degree of suppression of the petals. Of these characters, the degree of pubescence has the least taxonomic significance as there is a gradation from persistently pubescent specimens to ± glabrous specimens.

In typical *S. brachypetala* all of the petals are reduced to linear filaments. However, as discussed by Codd l.c. : 528, this suppression is frequently incomplete and from 1–4 normal petals per flower may be present. Although the number of normal petals per flower appears to be uniform on a single tree, there is often variation in the number of petals developed from tree to tree within a population. Apart from this difference in the number of petals developed, neighbouring trees are otherwise indistinguishable. Codd l.c. found that the tendency to produce normal petals becomes more marked towards the northern limits of distribution of the species.

S. brachypetala is almost evergreen, usually shedding its leaves for a short period immediately before the flowers appear. The flowers are well supplied with nectar and the trees often "weep" when in flower, whence the common names Weeping Boerboon or Huilboerboon. Several species of birds are attracted by the nectar.

The timber of *S. brachypetala* is of good quality and is suitable for use in furniture. The sapwood is pinkish grey and the heartwood dark walnut to black, hard, heavy and fine textured.

5. **Schotia latifolia** *Jacq.* × **S. afra** (*L.*) *Thunb.*, **Form A.**

Codd in Bothalia 6,3 : 529, figs. 9 & 11 (1956).

S. stipulata Ait.f., Hort. Kew ed. 2, 3: 33 (1811); DC., Prodr. 2 : 508 (1825). Type from a plant cultivated at Kew from seed collected in the Cape by Masson (BM, ? holo.!). *S. speciosa* var. *ovalifolia* Harv. in F.C. 2 : 274 (1862). Syntypes: The type of *S. stipulata* Ait.f. (BM!); Cape, "Winterhoeksberge and Zwartberge", *Ecklon & Zeyher* 1700 (GRA!, K.!, SAM!).

Theodora stipulata (Ait.f.) Eckl. & Zeyh., Enum. 261 (1836). Type as for *Schotia stipulata*.

Shrub or small tree; young branchlets glabrous to shortly pubescent. *Leaflets* 3–5 pairs per leaf, 1,2–4,2 cm long, 0,7–2,3 cm wide, sessile, elliptic-oblong to obovate, oblique, obtuse or acute apically and often mucronate. *Inflorescences* terminal, ± lax. *Flowers* red or pink, on pedicels 1–5 mm long. *Calyx* leathery; tube 1–4 mm long; lobes 4–9 mm long, 3,5–6 mm wide. *Petals* 5, obovate, 7–13 mm long, 3–4 mm wide. *Stamens* 10, filaments free to the base. *Ovary* oblong, compressed, 4–5 mm long, stipitate. *Pods* as in generic description. *Seeds* pale brown, ovoid, flattened, with a yellow basal aril. Differs from *S. afra* in having lax inflorescences and fewer pairs of larger leaflets; differs from *S. latifolia* in having stamen filaments free to the base.

Found in the Port Elizabeth and Uitenhage districts of the Cape Province.

CAPE.—3325 (Port Elizabeth): "Zwartkops River near Addo", *Zeyher 672* (BM, BOL, K, OXF, SAM p.p.); *Zeyher 2446* (SAM): Rehouse (on Swartkops River), *Paterson 662* (PRE). Grid ref. unknown: "Winterhoeksberge and Zwartberge", *Ecklon & Zeyher 1700* (GRA, K, SAM).

The specimens included here are themselves not very uniform. They resemble *S. latifolia* in general appearance, but differ from this species in having the stamen filaments free to the base.

Paterson 662 consists of a flowering twig and a fruiting twig. As the pod is mature, and as the leaflets on the fruiting twig are of a different size and shape to those on the flowering twig, it is by no means certain that both twigs were collected at the same time or off the same plant. This is stressed because the maximum leaflet dimensions recorded in the above description are taken from this fruiting twig. The fruiting twig bears a strong resemblance to *S. latifolia*, and the flowering twig has a superficial resemblance to specimens of *S. latifolia* × *S. afra* Form B, but differs in having the stamen filaments free to the base. The flowers in *Paterson* 662 are on pedicels 4–5 mm long, the calyx tube is 4 mm long, the lobes are up to 9 mm long, and the petals are up to 15 mm long. In *Zeyher* 672 and 2446, however, the pedicels and calyx tubes are much shorter and the calyx lobes and petals are smaller. In the Bolus Herbarium there are two collections of *Zeyher* 672: one consists of a mixed gathering of *S. latifolia* × *S. afra* Form A and of *S. latifolia*, and the second gathering consists entirely of the hybrid Form A. The sheet of *Zeyher* 672 in the South African Museum collection likewise consists of a mixed gathering of *S. latifolia* × *S. afra* Form A and of *S. latifolia*.

As the specimens share characters of both *S. afra* and *S. latifolia*, it appears that they may be hybrids, but there is no direct evidence to substantiate this suggestion. All of the specimens are from areas where both *S. afra* and *S. latifolia* occur. As indicated by Codd l.c. : 530, there seems to be no advantage in giving these plants any formal taxonomic rank until they have been subjected to detailed field studies.

Aiton based his description of *S. stipulata* on a plant cultivated at Kew and said to have been grown from seed collected in the Cape by Masson. A specimen, thought to be the holotype, is housed in the British Museum (Natural History). I have not seen any other specimen that matches it. The specimen has distinctly winged rhachides, 4–5 pairs of leaflets per leaf which are up to 3,2 cm long and 1,75 cm wide, and conspicuously mucronate apically. The stipules are obliquely ovate and up to 7 × 4 mm. The two flowers are on pedicels ± 1 mm long. In one flower the stamen filaments are free to the base, but in the other a few of the filaments are very shortly united basally. *S. stipulata* is difficult to place with certainty, but, as indicated by Codd l.c. : 529, it probably belongs to this group of specimens.

6. **Schotia latifolia** *Jacq.* × **S. afra** (*L.*) *Thunb.*, **Form B.**

Codd in Bothalia 6,3 : 530, fig. 10 (1956).

Shrub or tree up to 8 m high; young branchlets glabrous to shortly pubescent. *Leaflets* 4–10 opposite or subopposite pairs per leaf, 0,9–3,2 cm long, 0,4–2,1 cm wide, oblong to elliptic-oblong, usually obtuse apically and often mucronate. *Inflorescences* usually on abbreviated lateral branches or sometimes terminal, ± glomerate. *Flowers* pink to reddish, on pedicels 3–3,5 mm long. *Calyx* leathery; tube obconical, 3–6 mm long; lobes 5–12 mm long, 4–7 mm wide. *Petals* 5, oblanceolate, 13–20 mm long, 3–4,5 mm wide. *Stamens* 10, filaments united basally for 1–3 mm with the sheath split open on one side. *Ovary* oblong, compressed, 4–5 mm long, stipitate. *Pods* as in generic description. *Seeds* pale brown, ovoid, flattened, with a small or large aril. Differs from *S. afra* in having the stamen filaments united basally and in having fewer and larger leaflets; differs from *S. latifolia* in having longer pedicels, longer calyx receptacles, and more numerous and smaller leaflets.

Found in the Alexandria, Bathurst and East London districts of the Cape Province. Recorded from dune forest and valley bushveld.

CAPE.—3227 (Stutterheim): Bonza Bay, *East London Museum s.n.* (NBG). 3326 (Grahamstown): Lower Kariega valley, *Acocks 13280* (PRE); Kariega River bank near sea, *Bayliss BS4398* (PRE); Kenton-on-Sea, *Acocks 18337* (K, PRE); Port Alfred, *Stocks* 3 (PRE), *R. Verdoorn 10* (PRE); between Alexandria and Grahamstown, *Burtt Davy 12130* (BOL, GRA, PRE). 3327 (Peddie): 4,8 km N.W. of Hamburg, edge of Keiskamma River, *Acocks 21832* (PRE). Grid ref. unknown: Albany distr., 5,6 km N. of Nanaga, *Acocks 21689* (K, PRE).

The specimens are relatively uniform in floral characters and resemble *S. afra* in their usually glomerate inflorescences, pedicel length and the length of the calyx receptacle, but, as in *S. latifolia*, the stamen filaments are united basally. The leaflets are more variable, but typically they are fewer and larger than in *S. afra* and more numerous and smaller than in *S. latifolia*, being ± intermediate between the two species.

As these specimens share characters of both *S. afra* and *S. latifolia*, it appears that they may well be hybrids but there is still no direct evidence to substantiate this suggestion. The specimens are, however, from areas where both *S. afra* and *S. latifolia* are found. As indicated by Codd l.c. : 532, there seems to be no advantage in giving these specimens any formal taxonomic rank until they have been studied in detail in the field.

7. **Schotia sp.**

Tree 4–6 m high; young branchlets usually clothed with a ± dense spreading indumentum, sometimes sparingly pubescent. *Leaves* sparingly to densely spreading pubescent: petiole 1–4 mm long; rhachis (0,8)2–4,5 cm long, narrowly winged in juvenile state; leaflets 3–4 pairs, usually opposite, sessile, elliptic-oblong to ovate or obovate, very variable in size, 0,7–3,2 cm long, 0,4–2,25 cm wide, oblique basally, obtuse or rounded and usually mucronate apically, at times emarginate, pubescent on both surfaces or the upper glabrous and pubescence on lower surface confined to midrib and lateral nerves, margins usually ciliate. *Stipules* lanceolate or obliquely ovate, up to 6 mm long, deciduous. *Inflorescence* a terminal or lateral panicle, usually relatively open; branches of inflorescence patent, shortly and densely pubescent. *Flowers* dark pink-red, ± sessile or on very short pedicels; bracts small, deciduous. *Calyx* leathery, tube very short, up to 1,5 mm long; lobes 4, up to 6,5 mm long and 5 mm wide. *Petals* 5, spathulate, 6–7 mm long, up to 3 mm wide. *Stamens* 10; filaments very shortly united basally for up to 1 mm, at times almost free to the base; filaments linear, up to 1,5 cm long, exceeding the corolla. *Ovary* oblong, 4–5 mm long, compressed, stipitate, tuberculate along the margins; style 10–12 mm long. *Pods* as in generic description, 4–10,5 cm long, 2–3,5 cm wide. *Seeds* pale brown, 11–15 mm long, 10–12 mm wide, 5–7 mm thick.

Recorded from the banks of the Tsitsa River in the Transkei.

CAPE.—3128 (Umtata): along Tsitsa River, *Strey 10698*; Shawbury, bank of Tsitsa River, *Strey 11160*.

These are the only two gatherings. *Strey* 10698 bears flowers and young pods, and *Strey* 11160 bears mature pods. The latter specimen was collected from the same population or perhaps the same plant as *Strey* 10698.

Strey 10698 and 11160 do not match any of the other specimens examined and are extremely difficult to place with certainty. The two gatherings are very variable in leaflet size, even on a single specimen, and this gives the impression, correctly or incorrectly, of some genetic instability.

Strey 10698 seems most closely allied to *S. latifolia*, but has smaller leaflets and smaller petals than usually found in this species. In addition, it apparently does not grow within the distributional range of typical *S. latifolia*. As far as is known typical *S. latifolia* does not occur further east than the Kentani and Engcobo districts in the eastern Cape, while

S. brachypetala does not occur further south than Umtata. The two Strey gatherings therefore fall within the distributional range of *S. brachypetala*. There is a specimen (*Strey* 11156) from the same locality as *Strey* 11160, but unfortunately the former is sterile and its identity cannot be established with certainty as *S. latifolia* and *S. brachypetala* are indistinguishable when sterile. Because of its geographic location, it is assumed that *Strey* 11156 is *S. brachypetala*, but flowering material is required to positively identify the specimen.

The small petals in *Strey* 10698 are reminiscent of those sometimes found in *S. brachypetala*, but the specimen differs from typical *S. brachypetala* in that the flowers are in lax terminal or lateral panicles, and in having a very much shorter calyx tube and smaller calyx lobes.

Strey 10698 bears a superficial resemblance to some of the pubescent specimens of *S. capitata* from the Umfolozi Game Reserve, for example, *Ross* 2015. However, *Strey* 10698 differs from *S. capitata* in that the flowers are in lax panicles and the stamen filaments are united very shortly basally and do not form the characteristic staminal tube.

Strey 10698 has a different overall facies to specimens of *S. latifolia* × *S. afra*, *Form B*. The flowers of the latter have a much longer calyx receptacle and the stamen filaments are united basally into a conspicuous tube. As far as is known *Strey* 10698 does not occur within the distributional range of either *S. latifolia* or *S. afra*.

It is not known whether or not the seeds of *Strey* 11160 have an aril as all of the seeds have been partially eaten.

Although is is not possible to match *Strey* 10698 and 11160 with any other specimens, I am not convinced that they necessarily represent an undescribed species. With the record of hybridization in this genus, the possibility that the specimens are of hybrid origin cannot be excluded. Field studies and more material are required in an attempt to evaluate the status of these specimens.

Strey 10965, a fruiting specimen from Gibraltar in southern Natal (grid ref. 3030CB, Port Shepstone), may possibly also belong to this taxon. The pods are terminal and the seeds, which are the same size as those in *Strey* 11160, have a conspicuous yellow basal aril. However, *Strey* 10965 differs in leaflet shape and in having glabrous or very sparingly pubescent leaves. Flowering material and field observations may assist in establishing the identity of the plant.

3506a **6. UMTIZA**

Umtiza *Sim*, For. Fl. Cape Col. 205 (1907); Phill., Gen. ed. 2 : 394 (1951); J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30,2 : 279 (1957); Hutch., Gen. Fl. Pl. 1 : 236 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 333 (1965). Type species: *U. listerana* Sim.

Evergreen tree or shrub armed with stout spines which are often branched and bear leaves and inflorescences. *Leaves* simply paripinnate, alternate, with (3)5–9(12) pairs of subopposite or irregularly alternate leaflets, sometimes a lateral leaflet appearing terminal. *Stipules* absent. *Inflorescence* a short panicle, usually terminal on short lateral shoots. *Flowers* hermaphrodite, small, white. *Calyx* campanulate, with 5 short lobes. *Petals* 5, inserted in the mouth of the calyx-tube, free, equal, slightly imbricate. *Stamens* 10, free, inserted with the petals; filaments alternately longer and shorter, pubescent basally; anthers dorsifixed, opening by longitudinal slits. *Ovary* free, subsessile, 2-ovuled, pubescent; stigma capitate. *Pods* compressed, 1-seeded, dehiscent. *Seeds* compressed.

An endemic monotypic genus restricted to the East London, Kentani and King William's Town districts of the eastern Cape Province.

Umtiza is the native name for *U. listerana*.

Umtiza listerana *Sim*, For. Fl. Cape Col. 205, t.52/1 (1907); Von Breitenbach, Indig. Trees S. Afr. 3 : 334 (1965); Palmer & Pitman, Trees S. Afr. 2 : 857 (1973). Type: Sim, l.c. : t.52/1.

Evergreen tree up to 12 m high or sometimes a shrub, strongly armed with stout spines which are modified lateral shoots and which are frequently branched and bear leaves and inflorescences; trunk typically fluted basally. *Bark* dark brown, rough; young branchlets dark grey-brown to purplish-brown, lenticellate, minutely puberulous when young. *Leaves* simply paripinnate, alternate: petiole 0,2–0,8(1) cm long; rhachis (0,6) 1,2–4,5(7,2) cm long, channelled above, often very narrowly winged, glabrous to ± densely and shortly pubescent; leaflets in (3)5–9(12) subopposite or irregularly alternate pairs, sometimes a lateral leaflet appearing terminal, (3)9–17(20) mm long, (1,5)3–6(8) mm wide, oblong to narrowly obovate, obtuse or rounded apically, sometimes slightly emarginate, with a minute mucro, ± glossy,

FIG. 6.—**Umtiza listerana.** 1, flowering twig, × ⅔; 2, portion of leaf showing leaflets, × 2; 3, flower, × 6; 4, calyx, × 8; 5, part of corolla showing stamens, × 6; 6, stamen, × 24; 7, gynoecium, × 10, all from *Acocks* 23932; 8, fruiting twig, × ¾, from *Comins* 1636.

midrib prominent below, lateral nerves conspicuous, ascending and anastomosing, glabrous throughout or margins minutely ciliolate. *Stipules* absent. *Inflorescence* a short lax panicle up to 12 cm long, usually terminal on short lateral shoots; axes ± densely and shortly pubescent. *Flowers* white, pedicellate; bracts minute, up to 1,25 mm long, persisting for some time. *Calyx* pubescent, the lobes up to 1 × 0,75 mm, ovate, equal or often one lobe ± lanceolate and much longer than the others. *Petals* equal, pubescent on both surfaces and ciliate on margins, up to 3,5 × 1,5 mm, reflexed in flower. *Stamens* 10, the 5 shorter opposite the petals and the 5 longer alternating with them; filaments up to 3,5 mm long, pubescent basally. *Ovary* up to 2 mm long, clothed with spreading hairs basally at least; style ± 2 mm long, glabrous or sparingly pubescent. *Pods* brown when mature, 3–5 cm long, 0,9–1,2 cm wide, straight or almost so, ± oblong, oblique basally, acuminate apically, compressed, pubescent when young but soon becoming glabrous, dehiscent, valves curling. *Seeds* ± 8 × 6 mm, compressed. Fig. 6.

Restricted to relatively few forests and to valley bushveld in the East London, Kentani and King William's Town districts of the Cape Province.

CAPE.—3227 (Stutterheim): East London, *Sim 2585* (NH); *Sim 2879* (K, NU); *Rattray 291* (K); Amalinda Commonage, Saxilby Rd., *Acocks 23881*; Amalinda, *Acocks 23932*; Fort Grey Forest Reserve, *Sim 2291* (NU, PRE); *Wells 2877*; *Verdoorn 2472*; *Comins 1636*; *White 10811* (FHO); Buffalo River Pass, *Garrett sub NU 40118*; Fort Pato, *Sim 19964*. 3228 (Butterworth): 3,2 km S.E. of Kentani, *Story 4032*; *4036*.

Sim omitted to cite any specimens when describing *U. listerana*. In the absence of a type specimen Sim's t.52/1 will suffice as the type.

Sim described the flowers as regular. While this is true of many flowers, it is not always the case because frequently one sepal is much longer and larger than the others.

The exact position of the genus *Umtiza* in the Caesalpinioideae has never been definitely established and it remains in some doubt. A curious feature of the genus is that the calyx-lobes are open even when the flowers are in young bud.

Sim reported that the heartwood is purplish-black, excessively hard, heavy and close-grained but, as it seldom exceeds 15 cm in diameter, yields little serviceable timber.

U. listerana is said to be locally common in some areas. More material, particularly flowering and fruiting material, is required.

3507 7. BAIKIAEA

Baikiaea *Benth.* in Benth. & Hook.f., Gen. Pl. 1 : 581 (1865); Benth. in Trans. Linn. Soc. Lond. 25 : 313 (1865); Oliv. in F.T.A. 2 : 308 (1871); Taub. in Pflanzenfam. 3, 3 : 138 (1892); Harms in Engl., Pflanzenw. Afr. 3, 1 : 454 (1915); Bak.f., Leg. Trop. Afr. 3 : 703 (1930); Phill., Gen. ed. 2 : 394 (1951); J. Léon. in F.C.B. 3 : 296 (1952); in Mém. Acad. Roy. Belg. Classe Sci. 30, 2 : 72 (1957); Hutch., Gen. Fl. Pl. 1 : 248 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 334 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 108 (1967); Schreiber in F.S.W.A. 59 : 5 (1967). Type species: *B. insignis* Benth.

Unarmed evergreen or, in *B. plurijuga*, deciduous trees. *Leaves* simply pari- or imparipinnate; leaflets usually alternate, sometimes opposite, without pellucid gland-dots, usually with a small ± marked swelling near the posticous margin of each leaflet close to the base. *Inflorescences* of terminal or axillary racemes. *Flowers* hermaphrodite, usually large, pedicellate, distichously arranged along the inflorescence-axes; bracteoles usually small, not enclosing the flower-buds, imbricate, almost valvate, fulvous-villous-tomentose inside, soon deciduous. *Sepals* 4, the posticous one larger than the rest, very narrowly imbricate, densely fuscous- or paler brown-tomentellous outside. *Petals* 5, free, 4 of them equal, the fifth narrower and usually differently coloured, all obovate, imbricate, edges crinkled, villous along and near the midrib. *Stamens* 10; filaments glabrous or villous below, one of them free, the rest united basally into a short tube; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* stipitate, tomentose; ovules 1 to many; style elongate, glabrous, usually with an enlarged peltate depressed-subglobose stigma. *Pods* woody, flattened, dehiscing longitudinally into two valves. *Seeds* large, compressed, with a thin and fragile or a hard testa, exareolate.

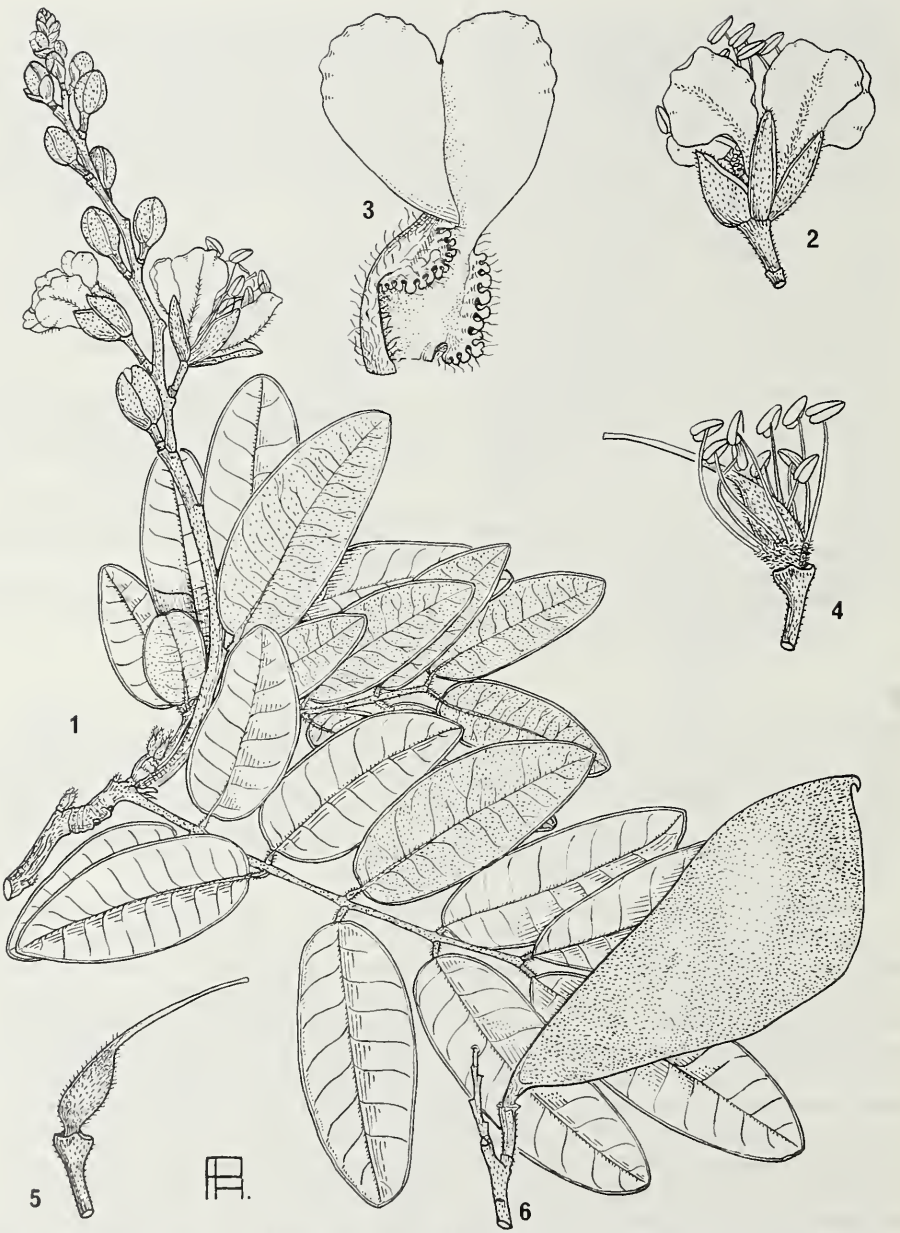

FIG. 7.—**Baikiaea plurijuga.** 1, branchlet with erect inflorescence and mature leaves, × ⅓, from *De Winter & Giess* 7026; 2, flower, × 1; 3, standard, × 2; 4, flower, with sepals and petals removed, × 1; 5, gynoecium, × 1, all from *De Winter* 3816; 6, pod, × ⅓, from *De Winter* 3762.

A genus of 5 species, all tropical African and occurring in the rain-forest region, except for *B. plurijuga* which occurs in Angola, South West Africa, Botswana, Zambia and Rhodesia on Kalahari sands.

The genus is named in honour of W.T. Baikie, a distinguished and enterprising traveller in west tropical Africa.

Baikiaea plurijuga *Harms* in Warb., Kunene-Samb. Exped. 248 (1903); Dinter in Feddes Repert. 15 : 346 (1918); Bak.f., Leg. Trop. Afr. 3 : 705 (1930); Pardy in Rhod. Agric. J. 48: 402 (1951); O.B. Miller in J. S. Afr. Bot. 18 : 28 (1952); Torre & Hillc. in C.F.A. 2 : 220, t.45 (1956); J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30, 2 : 74 (1957); Palgrave, Trees Cent. Afr. 66–69 (1957); F. White, For. Fl. N. Rhod. 98 (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 336 (1965); Schreiber in F.S.W.A. 59 : 5 (1967); Palmer & Pitman, Trees S. Afr. 2 : 861 (1973). Type: Angola, rio Cubango, Calolo, *Baum* 428 (B, holo. †, BM!, COI, K!).

Tree up to 20 m high with a spreading crown; bark grey or brown, rough and reticulate or sometimes ± smooth; young branchlets fulvous-tomentose or -pubescent. *Leaves* paripinnate, fulvous-tomentose or -pubescent at least when young: petiole 1–2,5 cm long; rhachis 4,5–10(11) cm long; leaflets 4–5 (very rarely 6) opposite pairs, (2,2)3–6,5 (7,5) cm long, 1,2–3,2(3,5) cm wide, narrowly elliptic or oblong-elliptic, slightly oblique basally, obtuse or rounded and usually slightly emarginate apically, mostly sparingly to densely fulvous-pubescent on both surfaces, especially beneath and on the midrib, sometimes ± glabrous above, closely but not very prominently reticulate on both surfaces; petiolules 1–4 mm long, fulvous-villous or -tomentose. *Stipules* 5–9 mm long, fulvous-villous. *Racemes* up to 35 cm long; axes fulvous-pubescent or -tomentose. *Flowers* pedicellate; bracts 3–5,5 mm long, 3–4 mm wide, ovate; bracteoles 3–4 mm long, 2–2,5 mm wide. *Sepals* 15–20 mm long, 5–12 mm wide, the posticous one larger than the rest, leathery, margins thinner and almost membranous, densely fulvous-tomentose outside, fuscous-tomentose inside. *Petals* 5, pale pink to mauve or magenta, up to 3,2 cm long and 2,5 cm wide, obovate-spathulate, edges crisped, villous along and near the midrib. *Stamens* 10; filaments up to 3 cm long, one filament free, the rest united basally for ± 1 cm; anthers 5–8 mm long. *Ovary* very shortly stipitate, up to 1,5 cm long, 4–5 mm wide, compressed, fulvous-tomentose; style up to 2,5 cm long. *Pods* woody, 9–14 cm long, 3,5–4,5(5) cm wide, compressed, oblanceolate, densely rusty-pubescent or -tomentose, dehiscing longitudinally, the 2 valves becoming spirally twisted. *Seeds* compressed, ± 2 × 1,5 cm, dark reddish-brown. Fig. 7.

Confined to Kalahari sands in Angola, South West Africa, Botswana, Zambia and Rhodesia. Occurs in woodland, often locally dominant.

S.W.A.—1714 (Ruacana Falls): S.E. of Ruacana, *Giess & Leippert 7605* (M). 1716 (Enana): 7,2 km S.E. of Oshandi, *De Winter & Giess 7026*. 1719 (Runtu): 35 km W. of Runtu on road to Sambusu, *De Winter 3816*. 1720 (Sambio): Masari, *Merxmüller & Giess 2124*. 1721 (Mbambi): Shamvura firebreak near Shamvura Camp, *De Winter & Marais 4871*. 1724 (Katima Mulilo): Katima Mulilo area, *Killick & Leistner 3050*. 1819 (Karakuwisa): Omuramba bed, 27,2 km S. of Runtu on road to Karakuwisa, *De Winter 3762*. 1820 (Tarikora): 8,8 km E. of Nyangana Mission Station, *De Winter & Wiss 4191*. 1821 (Andara): Bagani, *Volk 2118* (M). 1920 (Tsumkwe): near Samangeigei, *Story 6098*.

B. plurijuga, often known as "Rhodesian Teak", is an important timber tree. The wood is attractive, works well, and is used in furniture, building and in industry. Dug-out canoes are made from large logs.

B. plurijuga has much smaller leaves and flowers than the other species in the genus. Unlike the other species which are found in tropical rain-forest areas, *B. plurijuga* occurs in woodland on Kalahari sands.

3508 8. TAMARINDUS

Tamarindus *L.*, Sp. Pl. 1 : 34 (1753); Gen. Pl., ed.5 : 20 (1754); DC., Prodr. 2 : 488 (1825); G. Don, Gen. Syst. 2 : 437 (1832); Benth. & Hook.f., Gen. Pl. 1 : 581 (1865); Oliv. in F.T.A. 2 : 307 (1871); Taub. in Pflanzenfam. 3, 3 : 139 (1892); Sim, For. Fl. P.E. Afr. 50 (1909); Harms in Engl., Pflanzenw. Afr. 3, 1 : 460 (1915); Bak.f., Leg. Trop. Afr. 3 : 702 (1930); J. Léon. in F.C.B. 3 : 436 (1952); Roti-Michelozzi in Webbia 13 : 134 (1957); Keay in F.W.T.A. ed. 2, 1 : 477 (1958); Hutch., Gen. Fl. Pl. 1 : 246 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 151 (1967). Type species: *T. indica* L.


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FIG. 8.—**Tamarindus indica**. 1, branchlet with racemes and leaves, × ⅔; 2, leaflet base, lower surface, × 6; 3, leaflet, upper surface, showing venation, × 4; 4, young flower-bud protected by bract, × 4; 5, young flower-bud protected by bracteoles after fall of bract, × 4; 6, older flower-bud showing four imbricate sepals, after fall of bract and bracteoles, × 2; 7, flower, × 2; 8, sepal, × 2; 9, one of three upper large petals, × 2; 10, one of two lower minute petals, × 2; 11, stamens showing filaments fused below into a band, × 2; 12, ovary, cut longitudinally, × 4, all from *Semsei* in *F.H.* 2867; 13, mature pod, breaking up, × ⅔; 14, part of surface of pod, × 4; 15, seed showing areole, × 2, all from *Hughes* 5. Reproduced by permission of the Editor of Flora of Tropical East Africa.

Unarmed evergreen tree. *Leaves* paripinnate; leaflets opposite, in 10–18(21) pairs, almost sessile, asymmetric basally. *Stipules* free, ± asymmetrically lanceolate, rapidly deciduous. *Flowers* in lax terminal and lateral racemes; bracteoles 2, well-developed, valvate, completely enclosing the young flower-buds but falling off before the buds are full-sized. *Hypanthium* shortly elongate-turbinate. *Sepals* 4, imbricate. *Petals:* upper 3 well-developed; lower 2 minute, setiform, below the staminal tube. *Stamen-filaments* united to about half-way into a pubescent tube terminating in 3 upcurved anther-bearing filaments alternating with 5 sterile teeth (1–2 of the teeth rarely elongated into short filaments). *Ovary* ± pubescent, stipitate, the stipe adnate to one side of the hypanthium; ovules 8–14; style elongate, gradually enlarged into the capitate stigma. *Pods* indehiscent, with a dry outer shell and a pulpy inner layer. *Seeds* ± compressed, with a continuous-margined areole on each face.

A genus of one species in the Old World tropics, but so widely planted that its native range is difficult to determine. Although indigenous in Africa, it was almost certainly introduced into our area.

The generic name *Tamarindus* is from the Arabic words tamr (a date), and hindi (Indian), i.e. date of India.

Tamarindus indica *L.*, Sp. Pl. 1 : 34 (1753); DC., Prodr. 2 : 488 (1825); Oliv. in F.T.A. 2 : 307 (1871); Taub. in Pflanzenfam. 3, 3 : fig 79 (1892); Sim. For. Fl. P.E. Afr. 50, t.47 (1909); Harms in Engl., Pflanzenw. Afr. 3, 1 : 460, fig. 252 (1915); Bak.f., Leg. Trop. Afr. 3 : 702 (1930); Brenan, Checklist Tang. Terr. 106 (1949); J. Léon. in F.C.B. 3 : 436 (1952); Eggeling & Dale, Indig. Trees Uganda, ed. 2 : 69, fig. 17 (1952); Torre & Hillc. in C.F.A. 2 : 217 (1956); Roti-Michelozzi in Webbia 13 : 134, fig. 1 (1957); Keay in F.W.T.A. ed. 2, 1 : 477 (1958); Dale & Greenway, Kenya Trees & Shrubs 109, fig. 21 (1961); F. White, For. Fl. N. Rhod. 128 (1962); Gomes e Sousa, Dendrol. Moçamb. 1 : 263, t.62 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 153, fig. 32 (1967). Type uncertain.

Tree up to 20 m high with a somewhat rounded crown. *Bark* rough, grey, brown or greyish-black; young branchlets pubescent or puberulous. *Leaves*: petiole 0,4–0,8 cm long, subglabrous to ± pubescent; rhachis 4,5–12 cm long (in our area), subglabrous to ± pubescent; leaflets in 10–18 opposite pairs (in our area), oblong, (0,8)1,2–2,5 cm long, 0,3–1 cm wide (in our area), asymmetric basally, rounded to rounded-subtruncate apically, seldom slightly emarginate, glabrous throughout or with a basal tuft of hairs on the lower surface to one side of the midrib, sometimes (but not in our area) pubescent on midrib and margins or all over both surfaces, venation reticulate, ± raised and conspicuous on both surfaces. *Racemes* 1–15 cm long; axes subglabrous to densely pubescent. *Flowers* red in bud, on glabrous to pubescent pedicels 3–14 mm long. *Hypanthium* 3–5 mm long. *Sepals* 8–12 mm long, pale yellow inside, reddish outside, pubescent basally within. *Petals:* upper larger three 10–13 mm long, elliptic or obovate-elliptic, yellow with red veins. *Ovary* ± 6 mm long, pubescent. *Pods* brown, (3)6,5–14 cm long, 1,5–3 cm in diameter, curved or sometimes ± straight, sausage-like, usually obtuse basally and apically, margins sometimes irregularly constricted, closely covered outside with small brown scales, indehiscent. *Seeds* chestnut-brown, ± rhombic to trapeziform, 11–17 mm long, 10–12 mm wide. Fig. 8.

FIG. 9.—**Afzelia quanzensis.** 1, part of branchlet showing leaf and inflorescence, × ⅔; 2, base of leaflet, lower surface, showing gland, × 4; 3, gland, × 8; 4, flower-bud with overlapping bracteoles, × 2, all from *Hornby* 340; 5, flower, × ⅔; 6, large petal, × ⅔; 7, one of four small petals, × 8; 8, one of two staminodes, × 8; 9, longitudinal section of hypanthium showing adnate stipe of ovary, × 1, all from *Milne-Redhead & Taylor* 7061; 10, dehisced pod, × ⅔; 11, part of pod showing suture, × ⅔; 12, seed, showing aril, × ⅔, all from *Richards* 6348. Reproduced by permission of the Editor of Flora of Tropical East Africa.

Almost certainly introduced into our area and now found in the Transvaal and Natal. Most, if not all, of the plants in Natal occur in areas of former human habitation.

TRANSVAAL.—2527 (Rustenburg): Rustenburg, *Pole Evans sub PRE 9227.*

NATAL.—2930 (Pietermaritzburg): 8 km S. of Ndwedwe, *Moll 2393*; 4,8 km W. of Ndwedwe, *Moll 3286*; Isipingo Beach, *Ward 5559.* 2931 (Stanger): 4,8 km inland of Stanger, *M. Poynton* 43 (NU).

This is the well-known Tamarind, the acid pulpy part of whose pod is edible and used for preserves, jams, sweets etc., and also yields a refreshing drink. The seeds are also edible.

Specimens to the north of our area are often much more pubescent.

3509 9. AFZELIA

Afzelia *Sm.* in Trans. Linn. Soc. Lond. 4 : 221 (1798), nom. conserv.; DC., Prodr. 2 : 507 (1825); Benth. & Hook.f., Gen. Pl. 1 : 580 (1865); Oliv. in F.T.A. 2 : 301 (1871); Harms in Engl., Pflanzenw. Afr. 3, 1 : 457 (1915); Bak.f., Leg. Trop. Afr. 3 : 699 (1930); J. Léon. in Reinwardtia 1 : 61–66 (1950); Phill., Gen. ed. 2 : 395 (1951); J. Léon. in F.C.B. 3 : 350 (1952); in Mém. Acad. Roy. Belg. Classe Sci. 30, 2 : 106 (1957); Hutch., Gen. Fl. Pl. 1 : 243 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 124 (1967). Type species: *A. africana* Sm.

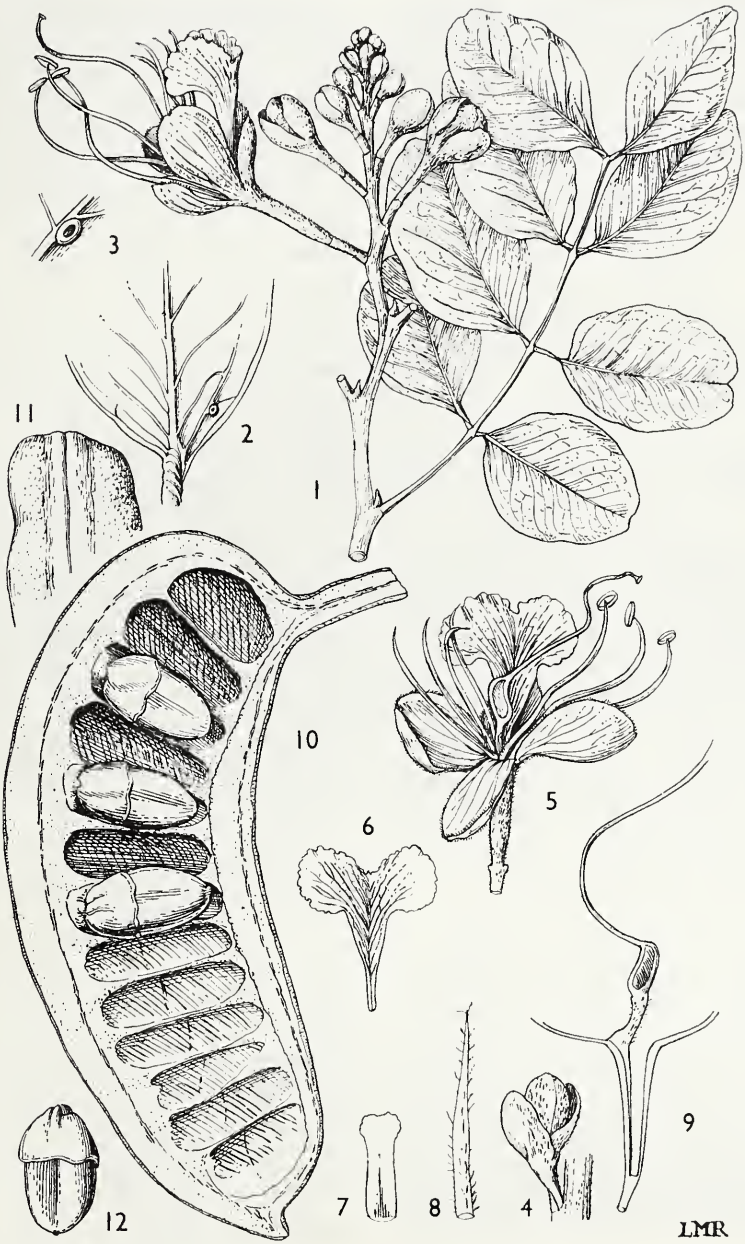
Pahudia Miq., Fl. Ind. Bat. 1,1 : 85 (1855); Benth. & Hook.f., Gen. Pl. 1 : 580 (1865).

Afrafzelia Pierre, Fl. For. Cochinch. sub t.388 (1899).

Unarmed evergreen or deciduous trees. Leaves simply and usually paripinnate, rarely subimparipinnate; petiolules twisted; leaflets opposite or subopposite, without translucent gland-dots, but usually with a small dot-like gland at proximal side of leaflet base either on the lower surface in angle between margin and midrib or on margin itself. *Stipules* minute, their basal parts connate into a persistent intra-petiolar scale and their upper parts free and deciduous. *Inflorescence* simply racemose or of racemes grouped into panicles. *Flowers* hermaphrodite, spirally arranged along the inflorescence-axes; pedicels jointed at base; bracteoles large, well-developed, concavo-convex, almost completely concealing the young flower-buds, one bracteole overlapping the other by its margins, both bracteoles deciduous before the flower opens. *Hypanthium* ± elongate. *Sepals* 4, imbricate, unequal (2 outer, 2 inner). *Petal* 1, large, clawed, the others rudimentary or absent. *Stamens* usually 7 fertile and 2 staminodes. *Ovary* stipitate, the stipe adnate to the hypanthium, ovules many; style elongated; stigma small, ± capitate. *Pods* obliquely oblong, compressed, dehiscing into 2 thick woody valves. *Seeds* embedded in white pith, transverse, large, thick, hard, with a basal brightly coloured aril.

A genus of 14 species, six in Malesia, the others in tropical Africa.

The genus is named in honour of Adam Afzelius, a disciple of Linnaeus's who collected plants in Sierra Leone, later Professor of Botany and materia medica at Uppsala.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Afzelia quanzensis* *Welw.* in Ann. Conselho Ultram. 1858 : 586 (1859); Oliv. in F.T.A. 2 : 302 (1871), as *cuanzensis*; Sim, For. Fl. P.E. Afr. 48, t.45 (1909); Marloth, Fl. S.Afr. 2 : 58, fig.37, t.20D (1925); Bak. f., Leg. Trop. Afr. 3 : 701 (1930); Burtt Davy, Fl. Transv. 2 : 327, fig. 53 (1932); Henkel, Woody Pl. Natal 220 (1934), as *cuanzensis*; Brenan, Checklist Tang. Terr. 87 (1949); J. Léon. in Reinwardtia 1 : 64 (1950) and in F.C.B. 3 : 354, fig. 27B (1952), as *cuanzensis*; Codd, Trees & Shrubs Kruger Nat. Park 59, fig. 56, 57 (1951); O. B. Miller in. J. S.Afr. Bot. 18 : 27 (1952); Pardy in Rhod. Agric. J. 49 : 82 (1952); Torre & Hillc. in C.F.A. 2 : 215 (1956), as *cuanzensis*; Palgrave, Trees Cent. Afr. 61–65 (1956), as *cuanzensis*; Roti-Michelozzi in Webbia 13 : 142 (1957); Palmer & Pitman, Trees S. Afr. 171, t. IF (1961), as *cuanzensis*; F. White, For. Fl. N. Rhod. 98, fig. 21J (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 337 (1965); Compton in J. S. Afr. Bot., Suppl. 6 : 46 (1966), as *cuanzensis*; Gomes e Sousa, Dendrol. Moçamb. 1 : 256 (1966), as *cuanzensis*; Brenan in F.T.E.A. Legum.-Caesalp. : 125, fig. 22 (1967); Van Wyk, Trees Kruger Nat. Park 1 : 192 (1972); Ross, Fl. Natal 194 (1973); Palmer & Pitman, Trees S. Afr. 2 : 863 (1973). Type: Angola, Cuanza Norte, R. Cuanza, near Candumba between Sansamanda and Quisonde, *Welwitsch* 594 (LISU holo., BM!, K!).

Afzelia petersiana Klotzsch in Peters, Reise Mossamb. Bot. 1 : 19 (1861). Syntypes from Mozambique, *Peters* (B †). *A. attenuata* Klotzsch in Peters, Reise Mossamb. Bot. 1 : 20 (1861). Type: Mozambique, Inhambane, *Peters* (B, holo. †).

Intsia quanzensis (Welw.) Kuntze, Rev. Gen. 1 : 192 (1891); Hiern, Cat. Afr. Pl. Welw. 1 : 299 (1896). Type as for *Afzelia quanzensis*.

Afrafzelia quanzensis (Welw.) Pierre, Fl. For. Cochinch. t.388 (1899). Type as for *Afzelia quanzensis*.

Pahudia quanzensis (Welw.) Prain, Sc. Mem. Med. Off. Ind. Army 12 : 16 (1901). Type as for *Afzelia quanzensis*.

* In spite of the "correction" by various authors, including J. Léonard in Reinwardtia 1 : 64 (1950) and in F.C.B. 3 : 354 (1952), of the spelling of the epithet to *cuanzensis*, there is no evidence that "*quanzensis*" was an unintentional orthographic error. The original spelling "*quanzensis*" should therefore be retained. Welwitsch used the initial "qu" repeatedly and Quanza is the version used in Stieler's Hand-Atlas (1882) and also, with Cuanza as a synonym, in Justus Perthes' Specialkarte von Afrika (1893).

Deciduous tree up to 20 m high with a large spreading crown. *Bark* grey, purplish-grey to pale brown, smooth or reticulate and flaking off; young branchlets pubescent, puberulous or glabrous. *Leaves* paripinnate: petiole 2,5–6 cm long (in our area), eglandular, glabrous; rhachis 4,5–18 cm long (in our area), eglandular, glabrous; leaflets (3)4–6(7) pairs, opposite or almost so, 2–9,5 cm long, 1,7–4,5 cm wide (in our area), ovate-elliptic, oblong-elliptic or elliptic, slightly oblique basally, rounded or sometimes obtuse and often emarginate apically, margins undulate, glabrous, shining above, venation prominent on both surfaces; petiolules 2–7 mm long, glabrous. *Inflorescences* erect, of simple or once-forked racemes; axes pubescent. *Flowers* sweetly scented, with hypanthium 1–2,5 cm long. *Sepals* shortly pubescent or puberulous outside, outer 2 elliptic, 0,9–1,7 cm long, 0,7–1,3 cm wide, inner 2 obovate-spathulate, 1,7–2,5 cm long, 0,9–1,8 cm wide. *Petal* upwardly-turned, 2,5–4,5 cm long, ± pubescent and green outside, dark red inside, with a long claw suddenly widened into a deeply bilobed lamina 2,2–3,1 cm wide. *Stamens* usually 7 fertile, with glabrous to pubescent usually green filaments. *Ovary* 6–8 mm long, stipitate; style pubescent or glabrous. *Pods* obliquely-oblong, 7–18(29,5) cm long, 4,5–6,5(9) cm wide, compressed, dehiscing into 2 thick woody valves. *Seeds* black, oblong-ellipsoid or ellipsoid, 2–3,4 cm long, 0,9–1,7 cm wide, with an orange, red, or vermillion, cup-shaped basal aril. Fig. 9.

Found in Somalia, Kenya, Tanzania, Zaire, Zambia, Malawi, Mozambique, Angola, South West Africa, Botswana, Rhodesia, the Transvaal, Swaziland and Natal (Tongaland). Occurs in woodland, forest and bushveld. Sometimes gregarious and locally dominant on sandy soils.

S.W.A.—Grid ref. unknown: Caprivi Strip, N. Ngamiland, east of Kwando [Cuando] River, at Kabuta, *Curson 910*.

TRANSVAAL.—2230 (Messina): 14,4 km E. of Sibasa, *Codd & Dyer 4493*. 2231 (Pafuri): Kruger National Park, Punda Milia, *Lang sub TRV 32092*; Kruger National Park, 8 km N.E. of Punda Milia, *Codd 4231*. 2431 (Acornhoek): Kruger National Park, 22,4 km from Skukuza on Satara rd., *Story 3949*; Kruger National Park, 23 km N.E. of Skukuza on Tshokwane rd., *Codd & De Winter 5070*.

SWAZILAND.—2632 (Bela Vista): Mnyami, *Compton 29289*; *Dlamini s.n.*

NATAL.—2632 (Bela Vista): Nkonjane-Abercorn Drift, *Moll & Pooley 4222*. 2732 (Ubombo): Sihangwane forest, *Tinley 524*; 0,4 km N.E. of Sihangwane store, *Ross 2374*.

Schoenfelder S127 (PRE), an incomplete specimen consisting of one pod valve, has been recorded from Muande, Grootfontein, S.W.A. The existence of *A. quanzensis* in this locality requires confirmation.

There are nearly always 7 fertile stamens and 2 staminodes, but sometimes there is some variation.

Brenan, in F.T.E.A. Legum.-Caesalp. : 126 (1967), recorded the existence of two fairly well-marked variants in east Africa; the one with glabrous petiolules and leaf-bases, and the other with some short spreading hairs on the petiolules and leaf-bases. In our area the petiolules and leaf-bases are glabrous.

A. quanzensis, variously known as Pod Mahogany, Rhodesian Mahogany or Mahogany Bean, yields a useful and ornamental light brown to reddish-brown timber. The attractive and unusual seeds are often sold as curios and are used in making ornaments such as necklaces.

3516b 10. JULBERNARDIA

Julbernardia *Pellegr.* in Boissiera 7 : 297 (Mar. 1943); Troupin in Bull. Jard. Bot. Brux. 20 : 309 (1950) pro parte; Hauman in Bull. Inst. R. Col. Belg. 23 : 477 (1952); J. Léon. in Mém. Acad. Roy. Belg. Classe Sci. 30, 2 : 188 (1957); Hutch., Gen. Fl. Pl. 1 : 273 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 145 (1967). Type species: *J. hochreutineri* Pellegr.

Isoberlinia sensu auct. afr. mult., pro parte, non Craib & Stapf.

Paraberlinia Pellegr. in Bull. Soc. Bot. Fr. 90 : 79 (July 1943).

Pseudoberlinia Duvign. in Bull. Inst. R. Col. Belg. 21 : 431 (1950); Hauman in F.C.B. 3 : 402 (1952).

Seretoberlinia Duvign. l.c. : 435 (1950).

Unarmed evergreen or deciduous trees. *Leaves* simply paripinnate: leaflets one to many opposite pairs, ± markedly asymmetric basally, venation prominent on both surfaces, translucent dots often present but sometimes absent (sometimes inconstant in a single species); petiolules usually twisted. *Stipules* intrapetiolar, always connate below, bicuspidate above or with 2 relatively large foliaceous lobes simulating free stipules, ± persistent or rapidly deciduous. *Inflorescence* a terminal usually much-branched panicle. *Flowers* hermaphrodite; bracteoles 2, well-developed, valvate, completely enclosing the flower-buds, persistent, keeled down back. *Hypanthium* absent. *Sepals* 5, well-developed, equal or nearly so in length, ciliate. *Petals* 5, equal or nearly so in length, all subequal and well-developed, 1 large and 4 small, or all small. *Stamens* 10, fertile; 9 filaments shortly united below, the tenth free. *Ovary* very shortly stipitate, densely pubescent; stipe free; ovules up to 5; style elongate; stigma capitate, abruptly enlarged. *Pods* compressed, 1–5-seeded, elastically dehiscing into 2 woody valves; valves obliquely transversely nerved (nerves often obscure in ripe pods); upper suture usually with a laterally projecting wing or ridge. *Seeds* compressed, exareolate, with a hard testa, borne on short funicles.

A genus of ± 8 species, all in tropical Africa.

The genus is named in honour of M. Jules Bernard, a former governor of Gabon.

Julbernardia globifera (*Benth.*) *Troupin* in Bull. Jard. Bot. Brux. 20 : 314 (1950); J. Léon. in Mém. Acad. Roy. Belg. Class Sci. 30, 2 : 192, 195 (1957); F. White, For. Fl. N. Rhod. 125 (1962); Gomes e Sousa, Dendrol. Moçamb. 1 : 266, t.64 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 147, fig. 30 (1967); Palmer & Pitman, Trees S. Afr. 2 : 864 (1973). Type: Malawi, Shire Highlands, *Buchanan* 138 (K, holo.!).

Brachystegia globifera Benth. in Hook. Icon. Pl. 14 : 43 (1881). Type as above.

Berlinia eminii Taub. in Pflanzenw. Ost Afr. C : 199 (1895). Syntypes from Tanzania. *B. globifera* (Benth.) Harms in Pflanzenw. Afr. 3,1 : 472 (1915); Hutch. & Burtt Davy in Kew Bull. 1923 : 162 (1923); Bak.f., Leg. Trop. Afr. 3 : 689 (1930). Type as for *Julbernardia globifera*.

Westia eminii (Taub.) Macbride in Contr. Gray Herb. 59 : 21 (1919). Syntypes as for *Berlinia eminii*.

Isoberlinia globifera (Benth.) Hutch. ex Greenway in Kew Bull. 1928 : 203 (1928); Brenan, Checklist Tang. Terr. 104 (1949); Pardy in Rhod. Agric. J. 48 : 314 (1951); Palgrave, Trees Cent. Afr. 107–110 (1957). Type as for *Julbernardia globifera*.


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FIG. 10.—**Julbernardia globifera**. 1, branchlet with leaves and inflorescence, × ⅔; 2, apical part of leaflet showing pubescent margin, × 4; 3, leaflet-base, × 2; 4, flower-bud with bract, × 4; 5, flower, × 3; 6, flower showing bracteoles, calyx and ovary (petals and stamens removed), × 3; 7, sepal, × 3; 8, larger petal, × 3; 9, lateral petal, × 3; 10, stamens, nine of them connate below, one free, × 3, all from *Welch* 290; 11, dehisced pod, × ⅔, from *Soil Cons. Dept.* O.F.C. 2. Reproduced by permission of the Editor of Flora of Tropical East Africa.

Pseudoberlinia globifera (Benth.) Duvign. in Bull. Inst. R. Col. Belg. 21 : 434 (1950); Hauman in F.C.B. 3 : 405 (1952). Type as for *Julbernardia globifera*.

Usually a tree up to 15 m high with a flattened or rounded spreading crown, sometimes shrubby or flowering from coppice shoots 0,3–2 m high. *Bark* dark grey and rough on old boles, pale grey and smooth on young boles; young branchlets puberulous to pubescent or tomentose, soon glabrescent. *Leaves*: petiole (1)1,5–3 cm long, puberulous to pubescent or tomentose; rhachis 4–17 cm long, pubescent like the petiole; leaflets (2)4–6(8) pairs per leaf, (1)2–8,5 (11,5) cm long, (0,6)1–3,2(6,5) cm wide, narrowly oblong-elliptic or oblong-lanceolate, or sometimes narrowly obovate-oblong, markedly asymmetric basally, obtuse or rounded and sometimes slightly emarginate apically, sparingly to densely pubescent on both surfaces, especially beneath and on the midrib, sometimes ± glabrous above, margins usually with a conspicuous fringe of whitish hairs. *Stipules* intrapetiolar, ± 3–5 mm long, united below, bicuspidate above, non-foliaceous, rapidly deciduous. *Panicles* up to ± 30 cm long and wide; axes brown-tomentellous or shortly tomentose. *Open flowers* on pedicels 2–6 mm long; bracts 2–10 mm long, usually half as long as to longer than the bracteoles (occasionally only one-third as long); bracteoles 7–10 mm long, 6–9 mm wide. *Sepals* oblong, not or only slightly wider above than below, non-contiguous, 2,5–4,5 mm long, ± 1,5 mm wide. *Petals* white, larger one ovate, shortly clawed, 6,5–9 mm long, 4–5 mm wide; the others oblanceolate to oblanceolate-spathulate or linear, 3–8 mm long, 0,5–3 mm wide. *Stamens* up to 13 mm long. *Ovary* densely fulvous-tomentose. *Pods* woody, obovate-oblong or oblong, 4–9 cm long, 1,8–3,2 cm wide, flattened, brown-tomentose, the 2 valves becoming spirally twisted. *Seeds* compressed, 1,2–1,6 × 0,8–1,5 cm, dark brown. Fig. 10.

Found in Tanzania, Zaire, Zambia, Malawi, Mozambique, South West Africa (Caprivi Strip), Rhodesia and Botswana. Occurs in deciduous woodland.

A specimen collected by P. Crosér in the Capriv Strip a few years ago was identified as *J. globifera* by the National Herbarium, Pretoria. Unfortunately the specimen was not kept and so the record of *J. globifera* from the Caprivi is supported only by verbal evidence. Confirmation of the existence of *J. globifera* in the Caprivi is desired.

3528

11. BAUHINIA

by L. A. COETZER and J. H. ROSS

Bauhinia *L.*, Sp. Pl. 1 : 374 (1753); Gen. Pl. ed. 5 : 177 (1754); DC., Prodr. 2 : 512 (1825); Mém. Leg. 476 (1825); Vogel in Linnaea 13 : 297 (1839); Endl., Gen. Pl. Suppl. 1317 (1840); Harv. in F.C. 2 : 275 (1862); Benth. & Hook. f., Gen. Pl. 1 : 575 (1865); Oliv. in F.T.A. 2 : 285 (1871); Baill., Hist. Pl. 2 : 110 (1872); Taub. in Engl., Pflanzenfam. 3, 3 : 147 (1892); Ridley, Fl. Malay Peninsula 1 : 624 (1922); Bak.f., Leg. Trop. Afr. 3 : 651 (1930); Burtt Davy, Fl. Transv. 2 : 322 (1932); Phill., Gen. ed. 2 : 395 (1951); Wilczek in F.C.B. 3 : 269 (1952); De Wit in Reinwardtia 3 : 386, 390 (1956); Keay in F.W.T.A. ed 2, 1 : 444 (1958); Dale & Greenway, Kenya Trees and Shrubs 96 (1961); Hutch., Gen. Fl. Pl. 1 : 242 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 207 (1967); Schreiber in F.S.W.A. 59 : 5 (1967); Palmer & Pitman, Trees S. Afr. 2 : 865 (1973). Type species: *B. divaricata* L.

Trees or shrubs, seldom scandent or climbing. *Tendrils* absent but branches sometimes curling apically and tendril-like. *Leaves* alternate, simple*, conspicuously bilobed or sometimes divided to the base. *Stipules* deciduous. *Inflorescence* a short usually few-flowered raceme or flowers solitary. *Flowers* usually large and showy, bisexual, irregular. *Calyx* spathaceous (the sepals ± cohering after the calyx has opened). *Petals* 5 (rarely 6), free. *Fertile stamens* 1–10, sometimes accompanied by staminodes, free; filaments ± hairy basally in indigenous species; anthers dehiscing by longitudinal slits. *Ovary* usually stipitate; style elongate; stigma capitate or small, sometimes ± unilateral; funicle of ovule short, at top often with 2 short outgrowths appressed to the seed, one of which may be ± suppressed. *Pods* oblong to linear, ± woody, dehiscent or rarely (but not in our area) indehiscent, few- to many seeded. *Seeds* compressed, with endosperm.

Bentham, in Gen. Pl. 1 : 575 (1865), followed earlier authors in giving *Bauhinia* L. a very wide concept, the genus being delimited primarily on the bilobed nature of the leaf. Here a narrower generic concept is taken which is explained by De Wit in his revision of the Malaysian Bauhinieae in Reinwardtia 3 : 390 (1956). In its emended form the genus is distributed through tropical Africa, Asia and America but the number of species is uncertain at present. Six indigenous species of *Bauhinia* are recorded from our area and three exotic species are planted for ornament. Other Southern African species formerly in *Bauhinia* may be sought in the genera *Adenolobus*, *Piliostigma* and *Tylosema*.

Recently Schmitz, in Bull. Jard. Bot. Nat. Belg. 43 : 369–423 (1973), has taken a very narrow view of *Bauhinia* and has restricted the genus to America, our species being referred to the genera *Perlebia* Mart. and *Pauletia* Cav.

The genus *Bauhinia* is named in honour of the two illustrious Swiss botanists of the sixteenth century, the brothers Jean and Caspar Bauhin. According to Linnaeus, Hort. Cliff. 157 (1737), Plumier, wishing to commemorate the two brothers, chose a genus characterized by bilobed leaves, the two lobes of the leaf exemplifying the two brothers.

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* As mentioned by Brenan, in F.T.E.A. Legum.-Caesalp. : 207 (1967), although the leaves of *Bauhinia* (and of the related genera Nos. 12–14) appear to be and are described as simple, they are in origin more complicated. R.E. Fries, in Arkiv för Bot. 8, No. 10 : 1–16 (1909), considered them to have been derived through lateral fusion of the leaflets from a pinnate leaf with a single pair of leaflets. Goebel, Organographie Pfl. ed. 2, 3 : 1354 (1923), emended Fries's theory by maintaining that there is no evidence of any ontogenetic fusion, but rather that each one of the pair of leaflets has failed to separate along one side from its partner, like a Siamese twin.

Key to indigenous species

Fertile stamens 10:
- Petals sulphur-yellow, 1–3 of them often (not always) with a dark brown or purplish basal blotch ..... 3. *B. tomentosa*
- Petals white, often with pink or reddish main veins:
  - Leaf-blade divided to the base into two distinct leaflets; flowers mostly solitary ..... 2. *B. natalensis*
  - Leaf-blade bilobed apically to about two-thirds of the way down; inflorescences 2–6-flowered. 1. *B. bowkeri*

Fertile stamens 3–6:
- Petals pinkish-red to brick-red or sometimes ± scarlet, with a conspicuous basal claw which is almost as long as the lamina ..... 4. *B. galpinii*
- Petals white (sometimes the midrib pinkish basally) or pink to mauve, without a conspicuous basal claw:
  - Hypanthium 0,4–0,6 cm long; flower-buds densely clothed with a rusty, woolly indumentum ..... 5. *B. urbaniana*
  - Hypanthium > 2 cm long; flower-buds ± densely brown-puberulous:
    - Hairs on lower surface of leaf appressed-puberulous; inflorescence 2–10-flowered ..... 6a. *B. petersiana* subsp. *petersiana*
    - Hairs on lower surface of leaf curved or spreading but not appressed; inflorescence 1–3(4)-flowered ..... 6b. *B. petersiana* subsp. *serpae*

Three exotic species of *Bauhinia* are planted in our area for ornament but there is no evidence of any of them becoming naturalized.

Key to exotic species

Unarmed tree or shrub; fertile stamens 3 or 5; petals up to 5 cm long; lower surface of leaf finely puberulous or glabrescent:
- Fertile stamens 5; flower-buds not winged or ridged above; calyx-tube splitting down one side and remaining spathaceous and entire:
  - Petals blotched or striped with purple ..... 7. *B. variegata* var. *variegata*
  - Petals without purple, either white or partly yellow ..... 7. *B. variegata* var. *candida*
- Fertile stamens 3; flower-buds winged or ridged above; calyx-tube usually splitting into two sections; petals pinkish, reddish or purplish ..... 8. *B. purpurea*

Shrub or tree armed with paired spines up to 5 mm long; fertile stamens 10; petals white, 8–12 cm long; lower surface of leaf densely pubescent ..... 9. *B. candicans*

1. **Bauhinia bowkeri** *Harv.* in F.C. 2 : 596 (1862); Oliv. in F.T.A. 2 : 289 (1871); Taub. in Pflanzenfam. 3,3 : 149 (1892); Schinz in Mém. Herb. Boiss. 1 : 121 (1900); Sim, For. Fl. Cape Col. 208 (1907); Bak.f., Leg. Trop. Afr. 3 : 655 (1930); Henkel, Woody Pl. Natal 118 (1934); Palmer & Pitman, Trees S. Afr. 2 : 867 (1973). Type: Cape, along Bashee River near Fort Bowker, *Henry Bowker* 378 (TCD, holo. !).

Pauletia bowkeri (Harv.) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 394 (1973). Type as above.

Shrub or tree to 5 m high; young branchlets minutely puberulous or glabrescent. *Leaves*: petiole 0,7–1,5 cm long; blade (1) 1,5–4 cm long, 1,4–4 cm wide, bilobed apically to about two-thirds of the way down, minutely appressed-puberulous on lower surface; lobes ± semicircular. *Stipules* 2–4 mm long, ± 1 mm wide. *Inflorescence* 2–6-flowered, mostly terminal. *Flower-buds*: upper part (i.e. sepals) linear to linear-lanceolate in outline, 1,3–2,8 cm long before anthesis; hypanthium 0,9–1,8 cm long, finely longitudinally sulcate. *Petals* white, 2,8–4,8 cm long, 0,8–1,4 cm wide, tapering basally, margins slightly crisped, glabrous above, the midrib slightly pubescent outside and with small glands or scales. *Stamens*: 10 fertile; filaments 1,5–3 cm long. *Style* 0,6–1,5 cm long, pubescent; stigma ± 1 mm in diameter. *Pod* linear-oblong to oblanceolate, 5–14 cm long, 1–2 cm wide, woody, dehiscent. *Seeds* light brown, oval to ± circular, 8–10 mm long, 4–6 mm wide.

B. bowkeri is restricted to the Butterworth and Umtata districts of the Eastern Cape. It occurs in valley bushveld and flowers from October to March.

CAPE.—3128 (Umtata): Egossa, *Sim 19969*. 3228 (Butterworth): Kentani, *Sim 19960*; Bashee River Bridge, 8 km from the Haven, *Wells 3571*; along banks of Kei River, *Flanagan 1058*; *Pegler 670*.

B. bowkeri is reported as an ornamental tree in Pretoria and Grahamstown.

The species is named after Colonel James Henry Bowker (1822–1900), soldier and noted naturalist.

2. **Bauhinia natalensis** *Oliv. ex Hook.* in Bot. Mag. t. 6086 (1874); Henkel, Woody Pl. Natal 117 (1934); Ross, Fl. Natal 195 (1973). Type: Natal, South Coast, *McKen* 2 (K, holo.!).

Perlebia natalensis (Oliv. ex Hook.) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 385 (1973). Type as above.

Shrub to 2 m high; young branchlets ± glabrous or very sparingly pubescent. *Leaves*: petiole 0,4–1,5 cm long; blade divided to the base into two distinct leaflets; leaflets obliquely ovate-oblong to obovate, the outer margin convex and the inner nearly straight, (0,5) 0,9–3,1 cm long, (0,3) 0,5–1,7 cm wide, glabrous. *Stipules* 1–3 mm long. *Flowers* mostly solitary, terminal. *Flower-buds*: upper part (i.e. sepals) linear to linear-lanceolate in outline, 1–1,8 cm long before anthesis; hypanthium 0,5–1,5 cm long, finely longitudinally sulcate. *Petals* white, often with pink to red main veins, obovate, 1,5–3 cm long, 0,7–1,5 cm wide, margins scarcely crisped, glabrous. *Stamens*: 10 fertile; filaments 0,8–1,8 cm long. *Style* 0,3–1 cm long, glabrous; stigma abruptly enlarged from the style. *Pod* linear-oblong to oblanceolate, 3–8 cm long, 0,8–1,2 cm wide, thinly woody, dehiscent, pale yellowish-brown with darker margins. *Seeds* light to dark brown, ovate or oval to ± circular, 4–7 mm long, 3–5 mm wide.

Confined to the eastern Cape and the south coast of Natal. Occurs in valley bushveld and scrub.

NATAL.—3030 (Port Shepstone): Gibraltar, *Strey 9580, Strey 10011*; Umzimkulu, Gibraltar, *Nicholson 515*.

CAPE.—3028 (Matatiele): Kenegha Valley below Nyeweni, *Acocks 12212*. 3029 (Kokstad): Umzimhlovu Valley between Tabankulu and Lusikisiki, *District Forest Officer 646*; Umzimvubu, *Schlechter 1835*; Mount Frere—Cedarville, *Strey 10815*. 3128 (Umtata): Tsitsa Waterfalls, *Pegler 127*. 3129 (Port St. Johns): 13 km S. of Holy Cross Mission, Lusikisiki, *Codd 9325*. 3228 (Butterworth): along coast at Kei River, *Woodroffe s.n.*

Grown as an ornamental shrub in botanical gardens. The only species of the genus *Bauhinia* in our area with compound leaves consisting of two distinct leaflets, and therefore easily distinguishable.

Flowering period is from October to April.

3. **Bauhinia tomentosa** *L.*, Sp. Pl. 1 : 375 (1753); DC., Prodr. 2 : 514 (1825); Harv. in F.C. 2 : 275 (1862); Oliv. in F.T.A. 2: 290 (1871); Taub. in Pflanzenfam. 3,3 : 149 (1892); Hiern, Cat. Afr. Pl. Welw. 1 : 296 (1896); Bak. f., Leg. Trop. Afr. 3 : 654 (1930); Henkel, Woody Pl. Natal 114 (1934); Wilczek in F.C.B. 3 : 271 (1952); De Wit in Reinwardtia 3 : 409 (1956); Torre & Hillc. in C.F.A. 2 : 192 (1956); Roti-Michelozzi in Webbia 13 : 153, figs. 3 & 4 (1957); Dale & Greenway, Kenya Trees and Shrubs 97 (1961); F. White, For. Fl. N. Rhod. 99 (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 209 (1967); Drummond in Kirkia 8,2 : 212 (1972); Palmer & Pitman, Trees S. Afr. 2 : 867 (1973); Ross, Fl. Natal 195 (1973). Type: Burmann, Thesaurus Zeylanicus, t. 18 (1737) (lecto.!; G, typotype).

B. tomentosa L. var. *glabrata* Hook.f. in Bot. Mag. t. 5560 (1866), as *glabra*; Chiov., Racc. Bot. Miss. Consol. Kenya 39 (1935). Type cultivated at Kew from seed collected in Angola.

Pauletia tomentosa (L.) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 393 (1973). Type as for *B. tomentosa*.

Shrub or tree up to 8 m high; young branchlets glabrous, puberulous or ± pubescent. *Leaves*: petiole 0,6–2 cm long; blade very variable in size, 1–7 cm long, 1–6,5 cm wide (in our area), mostly bilobed apically to about one-third of the way down, rarely to half way or more, lower surface glabrous, appressed-puberulous or ± pubescent. *Stipules* 3–5 mm long, ± 1 mm wide. *Inflorescence* 1–2(7)-flowered, terminal or lateral; bracteoles small and inconspicuous. *Flower-buds*: upper part (i.e. sepals) ovate in outline, 1–2 cm long before anthesis, glabrous or pubescent outside; hypanthium 2–8 mm long, smooth or finely longitudinally sulcate; pedicels 0,7–2,5 cm long. *Petals* sulphur-yellow, 1–3 of them often (not always) with a dark brown or purplish basal blotch, subcircular to obovate or elliptic (2,5) 3–5,5 cm long, (1,5) 2–4,5 cm wide, not or scarcely clawed. *Stamens*: 10 fertile; filaments up to 2 cm long. *Style* gradually enlarged towards the stigma; stigma 2,5–3 mm in diameter, variable, terminal, peltate or with one side produced downwards. *Pod* linear-oblong to oblanceolate-oblong, 6–13 cm long, (1) 1,3–2 cm wide, thinly woody, dehiscent, glabrescent to densely tomentose. *Seeds* blackish or chestnut-brown, ± elliptic, 5–9 mm long, 4–6 mm wide.

Widespread from Ethiopia and Somalia in the north southwards to Zaire, Angola, Rhodesia,

Mozambique, the Transvaal and Natal; also in Malaysia. Occurs in coastal forest, in woodland and bushveld.

TRANSVAAL.—2429 (Zebediela): 25 km N.N.W. of Schoonoord, *Acocks 20936*. 2430 (Pilgrim's Rest): 3 km from Lulu Trading Store on Stellenbosch Road, *Story 4107*; 11 km N.E. of Steelpoort P.O., *Codd 6696*.

NATAL.—2632 (Bela Vista): N. of Kosi mouth, *Stephen & Van Graan 1301*. 2732 (Ubombo): Lake Sibayi, *Moll 3181*. 2832 (Mtubatuba): Charter's Creek, *Ward 3028*; Dukuduku Forest, 8 km from St. Lucia, *Gerstner 6269*. 2930 (Pietermaritzburg): Isipingo, 1,6 km from the beach, *Watmough 439*. 2931 (Stanger): The Bluff, *Phillips s.n.* 3030 (Port Shepstone): near coast at Amanzimtoti, *Plowes 2424*; Izingolweni, *Galpin 14815*.

B. tomentosa shows a considerable range of variation, particularly in the degree of development of the indumentum from glabrous to strongly pubescent, in leaf-size and shape, in the shape, size and blotching of the petals, in the degree to which the tip of the flower-bud is acuminate and in the shape of the stigma. Within our area there is an inconsistent tendency for the petioles and lower surfaces of the leaves to be glabrescent to sparingly puberulous in Natal and sparingly puberulous to pubescent in the Transvaal. Although the extremes look a little different there is ± continuous variation and consequently no named varieties are recognized.

B. tomentosa is used for diverse medicinal purposes in many tropical countries (see Watt & Breyer-Brandwijk, The Medicinal and Poisonous plants of South and Eastern Africa 561, 1962).

The specific name alludes to the tomentum of the pods.

4. **Bauhinia galpinii** *N.E. Br.* in Gard. Chron. 9 : 728 (1891); Oliv. in Hook., Icon. Pl. t. 1994 (1891); Phillips, Flow. Pl. Afr. 2 : t. 79 (1922); Steedman, Trees, Shrubs & Lianes S. Rhod. 18 (1933); Pole Evans, Mem. Bot. Surv. S. Afr. 22 : 264 (1948); Codd, Trees & Shrubs Kruger Nat. Park 61 (1951); De Wit in Reinwardtia 3 : 398 (1956); Letty, Wild Flow. Transv. 160 (1962); Wright, Wild Flow. S. Afr.–Natal 89, pl. 5 (1963); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966); Eliovson, Flowering Shrubs, Trees & Climbers S. Afr. 63 (1971); Van der Spuy, S. Afr. Shrubs & Trees for the Garden 71 (1971); Drummond in Kirkia 8,2 : 212 (1972); Palmer and Pitman, Trees S. Afr. 2 : 867 (1973); Ross, Fl. Natal 195 (1973). Syntypes: Transvaal, Doorn Spruit near Spelonken, *Nelson* 409 (K!); near Barberton, *Saunders sub Wood* 3885 (K!); Barberton, *Galpin* 421 (K!; PRE!).

B. punctata Bolle in Peters, Reise Mossamb. Bot. 1 : 23 (1861) non *B. punctata* Jacq. (1780), nom. illegit.; Oliv. in F.T.A. 2: 292 (1871); Bak.f., Leg. Trop. Afr. 3 : 658 (1930); Burtt Davy, Fl. Transv. 2 : 323 (1932); Henkel, Woody Pl. Natal 117 (1934); Coates Palgrave, Trees Cent. Afr. 74 (1956). Type: Mozambique, Zambesi, *Peters* s.n. (B, holo. †, K, iso.!).

Perlebia galpinii (N.E. Br.) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 382 (1973). Type as for *B. galpinii*.

Spreading shrub up to 4 m high, occasionally scandent, sometimes forming fairly large thickets; young branchlets ± densely brown-pubescent or -puberulous. *Leaves*: petiole 0,8 – 1,5 cm long; blade often wider than long, (1,5) 2,5 – 5 cm long, 3–7 cm wide, bilobed apically for about one-quarter of the length of the leaf, appressed-puberulous on lower surface; lobes obliquely obovate to ovate. *Stipules* 1,5 – 3 mm long. *Inflorescence* up to 10-flowered, terminal, axillary or leaf-opposed. *Flower-buds*: upper part (i.e. sepals) linear to linear-lanceolate in outline, 1–3,4 cm long before anthesis; hypanthium 1,2–3 cm long, ± densely brown-puberulous, finely longitudinally sulcate. *Petals* pinkish-red to brick-red or sometimes ± scarlet, 3–4 cm long, lamina abruptly widened above from a conspicuous basal claw which is almost as long as the lamina, glabrous above, the midrib pubescent outside and with small glands or scales. *Stamens* : 3 fertile, the filaments 2,5–3,5 cm long; staminodes 7, free, red, 3–6 mm long. *Style* 4–7 mm long. *Pod* linear-oblong to oblanceolate-oblong, 5–14 cm long, 2–3 cm wide, on a woody stipe 2–3 cm long, dehiscent, woody, puberulous when young but sometimes becoming glabrescent with age. *Seeds* chestnut-brown, irregularly oblong to obovate, 1–1,6 cm long, 0,6–1 cm wide.

Found in Mozambique, Rhodesia, and the higher rainfall regions of the north-eastern and eastern Transvaal, Swaziland and Zululand. Occurs in bushveld and scrub, often on wooded or boulder strewn slopes or near streams.

TRANSVAAL.—2230 (Messina) : Sibasa, *Von Wolff sub TRV 34851*. 2231 (Pafuri) : 40 km from Louis Trichardt to Punda Milia, *Ihlenfeldt 2214*. 2329 (Pietersburg): 12 km E. of Soekmekaar on road to Tzaneen, *De Winter & Killick 8914*. 2330 (Tzaneen): Duiwelskloof, Westfalia Estate, *Scheepers 126*. 2428 (Nylstroom): Between Vaalwater and Beauty, *Werdermann & Oberdieck 1773*. 2430 (Pilgrim's Rest): Blyde River Gorge, *Galpin 14636*. 2431 (Acornhoek): Bushbuckridge, *Taat 1387*. 2529 (Witbank): Loskop Dam, near The Hell, *Codd 10352*. 2530 (Lydenburg): Somerset farm, Schoeman's Kloof, *Smuts & Gillett 2192*. 2531 (Komatipoort): Barberton, *Rogers 18215*.

SWAZILAND.—2531 (Komatipoort): Havelock Mine, *Miller S/31.* 2631 (Mbabane): Mantenga, *Compton 25447.* 2731 (Louwsburg): Nsoko, *Lindahl 30.*

NATAL.—2632 (Bela Vista): 5 km S. of Abercorn Pont on road to Ndumu, *Ross 1931.* 2732 (Ubombo): 3 km from Ingwavuma on road to Ndumu, *Ross 1895;* Jozini Dam, *Edwards 2874.*

An extremely decorative ornamental shrub, commonly known as Pride of De Kaap or Vlam-van-die-vlakte, that has been widely planted in parks and gardens. De Wit, in Reinwardtia 3 : 391 (1956), reports that it has been introduced as a garden shrub into Malaysia. Flowering period is from October to May (June).

The species is named in honour of Dr. E. E. Galpin, a botanical collector of the late nineteenth and early twentieth century.

5. **Bauhinia urbaniana** *Schinz* in Verh. Bot. Ver. Prov. Brandenb. 30: 169 (1888); in Mém. Herb. Boiss. 1 : 120 (1900); Bak. f., Leg. Trop. Afr. 3 : 656 (1930); O. B. Miller in J. S. Afr. Bot. 18 : 29 (1952); Torre & Hillc. in C.F.A. 2 : 193 (1956); F. White, For. Fl. N. Rhod. 100 (1962); Schreiber in F.S.W.A. 59 : 6 (1967); Palmer & Pitman, Trees S. Afr. 2 : 871 (1973). Type: North-western Kalahari, between Karakobis and Levisfontein, *Schinz* 275 (Z, holo.!).

Perlebia urbaniana (Schinz) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 386 (1973). Type as above.

Slender shrub up to 3 m high, often many-stemmed, branches slender; young branchlets densely pubescent and glandular. *Leaves:* petiole 0,4–1 cm long; blade often wider than long, (1,5) 2–4,5 cm long, (1,5) 2–7 cm wide, bilobed apically to about half or two-thirds of the way down, densely clothed with curved but non-appressed hairs on the lower surface, particularly on the main nerves. *Stipules* 3–4 mm long. *Inflorescence* mostly many-flowered, less frequently flowers solitary or 2 or 3 per inflorescence, terminal, axillary or leaf-opposed, with a dense rusty indumentum. *Flower-buds* densely clothed with a rusty indumentum and glandular: upper part (i.e. sepals) obovate-oblong in outline, 0,8–1,5 cm long before anthesis; hypanthium 4–6 mm long; pedicels 1–2 mm long. *Petals* white to pink or mauve, 1,8–2,5 cm long, 0,6–1 cm wide, margins crisped, glabrous above, the midrib pubescent outside and with many small orange glands or scales. *Stamens:* 5 fertile, free, filaments 1–1,5 cm long; staminodes 5, united basally for most of their length, 0,4–1 cm long; anthers of fertile stamens with conspicuous hairs. *Ovary* densely clothed with hairs; style 0,5–0,8 cm long, pubescent and glandular; stigma abruptly enlarged from the style. *Pod* oblanceolate-oblong to oblong, 7,5–12 cm long, 1,2–1,8 cm wide, woody, dehiscent, densely pubescent when young but indumentum wearing off with age. *Seeds* chestnut-brown, oblong to obovate or subcircular, 7–9 mm long, 5–6 mm wide.

Found in Angola, north-eastern South West Africa, Zambia and Botswana. Occurs in woodland, usually on sandy soil.

S.W.A.—1719 (Runtu): Mukusi Forest, Okavango, *Marsh s.n.* 1819 (Karakuwisa): Quata-quata, Okavango, *Keet 1648;* Okavango Forests, *Kruger 10.* 1820 (Tarikora): Tamso, S.E. of Runtu, *Maquire 1647;* 13 km S. of Tamso, *Giess 9972.* 1918 (Grootfontein): 7 mile Dune, Okavango, *Le Roux 315;* 13 km N. of Xeidang, *Giess 10037.*

Flowering period is from April to August.

B. urbaniana is named after Dr. Ignatz Urban (1848–1930), Assistant Director of the Botanical Gardens and Museum at Berlin-Dahlem.

6. **Bauhinia petersiana** *Bolle* in Peters, Reise Mossamb. Bot. 1 : 24 (1861). Type: Mozambique, rios de Sena, *Peters s.n.* (B, holo. †, K!).

Shrub or tree 1–10 m high, shrubs usually erect but sometimes scrambling or scandent, rarely a suffrutex up to 0,4 m high; young branchlets ± densely greyish or brown-pubescent or -puberulous and with many small orange glands or scales, some branchlets often coiled apically and tendril-like. *Leaves*: petiole 0,4–2 cm long; blade often wider than long, (1) 2–7 (8) cm long, (1,8) 2–10 cm wide, bilobed apically to about one-third to two-thirds of the way down, appressed-puberulous on lower surface or with spreading or ascending but non-appressed hairs; lobes elliptic to ovate or rounded. *Stipules* 3–5 mm long, 1–2 mm wide. *Inflorescence* 1–10-flowered, axillary, leaf-opposed or terminal and often crowded. *Flower-buds*: upper part (i.e. sepals) linear to linear-lanceolate in outline, 1,5–5 cm long before anthesis; hypanthium (1,5) 2–5,5 (6,5) cm long, finely longitudinally sulcate. *Petals* white throughout or sometimes the midrib pinkish basally, narrowly elliptic to ovate, 2,2–8,4 cm long, 0,6–2,2 (4,2) cm wide, with very crisped margins, glabrous above, the midrib pubescent outside and with

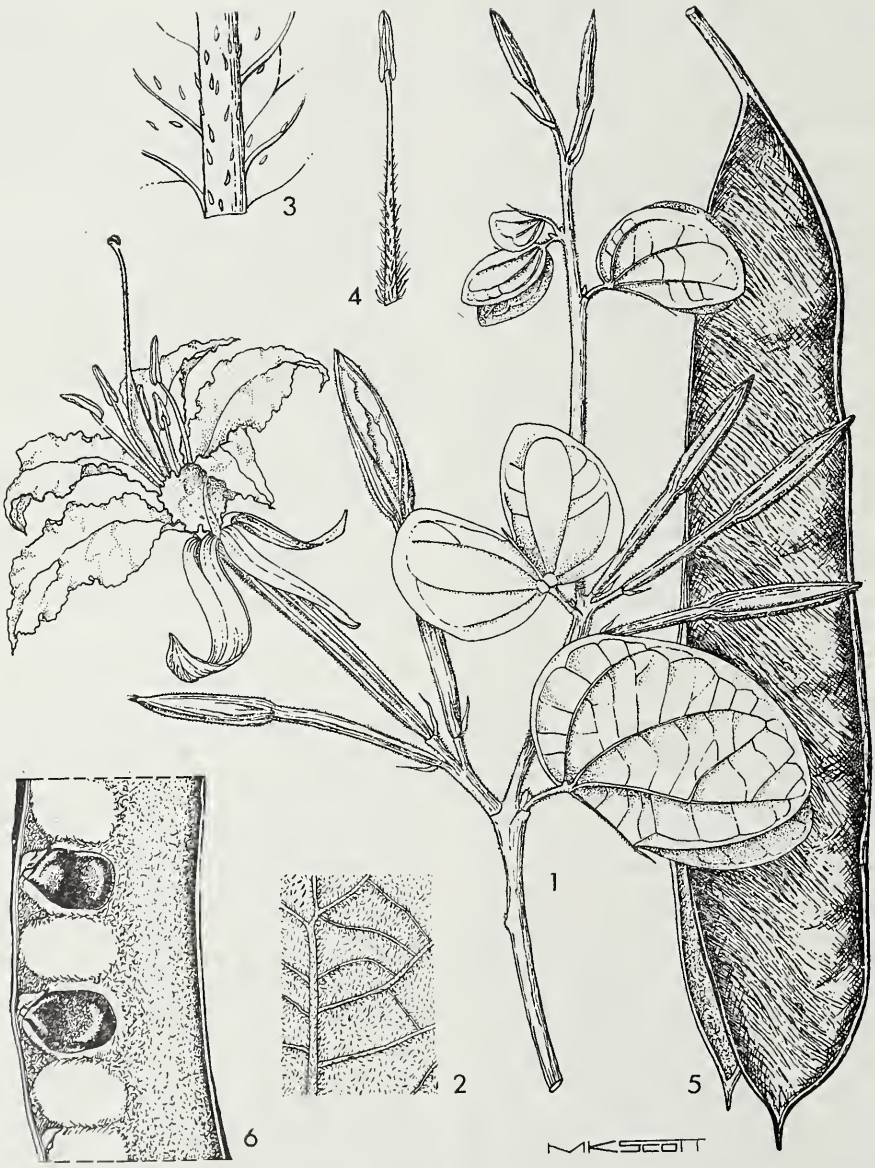


FIG. 11.—**Bauhinia petersiana** subsp. **serpae**. 1, flowering twig, × 1; 2, portion of lower surface of leaflet showing curved but non-appressed hairs, × 4; 3, part of petal showing glands, × 4; 4, stamen, × 2, all from *Killick & Leistner* 3199; 5, pod, × 1; 6, portion of dehisced pod showing seeds, × 1, both from *Hodgson* s.n.

many small orange glands or scales. *Stamens*: usually 5 fertile, occasionally 4 or 6 fertile, three longer, (3) 4,5–6 cm long, the other shorter two 3–5 cm long; filaments white, pink or red throughout, or sometimes pinkish basally and white above; staminodes 4 or 5. *Style* 2–4 cm long, pubescent and with glands or scales; stigma 2–3 mm in diameter, abruptly enlarged from the style. *Pod* linear-oblong to oblanceolate-oblong, 6–24 cm long, (1,3) 1,7–4,7 cm wide, woody, dehiscent, puberulous but often becoming glabrescent with age. *Seeds* deep chestnut-brown to blackish, irregularly oblong to obovate or subcircular, 1–1,6 cm long, 0,7–1,8 cm wide. Fig. 11.

Found in Zaire and Tanzania and southwards to Angola, South West Africa, Botswana, Transvaal and the northern Cape Province.

The species is named in honour of Prof. W. C. H. Peters of Berlin who collected extensively in Mozambique during the early years of the nineteenth century.

(a) subsp. **petersiana.**

Brummitt & Ross in Kew Bull. 30: 594 (1976).

B. petersiana Bolle in Peters, Reise Mossamb. Bot. 1 : 24 (1861); Oliv. in F.T.A. 2 : 288 (1871); Bak.f., Leg. Trop. Afr. 3 : 656 (1930); Wilczek in F.C.B. 3 : 274 (1952); Coates Palgrave, Trees Cent. Afr. 70 (1956); F. White, For. Fl. N. Rhod. 99 (1962); Brenan in F.T.E.A. Legum.-Caesalp.: 211, fig. 47 (1967); Tölken in Flow. Pl. Afr. 39: t.1532 (1969); Drummond in Kirkia 8,2: 212 (1972); Drummond & Coates Palgrave, Common Trees of the Highveld 34 (1973).

Perlebia petersiana (Bolle) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 385 (1973). Type as for *B. petersiana*.

Hairs on lower surface of leaf appressed-puberulous; inflorescence 2–10-flowered; petals 0,6–1,5 (2,7) cm wide; pods 2,3–4,7 cm wide.

Found in Zaire, Tanzania, Zambia, Malawi, Mozambique, the eastern Caprivi Strip and Rhodesia. The distributional ranges of subsp. *petersiana* and subsp. *serpae* overlap in the region of the Victoria Falls. Subsp. *petersiana* occurs in woodland and wooded grassland. Only one collection has been made from our area.

S.W.A.—2417 (Katima Mulilo): 2 km E. of Katima Mulilo on road to Ngoma, *Valrmeijer 2507*.

The indumentum on the lower surface of the leaf provides the most satisfactory character for distinguishing between the two subspecies. In subsp. *petersiana* the hairs are minute and closely appressed, while in subsp. *serpae* the hairs are longer and irregularly spreading or ascending but non-appressed. Occasionally, but not in our area, specimens with an indumentum ± intermediate between the two subspecies are found. In addition to the indumentum, the inflorescences in subsp. *petersiana* tend to have more flowers, the leaves tend to be larger, the petals tend to be narrower, 0,6 – 1,5 (2,7) cm wide as opposed to 0,8 – 2,2 (4,2) cm wide in subsp. *serpae*, and the pods tend to be wider, 2,3 – 4,7 cm wide in contrast to (1,3) 1,7 – 3 cm wide in subsp. *serpae*.

(b) subsp. **serpae** (*Ficalho & Hiern*) *Brummitt & J. Ross* in Kew Bull. 30: 594 (1976)*. Type: Angola, Ninda, *Serpa Pinto* 9 (LISU, holo.).

B. macrantha Oliv. in F.T.A. 2 : 289 (1871); Schinz in Mém. Herb. Boiss. 1 : 120 (1900); Thonner, Flow. Pl. Afr. t.67 (1915); Bak. f., Leg. Trop. Afr. 3 : 656 (1930); Burtt Davy, Fl. Transv. 2 : 323 (1932); O.B. Miller in J. S. Afr. Bot. 18 : 28 (1952); Torre & Hillc. in C.F.A. 2 : 194 (1956); F. White, For. Fl. N. Rhod. 99 (1962); Schreiber in F.S.W.A. 59 : 6 (1967); Meyer, Pflanzenwelt Südwestafrikas 86 (1969); Tölken in Flow. Pl. Afr. 39 : t.1531 (1969); Giess in Dinteria 5 : 27 (1970); Nordenstam in Dinteria 5 : 11 (1970); Eliovson, Flow. Shrubs, Trees & Climbers for S. Afr. 63 (1971); Drummond in Kirkia 8,2 : 212 (1972); Palmer & Pitman, Trees S. Afr. 2 : 869 (1973). Type: Botswana, Desert by Lake Ngami, *McCabe sub Atherstone* s.n. (K, holo.!). *B. serpae* Ficalho & Hiern in Trans. Linn. Soc., Bot., Ser. 2,2 : 20 (1881); Torre & Hillc. in C.F.A. 2 : 194 (1956). Type: Angola, Ninda, *Serpa Pinto* 9 (LISU, holo.).

Perlebia macrantha (Oliv.) Schmitz in Bull. Jard. Bot. Nat. Belg. 43 : 384 (1973). Type as for *B. macrantha*. *P. macrantha* subsp. *serpae* (Ficalho & Hiern) Schmitz, loc. cit.: 384 (1973). Type as for *B. serpae*.

Hairs on lower surface of leaf curved, spreading or ascending but not appressed; inflorescence 1–3 (4)-flowered; petals 0,8–2,2 (4,2) cm wide; pods (1,3) 1,7–3 cm wide.

* Schmitz, in Bull. Jard. Bot. Nat. Belg. 43 : 384 (1973), on the basis of pollen morphology, recognized two subspecies within *Perlebia macrantha*, namely, subsp. *macrantha* and subsp. *serpae* (Ficalho & Hiern) Schmitz. His publication of the name *Perlebia macrantha* subsp. *serpae* has an important, and most unfortunate, consequence under the present International Code of Botanical Nomenclature. At Seattle in 1969 a decision was accepted which excluded autonyms from consideration in matters of priority, so that *Perlebia macrantha* subsp. *macrantha*, automatically established in 1973 by publication of subsp. *serpae*, cannot compete with the latter for priority. Although efforts were made at Leningrad in 1975 to reverse this unfortunate decision, these succeeded only to the extent of having the matter put "on ice" pending consideration by a special committee reporting to the next Congress in 1981. Recognizing the desirability that the International Code be respected, the epithet *serpae* was reluctantly adopted for this subspecies in place of the well-known and familiar epithet *macrantha*.

Found in Angola, Zambia, South West Africa, Rhodesia, Botswana, the central and western Transvaal and the northern Cape. Favours the Kalahari sands and occurs in sandveld, bushveld and in thornveld.

S.W.A.—1715 (Ondangua): 32 km N. of Ondangua, *Le Roux 1027*. 1719 (Runtu): 16 km W. of Runtu, *De Winter 3747*. 1723 (Singalamwe): 96 km from Katima Mulilo on road to Singalamwe, *Killick & Leistner 3199*. 1724 (Katima Mulilo): Ngamiland, E. of Cuando River, *Curson 916*. 1816 (Namutoni): 64 km S.E. of Ondangua, *De Winter & Giess 6956*. 1819 (Karakuwisa): Tsammagaigai, E. of Karakuwisa, *Maquire 2104*. 1820 (Tarikora): 5 km down Omuramba Omatako, S. of junction of River and Omuramba, *De Winter & Wiss 4129*. 1821 (Andara): Andara Mission Station, *De Winter & Marais 4833*. 1917 (Tsumeb): Otavi, *Dinter 5293*. 1918 (Grootfontein): sand dunes N.E. of Grootfontein, *Schoenfelder 226*. 1919 (Kanovlei): Kanovlei, *Le Roux 34*. 1920 (Tsumkwe): W. foot of Aha Mountains, Grootfontein, *Story 6334*. 2017 (Waterberg): Omanbondatal, P. O. Guchab, *Bär s.n.* 2019 (Eiseb): northern Hereroland, *Venn 17*. 2116 (Okahandja): farm Quickborn, *Bradfield 130*. 2118 (Steinhausen): Springvale, *Hodgson s.n.* 2219 (Sandfontein): Gobabis, farm Gemsbokfontein, *Merxmüller & Giess 1188*.

TRANSVAAL.—2327 (Ellisras): 5 km N. of Ons Hoop P.O., *Codd 8456*. 2428 (Nylstroom): 13,5 km S. of Crecy, *Story 1585*. 2429 (Zebediela): Potgietersrus, *Crawley sub TRV 10111*. 2526 (Zeerust): Groot Marico, *Sutton 1132*. 2528 (Pretoria): Rooikop, *Pole Evans 1226*.

CAPE.—2524 (Vergeleë): 114 km W. of Mafeking, *Acocks 18765*. 2624 (Vryburg): Vryburg, *Coetzee 6*.

B. petersiana subsp. *serpae* is commonly known as "wild coffee bean" and the pods are edible. Palmer & Pitman (1973) report that Thomas Baines used the ground seed as a coffee substitute, as farmers still do today, while the "Bushmen and African peoples eat the roasted beans, pounded into a meal, which is nourishing, palatable and one of their staple foods".

Watt and Breyer-Brandwijk (1962) report that "The Luvale make a lotion from the leaf for application to wounds and use the root as a diarrhoea remedy".

7. **Bauhinia variegata** *L.*, Sp. Pl. 1 : 375 (1753); Wight & Arn., Prodr. Fl. Pen. Ind. Or. 296 (1834); Bak. in Fl. Brit. Ind. 2 : 284 (1878); De Wit in Reinwardtia 3 : 411 (1956); Brenan in F.T.E.A. Legum.-Caesalp.: 208 (1967). Type from south-east Asia.

Unarmed tree to 10 m high. *Leaves* broadly ovate, often broader than long, (3,5) 5–14 cm long, 6–14 cm wide, bilobed apically to about ⅓-way down, coriaceous, 11–13-nerved, lower surface finely puberulous. *Inflorescence* a few-flowered, abbreviated, axillary or terminal raceme. *Flowers* on thick striate puberulous 1,5–2 cm long pedicels which merge gradually into the receptacle; receptacle 1–2,5 cm long; bracts and bracteoles ovate, pubescent, short, rapidly deciduous. *Flower-buds:* upper part (i.e. sepals) fusiform, turgid, not winged or ridged. *Calyx-tube* splitting down one side and remaining spathaceous and entire. *Petals* up to 5 cm long and 3 cm wide, glabrous, sometimes margins more or less crisped. *Fertile stamens* 5; reduced stamens and staminodes 5, ⅓ as long as fertile ones. *Pod* oblanceolate-oblong, up to 30 cm long, 1,8–2,5 cm wide.

Introduced from south-east Asia and widely planted in our area for ornament. Relatively few specimens have been collected in our area and the actual distribution of this species greatly exceeds that indicated by the cited specimens below.

TRANSVAAL.—2528 (Pretoria): Prince's Park, *Repton 19B*; Garden of Union Buildings, *Phillips s.n.*; *Gunn 3*; *Schlieben 10098*; Schlieben's garden, Riviera, Pretoria, *Schlieben & Mendelsohn 12870*. 2530 (Lydenburg): grounds of Fig Tree Hotel, Nelspruit, *Ackermann sub PRF 8958*. 2531 (Komatipoort): Kruger National Park, Numbi-Hek, *Van der Schijff 27*; Kruger National Park, Pretoriuskop rest camp, *Van der Schijff 8*.

NATAL.—3030 (Port Shepstone): near Botha House, *Smuts 2348*.

Two varieties of *B. variegata* are recognized, namely, var. *variegata* in which the petals are blotched or striped with purple, and var. *candida* Voigt in which the petals are white or partly yellow but without any purple. Unfortunately there is no accurate indication of the flower colour on most of the specimens collected in our area but both varieties are represented among the cited specimens.

B. variegata is commonly known as "Camelsfoot".

8. **Bauhinia purpurea** *L.*, Sp. Pl. 1 : 375 (1753); Wight & Arn., Prodr. Fl. Pen. Ind. Or. 296 (1834); Bak. in Fl. Brit. Ind. 2 : 284 (1878); Trimen in Fl. Ceylon 2 : 117 (1894); De Wit in Reinwardtia 3 : 406 (1956); Brenan in F.T.E.A. Legum.-Caesalp.: 208 (1967). Type from south-east Asia.

Closely related to *B. variegata* from which it differs in having the flowers produced near the ends of long lateral or terminal branches, the flower-buds ridged or winged above with the ridges or wings twisted apically, the calyx-tube usually splitting into two sections unlike *B. variegata* where the calyx-tube splits down one side and remains spathaceous and entire to the end, the receptacle only 7–12 mm long, and only 3 (very rarely 4) fertile stamens.

Introduced from south-east Asia and planted in our area for ornament. More widely distributed in our area than indicated by the two cited specimens but less common than *B. variegata*.

TRANSVAAL.—2531 (Komatipoort): Barberton, *Thorncroft s.n.*

NATAL.—2931 (Stanger): Durban Botanic Garden, *Strey 5247.*

The petals of *B. purpurea* are pinkish, reddish or purplish.

9. **Bauhinia candicans** *Benth.* in Mart., Fl. Bras. 15,2 : 201 (1870); Sim, Flow. Trees & Shrubs 53 (1919); Burkart in Fl. Prov. Buenos Aires 3 : 447, fig. 139 (1967). Type from South America.

Large shrub or tree to 8 m high; young branchlets fairly densely pubescent, usually armed with paired spines up to 5 mm long. *Leaves* (2,6) 4–9 cm long, (1,8) 3–8 cm wide, bilobed apically for $\frac{1}{2}$ to $\frac{3}{4}$ of their length, 9–11-nerved, lower surface densely pubescent. *Inflorescence* a few-flowered axillary or terminal raceme or sometimes flowers solitary; flowers on thick pubescent pedicels. *Flower-buds:* upper part (i.e. sepals) fusiform, up to 7 cm long, turgid, not winged or ridged. *Petals* white, 8–12 cm long, 1,1–3,5 cm wide, distinctly narrowed basally. *Fertile stamens* 10. *Stigma* bilobed, abruptly expanded from the style. *Pod* 10–20 cm long, 1,5–2 cm wide.

Introduced from South America and cultivated for ornament because of its large white showy flowers.

TRANSVAAL.—2528 (Pretoria): "Wild Gardens", Pretoria, *Schlieben & Mendelsohn 12626*; Roodeplaat, Horticultural Research Institute, *Schlieben & Mendelsohn 12729*; Union Buildings Garden, *Schlieben 10006*; *Repton 972*; Paul Kruger St., *Repton 2912.*

NATAL.—locality unknown, *H. M. Forbes s.n.*

CAPE.—3126 (Queenstown): Queenstown, *Dodd s.n.*

Very closely related to *B. forficata* Link and perhaps not specifically distinct.

3528b

12. ADENOLOBUS

by L. A. COETZER and J. H. ROSS

Adenolobus (*Harv. ex Benth. & Hook. f.*) *Torre & Hillc.* in Bol. Soc. Brot. Sér. 2, 29 : 37 (1955); Schreiber in F.S.W.A. 59 : 4 (1967); Palmer & Pitman, Trees S. Afr. 2 : 873 (1973); Brummitt & Ross in Kew Bull. 31 : 399 (1976). Type species: *A. garipensis* (E. Mey.) Torre & Hillc.

Bauhinia Sect. *Adenolobus* Harv. ex Benth. & Hook. f., Gen. Pl. 1 : 576 (1865); Baill., Hist. Pl. 2: 113 (1872); Taub. in Pflanzenfam. 3, 3 : 150 (1892); Bak. f., Leg. Trop. Afr. 3 : 653 (1930).

Erect or prostrate shrub or small tree; branchlets often covered with multicellular sessile glands. *Tendrils* absent. *Leaves* alternate, simple, sometimes borne on abbreviated lateral shoots, emarginate apically or very shallowly bilobed, truncate to cordate basally; lobes obliquely obovate to semicircular. *Stipules* sagittate, deciduous. *Inflorescence* a short or elongate raceme or flowers borne on abbreviated lateral shoots. *Flowers* bisexual, irregular, medium to rather small. *Hypanthium* short. *Sepals* 5, united for most of their length into a campanulate tube, persistent, covered in some instances with multicellular glands. *Petals* 5, free, obovate or elliptical to lanceolate, narrowed basally into a claw. *Stamens* 10, all fertile, in two whorls of five, of two lengths; anthers dehiscing by longitudinal slits. *Ovary* long-stipitate; style elongate; stigma slightly narrowed towards the apex. *Pods* thin-textured, dehiscent, 5–10-seeded, glandular or eglandular. *Seeds* small.

A genus of two species occurring in southern Angola, South West Africa, northern Botswana and the northern Cape. Both species occur in our area.

The generic name *Adenolobus* means "glandular fruits"; in allusion to the glandular pods.

Flowers borne on elongate racemes (5) 10–20 cm long, more than 5 flowers per inflorescence; petals yellow, without conspicuous reddish venation.....1. *A. pechuelii*

Flowers borne on abbreviated lateral shoots, 1–3 flowers per inflorescence; petals yellow to reddish, with conspicuous reddish venation.....2. *A. garipensis*

1. **Adenolobus pechuelii** (*Kuntze*) *Torre & Hillc.* in Bol. Soc. Brot. Sér. 2, 29 : 38 (1955); Schreiber in F.S.W.A. 59 : 4 (1967); Meyer, Pflanzenwelt Südwestafrikas 86 (1969); Brummitt & Ross in Kew Bull. 31 : 401 (1976). Type: South West Africa, Tsoachaub River, *Pechuel-Loesche* s.n. (B, holo. †); Swakopmund Distr., S. of Kuiseb, *Strey* 2592 (PRE, neo.!, K).

Bauhinia pechuelii Kuntze in Jahrb. Bot. Gart. Berl. 4 : 263 (1886). Type as above.

Small shrub up to 1,5 m high with erect branches or branches prostrate and spreading; young branchlets with scattered stalked glands or eglandular. *Leaves*: petiole 4–9 mm long; blade 1–3 cm long, 1,2–4 cm wide, glaucous, glabrous, slightly emarginate or very shallowly lobed apically, cordate basally; lobes semicircular. *Stipules* 2–4 mm long, 1–1,5 mm broad. *Racemes* more than 5-flowered: peduncles glandular or eglandular; axis (5) 10–20 cm long, glandular or eglandular; pedicels 4–6 mm long, glandular or eglandular; bracts 2–4 mm long, 1–2 mm wide. *Hypanthium* 3–4 mm long, with scattered stalked glands or eglandular. *Sepals* 4–8 mm long, united for most of their length into a tube, glandular or eglandular, lobes 2–3 mm long, rounded apically. *Petals* yellow, some often with red spots, 1,2–2,5 cm long, 4–8 mm wide, narrowed basally into a claw, sometimes glandular. *Stamen-filaments* 3–7 mm long. *Ovary* 4–8 mm long, glandular or eglandular; style 4–8 mm long. *Pod* 1,8–2,5 cm long, 0,8–1,2 cm wide, on a stipe 0,8–2 cm long, pale yellow-brown to pinkish-red, glandular or eglandular. *Seed* 5–7 × 3–5 mm, light brown. Fig. 12: 4–6.

Occurs in southern Angola, the central and north-western parts of South West Africa and northern Botswana. Grows in coarse gravel, stony ground and in sandy river beds. Two subspecies are recognized.

Calyces, pedicels and pods covered with conspicuous stalked glands..... (a) subsp. *pechuelii*

Calyces, pedicels and pods eglandular or with very few glands on the inflorescence axes..... ..... (b) subsp. *mossamedensis*

(a) subsp. **pechuelii.**

Brummitt & Ross in Kew Bull. 31 : 402 (1976). Type as above.

Bauhinia pechuelii Kuntze in Jahrb. Bot. Gart. Berl. 4 : 263 (1886); Schinz in Mém. Herb. Boiss. 1 : 120 (1900). *B. marlothii* Engl. in Bot. Jahrb. 10 : 26 (1888); Schinz in Mém. Herb. Boiss. 1 : 120 (1900). Type : South West Africa, Karibib Distr., Usakos, *Marloth* 1184 (PRE, iso.!).

Occurs in central South West Africa.

S.W.A.—2115 (Karibib): 3 km N. of Klein Spitzkopf, *Hardy & De Winter 1411.* 2214 (Swakopmund): Namib, near Goanikontes, *Cannon sub Marloth 10159;* canyon near Goanikontes, *Rodin 2150.* 2215 (Trekkopje): Tsamathal bei Kuwosis in Khanthal, *Schenk 429.* 2218 (Gobabis): Okombuhe Road, *Boss sub TRV 36181.* 2314 (Sandwich Harbour): N. of Kuiseb, *Jensen 54.* 2315 (Rostock): Kuiseb, *Strey 2476*; S. of Kuiseb, *Strey 2592.* 2416 (Maltahöhe): Grosse Spitzkopf, *Hardy 2060.*

(b) subsp. **mossamedensis** (*Torre & Hillc.*) *Brummitt & J. Ross* in Kew Bull. 31 : 403 (1976). Type: Angola, Moçamedes, rio Coroca, prox. de Porto Alexandre, *Gossweiler* 12796 (LISC, holo.).

A. mossamedensis Torre & Hillc. in Bol. Soc. Brot. Sér. 2, 29 : 37, t.3 (1955); Torre in Mem. Junta Invest. Ultram. 38 : 60, tt.4–6 (1963). Type as above.

Bauhinia mossamedensis (Torre & Hillc.) Cusset in Adansonia 6 : 279 (1966). Type as above.

Occurs in southern Angola, northern South West Africa and northern Botswana.

S.W.A.—1713 (Swartbooisdrif): Kaokoveld—Schluchteingang bei Omutati, *Giess & Leippert 7407.* 1812 (Sanitatas): Okonjombo, *Merxmüller & Giess 1435*; 11 km E. of Puros, *Giess 3208.* 1813 (Ohopoho): 29 km W. of Otjihu, *De Winter & Leistner 5676.* 2014 (Welwitschia): 53 km W. of Welwitschia, *De Winter & Hardy 8138.* 2015 (Otjihorongo): Otjihorongo Reserve, *Merxmüller & Giess 1611.* 2114 (Uis): 32 km from Brandberg, *Liebenberg 4981.*

A. pechuelii is well grazed by game and stock in the arid regions where it grows.

2. **Adenolobus garipensis** (*E. Mey.*) *Torre & Hillc.* in Bol. Soc. Brot. Sér. 2, 29 : 37 (1955); in C.F.A. 2 : 196 (1956); Schreiber in F.S.W.A. 59 : 4 (1967); Meyer, Pflanzenwelt Südwestafrikas 87 (1969); Palmer & Pitman, Trees S. Afr. 2 : 875 (1973); Brummitt & Ross in Kew Bull. 31 : 403 (1976). Type: Between Verleptpram and Natvoet, Gariep, *Drège* (PRE, iso.!).

Bauhinia garipensis E. Mey., Comm. 162 (1836); Walp., Repert. 1 : 852 (1842); Harv. in F.C. 2 : 275 (1862); Oliv. in F.T.A. 2 : 291 (1871); Taub. in Pflanzenfam. 3,3 : 150 (1892); Hiern, Cat. Afr. Pl. Welw. 1: 297 (1896); Schinz in Mém. Herb. Boiss. 1 : 120 (1900); Sim, For. Fl. Cape Col. 209 (1907); Bak. f., Leg. Trop. Afr. 3: 658 (1930). Type as above.

Shrub or small tree up to 4 m high with erect branches. *Leaves* often aggregated on abbreviated lateral shoots: petiole (0,5) 0,8–1,8 cm long; blade 0,8–2 cm long, 1,2–3 cm

FIG. 12.—**Adenolobus garipensis.** 1, flowering twig, × 1; 2, longitudinal section of flower, × 2; 3, petal, × 2½, all from *Balsinhas & Kersberg* 1996. **Adenolobus pechuelii.** 4, flowering twig, × 1; 5, longitudinal section of flower, × 2; 6, petal, × 2½, all from *Cannon* 10159.

wide, glaucous, glabrous, slightly emarginate or very shallowly lobed apically, cordate basally; lobes ± semicircular. *Stipules* 1–3 mm long, 1–2 mm broad. *Flowers* solitary or in fascicles of 1–3, borne on abbreviated lateral shoots; pedicels 6–15 mm long; bracts ± 1 mm long, 1–1,5 mm wide. *Hypanthium* 4–6 mm long. *Sepals* 6–9 mm long, united for most of their length into a tube, lobes 3–4 mm long, acute apically. *Petals* yellow to pinkish or red, with conspicuous dark reddish venation, 1,5–2 cm long, 6–8 mm wide, narrowed basally into a claw. *Stamens* 10; filaments 1,5–2,8 cm long, red basally, green or yellowish-green apically. *Ovary* 4–6 mm long, glandular; style 5–6 mm long. *Pod* 2–3 cm long, 1–1,5 cm wide, on a stipe 1–2 cm long, glandular or eglandular, pale yellowish-brown to pinkish-red. *Seed* 5–7 × 4–5 mm. Fig. 12 : 1–3.

Found in southern Angola, the western areas of South West Africa and the north-western Cape. Palmer & Pitman l.c. report that *A. garipensis* grows on stony or gravelly soil, rocky hills or in coarse sand, and is equally at home on the plateau of the Namib Desert and on the islands and the banks of the Orange River.

Flowering period is from August to April.

S.W.A.—1712 (Posto Velho): 11 km S. of Kunene at Otjinungua, *De Winter & Leistner 5752.* 1812 (Sanitatas): Anabib Flucht, *Maguire 493.* 1913 (Sesfontein): Kaokoveld, in den Bergen nach Warmquelle, *Giess 3179.* 2015 (Otjihorongo): 64 km W. of Outjo, *Esterhuyse 450.* 2016 (Otjiwarongo): Farm Henrysvelde, *De Winter 3130.* 2114 (Uis): Namib valley, western Brandberg, *Wiss 1493.* 2115 (Karibib): Usakos, *Marloth 1421*; Karibib, *Kinges 3354.* 2216 (Otjimbingwe): 80 km W. of Windhoek, *Hardy & De Winter 1384.* 2314 (Sandwich Harbour): between Amichab and Heinrichsberg, *Jensen 305.* 2316 (Nauchas): 145 km from Windhoek on road to Walvis Bay, *Balsinhas & Kersberg 1996.* 2317 (Rehoboth): Farm Vrede, Maltahöhe, *Joubert s.n.* 2415 (Sossusvlei): 240 km W. of Maltahöhe, *Louw 274.* 2416 (Maltahohe): Buellspoort in Naukluft, *Hardy 1965; Strey 2181.* 2615 (Lüderitz): Tsarris, *Marloth 5071.* 2717 (Chamaites): road from Ai-ais to Fish River Canyon, *Carr 17.* 2718 (Grünau): Garis, *Dinter 5213.* 2818 (Warmbad): 17 km from Goodhouse, *Pole Evans 2334.* 2819 (Ariamsvlei): 5 km from Pella, *Pole Evans 2351.*

CAPE.—2817 (Vioolsdrif): Modderdrift, *Hardy 1699*; Vioolsdrif, *Werger 171.* 2818 (Warmbad): Orange River, *Schlechter 11451.* 2819 (Ariamsvlei): Onseepkans, *Acocks 15070.* 2820 (Kakamas): 6 km N. N.W. of Augrabies, *Leistner & Joynt 2850;* Island at Augrabies Falls, *Marloth 4778.*

A. garipensis is also variable in the presence or absence of glands, but in this species the glands are sessile and confined to the pods if present at all. Unlike the situation prevailing in *A. pechuelii,* the presence or absence of glands in *A. garipensis* is not correlated with geographical distribution.

A. garipensis is grown as an ornamental shrub in the Augrabies Botanical Garden. Where the plant grows in the veld it is heavily grazed by stock and by game. Although the flowers are not showy they are distinctive. The shiny pods tend to be more conspicuous than the flowers.

3528a

13. PILIOSTIGMA

by L. A. COETZER and J. H. ROSS

Piliostigma *Hochst.* in Flora 29 : 598 (1846); Milne-Redhead in Hook., Icon. Pl. 35: t. 3460 (1947); De Wit in Reinwardtia 3 : 530 (1956); Keay in F.W.T.A. ed. 2, 1 : 444 (1958); Brenan in F.T.E.A. Legum.-Caesalp. : 206 (1967); Schreiber in F.S.W.A. 59 : 17 (1967); Palmer & Pitman, Trees S. Afr. 2 : 871 (1973). Type species: *P. reticulatum* (DC.) Hochst.

Bauhinia L. Sect. *Piliostigma* (Hochst.) Benth. in Benth. & Hook. f., Gen. Pl. 1 : 576 (1865); Baill., Hist. Pl. 2 : 113 (1872); Taub. in Pflanzenfam. 3, 3 : 149 (1892); Bak. f., Leg. Trop. Afr. 3 : 653 (1930).

Locellaria Welw., Apont. Phytogeogr. 588 (1858). Type species: *L. bauhinioides* Welw.

Deciduous trees or shrubs, not climbing. *Tendrils* absent. *Leaves* alternate, simple, conspicuously bilobed, cordate basally. *Stipules* deciduous. *Inflorescence* a terminal, axillary or leaf-opposed raceme or panicle. *Flowers* medium to small, usually dioecious and unisexual, very rarely hermaphrodite (see F.C.B. 3 : 278, 1952). *Sepals* united for most of their length into a turbinate tube, with 4–5 short acute lobes. *Petals* 5. *Stamens* 10, all fertile in male flowers, reduced to staminodes in female flowers; filaments villous below; anthers dehiscing by longitudinal slits. *Stigma* thick, capitate, flattened-globose, sessile on the ovary; funicle

several times as long as the ovule. *Pod* linear to oblong, leathery or woody, many-seeded, indehiscent. *Seeds* embedded in pulp, irregularly arranged, with a U-shaped line on one side; endosperm present.

A genus of three species occurring in tropical Africa, Asia and Australia.

Piliostigma thonningii (*Schumach.*) *Milne-Redh.* in Hook., Icon. Pl. 35 : t. 3460 (1947); Codd, Trees & Shrubs Kruger Nat. Park 66 (1951); Eggeling, Indig. Trees Uganda, ed. 2 : 67, fig. 16 (1952): Torre & Hillc. in C.F.A. 2 : 199 (1956); Roti-Michelozzi in Webbia 13 : 174 (1957); Keay in F.W.T.A. ed. 2, 1 : 444 (1958); Dale & Greenway, Kenya Trees and Shrubs 107 (1961); Irvine, Woody Plants of Ghana 314 (1961); Palmer & Pitman, Trees S. Afr. 114 (1961); White, For. Fl. N. Rhod. 126 (1962); Brenan in F.T.E.A. Legum.-Caesalp.: 206, fig. 46 (1967); Schreiber in F.S.W.A. 59 : 18 (1967); Palmer & Pitman, Trees S. Afr. 2 : 871 (1973); Drummond & Coates Palgrave, Common Trees of the Highveld 45 (1973); Van Wyk, Trees Kruger Nat. Park 1 : 194 (1972). Type: Ghana, Aquapim, *Thonning* (C, holo., PRE, photo.).

Bauhinia thonningii Schumach., Beskr. 1 : 223 (1827); Bak. f., Leg. Trop. Afr. 3 : 657 (1930) ; Burtt Davy, Fl. Transv. 2 : 322 (1932); Steedman, Trees S. Rhod. 18 (1933); Henkel, Woody Pl. Natal 112 (1934); Wilczek in F.C.B. 3 : 275 (1952); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966). Type as above. *B. reticulata* auct. non DC.: Harms in Engl., Pflanzenw. Afr. 3,1 : 486 (1915); Oliv. in F.T.A. 2 : 290 (1871) pro parte quoad syn. *B. thonningii* (sphalm. *articulata*); Taub. in Pflanzenfam. 3,3 : 149 (1892); Hiern, Cat. Afr. Pl. Welw. 1 : 296 (1896); Bak. f., Leg. Trop. Afr. 3 : 657 (1930); Suesseng. & Merxm. in Mitt. Bot. Staatssamml. München 1 : 155 (1952).

Locellaria bauhinioides Welw., Apont. Phytogeogr. 588 (1858). Type: Angola, Calumguembo, *Welwitsch* 486 (BM, holo.).

Tree up to 10 m high or sometimes a shrub; bark rough, dark brown to grey or black; young branchlets rusty-tomentellous or shortly rusty-tomentose. *Leaves*: petiole 2–4 cm long; blade mostly 5–15 cm long and 6–16 cm wide in our area, bilobed apically about one-eighth to one-third of the length of the leaf, densely reticulate and rusty-puberulous or -pubescent beneath; lobes each with 5 or 6 main veins. *Stipules* 3–6 mm long. *Panicles* usually alternately leaf-opposed and axillary along the branches, the male ones 5–19 cm long and the female 2–7 cm long. *Calyx* 0,8–1,5 (2) cm long, rusty-tomentose or -tomentellous. *Petals* white to pinkish, obovate, 1,2–2 (2,6) cm long, rugose or bullate, hairy on basal claw and outside of limb. *Ovary* 5–12 mm long, stigma sessile on the ovary. *Pods* woody, indehiscent, oblong or linear-oblong, mostly 13–20 cm long and 3–6 cm wide in our area, shortly ferruginous pubescent, on a stipe 2–3 cm long. *Seeds* obovoid to ellipsoid, somewhat compressed, dark brown to blackish, 7–9 mm long, 5–7 mm wide and 3–4 mm thick. Fig. 13.

Widespread in tropical Africa from Senegal to the Sudan and southwards to South West Africa, Botswana and the northern and eastern Transvaal. *P. thonningii* was recorded from Swaziland by Compton, in J. S. Afr. Bot. Suppl. 6 : 46 (1966), but there is no herbarium specimen to substantiate this. Usually occurs on sandy soil in open woodland and wooded grassland.

Flowering period is from November to April.

S.W.A.—1715 (Ondangua): Oshikango, *Loeb 135*. 1718 (Kuring-Kuru): 5 km E. of Kuring-Kuru, *De Winter 3945*; Tondoro, *Le Roux 26*. 1724 (Katima Mulilo): Katima Mulilo, *Von Breitenbach 1191*; Mpilila Island, *Killick & Leistner 3377*. 1820 (Tarikora): 19 km W. of Nyangana Mission, *De Winter & Marais 4769*. 1823 (Siambisso): E. of Cuando River, *Curson 1018*.

TRANSVAAL.—2230 (Messina): 32 km E. of Sibasa, *Rodin 4123*. 2231 (Pafuri): Punda Milia, *Codd 4222*. 2330 (Tzaneen): 13 km E. of Soekmekaar, *De Winter & Killick 8916*; 22 km S.E. of Tzaneen, *De Winter & Killick 8942*. 2331 (Phalaborwa): Shingwidzi Game Reserve, *Smuts s.n.* 2430 (Pilgrim's Rest): Shiluwane, *Junod 4147*. 2431 (Acornhoek): 5 km W. of Acornhoek, *Stephen 318*. 2531 (Komatipoort): Malelane, *Thorncroft 3108*.

A red dye is obtained from the macerated and boiled roots, while a blue dye is obtainable from the pods and seeds (see Dale & Greenway, Kenya Trees and Shrubs 107, 1961). Bark and roots yield up to 18 per cent of tannin. Both leaf and fruit are eaten by stock. Interesting facts about the value and uses of this plant are given by Palmer and Pitman in Trees S. Afr. 2 : 871 (1973). Much information concerning the medicinal and poisonous value and uses of *P. thonningii* is given by Watt & Breyer-Brandwijk in The Medicinal and Poisonous Plants of Southern and Eastern Africa 640 (1962).

P. reticulatum (DC.) Hochst., which occurs from Senegal to the Sudan, differs from *P. thonningii* in having the leaves glabrous below, the inflorescence with racemose branches or racemose, and the mature pods glabrous and pruinose.

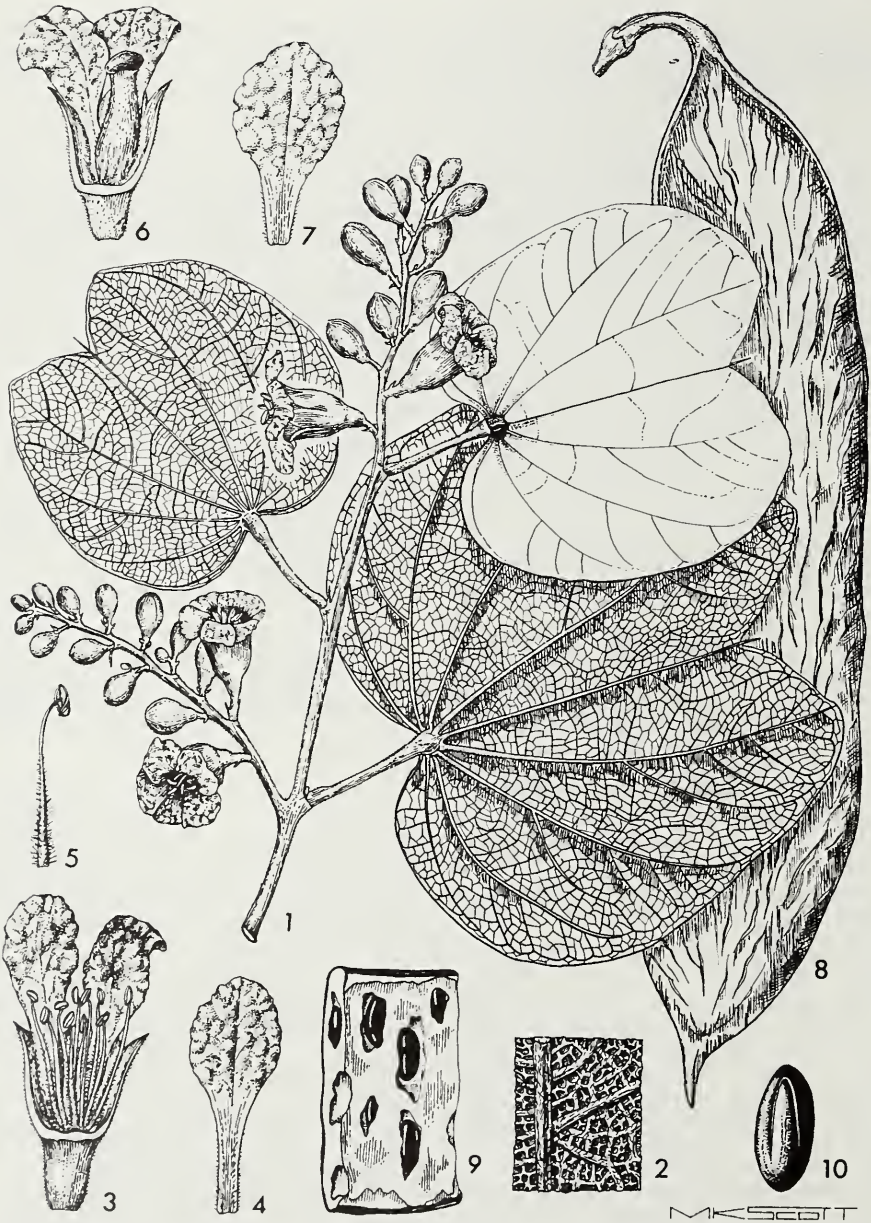


FIG. 13.—**Piliostigma thonningii.** 1, male flowering branch, × $\frac{2}{3}$; 2, lower surface of leaf, × 6, both from *Scheepers* 1195; 3, male flower with part of calyx and corolla removed, × $1\frac{1}{3}$; 4, petal of male flower, upper surface, × $1\frac{1}{3}$; 5, stamen, × 2, all from *Story* 5384; 6, female flower with part of calyx and corolla removed, × $1\frac{1}{3}$; 7, petal of female flower, upper surface, × $1\frac{1}{3}$, both from *Rodin* 4123; 8, pod, × $\frac{2}{3}$; 9 part of pod cut open to show seeds, × $\frac{2}{3}$; 10, seed, front view, × 2, all from *Codd* 7077.

3528c

14. TYLOSEMA

by L. A. COETZER and J. H. ROSS

Tylosema (*Schweinf.*) *Torre & Hillc.* in Bol. Soc. Brot. Sér. 2, 29 : 38 (1955); in C.F.A. 2 : 198 (1956); Brenan in F.T.E.A. Legum.-Caesalp. : 213 (1967); Schreiber in F.S.W.A. 59 : 19 (1967). Type species: *T. fassoglense* (Schweinf.) Torre & Hillc.

Bauhinia L. Sect. *Tylosema* Schweinf., Reliq. Kotsch. 17 (1868); Taub. in Pflanzenfam. 3, 3 : 151 (1892); Bak. f., Leg. Trop. Afr. 3 : 653 (1930).

Shrubs with trailing or climbing stems, herbaceous or woody below, arising from a large or very large woody underground tuber. *Tendrils* usually present, forked, axillary. *Leaves* alternate, simple, bilobed at apex or sometimes divided almost to the base, which is very cordate; lobes oval to obovate or reniform. *Stipules* oblong to squarish, appressed to the stem, persistent. *Inflorescence* a lateral short to elongate raceme. *Flowers* bisexual, irregular, medium to rather small, yellow. *Hypanthium* short, slightly sulcate outside. *Sepals* 5, the two upper usually completely or partly fused, the others free. *Petals* 5, the upper one smaller than the rest and bicallose basally. *Stamens*: 2 fertile, the remaining 7 or 8 staminodial, unequal, some ± flattened; anthers dehiscing by longitudinal slits. *Ovary* long-stipitate; style elongate; stigma very small, not wider than top of style. *Pods* woody, dehiscent or indehiscent, 1–2-seeded. *Seeds* large, with a U-shaped line extending for a short distance from the hilum; funicle short; a thin layer of endosperm present.

A genus of four species occurring in eastern and central tropical Africa, from the Sudan southwards to the Transvaal, Swaziland, northern Natal and northern Cape Province. Two species occur in our area.

The generic name *Tylosema* alludes to the torulose seed.

A peculiar feature found in this genus is heterostyly. Roti-Michelozzi, in Webbia 13 : 171 (1957), reported heterostyly to occur only in *T. humifusa*. Brenan, in F.T.E.A. Legum.-Caesalp. : 213 (1967), reported it to occur also in *T. fassoglense* and *T. argentea* and suggested that it seems to be characteristic of the genus. This suggestion was confirmed by H. R. Tölken who found heterostyly in *T. esculentum*.

Leaf-lobes 6–20 cm long; leaves divided apically for one-tenth to one-third (very rarely for ½) of their length; petiole 3–7 cm long ..... 1. *T. fassoglense*

Leaf-lobes 3–7,5 cm long; leaves divided apically for > ½ of their length; petiole 1,5–3,5 cm long ..... 2. *T. esculentum*

1. **Tylosema fassoglense** (*Schweinf.*) *Torre & Hillc.* in Bol. Soc. Brot. Sér. 2, 29 : 38 (1955), in C.F.A. 2 : 198 (1956); Brenan in F.T.E.A. Legum.-Caesalp. : 213 (1967); Schreiber in F.S.W.A. 59 : 20 (1967); Drummond in Kirkia 8,2 : 213 (1972); Ross, Fl. Natal 195 (1973). Syntypes: Sudan Republic, Fazoghli, *Boriani* 131 (W); *Cienkowski* 92 (?LE or W); Metemma, Gallabat, *Schweinfurth* 2250 (BM), 2252 (BM, K!) & 2253 (B†).

Bauhinia fassoglensis Schweinf., Reliq. Kotsch. 14, tt. 12 & 13 (1868); Oliv. in F.T.A. 2 : 286 (1871); Taub. in Pflanzenfam. 3,3 : 151 (1892); Bak. f., Leg. Trop. Afr. 3 : 659 (1930); Burtt Davy, Fl. Transv. 2 : 322 (1932); Miller in J.S. Afr. Bot. 18 : 28 (1952); Wilczek in F.C.B. 3 : 272 (1952); White, For. Fl. N. Rhod. 99 (1962); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966). Syntypes as above. *B. cissoïdes* Oliv. in F.T.A. 2 : 287 (1871); Taub. in Pflanzenfam. 3,3 : 151 (1892); Hiern, Cat. Afr. Pl. Welw. 1 : 295 (1896). Type: Angola, Ambaca, *Welwitsch* 552 (LISU, holo., BM, K). *B. welwitschii* Oliv. in F.T.A. 2 : 287 (1871); Taub. in Pflanzenfam. 3,3 : 151 (1892); Hiern, Cat. Afr. Pl. Welw. 1 : 296 (1896); Bak. f., Leg. Trop. Afr. 3 : 659 (1930). Type: Angola, Pungo Andongo, Tunda Quilombo, *Welwitsch* 554 (LISU, holo, BM, K). *B. kirkii* Oliv. in F.T.A. 2 : 288 (1871); Bak. f., Leg. Trop. Afr. 3 : 660 (1930); Burtt Davy, Fl. Transv. 2 : 322 (1932); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966). Type: Zambia, Highlands of Batoka, *Kirk* (K, holo.!).

Stems prostrate and trailing or climbing, up to 6 m or more, herbaceous or woody below; young parts rusty-tomentose or rusty-pubescent, indumentum becoming greyish or ± disappearing. *Tendrils* forked, 4–8 cm long, the lateral branches 1–2 cm long. *Leaves:* petiole 3–7 cm long (in our area); blade 6–11 (20) cm long, 5–12 (18) cm wide, usually ±rusty-pubescent beneath especially on nerves, sometimes subglabrous or densely tomentose, shallowly bilobed apically to about one-tenth to one-third (very rarely to

FIG. 14.—**Tylosema fassoglense**. 1, part of flowering stem, × ⅔; 2, longitudinal section of flower, showing upper petal cut longitudinally, four unequal staminodes, one fertile stamen and the ovary, × 2; 3, upper petal, seen from one side, × 2; 4, one fertile stamen and five staminodes, showing inequality of latter, × 2, all from *Harley* 9410; 5, dehisced pod, inner side of one valve, × ⅔, from *Rodin* 4341; 6, funicular end of seed, showing hilum, × 1, from *Chandler* 1126; 7, tuberous root, with scale in feet, from a photograph by J. H. Hopkins at Kew. Reproduced by permission of the Editor of Flora of Tropical East Africa.

half) the length of the leaf from the lobe-ends to junction with petiole, deeply cordate basally; lobes ovate-oval to obovate. *Stipules* 2–4 mm long, ± 2 mm broad. *Racemes:* peduncle (2) 5–17,5 cm long; axis (2) 5–23 (40) cm long; pedicels (1,5) 2–6 cm long. *Hypanthium* 3–8 mm long. *Sepals* 1–1,5 cm long, 3–4 mm wide, ± conspicuously keeled along back, the upper two fused, the other three free. *Petals* yellow, fading to pink; the four larger ones obovate to obovate-suborbicular, crinkled-bullate, 2–4 cm long, 1–3 cm wide, tapering into a basal claw. *Stamens:* filaments of fertile stamens 8–10 mm long, of staminodes 3–6 mm long. *Ovary* 5–6 mm long, pubescent. *Pod* obovate to oblong-ovate, 5–10 cm long, 3–6 cm wide. *Seeds* suborbicular or ellipsoid, 1,5–2,8 cm long, 1–2 cm wide, chestnut-brown to blackish. Fig. 14.

Occurs from the Sudan southwards to Angola, South West Africa, the Transvaal, Swaziland and Zululand.

Flowering period is from (October) November to February.

S.W.A.—1713 (Swartbooisdrif): Okavare, S. of Ohopoho, *Abner 44*. 1714 (Ruacana Falls): 35 km N. of turn off to Ohopoho from Ruacana, *Giess 12718*; 13 km E. of junction of Ruacana-Kamanjab road, *Giess 12737*. 1813 (Ohopoho): 16 km S. of Kaoko Otavi, *De Winter & Leistner 5596*.

TRANSVAAL.—2229 (Waterpoort): 12 km N. of Louis Trichardt, *Oakes 1508*. 2230 (Messina): 22 km N.E. of Sibasa, *Codd 6874*. 2231 (Pafuri): Punda Milia, *Van der Schijff 470*. 2327 (Ellisras): Between Vaalwater and Beauty, *Werdermann & Oberdieck 1792*. 2329 (Pietersburg): Helpmekaar, near Houtbosberg, *Burtt Davy 2378*. 2330 (Tzaneen): Modjadjes, *Rogers 18015;* Tzaneen Estate, *Burtt Davy 2575*. 2428 (Nylstroom): Welgevonden, near Naboomspruit, *Galpin 9128;* 13 km N. of Rietbokspruit P.O., *Story 1644*. 2429 (Zebediela): Potgietersrus, *Thode A1691· Rogers 2268*. 2430 (Pilgrim's Rest): Erasmus Pass, *Killick & Strey 2521*. 2431 (Acornhoek): Lothian, forest margin, *Strey 3572*. 2529 (Witbank): 18 km N.E. by E. of Groblersdal, *Acocks 20968*. 2530 (Lydenburg): Kliprandjie near Nelspruit, *Liebenberg 2631*. 2531 (Komatipoort): 18 km from Hectorspruit towards Hora, *Hutchinson 2519*.

SWAZILAND.—2531 (Komatipoort): Pigg's Peak, *Compton 30545*. 2631 (Mbabane): near Manzini, *Burtt Davy 3054*; Stegi Hill, *Compton 26652*; 30 km W. of Stegi, *Acocks 15359*.

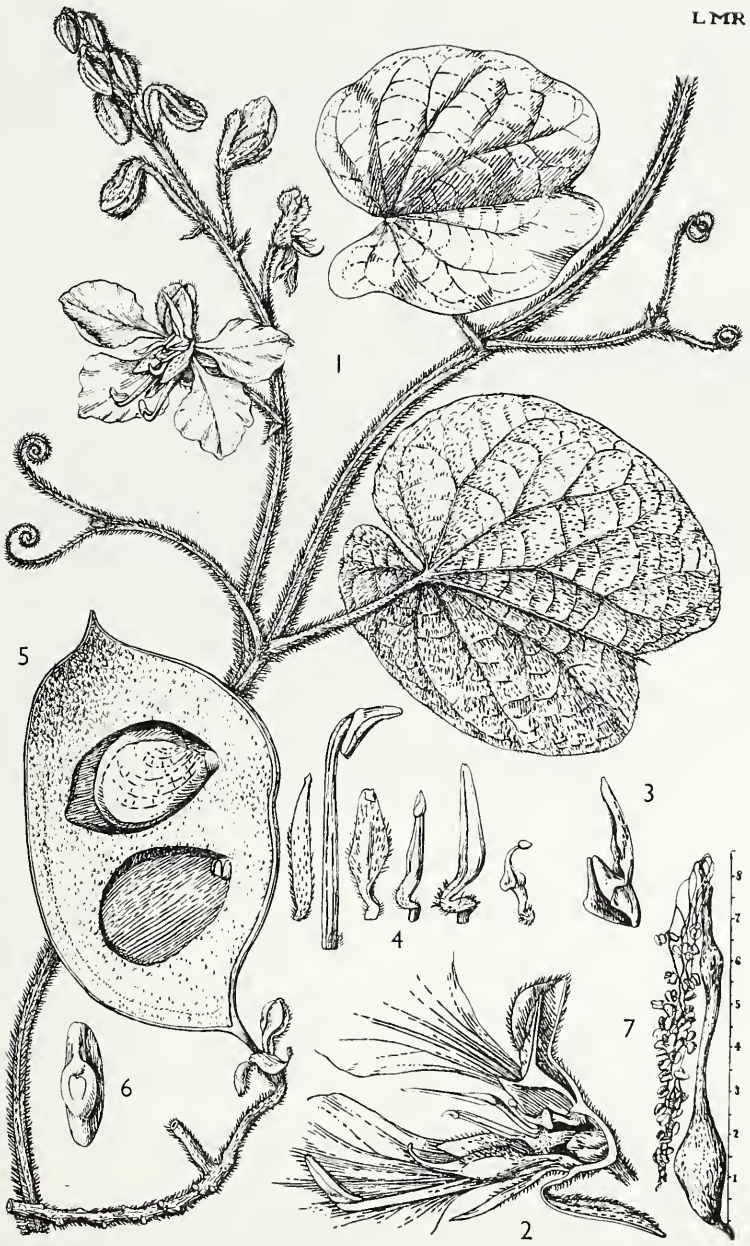
NATAL.—2732 (Ubombo): Mkuze Bridge on Candover-Nongoma road, *Venter 5194*.

According to Watt & Breyer-Brandwijk, The Medicinal and Poisonous Plants of Southern and Eastern Africa 560 (1962), the beans of *T. fassoglense* are edible and are collected for food by some tribes in Tanzania, while the pods are much sought after by the elephants. They also state that in East Africa a decoction of the tuberous root is administered by Africans as a galactagogue to the cows before calving. In South Africa the leaves and young branches are grazed by game and stock, while water is obtained from the fibrous tuber in arid regions.

2. **Tylosema esculentum** (*Burch.*) *Schreiber* in Mitt. Bot. Staatssamml. München 3 : 611 (1960); Schreiber in F.S.W.A. 59 : 20 (1967); Meyer, Pflanzenwelt Südwestafrikas 86 (1969); Giess in Dinteria 5 : 27 (1970). Type: Northern Cape, Kalahari, Litakun near a branch of Moshewa River, *Burchell* 2414 (K, holo.!, PRE, photo.).

Bauhinia esculenta Burch., Trav. 2 : 589 (1824); Schinz in Mém. Herb. Boiss. 1 : 121 (1900); Bak. f., Leg. Trop. Afr. 3 : 659 (1930); Burtt Davy, Fl. Transv. 2 : 322 (1932); Verdoorn in Flow. Pl. S. Afr. 33 : t. 1311 (1959); Letty, Wild Flow. Tvl. 157 (1962). Type as above. *B. burkeana* (Benth.) Harv. in F.C. 2 : 275 (1862); Taub. in Pflanzenfam. 3,3 : 151 (1892). Type: Transvaal, Mooi River, *Burke & Zeyher* s.n. (K, holo.!). *B. bainesii* Schinz in Mém. Herb. Boiss. 1 : 121 (1900); Brummitt & Ross in Kew Bull. 31 : 219 (1976). Type: South West Africa, E. of Gobabis at Oas, *Schinz* 2061 (Z, lecto.!).

Stems prostrate and trailing, up to 3 m long, herbaceous or woody below; young parts sparingly to fairly densely pubescent. *Tendrils* forked, 1,2–4 cm long, the lateral branches 8–12 mm long. *Leaves:* petiole 1,5–3,5 cm long; blade 3–7,5 cm long, 4–10 cm wide, glabrous or pubescent beneath, especially on nerves, deeply bilobed apically for $> \frac{1}{2}$ the length of the leaf from the lobe-ends to junction with petiole; lobes reniform. *Stipules* 3–5 mm long, 2–3 mm broad. *Racemes:* peduncle 2–4 cm long;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axis 4–12 cm long; pedicels 2–4,5 cm long. *Hypanthium* 2–4 mm long. *Sepals* 8–12 mm long, 2–3 mm wide. *Petals* yellow, the four larger ones 1,5–2,5 cm long, 1–1,4 cm wide, tapering into a basal claw. *Stamens:* filaments of fertile stamens 10–12 mm long, of staminodes 3–6 mm long. *Ovary* 5–6 mm long. *Pod* oval to oval-oblong, sometimes almost circular, 3,5–6 cm long, 2,8–4 cm wide. *Seeds* oval to circular, 1,3–1,8 cm long, 1,2–1,5 cm wide, rufous to brownish-black.

T. esculentum is restricted to Southern Africa. It occurs in the northern part of South West Africa, Botswana, the western and north-western Transvaal and the northern Cape. In the Transvaal *T. esculentum* is associated with dolomite where it grows in grass veld or open bushveld; in the remainder of its distributional range it occupies dry sandy regions.

Flowering period is from (October) November to March.

S.W.A.—1813 (Ohopoho): 50 km S. of Ohopoho, *Merxmüller & Giess 1526.* 1816 (Namutoni): Klein Namutoni, *Breyer s.n.* 1817 (Tsintsabis): sandveld N. of Namutoni, near farm Onguma, *Tinley 1385.* 1916 (Gobaub): Farm Nassau, *Walter 961.* 1917 (Tsumeb): W. of Grootfontein, *Schoenfelder S336.* 1918 (Grootfontein): Farm Lüshoff, *Giess 2111.* 1920 (Tsumkwe): W. foot of Aha Mountains, *Story 6330.* 2016 (Otjiwarongo): between Otjiwarongo and Otavi, *Werdermann & Oberdieck 2338.* 2017 (Waterberg): Osire Police Post, *Bradfield 129.* 2020 (Kaukauveld): 16 km S. of Nama Pan, *Story 6253.* 2114 (Uis): Brandberg, *Rodin 2711.* 2116 (Okahandja): Farm Omatako-Sicht, Okahandja, *Giess 11524.* 2118 (Steinhausen): Farm Sturmfeld G0252, *Tölken s.n.* 2218 (Gobabis): Gobabis, *Liebenberg 4647.*

TRANSVAAL.—2229 (Waterpoort): Soutpan, *Schlieben 9224.* 2428 (Nylstroom): near Nylstroom, *Quin s.n.* 2527 (Rustenburg): Wolhuterskop, *Pegler 992.* 2528 (Pretoria): 14 km S. of Pretoria, *Story 6007.* 2626 (Klerksdorp): Goedgedacht, *Sutton 504.* 2627 (Potchefstroom): Farm Somerville, *Codd 2126.*

CAPE.—2624 (Vryburg): Morokwen, *Taylor s.n.*

T. esculentum is known locally under its popular name "Gemsbuck bean". It is highly ranked as a survival plant by soldiers and inhabitants because of its water storing ability. According to Watt and Breyer-Brandwijk, The Medicinal and Poisonous Plants of Southern and Eastern Africa 559 (1962), the seed forms the staple diet of the Kalahari Bushmen and may even be bought at stores in the areas where the plant grows. They also state that although edible, the tuber is astringent and the foliage is apparently not browsed by stock. Much additional information concerning the uses and contents of *T. esculentum* seed is given by Watt and Breyer-Brandwijk.

3530 15. **DIALIUM**

Dialium *L.*, Mant. 3 (1767); DC., Prodr. 2 : 520 (1825); Guill. & Perr., Fl. Sen. 267 (1832); Benth. & Hook. f., Gen. Pl. 1 : 574 (1865); Oliv. in F.T.A. 2 : 282 (1871); Taub. in Pflanzenfam. 3, 3 : 155 (1892); Harms in Engl., Pflanzenw. Afr. 3, 1 : 489 (1915); Bak.f., Leg. Trop. Afr. 3 : 643 (1930); Phill., Gen. ed. 2 : 396 (1951); Steyaert in Bull. Soc. Roy. Bot. Belg. 84 : 29 (1951); in F.C.B. 3 : 531 (1952); Hutch., Gen. Fl. Pl. 1 : 231 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 343 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 103 (1967); Schreiber in F.S.W.A. 59 : 13 (1967). Type species : *D. indum* L.

Arouna Aubl., Hist. Pl. Guiane Fr. 1 : 16, t.5 (1775).
Codarium Soland. ex Vahl, Enum. 1 : 302 (1804).
Andradia Sim, For. Fl. P.E. Afr. 46 (1909).

Unarmed trees or (rarely) large shrubs, not climbing. *Leaves* simply imparipinnate, without conspicuous glands on petiole and rhachis; leaflets 3–21, opposite to alternate. *Stipules* small, soon deciduous. *Inflorescence* of terminal and lateral many-flowered panicles; bracts and bracteoles small, soon deciduous. *Flowers* hermaphrodite, irregular or sometimes regular. *Sepals* 5 (very rarely 6 or 7), imbricate. *Petals* absent or present but then greatly reduced in size. *Stamens* 2–10, free; anthers basifixed, dehiscing by longitudinal slits. *Disc* (in our species) well-developed, wider than the ovary. *Ovary* small, sessile or shortly stipitate, with 2 ovules. *Pod* ellipsoid to subglobose or sometimes compressed and ± flattened, indehiscent; exocarp hard, brittle, smooth except for the indumentum; mesocarp pulpy, mealy, orange-brown or reddish. *Seeds* 1–2, embedded in the mesocarp; testa smooth except for small ± irregular cracks; areoles absent; endosperm present.

A genus of ± 35 species predominantly in the Old World tropics and mostly African. Two species occur in our area.

Petals absent; stamens 7–10; pods ovoid-ellipsoid to subglobose, not ± flattened; leaflets 7–13 per leaf, 0,7–1,9 cm wide, oblong, elliptic or ovate, usually oblique basally, obtuse to rounded apically, papery to subcoriaceous ..... 1. *D. schlechteri*

Petals present but minute and inconspicuous, up to 1,5 mm long and alternating with the 5 sepals; stamens 5; pods ovoid-ellipsoid, somewhat laterally compressed and slightly flattened: leaflets (5)7–9(11) per leaf, 1,5–3,5 cm wide, ovate-lanceolate, lanceolate or narrowly-elliptic, ± symmetric basally, acute or acuminate apically, coriaceous ..... 2. *D. engleranum*

1. **Dialium schlechteri** *Harms* in Bot. Jahrb. 26 : 276 (1899); Bak.f., Leg. Trop. Afr. 3 : 650 (1930); Steyaert in Bull. Soc. Roy. Bot. Belg. 84 : 37 (1951); Von Breitenbach, Indig. Trees S. Afr. 3 : 343 (1965); Gomes e Sousa, Dendrol. Moçamb. 1 : 258, t.58 (1966); Ross, Fl. Natal 195 (1973); Palmer & Pitman, Trees S. Afr. 2 : 877 (1973). Type: Mozambique, Lourenço Marques, *Schlechter* 11603 (B, holo.; BM!, K!, P!).

Andradia arborea Sim, For. Fl. P.E. Afr. 47, t.26 (1909). Type: Mozambique, unlocalised, *Sim* 6141 (not traced).

Tree up to 12 m high, sometimes several-stemmed, usually with a somewhat rounded crown. *Bark* grey, often mottled, ± smooth; young branchlets grey or greyish-brown, puberulous at first but becoming subglabrous or glabrous. *Leaves* puberulous but sometimes becoming subglabrous with age: petiole 0,6–1,4 cm long; rhachis 2,5–10 cm long; leaflets 7–13, opposite, subopposite or alternate, (1,1)1,5–4(4,5) cm long, (0,7)0,9–1,9 cm wide, oblong, elliptic or ovate, oblique basally, obtuse to rounded and often somewhat emarginate apically or at times subacute, papery to subcoriaceous, venation ± raised and reticulate on both surfaces, often appressed-pubescent when young but becoming glabrous or subglabrous throughout or sparsely and inconspicuously pubescent on the lower surface, especially on the midrib and margins; petiolules 1–2,5 mm long, usually puberulous or pubescent. *Inflorescence* a many-flowered panicle up to

FIG. 15.—**Dialium schlechteri.** 1, flowering branch with young leaves, × ⅔; 2, flower, × 6; 3, petal, external surface, × 6; 4, petal, internal surface, × 6; 5, stamen, × 12; 6, gynoecium, × 12, all from *De Winter & Vahrmeijer* 8623; 7, fruiting branch with mature leaves, × ⅓; 8, fruit, × 1; 9, seed, surface view, ×2; 10, seed, profile, × 2, all from *Nel* 78.

15 cm long, axis fulvous or rusty-brown-puberulous. *Flowers* brown outside, greenish-white, white or cream inside; pedicels 1,5–3,5 mm long, fulvous or rusty-brown-puberulous. *Sepals* 5, fulvous or rusty-brown-puberulous outside, 3–4 mm long, 1,5–2,5 mm wide, ovate. *Petals* O. Stamens 7–10; filaments 1,5–2 mm long; anthers ± 1,75 mm long. *Ovary* up to 1,75 mm long, shortly stipitate, densely ferruginous-hirsute; style glabrous or subglabrous. *Pods* shortly stipitate, ovoid-ellipsoid to subglobose, not ± flattened, 1,4–2,5 cm long, 1,1–1,5 cm wide, densely brown velutinous-puberulous when young but indumentum wearing off with age, indehiscent, brittle; mesocarp edible, with a pleasant tartaric acid-like taste. *Seeds* brown, 8–10 mm long, 6–7 mm wide, compressed, very hard. Fig. 15.

Found in the coastal areas of Mozambique and Tongaland. Occurs on sandy soil and is a fairly common constituent of the dry sand forest.

NATAL.—2632 (Bela Vista): Maputa, *Nel 78*; near Maputa and Big Kosi Lake, *Rodin 4693*. 2732 (Ubombo): 1,6 km E. of Makanes Pont, *Moll & Strey 3781*; 32 km from Jozini on road to M'Bazwana, *Strey 5291*; 24 km W. of Maputa on road to Makanes Pont, *De Winter & Vahrmeijer 8623*; Mkuze Game Reserve, *Gerstner 3747*; False Bay Park area, *Ward 2534*; *2733*; 9,6 km from Hluhluwe on False Bay road, *Moll 2814*.

There is variation in the number of stamens present: 7, 8, 9 and 10 stamens per flower having been noted.

The Tonga name for *D. schlechteri* is "umThiba".

2. **Dialium engleranum** *Henriques* in Bol. Soc. Brot. 16 : 48 (1899); Bak.f., Leg. Trop. Afr. 3 : 650 (1930); Steyaert in Bull. Soc. Roy. Bot. Belg. 84 : 40 (1951); in F.C.B. 3 : 542 (1952); Torre & Hillc. in C.F.A. 2 : 187, t.39 (1956); F. White, For. Fl. N. Rhod. 122, fig. 21 L (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 344 (1965); Schreiber in F.S.W.A. 59 : 13 (1967); Palmer & Pitman, Trees S. Afr. 2 : 875 (1973). Type: Angola, Luanda district, entre Ma-Chinge e Ma-Lunda, *Marquès* 176 (COI, holo., LISU).

D. simii Phill. in Kew Bull. 1922 : 194 (1922); Bak.f. in J. Bot. 66, Suppl. Polypet. : 138 (1928), as *simsii*; Bak.f., Leg. Trop. Afr. 3 : 650 (1930), as *simsii*; O.B. Miller in J. S. Afr. Bot. 18 : 30 (1952). Syntypes: Rhodesia, near railway station, Victoria Falls, *Sim* 19004 (K!, PRE!); *Rogers* 5307 (K!).

Tree up to 21 m high with a somewhat rounded crown. *Bark* grey, usually rough; young branchlets shortly pubescent, grey or grey-brown, bark flaking off in small pieces to reveal a brown or reddish-brown inner layer. *Leaves* shortly pubescent or puberulous but sometimes becoming subglabrous with age: petiole 1,2–3,5 cm long; rhachis 4–8,5 cm long; leaflets (5)7–9(11), opposite or subopposite, 2,2–6 cm long, 1,5–3,5 cm wide (in our area), ovate-lanceolate, lanceolate or narrowly elliptic, often very slightly cordate basally, acute or acuminate and slightly emarginate apically, coriaceous, venation closely reticulate on both surfaces, glabrous or sparsely pubescent above, sparingly to densely appressed-pubescent on the lower surface; petiolules 1,5–3 mm long, puberulous or pubescent. *Inflorescence* a many-flowered panicle up to 15 cm long (in our area); axis fulvous or rusty-brown-puberulous. *Flowers* brown outside, greenish-white or cream inside; pedicles 1,5–4 mm long, fulvous or rusty-brown-puberulous. *Sepals* 5, fulvous or rusty-brown-puberulous outside, 3,5–5 mm long, 2–3 mm wide (in our area), ovate. *Petals* 5, minute and inconspicuous, up to 1,5 mm long, ± oblanceolate, alternating with the sepals. *Stamens* 5; filaments up to 1,5 mm long; anthers 2–3 mm long. *Ovary* up to 2 mm long, ± sessile, densely ferruginous-hirsute; style glabrous or subglabrous. *Pods* sessile or very shortly stipitate, ovoid-ellipsoid, somewhat laterally compressed and slightly flattened, 2–3,5 cm long, 1,2–2 cm wide, densely brown velutinous-puberulous when young but indumentum wearing off with age, indehiscent, brittle; mesocarp edible. *Seeds* salmon-brown to reddish-brown, 10–13 mm long, 8–9 mm wide, compressed, very hard.

Found in Zaire, Angola, South West Africa, Botswana, Zambia and Rhodesia. Occurs in woodland and forest on sandy soil.

S.WA.—1716 (Enana): Enana, *Loeb 380*. 1718 (Kuring-Kuru): 4,8 km S. of Omuramba Mpungu on road to Tsintsabis, *De Winter 3878*. 1724 (Katima Mulilo): 32 km W. of Zambesi River, *Brenan & Keay 7648* (K). 1819 (Karakuwisa): between Runtu and Karakuwisa, *Maguire 1737*; Bumbi, *Merxmüller & Giess 1856*. 1820 (Tarikora): 12,8 km S. of Kapupahedi, *Giess 10009*. 1821 (Andara): Andara, *Volk 2171* (M). Grid ref. unknown: between Samangeigei and Karakuwisa, *Story 6497*.

3536

16. CASSIA

by KATHLEEN D. GORDON-GRAY

Cassia *L.*, Sp. Pl. 1 : 376 (1753); Gen. Pl. ed. 5 : 178 (1754); Harv. in F.C. 2 : 271 (1862); Benth. & Hook. f., Gen. Pl. 1 : 571 (1865); Harv., Gen. Pl. ed. 2 : 90 (1868); Benth. in Trans. Linn. Soc. Lond. 27 : 503 (1871); Oliv. in F.T.A. 2 : 268 (1871); Taub. in Pflanzenfam. 3, 3 : 157 (1892); Bews, Fl. Natal 114 (1921); Forbes in S. Afr. J. Sci. 18 : 342 (1922); Bak. f., Leg. Trop. Afr. 3 : 262 (1930); Burtt Davy, Fl. Transv. 2 : 323 (1932); Steyaert in Bull. Jard. Bot. Brux. 20 : 233 (1950); Phill., Gen. ed. 2 : 396 (1951); Steyaert in F.C.B. 3 : 496 tt. 35–38 (1952); De Wit in Webbia 11 : 197, figs. 1–3 (1955); Mendonça & Torre in C.F.A. 2 : 174 (1956); Keay in F.W.T.A. ed. 2, 1 : 450 (1958); Irwin & Turner in Am. J. Bot. 47 : 309 (1960); Hutch., Gen. Fl. Pl. 1 : 246 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 47 (1967); Schreiber in F.S.W.A. 59 : 8 (1967); Ross, Fl. Natal 195 (1973). Lectotype: *C. fistula* L. (vide Britton & Brown, Ill. Fl. N. States & Canada, ed. 2, 2 : 335, 1913).

Senna Mill., Gard. Dict. ed. 8 (1786).
Chamaecrista Moench, Meth. 272 (1794).
Cathartocarpus Pers., Syn. 1 : 459 (1805).
Grimaldia Schrank in Allg. Bot. Biblioth. 4 : 185 (1805); in Denkschr. Akad. Muench. 103, t.3 (1808).
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Chamaefistula G. Don, Gen. Syst. 2 : 451 (1832).
Chamaesenna Raf., Sylva Tellur. 127 (1838).
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Trees, shrubs, perennial or annual herbs, rarely scrambling, unarmed, glandular or eglandular, sometimes foetid. *Leaves* simply paripinnate, rarely with laminae modified to phyllodes (cultivated spp. only); stipules various, often caducous; petioles and often petiolules pulvinate; conspicuous petiolar or rhachidal glands often present; leaflets in 2 – many (sometimes 1 only, outside Flora area) pairs, entire. *Inflorescences* usually axillary or supra-axillary, occasionally terminal, compound (when panicled) or simple, many- to few-flowered, elongate to short, sub-umbellate racemes or flowers sub-solitary, peduncles elongate to very short when the flowers appear axillary or lateral and fascicled, sub-solitary or solitary; axillary racemes often crowded to the branch endings (pseudo-paniculate); bracts and bracteoles various, often caducous. *Flowers* normally bisexual, occasionally bisexual and female, or bisexual and male (not seen in Flora area), often asymmetric; sepals 5, imbricate; petals 5, imbricate, usually adaxial smallest, inside in bud; yellow, occasionally cream, orange-red or pink. *Stamens* usually 10, occasionally 8, 7 or 5 (sometimes 4 outside Flora area), subequal or variable in size with the 2–3 abaxial largest and longest, all functional or with 1–3 adaxial reduced and staminodal; filaments free or minutely fused basally, uniform in width or with median or apical swellings, curved or with an S-bend; anthers bilocular, basifixed or dorsifixed, dehiscing by terminal pores only, or pores and longitudinal slits. *Ovaries* shortly stipitate, occasionally sessile, variously hairy or glabrous, several- to many-ovulate; stigmas usually hollow, hooded or not, fringed with short hairs or with a delicate membrane. *Pods* very variable, from 1 cm to 1 m long, cylindric or flattened, rarely winged, woody, coriaceous, membranous or ± succulent and pulpy, with or without septa between the seeds, rarely longitudinally septate; indehiscent, or tardily dehiscent either by putrefaction or by breaking away of the valves from the sutures either as a whole, or as one- or few-seeded portions, or abruptly dehiscent by rapid splitting along the mid-line of the sutures into two

valves that twist spirally. *Seeds* usually transverse, occasionally oblique or longitudinal, laterally compressed and thus flattened, or dorso-ventrally compressed and thus tetragonous-subterete; testa usually olive-green to brown, smooth or punctate, areoles 1 per lateral face or absent; endosperm present.

A large genus of 500–600 species, pantropical but most numerous in America. In the Flora area 13 species are probably truly indigenous; a further 8 are naturalized aliens that are common at least in local areas; 4 more have seldom or once only been recorded as escapes from cultivation. Some of these naturalized aliens are popular garden subjects and are frequent under cultivation. A further 8 species are known only under cultivation.

Despite the great diversity in habit exhibited among the species, the genus is readily recognized by its paripinnate leaves and distinctive floral structure. There are many generic synonyms, of which only those most relevant to our Flora, or significant in infra-generic classification, have been listed.

Groups of species are morphologically alike and have been recognized by Bentham (Trans. Linn. Soc. Lond. 27: 503, 1871) and others following him, among them Baker f. (Leg. Trop. Afr. 3 : 627, 1930), as sub-genera, sections and series. There is still controversy as to whether some sub-genera are better maintained or raised to generic level. Within some series species are freely interfertile and natural hybrids occur between them. A list of putative hybrids for the Flora area is given at the end of this account.

Many species are weeds or possess the potential to behave as such, but they are not unmanageably aggressive. Most species are significant in folklore, and roots, leaves, fruits and/or seeds are used medicinally, especially as purgatives.

Key to the indigenous and naturalized species

a Petiole and rhachis eglandular, that is without conspicuous, solitary glands on the petiole or on the rhachis between at least one of the leaflet pairs (minute glands, usually several to many grouped together, may be present):

Pods cylindrical, up to 90 cm long, persisting on the plant long after the leaves have been shed: flowers usually produced before the leaves; filaments of the three abaxial stamens each with an S-bend near the base and a swelling about halfway along their length....1. *C. abbreviata* subsp. *beareana*

Pods flattened, usually present on the plant together with leaves and often flowers; filaments of the three abaxial stamens without S-bend or swelling:

Pods much exceeding 12 cm in length: trees or woody shrubs with stiff leaves; leaflets coriaceous, finely appressed pubescent especially below, with broadly obtuse or rounded, often emarginate apices: flowers in stiff, axillary, corymbose racemes, often aggregated into panicles terminating lateral branches.....2. *C. siamea*

Pods not exceeding 12 cm in length: shrubs or herbs with soft leaves: flowers in more or less elongate axillary racemes:

Sepals acute at apex: leaflets not exceeding 3 mm in width.....19. *C. capensis*

Sepals obtuse or rounded at apex: leaflets much exceeding 3 mm in width:

Stipules broadly ovate-cordate, 8–14 mm wide: shrubs bearing pods usually 8–11 cm long without a ridge of crests along the middle of each valve.....3. *C. didymobotrya*

Stipules linear to ovate-triangular, not exceeding 3 mm wide: prostrate or decumbent perennial herbs or low-growing sub-shrubs bearing pods 2–6 cm long with a ridge of crests along the middle of each valve (crests undeveloped on pods of some plants in the eastern Transvaal and Natal).....4. *C. italica*

aa Petiole and rhachis glandular, that is with one (rarely two) conspicuous gland(s) on the petiole, *or* with a conspicuous gland between at least one of the leaflet pairs (minute glands, usually several to many grouped together, may be present):

b Petiole with one (occasionally two, one above the other) conspicuous gland(s) somewhere along its length: rhachis without such a gland between any of the leaflet pairs (very occasionally the petiolar gland may be abortive or absent):

The majority of leaflets exceeding 2 cm in length: petiole with a raised gland situated adaxially approximately at the distal end of the pulvinus:

Stems and leaves long hairy (hairs readily visible to the naked eye).....7. *C. hirsuta*

Stems and leaves hairy or glabrous, but hairs not long, ± shaggy and clearly visible to the naked eye:

Peduncles, at flowering (0,8–)1,5–2,5 cm long: bracts subacute to obtuse: leaflets 0,8–2(–2,5) cm wide: young stem apices faintly ridged, eglandular.....6. *C. sophera*

Peduncles, at flowering 0,3–0,5 cm long: bracts acuminate to narrowly acute: leaflets (1,5–)2–4 cm wide: young stem apices ridged, glandular especially in hollows between the ridges .....5. *C. occidentalis*

The majority of leaflets not exceeding 2 cm in length: petiolar gland adaxial and raised or sunken, but not always approximately at the distal end of the pulvinus (very occasionally abortive or absent):

c Leaf rhachis channelled adaxially (the channel lies between two short upgrowths of tissue from the adaxial margins of the rhachis which sometimes loosely cohere thus more or less obscuring the channel):

Petiolar gland 1–3 mm long, elliptic or elliptic-oblong, sessile:

Petiolar gland completely or partially sunken in the adaxial petiolar channel: petals usually exceeding 7,5 mm in length: stamens 10: plants perennial.....18. *C. comosa*

Petiolar gland sessile on the petiole, not completely nor partially sunken in the petiolar channel: petals not exceeding 7,5 mm in length: stamens 8 or 7, sometimes with 3, 2 or 1 filiform staminodes detectable adaxially: plants annual.....22. *C. quarrei*

Petiolar gland less than 1 mm long, variously shaped, sessile, subsessile or stalked, occasionally abortive or absent:

Petiolar gland sessile, projecting from the petiole or slightly sunken in its adaxial channel:

Petiolar gland projecting from the petiole: leaflets with main vein more or less centrally placed: stamens 8 or 7, sometimes with 3, 2 or 1 filiform staminodes detectable adaxially.....22. *C. quarrei*

Petiolar gland slightly sunken in the adaxial petiolar channel: leaflets with the main vein asymmetrically placed (near the anticous margin): stamens 10.....21. *C. falcinella* var. *parviflora*

Petiolar gland(s) (sometimes 2, one above the other), stalked or subsessile, occasionally abortive or absent:

Plants annual with an erect main stem: petiolar gland subsessile, slightly sunken in the petiolar channel: petals 4–6 mm long: (only from northern S.W.Africa).....21. *C. falcinella* var. *parviflora*

Plants perennial with decumbent or prostrate stems (if main stem erect, then petals exceeding 7,5 mm in length): petiolar gland long- or short-stalked, subsessile, abortive or absent:

Petals 4–8 mm long.....20. *C. biensis*

Petals 9–17 mm long.....19. *C. capensis*

cc Leaf rhachis crested adaxially (the crest is a short upgrowth of tissue from the mid-axial line of the rhachis: it is crenate or serrate when viewed in profile, the sinuses corresponding with the points of attachment of the leaflets):

Plants perennial, developing shoots annually from a more or less thickened, woody, rhizomatous rootstock: petals 7,5–17 mm long.....23. *C. plumosa*

Plants annual, sometimes persisting into a second year of growth under favourable conditions, but fibrous rooted and without a woody rhizomatous rootstock; petals usually 5–7,5 mm long (if exceeding 7,5 mm then plants from northern S.W. Africa or the northern Transvaal).....24. *C. mimosoides*

bb Petiole without conspicuous glands: rhachis with such a gland between one, at least, of the leaflet pairs:

Leaves with 2 pairs of leaflets only: plants annual, glandular, viscid: stamens 5, subequal, filaments straight.....17. *C. absus*

Leaves with more than 2 pairs of leaflets: plants annual or perennial, but not obviously glandular viscid: stamens more than 5, filaments various:

Annual herb bearing leaves with 3 pairs of leaflets only, with a stalked, finger-like, orange-brown gland ± 2 mm long between the lowest, or the two lower, pairs of leaflets: 3 largest anthers narrowed into a bottle-shaped neck below the apical pores: pods 13–15 cm long, subterete and faintly angled longitudinally: areoles of seed narrowly linear.....16. *C. obtusifolia*

Trees, shrubs or sub-shrubs, never annual herbs: if leaves with 3 pairs of leaflets only, then anthers, pods or seeds differing from those of *C. obtusifolia:*

d Leaflets with acute or subacuminate apices:

Stipules ± persistent, conspicuous, leafy, semi-cordate to reniform, with one end attenuate-caudate: pods 10–25 cm long, flattened, the blackish, ± succulent valves eventually breaking into ± 1-seeded portions that fall from the lighter coloured sutures: seeds inconspicuously areolate.....14. *C. petersiana*

Stipules usually caducous, linear: pods subterete or slightly flattened, valves light brown, indehiscent or tardily dehiscent by putrefaction:

Young stem apices and abaxial leaflet surfaces cano-tomentose.....10. *C. tomentosa**

Young stem apices and abaxial leaflet surfaces glabrous, occasionally glabrescent:

Leaves with lanceolate leaflets usually in 3, occasionally 2 pairs: ovaries with the valves appressed pubescent, the sutures ± glabrous.....*9. C. corymbosa*

Leaves with elliptic or ovate leaflets in 3–4, occasionally 2 or 5 pairs: ovaries glabrous.....8. *C. floribunda**

dd Leaflets with obtuse or rounded apices:

Leaves with 3, occasionally 2, pairs of leaflets: pedicels of open flowers 4–7 mm long: staminodes Y-shaped (obhastate): seeds without areoles.....11. *C. bicapsularis**

Leaves generally with more than 3 pairs of leaflets: pedicels of open flowers exceeding 7 mm long: staminodes, if present, not Y-shaped: seeds with or without areoles:

Leaves with a rhachidal gland between the lowest pair of leaflets only....12. *C. coluteoides*

Leaves with a rhachidal gland between each pair of leaflets, sometimes excepting the uppermost:

Bracts each with two stipitate, fusiform or linear glands in the positions of stipules: leaves with 5–10, very occasionally 3 or 4 pairs of leaflets, the uppermost pair not the largest (small tree or shrub from northern S.W. Africa only).....15. *C. sinqueana*

Bracts without glands in the positions of stipules: leaves with leaflets in 3–7 pairs, the uppermost pair the largest (escape from cultivation, known in the wild only from Natal).....13. *C. surattensis*

Key to the cultivated species

a Petiole and rhachis eglandular, that is without conspicuous solitary glands on the petiole or on the rhachis between at least one of the leaflet pairs (minute glands, usually several to many grouped together, may be present):

Shrubs: stipules persistent, broadly ovate-cordate, 8–14 mm wide: bracts dark purplish-green, foetid: pods flattened, 8–11 cm long.....3. *C. didymobotrya*

Trees: if shrubby rather than tree-like then stipules and/or bracts and/or pods differing from those of *C. didymobotrya:*

Petals pink, bracts persisting while flowers are open: trunks spiny: stipules leafy, ± 12–25 mm long, leaflets rounded apically.....27. *C. javanica*

Petals yellow or golden: trunks without spines: stipules and leaflets various:

Inflorescences pendulous, racemes borne singly or fascicled: abaxial filaments gradually and slightly thickened at about the middle: leaflets in 3–8 pairs, with acute apices and minute appressed puberulence abaxially.....25. *C. fistula*

Inflorescences not pendulous: abaxial filaments without obvious thickenings: leaves generally with more than 8 pairs of leaflets, apices and pubescence various:

Inflorescences terminating ± slender lateral branches, not stiffly erect nor crowded to the ends of branches: leaves willowy, tending to droop, leaflets ± glabrous beneath...26. *C. angolensis*

Inflorescences stiffly erect, crowded to the ends of branches: leaves ± stiff and erect, leaflets densely villous or appressed puberulous abaxially:

Leaflets acute, densely villous to pubescent abaxially: pods almost terete....29. *C. spectabilis*

Leaflets rounded or obtuse, often emarginate, minutely appressed pubescent abaxially..2. *C. siamea*

aa Petiole and rhachis glandular, that is with one conspicuous gland on the petiole, *or* with a conspicuous gland between at least one of the leaflet pairs (minute glands, usually several to many grouped together, may be present):

Leaves with a conspicuous gland on the petiole, this situated adaxially, approximately at the apex of the pulvinus.....6. *C. sophera*

Leaves with petioles eglandular, but with a conspicuous gland between one, or more, of the pairs of leaflets:

Leaflets not exceeding 3 mm in width, linear or filiform-terete: foliage grey or bluish-grey:

Leaves usually with 4 or 5, but up to 6, pairs of filiform-terete leaflets: herbs or sub-shrubs up to 1 m in height.....32. *C. artemisioides*

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* In areas where *C. floribunda* is sympatric with either *C. tomentosa* or *C. bicapsularis* putative hybrids occur.

Leaves with 1–3 pairs of linear leaflets, generally 2–3 mm in width: sub-shrubs or shrubs up to 3 m in height ..... 33. *C. eremophila*

Leaflets exceeding 3 mm in width, never linear nor filiform-terete: foliage green:

Leaflets in two pairs only:

Leaflets glabrous, with a stalked, slender, finger-like gland between the lower pair of leaflets only ..... 30. *C. splendida*

Leaflets villous, with a shortly stalked pyramidal to rounded gland between each pair of leaflets ..... 31. *C. speciosa*

Leaflets in more than two pairs (Note: in species with 3 pairs, an occasional leaf with 2 pairs only may be found):

Leaflets in 10–26 pairs, oblong in shape and rounded to emarginate at the apex .... 28. *C. multijuga*

Leaflets in less than 10 pairs (if an occasional leaf with 10 pairs occurs then leaflets glaucous below), variable in shape and apex:

Leaflet apices acute to acuminate:

Leaflets densely cano-tomentose abaxially ..... 10. *C. tomentosa*

Leaflets glabrous or glabrescent abaxially:

Leaflets lanceolate, usually in 3, occasionally in 2 pairs: ovaries with valves appressed pubescent, sutures ± glabrous ..... 9. *C. corymbosa*

Leaflets elliptic or ovate, in 3–4, occasionally 2–5 pairs: ovaries glabrous .... 8. *C. floribunda*

Leaflet apices obtuse to rounded:

Leaflets in 3 pairs (occasionally 2): flowering pedicels up to 7 mm long: staminodes Y-shaped (obhastate) ..... 11. *C. bicapsularis*

Leaflets in more than 3 pairs: flowering pedicels exceeding 7 mm long: staminodes, if present, not Y-shaped:

Leaves with a conspicuous gland between the lowest pair of leaflets only .. 12. *C. coluteoides*

Leaves with a conspicuous gland between each pair of leaflets except usually the two uppermost pairs ..... 13. *C. surattensis*

1. **Cassia abbreviata** *Oliv.* in F.T.A. 2 : 271 (1871); Bak. f., Leg. Trop. Afr. 3 : 632 (1930); Steyaert in F.C.B. 3 : 503 (1952); Coates Palgrave, Trees Centr. Afr. 93–96 (1956); Brenan in Kew Bull. 13 : 231–234 (1958); F. White, For. Fl. N. Rhod. 120 (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 59 (1967). Syntypes: Mozambique, near Lupata, *Kirk*, and near Tete, *Kirk*; Malawi, Manganja Hills, *Meller* and Lake Nyassa, Cape Maclear, *Kirk* (K).

subsp. **beareana** (*Holmes*) *Brenan* in Kew Bull. 13 : 232 (1958); Dale & Greenway, Kenya Trees & Shrubs 100 (1961); Von Breitenbach, Indig. Trees S. Afr. 3 : 346–7 (1965); De Winter et al., 66 Transv. Trees 70, t. 212 (1966); Brenan in F.T.E.A. Legum.-Caesalp.: 60 (1967); Schreiber in F.S.W.A. 59 : 10 (1967); Palmer & Pitman, Trees S.Afr. 2 : 880, 883 (1973). Type: East Africa (locality uncertain), *O'Sullivan Beare* (London Pharmaceutical Soc., holo., K, fragments).

C. beareana Holmes in Pharm. Journ. 68 (Ser. 4, 14) : 42 (1902); Bak.f., Leg. Trop. Afr. 3 : 631 (1930). Type as above. *C. granitica* Bak. f. in J. Bot., Lond. 43 : 45 (1905); Burtt Davy, Fl. Transv. 2 : 324 (1932). Type: Rhodesia, near Bulawayo, *Eyles* 1080 (BM, holo.). *C. mennei* Burtt Davy ined. *C. abbreviata* var. *granitica* (Bak. f.) Bak. f., Leg. Trop. Afr. 3 : 632 (1930); Codd, Trees & Shrubs Kruger Nat. Park 62, pl. 2., figs. 58, 60 (1951). Type as for *C. granitica*. *C. abbreviata* var. *glabrifructifera* Steyaert in Bull. Jard. Bot. Brux. 21 : 357 (1951), in F.C.B. 3 : 502 (1952). Type: Zaire, Kiniama, *A. Schmitz* 2834 (BR, holo.). *C. abbreviata* sensu Letty, Wild Flow. Transv. 156, pl. 78 (1962).

Tree (3–)5–7(–13)m high, occasionally shrubby. *Trunk* usually slender, erect, bearing dark grey, longitudinally-fissured bark and a rounded crown of drooping branches; wood light brown, darker streaked. *Stems* of branchlets faintly longitudinally ridged and furrowed, ± terete, young apices densely pubescent with short, curved, appressed, white hairs, often with yellow glands interspersed, older parts with brown to greyish faintly longitudinally striated bark. *Leaves* lax, willowy; petiole and rhachis (5–)10–25 (–35) cm long; stipules subulate, ± 1,5 mm long, 0,3 mm wide, pubescent, caducous; petiole 2,5–5 cm long including basal pulvinus, petiolar gland lacking, rhachis channelled adaxially, lacking conspicuous

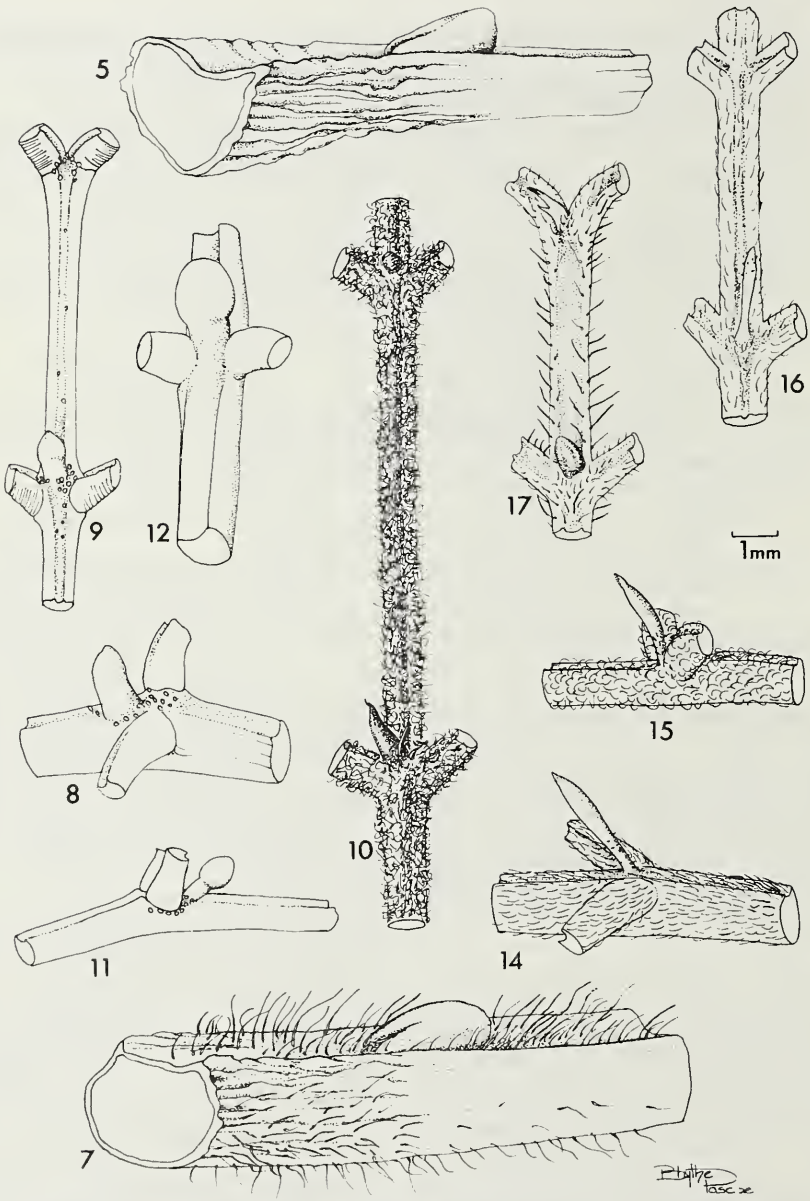


FIG. 16.—Petiolar glands of Cassia species, × 6¾. Species numbered as in text. 5, **C. occidentalis**; 9, **C. corymbosa**; 12, **C. coluteoides**; 10, **C. tomentosa** (lower gland complete; upper with apex abscised showing scar); 17, **C. absus** (gland between upper pair of leaflets reduced to a thin flap of tissue: the lower gland is sometimes similarly reduced); 16, **C. obtusifolia** (gland between the lowest leaflet pair only); 8, **C. floribunda**; 11, **C. bicapsularis**; 15, **C. sinqueana**; 14, **C. petersiana**; 7, **C. hirsuta**.

glands; leaflets in 7–9(–12) pairs, (sometimes sub-alternate), ovate-oblong, or elliptic when mature, often lanceolate-elliptic when young, (1,5–)2–5(–6) cm long, (0,7–)1–3(–4) cm wide, uppermost pair not largest, bases often slightly asymmetric, usually broadly rounded, apices rounded or obtuse, margins slightly thickened, surfaces pubescent or puberulous with short, straight, appressed, white hairs; petiolules up to 6 mm long. *Inflorescences* many-flowered, terminal, racemes 0,5–9 cm long; main axes ± appressed pubescent; bracts lanceolate, acuminate, 5–7 mm long, ± 2 mm wide, pubescent, bracteoles 2 in the position of stipules, persisting with bracts for duration of flowering; pedicels at flowering, slender, 4–7 cm long, glabrescent to pubescent distally. *Sepals* obtuse, pubescent to glabrescent abaxially, margins often ± glandular. *Petals* oblanceolate to obovate, occasionally elliptic, 1,7–2,5 (–3) cm long, 0,9–1,5 cm wide, creamy yellow, becoming brown veined on drying. *Stamens* 10: 3 adaxial shortest, 4 lateral medium, 3 abaxial longest with filaments ± 3 cm long with a basal S-bend and a pronounced swelling below the middle, adaxial anthers smallest, remainder larger and ± uniform, basifixed, dehiscence by basal and sometimes also apical pores. *Ovaries* densely cano-pubescent, curved, 2–2,5 cm long, basal stalks 0,7–1 cm long; style hardly developed; stigma hollow, with a narrow membranous margin. *Pods* cylindrical, ± straight, 30–60 (–75) cm long, 2–3 cm wide, transversely septate, valves woody, brownish-black at maturity, densely pubescent with short white appressed hairs becoming ± glabrescent in age, eventually dehiscing by the valves breaking away from the sutures. *Seeds* laterally compressed, ± elliptic, blackish, 9–12 mm long, 8–9 mm wide; areoles absent. Fig. 18 : 1; 20 : 1.

Subsp. *beareana* is widespread, extending from the Somali Republic, Kenya, Tanzania and Zaire, southwards through Zambia, Rhodesia and Mozambique to the Transvaal, Botswana and South West Africa. In the Flora area plants are limited to the northern and eastern Transvaal and to northern South West Africa, where they grow at altitudes from 650 to 1000 m, in lowveld bush, in open savanna, on koppies or along the banks of rivers.

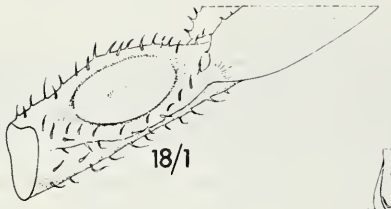
S.W.A.—1918 (Grootfontein): Grootfontein, *Schoenfelder S126.*

TRANSVAAL.—2229 (Waterpoort): Wyllie's Poort, *Dyer 3876.* 2230 (Messina): Messina, *Rogers 17761*; Tshipise, *Gerstner 6233.* 2231 (Pafuri): Punda Milia, *Lang sub TRV 32110.* 2329 (Pietersburg): Silwane, *Breyer 17562.* 2330 (Tzaneen): Hans Merensky Nature Reserve, *Oates 31.* 2430 (Pilgrim's Rest): 8 km N.E. of Skukuza Camp, *Codd 4389.* 2531 (Komatipoort): Skukuza Rest Camp, *Codd 6127.*

C. abbreviata is a variable species widespread in eastern Africa. Brenan, in preparation for his account of *Cassia* for the Flora of Tropical East Africa, examined specimens from throughout this range. He recognized three subspecies and differentiated among them on the basis of indumentum and petal length (see Kew Bull. 13 : 231–234 and F.T.E.A. Legum.-Caesalp.: 59 (1967). In the latter a general description of the species is given.

Subsp. *abbreviata* is known from Tanzania, Zaire, Zambia, Rhodesia and Mozambique. Subsp. *kassneri* (Bak.f.) Brenan is limited to Kenya and Tanzania. Subsp. *beareana* is the most widespread and the only subspecies to reach the Flora area. It is distinguished from subsp. *abbreviata* by the nature of the hairs to the undersurfaces of the leaflets (non-appressed, often curled in subsp. *abbreviata*; appressed, short and straight in subsp. *beareana*). Subsp. *kassneri* has the same leaflet pubescence as has subsp. *beareana*, but its flowers are smaller (1,5–2 cm long in *C. kassneri*; 1,8–3 cm in *C. beareana*).

Sweet-scented flowers are produced in abundance with or before the young leaves, but the blooming period is brief, and followed by the development of the long pods that hang on the trees often until the next flowering season. These are characteristic of the species and have resulted in the common names of "Long-tail Cassia" or "Kersboom". Some Transvaal plants possess leaflets that are markedly glaucescent abaxially (*Gerstner* 6233), but these also carry the appressed minute hairs on which subspecies *beareana* is differentiated from subspecies *abbreviata*. The South West African plants (*Schoenfelder* S126) have leaflets that are glabrous to glabrescent abaxially, except for some hairs near the midrib, especially when the leaflets are young. Brenan, 1958, has commented on the more appressed pubescence on the inflorescence axis in some of the Transvaal trees than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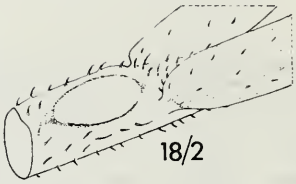
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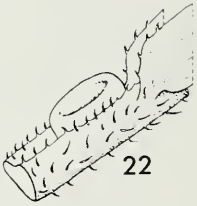
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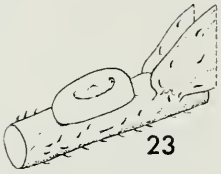
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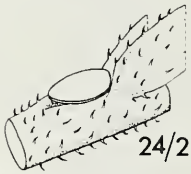
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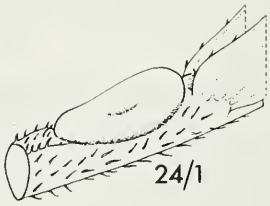
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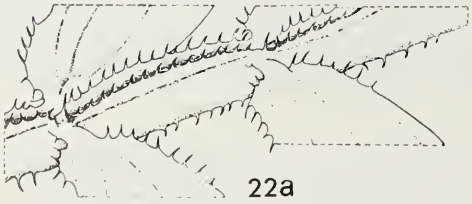
22a


23a

FIG. 17.—Petiolar glands of **Cassia** species within the Section Chamaecrista in Southern Africa, × 6¾. Species numbered as in text. 18/1, **C. comosa** var. **comosa**; 18/2, **C. comosa** var. **capricornia**; 19/1, **C. capensis** var. **capensis** (also many specimens of var. **flavescens**); 19/2, **C. capensis Group 1**; 20, **C. biensis**; 21, **C. falcinella** var. **parviflora**; 22, **C. quarrei**; 23, **C. plumosa**; 24/1, **C. mimosoides Group 1**; 24/2, **C. mimosoides Group 2**; 24/3 and 24/4, **C. mimosoides Group 3**, showing variation from slightly stalked to sessile. 22a, adaxial channelled surface of leaf rhachis of **C. quarrei**, × 6¾. 23a, adaxial crested surface of leaf rhachis of **C. plumosa**, × 6¾.

is usual for the subspecies. This is a variable feature, for plants with both spreading and appressed pubescence are to be found. The leaflets, when young, are narrow and lanceolate-elliptic, but increase in size with maturity to become ovate-elliptic or elliptic.

2. **Cassia siamea** *Lam.* Encycl. 1: 648 (1783); Benth. in Trans. Linn. Soc. Lond. 27 : 549 (1871); Bak. f., Leg. Trop. Afr. 3 : 639 (1930); Burtt Davy, Fl. Transv. 2 : 324 (1932); Steyaert in F.C.B. 3 : 506 (1952); Corner, Wayside Trees of Malaya ed. 2,2 : tt. 89,90 (1952); White, For. Fl. N. Rhod. 120 (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 50 (1967). Type: from Tropical Asia (probably P-LA).

C. legatii Burtt Davy ined.

Tree, evergreen, up to 10 m high. *Young stems* ± longitudinally ridged and angled, densely pubescent with short, straight appressed white hairs, becoming ± glabrous with age. *Bark* on twigs brown, faintly longitudinally striated. *Leaves*, when very young, silvery with dense, fine short white appressed hairs, at maturity with petiole and rhachis 9–22 cm long; stipules 2–3 mm long, linear-subulate, finely pubescent, caducous; petiole 1,5–3(–5) cm long including basal pulvinus, petiolar and rhachidal glands lacking; rhachis channelled adaxially; leaflets in 5–8(–12) pairs, elliptic, ovate-elliptic or oblong, 2–6,5 cm long, 1–2,5 cm wide, uppermost pair usually *not* the largest, bases broadly cuneate to rounded, usually symmetric, apices broadly obtuse or rounded, usually emarginate and minutely mucronate, margins yellow, glabrous, surfaces closely veined, pubescent with fine, short, straight white appressed hairs becoming glabrescent then glabrous with age, texture firm coriaceous; petiolule ± 3 mm long. *Inflorescences* corymbose racemes up to 6,5 cm long elongating to 12 cm with age, in the axils of the upper leaves, or aggregated into panicles 15–20 cm long that terminate lateral branches; peduncles, at flowering, 1–2 cm long, at fruiting stouter, blending into the elongated axis of the raceme; bracts ± 7 mm long, linear, slightly incurved, sometimes broadened about the middle to ± 1 mm wide, densely pubescent, present at time of flowering, eventually deciduous; pedicels, at flowering, 2–3 cm long, at fruiting stouter, hardly longer, pubescent. *Sepals* obtuse, thick, leathery, densely pubescent abaxially, persisting on the receptacle even until pods are mature. *Petals* obovate, slightly stalked, 1–1,5 cm long, ± 1 cm wide, deep yellow. *Stamens* 10, all functional: 3 adaxial small, slightly flattened, reduced, 4 lateral and central-abaxial medium, 2 lateral-abaxial large, filaments ± 8 mm long, dehiscence porose. *Ovaries* ± straight, slightly 4-angled, densely and shortly velutinous; style 4–5 mm long, apically recurved; stigma narrowed, both glabrous. *Pods* compressed, very shortly stalked, linear, 20–27 cm long, 1–1,3 cm wide, dark brown, many seeded, tardily dehiscent, sutures slightly thickened, valves coriaceous, transversely veined. *Seeds* laterally compressed, elliptic or orbicular, 6–8 mm long, 6–7 mm wide, testa bright shining brown; areole central on each lateral face, oblong, 3–4 mm long, 1,2–1,5 mm wide, with faint transverse cracks. Fig. 18 : 2; 19 : 2.

A native of tropical Asia, this species has become naturalized in the eastern Lowveld of the Transvaal. There is one record from Natal near the border with Mozambique (an abandoned kraal site on the Usutu floodplain, so the tree may have been planted). Burtt Davy (Fl. Transv. 2 : 324, 1932) records the species from "mountains above Mbabane", but this has not been confirmed by Compton (J .S. Afr. Bot., Suppl. 6 : 46, 1966) so Burtt Davy's record may have referred to planted trees.

TRANSVAAL.—2530 (Lydenburg): Nelspruit, *Legat 2832*. 2531 (Komatipoort): near Barberton, *Legat 1312*; Komatipoort, *Rogers 12618, 22174*.

NATAL.—2632 (Bela Vista): Ndumu Game Reserve, Usutu floodplain, *Ward 4515*.

A handsome shade tree cultivated in parks and along streets in Mozambique and Zambia. White (For. Fl. N. Rhod. 120, 1962) mentions its use for shelter belts and fuel plantations because of its ease of cultivation and resistance to termites.

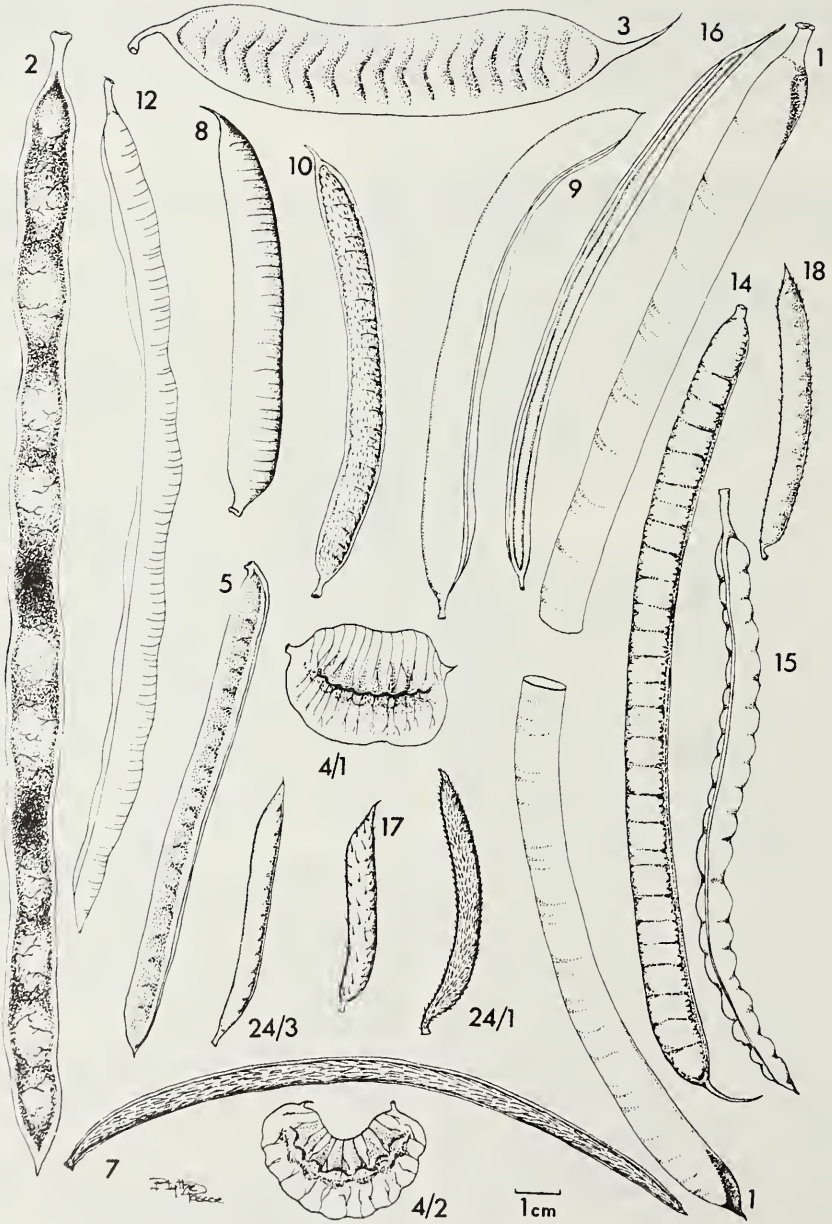
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FIG. 18.—Fruits of Cassia species, × ⅓. Species numbered as in text. 2, C. siamea; 3, C. didymobotrya; 12, C. coluteoides; 8, C. floribunda; 10, C. tomentosa; 9, C. corymbosa; 16, C. obtusifolia; 1, C. abbreviata subsp. beareana (young pod); 14, C. petersiana; 18, C. comosa var. comosa; 5, C. occidentalis; 4/1, C. italica subsp. arachoides group 1; 24/3, C. mimosoides group 3; 17, C. absus; 24/1, C. mimosoides group 1; 15, C. sinqueana; 7, C. hirsuta; 4/2, C. italica subsp. micrantha.

3. **Cassia didymobotrya** *Fresen.* in Flora 22 : 53 (1839); Oliv. in F.T.A. 2 : 276 (1871); Bak.f., Leg. Trop. Afr. 3 : 638 (1930); Burtt Davy, Fl. Transv. 2 : 324 (1932); Steyaert in F.C.B. 3 : 504, t. 36 (1952); Mendonça & Torre in C.F.A. 2 : 177 (1956); F. White, For. Fl. N. Rhod. 120 (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 66, fig. 12 (1967). Type: Ethiopia, *Rueppell* (FR, holo.).

C. nairobensis Aggeler & Musser, Los Angeles, California, seed catalogue 63 (1930), nomen subnudum; L. H. Bailey, Hortus Second 146 (1941) & Man. Cult. Pl., ed. 2 : 586 (1949) sine descr. lat. No type cited—cultivated in California, L. H. & E. Z. Bailey 7780, 7952 (BH).

Perennial, multi-stemmed and much branched from ground level forming an erect, rounded shrub (0,6–)2–7 m high. *Stems* ± woody, subterete, inconspicuously ridged, finely and softly pubescent with dense, short, white, patent hairs. *Leaves*: petiole and rhachis 19–30(–45) cm long; stipules broadly ovate-cordate, long acuminate, 1–1,2 cm long, 1,1–1,4 cm wide, pubescent, persistent, conspicuous; petiole 2,5–3,2 cm long including basal pulvinus; petiolar gland lacking; rhachis terete, lacking conspicuous glands, but with 1 – several small, hair-like dark structures between each of the leaflet pairs; leaflets in (8–)13–21 pairs, ovate-oblong, becoming ovate-elliptic and obovate towards distal end of leaf, 3–4,2(–5,5) cm long, 0,7–1,6(–2) cm wide, uppermost pair *not* largest, bases asymmetric, broadly cuneate to round, apices broadly obtuse, with a fine apiculus up to 3 mm long, margins slightly thickened, pubescent, surfaces pubescent, adaxial sparsely, abaxial densely. *Inflorescences* in axils of upper leaves, racemes elongating with age up to 45 cm long including peduncle, many-flowered; peduncles at flowering and fruiting 4–6 cm long, stout; bracts 2–2,3 cm long, 1–1,2 cm wide, elliptic, boat-shaped, viscid, foetid, dark brownish-green, conspicuous; pedicels, at flowering 5–8 mm long, at fruiting up to 10 mm long, pubescent to villous with soft patent hairs. *Sepals* obtuse, pubescent, viscid, foetid. *Petals* elliptic to obovate, shortly stalked, 2–2,5 cm long, 1,2–1,3 cm wide, bright yellow. *Stamens* 10 : 3 adaxial smallest, ± functional, 4 lateral medium, 2 lateral-abaxial largest, central-abaxial longer than laterals but shorter and considerably more slender than 2 lateral-abaxial, dehiscence porose. *Ovaries* white velutinous with soft, patent hairs; styles curved, glabrous; stigma narrowed to a fine hollow point, becoming ± membranous with age. *Pods* flattened, shortly stalked, straight, oblong-linear, 10–11 cm long, ± 2 cm wide, apex usually beaked, septate, sutures slightly thickened, slightly lighter than the dark brown, pubescent valves, many-seeded, dehiscent. *Seeds* laterally compressed, oblong with one pointed end, 6–7 mm long, 2,5–3 mm wide, testa light brown, minutely pitted or smooth; areole central on each lateral face, oblong, finely transversely striated, ± 4 mm long, ± 1 mm wide. Fig. 18 : 3; 19 : 3.

This striking and easily recognized species is known from Ethiopia, the Sudan, Zaire, Congo (Brazzaville), Uganda, Kenya, Tanzania, Malawi, Angola, Zambia, Rhodesia, Mozambique and South Africa. In the Flora area it is not indigenous, but is grown under cultivation, particularly in the Transvaal, Natal and the eastern Cape. Here it has also become naturalized and grows as a ruderal especially in sheltered, moist spots.

S.W.A.—2115 (Karibib): Okambahe, *Liebenberg 5042* (said to be naturalized, but confirmation required).

TRANSVAAL.—2329 (Pietersburg): Louis Trichardt Native Location, *Gerstner 5965*. 2431 (Acornhoek): Kruger National Park, Sabie River, 8 km E. of Skukuza, *Pienaar & Van Wyk 4507*. Without precise locality, *Legat sub PRE 4961*.

NATAL.—2832 (Mtubatuba): Hluhluwe Game Reserve, *Scott-Smith 17*. 2930 (Pietermaritzburg): Fox Hill Spruit, Pietermaritzburg, *Bourquin 313* (NU). 2931 (Stanger): Mvoti-Hlabitswa confluence, *Mol! 3294*.

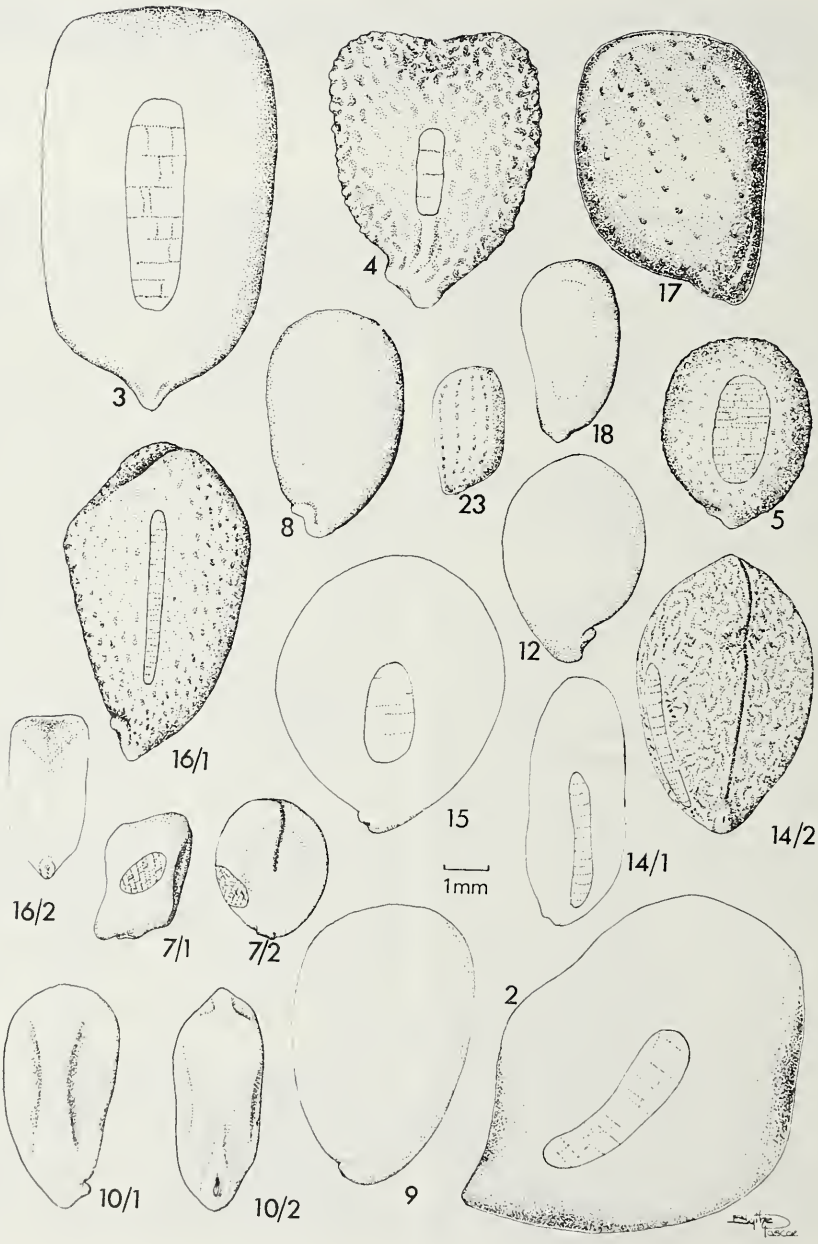
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FIG. 19.—Seeds of Cassia species, × 6¾. Species numbered as in text. 3, **C. didymobotrya**; 4, **C. italica** subsp. **arachoides**; 17, **C. absus**; 8, **C. floribunda**; 23, **C. plumosa**; 18, **C. comosa** (possibly not fully mature); 5, **C. occidentalis**; 16, **C. obtusifolia**–1, lateral view showing areole–2, end view showing hilum; 15, **C. sinqueana**; 12, **C. coluteoides**; 14, **C. petersiana**–1, lateral view showing areole–2, end view showing hilum; 7, **C. hirsuta**–1, lateral view showing areole–2, end view showing hilum (seed often much compressed in this plane, so that an areole lies across each "shoulder"); 10, **C. tomentosa**–1, lateral view–2, end view showing hilum; 9, **C. corymbosa**; 2, **C. siamea.**

CAPE.—3029 (Kokstad): 5 km from Umzimkulu on rd. to Creighton; banks of Umzimkulu River, *Killick 2235.* 3129 (Port St. Johns): Port St. Johns, *Hafström & Acocks 657.* 3326 (Grahamstown): Grahamstown, *Baird 20* (RU).

Its shrubby growth form, its large, multijugate leaves lacking petiolar and rhachidal glands, its dark brownish-green (almost black at a distance) viscid and foetid bracts and sepals, and its conspicuous erect racemes of deep yellow flowers, make *C. didymobotrya* distinctive among the species of the Flora area. Its closest relative, *C. italica,* is herbaceous and prostrate or decumbent: it is also a plant of drier areas.

C. didymobotrya is said to be used as a treatment for fever and as a purgative for children.

4. **Cassia italica** (*Mill.*) *Lam ex F.W. Andr.,* Fl. Pl. Anglo-Egypt. Sudan 2 : 117 (1952); Mendonça & Torre in C.F.A. 2 : 178 (1956); Brenan in Kew Bull. 13 : 239 (1958); Compton, J. S. Afr. Bot., Suppl. 6 : 46 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 65 (1967); Schreiber in F.S.W.A. 59 : 11 (1967). Type: whereabouts unknown.

Senna italica Mill., Gard. Dict., ed. 8, no. 2 (1768).

Cassia aschrek Forsk., Fl. Aegypt.-Arab. cxi, 86 (1775). Type: Yemen, Môr, *Forskal* (C, holo.). *C. obovata* Collad., Hist. Cass. 92, t. 15A (1816), *nom. illegit.*; Oliv. in F.T.A. 2 : 277 (1871); Bak. f., Leg. Trop. Afr. 3 : 636 (1930); Burtt Davy, Fl. Transv. 2 : 325 (1932). Type as for *C. italica.*

Perennial herb with several prostrate to decumbent, branched stems up to 40 cm high, or a sub-shrub, more erect and up to 60 cm high (unusual in Flora area), from a woody rootstock with long, thick roots. *Stems* when young slightly flattened, ± glandular and viscid to eglandular, minutely pubescent with short thick patent hairs becoming glabrescent with age, or appearing glabrous but with densely packed, microscopic, straight or curved hairs, or appressed pubescent with fine straight hairs lying parallel with surface, or densely pilose with long, slender patent hairs, becoming ± terete (sometimes with 1 or more marked furrows), non viscid, glabrescent, glabrous or remaining densely pilose with age. *Leaves* variable in size: petiole and rhachis (2–)4–10(–12) cm long; stipules persistent, asymmetric, hastate or ovate-triangular, 3,5–8(–11) mm long, 2–2,5 mm wide, with a well-marked mid-vein, glabrescent with short patent hairs especially on margins; petiole 0,3–3,5 cm long including basal pulvinus, petiole and rhachis eglandular (except for numerous small finger-like glands in the leaf axils and adaxially on the rhachis between each pair of leaflets); leaflets in (3–)4–6(–9) pairs, oblong, obovate-oblong or obovate-elliptic, 1–3,8 (–4,3) cm long, (0,4–)1–2,5(–2,7) cm wide, uppermost pair not always largest, bases asymmetric, apices emarginate, rounded or obtuse, sometimes mucronate, margins orange with short, scattered hairs, surfaces minutely glandular or eglandular, glabrous, glabrescent, pubescent or densely villous with hairs varying from minute and straight or curved or appressed to long and patent. *Inflorescences* axillary racemes, including naked peduncles, 2–15(–25) cm long, many-flowered; bracts 3–5,5 mm long, 3–5 mm wide, ovate, acuminate, deciduous ± at flower opening; pedicels, at flowering, ± 3 mm long, not much elongated at fruiting. *Sepals* obtuse. *Petals* sub-equal, obovate, (5–)7–12(–20) mm long, (2,7–)5–7(–10) mm wide, bright yellow to yellowish-white becoming brown-veined with age. *Stamens* 10 : 3 adaxial reduced, ± staminodal with ± flattened filaments, 4 lateral and 1 central-abaxial medium-sized, 2–3,3 mm long,

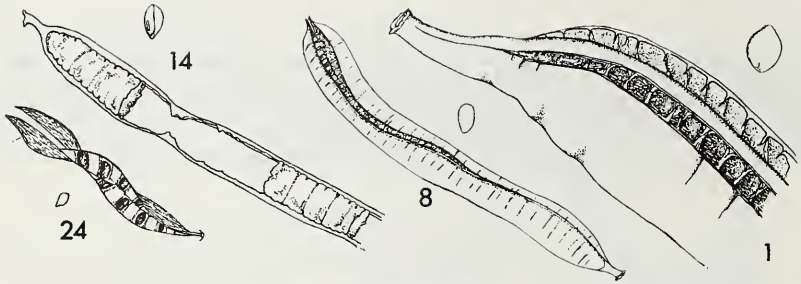

FIG. 20.—Fruits of Cassia species showing methods of dehiscence, × ¾. Species numbered as in text. 24, **C. mimosoides**, explosive dehiscence by splitting down both sutures; 14, **C. petersiana**, gradual break-up by putrefaction– one or more-seeded portions falling away leaving the tough sutures intact; 8, **C. floribunda**, tardy splitting down one suture; 1, **C. abbreviata** subsp. **beareana**, base of fruit showing splitting of both valves away from woody suture: often the split edges move apart so that the two valves become more or less flat.

2 lateral-abaxial large, 5–8 mm long, curved, dehiscence porose. *Ovaries* glabrous or white pubescent with minute straight, curved, or appressed hairs, or densely pilose with long patent hairs; style 3–7 mm long, bent at 70°–90° to ovary, or ± coiled; stigma either hardly wider than width of style narrowing apically into a small ± circular to elliptic aperture, or flared into an asymmetric trumpet markedly wider than style. *Pods* flattened, rather variable in size and shape, generally ± oblong to sub-orbicular, often slightly upwardly falcate 2–4(–6) cm long, 1,3–2,5 cm wide, apex beaked, valves membranous, evidently veined, brown, with a median line of crests (lacking in some plants from eastern Transvaal and Natal), glabrous or minutely pubescent or villous. *Seeds* laterally compressed, ± ovate, 6–7 mm long, ± 4 mm wide, testa brown, reticulate-rugose; areole central on each lateral face, oblong, faintly transversely-striate, ± 2 mm long, ± 0,5 mm wide.

Recorded from North Africa to South Africa, especially in drier areas, and through the Middle East to India. It is remarkably variable, yet readily distinguishable from other species except *C. truncata* Brenan which does not occur in the Flora area.

Brenan, in Kew Bull. 13 : 239 (1958), recognized three subspecies, of which subsp. *italica* was said to occupy the northern part of the total species range; subsp. *micrantha* was found to be Indian and East African and subsp. *arachoides* was mainly South African. In addition to the characters used by Brenan to separate these taxa, work in preparation for this account of *Cassia* (Gordon-Gray in preparation for J. S. Afr. Bot.) has yielded other features useful in distinguishing the entities at infra-specific level.

No plants with *all* the size dimensions of subsp. *italica* have been seen from the Flora area. Nevertheless, some South African plants are robust and come close to the limits accepted for this northern subspecies. There is no doubt that subsp. *italica* and subsp. *arachoides* are closely allied and differ quantitatively rather than qualitatively. In the present account subsp. *italica* is accepted as northern in distribution and will not be dealt with in detail. Brenan, in Kew Bull. 13 : 240 (1958), has described this taxon and outlined its variability and its distribution.

The subspecies may be recognized as follows:

Stigma (usually visible even on developing fruits) expanded to much exceed the width of the style, asymmetrically trumpet-shaped (better developed adaxially than abaxially); style 3–4 mm long, usually bent at 70°–90° to ovary: flowers yellowish-white, brown veined; racemes with open flowers mostly 2–8 cm long, usually shorter than subtending leaf..... (a) subsp. *micrantha*

Stigma hardly expanded sub-terminally and thus not much exceeding the width of the style, narrowed again terminally to form an aperture no wider than the style which is usually 6–7 mm long and ± circinnate: flowers bright yellow, brown veined only with age; racemes with open flowers mostly 6–15(–25) cm long, usually longer than subtending leaf:

Most petioles on a plant 1–2,5 cm long: petals mostly 9–20 mm long, 5–10 mm wide.... .....subsp. *italica*

Most petioles on a plant 0,3–1,2 cm long: petals mostly (7–)9–12 mm long, 5–7 mm wide..... (b) subsp. *arachoides*

(a) subsp. **micrantha** *Brenan* in Kew Bull. 13 : 241 (1958); in F.T.E.A. Legum.-Caesalp.: 65 (1967); Schreiber in F.S.W.A. 59 : 11 (1967). Type: Kenya, Turkana distr., *Padwa* 144 (K, holo.).

C. obovata var. *pallidiflora* Dinter in Feddes Repert. 15:355 (1918). Type: South West Africa, Okahandja distr., Okahandja, *Dinter* 366 (SAM, isosyn.!).

Stems appressed pubescent with fine, straight hairs lying parallel with the stem surface. *Leaves:* stipules 3,5–5 mm long; petioles mostly 0,9–2,3(–2,5) cm long including basal pulvinus; leaflets in (5–)6–7(–8) pairs, appressed pubescent (hairs as for stem), apices usually mucronate. *Racemes* (2–)3–5,5(–8) cm long, usually shorter than subtending leaf when lowest ovaries commence enlargement. *Petals* 5–7(–9) mm long, (2,7–)3,5–4,5 mm wide, pale yellow to yellowish-white, often brown-veined in age; largest anthers 5–6 mm long. *Ovaries* densely appressed pubescent (hairs straight, lying flat against pericarp); style 3–4 mm long, bent at 70°–90° to ovary; stigma exceeding style width, asymmetrically trumpet-shaped. *Pods* with sparse, appressed straight hairs. Fig. 18 : 4/2.

Recorded from India, Socotra and Africa. In Africa the subspecies occurs in Senegal, Mali, the Tibesti Mts. of the Sahara, Ethiopia, Somalia, Uganda, Kenya, Tanzania, Botswana, South West Africa and doubtfully Angola. In Ethiopia and Somalia it is rare and sympatric with the commoner subsp. *italica*; in Tropical East Africa, as in India, it is usually the only subsp. present, except for some plants from isolated localities in Kenya that must be placed with subsp. *italica*. In Botswana and South West Africa it is northern, but within these limits, southernmost records overlap with subsp. *arachoides*. It is not known from eastern South Africa.

S.W.A.—1713 (Swartbooisdrif): 32 km S. of Orupembe, Rivier am Weg nach Sarusas, *Giess & Leippert 7445* (WIND). 1813 (Ohopoho): near Ohopoho, *De Winter & Leistner 5291*. 1918 (Grootfontein): Grootfontein, *Schoenfelder 981*. 2016 (Otjiwarongo): 8 km S. of Elandsfontein, *Tölken & Hardy 848*. 2115 (Karibib): Omaruru near Messumberge, *Giess 9140* (WIND). 2214 (Swakopmund): Weisser Berg des Gungochoab, *Jensen 110* (WIND). 2314 (Sandwich Harbour): N. of Kuiseb at Gobabeb, *Jensen 164* (WIND). 2317 (Rehoboth): farm Buellsport, *Strey 2461*.

Brenan (1958, 1967) tentatively referred *Burtt Davy* 7040 from the Transvaal to subsp. *micrantha*, but re-study has provided evidence that this specimen is subsp. *arachoides*.

Plants develop prostrate to decumbent stems that spread to form more or less circular clumps 0,5–1 m in diameter by 30–40 cm in height. They occur generally in exposed, extreme habitats in granite/gravel, red sandy, or limestone soils. Morphologically this subspecies is remarkably homogeneous.

(b) subsp. **arachoides** (*Burch.*) *Brenan* in Kew Bull. 13 : 242 (1958); Schreiber in F.S.W.A. 59 : 11 (1967). Type: Griqualand West, Asbestos Mts., Kloof village, *Burchell* 1680 (K, holo.).

Cassia arachoides Burch., Trav. 1 : 341 (1822); Harv. in F.C. 2 : 272 (1862). *C. obovata* sensu Burtt Davy, Fl. Transv. 2 : 324 (1932). *C. obovata* Collad. var. *mucronata* Burtt Davy, Fl. Transv. 2 : 325 (1932). Type: Transvaal, Barberton, near Queen's River, *Galpin* 750 (K, holo.; PRE, NH).—var. *pilosa* Burtt Davy, l.c. : 325 (1932). Type: Transvaal, Pilgrim's Rest, *Rogers* 22504 (K, holo.; PRE).

Stems ± glandular and viscid to eglandular with short, thick, patent hairs becoming ± glabrescent with age, OR appearing glabrous but with densely packed, microscopic, straight or curved hairs, OR densely pilose with long slender, patent hairs. *Leaves:* stipules (5–)6–7(–8) mm long; petioles mostly (0,3–)0,6–1(–1,3) cm long including basal pulvinus; leaflets in (3–)4–6(–9) pairs, pubescent to glabrescent with scattered, short patent hairs, OR appearing glabrous but with sparse or dense, microscopic, patent or curved hairs, OR densely pilose with long patent hairs; apices emarginate, rounded or evidently mucronate. *Racemes* (4–)7–14(–22) cm long, usually exceeding length of subtending leaf when lowest ovaries commence enlargement. *Petals* 7–12 mm long, 5–7 mm wide, bright yellow, becoming brown-veined only with age; largest anthers ± 8 mm long. *Ovaries* glabrous, OR densely pubescent with short patent or curved microscopic hairs, OR densely villous with evident straight, slender, patent hairs; style 6–7 mm long, ± circinnate; stigma hardly wider than style, narrowing apically into a small ± circular to elliptic aperture. *Pods* glabrous, OR pubescent with microscopic patent or curved hairs, OR densely to sparsely villous with slender, straight, patent hairs. Fig. 18 : 4/1; 19 : 4.

Recorded from Mozambique, Rhodesia, South West Africa, Botswana, Swaziland and the four provinces of the Republic of South Africa. It is not known from Lesotho. In South West Africa and

Botswana there is some overlap with plants of subsp. *micrantha*. One specimen (*De Winter & Leistner* 5657) from near the Kunene River (1712-AB) shows characters of both subspecies suggesting hybridization is possible between them, but such intermediates appear infrequent.

Subsp. *arachoides* is far more variable than subsp. *micrantha*. Brenan recognized four forms within it. Work for the present account has shown that three rather clearly defined groups, based mainly on differences in indumentum, and with more or less distinct areas of distribution, may be differentiated within it. The subspecies, wherever it grows, is representative of dry habitats, but plants from South West Africa, Botswana and the northern Cape reflect in their morphology, features associated with drier environments than do plants from Swaziland and eastern South Africa. In the northern Transvaal densely pilose plants are readily distinguished from representatives of either of the other groups.

Group 1 from South West Africa, Botswana, the western Transvaal, the Orange Free State and the northern Cape, is typical of subsp. *arachoides*. Plants appear glaucous, are more or less glandular in the young parts and have a rather sparse indumentum of short, thick, patent hairs. Leaflets are usually emarginate or rounded. Ovaries and pods are glabrous. The bulk of subsp. *arachoides* falls within this group, as does the type of the subspecies.

Group 1.

S.W.A.—2017 (Waterberg): Waterberg Plateau, *Boss sub TRV 35008*. 2116 (Okahandja): Quickborn farm, *Bradfield 58*. 2118 (Steinhausen): near Okamatangara, *Schwerdtfeger 4182* (WIND). 2217 (Windhoek): Windhoek, municipal area, *Giess & Mueller 244* (WIND). 2218 (Gobabis): 72 km N.W. of Gobabis on rd. to Okahandja, *De Winter 2460*. 2317 (Rehoboth): farm Bergland-Arovley REH. 52, *Walter 190* (WIND); near Rehoboth, *Rodin 2767*.

TRANSVAAL.—2330 (Tzaneen): Woodbush near Letaba, *Wager sub TRV 22982*. 2428 (Nylstroom): Naboomspruit, Mosdene, *Galpin M 101*. 2526 (Zeerust): Zeerust, *Thode A 1401*. 2528 (Pretoria): Rust de Winter, *Pole Evans 3875*. 2725 (Bloemhof): S.A. Lombard Nature Reserve, *Leistner 53*. 2726 (Odendaalsrus): ± 2 km S. of Makwassie on rd. to Kommandodrift, *Scheepers 1510*.

O.F.S.—2825 (Boshof): between Sandfontein & Boshof, *Schweickerdt 1100*. 2924 (Hopetown): near Luckhoff, *Werger 235*.

CAPE.—2520 (Mata-Mata): Kalahari Gemsbok National Park, *Brynard 375*. 2624 (Vryburg): Armoedsvlakte, *Burtt Davy 11724*. 2723 (Kuruman): Kuruman, *La Grange 7*. 2821 (Upington): 64 km N.W. of Upington, *Lang sub TRV 31711*. 2824 (Kimberley): Schmidt's drift, *Acocks & Hafström H 1019*. 2922 (Prieska): Prieska, *Bryant J 178*.

Group 2 from Mozambique, Rhodesia, Swaziland, the eastern Transvaal and Natal, from 19°S (or perhaps further north) to 29°S and from approximately 29°–33°E, comprises green plants that appear glabrous, but which on microscopic examination are revealed as possessing a close indumentum of very small, straight patent, or curved, hairs. Leaflets are generally evidently mucronate. Ovaries and pods are densely and sparsely pubescent respectively with microscopic straight or curved hairs. Occasional plants from Barberton and Natal produce pods in which the median line of crests is poorly marked or lacking (Burtt Davy's var. *mucronata* in Fl. Transv. 2 : 325, 1932). Brenan's variants 2, 3 and some of 4, (Kew Bull. 13 : 243, 1958) fall within this group.

Group 2.

TRANSVAAL.—2329 (Pietersburg): between Louis Trichardt & Vivo, *Werdermann & Oberdieck 1967*. 2330 (Tzaneen): Elim, farm Spelonkwater, *Obermeyer 781*. 2431 (Acornhoek): ± 4 km E. of Skukuza on Lower Sabie rd., *Codd & De Winter 5009*. 2530 (Lydenburg): Lordskraal, *Barnard & Mogg 966*. 2531 (Komatipoort): Barberton, Queen's River, *Galpin 750*.

SWAZILAND.—2631 (Mbabane): Sipofaneni, *Compton 26296*.

NATAL.—2732 (Ubombo): Mkuzi Game Reserve, *Ward 3613*. 2831 (Nkandla): Umfolozi Game Reserve, *Leibnitz, Fakude & Hancox 8*.

Group 3 from the northern Transvaal, from approximately 22°–24°S and from approximately 28°–30°30′ E, comprises plants that are evidently pilose all over. Leaflets appear slightly smaller and more numerous than in the other groups; petioles are very short; racemes are long and flowers are large for subsp. *arachoides*, but dimensions do not reach those of subsp. *italica*. Leaflets are usually mucronate and rounded or emarginate. Ovaries and pods are densely or sparsely pilose respectively. The crests are poorly marked and appear late in the development of the fruits.

Group 3.

TRANSVAAL.—2228 (Maasstroom): between Tolwe & Swartwater, *Schlieben & Hartmann 12058*. 2329 (Pietersburg): near Pietersburg, *Hutchinson 2287*. 2229 (Waterpoort): road from Soutpan to Waterpoort, *Obermeyer, Schweickerdt & Verdoorn 265*.

Plants of subsp. *arachoides*, no matter to which group they belong, generally favour more or less open, often very exposed, disturbed situations on a variety of usually porous, readily draining soils. Thus they occur in sandveld, in open areas in bushveld, in disturbed areas along roadsides and less frequently in fallow land. They are said to carry eelworm infection. Roots and legumes are used as a strong purgative or to alleviate urinal troubles. The aerial parts are poisonous to cattle and sheep. Common names are Eland's pea, Wild Senna, Swartstorm and Wilde Ertjie.

5. **Cassia occidentalis** *L.*, Sp. Pl. 1 : 377 (1753); Harv. in F.C. 2 : 272 (1862); Oliv. in F.T.A. 2 : 274 (1871); Forbes in S. Afr. J. Sci. 18 : 343 (1922); Bak. f., Leg. Trop. Afr. 3 : 635 (1930); Burtt Davy, Fl. Transv. 2 : 324 (1932); Henkel, Woody Pl. Natal 220 (1934); Steyaert in F.C.B. 3 : 513 (1952); Mendonça & Torre in C.F.A. 2 : 181 (1956); Henderson, Malayan Wild Flowers (Dicotyledons) fig. 98 : 99 (1959); Compton in J.S.Afr. Bot., Suppl. 6 : 46 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 78, fig. 14 (1967); Schreiber in F.S.W.A. 59 : 12 (1967). Type: a cultivated plant in *Herb. Clifford* (BM, syn.).

Annual, or short-lived perennial, herb or sub-shrub with erect, simple, or sparsely branching stems (0,5–)1–1,8(–2) m high. *Stems* ridged, glandular, especially in the hollows between the ridges, and subglabrous when young, becoming ± terete and glabrous with age. *Leaves* densely glandular and sparsely pubescent when young becoming sparsely glandular and ± glabrous with age; petiole and rhachis 12–15(–20) cm long; stipules asymmetric, ovate-lanceolate, acute, ± 7 mm long, ± 3 mm wide, caducous; petiole (4–)5(–7) cm long including basal pulvinus; petiolar gland at distal end of pulvinus, sessile, hemispherical, globose or ovoid, blackish, ± 1 mm in diameter; rhachis without special glands; leaflets in 4–5 (–6) pairs, ovate to ovate-elliptic, occasionally lanceolate, (2,5–)4–10 cm long, (1,5–)2–4 cm wide, uppermost pair largest, bases rounded to asymmetric, apices acute to acuminate (sometimes obtuse or rounded on very young shoots), margins white-ciliate, almost pectinate, surfaces densely glandular when young, becoming ± eglandular adaxially and sparsely glandular abaxially with age. *Inflorescences* in axils of upper leaves, racemes short, almost umbellate, 2–4-flowered; peduncles, at flowering, 3–5 mm long, at fruiting to 8 mm; bracts 9–16 mm long, linear, acuminate; pedicels, at flowering, ± 5mm long, at fruiting ± 15 mm long, sparsely to densely pubescent. *Sepals* obtuse, usually glabrous. *Petals* obovate, 0,9–1,5 mm long, 0,5–0,6 mm wide, pale yellow with brown venation that becomes conspicuous with age. *Stamens* 10: usually 4 staminodal (3 adaxial, 1 abaxial) linear, flattened, 6 functional of which 2 lateral-abaxial are largest, dehiscence porose. *Ovaries* densely velutinous, hairs white; stigma hooded, ±1 mm long, fringed with short, soft white hairs. *Pods* linear, straight or slightly curved upwards, 8–13 cm long, 0,5–0,8 cm wide, compressed, septate, sutures thickened, green or yellowish, valves sparsely pubescent with curved, white-appressed hairs, not or tardily dehiscent, many-seeded. *Seeds* laterally compressed, suborbicular or elliptic in face view, 4,5–5 mm long, 3,75–4,5 mm wide; testa greyish-brown with minute raised dots; areole on each face oblong to elliptic, finely horizontally striated, ± 2,5 mm long, ± 1,5 mm wide. Fig. 16 : 5; 18 : 5; 19 : 5.

A pantropical weed of disturbed areas, especially damp sandy alluvium along river banks, coastal sand flats, grassland, roadsides, old lands or areas of of human habitation.

S.W.A.—1718 (Kuring-Kuru): Okavango Native Territ., 10,8 km E. of Makambu Camp on rd. to Katwitwi, *De Winter 3869*. 1721 (Mbambi): Banks of Okavango River below Diyona Camp beyond Nyangana Mission Station, *De Winter 4150*.

TRANSVAAL.—2231 (Pafuri): Kruger National Park, junction of Pafuri & Limpopo Rivers, *Codd 5409*. 2330 (Tzaneen): Tzaneen, *Rogers 12406*. 2526 (Zeerust): Zeerust, *Jenkins 13947*. 2530 (Lydenburg): Nelspruit, *Rogers 2388*.

SWAZILAND.—2631 (Mbabane): Manzini distr., Tulwane, *Karsten s.n.*

NATAL.—2632 (Bela Vista): Ndumu Game Reserve, old fields between Usutu Forest patches, *Pooley 405* (NH, NU). 2732 (Ubombo): N. bank of Mkuze River at road bridge on Mkuze-Candover rd., *Gordon-Gray 4684* (NU). 2830 (Dundee): 11 km from Muden on Keats Drift rd., *Edwards 2793*. 2831 (Nkandla): Umfolozi Game Reserve, Black Umfolozi River, *Mthonti 14*. 2832 (Mtubatuba): Hluhluwe Game Reserve, *Ward 2221*. 2930 (Pietermaritzburg): Nagle Dam, *Wells 1271; 1334* (NU). 2931 (Stanger): Umhlanga Rocks, *Ross 1599* (NU, NH). 3030 (Port Shepstone): Margate, *Rump s.n.* (NH).

Known from the Cape Province only under cultivation: East London Park, coll. *John Wood* in Herb. E. E. Galpin 5693.

Plants have been variously described as herbs, suffrutices, or shrubs, and as annuals, or short-lived perennials. Duration and extent of growth seems to depend upon geographical situation and micro-environment. Despite these variations and its extensive range, *C. occidentalis* is remarkably uniform and readily recognized. Its only close relative, *C. sophera* L., is known from the flora area only rarely and generally under cultivation. Bentham, in Trans. Linn. Soc. Lond. 27 : 509, 533 (1871), Irwin in Mem. N.Y. Bot. Gard. 15 : 119 (1966) and Brenan in F.T.E.A., Legum.-Caesalp. : 80 (1967), have dealt with the relationships of these two species. Irwin (l.c.) commented upon their growth patterns

under cultivation in Tropical America and the probable area of origin of these species. *C. occidentalis* is widely used medicinally (see Watt & Breyer-Brandwijk, Medicinal & Poisonous Plants of S. & E. Africa, ed. 2, 1962), while its seeds yield coffee or form a fowl food. The plant's unpleasant smell is reminiscent of the odour of *Cassia didymobotyra* and accounts for its common name of "Stinking Weed".

6. **Cassia sophera** *L.*, Sp. Pl. 1 : 379 (1753); Benth. in Trans. Linn. Soc. Lond. 27 : 532 (1871); Oliv. in F.T.A. 2 : 274 (1871); Bak.f., Leg. Trop. Afr. 3 : 636 (1930); De Wit in Webbia 11 : 265 (1955); Irwin in Mem. N.Y. Bot. Gard. 15 : 119–121 (1966). Type: Sri Lanka, *Hermann* (BM, lecto.).

Perennial with slender slightly woody ± unbranched stems forming an erect shrub (0,5)2–3 m high. *Stems* slightly flattened and ± longitudinally striated when young, terete in age, glabrous. *Leaves*: petiole and rhachis 8–10 cm long; stipules triangular, ± 3 mm long, ± 1 mm wide at base, early caducous; petiole 1–2,5 cm long including basal pulvinus; petiolar gland at distal end of pulvinus, sessile, rounded to somewhat pointed, blackish, 1,5–2 mm long, ± 1 mm wide; rhachis without special glands; leaflets in (4–)8(–10) pairs, lanceolate, 2–6 cm long, 0,4–1 cm wide, uppermost pair usually not largest, bases ± symmetric, rounded, apices acute, margins finely ciliolate when young, becoming glabrous with age, surfaces glabrous, lateral veins looping sub-marginally. *Inflorescences* in axils of upper leaves, racemes short, almost umbellate, (1–)3–5-flowered, peduncles at flowering 1,5–2,5 cm long, at fruiting 3 cm long; bracts 5–6 mm long, linear, subacute to obtuse, caducous; pedicels, at flowering ± 2 cm long, at fruiting stouter, hardly longer, glabrous. *Sepals* obtuse, sparsely pubescent or glabrous. *Petals* obovate, shortly stalked, 1–1,5 cm long, 0,4–0,5 cm wide, yellow, prominently brown veined. *Stamens* 10: usually 4 staminodal (3 adaxial flattened, ±reniform, yellow, central-abaxial linear, brown), 6 functional, ± equal in size, brown, filaments ± 2 mm long, adjacent shortly fused to one another basally, dehiscence porose. *Ovaries* glabrous; style 1–1,5 mm long; stigma hollow, shortly white-ciliate. *Pods* linear, straight or slightly curved upwards, 4–5 cm long, ± 0,5-0,7 cm wide, subcylindrical or slightly turgid, internally septate, sutures not thickened, valves brown, glabrous, not or tardily dehiscent, many-seeded. *Seeds* ± compressed, lying at right angles to long axis of pod, asymmetrically ovate, elliptic or ± circular in face view, 3–4 mm long, 2–3 mm wide; testa dull olive brown, outer layer cracking and peeling off; areole on each face oblong, elliptic or ovate, ± 2 mm long, ± 1 mm wide.

This species is common in Asia, rarer in America and Africa, except West Africa where it is fairly frequent. Now regarded as a pantropical weed, its country of origin is uncertain.

One record of plants growing as escapes from cultivation warrants the inclusion of this species here.

NATAL.—2930 (Pietermaritzburg): Cleland, Murray Road, *Borthwick 15* (NU).

C. sophera may be distinguished from *C. occidentalis*, its nearest relative, by its more graceful, delicate form, its more slender, narrower leaflets with usually more leaflet pairs to the rhachis, its longer peduncles and pedicels and its pods which are much shorter than those of *C. occidentalis* and without clearly thickened sutures.

7. **Cassia hirsuta** *L.*, Sp. Pl. 1 : 378 (1753); L.f., Suppl. 231 (1781); Lam. Encycl. 1,2 : 647 (1785); Steyaert in F.C.B. 3 : 513 (1952); Henderson, Malayan Wild Flowers (Dicotyledons) fig. 94, 96 (1959); Brenan, F.T.E.A. Legum.-Caesalp. : 80 (1967). Type: a cultivated plant in *Herb. Clifford* (BM, holo.).

C. tomentosa sensu H. M. L. Forbes in S. Afr. J. Sci. 18 : 342 (1922) non L.f. (exsiccata and parts of description).

Short-lived perennial shrub with erect, sparsely branched stems up to (1–)1,5–2,7 m high. *Stems* ridged, villous when young with dense straight slightly upward pointing, greyish-white hairs, becoming ± densely pubescent and sometimes ± terete with age. *Leaves* densely villous: petiole and rhachis (8–)11–20 cm long; stipules linear, narrowly acute to acuminate, up to 15 mm long, ± 1 mm wide, sparsely villous, tardily deciduous; petiole 2,5–4 cm long including basal pulvinus; petiolar gland at distal end of pulvinus, sessile, cylindric, finger-like, slightly narrowed at base, blackish, ± 2 mm long; rhachis without special glands; leaflets in 3–5 pairs, elliptic, occasionally ovate-

elliptic or ovate, (2–)5–7,5 cm long, 1,4–4,5 cm wide, uppermost pair largest, bases asymmetric, occasionally rounded, apices acute to subacuminate, often narrowing rather sharply, margins fringed, the hairs often extending from the leaf surfaces which are ± densely villous with straight greyish-white hairs. *Inflorescences* in axils of middle and upper leaves, ± 3 cm long, 3–6-flowered; peduncles, at flowering, (4–)15–20 mm long, at fruiting, occasionally up to 25 mm long; bracts ± 10–12 mm long, resembling stipules; pedicels, at flowering, ± 10 mm long, densely white-villous, at fruiting ± 20 mm long, sparsely villous. *Sepals* obtuse, densely villous abaxially. *Petals* obovate (10–)13–15 mm long, deep orange yellow, becoming conspicuously brown-veined with age. *Stamens* 10: usually 3+(1?) staminodal (ad- and abaxial) ± 2–3 mm long, obovate, flattened, 7 or 6 functional of which the 2 lateral-abaxial are largest, central-abaxial reduced, ± filiform, most often staminodal. *Ovaries* 4-angled, sericeous with coarse, white, ± flattened, rather matted hairs; style 1–2 mm long, broadening distally into a markedly hooded, dark coloured, almost glabrous stigma. *Pods* linear, mostly curving downwards, 10–15 cm long, 0,3–0,6 cm wide, septate but not obviously so, sutures thickened, green, valves sericeous with long straight whitish hairs, dehiscent, many-seeded. *Seeds* compressed against one another along length of pod, not laterally flattened as is usual in the genus, ± 4-angled, ± 3 mm long, 1–2 mm wide, testa dull greenish-brown with a black line from the hilum, areole 1 per lateral face, elliptic-oblong, ± 1,3 mm long, ± 1 mm wide. Fig. 16 : 7; 18 : 7; 19 : 7/1, 7/2.

Originally from South America, this species has become naturalized in parts of the Old World tropics. In Africa it is known from Guinea, Uganda, Burundi, Zaire, Tanzania, Malawi, Angola, Rhodesia and South Africa. In the Flora area it is best represented along the Natal coast having spread from Durban where it appears to have been introduced about 1893. A second point of introduction was Nelspruit, where seed from Uganda was planted in 1931; from here, also, plants have escaped from cultivation.

Plants occur as weeds, especially near sites of human habitation where there has been destruction of the natural vegetation. They favour riparian situations where sandy alluvium has been deposited, but are also to be found in disturbed grassland or forest margin.

TRANSVAAL.—2531 (Komatipoort): Nelspruit Research Station, *Liebenberg 2595*.

NATAL.—2831 (Nkandla): Empangeni Village, *Venter 2448* (NH, BLFU). 2930 (Pietermaritzburg): Albert Falls, *Comins 414* (NU); Cato Ridge, *Edwards 13* (NU); Isipingo Flats (S.W.) Ubogintwini Valley, *Ward 6275*. 2931 (Stanger): Stanger, *Pentz & Acocks 10337*. 3030 (Port Shepstone): Umkomaas, *Pole Evans 3551*.

Because of its dense indumentum *C. hirsuta* has been confused, in Natal at least, with another S. American species, *C. tomentosa* L.f. which has become naturalized in South West Africa, the Transvaal and the Cape Province. These species are best distinguished by: the petiolar gland of *C. hirsuta* that is absent in *C. tomentosa*; the rhachidal glands between all or most of the leaflets in *C. tomentosa* that are lacking in *C. hirsuta*; the nature of the indumentum which is villous and coarse in *C. hirsuta* (hairs long, straight, shaggy), tomentose and fine in *C. tomentosa* (hairs soft, intertwined, downy).

8. **Cassia floribunda** *Cav.*, Descr. 132 (1802); Sim. For. Fl. Cape Col. 207 (1907); Brenan in F.T.E.A. Legum.-Caesalp. : 70 (1967). Type: cultivated in Madrid Bot. Garden, originally from Mexico, Puebla de los Angeles. Whereabouts unknown.

C. laevigata Willd., Enum. Hort. Berol. 441 (1809); Benth. in Trans. Linn. Soc. Lond. 27 : 527 (1871); Oliv. in F.T.A. 2 : 274 (1871); Forbes in S. Afr. J. Sci. 18 : 343 (1922); Bak. f., Leg. Trop. Afr. 3 : 634 (1930); Burtt Davy, Fl. Transv. 2 : 324 (1932); Henkel, Woody Pl. Natal 221 (1934); Steyaert in F.C.B. 3 : 511 (1952). Type: cultivated in Berlin Bot. Garden (? B-W, holo.).

Short-lived perennial sub-shrub, shrub, or treelet with erect stem branching in the upper half to form an irregular to ± rounded crown, 1–2(–4) m high. *Stems* terete, glabrous. *Leaves:* petiole and rhachis 6,5–10 (–19) cm long: stipules linear, acute, up to 10 mm long, 1–1,5 mm wide, glabrous caducous; petiole (2,5–)3–4,5 cm long including basal pulvinus, petiolar gland lacking; rhachis channelled adaxially, with a sub-sessile cylindric, elliptic or obovate, dark gland between each pair of leaflets, or sometimes excluding the uppermost; leaflets in (2–)3–4 pairs, elliptic or ovate, (2,5–)5–7,5(–10,5) cm long (1,5–)2–3,5 cm wide, uppermost pair largest, bases broadly cuneate, often slightly asymmetric, apices narrowing suddenly into a short or long narrowly acute to acuminate apex, margins yellow, glabrous, surfaces glabrous. *Inflorescences* in axils of upper leaves, racemes ± corymbose, 6–10 cm long, forming a pseudo-panicle distally

on branches; peduncles, at flowering, 2,5–5,5 cm long, at fruiting, generally 3–4(–6,5) cm long; bracts ± 5 mm long, ± 1,5 mm wide, resembling stipules; pedicels, at flowering, 0,7–1,3 mm long, at fruiting 1,7–3,5 cm long, glabrous. *Sepals* obtuse, glabrous. *Petals* obovate to obovate-suborbicular, 1–1,4 cm long, 0,7–1,2 cm wide, deep yellow sometimes conspicuously brown-veined. *Stamens* 10: 3 staminodal (adaxial), flattened, ± oval to sub-orbicular in face view, ± 3 mm long including short filament; 7 functional (4 lateral medium, 2 lateral-abaxial large, central-abaxial medium) dehiscence porose. *Ovaries* glabrous; style 3–4 mm long, glabrous, ± straight; stigma slightly narrowed, hollowed, fringed with a narrow laciniate membrane. *Pods* very shortly stalked, terete and slightly inflated at maturity, usually shortly beaked, 7–10 cm long, 1–1,3 cm in diameter, light to dark brown, transversely septate within, many-seeded, tardily dehiscent. *Seeds* laterally compressed, oblong-elliptic, ± 5 mm long, ± 3 mm wide, testa shining olive-brown, smooth, areoles lacking. Fig. 16 : 8; 18 : 8; 19 : 8; 20 : 8.

This native American species is now pantropic in distribution. In the Flora area it is probably the most widespread, frequent and best known of the naturalized Cassias. Plants are weeds that establish themselves in disturbed areas along roadsides, in forest margins, along streambanks, in alluvial sand or silt, in neglected gardens or in fallow lands; occasionally they occur as undergrowth plants in plantations of eucalypts or wattles in particular.

TRANSVAAL.—2229 (Waterpoort): 13 km N. of Louis Trichardt on rd. to Messina, *Vahrmeijer 1509*. 2230 (Messina): Tshakhuma, *Van Warmelo 5159/9*. 2329 (Pietersburg): 1 km S. of Houtbosdorp, *Van Vuuren 1635*. 2330 (Tzaneen): Westfalia Estate, Duiwelskloof, *Scheepers 13*. 2430 (Pilgrim's Rest): Blyderiver Camp, *Van der Schijff 5523*. 2527 (Rustenburg): Buffelspoort 668, *Turner 49*. 2528 (Pretoria): Pretoria, behind Riviera Public School grounds, *Smith 6023*. 2531 (Komatipoort): White River, *Nel 131*.

SWAZILAND.—2631 (Mbabane): Mbabane, *Miller S/202*; Ubombo Mts., 7 km S. of Stegi, *Keith s.n.*

NATAL.—2731 (Louwsburg): margins of Ngome Forest, *Gerstner 5145*. 2732 (Ubombo): Pongola, *Gerstner 2468* (NH). 2831 (Nkandla): Eshowe, *Lawn 589* (NH). 2930 (Pietermaritzburg): Nagle Dam, *Wells 1037* (NU). 2931 (Stanger): 13 km from Doornkop on Mapumulo rd., *Edwards 1712*. 3030 (Port Shepstone): Umbogintwini Valley, *Ward 6161*.

CAPE.—3129 (Port St. Johns): Intafufu River, *Mills 398*. 3221 (Merweville): Prince Albert Road, *Burtt Davy 12736*. 3227 (Stutterheim): Pirie Dam, *Rhodes Univ. Bot. Exped. 285* (RU). 3228 (Butterworth): Bashee River Mouth, The Haven, *J.L. Gordon-Gray 265 1108* (NU). 3318 (Cape Town): Morning Star Farm near Lourens River, Stellenbosch, *Parker 4940* (NBG). 3326 (Grahamstown): Settler's Dam near Grahamstown, *Bayliss BRI B 147*.

The species is easily recognized by the glabrous, herbaceous texture of the plant; the leaves with usually 3 or 4 pairs of rather large elliptic or ovate, acute to acuminate leaflets with a rhachidal gland between each pair, sometimes excepting the uppermost; the brilliant yellow flowers and the cylindric, more or less inflated, internally septate pods that are tardily dehiscent.

C. floribunda belongs to the same series as do *C. tomentosa* L.f., and *C. bicapsularis* L. It is, therefore, perhaps not surprising that in the Flora area where plants of *C. floribunda* grow sympatrically with plants of either of these species, intermediates have been found (for list of putative hybrids see the end of this account of *Cassia*, p. 108). Irwin in Irwin and Turner, Am. J. Bot. 47 : 315 (1960), states that *C. laevigata*, i.e. *C. floribunda*, and *C. tomentosa* are freely interfertile, which supports the contention that the intermediates are inter-specific hybrids. Like most species of the genus, *C. floribunda* is regarded as unpleasantly smelling and has its own significance in folklore and native medicine.

9. **Cassia corymbosa** *Lam.*, Encycl. 1 : 644 (1785); Benth. in Trans. Linn. Soc. Lond. 27 : 526 (1871). Type from South America (probably P–LA).

Perennial with woody branching stems forming an erect shrub 2–3 m high. *Stems* terete, faintly longitudinally striated, glabrous. *Leaves*: petiole and rhachis 2,5–6 cm long; stipules linear, acute to acuminate, 3–4 mm long, ± 0,5 mm wide, early caducous, each scar on a small cushion; petiole 1,5–3 cm long, including basal pulvinus, petiolar gland lacking; rhachis channelled adaxially with a stalked, clavate, greenish gland between lowest pair of leaflets only; leaflets in 2–3 pairs, lanceolate, (2–)3–6 cm long, 0,6–1,5 cm wide, uppermost pair largest, bases slightly asymmetric, broadly cuneate to rounded, apices acute, margins yellow, glabrous, surfaces glabrous. *Inflorescences* axillary, towards the ends of primary, or short axillary branches, forming pseudo-panicles, racemes 4,5–6 cm long at flowering, slightly longer and stronger at fruiting, usually ± equalling subtending leaves; bracts ± 2 mm long, ± 0,5 mm wide

at base, acerose, ± pubescent with curved hairs, caducous; pedicels at flowering, up to 2,5 cm long, ± sparsely pubescent with curved hairs, stronger but hardly longer at fruiting. *Sepals* obtuse, margins shortly ciliate. *Petals* obovate, 1–1,5 cm long, ± 1 cm wide, bright yellow, brown-veined with age. *Stamens* 10: 3 staminodal (adaxial) ± oblanceolate, flattened, ± 4 mm long including filament; 7 functional (4 lateral medium, 3 abaxial large, of which the central is slightly shorter, longest filament 8–10 mm), dehiscence porose. *Ovaries* pubescent with white curved, appressed hairs especially along valves, sutures ± glabrous; styles 3–4 mm long, ± straight, usually lying at right angle to pod, glabrous; stigmas narrowed, slightly hooded, minutely ciliate. *Pods* slightly upwardly curved, ± 10 cm long, shortly stalked, apically rounded, terete, inflated, valves membranous, not or tardily dehiscent. *Seeds* laterally compressed, elliptic or elliptic-ovate, ± 5 mm long, 3–4 mm wide, testa brown, smooth, areoles lacking. Fig. 16 : 9; 18 : 9; 19 : 9.

One record of this alien species growing as an escape in the Flora area warrants its inclusion in this account. There is no other record known to me of its having escaped from cultivation in Africa.

CAPE.—3326 (Grahamstown): Grahamstown, *Bayliss 4445* (NBG).

The species is often grown as a garden subject in South Africa, but is not as popular as is *C. coluteoides*. The name *C. corymbosa* Hort. non Lam. has frequently been mis-applied to *C. coluteoides*. The leaf form and the shape of the staminodes distinguish *C. corymbosa* from both *C. coluteoides* and *C. bicapsularis*.

10. **Cassia tomentosa** *L.f.*, Suppl. 231 (1781); Lam., Encycl. 1,2 : 647 (1785); Harv. in F.C. 2 : 272 (1862); Oliv. in F.T.A. 2 : 274 (1871); Burtt Davy, Fl. Transv. 2 : 324 (1932); Henkel, Woody Pl. Natal 221 (1934) excl. locality; Brenan, F.T.E.A. Legum.-Caesalp. : 50 (1967). Type from South America, not located.

Perennial shrub with erect, branching, woody stems 3–4 m high. *Stems* terete, softly pubescent with short, straight, or ± curved and eventually rather matted, whitish hairs. *Leaves* discolorous, green adaxially, lighter greyish-green abaxially, softly pubescent to densely tomentose: petiole and rhachis (3–)9–12 cm long; stipules linear, acuminate, 2–3 mm long, ± 0,5 mm wide, densely pubescent, caducous; petiole 0,5–1,7 mm long including the inconspicuous basal pulvinus; petiolar gland lacking; rhachis with a sessile, cylindric, finger-like, acuminate, dark gland, 0,7–1 mm long between each pair of leaflets, these glands occasionally falling or breaking to leave a scar, or the acuminate apex abscising to leave an apical scar on the gland; leaflets in (3–)6–8 pairs, oblong, elliptic or obovate-oblong, 1,4–5 cm long, (0,6–)0,8–1,5 cm wide, uppermost pair largest, bases asymmetric, occasionally rounded, apices obtuse, occasionally broadly acute, mucronate, or almost apiculate, margins hairy, adaxial surfaces sparsely pubescent, abaxial cano-tomentose or cano-pubescent with curved or curled, ± matted hairs (grey coloration is often accentuated by the texture of the underlying leaf surface). *Inflorescences* in axils of upper leaves, 3,7–7 cm long, forming a pseudo-panicle distally on the branches; peduncles, at flowering, 2–4 cm long, at fruiting to 4,5–5 cm long; bracts 5–7(–9) mm long, 1–1,5 mm wide, lanceolate, acuminate; pedicels, at flowering, 1,3–1,7(–2,5) cm long, at fruiting, 2–2,5(–3) cm long; peduncles, bracts and pedicels densely pubescent. *Sepals* obtuse, pubescent to ± villous abaxially. *Petals* elliptic or obovate, 1,2–1,5 cm long, 0,7–1 cm wide, deep yellow becoming brown-veined with age, margins shortly white-ciliate when young. *Stamens* 10 : 3 staminodal (adaxial) ± 2 mm long, ± flattened; 7 functional (4 lateral medium, 3 abaxial large) dehiscence porose, eventually longitudinal. *Ovaries* cano-tomentose to sericeous with ± matted, fine, white, ± curled to straight white hairs; style ± 2 mm long, slightly curved, glabrous, dark; stigma slightly narrowed, hollowed, inconspicuously ciliate. *Pods* linear, straight or slightly curved, 7–11 cm long, 6–10 mm wide, compressed, faintly septate, sutures slightly thickened, valves green and cano-tomentose when young, becoming yellow, membranous and ± glabrous in age, eventually breaking down when seeds are shed, indehiscent. *Seeds* numerous, compressed against one another along length of pod, ± 3-angled, ± 5 mm long, ± 2 mm wide, testa shining brown, often with a darker line from the hilum ± round the seed, areoles lacking. Fig. 16 : 10; 18 : 10; 19 : 10/1, 10/2.

Originally from South America, this species has become naturalized in South West Africa, the Transvaal, the Orange Free State and especially the Cape, where it is particularly frequent near Grahamstown. It has been recorded for Natal by Bews (Flora of Natal & Zululand, 1921); Forbes (S. Afr. J. Sci. 18 : 342, 1922); Burtt Davy (Fl. Transv. 2 : 324, 1932) and Henkel (Woody Pl. Natal 220, 1934) but misidentification of hairy plants growing as weeds near Durban (really *C. hirsuta* L.) by an unknown worker about 1920, led to this confusion. No specimens are known from Natal, nor have living plants been located there.

S.W.A.—2217 (Windhoek): farm Niedersachsen near Windhoek, *Liebenberg 5069*.

TRANSVAAL.—2528 (Pretoria): Pretoria, *Repton 5919* (possibly under cultivation, no details given by collector). Also recorded from Pretoria by Burtt Davy, specimen not seen.

O.F.S.—2828 (Bethlehem): Bethlehem distr., farm General Will, *Liebenberg 7047*.

CAPE.—3227 (Stutterheim): Fort Cunynghame, *Galpin 2442*. 3318 (Cape Town): Cape Town, *Marloth s.n.* 3324 (Steytlerville): Gamtoos River, *Schlechter 1385*. 3325 (Port Elizabeth): Uitenhage distr., *Zeyher sub SAM 15621*. 3326 (Grahamstown): Grahamstown, "Sable Farm", *Burtt Davy 7823*. 3421 (Riversdale): Rhenoster Hills, N. of Riversdale, *Marloth 13076*. 3424 (Humansdorp): Flats, Wilde Els Bosch, *Fourcade 1367* (SAM).

C. tomentosa appears to have been an earlier introduction into S. Africa than *C. hirsuta*, for Zeyher, who died in 1858, collected the species from Uitenhage, while Burtt Davy records it from near Lydenburg in 1885 (no specimen seen by me). Burtt Davy stated that the plant was "Greedily eaten by ostriches near Grahamstown....". Significant differences by which *C. tomentosa* may be distinguished from *C. hirsuta* are given under the latter species. In Africa, *C. tomentosa* is known under cultivation in Kenya and Tanzania, but there are no known records of its having become naturalized in these countries.

Specimens that exhibit characters of both *C. tomentosa* and *C. floribunda* have been collected from Grahamstown. These suggest that in this area, where both species have become naturalized and plants are frequent, hybridization has taken place between them, the products of this genetic exchange sometimes surviving to reproductive maturity. (See also under *C. floribunda*; for list of putative hybrids see the end of this account of *Cassia*, p. 108).

11. **Cassia bicapsularis** *L.*, Sp. Pl. 1 : 376 (1753); Benth. in Trans. Linn. Soc. Lond. 27 : 525 (1871); Bak. f., Leg. Trop. Afr. 3 : 635 (1930); Steyaert in F.C.B. 3 : 511 (1952); F. White, For. Fl. N. Rhod. 120 (1962); Irwin in Mem. N.Y. Bot. Gard. 15 : 118 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 71 (1967). Type: *Herb. Linnaeus* 528.10 (LINN, syn.!).

C. transversali-seminata De Wild., Pl. Bequaert. 3 : 242 (1925).

Perennial with ± woody, branching stems forming an erect ± rounded shrub usually about 2 m high, or spreading, or scrambling to form a semi-scandent to scandent shrub with the stems much longer. *Stems* terete, faintly ridged, glabrous. *Leaves*: petiole and rhachis (2,5–)3–4 cm long, delicate; stipules linear, acute, 2–3 mm long, 0,3–0,6 mm wide, glabrous, caducous: petiole 1–2 cm long including basal pulvinus, petiolar gland lacking; rhachis channelled adaxially with a stalked clavate to subglobose, greenish or dark gland between lowest pair of leaflets only; leaflets in (2–)3 pairs, obovate, elliptic, oblong-elliptic or suborbicular, 0,9–3,2 cm long, 0,7–2 cm wide, uppermost pair largest, bases asymmetric, broadly cuneate to rounded, apices rounded or slightly emarginate, usually mucronate, margins yellow, glabrous, surfaces glabrous. *Inflorescences* axillary, numerous towards the ends of branches, but not aggregated into pseudo-panicles, racemes 6–12 cm long when in flower, 3–many-flowered, peduncles well developed, 2–5 cm long at flowering, slightly longer and stronger at fruiting, often clearly exceeding leaves; bracts ± 2 mm long, ± 0,5 mm wide at base, acerose, caducous; pedicels, at flowering, 4–7 mm long, at fruiting to 10 mm long, peduncles, bracts and pedicels glabrous. *Sepals* obtuse, glabrous or margins very minutely fringed when young. *Petals* obovate, 0,9–1,2 cm long, ± 0,5 cm wide, yellow with brown veins. *Stamens* 10 : 3 occasionally 2, staminodal, Y-shaped (obhastate), ± 4 mm long including filament; 7 functional (4 lateral medium, 2 lateral-abaxial large with filaments ± 7 mm long, central-abaxial medium), dehiscence porose. *Ovaries* glabrous, styles 2–4 mm long, glabrous, ± curved; stigmas slightly narrowed and hooded, glabrous. *Pods* ± straight, often only 5–6 cm long, apex rounded, in other respects pods and seeds as for *C. floribunda* Cav. Fig. 16 : 11.

Originally from the West Indies and western South America; cultivated and now naturalized in many parts of the tropics including Africa where it is known from Uganda, Kenya, Tanzania, Zaire, Zambia, Rhodesia, Mozambique and South Africa. In the Flora area it is known only along the Natal coast where it grows in disturbed areas as an escape, and occasionally under cultivation. It is sometimes used as a cattle kraal fence and has been known to become a pest in native areas.

NATAL.—2632 (Bela Vista): Ndumu Game Reserve, Mankobolo's Kraal, banks of Usutu River, *Pooley 641* (NH, NU). 2831 (Nkandla): Ngoye area, Umhlatuzana Hills, *Venter 3777* (BLFU). 2930 (Pietermaritzburg): Isipingo Beach, *Ward 883*. 3030 (Port Shepstone): Port Shepstone, *Sidey 3219*.

Irwin (Mem. N.Y. Bot. Gard. 15 : 118) refers to the "three phases" within *C. bicapsularis* in Central and South America and the West Indies. He states that Linnaeus gave "India" as the province for his species (presumably in error for "India occ.") and that his type agrees with "the glabrous, small-flowered type" prevailingly occurring in the West Indies. In my opinion it is with Linnaeus' type that the South African plants also agree, despite some difference in the shape of the leaflet apices.

In the Flora area *C. bicapsularis* has been much confused with two other American aliens, *C. coluteoides* Collad. and *C. corymbosa* Lam., both originally introduced under cultivation and still popular garden subjects, now naturalized to a limited extent in certain restricted areas. The confusion no doubt arose since some authorities treated *C. coluteoides* as synonymous with *C. bicapsularis* (Benth., 1871), or as a variety of this taxon (var. *tenuifolia* Benth. l.c.). Nomenclatural confusion has been worse confounded by the constant application to *C. coluteoides* of the horticultural names *C. floribunda* and *C. corymbosa*, both of which, when applied in the sense of Cavanilles and Lamarck respectively, represent valid species within the genus.

C. bicapsularis may be distinguished from *C. coluteoides* by its leaves bearing not more than 3 pairs of leaflets; its pedicels, at flowering, not exceeding 1 cm in length; its Y-shaped staminodes; its glabrous ovaries; its usually smaller flowers more clearly marked with brown, and the more markedly stipitate (clavate) rhachidal glands. *C. bicapsularis* has the rounded or obtuse leaflet apices that characterize *C. coluteoides*, but on this character both these species are readily distinguished from *C. floribunda* Cav. *non* Hort. and *C. corymbosa* Lam. *non* Hort. in which the leaflet apices are acute.

12. **Cassia coluteoides** *Collad.*, Hist. Cass. 102, t. 12 (1816). Type from South America.

C. bicapsularis L. var. *tenuifolia* Benth. in Trans. Linn. Soc. Lond. 27 : 525 (1871), as *tenufolia*. Type from Brazil (K, holo.). *C. bicapsularis* sensu H.M.L. Forbes in S. Afr. J. Sci. 18 : 344 (1922), non L. *C. floribunda* Hort., non Cav. *C. corymbosa* Hort., non Lam.

Perennial with several, occasionally one, erect, woody, branching stem forming a shrub 2–4 m high with ± rounded, dense leafy crown. *Stems* terete, finely and softly pubescent with short, white, appressed, curved, or ± straight, patent hairs when young, becoming glabrous, and ± lenticellate with age. *Leaves*: petiole and rhachis 4,5–7 cm long; stipules linear, acute, 7–8 mm long, ± 1 mm wide, sparsely pubescent, deciduous, usually not early caducous; petiole 1,5–3 cm long including basal pulvinus, petiolar gland lacking; rhachis channelled adaxially with a sessile, or sub-sessile, globose or clavate, green or yellowish gland between the lowest pair of leaflets only; leaflets in 4 or 5 pairs, obovate, elliptic or suborbicular, (1,3–)1,7–4 cm long, 0,9–2 cm wide, uppermost pair largest, bases asymmetric, narrowly to broadly cuneate, apices very broadly obtuse or rounded, usually minutely mucronate, margins yellow, sparsely white-pubescent in proximal half of leaflet, becoming glabrous in distal half, adaxial surfaces glabrous, abaxial white-pubescent near leaflet bases especially anticously and along midvein. *Inflorescences* axillary, numerous at ends of branches, sometimes extending back 40 cm or more, more often forming pseudo-panicles, racemes ± corymbose, 4–10 cm long, 2–10-flowered; peduncles (1,5–)3–5 cm long at flowering, stronger and slightly longer at fruiting; bracts, up to 2 mm wide, resembling stipules; pedicels, at flowering, 2–3 cm long, at fruiting stouter but hardly longer, glabrous. *Sepals* obtuse, glabrous. *Petals* obovate or elliptic, 1,8–2 cm long, 1–1,3 cm wide, bright yellow. *Stamens* 10: 3 staminodal or 2 + 1 reduced, (adaxial) flattened, ± orbicular in face view, margin slightly wavy, 4–4,5 mm long including filament, 7 functional (4 lateral medium, 2 lateral-abaxial large, filaments ± 1,9 cm long, central-abaxial medium, filament ± 0,8 cm long), dehiscence porose, longitudinal cracks developing down potential line of longitudinal dehiscence in medium-sized and large anthers. *Ovaries* villous with long curled white hairs with ± stalked glands intermingled; styles ± coiled, ± 8 mm long, glabrous; stigmas narrowed, hollowed, glabrous. *Pods* ± straight to slightly curved distally, shortly stalked, rounded apically, terete, ± inflated, 18–20 cm long, ± 1 cm wide, transversely septate within, pendulous, many-seeded, indehiscent or very tardily dehiscent. *Seeds* laterally compressed, elliptic, ± 7 mm long, ± 5 mm wide, testa brown, smooth; areoles lacking. Fig. 16 : 12; 18 : 12; 19 : 12.

This tropical American species is very popular as a garden subject in parts of Africa including the Flora area. Under cultivation it is often incorrectly known as *C. bicapsularis, C. floribunda* or *C. corym-*

bosa. These names, when correctly applied, represent valid, disparate species within the genus. For distinctions among them see under *C. bicapsularis*.

With a species as commonly cultivated as is this one, it is surprising it has not "escaped" more frequently than appears to be the case. The following records are suggestive of plants growing without cultivation, but it is difficult to be certain if this was the case.

TRANSVAAL.—2329 (Pietersburg): Magoeba's Kloof, *Murray 781*.

NATAL.—2831 (Nkandla): near junction of rd. to Qua Mondi with Melmoth rd., *Lawn 2306* (NH).

13. **Cassia surattensis** *Burm. f.*, Fl. Ind. 97 (1768); Corner, Wayside Trees of Malaysia ed. 2, 1 : 390; 2 : Pl. 85 (1952). Type from India.

C. glauca Lam., Encycl. 1 : 647 (1785).

Perennial, multistemmed and branched from ground level to form an erect rounded shrub to 4 m, or a more slender treelet up to 7 m. *Stems* when young faintly longitudinally ridged, appressed-pubescent with short white hairs, becoming woody, terete and covered in greyish-brown, longitudinally striated bark with age. *Leaves*: petiole and rhachis 5,5–20 cm long: stipules asymmetric, linear to falcate, ± 1 cm long, ± 0,1 cm wide, appressed-pubescent, caducous; petiole 4–8 cm long including basal pulvinus, petiolar gland lacking; rhachis faintly channelled to ± flattened adaxially with 1 shortly-stalked conical gland between each pair of leaflets except usually the two uppermost; leaflets in (2–)4–6(–9) pairs, ovate or elliptic (2–)4–7 cm long, (1,3–)2–3,2 cm wide, uppermost 1 or 2 pairs largest, petiolules ± 3 mm long, appressed white-pubescent, bases slightly asymmetric, broadly cuneate to ± rounded, apices obtuse, margins slightly thickened, glabrous, surfaces glabrous, adaxial green, abaxial markedly glaucous. *Inflorescences* axillary racemes crowded to the ends of branches, peduncles 3–8 cm long, pedicels, appressed-pubescent, at flowering 2–2,5 cm long with a single conical, eventually deciduous, gland at the base of each adaxially; bracts ovate or elliptic, 4–5 mm long, appressed pubescent abaxially. *Sepals* obtuse. *Petals* 2–2,5 cm long, 0,7–1 cm wide, shortly stalked, greenish yellow. *Stamens* 10, fertile, ± uniform, filaments 1–2 mm long, dehiscence porose. *Ovaries* densely sericeous along abaxial suture, otherwise sparsely sericeous to glabrous, curved; style glabrous; stigma hollow with ± membranous margin. *Pods* flattened, straight, 12–15 cm long, 1–1,5 cm wide, transversely septate, apex often beaked, valves ± membranous, glabrous, brown, sutures hardly thickened. *Seeds* laterally compressed, ± oblong, ± 7 mm long, ± 3 mm wide; testa shining, brown, smooth, lacking an areole.

One record of this species that is indigenous to India and Sri Lanka, growing as an escape in the Flora area, warrants its inclusion in this account.

NATAL.—2930 (Pietermaritzburg): Pietermaritzburg, *Ross s.n.* (NU).

Less frequently cultivated than *C. coluteoides*, it is worthy of more attention. The greater size of the plant, its more numerous leaflet pairs, more numerous rhachidal glands, markedly glaucous leaflet undersurfaces and greenish yellow flower colour distinguish it from that species. It bears resemblance also to *C. floribunda*, but its more rounded growth habit, lack of staminodes and flattened pods readily distinguish it.

14. **Cassia petersiana** *Bolle* in Peters, Reise Mossamb. Bot. 1 : 13 (1861); Oliv. in F.T.A. 2 : 272 (1871); Bak. f., Leg. Trop. Afr. 3 : 633 (1930); Henkel, Woody Pl. Natal 220 (1934); Steyaert in F.C.B. 3 : 508 (1952); F. White, For. Fl. N. Rhod. 119 (1962); Compton, J.S.Afr. Bot., Suppl. 6 : 46 (1966); Brenan in F.T.E.A. Legum-Caesalp. : 72 (1967); Palmer & Pitman, Trees S.Afr. 2 : 881 (1973). Type: "Mozambique, Querimba I. and Mozambique", *Peters* (B, holo.).

C. delagoensis Harv. in F.C. 2 : 272 (1862); Bews, Fl. Natal & Zululand 114 (1921); Forbes in S. Afr. J. Sci. 18 : 343 (1922); Burtt Davy, Fl. Transv. 2 : 324 (1927). Syntypes: Delagoa Bay, *Forbes* (K); "Port Natal", *Hewittson* (K).

Small tree or sparingly to multibranched, slender to rounded shrub 1–4(–7) m high. *Stems* when young longitudinally ridged and furrowed, villous with long curved ± appressed white hairs interspersed with short straight patent hairs and numerous reddish-brown, finger-like, slender glands, becoming woody, ± terete and sparingly villous to pubescent with age. *Leaves* when young, cano-sericeous especially abaxially, with many yellowish-red glands interspersed among the hairs: when mature petiole and rhachis 7–22 cm long; stipules conspicuous, leafy, semi-cordate to reniform, with one end attenuate-caudate, up to 1,5 cm long excluding apex of 1–1,2 cm long, 0,7–0,8 cm wide, eventually deciduous; petiole 2–4 cm long including basal pulvinus, petiolar gland

lacking; rhachis channelled adaxially with 1 large ± stalked, clavate to finger-like, reddish to dark brown, projecting gland between all, or most, of the (4–)7–12 leaflet pairs (glands readily break away); leaflets ovate, lanceolate or elliptic or a combination of these, variable in size, especially in width, (1,5–)3–4(–6,5) cm long, 0,8–1,6(–2,3) cm wide, uppermost pair usually *not* largest, bases slightly asymmetric, broadly cuneate to round, apices acute to acuminate, margins thickened, yellowish, ± villous, surfaces sparsely villous, dark green adaxially, ± densely villous, ± glandular and paler-green abaxially. *Inflorescences* 10–15-flowered corymbose racemes in axils of upper leaves and aggregated into ± rounded panicles 10–20 cm long terminating branches; peduncles at flowering and fruiting 2–5 cm long; bracts variable often in the same inflorescence, from cordate through rhomboid to ovate, green, pubescent and glandular, each with two stipitate, conical glands in the position of stipules; pedicels, at flowering and fruiting 2–3 cm long, pubescent, glandular except with extreme age. *Sepals* obtuse, villous abaxially. *Petals* unequal, elliptic to obovate, stalked, largest 2–2,5 cm long, 1,3–1,5 cm wide, deep yellow, brown-veined. *Stamens* 10: 3 staminodal (adaxial), flattened ± cordate, ± 3 mm long including short filament, 7 functional (4 lateral medium, 3 abaxial large, filaments 7–9 mm long, dorsifixed), dehiscence porose. *Ovaries* densely cano-sericeous; style straight, glabrous; stigma hollow, fringed with short white hairs. *Pods* flattened, straight or slightly curved, 10–25 cm long, 1–1,5 cm wide, transversely septate, apex often beaked, valves dark brown to black, ± soft and succulent, glabrous, sutures thickened, lighter coloured, indehiscent, but 1- or more-seeded portions shed from between the sutures which hang suspended from the plant before breaking up. *Seeds* slightly dorsally compressed, ± 4-angled, ovate to suborbicular in outline, 4–5 mm in length and breadth; testa dark dull brown, smooth or faintly dotted with a dark line from hilum; areole on each lateral face (i.e. on shoulder or margin), narrowly elliptic, ± 3 mm long, ± 1 mm wide, paler, faintly transversely cracked. Fig. 16 : 14; 18 : 14; 19 : 14/1, 14/2; 20 : 14.

This tropical species is widespread in eastern Africa, extending from Ethiopia and the Sudan Republic, southwards to Rhodesia, Mozambique and South Africa. It is also found in Madagascar. Westwards it reaches the Cameroun and the Central African Republics. In the Flora area it occurs in the Transvaal, Swaziland and northernmost Natal.

TRANSVAAL.—2229 (Waterpoort): Soutpansberg Mts., farm Franz Hoek, *Galpin 14933*. 2230 (Messina): between Louis Trichardt & Punda Milia, *Schlieben 10595*. 2329 (Pietersburg): Pietersburg, *Dyer 3158*. 2330 (Tzaneen): Duiwelskloof, *Galpin 10862*. 2430 (Pilgrim's Rest): Erasmus Pass, hill up to Devil's Preekstool, *Schlieben & Strey 8403*. 2431 (Acornhoek): 3 km E. of Skukuza, *Codd 5490*. 2531 (Komatipoort): Komatipoort, *Rogers 2382*.

SWAZILAND.—2531 (Komatipoort): Piggs Peak, Wyldesdale, *Compton 28726, 26040*. 2631 (Mbabane): Sicusha, near Stegi, *Compton 30074*.

NATAL.—2632 (Bela Vista): 13 km from Makanes Bridge on road to Sihangwa, *Ross 2428*. 2732 (Ubombo): Otobotini, *Gerstner 3425* (NH).

Brenan, in Fl. Trop. E. Afr. Legum.-Caesalp : 72 (1967), commented on its variability and recognized three principal variants, all tropical African, that he did not name. He stated that further south (the Flora area and Mozambique) intermediates among these, as well as other perplexing, narrow-leaved forms occurred. Other workers have noted this variation before (*C. delagoensis* Harvey, 1862, for plants with smaller, narrower, more numerous leaflets with less prominent venation). In the Flora area leaflet size varies from 3 × 0,8 cm (*Rogers* 12988) to 6,5 × 2 cm (*Gerstner* 5407) and number of leaflet pairs from 4–12, but this does not seem to represent anything more than a range usual for a tree or shrub, with perhaps a slight tendency for the leaves of plants towards the southern limit of the distribution range to be many-jugate with the leaflets narrow.

Plants favour sandy soils and are to be found along streambanks, sometimes in alluvium, as a constituent of low shrubby vegetation on steep slopes, in low-veld woodland, in Mopane veld and in Sand Forest. There is a tendency for their numbers to increase, forming almost pure thickets, where some disturbance of existing vegetation has occurred.

Flowers, produced in late summer to autumn, are strongly and pleasantly scented. *C. petersiana* is easily recognized by its pendant, dark-brown pods that break up leaving the lighter coloured sutures temporarily attached, and its leaves, dark green above, densely villous, glandular and paler green below. Roots, bark and leaves are used medicinally by Africans, while the pod valves, said to be edible, are relished by some birds and are used in preparing a fermenting beverage.

Common names: "Eared Cassia", "Dwarf Cassia".

15. **Cassia sinqueana** *Del.*, Cent. Pl. Afr. 28 (1826); Del. in Caillaud, Voy. à Méroé 4 : 27 (1827); Steyaert in F.C.B. 3 : 509 (1952); Mendonça & Torre in C.F.A. 2 : 179

(1956); Dale & Greenway, Kenya Trees and Shrubs 102, t. 8 (1961); F. White, For. Fl. N. Rhod. 120 (1962); Brenan in F.T.E.A. Legum.-Caesalp. : 73, fig. 13 (1967); Schreiber in F.S.W.A. 59 : 12 (1967); Palmer & Pitman, Trees S.Afr. 2 : 885 (1973). Type: Ethiopia, Singué [Jebel Singe], *Caillaud* (MPU, holo.).

C. goratensis Fresen. in Flora 22 : 53 (1839); Oliv. in F.T.A. 2 : 273 (1871); Bak. f., Leg. Trop. Afr. 3 : 634 (1930). Type: Ethiopia, *Rueppell* (FR, holo.). *C. zanzibarensis* Vatke in Oesterr. Bot. Zeitschr. 30 : 77 (1880); Bak. f., Leg. Trop. Afr. 3 : 635 (1930). Type: Tanzania, Bagamoyo distr., River Wami & River Kingoni, *Hildebrandt* 904 (B holo.; BM).

Small tree or shrub 1–6 m high with spreading, rounded, ± open crown ± 2 m in diameter. *Trunk* to 15 cm across, with dark grey, rough bark irregularly longitudinally fissured; slash light brown, yellow within. *Stems* of branchlets faintly longitudinally ridged to terete, young apices densely pubescent with curled white hairs interspersed among minute ones forming an underlayer, becoming sparsely pubescent and glabrous as bark develops. *Leaves*: petiole and rhachis 4–30 cm long; stipules subulate, ± 5 mm long, ± 0,3 mm wide, caducous; petiole 1,5–5 cm long including basal pulvinus, petiolar gland lacking, rhachis channelled, with a stalked, fusiform to elliptic, deciduous gland between each pair of leaflets, sometimes excepting the terminal; leaflets in (3–)5–10 pairs, elliptic, elliptic-oblong or elliptic-obovate, (1,3–)2–5,2 cm long, 0,7–2,5 cm wide, uppermost pair not largest, bases slightly asymmetric, rounded, apices rounded and acuminate to emarginate, margins slightly thickened, surfaces with scattered straight to curved appressed hairs. *Inflorescences* many-flowered, corymbose panicles (occasionally simple racemes), axillary and crowded to the ends of branches; peduncles at flowering and fruiting up to 3 cm long; bracts rounded to elliptic, ± 6 mm in width, densely pubescent, caducous, each with two stipitate fusiform to linear glands in the position of stipules; pedicels at flowering up to 5 cm long, glandular. *Sepals* obtuse, densely pubescent abaxially. *Petals* unequal, obovate to suborbicular, stalked, 1,5–3,5 cm long, 1,2–1,7 cm wide, deep yellow, brown-veined. *Stamens* 10: 3 staminodal (adaxial) flattened to ± round, ± 5 mm long including filament, 7 functional (4 lateral medium, 3 abaxial large, filaments ± 1,3 cm long, dorsifixed, dehiscence porose. *Ovaries* ± pubescent or glabrous; style straight; stigma hollow, fringed with short white hairs. *Pods* subcylindric, torulose, straight or slightly twisted, 5,5–25 cm long, 0,7–1 cm wide, septate, apex often beaked, valves stiff and hard, ± pubescent or glabrous, yellow-brown at maturity, indehiscent. *Seeds* laterally compressed, ± round in outline, 5–6 mm in diameter, testa dull brown, areole on each lateral face, narrowly elliptic, 2–2,5 mm long, 1–1,5 mm wide. Fig. 16 : 15; 18 : 15; 19 : 15.

This tropical species represented in the Comoro Islands and widespread in Africa, except in rain forest regions, from Ethiopia southwards to Mozambique, Rhodesia and Angola, only just reaches the Flora area by extending into the Kaokoveld in northern South West Africa.

S.W.A.—1814 (Otjitundua): Otjitundua, *Giess & Leippert 7345*; *7351* (WIND).

Brenan, F.T.E.A. Legum.-Caesalp. : 75 (1967), summarised the variation known within this species in tropical Africa. Among characters mentioned were presence or lack of an indumentum, and a range in leaflet shape. The South West African specimens are densely pubescent in the young parts becoming more or less glabrescent with age. The leaflets are generally fairly broadly elliptic and leathery and pubescent to glabrescent with appressed hairs. In Rhodesia plants are glabrous or almost so. The species often produces flowers when leafless and is reputed to bloom more than once a year, but the latter may be no more than unco-ordinated flowering in plants of a local area. Flowers are fragrant and spectacular.

16. **Cassia obtusifolia** *L.*, Sp. Pl. 1 : 377 (1753); Brenan in Kew Bull. 13 : 248 (1958); Irwin in Mem. N.Y. Bot. Gard. 15 : 121, 122 (1966); Schreiber in F.S.W.A. 59 : 12 (1967); Brenan in F.T.E.A. Legum.-Caesalp. : 77 (1967). Type: Dillenius, Hortus Eltham. 71, Tab. 62 (1732) (lecto.). A specimen grown from seed collected in Cuba, near Havana, *Herb. Dillenius* (OXF, typo.) (see explanatory note by Brenan in Kew Bull. 13 : 250-251, 1958).

C. tora sensu auctt. mult., e.g. Bak. f., Leg. Trop. Afr. 3 : 636 (1930); Steyaert in F.C.B. 3 : 512 (1952); Mendonça & Torre in C.F.A. 2 : 180 (1956), non L.

Annual, or short-lived perennial, herb or sub-shrub with erect, sparsely branched stems 0,5–1 m high. *Stems* terete to faintly ridged, with sparse, sub-sessile small dark glands irregularly scattered among coarse,

upward-pointing curved white hairs that form a strigose indumentum especially on the young parts, older stems ± eglandular and glabrescent to glabrous. *Leaves*: petiole and rhachis (2–)4–6 cm long; stipules linear, ± 10 mm long, 0,5–0,7 mm wide, strigose, tardily deciduous; petiole 2–4 cm long including basal pulvinus, petiolar gland lacking; rhachis channelled adaxially, with a stalked, cylindric, finger-like, orange-brown gland ± 2 mm long between the lowest, sometimes the 2 lower, pairs of leaflets, gland often papillate especially distally; leaflets in 3 pairs, elliptic to obovate, (1–)2–5,5 cm long, (0,5–)1–3 cm wide, uppermost pair largest, bases asymmetric, apices rounded or obtuse, mucronate, margins strigose, almost pectinate when young, becoming ± glabrous with age, sparsely glandular; adaxial surfaces ± glabrous, abaxial white-strigose becoming glabrescent in age. *Inflorescences* in axils of uppermost leaves, not exceeding 3 cm long, racemes reduced, 1–2-flowered, peduncles ± 0; bracts ± 3 mm long, resembling stipules; pedicels at flowering 1–2,2 cm long, at fruiting 2–2,5 cm long. *Sepals* obtuse, strigose abaxially, persisting for some time at base of developing fruit. *Petals* obovate, 1–1,3 cm long, 0,3–0,5 cm wide, yellow, marked with brown veins. *Stamens* 10: 3 ± staminodal (adaxial) with anther lobes much reduced, filaments flattened distally, 7 functional (4 lateral medium-sized, rounded apically, 3 abaxial large, narrowed into a bottle-shaped neck before the apical pores), filaments of functional stamens with a swollen joint at point of attachment to anthers, dehiscence porose. *Ovaries* faintly angled, sericeous with ± matted, curved, slightly coarse, white hairs especially dense between the angles; style almost straight, 1–1,5 mm long, sparsely sericeous; stigma expanded into a ± fan-shaped lobe. *Pods* linear, straight or curved, tapering at base and apex, 13–15 cm long, 4–5 mm wide, subterete, usually ± angled longitudinally, many-seeded, dehiscent. *Seeds* ± rhombic or cylindric, not flattened laterally, 4,5–6 mm long, 2–4 mm wide, testa shining, brown with dark line from hilum, surface with minute raised dots; areole 1 on each lateral face, narrowly linear, 3,5–4 mm long, 0,2–0,3 mm wide. Fig. 16 : 16; 18 : 16; 19 : 16/1, 16/2.

Plants of *C. obtusifolia* are frequent in Rhodesia and were recorded from the Victoria Falls in 1904 (*Eyles* 1263) and from Bechuanaland (Botswana) in 1930 (*Van Son* sub TRV 28917). Burtt Davy (Fl. Transv. 2 : 323, 1932) stated that, "*C. tora* L. occurs at Lourenço Marques and should be sought in the Transvaal Lowveld." The first known record from the Transvaal was in 1953 (*Van der Schijff* 2722). Plants are nowhere common in the Flora area and all records (none further south than 25°S) are comparatively recent. They favour damp situations where the natural vegetation has been disturbed.

S.W.A.—1718 (Kuring-Kuru): 17° 37′ S, 18°36′ E, UTM grid, *Soini s.n.* 1719 (Runtu): on rd. 16 km E. of Runtu, *Merxmüller & Giess 1914* (WIND). 1820 (Tarikora): Ndonga Camp at junction of Omuramba Omatako & Okavango Rivers, *De Winter & Marais 4614.*

TRANSVAAL.—2531 (Komatipoort): Kruger National Park, banks of Sabie River, "Onder Sabie" rd., *Van der Schijff 2722.*

This pantropical, herbaceous weed, readily recognized by its trijugate leaves and its more or less cylindric, longitudinally angled pods, has been much confused with *C. tora* L., a species which, according to Brenan (Kew Bull. 13 : 248, 1958) is confined to Asia, (from India to China and Fiji) and which may be distinguished from *C. obtusifolia* by its shorter pedicels (about 0,5–1 cm in flower; not exceeding 1,5 cm in fruit), its 2 largest anthers not narrowed into a neck below the apical pores, and the areoles to its seeds not linear but 1,5–2 mm wide. Irwin and Turner (Am. Journ. Bot. 47 : 315, 1960) and Irwin (Mem. N.Y. Bot. Gard. 15 : 121, 1966) suggest that the variability within *C. obtusifolia* is more extensive than Brenan's remarks indicate; thus the differences between the two species may not be clear cut. *C. tora* has a gland between each of the two lower pairs of leaflets; *C. obtusifolia*, except in Africa and with rare exceptions outside this continent, has a gland between the lowest leaflet pair only. African plants, including those from the Flora area, vary in this character (sometimes within an individual plant), and often develop two glands per leaf.

Rhino are said to browse plants, eating the fruits, thus disseminating seed.

17. **Cassia absus** *L.*, Sp. Pl. 1 : 376 (1753); Oliv. in F.T.A. 2 : 279 (1871); Bak. f., Leg. Trop. Afr. 3 : 639 (1930); Burtt Davy, Fl. Transv. 2 : 324 (1932); Steyaert in F.C.B. 3 : 507 (1952); Mendonça & Torre in C.F.A. 2 : 179 (1956); Brenan in F.T.E.A. Legum.-Caesalp. : 81, fig. 15 (1967); Schreiber in F.S.W.A. 59 : 10 (1967). Type: Hortus Upsaliensis, *Herb. Linnaeus* 528.4 (LINN, syn.!).

Annual herb, sometimes slightly woody, with erect, sparsely to densely branching (when sometimes ± procumbent due, probably, to browsing or cutting) stems (0,1–)0,3–0,6(–1) m high, the whole plant glandular, viscid. *Stems* terete, faintly ridged,

villous to pilose (densely so in young parts, becoming sparser with age), hairs scattered, straight, ± patent, white, glandular-based (apices eventually falling or breaking to leave the sticky bases), usually with more numerous, fine, shorter, ± curved, white hairs intermixed. *Leaves* variable in size: petiole and rhachis 1–5 cm long; stipules linear-subulate, ± 3 mm long, ± 0,3 mm wide, with a clearly defined main vein, ± pilose, tardily deciduous; petiole 0,7–4,3 cm long including basal pulvinus; petiolar gland lacking; rhachis with a sessile, ± flattened and bract-like, or slender and finger-like, acute to acuminate, pale gland between each pair of leaflets; leaflets in 2 pairs, obovate, elliptic or sub-orbicular, (0,5–)1–4,7 cm long, 0,5–3,3 cm wide, uppermost pair usually largest, bases asymmetric, apices obtuse, less frequently rounded, usually mucronate, margins slightly thickened, pilose with stiffer glandular-based and shorter soft white hairs intermingled; surfaces glandular (glands sessile, numerous), velutinous to sparsely villous with fine, white, straight, usually patent, sometimes ± appressed hairs. *Inflorescences* terminating main stems and branches (never axillary), racemes 1–6(–8) cm long, ± 10-flowered. *Bracts* 3–4 mm long, 1–1,5 mm wide, ovate, acuminate, persistent; pedicels at flowering ± 3 mm long, at fruiting 5–9 mm long. *Sepals* obtuse. *Petals* sub-equal, obovate to ± spathulate, 5–6 mm long, ± 2,5 mm wide, yellow, orange, salmon or pinkish-red, veins usually reddish-brown. *Stamens* 5, all fertile, sub-equal, dehiscence apical at first, without clearly defined pores, becoming longitudinal. *Ovaries* strigose with dense, bristle-like white hairs; styles slightly curved, dark-coloured, glabrous; stigmas slightly expanded into a ± hooded fan-shaped lobe with finely ciliate margin. *Pods* oblong-linear, straight to slightly curved, (2,5–)3–5,5 cm long, 0,5–0,8 cm wide, compressed, sutures thickened, pubescent, valves setose to pilose with scattered, rather stiff, glandular-based hairs, with or without fine soft hairs intermixed, dehiscent. *Seeds* few per pod, laterally flattened, elliptic, subrhombic or suborbicular, 4–5 mm long, 3–4 mm wide, testa dark brown to black, shining, marked with longitudinal rows of lighter dots; areoles acking. Fig. 16 : 17; 18 : 17; 19 : 17.

Widespread in tropical regions of the Old World. In the Flora area the species is known only from the hotter, drier parts where plants occur as weeds in disturbed grassland, or in open patches in forest or parkland. They are also common on stony exposed ground, on roadsides or sites of old cultivations, or they may be riverine, growing on sandy alluvium.

S.W.A.—1714 (Ruacana Falls): 32 km S. of Ruacana, *Giess & Leippert 7585* (WIND). 1715 (Ondangua): Ondangua, *Rautanen & Schinz s.n.* 1720 (Sambio): 1 km S. of junction of Okavango River with Omuramba Omatako, *De Winter* 4140. 1724 (Katima Mulilo): ca. 11 km S. of Katima Mulilo on rd. to Ngoma, *Killick & Leistner 3022.* 1816 (Namutoni): ca. 64 km S.E. of Ondangua on rd. to Namutoni, near Omuramba Ovambo, *De Winter & Giess 6950.* 1920 (Tsumkwe): W. foot of Aha Mts., *Story 6515.* 2016 (Otjiwarongo): Outjo distr., farm Hillendale OU 238, *Giess, Volk & Bleissner 6087* (WIND). 2115 (Karibib): Ohere-oos, *Merxmüller & Giess 1592.* 2116 (Okahandja): Quickborn, P.O. Okahandja, *Bradfield 407.* 2218 (Gobabis): farm Dawis, *Merxmüller & Giess 1197.*

TRANSVAAL.—2230 (Messina): Messina, *Rogers 20789.* 2329 (Pietersburg): Louis Trichardt, *Breyer 19555.* 2330 (Tzaneen): Westfalia Estate, Duiwelskloof, *Scheepers 891.* 2427 (Thabazimbi): 9 km E. of P.O. Hermanusdoorns, *Codd 1000.* 2428 (Nylstroom): Naboomspruit, Mosdene, *Galpin 473.* 2529 (Witbank): Loskopdam Nature Reserve, Donkerhoek, *Theron 2083.* 2531 (Komatipoort): 25 km S. of Skukuza on Malelane rd., *Codd 5110.* 2628 (Johannesburg): Rooikop, *Smuts & Gillett 2050.*

SWAZILAND.—2631 (Mbabane): Hlatikulu distr., Kubuta Estate, *Pierce 32.*

NATAL.—2731 (Louwsburg): Nongoma, Bululwana, *Van Rensburg N.P. 28* (NU).

Plants are variable in degree of branching and in leaflet size, but otherwise are remarkably uniform and readily distinguished by the two pairs of leaflets, the viscid texture of the whole plant and the small yellow, orange or pinkish-red flowers with only five stamens. The tap-root is said to be used in the treatment of foot troubles.

18. **Cassia comosa** (*E. Mey.*) *Vogel*, Syn. Gen. Cassiae 65 (1837); Ghesq. in Bull. Jard. Bot. Brux. 9 : 153 (1932); Steyaert in Bull. Jard. Bot. Brux. 20 : 251 (1950); Brenan in F.T.E.A. Legum.-Caesalp. : 89 (1967). Type: E. Cape Province, between Umzimvubu River [Omsamwubo] and Umsikaba River [Omsamcaba], *Drège* (? B, holo.).

Chamaecrista comosa E. Mey., Comm. 1 : 160 (1836). Type as above.

Cassia mimosoides L. var. *comosa* (E. Mey.) Harv. in F. C. 2 : 273 (1862). Type as above.

Perennial herb with erect, simple or subsimple stems up to 55 cm tall, ascending from a horizontally spreading, sympodial, ± woody but slender, perennial rhizomatous

root-stock. *Stems* ± ridged, glabrous, glabrate or sparsely to densely velutinous or villous, hairs usually straight, patent, occasionally curved or curled. *Leaves* linear to oblong-linear, tapering slightly distally, 30–150 mm long, 10–35 mm wide; stipules straight, ovate-lanceolate to ovate, prominently nerved, base oblique, apex acute to acuminate; petiolar gland sessile, elliptic, occasionally ovate-elliptic, cushionlike with a darker central depression, 1,2–3 mm long, 0,4–1,4 mm wide, sunken in, lying flush with, or slightly projecting from the channel on the adaxial petiolar surface, often separating widely the margins of this channel so that the abaxial petiolar surface is ± flat below the gland; rhachis channelled adaxially, not crested, margins of the channel ciliate; leaflets in 11–35 pairs, asymmetrically oblong to oblong-elliptic, narrowing slightly towards apex, 5–18 mm long, 1–7 mm wide, base oblique, apex almost rounded and shortly mucronate to apiculate, surfaces glabrous, occasionally glabrescent, margin ± ciliate, midrib excentric (towards anticous margin), lateral nerves several towards both margins, ± prominent beneath. *Inflorescences* supra-axillary, (1–)2–3(–5)-flowered, bracts resembling stipules; pedicels at flowering 10–12 mm long, at fruiting 12–25 mm long, glabrous, glabrescent, villous or velutinous. *Petals* obovate, 7,5–15 mm long, not much exceeding sepals, bright yellow. *Stamens* 10. *Ovaries* sparsely to densely velutinous, hairs curved, white. *Pods* 40–65 mm long, 4–8 mm wide, valves glabrescent. *Seeds* ± rhombic, 3–4 mm long, 2–3 mm wide, testa brown with darker brown dots arranged in lines. Fig. 19 : 18.

Recorded from Zaire, Tanzania, Malawi, Mozambique, Swaziland and South Africa. Data are needed from Zambia and Rhodesia. *C. comosa* is the most easily recognized of the species comprising the section Chamaecrista in South Africa. The large petiolar gland, the channelled leaf rhachis, the long leaves bearing leaflets that are wide for the complex, and the large flowers held relatively close to the stem are correlated characters that distinguish it. Three varieties were recognized, of which var. *lanata* is now included within the typical variety (Gordon-Gray and Schorn in J. S. Afr. Bot. 41 : 136, 1975). Vars. *comosa* and *capricornia* are geographically separate in the Republic: further field work in areas of contact (?) is required.

Leaflets 3–7 mm wide; gland sunken in the channel of the adaxial petiolar surface, separating widely its margins and not, or hardly, visible when the petiole is viewed from the side; petals 10–15 mm long .....(a) var. *comosa*

Leaflets 1,4–3 mm wide; gland not completely sunken in the channel of the adaxial petiolar surface, not separating so widely its margins, usually clearly visible when petiole is viewed from the side; petals 7,5–10 (–13) mm long .....(b) var. *capricornia*

(a) var. **comosa.**

Steyaert in Bull. Jard. Bot. Brux. 20 : 251 (1950).

Cassia comosa var. *lanata* Steyaert in Bull. Jard. Bot. Brux. 20 : 252 (1950). Type : Natal, Mtunzini, Myezaan Zulu Reserve, near Nyoni, *Wood* 3855 (K, holo.; NH!).

Robust plants with mostly simple stems 8–50 cm tall. *Leaves* 50–150 mm long, 10–35 mm wide, leaflets in 11–35 pairs, 6–18 mm long, 3–7 mm wide; gland well sunken in adaxial channel of petiole; pedicels 12–25 mm long. *Petals* 10–15 mm long. *Pods* 40–65 mm long, 4–8 mm wide. Fig. 17 : 18/1; 18 : 18.

Distributed along the Natal and Transkeian coast as far south as Lusikisiki. Appearing restricted to grassland areas with a high water table on sand or granite soils. Also from Malawi and Mozambique.

NATAL.—2831 (Nkandla) : Ngoye Forest, *Gordon-Gray 6192* (NH, NU); *Hilliard 3179* (NU, E). 2832 (Mtubatuba) : W. of St. Lucia Estuary, *Feely & Ward 5*. 3030 (Port Shepstone) : Dumisa, Ellesmere, *Rudatis 1158* (STE); Shelly Beach hinterland, *Strey 7723*.

CAPE.—3129 (Port St. Johns) : Magwa Falls, *Davies s.n.* (NU). 3130 (Port Edward) : turn-off to Mzamba River mouth, 5 km S. of Port Edward, *Arnold 792*.

(b) var. **capricornia** *Steyaert* in Bull. Jard. Bot. Brux. 20 : 252 (1950); in F.C.B. 3 : 525 (1952); Brenan in F.T.E.A. Legum.-Caesalp. : 89 (1967). Type: Zaire, Katanga, Elizabethville, *Rogers* 10184 (BR, holo.!).

C. mimosoides sensu Letty in Wild Flow. Transv. 79: 1 (1962).

Less robust plants with simple, sub-simple or branched stems 10–37 (–55) cm tall. *Leaves* 40–90 mm long, 10–20 mm wide, leaflets in 16–31 pairs, 5–10 mm long, 1,4–3 mm wide; gland flush with or extending above (sometimes slightly spreading over) margins of adaxial channel of petiole; pedicels 10–17 (–22) mm long. *Petals* 7,5–10 (–13) mm long. *Pods* 40–50 mm long, 4,5–6,5 mm wide. Fig. 17 : 18/2.

Distributed through the Transvaal and Swaziland. Growing in grassveld and among boulders, often on sand or gravelly soils and frequently where

some disturbance of the natural vegetation has occurred: occasionally colonizing old lands. More tolerant of drier habitat conditions than is var. *comosa*. Also from Rhodesia, Zaire and Tanzania.

TRANSVAAL.—2329 (Pietersburg) : Daviesville, *Markotter 16288* (STE). 2330 (Tzaneen): New Agatha Forest Reserve, *McCallum 548*. 2428 (Nylstroom) : Palala, *Ihlenfeldt 2056*. 2430 (Pilgrim's Rest) : Blyde River Nature Reserve, *Hilliard & Burtt 6029*. 2527 (Rustenburg) : Rustenburg, Waterkloof, *Collins 6985*. 2528 (Pretoria) : Sher, *Letty 446*. 2529 (Witbank) : Olifants River, *Van Niekerk 7527*. 2530 (Lydenburg) : rd. from Machadadorp to Sabie via Houtbosloop, *Hilliard & Burtt 5954*. 2531 (Komatipoort) : Mt. Schagen, *Liebenberg 2843*. 2626 (Klerksdorp) : Grasfontein, *Sutton 344*. 2627 (Potchefstroom) : Welverdiend, *Louw 538*. 2628 (Johannesburg) : Mulder's Drift rd., *Young 26450*.

SWAZILAND.—2531 (Komatipoort) : Piggs Peak, *Burtt & Hilliard 3561* (NU). 2631 (Mbabane) : Mbabane, *Burtt Davy 2761*. 2731 (Louwsburg) : 3 km E. of Goedgegun, *Ross 1748* (NH).

Steyaert (1950) described *C. parva*, a species presently recorded from Kenya, Tanzania, Zaire, Zambia and Rhodesia, which Brenan l.c. : 89 regarded as non-homogeneous and among the least satisfactorily defined of the Section. In part at least, this species bears close relationship to *C. comosa* var. *capricornia*. Critical study in the Flora Zambesiaca area should make possible the decision whether *C. parva* should be maintained.

19. **Cassia capensis** *Thunb.*, Prodr. 1 : 79 (1794); Lodd., Bot. Cab. 6 : 511 (1821); Thunb., Fl. Cap. ed. Schult. 388 (1823); Vogel, Syn. Gen. Cassiae 64 (1837); Steyaert in Bull. Jard. Bot. Brux. 20 : 250 (1950). Syntypes: Cape Province, between Loerie (?) [Luri] and Sundays River [Sontags], *Thunberg* (UPS!).

Chamaecrista capensis (Thunb.) E. Mey., Comm. 1 : 158 (1836). Type as above.

Cassia mimosoides L. var. *capensis* (Thunb.) Harv. in F. C. 2 : 273 (1862). Type as above.

Perennial herb with several prostrate, semi-erect, or erect, simple or sub-simple stems from a woody rootstock, or with one or few erect stems up to 90 cm high, usually branched in the upper half. *Stems* ± ridged, glabrate, sericeous, villous or velutinous with only straight appressed or curved appressed hairs, or with few or many short or long, or short and long, patent hairs intermixed with the appressed type; short hairs mostly greyish-white, long hairs greyish-white, silvery, fulvous or yellow. *Leaves* linear or oblong-linear, tapering slightly distally, 17–52(–65) mm long, 7–18(–25) mm wide; stipules straight or slightly curved, lanceolate, prominently nerved, the nerves sometimes rendered invisible by dense hairs, base oblique, apex acute or acuminate, surface sub-glabrous to villous: petiolar gland sub-sessile or raised on an indistinct, or occasionally a distinct (up to 1,5 mm long) stalk, circular to ± elliptic, concave, 0,2–0,5(–0,7) mm long, 0,1–0,3 mm wide (usually 0,2 mm in diameter); rhachis channelled to faintly channelled adaxially, margins of the channel villous, sometimes adhering and obscuring canal between until revealed artificially, sparsely to densely villous abaxially; leaflets in (3–)10–24(–34) pairs, obliquely linear to oblong-linear, sometimes subfalcate to falcate, 4–14 mm long, 1,2–2,8(–4) mm wide, base oblique, apex asymmetric, usually apiculate, occasionally mucronate, surfaces glabrous or glabrescent, margin with scattered long, spreading hairs, midrib strongly excentric (towards anticous margin) lateral nerves several towards both margins, prominent beneath. *Inflorescences* axillary to slightly supra-axillary, 2–3–5-flowered, bracts resembling stipules; pedicels, at flowering (12–)18–40 mm long, at fruiting to 60 mm long, villous with short curved appressed and long straight patent hairs intermixed. *Petals* obovate, 9–17 mm long, usually exceeding sepals, bright yellow. *Stamens* 10. *Ovaries* densely strigose, hairs nearly straight, or curved, greyish-white. *Pods* 30–50 mm long, 3–6 mm wide, valves glabrescent with short curved appressed hairs, or sparsely to densely villous. *Seeds* rhombic, ± 3 mm long, ± 2,5 mm wide, testa brown, with darker brown dots arranged in lines.

Recorded from the Transvaal, Natal and the Cape Province with outliers in Swaziland and Mozambique. The species has a more southerly distribution than have other South African representatives of Chamaecrista. The long pedicels of flowers and fruits arising from inflorescences that are more nearly axillary than in any other species of the Section, the shortly stalked to sub-sessile, circular to circular-elliptic petiolar glands, and the strongly excentric midribs to the leaflets, are correlated characters that distinguish *C. capensis* from other species in which the adaxial surface to the leaflet rhachis is channelled. Most closely related is *C. biensis*, another perennial with similar leaf features except that the petiolar glands are longer stalked, while the smaller flowers are borne on clearly supra-axillary inflorescences. Plants of *C. biensis* are probably more drought-resistant than are those of *C. capensis*.

Meyer (1836) established var. *flavescens* within *Chamaecrista capensis*. This was maintained by Vogel

(1837) under *Cassia*. Later Steyaert (1950) described a second variety *keiensis*, which is considered as falling within the range of var. *flavescens* and thus is included within it.

Another variant, known by only few specimens from disjunct localities, needs further study. Temporarily this entity is designated Group 1. It is most readily distinguished by the long stalked petiolar gland (stalk 1–1,5 mm long). In flower size this entity is intermediate between *C. capensis* and *C. biensis*, but in general facies it has more in common with the former taxon.

Leaflets less than 2,3 mm wide; petiolar gland circular or elliptic-circular, sub-sessile or with a stalk less than 1 mm long, occasionally gland obsolete or wanting:

Stems with, or without, appressed or short patent hairs; if long patent hairs are interspersed these are few and scattered, so that any indumentum present does not appear velutinous to the naked eye (sometimes sericeous), hairs greyish-white, never fulvous nor yellow; petiolar gland slightly raised, circular; channel to adaxial surface of rhachis well defined; several prostrate or decumbent stems produced from a perennial rootstock .....(a) var. *capensis*

Stems with appressed and/or short patent hairs with many long patent hairs interspersed, so that the indumentum appears velutinous to the naked eye, indumentum especially on young parts of stems, greyish-white, fulvous or bright yellow; petiolar gland often obsolete or wanting, when present subsessile, elliptic-circular; channel to adaxial surface of rhachis often poorly defined; several robust, prostrate or decumbent stems produced from a perennial rootstock, or a single, or few, erect stems up to 90 cm high arising from a less definitely perennial rooting system (Note: some erect, robust plants with poorly developed petiolar glands may be only glabrate) .....(b) var. *flavescens*

Leaflets more than 2,3 mm wide; petiolar gland circular, raised on a clearly defined stalk 1–1,5 mm long.....(c) *Group 1*

(a) var. **capensis.**

Steyaert in Bull. Jard. Bot. Brux. 20 : 250 (1950).

Chamaecrista capensis (Thunb.) E. Mey., Comm. 1 : 158 (1836) excl. var. *flavescens*.

Perennial herb up to 40 cm tall, usually much shorter. *Stems* prostrate or decumbent, rarely ± erect from a woody rootstock, glabrate to sericeous, but not velutinous to the naked eye, indumentum composed of straight or curved appressed sordid hairs, without, occasionally with, sparsely scattered long patent hairs intermixed. *Leaves* with petiolar gland slightly raised on an indistinct stalk, ± circular, flat or concave, 0,2–0,4 mm long, (usually 0,2 mm in diameter), rhachis channelled adaxially, leaflets 1,2–2 mm wide, in 14–20 pairs. *Pedicels* 23–40 mm long. *Petals* 9–15 mm long. *Pods* with valves sparsely puberulous with short straight or curved appressed hairs. Fig. 17 : 19/1.

Distributed through the central and eastern Transvaal and the eastern Cape Province from the Cathcart and King William's Town districts to the Humansdorp district, especially fairly close to the coast. Steyaert (1950 : 250) recorded a single gathering from Hlatikulu, Swaziland (*M. M. Stewart* 110), but this is better placed with var. *flavescens*.

TRANSVAAL.—2330 (Tzaneen) : New Agatha Forest Reserve, 1 km E. of Steilkop, *Muller & Scheepers 57*. 2428 (Nylstroom) : Naboomspruit, Mosdene, *Galpin 17102*. 2430 (Pilgrim's Rest) : near Graskop, rd. to God's Window, *Hilliard & Burtt 6035*. 2527 (Rustenburg) : Rustenburg, *Lanham 24*. 2528 (Pretoria) : 32–48 km E. of Pretoria, *Werdermann & Oberdieck 1247*. 2529 (Witbank) : Loskop dam, Donkerhoek, *Theron 1673*. 2530 (Lydenburg) : farm Zwagershoek, *Obermeyer 186*. 2531 (Komatipoort) : towards Kaapmuiden, *Nel 112*. 2628 (Johannesburg) : Kempton Park distr., between Johannesburg and Irene, *Hutchinson 2609*. 2629 (Bethal): Athole Pasture Research Station, *Preller 145*.

CAPE.—3226 (Fort Beaufort) : Alice, Seymour near Brambledene, *Barker 2895* (NBG). 3227 (Stutterheim) : Windvoelberg, near Cathcart, *Roberts 1728*. 3324 (Steytlerville) : van Staadenshoogte, *MacOwan 2051* (GRA). 3325 (Port Elizabeth) : Kragga Kamma, *Long 889*. 3326 (Grahamstown) : near Bathurst, *Hutchinson 1559*. 3327 (Peddie) : Hamburg, *Gemmell 7516* (BLFU). 3424 (Humansdorp) : Slang River, *Phillips 3417*.

(b) var. **flavescens** (*E. Mey.*) *Vogel*, Syn. Gen. Cassiae 64 (1837).

Chamaecrista capensis (Thunb.) E. Mey. var. *flavescens* E. Mey., Comm. 1 : 158 (1836). Type: Transkei, between Gekau and Bashee Rivers [Basche], alt. 1 500–2 000 ft. *Drège* (B, holo.).

Cassia capensis var. *keiensis* Steyaert in Bull. Jard. Bot. Brux. 20 : 251 (1950). Type : Cape Province, King William's Town distr., Kei Road, *Dyer* 1703 (K, holo.; PRE!; GRA!).

Herb up to 90 cm tall, often shorter. *Stems* prostrate, decumbent or ± erect from a woody rootstock, or one or few stems ± woody and branched only in the upper part, developed from a less obviously perennial rootstock; usually velutinous to the naked eye, the indumentum greyish-white or silvery, sometimes fulvous or yellow on the young

parts, composed of long patent hairs with short patent straight and/or short curved appressed hairs forming an underlayer; occasionally the long patent hairs, or the complete indumentum, sparse or lacking, so that the stems appear sericeous, villous, glabrate or glabrous. *Leaves* with petiolar gland often obsolete or wanting, when present subsessile, circular-elliptic, 0,2–0,7 mm long, rhachis with adaxial channel often indistinct, leaflets 1,2–2,3 mm wide, in 10–24 pairs. *Pedicels* 18–46 mm long. *Petals* 10,5–17 mm long. *Pods* with valves villous with curled hairs or velutinous with dense patent hairs.

Recorded from the central and eastern Transvaal, Swaziland, Natal and the eastern Cape Province as far south as Bathurst and Alexandria. Further information on distribution is needed, especially from Zululand, the northern Transvaal, Mozambique and Rhodesia.

TRANSVAAL.—2428 (Nylstroom) : Warmbaths, *Leendertz 5546*. 2528 (Pretoria) : Middelkop farm near Pienaar's River, *Smith 2169*. 2629 (Bethal) : Davel, *Hoffe 5*. 2630 (Carolina) : 14,4 km from Warburton P.O. on Mbabane rd., *Hilliard 4780* (NU, E). 2725 (Bloemhof) : Christiana, Kaffraria, *Burtt Davy s.n.*

SWAZILAND.—2631 (Mbabane) : Hawane Falls, *Compton 27405* (NBG); Hlatikulu, *Stewart 110* (NBG, K).

NATAL.—2830 (Dundee) : Krantzkop, *Thode 4032* (STE). 2930 (Pietermaritzburg) : Key Ridge on Pietermaritzburg-Durban rd., *Gordon-Gray 6145* (NU); Indaleni near Richmond, *Barker 5182* (NBG). 3030 (Port Shepstone) : Umgaye Flat, Friedenau, *Rudatis 597* (STE); cliffs above Otterburn Halt, *Hilliard 2751* (NU).

CAPE.—3128 (Umtata): mountain between Qumbu & Shawbury, *Schonland 4115* (GRA); slope towards Umtata waterfall, *Schonland 3804*. 3226 (Fort Beaufort): Kei Road, *Dyer 1703*. 3227 (Stutterheim): Fort Cunynghame, *Schonland 29*; Berlin, *Comins 1836* (GRA). 3228 (Butterworth): Kentani, *Pegler 1904*. 3326 (Grahamstown): few km S. of Bathurst village, *Dyer 1730* (GRA).

(c) **Group 1.**

Perennial herb up to 30 cm high. *Stems* procumbent to decumbent, sericeous, hairs short, curved or curled, some long patent hairs added at some nodes. *Leaves* 30–40(–47) mm long, 10–20(–25) mm wide; leaflets in 3–14(–16) pairs, 5–14 mm long, 2,4–4 mm wide; petiolar gland circular, 0,2–0,3 mm in diameter, concave, dark brown, distinctly stalked (stalk slender, 1–1,5 mm long). *Inflorescence* axillary; pedicels 35–52 mm long (±60 mm in fruit), villous; petals 9,5–12 mm long. *Pods* ± 40 mm long, ± 4 mm wide, valves glabrescent with sparse appressed curved hairs. Fig. 17 : 19/2.

TRANSVAAL.—2428 (Nylstroom): 11 km E. of Magalakwin Causeway, *Mogg 24430*.

NATAL.—2832 (Mtubatuba): Hluhluwe Game Reserve, *Ward 2439* (NU, NH); Hlabisa, Gunjanene area, *Ward 2709* (NU).

20. **Cassia biensis** (*Steyaert*) *Mendonça & Torre* in Bol. Soc. Brot. Sér. 2, 24 : 33, Tab. 1, C. (1955); Exell & Mendonça in C.F.A. 2 : 184, t. 38C (1956); Schreiber in F.S.W.A. 59 : 11 (1967). Type: Angola, Bie, *Gossweiler 9* (BR, holo!).

C. katangensis (Ghesq.) Steyaert var. *biensis* Steyaert in Bull. Jard. Bot. Brux. 20 : 260, t. 10 E, F (1950). Type as above.

Perennial herb with several prostrate or decumbent, occasionally semi-erect to erect, simple or sub-simple stems up to 45 cm tall, from a woody rootstock. *Stems* pubescent to velutinous, hairs curved appressed, occasionally with short straight hairs intermingled, greyish-white. *Leaves* linear or oblong-linear tapering slightly distally, 25–44(–65) mm long, 7–15 mm wide; stipules straight or slightly curved, lanceolate, prominently-nerved, base oblique, apex acuminate bristle-like, abaxial surface glabrate to pubescent; petiolar gland raised on an indistinct stalk 0,1–0,3 mm long or sub-sessile, circular, occasionally elliptic-circular, concave, 0,1–0,4 mm long; rhachis channelled adaxially, margins of channel ciliate, sometimes adhering and thus obscuring the channel until parted artificially, sparsely villous abaxially; leaflets in (5–)13–24(–34) pairs, obliquely linear, 4–10 mm long, 0,7–1,8 mm wide, base oblique, apex asymmetric, apiculate, surfaces glabrous or glabrescent, occasionally villous below, margin fringed with curved appressed hairs, midrib strongly excentric (towards anticous margin) lateral nerves (towards posticous margin only) prominent beneath. *Inflorescences* supra-axillary, usually 1-flowered; pedicels, at flowering 13–20 mm long, at fruiting to 26 mm long, villous with short, curved or straight, and long patent hairs intermixed. *Petals* obovate, 4–7 mm long, hardly exceeding sepals, bright yellow. *Stamens* 10. *Ovaries* densely strigose, hairs appressed, straight or slightly curved, greyish-

white. *Pods* 30–45 mm long, 4–5 mm wide, valves glabrescent to sparsely velutinous with appressed straight to curved hairs. *Seeds* rhombic-elliptic, ± 3 mm long, ± 2,5 mm wide, testa light brown with darker brown scattered dots. Fig. 17 : 20.

Recorded from Rhodesia, Angola, South West Africa, Botswana, the Transvaal, Orange Free State and northern Cape Province. This generally low-growing, small-flowered perennial has a distribution from the sub-tropics southwards through the drier more extreme areas of southern Africa.

S.W.A.—1724 (Katima Mulilo): E. Caprivi, Mpola, 24 km from Katima Mulilo on Ngoma rd., *Killick & Leistner 3299*. 1918 (Grootfontein): Grootfontein, *Story 6192*. 2116 (Okahandja): Quickborn farm, *Bradfield 161*. 2118 (Steinhausen): farm Steinhausen, *De Winter 2443*. 2217 (Windhoek): Bodenhausen, *Seydel 1789* (WIND). Precise locality unknown: Ovamboland, Omatope, *Schinz 282* (GRA).

TRANSVAAL.—2229 (Waterpoort): Soutpansberg, *Van den Berg 26*. 2428 (Nylstroom): Percy Fyfe Nature Reserve, *Huntley 1114, 1237*. 2429 (Zebediela): Schoonoord, *Barnard & Mogg 890*. 2430 (Pilgrim's Rest): beyond Blyde River Nature Reserve, Ohrigstad rd., *Hilliard & Burtt 6031*. 2526 (Zeerust): Rooikoppiesfontein, *Carter 895*. 2527 (Rustenburg): Rustenburg, *McClelland 5010*. 2528 (Pretoria): Pretoria, Brummeria Bot. Garden, *Todd 3*. 2531 (Komatipoort): Pretorius Kop, *Codd & De Winter 4919 p.p.* 2626 (Klerksdorp): Lichtenburg, *Jenkins 11208*. 2627 (Potchefstroom): Westonaria, Libanon, *L. E. Taylor 5039, 5043* (NBG). 2628 (Johannesburg): Kempton Park distr., Kaalfontein, *PoleEvans sub PRE 13538, sub PRE 16822*. 2629 (Bethal): Ermelo, *Walker* 119. 2725 (Bloemhof): Makwassie, Tussenvier, *Morris & Engelbrecht 1149*.

O.F.S.—2727 (Kroonstad): Kroonstad, *Laubscher 5005* (BLFU). 2926 (Bloemfontein): Bloemfontein racecourse, *Potts 2922*.

CAPE.—2624 (Vryburg): Armoedsvlakte, *Victoria Coll. Herb. 8757* (STE); farm Palmyra, 96 km N.W. of Vryburg, *Rodin 3499*. 2823 (Griekwastad): Postmasburg, *Leistner 1683* 2824 (Kimberley): Barkly West, *Wilman 1471*.

In facies, plants of *C. biensis* closely resemble low-growing plants of *C. capensis*, especially var. *capensis*. There is also similarity in leaf, leaflet and petiolar gland structure, but *C. biensis* may be distinguished by the more distinctly developed stalk to the gland and the more markedly excentric midrib to the leaflet. Most obvious are differences in floral structure: in *C. biensis* the inflorescences are supra-axillary and reduced so that each develops usually only a solitary flower that is small and probably inbreeding; in *C. capensis* the inflorencences are generally axillary or almost so, and consist of a short raceme bearing 2–5 large flowers that develop in sequence and are probably predominantly outbreeding. In its stalked petiolar gland and small flowers, *C. biensis* shows relationship with *C. capensis* Group 1, but the length of the gland stalk and the size of the flowers both exceed dimensions attained within *C. biensis*.

21. **Cassia falcinella** *Oliv.* in F.T.A. 2 : 281 (1871); Bak. f., Leg. Trop. Afr. 3 : 641 (1930); Ghesq. in Bull. Jard. Bot. Brux. 9 : 162 (1932), excl. var. *longifolia*; Steyaert in F.C.B. 3 : 520 (1952); Brenan in Kew Bull. 14: 178 (1960), in F.T.E.A. Legum.-Caesalp. : 90 (1967). Type: Tanzania, Bukoba distr., Karagwe, *Grant* 445 (K, holo.).

var. **parviflora** *Steyaert,* Bull. Jard. Bot. Brux. 20 : 251 (1950), in F.C.B. 3 : 521 (1952); Brenan in Kew Bull. 14 : 178 (1960), in F.T.E.A. Legum.-Caesalp. : 90 (1967); Schreiber in F.S.W.A. 59 : 11 (1967). Type: Rwanda Republic, Gabiro, *Becquet* 613 (BR, holo.!).

Annual herb with erect stem up to 50 cm tall, sometimes becoming slightly woody above ground level, lateral branches usually several, often patent. Roots annual, rootstock wanting. *Stems* terete, villous with short curved, and long straight patent hairs intermixed. *Leaves* oblong, tapering distally, 25–45 mm long, 7–17 mm wide; stipules ± falcate, cordate-lanceolate, prominently-nerved, base oblique, apex acuminate, surface sub-glabrous to shortly pubescent, margin long hairy, almost pectinate; petiolar gland sessile or sub-sessile often partially sunken in the channelled petiole, elliptic or circular-elliptic, flat or depressed centrally, 0,5–0,7 mm long, 0,3–0,4 mm wide, rhachis channelled adaxially, not crested, villous abaxially with curved hairs, with or without long straight patent hairs added; leaflets sessile, in 10–13(–17) pairs, oblong, curving slightly towards tip, 6–10(–12) mm long, 1,2–1,5 mm wide, base oblique, apex asymmetric, apiculate, adaxial surface glabrous, dotted with minute black glands, abaxial glabrous, glabrescent or villous with curved hairs, margin glabrous or sparsely ciliate, midrib excentric, lateral nerves several towards both margins, prominulous abaxially. *Inflorescences* supra-axillary, 1–3-flowered, bracts asymmetric, acuminate, pedicels, at flowering, ± 10 mm long, at fruiting, ± 15 mm long, sparsely to densely velutinous with curled hairs, with many long straight patent hairs intermixed. *Petals* obovate, 4–6 mm long, 2–5 mm wide, usually only slightly exceeding pubescent sepals, pale yellow. *Ovaries* densely strigose with stiff bristle-like, or apically swollen (each resembling an inverted flask) white hairs. *Pods* 35–55 mm

long, 4,5–5 mm wide, valves sparsely strigose to glabrescent. *Seeds* rhombic, ± 3 mm long, ± 2,5 mm wide, testa glossy, brown, marked with lines of darker dots. Fig. 17 : 21.

A variable species within which three infraspecific categories are now recognized, namely var. *parviflora* Steyaert, var. *intermedia* Brenan (1960: 178–179) and var. *falcinella*. A fourth, var. *longifolia* Ghesq. (1932) is no longer considered conspecific and is placed with *C. parva* Steyaert (Brenan 1960: 178 & 1967: 89). It is only var. *parviflora*, a small-flowered annual, that extends into the area covered by the Flora of Southern Africa, and then only in the west. Vars. *intermedia* and *falcinella*, which mainly differ in the nature and density of the indumentum of the stipules, are large-flowered perennials, tropical African in distribution.

Var. *parviflora* is recorded from the Rwanda and the Zaire Republic, Uganda, Kenya, Zambia, Rhodesia, Botswana and South West Africa. There are relatively few gatherings from South West Africa and these only from northern and north-eastern localities. In these specimens the petiolar gland is elliptic rather than round, a feature representative of var. *intermedia*, but not of var. *falcinella*.

S.W.A.—1819 (Karakuwisa): Cigarette, N.E. of Karakuwisa, *Maguire 2437* (NBG). 1820 (Tarikora): Okavango distr., Ndonga Camp, *De Winter & Marais 4619*. 1917 (Tsumeb): Tsumeb, *Dinter 1314* (NBG). 1918 (Grootfontein): Grootfontein North, *Merxmüller & Giess 1788* (WIND).

Plants may be distinguished on gland form and on their annual habit from the perennial *C. biensis* (Steyaert) Mendonça & Torre, and on the channelled adaxial surface to the leaf rhachis from the less robust, finer leaved, larger flowered, more glabrous, also annual, *C. mimosoides* L.

22. **Cassia quarrei** (*Ghesq.*) *Steyaert* in Bull. Jard. Bot. Brux. 20 : 264, fig. 26 (1950); Steyaert in F.C.B. 3 : 522 (1952); Brenan in F.T.E.A. Legum.-Caesalp. : 95 (1967). Type: Zaire, Katanga, Etoile, *Quarré* 380 (BR, lecto.!).

Chamaecrista stricta E. Mey., Comm. 1 : 159 (1836). Type: E. Cape Province, Bashee River, *Drège* (K, iso.).

Cassia stricta (E. Mey.) Steud., Nom., ed. 2, 1 : 308 (1840) nom. illegit., non *Cassia stricta* Schrank (1819). *C. mimosoides* L. var. *stricta* (E. Mey.) Harv. in F.C. 2 : 273 (1862). *C. kirkii* Oliv. var. *quarrei* Ghesq. in Bull. Jard. Bot. Brux. 9 : 153 (1932), pro parte vide Steyaert. Type as for *C. quarrei*. *C. capensis* Thunb. var. *humifusa* Ghesq. in Bull. Jard. Bot. Brux. 9 : 164 (1932), pro parte, quoad *Robyns* 2448 (BR).

Annual herb with erect stem, simple or subsimple when young, arching outward with age and producing arcuate-spreading branches to form a frond-like mature plant, woody or sub-woody below, but never known to perennate. Roots annual, rootstock wanting. *Stems* sub-glabrous to velutinous with curved hairs, with, or without, long straight, patent hairs intermixed. *Leaves* linear to linear-oblong, ± parallel-sided but tapering slightly distally, (30–)40–70(–80) mm long, 8–15 mm wide; stipules straight, ovate-lanceolate prominently nerved, base oblique, apex acuminate; surfaces glabrous, margin with sparse, short hairs; petiolar gland sessile, never sunken, broadly elliptic to oblong, concave above (dish-shaped), dark brown when dry, bright reddish brown with a darker centre in life, 0,5–1,2 mm long, 0,4–0,8 mm wide, rhachis channelled adaxially, not crested, margins of the channel ciliate, strigose abaxially; leaflets sessile, in (15–)20–37 pairs, linear-oblong, 4–10 mm long, 0,9–2,3 mm wide, base oblique, apex acuminate to mucronate, glabrous except for sparse short hairs marginally and abaxially, midrib excentric, lateral nerves several towards both margins, prominulous beneath. *Inflorescences* supra-axillary, (1–)3(–4)-flowered, bracts prominently nerved, acuminate; pedicels, at flowering 7–10 mm, at fruiting –15 mm long, sparsely to densely velutinous with curled hairs with few, or many, long straight, patent hairs intermixed. *Petals* obovate, 5,5–7,5 mm long, usually not exceeding sepals, pale yellow. *Stamens* 8, staminodes 2 or 1 or 0, filiform often difficult to detect. *Ovaries* densely strigose, hairs almost straight, more or less appressed, greyish-white. *Pods* 30–60 mm long, 4–5,5 mm wide, valves greyish-white strigose. *Seeds* rhombic, 3–4 mm long, 1,5–3 mm wide, testa shining brown with lines of darker dots. Fig. 17: 22a.

Recorded from Zaire, Malawi, Zambia, Rhodesia, Swaziland and South Africa. In South Africa plants favour, in particular, altitudes between 700 and 1 700 m, occurring in the Transvaal, the northern Orange Free State, Natal and the Transkei. The species exhibits little variability throughout its range.

TRANSVAAL.—2230 (Messina): 20 km N.E. of Louis Trichardt on Witvlag rd., *Stephen 275*. 2329 (Pietersburg): Magoebaskloof, *Grobbelaar 88*. 2330 (Tzaneen): Duiwelskloof, Westfalia Estate, *Scheepers 54*. 2428 (Nylstroom): Potgietersrus, *Maguire 2526* (NBG). 2526 (Zeerust): Zwartruggens, Eland's River, *Sutton 846*. 2528 (Pretoria): Van Riebeeck Nature Reserve, *Kok 138*. 2530 (Lydenburg): Lydenburg, *Wilms 5901*. 2627 (Potchefstroom): farm Gladysvale, near Krugersdorp, *Rodin 3926*.

SWAZILAND.—2631 (Mbabane): between Piggs Peak & Mbabane, *Werdermann & Oberdieck 2205*.

O.F.S.—2627 (Potchefstroom): Parys, *Potts 533* BLFU).

NATAL.—2730 (Vryheid): Utrecht, *Schorn 18* (NU). 2732 (Ubombo): 8 km E. of Ngwavuma, *Schorn 12* (NU). 2830 (Dundee): Dannhauser distr., farm Broadfields, *Schorn 7* (NU, K). 2929 (Underberg): Estcourt, *West 1790*. 2930 (Pietermaritzburg): Camperdown, verge of National rd., *Schorn 23* (NU). 3030 (Port Shepstone): Kenterton, *Thode 4029* (STE).

CAPE.—3029 (Kokstad): circa Clydesdale, *Tyson 1167 p.p.* (SAM). 3129 (Port St. Johns): Transkei, Nquelini, *Strey 11170* (NH, NU). 3228 (Butterworth): Bashee River mouth, The Haven, *J. L. Gordon-Gray 1379* (NU).

Plants are annual and bear small pale yellow flowers. In both these characters there is relationship with *C. mimosoides* group 1 which is sympatric over some of *C. quarrei's* range in South Africa. The latter may be distinguished from the former by the structure of the adaxial surface of the leaf rhachis (clearly channelled in *C. quarrei*, crested in *C. mimosoides*) and by the stamens (in *C. quarrei*, 8, sometimes 2 with very short anthers and, 2 or 1 staminodal, filiform and difficult to detect, or absent; in *C. mimosoides*, 10, perhaps not all functional, but all with recognizable anthers). Plants are weeds and form extensive local populations in disturbed areas, but are not aggressive.

23. **Cassia plumosa** (*E. Mey.*) *Vogel*, Syn. Gen. Cassiae 65 (1837).

Chamaecrista plumosa E. Mey., Comm. 1 : 159 (1836). Type: E. Cape Province, between Bashee River [Basche] and Umtata, alt. 1 500 ft., *Drège* s.n. (K, iso.).

Perennial herb with one or few stems from a thickened woody rhizomatous rootstock, either prostrate and diffusely branched forming a spreading mat up to 40 cm in diameter and about 10 cm in height, or semi-erect or erect and eventually diffusely branched forming a compact more or less rounded bush up to about 40 cm in height, or erect and simple or sub-simple producing a few willowy branches above the middle to form a spindly sub-suffrutex up to 2,5 m in height. *Stems* sometimes glabrous or glabrescent, then often reddish to purplish on one side only, usually pubescent to velutinous with a sparse or dense covering of short, curved, appressed greyish-white hairs, or sparsely or densely villous with shorter and longer straight patent hairs either greyish-white, fulvous or bright yellow in colour, occasionally with all types of hair present together. *Leaves* linear, tapering slightly distally, 23–55(–75) mm long, 3–12 mm wide; stipules straight, narrowly lanceolate, prominently nerved, base oblique, apex acuminate and bristle-like, occasionally acute, surfaces glabrous and glaucous, or sparsely pubescent and yellowish-green, petiolar gland sessile, but never sunken, circular, elliptic or ovate, concave or shallowly depressed, 0,3–0,8(–1,6) mm long, 0,2–0,8 mm wide, yellow or light red when young becoming dark in age; rhachis with an upgrowth of tissue forming a ridge along the mid-adaxial line, this ridge crenate (occasionally ± serrate) when viewed in profile, the sinuses lying at the points of attachment of the leaflets, rhachis sparsely to densely villous abaxially; leaflets in 12–48 pairs, obliquely linear, 4–7 mm long, (0,6–)0,8–1,3(–1,9) mm wide; base oblique, apex asymmetric, apiculate or mucronate, surfaces glabrous and glaucous or glabrescent and non-glaucous, margins sparsely fringed with white hairs, midribs strongly excentric (towards anticous margin) lateral nerves several on posticous side, present, but indistinct anticously, prominent beneath. *Inflorescences* axillary to markedly supra-axillary, each a short raceme bearing (1–)2–5 flowers, bracts resembling stipules; pedicels at flowering (10–)17–30 mm long, at fruiting to 38 mm long, sparsely to densely velutinous with more or less appressed hairs. *Petals* obovate, 7,5–17 mm long, exceeding sepals, bright yellow. *Stamens* 10. *Ovaries* densely strigose, hairs straight, greyish white. *Pods* 30–55 mm long, 3–5 mm wide. *Seeds* rhombic, 3–4 mm long, 1–2,5 mm wide, testa shining brown with lines of darker dots. Fig. 17 : 23a ; 19 : 23.

Recorded from coastal Mozambique, the eastern Transvaal, Natal and the eastern Cape Province. The crested leaf rhachis has resulted in this species being much confused with *C. mimosoides*, but *C. plumosa* is perennial with a well developed underground system increasing and spreading by lateral rhizomes that produce aerial stems annually. It is also a constituent of permanent vegetation types and is not a transient ruderal. Its flowers are much larger and more conspicuous and more profusely produced on the plants for a shorter period than are those of *C. mimosoides*.

Meyer (1836) distinguished var. *diffusa* under *Chamaecrista plumosa*, which was upheld under *Cassia* by Vogel. Meyer regarded type and variety as very closely related, so var. *diffusa* has been included within var. *plumosa*, while a more clearly defined variant has been recognized as var. *erecta* Schorn & Gordon-Gray in J. S. Afr. Bot. 41 : 153 (1975). The variability within *C. plumosa* parallels that within *C. capensis*, for in both species there is a comparable range in growth form and in indumentum.

Plants more or less prostrate, much-branched sub-suffrutices, or ± erect, compact, more or less rounded, diffusely branched herbs or sub-suffrutices usually not exceeding 40 cm in height. Leaflets glaucous. Stems glabrous, glabrescent, puberulous or pubescent with curved, appressed hairs.....(a) var. *plumosa*

Plants erect, usually consisting of one or few stems from the perennial rootstock, these stems branching only above the middle to form a narrow, rather spindly sub-shrub up to 2,5 m in height; occasionally shorter and more diffusely branched to form a fairly compact, rounded sub-suffrutex 20 cm to 1,5 m in height. Leaves usually not glaucous, often yellowish green and puberulous especially towards base abaxially. Stems and abaxial surfaces of leaf rhachises villous, velutinous or pubescent to the naked eye, indumentum often fulvous or yellow. Hairs usually patent, often fulvous or yellow, occasionally curved, appressed but very densely packed

(b) var. *erecta**

(a) var. **plumosa.**

Gordon-Gray and Schorn in J. S. Afr. Bot. 41 : 153 (1975).

Chamaecrista plumosa var. *diffusa* E. Mey., Comm. 1 : 159 (1836). Type: Cape Province, near Umzimkulu [Omsamcula], below 100 ft. alt., *Drège* (whereabouts unknown).

Cassia plumosa var. *diffusa* (E. Mey.) Vogel, Syn. Gen. Cassiae 65 (1837). Type as above.

Perennial herb either prostrate and diffusely branched forming a spreading mat up to ± 40 cm in diameter, ± 10 cm high, or semi-erect or erect, eventually diffusely branched forming a compact ± rounded bush up to ± 40 cm high. *Stems* glabrous or glabrescent, reddish or purplish often on one side only, or pubescent to velutinous with sparse to dense curved, appressed greyish-white hairs. *Leaflets* glaucous.

Distributed mainly along the coast from Mozambique to Kei Mouth where plants usually grow in sandy grassveld. Occasional outliers from further inland, especially in Natal, also belong here, but these are few among a majority that must be placed with the taller growing, more hirsute, less glaucous var. *erecta*. In the field distinction between type and variety is far more obvious than in the herbarium, where some specimens at least, are likely to be sorted differently by workers with differing experience of the species.

NATAL.—2732 (Ubombo): Ingwavuma distr., Vazi Swamp, *Moll 4742*. 2832 (Mtubatuba): Hluhluwe Game Reserve, *Ward 1873* (NH, NU). 2929 (Underberg): Deepdale, *Evans 248* (NH). 2930 (Pietermaritzburg): Botha's Hill, *Schorn 5* (NU); Westville, Chiltern Hills, *Ward 6396* (NU, UDW). 2931 (Stanger): John Ross bridge over Tugela River, *Hilliard & Burtt 3207* (NU, E). 3030 (Port Shepstone): Umzumbe, *Strey 9739*.

CAPE.—3029 (Kokstad): Clydesdale, *Tyson 1167 p.p.* 3228 (Butterworth): near Kei Mouth, *Flanagan 1127*.

*Note.—Occasional erect, single or few-stemmed plants are glabrescent or glabrous. Because of their growth form and robustness they should be placed with var. *erecta*.

(b) var. **erecta** *Schorn & Gordon-Gray* in J. S. Afr. Bot. 41 : 153 (1975). Type: Natal, Camperdown Distr., Inchanga, *Schorn* 36 (NU, holo!).

Perennial herb producing one or few erect, simple or sub-simple stems eventually branching sparsely above the middle to form a spindly, ± willowy sub-suffrutex up to 2,5 m in height, less often shorter (from 2,5–0,4 m) and more diffusely branched and compacted. Stems usually densely villous with short and long straight patent hairs, greyish-white fulvous or yellow, less often sparsely villous, velutinous, pubescent or glabrescent, with long straight or curved ± appressed hairs. Leaflets usually yellow-green and ± pubescent abaxially especially towards the base of the leaf, less often glabrescent to glabrous and ± glaucous.

Distributed from the eastern Transvaal, through coastal and midland Natal to Port St. Johns. Usually a grassland forb flowering in summer.

TRANSVAAL.—2531 (Komatipoort): N. of White River, *Grobbelaar 1098*.

NATAL.—2730 (Vryheid): Paulpietersburg area, Dumbe Mts., *Galpin 9296*. 2731 (Louwsburg): Ngome, *Tinley 743* (NU). 2732 (Ubombo): Ubombo, *Vahrmeijer 1152*. 2831 (Nkandla): Eshowe, Hlinza Forest, *Edwards 2870*. 2930 (Pietermaritzburg): Inchanga, *Schorn 36* (NU). 2931 (Stanger): Maidstone, *Hillary 12* (NU). 3030 (Port Shepstone): 8 km from Port Edward on Izingolweni rd., *Hilliard 3042* (NU).

CAPE.—3129 (Port St Johns): Port St. Johns, *Schonland 4176* (STE).

It is possible that some of the variability within this variety is the outcome of sporadic hybridization and possibly introgression between plants of *C. plumosa* and *C. mimosoides* group 1. Populations of both these species are often to be found growing in the same general locality.

24. **Cassia mimosoides** *L.*, Sp. Pl. 1 : 379 (1753); Harv. in F.C. 2 : 273 (1862) excl. vars.; Forbes in S. Afr. J. Sci. 18 : 344 (1922) excl. vars.; Burtt Davy, Fl. Transv. 2 : 325 (1932) excl. syn.; Steyaert in Bull. Jard. Bot. Brux. 20 : 236, 240, 247, tab. 8 (1950); in F.C.B. 3 : 514, tab. 37 (1952); De Wit in Webbia 11 : 283 (1955); Mendonça & Torre in C.F.A. 2 : 181 (1956); Brenan in F.T.E.A. Legum.-Caesalp. : 100–103 (1967); Schreiber in F.S.W.A. 59 : 12 (1967). Syntypes: Sri Lanka, *Herb. Hermann* vol. 2 : 13, 78 (BM).

Annual, or short-lived perennial herb (a plant may persist into a second season, or longer under especially favourable conditions

but a perennial, rhizomatous underground system from which new aerial shoots arise annually is never developed), up to 1,6 m high with erect, simple or subsimple stem usually branching sparsely above the middle (often prostrate to decumbent soon after germination, later becoming erect), OR ± 45–75 cm high and branching from ground level to become ± rounded; tap-root system branching, spreading, often ± woody near ground level. *Stems* usually slender, sometimes up to 12 mm in diameter and ± woody, usually pubescent with short, curved, appressed upward pointing hairs, or glabrescent, or glabrous. *Leaves* linear, ± parallel-sided but tapering slightly distally, (33–)40–80(–115) mm long, 3–12 mm wide; stipules falcate (curved in lower half, straight above, persistent, ovate-lanceolate, prominently nerved, base oblique, apex acuminate, surfaces glabrous, margin glabrous to shortly ciliate; petiolar gland variable, either sessile, elliptic, projecting laterally over petiole, 0,7–1,7 mm long by 0,5–1(–1,3) mm wide, yellow becoming red or pink at maturity and brown when dry, OR sessile or subsessile, circular to circular-elliptic, (0,2–)0,4(–0,6) mm long, 0,2–0,5 mm wide, pale yellow margined with a dark yellowish or reddish-brown central zone; rhachis crested adaxially, crests symmetrically or asymmetrically crenate or serrate in profile and shallowly channelled above with the margins of the channel usually ciliate; leaflets sessile, in (28–) 35–65 pairs, linear, 3–8 mm long, 0,3–1,3 mm wide, base oblique, apex asymmetric, mucronate, surfaces glabrous, or glabrescent to pubescent especially beneath, midrib excentric, lateral nerves developed towards both margins, prominulous beneath. *Inflorescences* supra-axillary (occasionally 2 inflorescences develop at different points on the same internode), 3–1-flowered, bracts resembling stipules and persisting with them to become conspicuous after the leaves have fallen; pedicels, at flowering, (5–)8–14(–25) mm long, velutinous with short patent hairs, or pubescent with appressed, curved hairs. *Petals* obovate, 5–7(–10) mm long, pale cream or yellow to bright yellow, not much exceeding sepals that are brownish often tinged with red. *Ovaries* lanate with fine, ± matted, curled to straight, greyish-white hairs, OR strigose with dense, straight, appressed greyish-white hairs. *Pods* 35–50 mm long, 3–5,5 mm wide, valves ± lanate to villous with scattered, fine, ± matted, curled hairs. *Seeds* rhombic, 3–4 mm long, 1–2,5 mm wide, testa shining brown with lines of darker dots, areole lacking. Fig. 20 : 24.

An extremely variable species recorded from Sri Lanka, the tropics of Asia and Africa, and South Africa. Brenan (1967), for Tropical East Africa, recognized within it seven groups which he identified by symbols but did not name. Three of these he stated extended into South Africa. The present study has also shown three groups within the Flora area, but comparison of representative specimens of these against Hermann's types and Brenan's entities led to the conclusion that in no case was agreement sufficiently precise for direct relationships to be accepted.

Accounts of the variants in Angola and in the Flora Zambesiaca area are needed. At the present stage of knowledge of the species in Africa, it would be unwise to establish infraspecific taxa for the S. African entities: they are therefore merely regarded as groups identified by numerals and thus are distinct from Brenan's groups which are identified by letters. Elsewhere (Gordon-Gray and Schorn in J.S. Afr. Bot. 41 : 154, 1975) these groups have been regarded as segregants from the typical form of *C. mimosoides* and identified according to the locality in South Africa where they are mainly represented).

In the Flora area, *C. mimosoides* (all groups), may be distinguished from other species of the Section Chamaecrista by the following characteristics:

Plants annual, sometimes persisting into a second season or longer, but never producing a rhizomatous underground system from which new aerial shoots arise annually.

Leaf rhachis with adaxial surface crested, never distinctly channelled (a faint channel is often visible along the top of the crest, but the crest is always present); the crests between the points of attachment of the leaflets are symmetrically or asymmetrically crenate or markedly serrate when seen in profile.

This species is most readily confused with *C. plumosa* (perennial with rhizomatous rootstock producing aerial shoots annually; petals 7,5–17 mm long) and with *C. quarrei* (annual with leaf rhachis channelled adaxially; petals 5,5–7,5 mm long).

The infraspecific groups are best distinguished as follows:

Petiolar gland sessile, elliptic, projecting laterally over petiole (best seen when petiole is viewed from beneath) 0,7–1,7 mm long, 0,5–1 (–1,3) mm wide..... *Group 1*

Petiolar gland sub-sessile to sessile, circular, occasionally circular-elliptic, (0,2–)0,4–0,5 (–0,6) mm long; 0,2–0,4 mm wide:

Petiolar gland sub-sessile to sessile, circular, usually 0,4 mm in diameter. Flowers bright yellow; either petals 5–7,5 mm long and pedicels 20–25 mm long, OR petals 7,5–10 mm long and pedicels 10–14 mm long; ovaries densely strigose with straight, rather coarse greyish-white hairs.... *Group 3*

Petiolar gland sessile, circular to circular-elliptic, 0,2–0,6 mm long, 0,2–0,3 mm wide. Flowers pale, creamy yellow; petals 5–7,5 mm long and pedicels 5–12(–14) mm long; ovaries lanate with curled and straight more or less matted hairs..... *Group 2*

Group 1.

Characterized most readily by the relatively large, elliptic petiolar gland, the more or less uniform pubescence of curved, appressed hairs and the stipules and bracts that persist after the leaves have fallen. Plants of group 1 differ from the typical form of *C. mimosoides* in the short pedicelled, smaller, paler flowers; the shorter leaves with large elliptic petiolar glands and the symmetrically or asymmetrically crenate crests to the adaxial rhachis surface when this is viewed in profile. Fig. 17 : 24/1; 18 : 24/1.

Recorded from Mozambique and some of the off-shore islands (including Bazaruto and Inhaca), Swaziland, the Transvaal and Natal. Its presence in Rhodesia needs confirmation as does its absence from the Transkei.

A weed of disturbed areas, especially common on road verges and in secondary grassveld on sandy soils, but not aggressive. Along the Natal coast there is evidence of hybridization between plants of this taxon and plants of *C. plumosa*.

TRANSVAAL.—2430 (Pilgrim's Rest): Mariepskop, *Werdermann & Oberdieck 1816*. 2530 (Lydenburg): Nelspruit distr., *Breyer s.n.*

SWAZILAND.—Without precise locality, *Stewart 8952* (GRA).

NATAL.—2632 (Bela Vista): Kosi Store, *Vahrmeijer 1230*. 2732 (Ubombo): Sordwana Bay, *Vahrmeijer & Tölken 330*. 2831 (Nkandla): Umfolozi Game Reserve, Tobothi, *Ross 2024*. 2832 (Mtubatuba): St. Lucia Estuary, E. side of Narrows, *Ward 4340*. 2930 (Pietermaritzburg): Hammarsdale, near National rd., *Schorn 4* (NU). 2931 (Stanger): 1,6 km N. of Stanger, *Moll 782*. 3030 (Port Shepstone): Uvongo, *Strey 9706*.

Group 2.

Differs from group 1 in the smaller, circular or circular-elliptic petiolar gland, the almost cream flowers and the less robust, more freely branching growth form. There is also a tendency (appearing much better expressed in plants from Rhodesian localities but this requiring further confirmation) for the pedicels to be longer. These longer pedicelled plants (which may have slightly larger, brighter yellow flowers) show resemblance also with group 3, but cannot be placed there because of differences in general facies, texture and indumentum.

Group 2 differs from the typical form of *C. mimosoides* in its usually pale, small, short-pedicelled flowers, its low, rounded growth form and the crests to the adaxial rhachis surface that are never serrate in profile. Fig. 17 : 24/2.

Recorded from Rhodesia, Mozambique and some of the off-shore islands (including Inhaca), Swaziland, the Transvaal and Natal. Also a weed.

TRANSVAAL.—2330 (Tzaneen): Tzaneen, *Rogers 12533* (GRA). 2427 (Thabazimbi): Waterberg, *Coetzer 3536/5*. 2428 (Nylstroom): Potgietersrus, *Rogers 1335* (GRA). 2430 (Pilgrim's Rest): beyond Blyde River Nature Reserve camp on Ohrigstad rd., *Hilliard & Burtt 6031A*. 2528 (Pretoria): Pretoria, Onderstepoort, "*Aaron*" *7937*. 2529 (Witbank): Loskopdam, *Theron 1058*. 2531 (Komatipoort): Barberton distr., Berea, *Thorncroft 885* (NH). 2628 (Johannesburg): Johannesburg, *Bruyns-Haylett 42* (NU).

SWAZILAND.—2631 (Mbabane): Komati River, old ferry, *Compton 29826*.

NATAL.—2632 (Bela Vista): Ndumu Game Reserve, Ndumu Hill, *Pooley 716* (NU). 2731 (Louwsburg): 3 km from Mkuzi on Ngoma rd., *Ross 1028* (NU). 2732 (Ubombo): 8 km N. of Jozini Dam, *Schorn 13* (NU). 2832 (Mtubatuba): Richard's Bay, *Rump s.n.* (NH). 2930 (Pietermaritzburg): Isipingo Flats, *Ward 6527* (NU, UDW).

Group 3.

Very close to the typical form of *C. mimosoides*, but differing in the development of lateral branches (branches are not clearly evident in Hermann's types, but are no doubt produced in plants growing in the type locality), and in the slightly larger flowers. This is the variant that was accepted without comment by Schreiber (1967, 59 : 12) as *C. mimosoides* and it may well be shown eventually that it falls within the range of variation of the species in Sri Lanka.

Plants differ from those included within groups 2 and 3 in the longer, more feathery leaves; the larger, brighter yellow flowers, the glabrescent to glabrous (only occasionally pubescent) stems and the different facies that is difficult to express in words. Fig. 17 : 24/3, 24/4; 18 : 24/3.

Recorded from northern South West Africa. Its suspected presence in Botswana, Angola, Rhodesia and Mozambique needs confirmation. In South West Africa two forms are represented: the first is small-flowered (petals 5–7,5 mm long), with long fine pedicels (20–25 mm long) and the crests to the adaxial surface of the rhachis asymmetrically crenate in profile. The second is larger-flowered (petals

7,5–10 mm long) with shorter pedicels (10–14 mm long) and crests markedly serrate in profile. It is this latter form that agrees most closely with Hermann's types.

A weed, but appearing to favour damp or wet situations in sandy soils.

S.W.A.—1719 (Runtu): Okavango bei Runtu, *Giess 10085* (WIND). 1722 (Chirundi): 48 km N. of Gautscha Pan, *Story 6439*. 1820 (Tarikora): 16 km N. of Tamso on Kapupahedi rd., *De Winter & Marais 4728 p.p.* 1821 (Andara): Caprivi-Zipfel, Popa Fälle, *Merxmüller & Giess 2020*. Without precise locality: Ovamboland, Kunene River banks, *Barnard 525* (NBG).

Exotic species known only under cultivation

Cassia angolensis *Hiern,* Cat. Afr. Pl. Welw. 1 : 291 (1896).

Tree up to 25 m in height, deciduous. *Petioles* and rhachides eglandular; *leaflets* in up to 13 pairs, glabrous or almost so. *Racemes* up to 12 cm long. *Petals* golden yellow; filaments of 2–3 anticous stamens each with an S-bend above the base. *Pods* cylindrical, indehiscent; seeds flattened, without areoles.

Indigenous to Tropical Africa.

Cassia artemisioides *Gaudich. ex DC.*, Prodr. 2 : 495 (1825).

Shrub ± bushy, ± 1 m in height, grey pubescent all over. *Petioles* eglandular; leaves with up to 6 pairs of ± terete, almost filiform leaflets with a shortly stipitate ± pyramidal gland between the lowest pair. *Racemes* axillary, on peduncles 1–2 cm long, several-flowered, but short. *Petals* deep yellow; stamens 10, ± uniform. *Pods* flattened, dehiscent, valves papery, brown, shining; seeds flattened.

Indigenous to South-central Australia.

TRANSVAAL.—2528 (Pretoria): Burgers Park, *Repton 1443;* Union Buildings, *Schlieben & Mendelsohn 12763*.

Cassia auriculata *L.*, Sp. Pl. 1 : 379 (1753).

Shrub or small tree up to 7,5 m in height. *Petioles* eglandular; *leaves* with up to 13 pairs of puberulous or softy pubescent leaflets; rhachides with a subulate or fusiform gland between each pair, sometimes excepting the uppermost. *Racemes* corymbose, aggregated into terminal panicles. *Petals* yellow; 3 abaxial stamens with long filaments and large anthers. *Pods* flattened, indehiscent, valves papery; seeds flattened, areolate.

Indigenous to Sri Lanka, India and Burma.

NATAL.—2931 (Stanger): Durban Botanic Gardens, *Mills 291*.

Cassia eremophila *A. Cunn. ex Vogel,* Syn. Gen. Cassiae 47 (1837).

Shrub, ± bushy, up to 3 m in height, greyish green. *Petioles* eglandular; *leaves* with up to 3 pairs of linear leaflets, 2–3 mm wide, with a prominent gland between at least one of the pairs of leaflets. *Racemes*, flowers and pods resembling those of *C. artemesioides*; seeds flattened, black with an oblong, linear areole on each face.

Indigenous to east and central Australia.

TRANSVAAL.—2528 (Pretoria): Venning Park, *Du Toit & Liebenberg s.n.*

Cassia fistula *L.*, Sp. Pl. 1 : 377 (1753).

Tree up to 10 m high, deciduous, slow-growing, the flowers developing with the new leaves. *Petioles* and rhachides eglandular. *Leaves* with 3–8 pairs of leaflets 7–18 cm long, 5–8 cm wide, broadly ovate, acute, ± equal at the base. *Racemes* pendulous, 1–3 together from behind the leaves on the old branches, up to 60 cm long. *Flowers* golden yellow, petals 1,6–3 cm long, abaxial filaments gradually and slightly thickened in the middle. *Pods* cylindric, 1,5–2,5 cm in diameter, woody, blackish; seeds produced in fleshy pulp eaten by monkeys.

Indigenous to India and Sri Lanka, cultivated in tropical Asia.

TRANSVAAL.—2531 (Komatipoort): Barberton, *Nel 270* (NBG).

NATAL.—2931 (Stanger): Durban, *Schlieben 10215*.

Cassia javanica *L.*, Sp. Pl. 1 : 379 (1753).

Tree up to 30 m high, with a spiny trunk, deciduous. *Petioles* and rhachides eglandular. *Leaflets* rounded at apex, stipules leafy, 12–25 mm long. *Racemes* 3–16 cm long, borne singly at the ends of short, mostly leafless shoots arising from older, leafy twigs; petals pink, bracts persisting while flowers are open. *Pods* cylindric, black, up to 60 cm long.

Indigenous to Java, Sumatra and the Phillipines.

NATAL.—2931 (Stanger): Durban, *Schlieben 10214*.

Cassia multijuga *L. C. Rich.* in Act. Soc. Hist. Nat. Paris 1 : 108 (1792).

Tree, up to 9 m high, evergreen, usually quick-growing. *Petioles* eglandular; *leaves*

with up to 26 pairs of ± oblong leaflets with appressed pubescence; rhachides with a conspicuous finger-like gland between 1–4 or more lowest leaflet pairs. *Racemes* axillary and terminal, densely clustered to the ends of the branches forming a pseudo-panicle up to 25 cm long. *Petals* bright yellow. *Pods* flattened, brown, up to 10 cm long; seeds flattened, brown.

Indigenous to Central and South America.

TRANSVAAL.—2528 (Pretoria): Pretoria, Experimental Garden, *Repton 6901.*

NATAL.—2931 (Stanger): Edith Benson Crescent, Durban, *Holmes s.n.*

Cassia speciosa *Schrad.* in Goett. Gel. Anz. 1 : 718 (1821).

Small tree or shrub with densely pubescent stems. *Petioles* eglandular, leaves with 2 pairs of asymmetric, acute, densely villous leaflets up to 20 cm long and 7 cm wide, with a shortly stalked, pyramidal or rounded gland between each pair. *Racemes* up to 15 cm long; petals deep yellow up to 5 cm long; staminodes 3, fertile stamens 7, with 3 adaxial largest, filaments and ovary densely pubescent. *Pods* and seeds not seen.

Indigenous to Brazil.

NATAL.—2931 (Stanger): Durban North, *Carver s.n.*

Cassia spectabilis *DC.*, Cat. Pl. Hort. Monsp. 90 (1813).

Tree up to 7 m high or shrubby to 4 m, with dark olive green, densely and finely pubescent stem. *Petioles* and rhachides eglandular; *leaflets* in up to 15 pairs, narrowly elliptic, or ovate-lanceolate, acute, 2,5–6,0(–9,0) cm long, 1,5–2,0 cm wide, densely pubescent to villous beneath. *Racemes* terminal and axillary, stiff and erect, crowded to the ends of branches, forming pseudo-panicles; peduncles up to 5 cm long, flowers yellow, sweet scented; petals 2,0–2,5 cm long, ± 1,5 cm wide; stamens 3 reduced ± staminodal, 7 fertile ± uniform. *Pods* terete, ± torulose; seeds not seen.

Indigenous to Central America, the West Indies and tropical South America.

TRANSVAAL.—2528 (Pretoria): Booysens Nursery, *Repton 6906.*

NATAL.—2931 (Stanger): Durban Botanic Gardens, *Mills 297.*

Cassia splendida *Vogel*, Syn. Gen. Cassiae 17 (1837).

Shrub to 5 m high, freely branched. *Petioles* eglandular, very slender, 2–3 cm long; *leaflets* in 2 pairs, with a clearly stipitate, finger-like gland between the first pair only, oblong-elliptic, 2,5–4,0 cm long, 1,0–1,5 cm wide, apices rounded, glabrous. *Inflorescences* terminating short lateral shoots, few-flowered; petals stalked, 3–4 cm long, ± 2 cm wide, deep golden yellow; stamens: 3 adaxial staminodal, 4 lateral with anthers ± 1 cm long, 3 abaxial largest with curved anthers ± 2 cm long. *Pods* and seeds not seen.

Indigenous to tropical South America.

TRANSVAAL.—2528 (Pretoria): cultivated in park, *Aves s.n.*

List of putative hybrids

1. Putative parents **C. floribunda** *Cav.* × **C. tomentosa** *L.f.*

CAPE: *Schlechter* 2622; *Rogers* 25383, 38539; *Breyer* 23707, 23903; *Denman* 328; *Welsh* 67.

TRANSVAAL: *Leendertz* 199.

These specimens all show some evidence of hairs (*C. floribunda* is glabrous). Some resemble *C. floribunda* in general facies; others are like *C. tomentosa* especially in leaf shape, twig branching and rhachidal gland form.

2. Putative parents **C. floribunda** *Cav.* × **C. bicapsularis** *L.*

NATAL: *Strey* 7725.

3. Putative parents **C. plumosa** (*E. Mey.*) *Vogel* × **C. mimosoides** *L.* group 1.

NATAL: *Strey* 6568; *Ward* 6743.

3551 **17. PARKINSONIA**

Parkinsonia *L.*, Sp. Pl. 1 : 375 (1753); Gen. Pl. ed. 5 : 177 (1754); DC., Prodr. 2 : 485 (1825); Harv. in F.C. 2 : 269 (1862); Benth. & Hook. f., Gen. Pl. 1 : 570 (1865); Harv., Gen. Pl. ed. 2 : 89 (1868); Oliv. in F.T.A. 2 : 266 (1871); Taub. in Pflanzenfam. 3, 3 : 171 (1892); Harms in Engl., Pflanzenw. Afr. 3, 1 : 500 (1915); Johnston in Contr. Gray Herb. 70 : 61 (1924); Bak.f., Leg. Trop. Afr. 3 : 624 (1930); Phill., Gen. ed. 2 : 397 (1951): Wilczek in F.C.B. 3 : 247 (1952); Brenan in Kew Bull. 17 : 203 (1963); Hutch., Gen. Fl. Pl. 1 : 264 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 346 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 43 (1967); Schreiber in F.S.W.A. 59 : 16 (1967). Type species: P. *aculeata* L.

Cercidium Tul. in Arch. Mus. Par. 4 : 133 (1844); Benth. & Hook.f., Gen. Pl. 1 : 570 (1865); Brenan in Kew Bull. 17 : 203 (1963); Hutch., Gen. Fl. Pl. 1 : 264 (1964).

Peltophoropsis Chiov. in Ann. Bot., Roma 13 : 385 (1915); Roti-Michelozzi in Webbia 13 : 220 (1957); Brenan in Kew Bull. 17 : 203 (1963); Hutch., Gen. Fl. Pl. 1 : 264 (1964).

Shrubs or small trees, not climbing, armed with spines or unarmed, eglandular. *Leaves* bipinnate; sometimes (and in our species) the rhachillae ± phyllodial; leaflets opposite or partly alternate, sometimes (and in our species) much reduced or absent. *Stipules* various, minute and scale-like to conspicuous and spinescent. *Inflorescences* in axillary racemes which are sometimes corymbose and short; bracts minute and scale-like, soon deciduous. *Flowers* hermaphrodite. *Sepals* 5, valvate to very narrowly imbricate. *Petals* 5, subequal except for the upper one which is usually somewhat modified and has a more pronounced claw than the others. *Stamens* 10; filaments alternately longer and shorter, all pubescent below; anthers dorsifixed, opening by longitudinal slits. *Ovary* free, shortly stipitate, with 2–8 ovules, glabrous to (more usually) ± pubescent; style glabrous or clothed below like the ovary, often ± spirally twisted; stigma truncate, ciliolate or glabrous. *Pods* linear to ± elliptic, flat or turgid, sometimes ± constricted between the seeds, not winged, indehiscent, with usually papery or thinly coriaceous brown valves. *Seeds* usually ± oblique or longitudinal, hard, compressed, with endosperm; funicle usually rather long and slender.

The generic concept adopted here is that of Brenan in Kew Bull. 17 : 203–209 (1963). A genus of ± 14 species, mostly in the drier areas of North and South America, but one in southern Africa and two species in east and north-east tropical Africa.

The genus is named in honour of John Parkinson, a London apothecary and botanist of the seventeenth century, Curator of the Royal Gardens at Hampton Court about 350 years ago.

Leaf-rhachis not spinescent, the spines being modified lateral shoots; leaves reduced to terete or subterete pinnae-rhachillae up to 15 cm long, not winged or flattened, usually without leaflets but occasionally with minute inconspicuous scale-like leaflets; stipules not spinescent.....1. *P. africana*

Leaf-rhachis spinescent; pinnae-rhachillae up to 40 cm long, laterally winged and thus appearing flattened, usually with numerous opposite or alternate leaflets along each margin; stipules usually spinescent.....2. *P. aculeata*

1. **Parkinsonia africana** *Sond.* in Linnaea 23 : 38 (1850); Harv. in F.C. 2 : 269 (1862); Schinz in Mém. Herb. Boiss. 1 : 123 (1900); Sim, For. Fl. Cape Col. 208 (1907); Harms in Engl., Pflanzenw. Afr. 3, 1 : 501, fig. 267 (1915); Marloth, Fl. S. Afr. 2 : fig. 35 (1925); Dinter in Feddes Repert. 22 : 111 (1925); Bak.f., Leg. Trop. Afr. 3 : 625 (1930); Wilman, Checklist Griq. West 69 (1946); O. B. Miller in J. S. Afr. Bot. 18 : 34 (1952); Leistner in Koedoe 2 : 163 (1959); Brenan in Kew Bull. 17 : 206 (1963); Von Breitenbach, Indig. Trees S. Afr. 3 : 348 (1965); Schreiber in F.S.W.A. 59 : 16 (1967); Palmer & Pitman, Trees S. Afr. 2 : 887 (1973). Type: Cape, Calvinia Distr., Springbokkeel, *Burke & Zeyher* 557 (BM!, K!, OXF!, PRE!, iso.).

Virgately branched shrub or tree up to 6 m high, armed with stout spines which are modified lateral shoots and which are often branched and bear leaves and inflorescences; young branchlets pale greenish-yellow or yellowish-brown, becoming greyish-

brown to grey or brown with age, subglabrous or occasionally finely pubescent when young. *Leaves* reduced to green pinnae-rhachillae (2)4–15 cm long, terete or subterete, slightly grooved on the upper surface, with up to 15 nodes but no leaflets or occasionally with minute inconspicuous scale-like linear or oblanceolate opposite leaflets up to 1,5 × 0,5 mm. *Stipules* inconspicuous, not spinescent. *Racemes* lax, up to 18 cm long; bracts up to 1,5 mm long, ± ovate, soon deciduous. *Flowers* yellow, on pedicels 3–10 mm long (excluding the elongate lower part of the hypanthium). *Receptacle* consisting of a disc up to 3 mm in diameter and a lower elongate part up to 10 mm long which simulates the pedicel; the disc usually remaining in fruit to form a small collar. *Sepals* 5–8 mm long, narrowly-ovate to ± oblong, narrowly imbricate, becoming reflexed in flower, subglabrous or with short scattered hairs. *Petals* 7–12 mm long, the upper one larger than the others, with a distinct claw and a ± reniform lamina; the other petals ovate-lanceolate. *Stamens* up to 12 mm long, filaments densely pubescent below; anthers 1–1,7 mm long. *Ovary* glabrous or with few scattered hairs, especially on the margins. *Pods* brown, (3,5)5–13 cm long, 0,6–0,95 cm wide, linear, straight or curved and sometimes ± falcate, attenuate at both ends, flattened, often somewhat constricted between the seeds, glabrous, longitudinally venose, indehiscent or perhaps very tardily dehiscent. *Seeds* 7–9,5 × 5–6 × 2–3 mm, oblong, elongated longitudinally in the pods, mottled, light brown with dark brown markings, smooth. Fig. 21.

Found in South West Africa, the northern Cape Province and probably also in south-western Botswana. Occurs in dry semi-desert or desert areas, especially on sandy plains and near watercourses.

S.W.A.—1812 (Sanitatas): Orupembe, *Story 5709*. 2013 (Unjab Mouth): ± 144 km W. of Welwitschia, *Jensen 19*. 2014 (Welwitschia): Fransfontein, *Liebenberg 4921*. 2115 (Karibib): Karibib, *Kinges 3194*. 2117 (Otjosondu): Otjosondu, *Seydel 3326* (M). 2214 (Swakopmund): 59 km E. of Swakopmund on road to Usakos, *De Winter 3198*. 2216 (Otjimbingwe): Okomitundu, *Haelbich sub Seydel 1679* (M). 2316 (Nauchas): farm Kos, *Merxnüller 920*. 2317 (Rehoboth): farm Sib, ± 32 km N. of Uhlenhorst, *Boshoff & Mason 3573*. 2318 (Leonardville): near junction of Black and White Nossob Rivers, *Codd 5839*. 2416 (Maltahöhe): Bullspoort, base of Naukloof Mts., *Rodin 2945*. 2417 (Mariental): Hardap, *Coetzee* 7. 2617 (Bethanie): between Gellap and Great Fish River, *Pearson* 9293 (K). 2618 (Keetmanshoop): Keetmanshoop, *Lynes 1894* (BM). 2619 (Aroab): near Aroab, *Gerstner 6284*. 2717 (Chamaites): Fish River Canyon, *Schlieben 10268*. 2718 (Grünau): Klein Karas, *Ortendahl 126* (K). 2818 (Warmbad): Ramansdrift, *Kruger* 7. 2819 (Ariamsvlei): Ariamsvlei, *Merxmüller 730*.

CAPE.—2620 (Twee Rivieren): near S.W.A. border, 6,4 km W. of Rietfontein, *Van Son sub TRV 31760*. 2722 (Olifantshoek): Klapin, *Leistner 2053*. 2723 (Kuruman): Newstead near the Orange River, *Acocks 1767*. 2818 (Warmbad): near Henkriesfontein, *Pearson 3104* (BM, K). 2820 (Kakamas): near Augrabies Falls hotel, *Barclay & Acocks 979*. 2821 (Upington): 45 km W. of Upington, 3,2 km E. of Neilersdrift, on Brakfontein Kop, *Werger 148*. 2918 (Gamoep): between Kweekfontein and Ougrabies, *Pearson 3797* (K). 2922 (Prieska): 12,8 km E. of Koegas, *Codd 1257*. 3019 (Loeriesfontein): Springbokkeel, *Burke & Zeyher 557*.

The seeds of *P. africana* are said to make an excellent coffee.

P. africana is often called lemoenhout or lemoendoring; in allusion to the pale greenish-yellow branches.

2. **Parkinsonia aculeata** *L.*, Sp. Pl. 1 : 375 (1753); DC., Prodr. 2 : 486 (1825); Benth. in Mart., Fl. Bras. 15, 2 : 78, t.26 (1870); Oliv. in F.T.A. 2 : 267 (1871); Harms in Engl., Pflanzenw. Afr. 3, 1 : 500 (1915); Bak.f., Leg. Trop. Afr. 3 : 625 (1930); Brenan, Checklist Tang. Terr. 105 (1949); Wilczek in F.C.B. 3 : 248 (1952); Torre & Hillc. in C.F.A. 2 : 174 (1956); Roti-Michelozzi in Webbia 13 : 179 (1957); Keay in F.W.T.A. ed.2, 1 : 483, t.154B (1958); Brenan in Kew Bull. 17 : 206 (1963); in F.T.E.A. Legum.-Caesalp. : 43 (1967); Schreiber in F.S.W.A. 59 : 17 (1967); Ross, Fl. Natal 195 (1973). Type from South America.

Shrub or tree up to 8 m high, armed with stout spines which are modified leaf-rhachides and sometimes also with stipular spines; young branchlets pale greenish-yellow or yellowish-brown, becoming brown with age, subglabrous or shortly appressed-pubescent when young. *Leaves* with 1–2(3) pairs of very long slender green pinnae inserted very close together near the base of the spinescent rhachis, thus resembling 2–4(6) simply pinnate leaves borne on a short spine; spines (rhachides) 0,2–1,7 cm long; pinnae (rhachillae) up to 40 cm long, broadly winged and thus appearing flattened, up to 2,5 mm wide; with up to 80 very small obovate-elliptic to obovate-oblong or oblong leaflets up to 6(9) × 2(3) mm along each margin of the rhachilla, opposite or

FIG. 21.—**Parkinsonia africana.** 1, flowering branch with reduced leaves, × ⅔, from *Keet* 1659; 2, leaflets and portion of pinna-rhachilla, × 6, from *Gerstner* 6284; 3, flower, × 3; 4, sepals and disc-like receptacle, × 4; 5, upper petal, × 4; 6, stamen, × 4; 7, gynoecium, × 4, all from *Keet* 1659; 8, fruiting twig, × ⅔; 9, seed, surface view, × 4; 10, funicular end of seed, × 4, all from *Pearson* 9293.

alternate, sometimes leaflets absent or deciduous. *Stipules* often spinescent like the rhachis. *Racemes* lax, up to 20 cm long; bracts up to 2 mm long, soon deciduous. *Flowers* yellow, on pedicels 5–16 mm long (excluding the elongate lower part of the hypanthium). *Receptacle* consisting of a disc ± 3 mm in diameter and a lower elongate part up to 4 mm long which simulates the pedicel but is shorter than the pedicel proper; the disc remaining in fruit to form a small collar. *Sepals* 5–7 mm long, narrowly ovate to oblong, narrowly imbricate, becoming reflexed in flower, subglabrous or with short scattered hairs. *Petals* 8–14 mm long, the upper one with a distinct claw; the other petals ± obovate. *Stamens* up to 10 mm long: filaments densely pubescent below; anthers 1,3–2 mm long. *Ovary* ± densely clothed with long white hairs. *Pods* brown, (2)3–12(15) cm long, 0,5–0,8 cm wide, linear, usually ± straight, attenuate at both ends, ± flattened, often somewhat constricted between the seeds, glabrous, longitudinally venose, indehiscent. *Seeds* 5–9 × 4–6 × 1,5–2,5 mm, elliptic-oblong, elongated in the pod.

A native of tropical and subtropical America, but now widely cultivated in many tropical and subtropical countries, often becoming naturalized and sometimes troublesome although there is no evidence of this happening in our area so far.

S.W.A.—2017 (Waterberg): Otjenga, *Volk 840* (M). 2216 (Otjimbingwe): farm Otjiseva, *Wiss 886* (M). Grid ref. unknown: Grootfontein Distr., without locality, *Le Roux 237* (M).

TRANSVAAL.—2528 (Pretoria): Prince's Park, *Repton 372;* Grounds of University of Pretoria, *Grobbelaar 179.*

NATAL.—2632 (Bela Vista): Ndumu Game Reserve, *Dixon 1.* 2930 (Pietermaritzburg): Pietermaritz Street, *Taylor 2248.*

O.F.S.—2926 (Bloemfontein): Grounds of Bloemfontein mental hospital, *Kotze 774.*

CAPE.—2824 (Kimberley): Kimberley, *Badenhorst 35; Wilman sub KMG 2470.*

In America *P. aculeata* is commonly known as the Jerusalem Thorn.

3552 18. HAEMATOXYLUM

Haematoxylum *L.*, Sp. Pl. 1 : 384 (1753); Gen. Pl. ed. 5 : 181 (1754); Gen. Pl. ed. 6 : 210 (1764); DC., Prodr. 2 : 485 (1825), as *Haematoxylon;* G. Don, Gen. Syst. 2 : 434 (1832), as *Haematoxylon;* Benth. & Hook. f., Gen. Pl. 1 : 567 (1865), as *Haematoxylon*; Taub. in Pflanzenfam. 3, 3 : 171 (1892), as *Haematoxylon*; Harms in Engl., Pflanzenw. Afr. 3, 1 : 504 (1915), as *Haematoxylon;* Bak f., Leg. Trop. Afr. 3 : 619 (1930), as *Haematoxylon*; Phill., Gen. ed. 2 : 397 (1951), as *Haematoxylon*; Hutch., Gen. Fl. Pl. 1 : 236 (1964), as *Haematoxylon*; Schreiber in F.S.W.A. 59 : 14 (1967). Type species: *H. campechianum* L.

Haematoxyllum Scop., Introd. Hist. Nat. 225 (1777).

Cymbosepalum Bak. in Kew Bull. 1895: 103 (1895).

Trees or shrubs, unarmed or armed with spine-tipped abbreviated lateral shoots. *Leaves* simply paripinnate (in our species) or sometimes the lower pinnae again divided and bipinnate; with few pairs of usually obcordate leaflets. *Stipules* small and relatively inconspicuous or spinescent. *Inflorescence* an axillary or terminal raceme. *Flowers* hermaphrodite, pedicellate; bracts minute or inconspicuous; bracteoles 0. *Calyx* eglandular or sometimes covered with numerous small stalked glands; receptacle very short, oblique; sepals 5, imbricate, the lower sepal much larger, hooded apically and clasping the others. *Petals* 5, imbricate, obovate or oblong, slightly unequal. *Stamens* 10, free; filaments densely villous basally, glabrous above; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* shortly stipitate, compressed, 2–3-ovuled, sometimes glandular; style filiform: stigma small, terminal. *Pods* compressed, membranous, splitting longitudinally almost along the middle of each valve. *Seeds* transversely oblong.

A genus of 3 species, 2 in tropical America and the West Indies, 1 in South West Africa.

The generic name *Haematoxylum* is derived from the Greek word for "blood" and the Latin word for "wood"; in allusion to the blood-red wood of *H. campechianum.* The heartwood of *H. campechianum* is the source of haematoxylin, the stain used in microscopical preparations.

FIG. 22.—**Haematoxylum dinteri.** 1, flowering branch with mature leaves and young pods, × ⅓; 2, leaflet, ×4, both from *Pearson* 9717; 3, flower, × 2; 4, stamen, × 4; 5, gynoecium, × 6, all from *Pearson* 4134; 6, fruiting twig, × ¼; 7, pod showing longitudinal dehiscence almost along the middle of the valve, × 1, both from *Pearson* 9717; 8, seed, × 1, from *Pearson* 4314.

Haematoxylum dinteri (*Harms*) *Harms* in Feddes Repert. 12 : 555 (1913); in Engl., Pflanzenw. Afr. 3, 1 : 504 (1915); Dinter in Feddes Repert. 18 : 16 (1922); Bak.f., Leg. Trop. Afr. 3 : 619 (1930); Schreiber in F.S.W.A. 59 : 15 (1967); Ross in Bothalia 12 : 60 (1976). Type: South West Africa, Bethanie Distr., Inachab, *Dinter* 1169 (B, holo.†); Keetmanshoop Distr., Little Karas Mts., E. of Holoog station, *Pearson* 9717 (PRE, neo.!).

Caesalpinia dinteri Harms in Bot. Jahrb. 40 : 31 (21 May 1907). Type as above. *C. obovata* Schinz in Vjschr. Naturf. Ges. Zürich 52 : 430 (14 Dec. 1907). Type: South West Africa, Bethanie Distr., Inachab, *Dinter 1169*.

Haematoxylon africanum E. L. Stephens in Trans. Roy. Soc. S. Afr. 3 : 255, t.18 (1913). Type: South West Africa, Keetmanshoop Distr., near Holoog, *Pearson* 4134 (BOL, holo!, K!, PRE!).

Shrub up to 2 m high, some of the lateral branchlets abbreviated and spine-tipped; young branchlets grey- to reddish-brown, shortly and fairly densely pubescent and with numerous stalked glands; older branches becoming glabrescent, epidermis flaking minutely. *Leaves* simply paripinnate, up to 1,1 cm long, shortly and fairly densely pubescent: petiole 2–3 mm long; rhachis 6–8 mm long, with reddish ovate-subulate stipels at the insertions of the leaflets; leaflets in 3 pairs, (2,5)4–8 × (2,75)3–8 mm, obcordate or broadly obovate or obovate-suborbicular, very shortly petiolulate, obtuse basally, emarginate apically, rarely obtuse or truncate, grey-green, minutely puberulous on both surfaces or the lower only, with relatively conspicuous ascending lateral venation. *Stipules* reddish, ovate-subulate, up to 2,5 mm long. *Inflorescence* a relatively few-flowered lateral or terminal raceme up to 15 cm long, minutely puberulous and glandular. *Flowers* yellow, on glandular pedicels up to 1 cm long; bracts minute and subulate. *Receptacle* oblique, 2–3 mm long, up to 5 mm wide, glandular, 10-nerved, persisting in fruit to form a collar. *Sepals* 5, shortly pubescent and glandular, oblong, up to 6 × 2,5 mm, the lower one much larger, hooded apically and clasping the others. *Petals* 5, obovate or obovate-spathulate, 8–10 × 5–7 mm, unequal. *Stamens* up to 10 mm long, alternately long and short, the longer ones alternating with the petals; filaments densely villous basally, glabrous above. *Ovary* very shortly stipitate, 5–5,5 mm long, compressed, covered with stalked glands; style ± 8 mm long. *Pods* reddish-brown to purplish, 2,5–3,5 cm long, ± 1 cm wide, obliquely oblong, compressed, membranous, glandular, inconspicuously venose, dehiscing longitudinally almost along the middle of each valve. *Seeds* compressed, transversely oblong, ± 6 × 1 mm. Fig. 22.

Endemic in South West Africa. Occurs in rocky crevices and sandy river beds.

S.W.A.—2617 (Bethanie): near Bethanie, *Range 1514* (SAM). 2717 (Chamaites): Inachab, *Dinter 1169;* near Holoog, *Pearson 4134* (BOL, K, PRE); am Rivier vor Holoog, *Walter 2291* (M); western foothills of Little Karas Mts., *Pearson 9717* (K, PRE).

More material of this very distinctive species is required.

3553 19. PTEROLOBIUM

Pterolobium *R.Br.* [in Salt. Voy. Abyss., append. : lxiv (1814), nomen nudum] *ex Wight & Arn.*, Prodr. Fl. Ind. Or. 1 : 283 (1834), nom. conserv.; Benth. & Hook.f., Gen. Pl. 1 : 567 (1865); Oliv. in F.T.A. 2 : 264 (1871); Harms in Engl., Pflanzenw. Afr. 3, 1 : 502 (1915); Bak.f., Leg. Trop. Afr. 3 : 621 (1930); Phill., Gen. ed. 2 : 397 (1951); Wilczek in F.C.B. 3: 256 (1952); Brenan in Taxon 3, 2 : 65 (1954); Roti-Michelozzi in Webbia 13 : 181 (1957); Hutch., Gen. Fl. Pl. 1 : 261 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 348 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 40 (1967); Brummitt in Taxon 17, 5 : 598 (1968); McVaugh in Taxon 19, 2 : 291 (1970). Type species: *P. stellatum* (Forsk.) Brenan (*P. lacerans* R.Br. ex Wight & Arn.).

Kantuffa Bruce, Trav. 5 : 49 (1790).

Cantuffa J. F. Gmel. in L., Syst. Nat. ed. 13 : 677 (1791).

Reichardia Roth, Nov. Pl. Spec. 210 (1821) pro parte.

Quartinia A. Rich. in Ann. Sci. Nat., Sér. 2, 14 : 259 (1840).

Shrubs, usually climbing, armed with prickles on stem and leaves. *Leaves* bipinnate; petiole and rhachis without specialised glands; leaflets opposite. *Stipules* small, inconspicuous, soon deciduous, subulate or triangular-subulate. *Inflorescences* of terminal and axillary often paniculately aggregated racemes: bracts small, soon deciduous. *Flowers* hermaphrodite. *Sepals* 5, imbricate, unequal, the lower one cucullate and embracing the others; hypanthium cupular, regular, *Petals* 5, equal or almost so. *Stamens* 10, all fertile; filaments alternately rather longer and shorter, all pubescent below; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* free, very shortly stipitate; ovule 1, attached near top of ovary; style gradually enlarged near apex; stigma transversely flattened, not peltate. *Pods* resembling the samara of *Acer* spp., with a basal seed-containing portion (1-seeded) whose upper suture is greatly extended beyond the seed-containing part of the pod and is broadly winged on its lower side. *Seeds* compressed, pendulous, without endosperm.

A genus of ± 10 species, mostly in Asia and Indonesia; only one species in Arabia and Africa.

The generic name *Pterolobium* is derived from the Greek words for wing and fruit; in allusion to the winged fruits of the species in this genus.

Pterolobium stellatum (*Forsk.*) *Brenan* in Mem. N.Y. Bot. Gdn. 8 : 425 (1954); Roti-Michelozzi in Webbia 13 : 181 (1957); F. White, For. Fl. N. Rhod. 128, fig. 2OJ (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 350 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 42, fig. 7 (1967). Type: Yemen, Kurma, *Forskal* (C, lecto., K, photo!).

Mimosa stellata Forsk., Fl. Aegypt.-Arab. cxxiii, 177 (1775); Vahl, Symb. Bot. 1 : 81 (1790), non *M. stellata* Lour. (1790). Type as above.

Cantuffa exosa J. F. Gmel. in L., Syst. Nat. ed. 13 : 677 (1791). Type: Bruce, Travels 5 : app. 49 (1790). *C. stellata* (Forsk.) Chiov. in Ann. Bot., Roma 13 : 409 (1915). Type as for *Pterolobium stellatum*.

Acacia stellata (Forsk.) Willd., Sp. Pl. 4 : 1078 (1806). Type as for *Pterolobium stellatum*.

Pterolobium lacerans R.Br. [in Salt, Voy. Abyss., append. : lxiv (1814), nomen ipse nudum sed cum syn. "Kantuffa" Bruce] ex Wight & Arn., Prodr. Fl. Ind. Or. 1 : 283 (1834); Oliv. in F.T.A. 2 : 264 (1871); Harms in Engl., Pflanzenw. Afr. 3,1 : 503, fig. 268 (1915); Eyles in Trans. Roy. Soc. S. Afr. 5 : 368 (1916). Type as for *Cantuffa exosa*. *P. exosum* (J. F. Gmel.) Bak.f., Leg. Trop. Afr. 3 : 621 (1930); Burtt Davy, Fl. Transv. 2 : 330 (1932); Hutch., Botanist in S. Afr. 394, 455 (1946); Brenan, Checklist Tang. Terr. 106 (1949); Wilczek in F.C.B. 3 : 256 (1952). Type as for *Cantuffa exosa*.

Quartinia abyssinica A. Rich. in Ann. Sci. Nat., Sér. 2,14 : 260, t.14 (1840). Type from Ethiopia.

Scrambling or climbing shrub up to 15 m high, seldom semi-erect. *Stems* ± densely pubescent at least when young, armed with reflexed prickles up to 6 mm long, in pairs at the nodes and often with scattered ones between the nodes. *Leaves* ± densely puberulous when young, sometimes becoming glabrescent with age: petiole 1,5–3,6 cm long; rhachis 5–15(18) cm long (in our area), armed on the lower side with paired reflexed prickles at the insertions of the pinnae and occasionally with single prickles in between the pinnae, and on the upper side often with straight ascending prickles singly at the insertions of the pinnae; pinnae 5–13 pairs; rhachillae 2–6 cm long; leaflets 7–15 pairs per pinna, (4)6–10(12) mm long, 2–4 mm wide, narrowly oblong or elliptic-oblong, with the terminal ones ± obovate, rounded to slightly emarginate apically, lower surface puberulous to pubescent or glabrous, upper surface glabrous or sometimes puberulous. *Racemes* 5–18 cm long, terminal and axillary, aggregated into panicles up to 35 cm long, puberulous to shortly pubescent; bracts subulate, rapidly deciduous. *Flowers* sweetly scented, pale yellowish-white, on pubescent pedicels 3–6 mm long. *Sepals* 2–3 mm long, 0,75–1,4 mm wide, greenish, pubescent basally at least,


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LMP

FIG. 23.—**Pterolobium stellatum.** 1, part of flowering branch, × ⅔; 2, flower, × 4; 3, flower, longitudinal section, × 6; 4, petal, × 9; 5, stamen, × 9, all from *Richards* 11275; 6, part of branch with mature pods, × ⅔, from *Eggeling* 3400; 7, pod, with seed-bearing part opened, × ⅔, from *Sandwith* 25. Reproduced by permission of the Editor of Flora of Tropical East Africa.

usually ± reflexed in flower. *Petals* ± the same size as the sepals, oblanceolate-oblong. *Stamens* all exserted, 4–6 mm long. *Ovary* densely pubescent. *Pods* red to scarlet when young but becoming brown with age, 3–5 cm long (including the wing), wing 0,9–1,6 cm wide, pubescent, puberulous or at maturity ± glabrescent. *Seeds* olive, 9-11 mm long, 5–6,5 mm wide, ellipsoid. Fig. 23.

Widespread in eastern Africa from Ethiopia and the Sudan southwards to the Transvaal; also in Arabia. Occurs on forest margins, in riverine bush' ravines, bushveld and woodland.

TRANSVAAL.—2229 (Waterpoort): Wyllie's Poort, *Hutchinson & Gillett 3204; Gerstner 6986.* 2329 (Pietersburg): Louis Trichardt, *Galpin 14001.* 2330 (Tzaneen): Duiwelskloof, *Galpin 9396.* 2429 (Zebediela): Zebediela Estates, banks of Mogots River, *Galpin 8972.* 2430 (Pilgrim's Rest): Penge, banks of Olifants River, *Repton 5946.* 2531 (Komatipoort): Kruger National Park, 14,4 km S.E. of Pretorius Kop, *Codd 6039.*

A viciously armed plant which often forms dense impenetrable thickets.

3557 20. HOFFMANNSEGGIA

Hoffmannseggia *Cav.*, Icon. Descr. Pl. Hisp. 4 : 63, t.392 (1798), as *Hoffmanseggia*, nom. conserv.; Willd., Enum. 445 (1809); DC., Prodr. 2 : 484 (1825); Benth. & Hook. f., Gen. Pl. 1 : 567 (1865); Oliv. in F.T.A. 2 : 263 (1871); Taub. in Pflanzenfam. 3, 3 : 173 (1892); Marloth, Fl. S. Afr. 2 : 56 (1925); Bak.f., Leg. Trop. Afr. 3 : 618 (1930); Phill., Gen. ed. 2 : 398 (1951); Hutch., Gen. Fl. Pl. 1 : 261 (1964); Schreiber in F.S.W.A. 59 : 15 (1967); Brummitt & Ross in Kew Bull. 29 : 417 (1974); in Taxon 23 : 433 (1974); McVaugh in Taxon 24, 1 : 247 (1975). Type species: *H. falcaria* Cav., now known as *H. glauca* (Orteg.) Eifert.

Melanosticta DC., Prodr. 2 : 485 (1825); Mém. Leg. 474, t.69 (1826); G. Don, Gen. Syst. 2 : 434 (1832); Meisn., Pl. Vasc. Gen. 98 (1837); Endl., Gen. Pl. 1314 (1840); Benth. in Hook., J. Bot. 2 : 73 (1840); Harv., Gen. Pl. ed.1 : 92 (1838); in F.C. 2 : 270 (1862); Gen. Pl. ed. 2 : 89 (1868). Type species: *M. burchellii* DC.

Caesalpinia Sect. *Hoffmannseggia* (Cav.) Baill., Hist. Pl. 2 : 80 (1870).

Herbs or low shrubs, sometimes almost acaulescent, all parts of plant except petals and stamens usually with numerous dark scattered glands; stems with or without plumose setae. *Leaves* bipinnate, imparipinnate; leaflets usually small. *Stipules* present, usually deciduous; stipellae when present small and setaceous. *Inflorescence* a terminal or leaf-opposed raceme; bracts small, deciduous; bracteoles absent. *Flowers* hermaphrodite, pedicellate, yellow or (in our species) pink to red. *Calyx-tube* very short, lobes 5, unequal, the lower one larger than the others. *Petals* 5, imbricate, unequal, the upper usually differing from the others. *Stamens* 10, free; filaments alternately longer and shorter, villous basally (in our species); anthers uniform, opening by longitudinal slits. *Ovary* subsessile, free, few- to many-ovuled; style often incurved and clavate apically; stigma terminal. *Pods* oblong to ovate, straight to falcate, compressed, longitudinally dehiscent, valves often glandular. *Seeds* compressed.

The genus is predominantly American with 25–30 species extending from the south western United States to Chile and Argentina, 3 species occurring in southern Africa. The African species of *Hoffmannseggia* are peculiar among the bipinnate Caesalpinioideae indigenous to southern Africa as they are apparently the only ones which have imparipinnate leaves, i.e., with a single terminal pinna.

Hoffmannseggia was illegitimate when published but the genus has now been conserved (Taxon 24, 1 : 247, 1975). The spelling of the generic name has been a source of controversy almost since it was first published. The generic name was originally published as *Hoffmanseggia* by Cavanilles who explained in a footnote that it was named "in honorem D. Ioannis Centurii Comitis de Hoffmansegg," Cavanilles was clearly under the impression that the man commemorated spelled his name with a single "n". The weight of evidence, however, shows that this was not the case as the man concerned almost always spelled his own name with the double "n". Willdenow, Enum. 445 (1809), corrected the generic name to *Hoffmannseggia*, and both spellings (as well as the other variants *Hoffmannsegia*, *Hofmannseggia* and *Hofmanseggia*) have been used subsequently, although the original spelling *Hoffmanseggia* has had the greater preponderance of usage.

When recommending the conservation of the genus the Committee for Spermatophyta suggested that the spelling *Hoffmannseggia* should be adopted as proposed in Taxon 23 : 433 (1974).

Flowering pedicels (2,5)5–14 mm long: lower calyx lobe 6–10,5 × 2–6,5 mm; pods usually dark brown, clothed with a dense shaggy pinkish indumentum of plumose setae especially when young; pinnae usually 3–7 pairs per leaf; young stems and leaf-rhachides usually with conspicuous pink or reddish-brown setae..... 3. *H. sandersonii*

Flowering pedicels 1–3(6) mm long: lower calyx lobe up to 7 × 3 mm; pods pale buff, with or without a short indumentum of whitish hairs and whitish plumose setae; pinnae 1–5 pairs; young stems and leaf-rhachides with or without conspicuous pale plumose setae:

Low much-branched shrub; young stems densely appressed-pubescent with whitish hairs, plumose setae few or absent; terminal pinna 0,4–2,4 cm long, not conspicuously longer than the lateral pinnae, with 4–6 pairs of leaflets; pods distinctly curved to falcate..... 2. *H. lactea*

Shortly erect or decumbent-ascending herb or rarely subshrub; young stems sparsely appressed to densely spreading pubescent, plumose setae usually conspicuous; terminal pinna 1,5–10,5 cm long, typically considerably longer than the lateral pinnae, with 4–12 pairs of leaflets: pods straight or slightly curved:

Stems short, ± ascending, up to 30 cm long, often subacaulescent; leaves with 1–2 (3) pinnae pairs; terminal pinna usually conspicuously longer than the lateral pinnae, with 5–12 pairs of leaflets, the terminal pinna of the largest leaves of each plant with at least 7 pairs of leaflets..... 1a. *H. burchellii* subsp. *burchellii*

Stems up to 45 cm long, decumbent-ascending; leaves with (2)3–4 pinnae pairs; terminal pinna not conspicuously longer than the lateral pinnae, with 4–6 pairs of leaflets..... 1b. *H. burchellii* subsp. *rubro-violacea*

1. **Hoffmannseggia burchellii** (*DC.*) *Benth. ex Oliv.* in F.T.A. 2 : 263 (1871); Brummitt & Ross in Kew Bull. 29 : 418 (1974). Type: Cape Province, Vryburg Distr., "Chooi Desert between Desert Stn. and Giraffe Stn.", *Burchell* 2345 (G–DC, holo., K!).

Melanosticta burchellii DC., Prodr. 2 : 485 (1825). Type as above.

Shortly erect or decumbent-ascending herb or rarely subshrub with stems 12–45 cm long arising from a woody rootstock, rootstock, at least in subsp. *burchellii*, bearing fusiform tubers up to 15 cm long. *Stems* with sparsely appressed to densely spreading hairs usually interspersed with conspicuous longer pale plumose setae up to 2 mm long; dark glands present on stems, leaves, inflorescences, calyces and pods. *Stipules* up to 8 × 1,5 mm, lanceolate with marginal plumose setae, pubescent like the stem. *Leaves*: petiole and rhachis pubescent like the stem, with plumose setae aggregated at insertions of pinnae and leaflets; petiole 0,5–2,7 cm long; rhachis (excluding terminal pinna) 0–6,5 cm long; pinnae 1–4 pairs; rhachides of lateral pinnae 0,7–4 cm long, with 2–6 pairs of leaflets; rhachides of terminal pinna 1,5–10,5 cm long, with 4–12 pairs of leaflets; leaflets 4–11 × 2-5(7) mm, usually oblong to elliptic-oblong, glabrous to appressed-pubescent. *Inflorescence* (including peduncle) up to 12,5 cm long; pedicels up to 3(6) mm long in flower; bracts linear-lanceolate with plumose setae, deciduous before the buds open. *Calyx* with a very short tube, lobes 5, unequal, the lower lobe up to 6 × 3,5 mm, the upper ones up to 6 × 2 mm. *Petals* 5, unequal, up to 6 × 2,5 mm, recorded as red, orange, salmon, pink or purple. *Stamens* 10, filaments alternately longer and shorter, up to 6 mm long. *Ovary* subsessile, pubescent. *Pods* obliquely oblong, straight or slightly curved, 1,8–3,2 × 0,8–1 cm, pale buff with conspicuous dark glands, with or without short pubescence, densely covered with plumose setae. *Seeds* 3 or 4 per pod, 5–6,5 × 3,5–6 mm.

Found in South West Africa, Botswana, Rhodesia, the western Transvaal and northern Cape. Occurs on sandy soils.

(a) subsp. **burchellii.**

Brummitt & Ross in Kew Bull. 29 : 418 (1974).

H. burchellii (DC.) Benth. ex Oliv. in F.T.A. 2 : 263 (1871); Schinz in Mém. Herb. Boiss. 1 : 123 (1900); Dinter in Feddes Repert. 18 : 424 (1922); Bak.f., Leg. Trop. Afr. 3 : 618 (1930); Wilman, Checklist Griq. West 69 (1946); Leistner, Mem. Bot. Surv. S. Afr. 38 : 124 (1967); Schreiber in F.S.W.A. 59 : 16 (1967).

Melanosticta burchellii DC., Prodr. 2 : 485 (1825); Mém. Leg. 475, t.69 (1826); G. Don, Gen. Syst. 2 : 434 (1832); Harv., Gen. Pl. ed. 1 : 92 (1838); Thes. Cap. 1 : 2, t.2 (1859); in Fl. Cap. 2 : 270 (1862).

Caesalpinia melanosticta Spreng. in L., Syst. Veg. ed. 16,4 : Cur. Post. 169 (1827), nom. illegit. Type as for *Melanosticta burchellii.*

Stems short, ± ascending, up to 30 cm long, often subacaulescent. Leaves: pinnae 1–2(3) pairs; terminal pinna with 5–12 pairs

of leaflets, that of the larger leaves of each plant with at least 7 pairs of leaflets.

Found in South West Africa, Botswana, Rhodesia and the northern Cape.

S.W.A.—1718 (Kuring-Kuru): near 1st borehole S.W. of Nzinzi down Mpungu Omuramba, *De Winter 3986*. 1920 (Tsumkwe): western foot of Aha mountains, *Story 6341*. 2218 (Gobabis): ± 64 km N. of Gobabis, *Basson 241*. 2219 (Sandfontein): farm Gemsbokfontein, *Merxmüller 1182*. 2318 (Leonardville): 19 km S.E. of P. O. Pretorius, between Nossob River and Botswana, *Codd 5846*. 2419 (Aranos): farm Bethel east of Aranos, 9,6 km from Botswana border, *Van Vuuren & Giess 1121*.

CAPE.—2520 (Mata-Mata): Kalahari Gemsbok National Park, between Driefondas and Unie-end, *Liebenberg 7076*. 2622 (Tsabong): 8 km N. of Aansluit on road to Tsabong, *Leistner 1570*. 2623 (Morokweng): "Chooi Desert between Desert Stn. and Giraffe Stn.", *Burchell 2345* (K). 2624 (Vryburg): farm Palmyra, 96 km N.W. of Vryburg, *Rodin 3590*. 2625 (Delareyville): Setlagoli, *Brueckner 583*. 2721 (Tellery Pan): 80 km W.S.W. of Van Zylsrus, *Leistner 1896*. 2722 (Olifantshoek): 8 km W.N.W. of Moeswal, W. of Langeberg Mts., *Leistner 1678*. 2723 (Kuruman): "Klibbolikhonni", *Burchell 2501* (K). 2822 (Glen Lyon): 18 km W. of Volop, *Leistner 1746;* 8 km W. of entrance of Padkloof Pass, *Acocks 2059*. 2824 (Kimberley): between Jacobs Rush and Sydney-on-Vaal, *Acocks 1401*. 2924 (Hopetown): 80 km W.S.W. of Kimberley, 16 km S.E. of Olierivier on Douglas road, *Leistner 2873*.

The plate of *Melanosticta burchellii* in Harvey's Thes. Cap. 1 : 2, t.2 (1859) was prepared from a specimen sent to Harvey in 1840 collected by Miss Owen and said to be from "some part of the Zooloo Country". The assumption that Miss Owen's specimen was collected in Zululand was repeated by Harvey in Fl. Cap. 2 : 270 (1862) and was the sole basis for the inclusion of the species in the Natal flora by Wood, Natal Pl. 3,3 : 10 (1901); Handb. Fl. Natal 43 (1907), and in Trans. S. Afr. Phil. Soc. 18,2 : 151 (1908), and by Bews, Fl. Natal & Zululand 114 (1921). However, as indicated by Dyer in S. Afr. J. Sci. 55 : 319–320 (1959), many of Miss Owen's collections were not made in Natal and her itinerary took her through the northern Cape Province in 1839 and 1840. As *H. burchellii* has never been recorded from Natal subsequently, it seems safe to assume that the specimen was in fact collected in the northern Cape. The excellent illustration published by Harvey leaves no doubt that the plant is referable to subsp. *burchellii*.

(b) subsp. **rubro-violacea** (*Bak.f.*) *Brummitt & J. Ross* in Kew Bull. 29 : 419 (1974). Type: Botswana, Henry's Pan, *Holub s.n.* (Z, holo.!).

H. rubro-violacea Bak.f. in Vjschr. Naturf. Ges. Zürich 70 : 216 (1925) cum tab.; Leg. Trop. Afr. 3 : 619 (1930). Type as above. *H. sandersonii* sensu Burtt Davy, Fl. Transv. 2 : 330 (1932) pro parte quoad specim. *Schlechter* 4667.

Stems decumbent, up to 45 cm long. Leaves: pinnae (2)3–4 pairs; terminal pinna with 4–6 pairs of leaflets.

Found in Botswana and the western Transvaal

TRANSVAAL.—2327 (Ellisras): farm Alfred, 3,2 km N.W. of P.O. Monte Christo, *Codd 6595*. 2328 (Baltimore): Makgabeng [Maxaben], *Schlechter 4667*. 2329 (Pietersburg): Vivo, *Bremekamp & Schweickerdt 219*. 2427 (Thabazimbi): near Sentrum, *Vahrmeijer 1335*. 2428 (Nylstroom): near Nylstroom, *Van der Vywer sub PRE 30390*. Grid ref. unknown: Waterberg Distr., Soetfontein, *Div. Vet. Services M 2297*.

The fusiform tubers are a conspicuous feature of most specimens of subsp. *burchellii*, but underground parts are unknown in subsp. *rubro-violacea*. Collectors should investigate the root system of subsp. *rubro-violacea*.

A field observation on the label of *Story* 6341 indicates that in subsp. *burchellii* the leaflets droop when touched, and this is borne out by the herbarium specimens where the leaflets generally are folded together. In specimens of subsp. *rubro-violacea*, however, the opposing leaflets tend to lie apart suggesting that they are not sensitive to touch. Field observations on whether this distinction between the two taxa is actual rather than apparent would be interesting.

2. **Hoffmannseggia lactea** (*Schinz*) *Schinz* in Bull. Herb. Boiss. 2, 1 : 875 (1901); Dinter in Feddes Repert. 18 : 425 (1922); Bak.f., Leg. Trop. Afr. 3 : 618 (1930); Schreiber in F.S.W.A. 59 : 16 (1967); Brummitt & Ross in Kew Bull. 29 : 420 (1974). Type: South West Africa, Keetmanshoop Distr., Keetmanshoop, *Fenchel* [fide Schinz, see note below] 172 (Z, lecto.!).

H. sandersonii var. *lactea* Schinz in Mém. Herb. Boiss. 1 : 124 (1900). Type as above. *H. pearsonii* Phill. in Kew Bull. 1911 : 262 (1911); F. Bol. et al. in Ann. Bolus Herb. 1 : 14, t.6 (1914); L. Bol. in Ann. S. Afr. Mus. 9 : 258 (1915). Type: South West Africa, Keetmanshoop Distr., Aub River bed at Gobas, *Pearson* 3747 (K, lecto.!, BM!).

Low much-branched shrub up to 50 cm high. *Stems* densely appressed-pubescent with whitish hairs, plumose setae very few or absent; dark glands present and very conspicuous on stems, leaves, inflorescences, calyces and pods. *Stipules* up to 6 × 2 mm, laciniate, often rigid and persistent. *Leaves:* petiole and rhachis glabrous to appressed- or spreading-pubescent, setae, if present, not plumose; petiole 0,3–2,3 cm long, often persisting as a rigid subspine after the fall of the rest of the leaf; rhachis (excluding terminal pinna) 0,3–3,8 cm long; pinnae (1)2–5 pairs; rhachides of lateral pinnae (0,3)0,6–1,8 cm long, with 3–7 pairs of leaflets; rhachides of terminal pinna 0,4–2,4 cm long, with 4–6 pairs of leaflets; leaflets 3–8 × 1–3 mm, oblong to elliptic-oblong, glabrous. *Inflorescence* (including peduncle)

FIG. 24.—**Hoffmannseggia sandersonii.** 1, habit, showing erect stem arising from a slender woody rhizome, × ⅓; 2, leaflet, × 3; 3, stipule, × 3; 4, flower, × 3; 5, calyx, with petals, stamens and gynophore removed, × 3; 6, one of the longer stamens, × 6; 7, one of the shorter stamens showing the characteristic bend in the filament, × 6; 8, gynoecium, × 6, all from *Strey* 7698; 9, fruiting twig, × ⅓, from *Galpin* 9576.

up to 21 cm long; pedicels up to 3 mm long in flower; bracts up to 5 × 2 mm, laciniate, deciduous before the buds open. *Calyx* with a very short tube, lobes 5, unequal, the lower lobe up to 7 × 3 mm, the upper ones up to 6 × 1 mm. *Petals* 5, unequal, up to 8 × 3 mm, recorded as red, dark red, brownish-pink and purple-orange. *Stamens* 10; filaments alternately longer and shorter, up to 5 mm long. *Ovary* subsessile, up to 4 × 1 mm. *Pods* distinctly curved or falcate, 2,4–3,4 × 0,7–0,9 cm, pale buff with conspicuous dark glands, with a short dense indumentum interspersed with plumose setae. *Seeds* 3–5 per pod, 5–5,5 × 4,5–5 mm.

Found in South West Africa and the northern Cape Province; often occurs in or near dry watercourses.

S.W.A.—2115 (Karibib): Karibib, *Dinter 6819*. 2116 (Okahandja): Okahandja, *Dinter 442* (BM, K). 2317 (Rehoboth): Rehoboth, *Fleck 159* (Z), *Fleck 397a* (Z), *Fleck 859* (Z). 2416 (Maltahöhe): Buellsport, *Strey 2075*; between Gamis and Bull's Mouth Pass, banks of Upper Fish River, *Pearson 8941* (K). 2418 (Stampriet): ± 48 km N. of Mariental, *Basson 273*. 2617 (Bethanie): 8 km S.E. of Wasserfall, *Pearson 7888* (K). 2618 (Keetmanshoop): Aub River bed at Gobas, *Pearson 3747* (BM, K). 2717 (Chamaites): near Holoog, *Pearson 9742* (K). 2816 (Oranjemund): Daberas, *Fleck 385a* (Z). Grid ref. unknown: Gt. Karasberg, west of Paviaanspforte, *Pearson 8160* (K); Gt. Karasberg, Naruda Süd, *Pearson 8230* (K); between Goas and Kabiras, *Pearson 9062* (K).

CAPE.—2623 (Morokweng): "between Chue Vley and Mashowing River", *Burchell 2400* (K). 2819 (Ariamsvlei): 20 km N. of Pofadder, *Comins 667*; 4 km W. by S. of Bladgrond, *Acocks 14259*. 2820 (Kakamas): Grondneus, *Pole Evans 2136*; bed of Hartebeest River, near Kakamas Veld Reserve, *Acocks 16369*. 2821 (Upington): farm Steenkampspan, *Walter 2434*.

In the protologue Schinz cited *Fenchel* 172 from Keetmanshoop as one of the syntypes of *H. sandersonii* var. *lactea*. All of the syntypes were examined but no reference to Fenchel was found on any of the specimens. The specimen from Keetmanshoop is numbered 172, but has only Schinz's name printed on the label. It is assumed that this was the specimen referred to by Schinz and it is the specimen selected as the lectotype.

3. **Hoffmannseggia sandersonii** (*Harv.*) *Engl.* in Bot. Jahrb. 10 : 25 (1888), as *sandersoni;* Wood, Natal Pl. 3, 3 : 10, t.233 (1901); Wood, Handb. Fl. Natal 43 (1907); in Trans. S. Afr. Phil. Soc. 18, 2 : 151 (1908); Burtt Davy in Ann. Transv. Mus. 3, 3 : 122 (1912); Burtt Davy & Pott Leendertz in Ann. Transv. Mus. 3, 3 : 145 (1912); Bews, Fl. Natal & Zululand 114 (1921); Burtt Davy, Fl. Transv. 2 : 330 (1932) pro parte quoad specim. *Sanderson;* West in Mem. Bot. Surv. S. Afr. 23 : 135 (1951); Edwards in Mem. Bot. Surv. S. Afr. 36 : 267 (1967); Trauseld, Wild. Fl. Natal Drakensberg 93, cum photos. (1969); Ross, Fl. Natal 195 (1973); Brummitt & Ross in Kew Bull. 29 : 421 (1974). Type: "Transvaal", *Sanderson* (K, holo., missing); Natal, Weenen County, *Sutherland s.n.* (TCD, neo.!).

Melanosticta sandersonii Harv. in F.C. 2 : 270 (1862) as *sandersoni*. Type as above.

Suffrutex with several erect herbaceous annual stems up to 40 cm high arising from a slender woody rhizome. *Stems* with sparsely crisped to densely spreading hairs interspersed with conspicuous longer usually pink or reddish-brown setae up to 2,5 mm long; dark glands present but inconspicuous except on leaflets and calyces. *Stipules* up to 15 × 2 mm, linear-lanceolate, with marginal setae or sometimes distinctly branched, pubescent like the stem. *Leaves:* petiole and rhachis pubescent like the stem, with setae aggregated at insertions of pinnae and leaflets; petiole (1,2)2–5,2 cm long; rhachis (excluding terminal pinna) (0)1,8–8 cm long; pinnae 3–7 pairs (sometimes only 1 or 2 pairs present on reduced lower leaves); rhachides of lateral pinnae 1–6,2 cm long, with 3–10 pairs of leaflets; rhachides of terminal pinna 1,4–6,6 cm long, with 3–10 pairs of leaflets; leaflets 5–14 × 2–6,5 mm, usually oblong to elliptic-oblong, glabrous or with sparse hairs usually confined to the midrib and margins. *Inflorescence* (including peduncle) up to 30 cm long; pedicels (2,5)5–14 mm long in flower; bracts up to 12 × 5 mm, ovate-lanceolate, pubescent, deciduous before the buds open. *Calyx* with a very short tube, lobes 5, unequal, the lower lobe 6–10,5 × 4–7 mm, the upper ones 5–7 × 1–2 mm. *Petals* 5, unequal, up to 9 × 7 mm, recorded as red, terra-cotta, pink and salmon. *Stamens* 10; filaments alternately longer and shorter, up to 7 mm long. *Ovary* subsessile, up to 4 × 1,5 mm. *Pods* obliquely oblong, straight or slightly curved, 2,5–4,5 × 0,9–1,6 cm, usually dark brown, clothed with a dense shaggy pinkish indumentum of plumose setae, especially when young, which tends to obscure the dark glands. *Seeds* 3 or 4 per pod, ± 7,5 × 7 mm. Fig. 24.

Found in Natal and the eastern Cape Province. Occurs in grassland.

NATAL.—2729 (Volksrus): Normandien Pass, *Edwards 2818*, *Sim 2881*. 2828 (Bethlehem): Royal Natal National Park, *Werdermann & Oberdieck 1518*. 2829 (Harrismith): Elandslaagte, *Shirley 192* (NH, NU); Oliviers Hoek Pass, *Hilliard 2441* (NH, NU); Tugela River bank at Bergville, *Galpin 9576*. 2830 (Dundee): Kelvin Grove near Glencoe, *Wood 5128*. 2929 (Underberg): Little Bushman River, *Strey 7875*; Estcourt Pasture Research Station, *Acocks 9882*; farm Springvale, *Strey 7698*; 3,6 km from Donnybrook on road to Bulwer, *Killick & Marais 2096*. 2930 (Pietermaritzburg): Otto's Bluff, *Coleman 646* (NH); Mt. Ashley, *Moll 1330*; Hela Hela, *Strey 9224*. 3030 (Port Shepstone): Ixopo, *Mogg 2337*; Fairfield, Dumisa, *Rudatis 773*.

CAPE.—3029 (Kokstad): Mealiefontein-Glengarry, *Strey 9163*; near Clydesdale, *Tyson 1065 sub Muir 1482*; near Kokstad, *Tyson 1065*.

The type specimen of *H. sandersonii* was cited by Harvey as "Hab. Transvaal, *J. Sanderson* Esq. (Herb. Hk.)" and it must be assumed that it passed with Hooker's Herbarium to Kew. The specimen, however, could not be found in the Kew Herbarium and various other attempts to locate it were unsuccessful.

Harvey's original description fortunately enables *H. sandersonii* to be identified without doubt, but the distribution (Transvaal) given conflicts with the known present-day distribution of the species. Sanderson's itinerary is clearly recorded in J. Roy. Geog. Soc. 30 : 233–255 (1860) and a sketch map shows that he journeyed in the Transvaal from the vicinity of Potchefstroom to north of Rustenburg. I have seen no specimen of *H. sandersonii* from the Transvaal and, although it could conceivably occur in the Transvaal in the Volksrust district, this is far removed from the area visited by Sanderson. On his route to the Transvaal Sanderson travelled north-west from Pietermaritzburg and crossed the Natal Drakensberg near the present-day Van Reenen's Pass, and it is thought that the specimen in question was probably collected along this route in Natal and was later mislabelled as having come from the Transvaal.

Burtt Davy, Fl. Transv. 2 : 330 (1932), recorded *H. sandersonii* from the Orange Free State, but I have seen no specimen from this province. Despite this, the possibility exists that the species does occur there as it has been collected in Natal from the Oliviers Hoek Pass and from the Normandien Pass, both of which are very close to the border of the Orange Free State. Confirmation of the existence of this species in the Orange Free State, and in the Transvaal, would be welcome.

Burtt Davy, Fl. Transv. 2 : 330 (1932), recommended the introduction of an American species, *H. stricta* Benth. from the south-western USA and Mexico, into the Transvaal for trial as a hay-crop in semi-arid districts. I have seen no specimens of this species from our area. It has the habit of typical *H. burchellii* but may be readily distinguished by its smaller leaflets, more numerous pinnae, lack of plumose setae, larger petals, stalked glands on pedicels and petal margins, and narrower pods with more seeds.

3559 21. CAESALPINIA

Caesalpinia *L.*, Sp. Pl. 1 : 380 (1753); Gen. Pl. ed. 5 : 178 (1754), as *Caesalpina;* Willd., Sp. Pl. 2 : 530 (1800); DC., Prodr. 2 : 481 (1825); Benth. & Hook. f., Gen. Pl. 1 : 565 (1865); Oliv. in F.T.A. 2 : 262 (1871); Taub. in Pflanzenfam. 3, 3 : 173 (1892); Harms in Engl., Pflanzenw. Afr. 3, 1 : 508 (1915); Bak. f., Leg. Trop. Afr. 3 : 613 (1930); Phill., Gen. ed. 2 : 398 (1951); Wilczek in F.C.B. 3 : 249 (1952); Roti-Michelozzi in Webbia 13 : 203 (1957); Hutch., Gen. Fl. Pl. 1 : 260 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 28 (1967); Schreiber in F.S.W.A. 59 : 7 (1967); Hattink in Reinwardtia 9 : 1 (1974). Type species: *C. brasiliensis* L.

Guilandina L., Sp. Pl. 1 : 381 (1753); Gen. Pl., ed.5 : 179 (1754); DC., Prodr. 2 : 480 (1825); Harv., Gen. Pl., ed. 1 : 415 (1838); in F.C. 2 : 269 (1862); Gen. Pl., ed. 2 : 89 (1868).

Guilandia P.Br., Hist. Jam. 228 (1756).

Bonduc Adans., Fam. Pl. 2 : 318 (1763).

Shrubs, erect or more often scrambling or climbing, or sometimes trees, usually armed with spines or prickles but sometimes unarmed. *Leaves* bipinnate or rarely the pinnae digitately arranged, very rarely (not in our area) reduced to scales, without specialised glands on petiole and rhachis, although sometimes a general glandular indumentum may be present; leaflets opposite, rarely alternate, glandular or sometimes eglandular. *Stipules* minute to conspicuously leafy. *Inflorescences* of terminal, sometimes falsely lateral, or terminal and axillary racemes or panicles; rarely racemes much reduced to single or very few flowers; bracts usually rapidly deciduous. *Flowers* hermaphrodite or (in *C. bonduc* in our area) male and hermaphrodite. *Sepals* 5, imbricate, sometimes very narrowly so, or almost valvate, the lower sepal often

cucullate apically and clasping the others. *Petals* 5, subequal except for the upper one which is usually somewhat modified and usually has a smaller lamina and a more pronounced claw. *Stamens* 10, fertile, rarely with 1 ± abortive; filaments alternately longer and shorter, pubescent or villous and often glandular basally; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* subsessile or shortly stipitate, usually 2–10-ovuled, glabrous, pubescent or glandular; stigma truncate or oblique, ciliolate or glabrous. *Pods* very variable, usually ± compressed, not winged, indehiscent or dehiscent and 2-valved, hard and woody or thick and pulpy, sometimes spiny. *Seeds* transverse or nearly so, hard, endosperm present or absent.

A genus of 150–200 species throughout the tropics but most numerous in the New World. Four species are indigenous in our area and one species has become naturalized.

The genus is named in honour of Andrea Caesalpini, the Italian botanist, philosopher and physician to Pope Clement VIII.

Key to indigenous and naturalized species

Leaves with 3 digitately arranged pinnae; pinnae up to 2 cm long; flowers pale yellow, in short racemes up to 5 cm long; pods strongly falcate, semi-orbicular or sometimes almost circular, compressed, covered with spreading ± straight pinkish-brown prickles.....5. *C. pearsonii*

Leaves bipinnate; flowers pale yellow, pink, red or magenta, if pale yellow in racemes 10–40 cm long; pods unarmed or armed but not as above:

Leaflets large, 0,8–2,3 cm wide; stipules conspicuous, leafy, usually with 3 unequal-sized lobes resembling leaflets; petals pale yellow; pods 3,5–5 cm wide, broadly elliptic-oblong, covered with stiff spreading prickles; plants growing on or near the sea shore.....1. *C. bonduc*

Leaflets smaller than above, up to 0,8 cm wide: stipules inconspicuous or conspicuous but not leafy; petals pale yellow, pink, red or magenta; pods less than 3 cm wide, unarmed; plants usually growing away from the sea shore:

Leaflets (0,8)1–2 cm long, without gland-dots; stipules asymmetrically ovate, 4–20 mm long, 2–8 mm wide; petals pale yellow; pods 6–9,5 cm long.....2. *C. decapetala*

Leaflets up to 1,1 cm long, with numerous scattered gland-dots particularly on the lower surface; stipules inconspicuous; petals red, pink or magenta; pods up to 3 cm long:

Pinnae 4–13 pairs per leaf; leaflets 8–19 pairs per pinna, 1,3–6(7) mm long, 0,6–2(3) mm wide; lower sepal without a conspicuous rostrate beak but occasionally a small rudimentary beak ± 1 mm long present.....3. *C. rubra*

Pinnae (1)3–7 pairs per leaf; leaflets (4)6–11 pairs per pinna, (2)3–11 mm long, (1,5)2–5 mm wide; lower sepal with a very conspicuous apical upwardly-curved rostrate beak 2,5–4 mm long.....4. *C. rostrata*

Three exotic species of *Caesalpinia* are planted in our area for ornament but there is no evidence of any of them becoming naturalized. The species concerned are *C. pulcherrima* (L.) Swartz, *C. gilliesii* (Wall. ex Hook.) Benth. and *C. spinosa* (Mol.) Kuntze. None of them is likely to be confused with any of the indigenous species or the naturalized *C. decapetala* (Roth) Alston. *C. pulcherrima* and *C. gilliesii* differ from the indigenous and naturalized species in having long-exserted scarlet stamen-filaments 4–12 cm long, and *C. spinosa* differs from them in having conspicuously fimbriate-pectinate lower sepals.

Key to exotic species

Stamens scarlet, long-exserted, filaments 4–12 cm long; shrubs:

Inflorescence, including outside of sepals, glabrous (only stamen-filaments pubescent basally): sepals entire or almost so; petals scarlet, red and yellow, or all yellow; leaflets 4–12 mm wide; plant armed or unarmed; leaves paripinnate.....6. *C. pulcherrima*

Inflorescence, including outside of sepals, pubescent and copiously glandular-hairy; sepal-margins lacerate towards the apex; petals yellow; leaflets less than 2,5 mm wide; plant unarmed; leaves often imparipinnate.....7. *C. gilliesii*

Stamens not scarlet, not or shortly exserted, filaments 0,5–1,5 cm long; prickly tree; lower sepal fimbriate-pectinate, the others ± erose or lacerate.....8. *C. spinosa*

1. **Caesalpinia bonduc** (*L.*) *Roxb.*, Fl. Ind., ed. 2, 2 : 362 (1832); Dandy & Exell in J. Bot., Lond. 76 : 179 (1938); Brenan, Checklist Tang. Terr. 94 (1949); Wilczek in F.C.B. 3 : 250 (1952); Torre & Hillc. in C.F.A. 2 : 171 (1956); Roti-Michelozzi in Webbia 13 : 204 (1957); Keay in F.W.T.A., ed.2, 1 : 481, fig. 154A (1958); Mogg in Macnae & Kalk, Nat. Hist. Inhaca Is. Mozamb. 46 (1958); Dale & Greenway, Kenya Trees & Shrubs 99 (1961); Brenan in F.T.E.A. Legum.-Caesalp. : 37 (1967); Ross, Fl. Natal 195 (1973); Hattink in Reinwardtia 9 : 17, fig. 3 (1974). Type: Sri Lanka [Ceylon], *Herb. Hermann* vol. 3, fol. 35 (BM, lecto.!).

Guilandina bonduc L., Sp. Pl. 1 : 381 (1753); DC., Prodr. 2 : 480 (1825); E. Mey., Comm. 1 : 158 (1836); Harv. in F.C. 2 : 269 (1862). Type as above. *G. bonducella* L., Sp. Pl., ed.2 : 545 (1762). Type as for *C. bonduc*.

Caesalpinia bonducella (L.) Fleming in Asiat. Res. 11 : 159 (1810); Oliv. in F.T.A. 2 : 262 (1871); Taub. in Engl., Pflanzenw. Ost Afr. C : 202 (1895). Type as above. *C. crista* L., Sp. Pl. 1 : 380 (1753) pro parte, quoad syn. Pluk. et Breyn.; sensu Hutch. & Dalziel in F.W.T.A. 1 : 348, fig. 135A (1928); Bak.f., Leg. Trop. Afr. 3 : 614 (1930).

Shrub or sometimes a small shrubby tree, spreading, scrambling or ± scandent, up to 6 m high. *Stems* fulvous-pubescent at least when young and ± densely armed with spreading straight or slightly deflexed prickles of varying length. *Leaves* pubescent at least when young: petiole up to 10 cm long, armed with recurved prickles particularly on the lower side but sometimes throughout; rhachis up to 40 cm long, armed on the lower side with reflexed prickles, often in pairs particularly at the insertions of the pinnae and sometimes also with a solitary ± straight prickle on the upper side at the insertion of the pinnae; pinnae 3–10 pairs; rhachillae (4)6–18 cm long, usually with paired reflexed prickles on the lower side at the insertions of the leaflets but occasionally unarmed; leaflets (4)6–10 pairs per pinna, 1–5 cm long, (0,5)0,8–2,3(2,5) cm wide, asymmetrically ovate or elliptic- to ovate-oblong, obtuse or subacute to acuminate apically, appressed-pubescent on both surfaces when young but often becoming glabrescent except for midrib and margins with age. *Stipules* conspicuous, leafy, usually with 3 unequal-sized often asymmetric lobes resembling leaflets, each 0,3–2,5 cm long, 0,2–2,5 cm wide, mucronate and rounded to emarginate apically. *Racemes* up to 40 cm long, axillary, pedunculate, simple or with 1–2 branches below, often sparsely prickly; bracts up to 14 mm long, linear-lanceolate, exceeding the subtended buds and reflexing as the buds develop, deciduous ± when the buds open. *Flowers* pale yellow, on pedicels 4–9 mm long. *Sepals* 4–7 mm long, 2–3 mm wide, rusty-pubescent outside. *Petals* 6–10 mm long, 2–3 mm wide, oblanceolate-oblong, the upper one broader and stouter than the others. *Stamens* 4–7 mm long; filaments densely villous basally, glabrous above. *Ovary* densely setulose. *Pods* brown, 4,5–8 cm long, 3,5–5 cm wide, broadly elliptic-oblong, usually 1–2-seeded, valves coriaceous, fairly densely covered with stiff spreading prickles up to 9 mm long, ultimately dehiscing along the upper suture. *Seeds* ± 1,5–2 cm in diameter, globose to subglobose, hard, leaden-grey, the testa regularly transversely and finely cracked.

Widespread on tropical coasts of the Old and New Worlds. Occurs on or near the sea-shore, on the banks of estuaries and lagoons, and among dunes.

NATAL.—2632 (Bela Vista): Kosi Bay estuary, *Vahrmeijer & Tölken 907.* 2732 (Ubombo): Banga Nek, *Moll 5736.* 2832 (Mtubatuba): Richard's Bay, *Guy & Hill 2.* 2931 (Stanger): Amatikulu River estuary, *Strey 7397; 7491.* 3030 (Port Shepstone): Melville, *Ward 6745.*

CAPE.—3129 (Port St. Johns): Umsikaba River mouth, *Drège s.n.* (K); Umnenga River near the sea, *Theron 1559*; Manteku estuary, *Strey 10190.*

The early nomenclature of *C. bonduc*, commonly called the Grey Nickar, was very confused and is discussed in detail by Dandy & Exell in J. Bot., Lond. 76 : 177–180 (1938).

C. bonduc is closely related to *C. major* (Medik.) Dandy & Exell and sometimes confused with it. Hattink, in Reinwardtia 9: 14 (1974), distinguishes between the two species as follows:

Stipules pinnate, consisting of 3–5 leaflets, each ca ½–2 cm long. Leaflets (12–) 16–24 in all per pinna, the base unequal. When flowering the pedicels 2–6 mm long. Ovules 2. Seeds grey.....*C. bonduc*

Stipules subulate or absent, sometimes split, up to 2 mm long. Leaflets 6–14 in all per pinna, the base (approximately) equal. When flowering the pedicels 6–12 mm long. Ovules 4. Seeds yellow.....*C. major*

Until recently it was thought that both *C. bonduc* and *C. major* occurred in our area but it is now apparent that only *C. bonduc* is present. All of the specimens from our area have the conspicuous leafy stipules and the pedicels in flowering specimens are less than 6 mm long. However, a range of variation in the colour of the seed is evident in our area.

Initially only one fruiting specimen with ripe seed, *Guy & Hill* 2, was known from our area. The seed of this specimen is leaden grey and corresponds well with the seed of typical *C. bonduc*. In response to requests for more fruiting specimens with ripe seeds, two gatherings, *Moll* 5736 and *Ward* s.n., were collected recently and these require some comment.

In *Moll* 5736 from Banga Nek in Tongaland the seeds are olive-grey, while in *Ward* s.n. from Melville on the Natal south coast the seeds are olive- to yellowish-grey. The seed of *Ward* s.n. have a distinct yellowish tinge which is lacking in mature seed of *C. bonduc*. The seed in both specimens appears to be ripe but the possibility exists that they have not yet attained full maturity and may still change in colour. Hattink records that the immature seeds in *C. bonduc* are greenish-grey. The seed of *Guy & Hill* 2, *Moll* 5736 and *Ward* s.n. show a progression in colour from a definite grey to olive-grey to yellowish-grey.

The very hard-shelled seeds of *C. bonduc* float well in the sea and are capable of retaining their power of germination after several years afloat. Seeds may be carried great distances by ocean currents before being washed up on a coast. For further information see Ridley, Dispersal of Plants throughout the World 282–3 (1930) (as *Guilandina bonducella* L.)

The earliest-collected specimen seen from our area is by J. F. Drège from the Umsikaba River mouth in 1832. More material of *C. bonduc*, particularly flowering and fruiting material, is required.

2. **Caesalpinia decapetala** (*Roth*) *Alston* in Trimen, Handb. Fl. Ceylon 6 (suppl): 89 (1931); Brenan, Checklist Tang. Terr. 94 (1949): in Mem. N.Y. Bot. Gdn. 8 : 425 (1954); Wilczek in F.C.B. 3 : 253 (1952); Torre & Hillc. in C.F.A. 2 : 172 (1956); F. White, For. Fl. N. Rhod. 118, fig. 20H (1962); Henderson & Anderson in Mem. Bot. Surv. S. Afr. 37 : 176, fig. 87 (1966); Compton in J. S. Afr. Bot. Suppl. 6 : 46 (1966); Ross, Fl. Natal 196 (1973); Hattink in Reinwardtia 9 : 24 (1974). Type: India, *Heyne* (whereabouts of holo. uncertain, ? K, iso!).

Reichardia decapetala Roth, Nov. Pl. Sp. Ind. Or. 212 (1821). Type as above.

Caesalpinia sepiaria Roxb. [Hort. Bengal. : 32 (1814), nomen nudum] Fl. Ind., ed. 2, 2 : 360 (1832); Bak.f., Leg. Trop. Afr. 3 : 615 (1930); Burtt Davy, Fl. Transv. 2 : 328 (1932); Henkel, Woody Pl. Natal 234 (1934); Howes in Kew Bull. 1 : 63 (1947). Type: India, Roxburgh (whereabouts of holo. uncertain, K (*Roxburgh in Wallich 5834a*) ? iso. or isosyn.!).

Climbing or straggling bushy shrub up to 8 m high, often forming dense impenetrable thickets. *Stems* ± densely clothed with short brownish pubescence or puberulence when young, rarely sparsely clothed or subglabrous, armed with scattered ± straight spreading prickles 1–8 mm long. *Leaves* finely fulvous-pubescent: petiole 3–6,5 cm long, eglandular, armed on the lower surface with hooked prickles; rhachis (8)12–35(40) cm long, armed on the lower surface with downwardly hooked prickles up to 6 mm long, often in pairs especially at the insertions of the pinnae, and on the upper side usually with solitary upwardly curved prickles at the insertions of the pinnae; pinnae 4–11 pairs; rhachillae 2,5–9 cm long, usually unarmed; leaflets 8–13 pairs per pinna, (0,8)1–2,1 cm long, 0,3–0,8 cm wide (in our area), ± oblong to slightly obovate-oblong, ± rounded apically and often minutely mucronate, shortly petiolulate, pubescent or puberulous on both surfaces, especially on the midrib below. *Stipules* asymmetrically ovate, acuminate, 4–20 mm long, 2–8 mm wide, margins undulate. *Racemes* 10–40 cm long, axillary and terminal, simple, sparsely prickly; bracts up to 11 × 4 mm, lanceolate to ovate-triangular, margins undulate, deciduous before the flowers open. *Flowers* pale yellow; pedicels 1,5–3,5 cm long, sparsely to ± densely fulvous-pubescent, ascending at an acute angle from the main axis. *Sepals* 8–11 mm long, appressed fulvous- to greyish-pubescent outside. *Petals* 10–15 mm long, 8–15 mm wide (the upper one smaller, 8–11 mm long, 5–6 mm wide). *Stamens* (9)12–20 mm long; filaments densely villous basally, glabrous above. *Ovary* pubescent. *Pods* brown, 6–9,5 cm long (excluding beak), 2–2,7 cm wide (in our area), straight or slightly curved, compressed, unarmed, shortly pubescent when young but ± glabrous at maturity, ultimately dehiscing along the upper suture, with a slender beak 0,6–3 cm long arising at the apex near the line of the upper suture; the exocarp sometimes flaking off in old pods to reveal the pronounced reticulate venation of the endocarp. *Seeds* 8–10 mm long, 6–8 mm wide, ellipsoid, mottled brown and blackish or uniform brown.

Introduced from tropical Asia, but now widely cultivated in tropical countries and often naturalized; in Africa from Uganda and Kenya southwards to the Transvaal, Swaziland, Natal and the eastern Cape Province. Occurs in high-rainfall areas; recorded from forest margins, forest-clearings, river banks, scrub and grassland.

TRANSVAAL.—2229 (Waterpoort): Crewe farm, 21 km W. of Wyllie's Poort, *Hutchinson 4452*. 2230 (Messina): Entabeni, *Prosser 1845*. 2330 (Tzaneen): Westfalia, *Schlieben 7209*. 2429 (Zebediela): farm

FIG. 25.—**Caesalpinia rubra.** 1, flowering branchlet, × ⅔; 2, leaflet, showing scattered gland-dots, × 6; 3, bract, × 8; 4, flower-bud, × 2; 5, flower, × 2; 6, one of the longer stamens, × 4; 7, one of the shorter stamens, × 4; 8, gynoecium, × 4, all from *De Winter* 3033; 9, fruiting branchlet, × ⅓; 10, valve of pod after dehiscence showing attached seed, × 1; 11, seed, × 2, all from *De Winter* 3164.

Schoonoord, *Barnard 41.* 2430 (Pilgrim's Rest): Blyde River Canyon, 29,6 radial km from Pilgrim's Rest, *Davidson & Mogg 33372.* 2528 (Pretoria): near Pretoria, *Pole Evans sub PRE 32204.* 2531 (Komatipoort): Barberton, *Burtt Davy 279.*

SWAZILAND.—2531 (Komatipoort): Piggs Peak, *Compton 27983.* 2631 (Mbabane): Mbabane to Stegi, *Verdoorn 1667.*

NATAL.—2830 (Dundee): near Solitude store, Kranskop, *Acocks 11652.* 2831 (Nkandla): Eshowe, *Lawn 775* (NH). 2930 (Pietermaritzburg): Zwartkop location, *Moll 943.* 2931 (Stanger): Nonoti River, ± 1,6 km above sugar mill, *Archibald 19* (NH). 3030 (Port Shepstone): Ifafa, *Lansdell sub NH 16104.*

CAPE.—3129 (Port St. Johns): Port St. Johns, *Theron 808;* Egossa, *Sim 2465.* 3228 (Butterworth): Manubi, *Pegler 1262.*

C. decapetala, commonly known as Mauritius Thorn, is planted as a hedge or fence around kraals in some areas and it soon forms an impenetrable barrier. The species is now widely naturalized and has become troublesome as it is invading and displacing the indigenous vegetation. The earliest-collected specimen seen from our area is by Wilms (K) from near Durban in October 1888.

As mentioned by Brenan in F.T.E.A. Legum.–Caesalp. : 36 (1967), *C. decapetala* shows a much wider range of variation in Asia where it is native than it does in Africa where it is introduced. In our area the stems are nearly always densely pubescent when young but in India subglabrous stems are common.

The specific epithet "*decapetala*" is unfortunate as the plant has five, not ten, petals.

3. **Caesalpinia rubra** (*Engl.*) *Brenan* in Kew Bull. 17 : 202 (1963); Schreiber in F.S.W.A. 59 : 8 (1967). Type: South West Africa, Karibib Distr., Usakos, *Marloth* 1432 (B, holo.†; BOL!, PRE!).

Hoffmanseggia rubra Engl. in Bot. Jahrb. 10 : 25 (1889); Harms in Engl., Pflanzenw. Afr. 3,1 : 503 (1915); Dinter in Feddes Repert. 18 : 425 (1922); Bak.f., Leg. Trop. Afr. 3 : 619 (1930); O. B. Miller in J. S. Afr. Bot. 18 : 32 (1952). Type as above.

Shrub up to 1,6(3) m high. *Stems* ± densely grey-puberulent to -pubescent when young, often becoming glabrescent or glabrous with age, usually sparsely armed with spreading or slightly recurved prickles up to 7 mm long, occasionally ± unarmed. *Leaves* sparingly to ± densely grey-puberulent: petiole 2–14 mm long; rhachis 0,9–6(9) cm long, with small subulate stipellae at the insertions of the pinnae; pinnae 4–13 pairs; rhachillae (0,4)0,6–3,5(4,6) cm long, unarmed; leaflets 8–19 pairs per pinna, 1,3–6(7) mm long, 0,6–2(3) mm wide, asymmetrically oblong, rounded apically, glabrous throughout or the midrib puberulent and the margins ciliate, with numerous scattered dark gland dots. *Stipules* subulate, up to 5 mm long. *Racemes* 5–18(25) cm long, usually terminal, simple, unarmed or sometimes sparsely prickly, puberulous; bracts conspicuously aristate apically, up to 5 mm long including a terminal arista 2–2,5 mm long, up to 2 mm wide, broadly ovate, ± scarious, appressed grey-pubescent, falling before the buds they subtend open. *Flowers* red or magenta, on sparingly to ± densely appressed-pubescent pedicels up to 1,4 cm long. *Sepals* 4–8 mm long, dark red, the lower sepal larger and cucullate, occasionally with a small apical beak; all sepals appressed-pubescent. *Petals* 7–12 mm long, red or magenta, broadly obovate, the upper one smaller. *Stamens* up to 10 mm long; filaments densely villous basally, glabrous above. *Ovary* glabrous. *Pods* brown to ± red, 2–3 cm long, 1,1–1,8 cm wide, obliquely pyriform, attached to pedicel sublaterally, compressed, narrowed to an acute beak which is usually directed forwards and upwards, unarmed, dehiscing longitudinally along both sutures. *Seeds* 8–9 × 6–8 mm, compressed. Fig. 25.

Found in South West Africa and Botswana. Favours dry rocky areas.

S.W.A.—1913 (Sesfontein): 31,2 km from Warmbad on road to Ombombo, *De Winter & Leistner 5831.* 1915 (Okaukuejo): Otjovasandu, *Schinz 851* (K); farm Tsaus, *Giess, Volk & Bleissner 6079.* 2014 (Welwitschia): Fransfontein, *Liebenberg 4924.* 2016 (Otjiwarongo): Outjo commonage, *De Winter 3033;* Outjo, *Merxmüller & Giess 1293.* 2114 (Uis): 4 km W. of Uis Mine on road to Swakopmund, *De Winter 3164;* 9,6 km N. of Uis, *Giess 9198.* 2115 (Karibib): Onguati, *Engler 6170* (K), *Dinter 6840* (BM, K); Ameib, south Erongo Mts., *Jensen 484.* 2215 (Trekkopje): farm Tsabichab : KAR 58, *Giess 9588.* 2417 (Mariental): Hardap Dam, *Tölken & Hardy 641, Schlieben 10280.*

Leaflet size on some plants shows a considerable range of variation.

4. **Caesalpinia rostrata** *N.E.Br.* in Hook. Icon. Pl. 28 : t.2702 (1901); Harms in Engl., Pflanzenw. Afr. 3, 1 : 510 (1915); Torre in Mendonça, Contr. Conhec. Fl. Moçamb. 2 : 67 (1954). Type from cultivation in the Durban Botanic Garden, raised from seed collected by Mr. Jas. Wilson at "Delagoa Bay" (Lourenço Marques), *Wood* 7943 (K, holo.!, BOL!, NH!, PRE!).

Scrambling shrub up to 3 m high. *Stems* puberulous or appressed-pubescent when young, armed with scattered ± straight broad-based spreading prickles up to 10 mm

long. *Leaves:* petiole 0,6–1,5 cm long, sparingly puberulous; rhachis (0)1–8,5 cm long, sparingly puberulous, with small subulate stipellae at the insertions of the pinnae, occasionally also armed with a few prickles towards the base of the rhachis; pinnae (1)3–7 pairs; rhachillae 1–5,5 cm long, unarmed; leaflets (4)6–11 pairs per pinna, (2)3–11 mm long, (1,5)2–5 mm wide, oblong to elliptic-oblong, asymmetric basally, rounded to ± truncate and often slightly emarginate apically, glabrous or the midrib puberulent beneath, with numerous scattered dark gland dots, particularly conspicuous on the lower surface. *Stipules* inconspicuous. *Racemes* up to 15 cm long, axillary or terminal, simple, unarmed, puberulous; bracts conspicuously aristate apically, up to 9 mm long including a terminal arista ± 2 mm long, up to 8 mm wide, broadly elliptic to suborbicular, concave, ± scarious, pinkish-brown, appressed-pubescent, deciduous before the buds they subtend open. *Flowers* pink or red, on appressed-pubescent pedicels 3–5 mm long. *Sepals* dark red, 5–7 mm long, the lower sepal larger and cucullate, forming a hood over the other sepals and with a very conspicuous apical upwardly-curved rostrate beak 2,5–4 mm long, reflexing with age; all sepals appressed-pubescent. *Petals* ± 12 mm long, broadly obovate, the upper one shorter and narrower, ± spathulate. *Stamens* up to 12 mm long; filaments densely villous basally, glabrous above. *Ovary* glabrous. *Pods* brown, 2,7–3,2 cm long, 1,6–2,1 cm wide, broadly oblong, unarmed, glabrous, dehiscing longitudinally along both sutures. *Seeds* not seen.

Restricted to southern Mozambique and the eastern Transvaal. Recorded from river banks, but ecology unknown and more information required.

TRANSVAAL.—2531 (Komatipoort): Kruger National Park, Komati River gorge through Lebombo Mts., *Van der Schijff 3999*.

The above specimen is the only record of *C. rostrata* in the wild from our area. Besides this specimen, only two other collections from southern Mozambique are known. More material of *C. rostrata*, particularly from our area, is required.

C. rostrata is an interesting species. The gland-dotted leaflets, ±scarious bracts which are distinctly aristate apically, the subulate stipellae, and the pods indicate that its affinities are with *C. trothae* Harms from tropical East Africa and *C. rubra*. The most distinctive rostrate beak on the lower sepal, which is so characteristic of *C. rostrata*, is occasionally slightly developed in *C. rubra*.

The plant in the Durban Botanic Garden from which the type material was collected is no longer in cultivation and there is no record of how long it survived.

5. **Caesalpinia pearsonii** *L. Bol.* in Ann. Bolus Herb. 3 : 4, t.1 B (1920); Wordsworth et al in Ann. Bolus Herb. 3 : 21 (1920); Bak.f., Leg. Trop. Afr. 3 : 615 (1930); Schreiber in F.S.W.A. 59 : 8 (1967). Type: South West Africa, Abbabis [Ababes], breccia banks of Tsondab River below farm, *Pearson* 9162 (BOL, holo!, K!, PRE!).

Rigid much-branched shrub up to 2 m high. *Stems* white or grey- to purplish-brown, sometimes as though whitewashed over a purplish background, armed with scattered broad-based usually recurved prickles up to 7 mm long; young stems densely sericeous, becoming glabrescent with age. *Leaves* small, with 3 digitately arranged pinnae; pinnae up to 2 cm long, sparingly to densely pubescent; leaflets 5–9 pairs per pinna, opposite or almost so, 2–8 mm long, 1–3 mm wide, elliptic to ovate, obtuse to subacute or sometimes acuminate apically, sparingly to densely appressed sericeous on both surfaces or on the lower only. *Stipules* inconspicuous. *Racemes* up to 5 cm long, terminal or lateral, simple, relatively few-flowered, armed with prickles, sparingly appressed-pubescent to densely sericeous; bracts ovate, aristate apically, up to 2 mm long and 1,5 mm wide, sericeous, deciduous before the buds open. *Flowers* pale yellow, on sericeous pedicels up to 4 mm long. *Sepals* 3–5 mm long, up to 2 mm wide, obovate-oblong, sparingly to densely sericeous, the lower sepal larger and cucullate apically. *Petals* 6–9 mm long, obovate, pubescent basally within, the upper one shorter and narrower. *Stamens* up to 10 mm long; filaments densely villous basally, glabrous above. *Ovary* up to 2,5 mm long, shortly stipitate, pubescent; style up to 8 mm long. *Pods* pinkish- to reddish-brown, strongly falcate, semi-orbicular or sometimes almost circular, the terminal remains of the style (beak) then situated close to the point of attachment of the pod, up to 2 cm long, 1–1,3 cm wide, compressed, appressed-pubescent, covered with spreading ± straight pinkish-brown prickles up to 6 mm long, indehiscent, 1-seeded. *Seeds* compressed, ± 6 × 4 mm.

Endemic in South West Africa. Occurs in semi-desert and desert areas, but ecology imperfectly known.

S.W.A.—2014 (Welwitschia): farm Twyfelfontein, *Scherz sub PRE 32200*; *Giess, Volk & Bleissner 6214*. 2216 (Otjimbingwe): Kuiseb, *Strey 2475*. 2315 (Rostock): farm Greylingshof, 11,2 km S. of Gaub River, *Giess, Volk & Bleissner 5156*. 2415 (Sossusvlei): Sesriem, *Strey 2295*.

A very distinct and easily recognized species.

6. **Caesalpinia pulcherrima** (*L.*) *Swartz*, Observ. Bot. Pl. Ind. Occ. 166 (1791); Oliv. in F.T.A. 2 : 262 (1871); Bak.f., Leg. Trop. Afr. 3 : 616 (1930); Codd, Trees & Shrubs Kruger Nat. Park 13 (1951); Wilczek in F.C.B. 3 : 254 (1952); Torre & Hillc. in C.F.A. 2 : 172 (1956); Roti-Michelozzi in Webbia 13 : 214 (1957); Brenan in F.T.E.A. Legum.-Caesalp. : 31 (1967). Type: in *Herb. Linnaeus* 529.1 (LINN, syn.!).

Poinciana pulcherrima L., Sp. Pl. 1 : 380 (1753); Howes in Kew Bull. 1 : 78 (1947). Type as above.

Shrub up to 5 m high, unarmed or sometimes with short spines in pairs at the nodes, rarely scattered, quite glabrous except for the stamen-filaments. *Leaves* 6–30 cm long, unarmed or occasionally with paired prickles or spinulose stipels at the insertions of the pinnae and leaflets; pinnae 3–10 pairs; rhachillae 1,8–8,5 cm long; leaflets 5–12 pairs per pinna, (5)8–18(28) mm long, 4–12 mm wide, oblong to oblong-elliptic, rounded to emarginate apically. *Racemes* terminal or terminal and axillary, up to 35 cm long; bracts ± linear-lanceolate, up to 7,5 mm long, rapidly deciduous and shed when the buds are young. *Flowers* scarlet, red and yellow, orange-red or yellow (var. *flava* L. H. Bailey); pedicels 2–7,5 cm long in flower, sometimes longer in fruit. *Sepals* 7–14 mm long, the lower one 14–17 mm long and hooded apically. *Petals* 15–25 mm long, long-clawed, with a lamina ± 10–20 mm wide, distal margin erose-undulate; upper petal smaller. *Stamens* scarlet, long-exserted; filaments 4–6,5 cm long, pubescent basally, glabrous above; anthers glabrous. *Ovary* glabrous. *Pods* asymmetrically oblanceolate-oblong, 6–12 cm long, 1,4–2,2 cm wide, brown or purplish-brown, compressed, unarmed, dehiscent. *Seeds* brown, ± 9–10 × 7–8 mm, obovate, subtruncate apically, somewhat compressed.

Probably a native of tropical America (though often alleged to be Asiatic), but widely cultivated in most parts of the tropics and often becoming naturalized. Commonly known as the Pride of Barbados.

TRANSVAAL.—2528 (Pretoria): Pretoria district, *Graf s.n.* 2531 (Komatipoort): Kruger National Park, Malelane Rest Camp, *Codd 6106*; Pretoriuskop Rest Camp, *De Winter & Codd 620*; Barberton, *Matthews 67* (FHO).

NATAL.—Grid ref. unknown: Durban, *Jenkins 7081*.

7. **Caesalpinia gilliesii** (*Wall. ex Hook.*) *Benth.* in Mart., Fl. Bras. 15, 2 : 71 (1870); Bak.f., Leg. Trop. Afr. 3 : 616 (1930); Burtt Davy, Fl. Transv. 2 : 328 (1932); Roti-Michelozzi in Webbia 13 : 215 (1957); Brenan in F.T.E.A. Legum.-Caesalp. : 29 (1967); Schreiber in F.S.W.A. 59 : 8 (1967). Type from temperate South America (Argentina).

Poinciana gilliesii Wall. ex Hook., Bot. Miscell. 1 : 129, t.34 (1830). Type as above.

Unarmed shrub up to 3(5) m high; young stems and inflorescences pubescent and fairly densely covered with blackish or brown stalked glands. *Leaves* 6–20 cm long, unarmed, glabrous, occasionally with a few glands; pinnae 7–15 on each side of the rhachis, opposite, subopposite or alternate, often with a solitary terminal pinna; rhachillae 1–4 cm long; leaflets 7–12 pairs per pinna, 2–8 mm long, 1–2,5 mm wide (in our area), oblong-elliptic, glabrous, usually with black gland-dots just inside the margins. *Racemes* 6–18 cm long, terminal; bracts up to 28 × 8 mm, lanceolate or oblanceolate, margins lacerate, conspicuous and concealing the young buds but deciduous before the buds open. *Flowers* yellow; pedicels 1,5–3,5 cm long, covered with stipitate glands. *Sepals* 13–21 mm long, pubescent and with numerous stipitate glands, the lower one larger and margins lacerate towards the apex. *Petals* 17–32 mm long. *Stamens* scarlet, long-exserted; filaments 5–10,5 cm long, pubescent basally, glabrous above. *Ovary* tomentose, glandular. *Pods* asymmetrically oblanceolate-oblong, straight or curved upwards, 6–10 cm long, 1,6–2,1 cm wide, light brown, compressed, pubescent and usually fairly conspicuously glandular when young but becoming glabrescent with age, unarmed, dehiscent. *Seeds* somewhat compressed.

A native of temperate South America but widely cultivated as an ornamental shrub in tropical and warm-temperate countries.

S.W.A.—1918 (Grootfontein): Grootfontein, *Von Wettstein 115* (M). 2115 (Karibib): Usakos, *Volk 65* (M). 2217 (Windhoek): Klein-Windhoek, *Giess f. 107* (M).

TRANSVAAL.—2230 (Messina): Messina, *Rogers 22123* (FHO). 2528 (Pretoria): Union Building Gardens, *Schlieben 10002*.

8. **Caesalpinia spinosa** (*Mol.*) *Kuntze*, Rev. Gen. 3, 2 : 54 (1898); Sprague in Kew Bull. 1931 : 94 (1931); Roti-Michelozzi in Webbia 13 : 217 (1957); Brenan in F.T.E.A. Legum.-Caesalp. : 29 (1967). Type from South America.

Poinciana spinosa Mol., Saggio Chili, ed.1 : 158 (1782). Type as above.

Caesalpinia pectinata Cav., Descr. Pl. 467 (1802). Type a plant cultivated in Madrid. *C. tinctoria* (H.B.K.) Taub. in Pflanzenfam. 3,3 : 175 (1892). Type as for *Coulteria tinctoria* H.B.K.

Coulteria tinctoria H.B.K., Nov. Gen. 6 : 331, t.569 (1823). Type from South America.

Tara spinosa (Mol.) Britton & Rose in N. Am. Fl. 23, 5 : 320 (1930). Type as for *Caesalpinia spinosa*.

Tree up to 5 m high, branches armed with short prickles up to 5 mm long. *Leaves:* petiole and rhachis together (1)4–10 cm long, typically armed with short prickles at the insertions of the pinnae; pinnae 1–4 pairs; rhachillae 4–10 cm long, unarmed or with short prickles at the insertions of the leaflets; leaflets 4–7 pairs per pinna, 1,5–4,5 cm long, 0,6–2 cm wide (in our area), oblong-elliptic, obtuse or emarginate apically, glabrous or subglabrous. *Racemes* 10–20 cm long, many-flowered, usually sparsely prickly. *Flowers* pedicellate, pedicels 5–12 mm long, articulated near the apex. *Sepals* 4–6 mm long, margins ± erose or lacerate, the lower sepal much larger and fimbriate-pectinate. *Petals* up to 1 cm long. *Stamens* not or scarcely exserted, yellow; filaments up to 8 mm long, pubescent below, glabrous above. *Pods* oblong, thick, 5–9,5 cm long, 1,5–2,5 cm wide, pinkish-brown or crimson, indehiscent. *Seeds* brown, 8–10 × 6–7 mm, somewhat compressed.

A native of South America but fairly widely cultivated in the tropics.

S.W.A.—2217 (Windhoek): Administration Garden, *De Winter 6074*; *Keet 1688*; *Loock 5*.

TRANSVAAL.—2528 (Pretoria): Pretoria, *Repton 3682*.

3561 22. PELTOPHORUM

Peltophorum (*Vogel*) *Benth.* in Hook., J. Bot. 2 : 75 (1840), nom. conserv.; Walpers, Repert. 1 : 811 (1843); Harv. in F.C. 2 : 270 (1862); Benth. & Hook.f., Gen. Pl. 1 : 565 (1865); Harv., Gen. Pl. ed. 2 : 90 (1868); Oliv. in F.T.A. 2 : 260 (1871); Taub. in Pflanzenfam. 3, 3 : 176 (1892); Bak.f., Leg. Trop. Afr. 3 : 611 (1930); Phill., Gen. ed. 2 : 398 (1951); Wilczek in F.C.B. 3 : 262 (1952); Hutch., Gen. Fl. Pl. 1 : 262 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 350 (1965); Schreiber in F.S.W.A. 59 : 17 (1967); Brummitt in Taxon 17, 2 : 232 (1968). Type species: *P. dubium* (Spreng.) Taub. (*P. vogelianum* Benth., nom. illegit.).

Caesalpinia Sect. *Peltophorum* Vogel in Linnaea 11 : 406 (1837).

Baryxylum Lour., Fl. Cochinch. 266 (1790).

Brasilettia DC. ex Kuntze, Rev. Gen. 1 : 164 (1891).

Unarmed trees. *Leaves* bipinnate, without specialised glands on petiole and rhachis; with up to 21 pinnae pairs; leaflets numerous, opposite. *Stipules* soon deciduous. *Inflorescence* a raceme, racemes often ± aggregated and panicled; bracts usually linear-lanceolate and deciduous. *Flowers* hermaphrodite. *Calyx-tube* very short, lobes 5, imbricate, subequal, longer than the tube. *Petals* 5, subequal, the upper one often shorter than the others, ± spathulate, strongly imbricate. *Stamens* 10, declinate; filaments free, conspicuously brown-villous basally, glabrous above; anthers dorsifixed, dehiscing by longitudinal slits. *Ovary* sessile or subsessile, brown-pubescent or -tomentose, 2 to many-ovuled; style filiform, pubescent basally, glabrous above; stigma broadly peltate. *Pods* narrowly elliptic to oblong, compressed, with a distinct wing along each margin, indehiscent. *Seeds* strongly compressed, elongated longitudinally within the pod.

FIG. 26.—**Peltophorum africanum.** 1, flowering branchlet, × ⅓; 2, stipule, × 4; 3, flower, × 2; 4, calyx, with petals, stamens and gynophore removed, × 2; 5, petal, × 4; 6, one of the longer stamens, × 4; 7, one of the shorter stamens, × 4; 8, gynoecium, × 4, all from *De Winter* 3630; 9, fruiting twig, × ⅓; 10, portion of pod showing attached seed, × 2, both from *De Winter* 3865.

A pan-tropical genus of 6–9 species, only one of them, *P. africanum*, indigenous in Africa. In addition, a second species, *P. pterocarpum*, is occasionally planted in our area for ornament.

The generic name *Peltophorum* is derived from the Greek words meaning "shield bearing"; in allusion to the peltate stigmas.

1. **Peltophorum africanum** *Sond.* in Linnaea 23 : 35 (1850); Harv. in F.C. 2 : 270 (1862); Oliv. in F.T.A. 2 : 260 (1871); Hiern, Cat. Afr. Pl. Welw. 1 : 287 (1896); Harms in Warb., Kunene-Samb. Exped. 252 (1903); Sim, For. Fl. P.E. Afr. 47, t. 49B (1909); Harms in Engl., Pflanzenw. Afr. 3, 1 : 512 (1915); Bak.f., Leg. Trop. Afr. 3 : 611 (1930); Burtt Davy, Fl. Transv. 2 : 328, fig. 54 (1932); Henkel, Woody Pl. Natal 237 (1934); Hutch., Botanist in S. Afr. 298, 299, 300 (1946); Brenan, Checklist Tang. Terr. 105 (1949); Codd, Trees & Shrubs Kruger Nat. Park 64, fig. 61 (1951); Wilczek in F.C.B. 3 : 262 (1952); O. B. Miller in J.S. Afr. Bot. 18 : 35 (1952); Pardy in Rhod. Agric. J. 49 : 218 (1952); Torre & Hillc. in C.F.A. 2 : 169 (1956); Palgrave, Trees Cent. Afr. 111–114 (1957); Palmer & Pitman, Trees S. Afr. 175, t.6, 54, XVIII (1961); F. White, For. Fl. N. Rhod. 126 (1962); Flow. Pl. Afr. 36 : t.1434 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 352 (1965); Compton in J. S. Afr. Bot., Suppl. 6 : 46 (1966); Gomes e Sousa, Dendrol. Moçamb. 1 : 245, t.48 (1966); De Winter et al., 66 Transv. Trees 72, 78 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 17 (1967); Schreiber in F.S.W.A. 59 : 17 (1967); Van Wyk, Trees Kruger Nat. Park 1 : 198 (1972); Ross, Fl. Natal 196 (1973); Palmer & Pitman, Trees S. Afr. 2 : 887 (1973). Type: Transvaal, northern slopes of Magaliesberg at Crocodile River, *Zeyher* 554 (BM!, K!, OXF!, P!, iso.).

Brasilettia africana (Sond.) Kuntze, Rev. Gen. 1 : 164 (1891). Type as above.

Small tree 3–9 m high, or at times larger and up to 14 m high, often branching from near the base, crown ± rounded, deciduous; stems frequently crooked. *Bark* light to dark brown, rough, longitudinally fissured; young branchlets rusty- or greyish-tomentose or pubescent. *Leaves* rusty- or greyish-pubescent or tomentose: petiole 0,7–2(3,2) cm long; rhachis 3,5–13(16) cm long (in our area); pinnae (3)4–9(12) pairs (in our area); rhachillae 1,5–8(10) cm long; leaflets (6)8–22(28) pairs per pinna, (2)4–9(12) mm long, (1)1,5–3,5(4,5) mm wide, linear-oblong or oblong, occasionally narrowly ovate- or obovate-oblong, asymmetric basally, rounded and mucronate apically, appressed-pubescent on both surfaces, lower surface paler than upper. *Stipules* up to 1,4 cm long, linear-subulate with up to 7 linear, alternate, lateral appendages up to 6 mm long, rusty-pubescent, soon deciduous. *Inflorescences* racemose, terminal and axillary, up to 24 cm long, often aggregated at the ends of the branchlets and ± panicled; the axes densely rusty-tomentose or pubescent; bracts up to 7 × 1 mm, linear-lanceolate, deciduous. *Flowers* yellow, on rusty-tomentose or pubescent pedicels 3–10 mm long. *Calyx* rusty-tomentose or pubescent outside, tube very short, ± 2 mm long; lobes 4–7 mm long, 2,5–4 mm wide, subequal, ± oblong, the inner lobes with scarious, denticulate margins, reflexed in flower. *Petals* 10–14(17) mm long, obtriangular-spathulate with a short claw, or the upper one somewhat shorter and with a broader, stouter claw, rusty-hirsute basally within. *Stamens* 8–13 mm long, rusty-hirsute basally, glabrous above, filaments of different lengths; anthers 1,5–3 mm long. *Ovary* rusty-pubescent; stigma broadly peltate. *Pods* pendulous, narrowly elliptic to elliptic, 4–9 cm long, 1,4–2(2,2) cm wide, compressed, with a wing 2–6 mm wide down each margin, 1–2-seeded, indehiscent, acuminate at both ends, finely ± longitudinally striate, densely puberulous or sometimes ± glabrescent at maturity, often persisting on leafless plants. Seeds ± 9–12 × 5–8 × 1 mm, strongly compressed, elongated longitudinally in the pod. Fig. 26.

Found in Zaire, Angola, South West Africa, Botswana, Zambia, Rhodesia, Mozambique, the Transvaal, Swaziland and Natal (Zululand). Occurs in bushveld and woodland, often on sandy soil or among rocks.

S.W.A.—1713 (Swartbooisdrif): near Otjiwero, *De Winter & Leistner 5402*. 1715 (Ondangua): Okatana Mission Station, *De Winter & Giess 7074*. 1716 (Enana): 19,2 km S.W. of Omafa on road to Ndola Store, *De Winter 3630*. 1718 (Kuring-Kuru): Between Katwitwi and Makambo camp, *De Winter 3865*. 1719 (Runtu): 8 km W. of Runtu on road to Kapako, *De Winter 3729*. 1723 (Singalamwe): Singalamwe, *Killick & Leistner 3242*. 1724 (Katima Mulilo): Katima Mulilo area, *Killick & Leistner 3069*. 1917 (Tsumeb): near Otavi, *Rodin 2597*. 2016 (Otjiwarongo): Waterberg Plateau, *De Winter 2812a*.

TRANSVAAL.—2229 (Waterpoort): farm Zoutpan 193, *Obermeyer, Schweickerdt & Verdoorn 107*. 2231 (Pafuri): Kruger National Park, Mabasa, *Lang sub TRV 32346*. 2329 (Pietersburg): 83 km W. of Louis Trichardt, *Schlieben 7403*. 2330 (Tzaneen): Merensky Dam, *Scheepers 821*. 2425 (Gaberones): Lekkerlach, *Louw 599* (NH). 2426 (Mochudi): Rooibokkraal farm, 3,2 km E. of Rooibokkraal P.O., *Leistner 3207*. 2427 (Thabazimbi): Rooiberg, *Werdermann & Oberdieck 1708*. 2428 (Nylstroom): near Nylstroom, *Burtt Davy 2014*. 2429 (Zebediela): Potgietersrust, *Thode A 1690*. 2430 (Pilgrim's Rest): Strydom Tunnel, *Strey 7883*. 2527 (Rustenberg): northern slopes of Magaliesberg at Crocodile River, *Zeyher 554* (K). 2528 (Pretoria): near Hammanskraal, *Codd 6308*. 2530 (Lydenburg): near Waterval-Bo, *Rogers 12920*. 2531 (Komatipoort): Kruger National Park, near Pretoriuskop Camp, *Codd 4413*.

SWAZILAND.—2631 (Mbabane): Grand Valley Hills, *Compton 27939*; Umtintegwa, *Compton 26025*; 1,6 km W. of Usutu Bridge on Mankaiana road, *Miller S/235*.

NATAL.—2732 (Ubombo): 3,2 km W. of Sihangwa Store on Ingwavuma road, *Moll 4881*; Mkuzi Game Reserve, *Lawson 1047* (NH). 2831 (Nkandla): Umfolozi Game Reserve, *Feely 100* (NH). 2832 (Mtubatuba): Hluhluwe Game Reserve, *Ward 1847; Tinley 594*.

P. africanum is commonly known as the African Wattle or Huilboom. The former name is applied because of the resemblance of its leaves to those of some "Wattles", *Acacia* species from Australia, and the latter because of the tear-like drops that fall from the plant at certain times of the year. The "rain" is caused by a small insect, a spittle bug or froghopper, which pierces the wood and sucks the sap, excreting large quantities of almost pure water which forms a frothy mass around the insect and drips constantly.

The wood is of medium hardness, does not split, and works easily and well.

2. **Peltophorum pterocarpum** (*DC.*) *Heyne*, Nutt. Pl. Ned.-Ind. ed.2, 2 : 755 (1927); Brenan in F.T.E.A. Legum.-Caesalp. : 17 (1967). Type from Indonesia (Timor).

Inga pterocarpa DC., Prodr. 2 : 441 (1825). Type as above.

Caesalpinia ferruginea Decne., Descr. Herb. Tim. 134 (1834). Type from Indonesia (Timor).

Peltophorum ferrugineum (Decne.) Benth., Fl. Austral. 2 : 279 (1864); Bak.f., Leg. Trop. Afr. 3 : 612 (1930). Type as for *Caesalpinia ferruginea*. *P. africanum* var. *speciosum* Burtt Davy in Kew Bull. 1921 : 50 (1921), pro parte quoad spec. Maurit. sed excl. spec. Rhod.

Tree up to 15 m high; young branchlets shortly rusty brown-tomentose, sometimes becoming glabrescent with age. *Leaves:* petiole and rhachis together up to 35 cm long, rusty brown-tomentose when young; pinnae 7–14 pairs; rhachillae 4–13 cm long; leaflets (5)9–17(20) pairs per pinna, 8–21 mm long, 3,5–9 mm wide, ± oblong or oblong-rhombic, asymmetric basally, rounded and usually emarginate (never mucronate) apically, glabrous or appressed-pubescent on both surfaces. *Stipules* simple and inconspicuous. *Inflorescence* like that of *P. africanum* but usually larger and with more branches. *Flowers* yellow, on rusty-tomentose or pubescent pedicels 4–10 mm long. *Calyx* rusty-tomentose or pubescent outside, lobes (5)6–8(10) mm long. *Petals* 13–23 mm long. *Ovary* rusty-pubescent. *Pods* 4–12 cm long, 1,6–3,2 cm wide, narrowly elliptic to oblong.

Native of tropical Asia and Australia, but widely planted for ornament.

NATAL.—2831 (Nkandla): Empangeni, *Forester 13313, 13669* (K). Grid ref. unknown: near Durban, *Wylie sub NH 29898*.

P. pterocarpum differs from *P. africanum* in having unbranched stipules and typically larger leaflets which are usually emarginate and not mucronate apically.

3573 23. CORDYLA

Cordyla *Lour.*, Fl. Cochinch. 411 (1790); DC., Prodr. 2 : 521 (1825); G. Don, Gen. Syst. 2 : 466 (1832); Benth. & Hook.f., Gen. Pl. 1 : 562 (1865); Bak. in F.T.A. 2 : 257 (1871); Taub. in Pflanzenfam. 3, 3 : 181 (1892); Harms in Engl., Pflanzenw. Afr. 3, 1 : 516 (1915); Bak.f., Leg. Trop. Afr. 2 : 606 (1929); Milne-Redhead in Feddes Repert. 41 : 227 (1937); Phill., Gen. ed. 2 : 399 (1951); Hutch., Gen. Fl. Pl. 1 : 319 (1964); Von Breitenbach, Indig. Trees S. Afr. 3 : 353 (1965); Brenan in F.T.E.A. Legum.-Caesalp. : 221 (1967). Type species: *C. africana* Lour.

Cordylia Pers., Syn. Pl. 2 : 260 (1807).

Calycandra Lepr. ex A. Rich. in Guill., Perr. & A. Rich., Fl. Sen. 30, 232, t.9 (1832).

Unarmed deciduous trees, rarely shrubby. *Leaves* alternate, imparipinnate; leaflets petiolulate, alternate or rarely subopposite, with numerous pellucid dots or streaks. *Stipules* small, soon deciduous. *Flowers* hermaphrodite or male, in racemes which are axillary or

FIG. 27.—**Cordyla africana**. 1, part of flowering branch, × 1, from *McCoy-Hill* 19; 2, part of leaflet-surface, showing venation and gland-dots, × 6; 3, longitudinal section of flower, showing attachment of stipe of ovary, × 1½; 4, ovary, longitudinal section, × 6, all from *Lewis* 38; 5, fruit, × 1; 6, fruit, longitudinal section, × 1, both from *Wild* 2408. Reproduced by permission of the Editor of Flora of Tropical East Africa.

clustered at the nodes or sometimes terminal; bracts and bracteoles minute, soon deciduous. *Calyx* with a subglobose limb entire before dehiscence, splitting into 3–5 lobes on opening. *Petals* 0. *Receptacle* ("calyx-tube") campanulate; a definite disc (i.e. with a margin) not present, the staminal tube merging evenly with the receptacle. *Stamens* numerous (±23–126), usually crowded into several series round the top of the receptacle; filaments very shortly united basally; anthers dorsifixed, dehiscing by longitudinal slits; connective glandular apically. *Ovary* (in hermaphrodite flowers) long-stipitate, several-ovuled, tapering into a subulate style; stigma small. *Fruit* stipitate, ellipsoid to subglobose, beaked or rounded, indehiscent, with 1–6 seeds embedded in pulp. *Seeds* large, thin-walled, not arillate, without endosperm; radicle of embryo straight.

A genus of 5 (?6) species all tropical African (although *C. africana* extends southwards beyond the tropics in our area), except for *C. madagascariensis* R. Vig. from Madagascar which, from the description, is perhaps not distinct from *C. africana*.

The generic name *Cordyla* is derived from the Greek word for club; in allusion to the shape of the calyx before expansion and dehiscence.

Cordyla africana *Lour.*, Fl. Cochinch. 412 (1790); DC., Prodr. 2 : 521 (1825); Mém. Leg. 460 (1826); Bolle in Peters, Reise Mossamb. Bot. 1 : 17, t.4 (1861); Bak. in F.T.A. 2 : 257 (1871) pro parte; Sim, For. Fl. P.E. Afr. 46, t.46 (1909); Harms in Engl., Pflanzenw. Afr. 3, 1 : 516 (1915) pro parte; Bak.f., Leg. Trop. Afr. 2 : 606 (1929) pro parte; Burtt Davy, Fl. Transv. 2 : 353 (1932); Henkel, Woody Pl. Natal 205 (1934); Milne-Redhead in Feddes Repert. 41 : 230 (1937); Hutch., Botanist in S. Afr. 271, 377 (1946); Brenan, Checklist Tang. Terr. 410 (1949); Pardy in Rhod. Agric. J. 51 : 110 (1954); F. White, For. Fl. N. Rhod. 121, fig. 21 F, G (1962); Von Breitenbach, Indig. Trees S. Afr. 3 : 353 (1965) excl. syn. *Calycandra pinnata* Lepr. ex A. Rich.; Gomes e Sousa, Dendrol. Moçamb. 1 : 276, t.71 (1966); Compton in J. S. Afr. Bot., Suppl. 6 : 46 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 221, fig. 51 (1967); Van Wyk, Trees Kruger Nat. Park 1 : 201 (1972); Ross, Fl. Natal 196 (1973); Palmer & Pitman, Trees S. Afr. 2 : 889 (1973). Type: East African coast, *Loureiro* (P, holo!, BM,? fragm.!).

Tree up to 23 m high (in our area) with a somewhat rounded spreading crown; bark brown or grey, rough, longitudinally fissured. *Leaves* glabrous to sparingly pubescent: petiole 1,5–2,8 cm long; rhachis (4,5)9–22 cm long; leaflets (7)11–28, usually alternate, (1)2–4 cm long, (0,7)1–2 cm wide (in our area), oblong, oblong-elliptic or ovate-oblong, usually rounded apically and sometimes slightly emarginate, minutely appressed-puberulous beneath; petiolules 2–3 mm long, glabrous to sparingly pubescent. *Racemes* 1,5–6 cm long (in our area), usually borne on shoots of the current season's growth below the leaves; pedicles (and outside of receptacle and calyx) subglabrous to shortly and finely pubescent, 4–9 mm long. *Flowers* usually facing upward, orange-yellow. *Calyx* entire and turbinate in bud, splitting into 3–5 lobes on opening. *Receptacle* and calyx-lobes green, the latter with an apical tuft of yellowish pubescence. *Petals* absent. *Stamens* 23–45, orange-yellow, filaments up to 2 cm long, united basally. *Ovary* on a long stipe, glabrous. *Fruits* ellipsoid, oblong or spherical, ± oblique, 3–8 cm long, 2–6 cm wide, 1–3-seeded, yellow when ripe, edible. *Seeds* 1,6–3,2 cm long, 0,9–2 cm wide, embedded in pulp, somewhat compressed. Fig. 27.

Found in Kenya, Tanzania, Zambia, Malawi, Rhodesia, Mozambique, the Transvaal, Swaziland and Natal (Tongaland). Usually occurs in riverine forest.

TRANSVAAL.—2531 (Komatipoort): Komatipoort, *Pole Evans sub PRE 16873*; *Pole Evans sub PRE 18911*; *Wallis sub PRE 32210*; Kruger National Park, Crocodile River, ± halfway between Crocodile Bridge and border of Mozambique, *Pienaar 4692*; Coopersdal, near Komatidraaiboere, *Nel 177*.

SWAZILAND.—Although recorded from Swaziland by Compton in J. S.Afr. Bot., Suppl. 6 : 46 (1966), I have seen no specimen from this territory.

NATAL.—2632 (Bela Vista): E. of Ndumu Game Reserve, *Ross & Moll 5094*. 2732 (Ubombo): near Sakhunte Pan on Pongola River bank, *Tinley 549*. 2832 (Mtubatuba): False Bay south east, Baheni stream, *Ward 2995*.

FIG. 28.—**Swartzia madagascariensis**. 1, part of flowering branch, × 1; 2, flower, with petal and stamens removed, × 1½; 3, petal, under-surface, × 1½; 4, apex of style, and stigma, × 6; 5, ovary, cross-section, diagrammatic; 6, ovary, longitudinal section, diagrammatic, all from *B. D. Burtt* 3417; 7, pod, × ⅔; 8, pod, cross-section, diagrammatic; 9, pod, longitudinal-section, diagrammatic; 10, seed, × 3, all from *B. D. Burtt* 3382. Reproduced by permission of the Editor of Flora of Tropical East Africa.

3574 24. SWARTZIA

Swartzia *Schreb.*, Gen. Pl. 2 : 518 (1791) nom. conserv.; Willd., Sp. Pl. 2 : 1219 (1800); DC., Prodr. 2 : 422 (1825); G. Don, Gen. Syst. 2 : 379 (1832); Benth. & Hook.f., Gen. Pl. 1 : 561 (1865); Bak. in F.T.A. 2 : 256 (1871); Harms in Engl., Pflanzenw. Afr. 3, 1 : 517 (1915); Bak.f., Leg. Trop. Afr. 2 : 605 (1929); Gilbert & Boutique in F.C.B. 3 : 550 (1952); Hutch., Gen. Fl. Pl. 1 : 318 (1964); Brenan in F.T.E.A. Legum.-Caesalp. : 218 (1967); Schreiber in F.S.W.A. 59 : 19 (1967); Cowan in Fl. Neotropica 1 : 12 (1968). Type species: *S. guianensis* (Aubl.) Urb. (*S. alata* Willd.).

Tounatea Aubl., Hist. Pl. Guiane Fr. 1 : 549, t.218 (1775); Taub. in Pflanzenfam. 3, 3 : 182 (1892).

Unarmed trees or rarely shrubs. *Leaves* alternate, imparipinnate or pinnately trifoliolate or (but not in our area) unifoliolate; leaflets opposite or more rarely alternate, without pellucid dots. *Stipules* mostly small or very small. *Flowers* hermaphrodite, in lateral racemes or sometimes in panicles or fascicles; bracteoles inconspicuous or absent. *Calyx* globose or ellipsoid and entire before dehiscence, becoming variously lobed or torn on opening; disc absent. *Petals* usually 1, rarely (and not in our area) with 2 small additional lateral ones, or entirely absent. *Stamens* numerous (more than 30), arranged in several rows at base of calyx around the gynophore, free or almost so, often dimorphic; anthers affixed near the base, dehiscing by longitudinal slits; connective not glandular. *Ovary* long-stipitate, several- to many-ovuled; stigma very small. *Pods* stipitate, coriaceous or woody, turgid or cylindrical, sometimes compressed, shortly boat-shaped to cylindrical or torulose, dehiscing into 2 valves or indehiscent, 1-several-seeded. *Seeds* not areolate, arillate or not, with or without endosperm; radicle of embryo curved or straight.*

A genus of 129 species, 127 of which are found in tropical America. The 2 remaining species occur in Africa, one of them in our area.

The genus is named in honour of the Swedish botanist Olof Swartz, a long time resident in the West Indies and author of Flora Indica Occidentalis and other works.

Swartzia madagascariensis *Desv.* in Ann. Sci. Nat., Sér. 1, 9 : 424 (1826); Bak. in F.T.A. 2 : 257 (1871); Harms in Warb., Kunene-Samb. Exped. 252 (1903); Sim, For. Fl. P.E. Afr. 46, t.52 (1909); Harms in Engl., Pflanzenw. Afr. 3, 1 : 517 (1915); Bak.f., Leg. Trop. Afr. 2 : 605 (1929); Brenan, Checklist Tang. Terr. 444 (1949); Gilbert & Boutique in F.C.B. 3 : 551 (1952); O. B. Miller in J. S. Afr. Bot. 18 : 36 (1952); Pardy in Rhod. Agric. J. 51 : 274 (1954); Torre & Hillc. in C.F.A. 2 : 167 (1956); Palgrave, Trees Cent. Afr. 122–6 (1957); Keay in F.W.T.A. ed. 2, 1 : 446, fig. 146 (1958); F. White, For. Fl. N. Rhod. 128, fig. 21 K (1962); Gomes e Sousa, Dendrol. Moçamb. 1 : 296, t.88 (1966); Brenan in F.T.E.A. Legum.-Caesalp. : 219, fig. 50 (1967); Schreiber in F.S.W.A. 59 : 19 (1967); Palmer & Pitman, Trees S. Afr. 2 : 891 (1973). Type: locality doubtful, *Herb. Desvaux* (P, holo.!).

* Bentham in Gen. Pl. 1 : 561 (1865) described the radicle in *Swartzia* as curved; Corner in Phytomorphology 1 : 141 (1951) described the radicle of *Swartzia pinnata* as straight. The radicle of *S. madagascariensis* is curved. As discussed by Brenan in F.T.E.A. Legum.-Caesalp. : 219 (1967), the matter is of more than casual significance because in *Papilionoideae* the radicle is curved and in *Caesalpinioideae* usually straight. The presence of both sorts of radicle within *Swartzia* emphasizes the borderline position (on other characters) that it occupies between *Papilionoideae* and *Caesalpinioideae*, and supports their treatment as no more than subfamilies.


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Tounatea madagascariensis (Desv.) Baill. in Bull. Soc. Linn., Paris 1 : 446 (1885); Taub. in Bot. Zbl. 47 : 391 (1891); Hiern, Cat. Afr. Pl. Welw. 1 : 286 (1896). Type as above.

Tree or occasionally a shrub up to 12 m high; bark grey or brown, rough, longitudinally fissured or reticulate; young branchlets densely pubescent to tomentose, indumentum rusty or fulvous when young but often becoming greyish with age. *Leaves* densely pubescent to tomentose: petiole (0,5)1,1–3 cm long; rhachis 1,5–11 cm long (in our area); leaflets alternate or more infrequently opposite, (3)5–11 per leaf (in our area), (1,8)2–7 cm long, (0,9)1,2–3,8 cm wide (in our area), elliptic or obovate-elliptic, rarely oblong-elliptic, rounded at both ends and often slightly emarginate apically, ± densely appressed-hairy or tomentose beneath, rarely subglabrous. *Stipules* linear-lanceolate, up to 7 × 1 mm. *Racemes* 2–10-flowered, axillary, solitary or up to 3 together; axis densely rusty or fulvous-tomentose, up to 5 cm long, sometimes very short or absent so that the flowers appear fascicled; pedicels 1,2–5 cm long, usually tomentose like the axis. *Calyx* rusty or fulvous-tomentose, globose at first and 5–7 mm in diameter, ultimately rupturing irregularly into 2–5 lobes, the lobes reflexing. *Petal* 1, white, densely rusty-pilose outside, glabrous inside, crinkled, clawed, 2–3,6 cm long, 1,8–3 cm wide. *Stamens* orange-yellow, up to 1,8 cm long. *Ovary* glabrous. *Pods* deep chestnut-brown to black, ± cylindrical, (6)8–30 cm long, 1–2,3 cm in diameter, hard, indehiscent. *Seeds* olive-brown, 6–8 mm long, 5–7 mm wide, ± 3 mm thick, without arils or endosperm. Fig. 28.

Found from Gambia to the Cameroun Republic, and in Zaire, Tanzania, Angola, South West Africa, Botswana, Zambia, Rhodesia and Mozambique.* Occurs in deciduous woodland, usually on sandy soils in our area.

S.W.A.—1718 (Kuring-Kuru): 4,8 km S. of Omuramba Mpungu on road to Tsinsabis, *De Winter 3893*; 1,6 km W. of Katwitwi, *De Winter 3852*. 1722 (Chirundi): Bwabwata, *Watt 23*. 1723 (Singalamwe): road to Sibinda from Katima Mulilo, *Pienaar & Vahrmeijer 225*. 1819 (Karakuwisa): 89,6 km S. of Runtu, *Maguire 1591*. 1821 (Andara): Andara Mission station, *De Winter & Wiss 4279*; Andara, *Merxmüller & Giess 2062*; *Banks 99*. 1920 (Tsumkwe): 16 km E. of Samangeigei, *Giess 9935*; near Samangeigei, *Story 6096*.

The pods are roasted, ground up and used as an arrow poison which is effective on its own for small game. The ripe pods are also used as a fish poison.

* Despite the specific epithet "*madagascariensis*", there is no evidence that this species occurs in Madagascar or the Mascarenes beyond Desvaux's original statement which, as mentioned by Brenan l.c. : 219, is almost certainly erroneous.

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* An asterisk signifies exotic species or genera which are not naturalized; synonyms are in italics.