

## COMMON PERENNIAL LILIES OF KENYA WITH EPHEMERAL FLOWERING SHOOTS

By

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(E.A. Herbarium)

These plants form a conspicuous and attractive feature of the flush of herbs, which appears fleetingly after the first rains. Members of the Liliaceae can easily be distinguished from other families of showy flowered monocotyledons of the same type, by the following key:-

- 1a. Petal-like perianth segments inserted below the ovary.....2  
 1b. Petal-like perianth segments inserted above the ovary.....  
 .....Iridaceae, Amaryllidaceae, Hypoxidaceae  
 2a. Perianth segments all similar, if not in size, then  
 in colour and texture.....Liliaceae  
 2b. Perianth segments dissimilar, three coloured, petal-like,  
 three smaller, green, sepal-like.....Commelinaceae

I have included here all the Kenya genera, except Asparagus and Aloe, although a few species, mostly forest ones, have rather more persistent flowering shoots; conversely the odd species of the excluded genera has rather short lived ones. In any case, it will be seen that plants with underground storage organs, which persist and to a certain extent spread vegetatively for a number of years, sending up shoots which flower and set seed within a few weeks, make up a substantial part of the family. This life-form is well adapted to the many dry parts of Kenya with infrequent and scanty rain and also clayey soils, such as black cotton and 'mbuga', which have a large run-off in the rains and a very poor tilth in the dry weather. They are again found commonly on shallow soils overlying rock such as are found along the sides of many river valleys. These sills catch a good supply of rainwater, but rapidly lose it again by evaporation.

The underground organs not only provide a number of useful characters for classification, but also have a more general biological interest in showing the ways in which different parts of the plant have become modified. Some have bulbs, which are made up of swollen leaf bases, others have corms, which are swollen stems, and yet others have rhizomes, which are also stems, but spreading and root-like, often swollen into stocks at the base of the shoots of each successive year. The appearance of all these is very diverse and in addition the roots are often modified as well, some stringy with potato-like tubers, others fleshy and tuberosus to varying degrees. So many collectors pick off a shoot at ground level, that these differences have often been of little use to the herbarium worker. I have not hesitated to make what use I can of these characters in the following keys and notes, and it may be added that carefully dug up specimens of various species from the remoter parts of Kenya, which are inaccessible to many during the rains, are still wanted for the herbarium. In all

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cases they often facilitate naming. Exact colour of the flowers and specimens of ripe fruits also provide useful characters - for instance, the genera Anthericum and Chlorophytum are primarily defined on the shapes of their seeds.

Partly because of the inadequate material of early collectors and partly because a number of the genera are large with species varying considerably in height, leaf development and, to a lesser extent, in hairiness and flower size, which cannot be appreciated without a number of specimens, the taxonomy has become somewhat confused. It may be expected that a number of names will have to be altered when a much needed revision is undertaken - the last general account, for the Flora of Tropical Africa, appeared in 1898. A limited synonymy of names previously in botanical usage is given in the index.

The material in the East African Herbarium was carefully worked over a few years ago by Mr. Rayner, a prominent member of the Society, and has made the preparation of this article much easier. I am also grateful to members of the East African Herbarium and Mrs. S. Holmes, of the Royal Botanic Gardens, Kew, for advice and help with the nomenclature, and in particular to my mother, Mrs. Evelyn Polhill, for the great care she has taken over the preparation of the habit sketches of living plants, used in the illustrations, which form a most valuable part of this account.

### KEY TO THE GENERA

- 1a. Intricately branched herbaceous climber; stem leaves reduced to scales ..... Bowiea
- 1b. Not climbing or if so, rarely branched and with well developed stem leaves..... 2
- 2a. Leaves tapering into tendrils, crowded on a well developed stem.....Gloriosa
- 2b. Leaves not forming tendrils, all basal or rarely a few on a diminutive stem.....3
- 3a. Styles three (Figs. 2, 23).....4
- 3b. Styles one.....5
- 4a. Bracts large and showy, sheathing small flowers with inconspicuous perianth segments..... Androcymbium
- 4b. Bracts small, perianth segments white with two contiguous purple spots towards the base, in the Kenya species..... Wurmbea
- 5a. Filaments covered with long yellow hairs..... Bulbine
- 5b. Filaments not covered with long hairs.....6
- 6a. Plants with bulbs.....7
- 6b. Plants with corms, rhizomes or tubers, sometimes bulb-shaped, but not made up of swollen leaf bases.....14
- 7a. Perianth segments united into a tube at the base with the filaments inserted on the segments at the top of the tube.....8
- 7b. Perianth segments free.....11

- 8a. Perianth united, the lobes dissimilar, the outer often developed into solid tails, the inner continued, more or less joined together, tube-like, only their tips free and spreading..... Dipcadi
- 8b. Perianth segments similar.....9
- 9a. Inflorescence small, spike-like; the flowers small, subglobose, greenish to white..... Drimyopsis
- 9b. Inflorescence various, but if spike-like, the plants robust with conspicuous flowers and spreading perianth segments.....10
- 10a. Perianth segments joined for about 1/3 of their length or less; the Kenya species with laxly arranged flowers and very short bracts; the perianth segments greenish to white, usually with a green or brown median stripe..... Urginea\*
- 10b. Perianth segments joined for about 1/4 of their length; the Kenya species with crowded flowers and conspicuous bracts; the perianth segments white, sometimes marked with mauve..... Drimia
- 11a. Flowers blueish to mauve; the leaves often spotted; the anthers small, nearly as wide as long; the filaments narrow, thread-like..... Scilla
- 11b. Flowers various combinations of white, green and brown; the anthers distinctly longer than wide; the filaments more or less expanded.....12
- 12a. Filaments joined to the base of the perianth segments, which are more often joined into a short tube; the seeds often with a conspicuous, membranous wing..... Urginea
- 12b. Filaments inserted below the ovary; the seeds orbicular to subglobose.....13
- 13a. Flowers bell-shaped, the inner perianth segments, at least, not much spreading even when mature; the seeds flattened, orbicular..... Albuca
- 13b. Flowers cup-shaped with spreading perianth segments when mature; the seeds supposedly subglobose or angular, but often rather flattened in the Kenya species..... Ornithogalum
- 14a. Perianth segments joined into a tube for most of their length, the flowers trumpet-shaped..... Kniphofia  
(N.B. Aloe, which would key out here, is excluded).
- 14b. Perianth segments free or almost so.....15
- 15a. Seeds hairy; the flowers often yellow, tinged red outside; plants growing from a subglobose tuber..... Eriospermum
- 15b. Seeds not hairy; the flowers whitish to green, sometimes with a brown stripe to the perianth segments; the plants variously rhizomatous.....16
- 16a. Seeds angular to irregular; the fruits three-angled or slightly grooved..... Anthericum
- 16b. Seeds flat, a few sometimes distorted by pressure in the capsule; the fruits three-winged..... Chlorophytum

\* The Kenya species of Scilla also appear to have the perianth segments very shortly joined at the base, but then the flowers blueish to mauve.

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### ALBUCA Linn.

Pedicels  $\frac{1}{2}$  in. long or less in flower, up to  $\frac{5}{8}$  in. long in fruit; usually flowering with the leaves well developed..... A. wakefieldii

Pedicels of the mature flowers more than  $\frac{1}{2}$  in. long, usually about  $\frac{3}{4}$  -  $1\frac{1}{2}$  ins. long, at least in fruit; small plants, flowering before the leaves..... A. pachyclamys

#### A. pachyclamys Bak.

Large bulb, surrounded by tough old leaf sheaths, crowned with wiry fibres. Flowering before the leaves appear. Peduncles short, usually less than 8 ins. tall, stout and slightly zig-zag. Bracts ovate-lanceolate, short, up to  $\frac{1}{2}$  in. long, much shorter than the pedicels, which are usually  $\frac{3}{4}$  -  $1\frac{1}{4}$  ins. long in flower, sometimes longer in fruit. Perianth segments white with a brownish purple median stripe, up to  $\frac{5}{8}$  in. long. Fruits ovoid-oblong, about  $\frac{3}{4}$  in. long, slightly three-lobed.

Rare, Machakos District.

#### A. wakefieldii Bak. Fig. 1

A very variable species, with bulbs 1 - 2 ins. across; the leaves strap-shaped, from a few to about 18 ins. long, sometimes hairy along the margins. Peduncles 6 ins. to 4 ft. long, with the flowers laxly arranged on short pedicels, up to  $\frac{1}{4}$  in., rarely  $\frac{1}{2}$  in. long, in flower; the upper bracts  $\frac{1}{4}$  -  $\frac{1}{2}$  in., the lower ones up to 1 in. long. Flowers nodding, bell-shaped, never opening fully, with oblong perianth segments,  $\frac{3}{8}$  - 1 in. long, with a broad green median stripe, yellowish then white towards the margin, sometimes entirely yellow, hooded at the apex. The filaments waisted where they clasp the top of the ovary in bud, tapered above. Fruits  $\frac{1}{2}$  - 1 in. long, slightly three-lobed, pointed at the apex.

Common in most parts of Kenya below about 8,000 ft.

The above description includes a wide variety of plants, but none of the characters appear to be sufficiently constant to suggest that more than one species is involved, except perhaps certain plants from the Northern Frontier Province with rather long, weak hairs on the leaf bases, named A. blepharophylla Cuf. Several varieties might be recognised, e.g. the coastal type, often tall with consistently large fruits and rather large greenish flowers, and one from the Kitui and Tsavo areas with bright yellow flowers, 1 in. long. The size of the plants, the hairiness of the leaves and the size of the flowers (which anyway increases considerably with age), vary widely throughout the country.

### ANDROCYMBIUM Willd.

#### A. melanthioides Willd. var. striatum (A. Rich.) Bak. Fig. 2

A small plant, from a few inches to nearly 1 ft. tall, growing from a small corm, with narrow basal leaves and a few very small leaves on the stem. Peduncles with about four clustered flowers, with very large sheathing bracts, 1 - 3 ins. long, white to greenish, conspicuously veined dark green to brown. Flowers small,  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, with yellow-green perianth segments clasping

the filaments; the ovaries with three styles. Fruits up to ½ in. long, with persistent styles.

Central highlands and Elgon area.

ANTHERICUM Linn.

- 1a. Leaves arising from a prostrate aerial rhizome, which may be several feet long..... A. suffruticosum
- 1b. Leaves from an underground rhizome, forming a rosette at ground level.....2
- 2a. Inflorescences compound, repeatedly branched with numerous small flowers on long pedicels, the lower branches nearly as long as the continuation of the main stalk..... A. zavattarii
- 2b. Inflorescences usually without lateral branches, or if a few present at the base, then much shorter than the continuation of the main stalk and the flowers congested.....3
- 3a. Flowers single to a bract, never in groups; the inflorescences always lax; the pedicels well developed (sometimes longer than the peduncle); the roots tapering from a thickened base, without tubers.....4
- 3b. Lower flowers at least in groups of two to four, if rarely all single, then the pedicels short and the roots wiry, some with small potato-like tubers.....6
- 4a. Peduncles usually more than 6 ins. long with a number of flowers; the pedicels not stiffly spreading; the perianth segments with a brown median stripe; the filaments covered with small barb-like papillae..... A. kassneri
- 4b. Peduncles very short, or if a little longer (2-6 ins.), erect with a few stiffly spreading pedicels; the perianth segments pure white or with a greenish stripe; the filaments smooth.....5
- 5a. Pedicels longer than the peduncle, which is often hidden in the leaf rosette; the perianth segments wholly white..... A. angustifolium
- 5b. Pedicels shorter than the peduncle, which is 2-6 ins. long; the perianth segments with a green median stripe..... A. gregorianum
- 6a. Roots tapering from a thickened base; small plants less than 1 ft. tall; the peduncles shortly scabrid hairy on the upper part; the perianth segments without a median stripe; most of the flowers in groups of 2-4..... A. sp. (= Chlorophytum moniliforme)\*
- 6b. Roots wiry, some at least bearing potato-like tubers; the stalks hairless, or if roughened to hairy, then the perianth segments with a median stripe (A. subpapillosum and A. venulosum) or all the flowers except the lowermost single to a bract (A. taylorianum) .....7
- 7a. All except the lowest flowers one to a bract; the perianth segments wholly white, usually three-veined; the upper part of the peduncles shortly scabrid hairy..... A. taylorianum
- 7b. Majority of the flowers in groups of 2-4; the peduncles hairless or if roughened or hairy, then the perianth segments with a conspicuous median stripe.....8

\* This clumsy designation is necessary to avoid publishing a new name combination, which is undesirable in an article of this sort.

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- 8a. Leaf bases with irregular purple splotches; the inflorescences lax; the peduncles flattened and narrowly winged, often zig-zig between the groups of 2-4 flowers, hairless..... A. uvuense
- 8b. Leaf bases unspotted; the inflorescences congested or, if lax, the peduncles hairy.....9
- 9a. Perianth segments without a brown median stripe; the rather few flowers crowded at the top of the medium sized, hairless and narrowly winged peduncle; the leaves narrow, about 18 x ¼ - ½ in..... A. zaquebaricum
- 9b. Perianth segments with a brown or purplish median stripe; the peduncles roughened and almost wingless to hairy, or if hairless then robust plants more than 18 ins. tall with mature leaves ¾ - 2 ins. wide and many flowered, often branched, inflorescences.....10
- 10a. Peduncles smooth and hairless, markedly winged; robust plants usually more than 18 ins. tall; the mature leaves ¾ - 2 ins. wide.....11
- 10b. Peduncles minutely roughened and almost wingless to hairy and winged; the plants variable in size, but usually less than 18 ins. tall; the mature leaves less than ½ in. wide.....12
- 11a. Leaves markedly contracted in their lower part; the inflorescences usually with short lateral branches....A. sp. near pterocaulon 1
- 11b. Leaves gradually tapered in their lower part; the inflorescences unbranched.....A. sp. near pterocaulon 2
- 12a. Peduncles shortly hairy along the margins, which are finely winged; the leaf margins also hairy; the mature inflorescences lax.....A. venulosum
- 12b. Peduncles minutely roughened (subpapillose), sometimes finely winged; the leaf margins hairless; the inflorescences short and congested.....A. subpapillosum

A. angustifolium Hochst. ex A. Rich.

A small plant with tapering roots thickened to about 1/8 in. across at the base; the stocks fibrous. Leaves very slender, usually less than 5 ins. long and about 1/8 in. wide. Flowers few, on long pedicels, 1 - 2 (- 3) ins. long, much longer than the peduncle, which is often hidden in the leaf rosette. Flowers wholly white, star-like, with narrow segments, about ½ in. long. Fruits about ¼ in. long, not deeply indented at the apex.

Short grassland, central highlands and Elgon area.

A. gregorianum Rendle Fig. 3

A more robust plant than A. angustifolium; the roots thickened to about ¼ in. across at the base; the leaves 3 - 9 ins. long. Inflorescences with a distinct peduncle, 2 - 6 ins. long. Bracts shorter than the stiffly spreading pedicels, which are up to ¾ in. long. Flowers about ¾ in. across, the perianth segments white with a three-veined, green median stripe. Fruits three-angled, shortly indented at the apex, about ¼ in. long.

Short grassland, Nairobi, Machakos and Masai Dists.; Northern Frontier Province.

A. kassneri Poelln. Fig. 5

Shortly rhizomatous, the stocks often bulb-shaped, fibrous; the tapering roots swollen, up to 3/16 in. across at the base. Leaves

up to 1 ft. or so long, usually fleshy, grooved down the inner side,  $1/16 - 3/16$  in. wide, sometimes hairy. Peduncles erect or often spreading and then ascending, 8 - 18 ins. long, sometimes hairy, the flowers well spaced, one to a bract. Bracts up to  $1/4$  in. long, the pedicels  $1/4 - 1/2$  in. long. Flowers vary from  $1/2 - 3/4$  in. across, the segments narrow with a conspicuous brown median stripe; with a faint sweet scent; opening only in the afternoon. Filaments and, to a lesser extent, the perianth segments covered with small barb-like papillae. Fruits small, almost globular,  $1/4 - 3/8$  in. long.

Northern Frontier Province, southern, eastern and central Kenya, from 3,000 to about 8,000 ft.

A very variable species, belonging to a complex group; possibly synonymous with A. oatesii Bak.

A. sp. ( = Chlorophytum moniliforme Rendle)\* Fig. 4

Rhizomes rarely branched and the stocks of successive seasons are close together, giving a necklace-like (moniliform) appearance; the roots thickened at the base, without tubers. Leaves usually about 6 ins. long, sometimes to 1 ft., the mature ones narrowed in their lower half, giving a petiole-like effect, very shortly hairy along the margins. Peduncles about 4 - 9 ins. long, shortly hairy, the flowers crowded on the upper part, the lower ones in groups of 2 - 4. Bracts  $1/2 - 3/4$  in. long, hairy; the pedicels short, rarely exceeding  $1/4$  in. Flowers  $3/4 - 7/8$  in. across, white, buff tinged near the apex outside. Fruits about  $1/4$  in. long, three-angled, not deeply indented at the apex; the seeds three-angled.

Grassland, medium altitudes (3-8,000 ft.), southern, central and western Kenya.

Very close to A. subpetiolatum Bak., an earlier described species, with hairless leaves and peduncles. This character may not prove to be constant when more material is examined.

A. sp. near pterocaulon Welw., 1

Rhizomes with many fine roots. Leaves 1 - 2 ft. long, hairless, markedly narrowed in their lower part,  $3/4 - 2$  ins. across. Peduncles 18 ins. - 4 ft. long, flattened, with a narrow wing up either side, often with several short lateral branches. Flowers crowded and grouped several together. Bracts variable, the upper ones short, boat-shaped, the lower ones long; the pedicels about  $1/4$  in. long. Flowers white, about  $3/4$  in. across; ? with a median stripe to the segments. Fruits about  $3/8$  in. long, transversely wrinkled, three-angled, not deeply indented at the apex.

Forest, coastal.

A. sp. near pterocaulon Welw., 2

Underground parts not seen. Leaves up to  $30 \times 3/4$  in., hairless, tapering downwards, but not markedly contracted. Peduncles to about 3 ft. long, the inflorescences not branched in the material seen, but long bracts scattered below the congested inflorescence. Flowers similar to A. sp. near pterocaulon 1. Fruits not seen.

Turkana District.

A. pterocaulon differs from both the above species, by having narrow, folded, recurved leaves.

\* see footnote p. 5

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### A. subpapillosum Poelln. Fig. 6

Stocks of successive years contiguous, forming a thick irregular rhizome; the roots stringy, some with small, distant, potato-like tubers; the stocks fibrous. Leaves 6 - 15 ins. long and up to  $\frac{3}{8}$  in. wide, narrowed in their lower part, bluey-green, the veins close, rib-like, subpapillose under a lens, but hairless. Peduncles flattened, more or less narrowly winged, roughened (subpapillose) on the upper part; the flowers usually rather few, crowded towards the top, at least the lower ones in groups of 2 - 3. Bracts small, boat-shaped, less than  $\frac{1}{4}$  in. long; the pedicels short about  $\frac{1}{4}$  in., sometimes  $\frac{1}{2}$  in. long. Flowers  $\frac{3}{4}$  - 1 in. across, the perianth segments white, with a green to red-brown median stripe, fading dull crimson-lake. Anthers oblong, crinkly-edged when dried out, longer than the filaments. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, bluntly three-angled, scarcely indented at the apex, transversely wrinkled.

Masai, Machakos, and Nairobi Districts, north to Mt. Kenya and Mathews Range, also the Elgon area, from about 5-7,000 ft.

### A. suffruticosum (Bak.) Milne-Redhead

Prostrate, branched, aerial rhizomes, about 1 in. thick, up to several feet long, from which the rosettes of leaves arise, quite unlike any other species of the genus. Flowers white with a greenish or brown stripe.

Coast and rocky outcrops inland to the Tsavo area.

### A. taylorianum Rendle

Stocks small with short rhizome connections; the roots wiry with small distant, potato-like tubers; the fibrous remains of the old leaf bases usually rather few and fine. Leaves narrow, 6 - 18 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., the margins shortly hairy and usually wavy. Peduncles 6 - 12 ins. long, shortly scabrid hairy, especially on the upper part. The majority of the flowers solitary to a bract, eventually a few of the lower ones in pairs. Upper bracts  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, the lower ones up to 1 in. or more, slightly hairy; the pedicels shorter than the bracts. Flowers about  $\frac{3}{4}$  in. across, the perianth segments white, without a median stripe, but sometimes bronze-tinged. Fruits up to about  $\frac{1}{4}$  in. long.

Turkana-Karamoja area.

### A. uyuiense Rendle Fig. 7

Stocks contiguous, fibrous, forming a thick irregular rhizome, about  $\frac{1}{2}$  in. across; the roots stringy, sometimes with small distant potato-like tubers. Leaves 1 - 2 ft. long and  $\frac{1}{4}$  -  $\frac{1}{2}$  in. wide, narrowed in their lower half, hairless, the sheaths with irregular purple markings just above ground level. Peduncles up to 2 ft. long, flattened and narrowly winged, slightly zig-zag between the well spaced groups of 1 - 3 flowers. Bracts, except the lowermost, short, subequal to the pedicels, which are less than  $\frac{1}{4}$  in. long. Flowers  $\frac{3}{4}$  -  $1\frac{1}{4}$  ins. across, the perianth segments white, without a well developed median stripe. Fruits about  $\frac{1}{4}$  in. long, transversely wrinkled, little indented at the apex.

Western Kenya, particularly in the Elgon area.

### A. venulosum Bak.

Underground parts not seen. Leaves up to 18 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., with hairy margins. Peduncles 15 - 30 ins. long, flattened and finely winged, the margins shortly hairy. Flowers laxly arranged in groups of 2 - 3. Bracts, except the lowest, small, less than  $\frac{1}{4}$  in.



long; the pedicels subequal. Flowers 1 - 1¼ ins. across, the perianth segments white with a conspicuous red-brown stripe. Fruits up to ¼ in. long, transversely wrinkled, little indented at the apex.

Southern Province, not common; more material desirable.

A. zanguebaricum Bak.

Stocks fibrous, with short connecting rhizomes; the roots stringy, some with small potato-like tubers. Leaves narrow, 18 x 1/4 - 1/3 in narrowed in their lower part, hairless. Inflorescences usually 12 - 18 ins. tall, the flowers usually rather crowded towards the top, occasionally with short lateral branches; the peduncles flattened and slightly winged, at least in their upper part. Flowers mostly in groups of 2 - 3. Bracts short 1/8 - 1/4 in. long; the pedicels also short, up to 1/3 in. long. Flowers up to 1 in. across, the perianth segments white to pale green (?), without a median stripe. Fruits about 1/4 in. long, little indented at the apex.

Coastal.

A. zavattarii Cuf.

Roots tapering from thickened bases, 1/8 - 1/4 in. across; the stocks fibrous. Leaves broad, 4 - 8 x 1 - 2 ins., markedly narrowed in their lower part, hairless. Peduncles 12 - 18 ins. long, with many well developed branches, these usually branching again, bearing many well spaced flowers, often in pairs. Pedicels 1/2 - 1 1/2 ins. long. Flowers greenish to white, very variable in size, (1/8 -) 1/4 - 1/2 (- 5/8) in. long; opening only in the afternoon.

Northern Frontier Province.

BOWIEA Harv.

B. volubilis Harv.

Fig. 8

Climber with a large bulb up to 6 ins. across, producing one to two strap-shaped leaves up to 3 ins. long and slender much branched green stems, with narrow, fleshy, ultimate branchlets. Stem leaves inconspicuous, scale-like. Flowers solitary on pedicels 1 - 2 ins. long; the perianth segments narrow, greenish, with small attached stamens, around the conic ovary. Fruits bluntly three-angled and long-pointed ellipsoid, eventually up to 1 x 3/8 in., the seeds flattened and elongate.

Dry places in most parts of Kenya, below 8,000 ft.

BULBINE Linn.

Flowers yellow; the fruits up to 3/8 in. long..... B. abyssinica

Flowers whitish, the perianth segments with a vague green stripe; the fruits inflated, about 1/2 in. long..... B. fistulosa

B. abyssinica A. Rich.

Fig. 9

Shortly rhizomatous with small fibrous stocks; the roots fleshy. Leaves narrow, often inrolled, up to 1 ft. long. Peduncles 8 - 18 ins. long, with rather a dense head of flowers. Bracts 1/4 - 1/2 in. long; the pedicels 1/2 - 1 in. long. Flowers yellow, 3/8 - 5/8 in. across; the filaments densely bearded. Fruits globose, shrouded by a persistent and pointed cap of dried-out perianth segments, about

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3/8 in. long.

Very common throughout the highlands, Masai and Machakos Districts, Northern Frontier Province.

Until recently, usually confused with the South African species, B. asphodeloides (L.) Spreng.

B. fistulosa Chiov.

Stocks small, less than 1/2 in. across with fleshy roots; the old leaf bases papery. Leaves narrow, cylindrical, up to 15 ins. long. Peduncles short, about 6 ins. long, the flowers rather crowded towards the top. Bracts 1/4 - 5/8 in. long; the pedicels short in flower, up to 1 in. long in fruit. Flowers small, the perianth segments whitish, with a vague green stripe; the filaments with conspicuous yellow hairs. Fruits much inflated, up to 3/4 in. long and nearly as wide, three-angled, each cavity with a single seed.

Rare, Northern Frontier Province.

CHLOROPHYTUM Ker.

- 1a. Inflorescences spike-like; the pedicels less than 1/16 in. long; the flowers small, bell-shaped, less than 1/4 in. long.....2
- 1b. Inflorescences not spike-like, or if so, then the pedicels 1/4 in. long or more and the flowers not bell-shaped, the segments more than 1/2 in. long.....3
- 2a. Peduncles shortly scabrid hairy on their upper part.....C. bakeri
- 2b. Peduncles hairless.....C. sp. near bakeri
- 3a. Inflorescences prostrate on the ground, branched from near the base, about 6 - 10 ins. long, with well spaced flowers, single or in pairs..... C. humifusum
- 3b. Inflorescences erect.....4
- 4a. Large showy white flowers, with perianth segments 1/2 - 1 in. long.....5
- 4b. Perianth segments less than 1/2 in. long, yellowish, green or white, sometimes with a median stripe.....7
- 5a. Perianth segments narrow, not overlapping; the bracts well developed, often 1 in. long, soon dying off blackish; the flowers crowded; the roots swollen, but without well developed tubers.....C. sp. near macrophyllum
- 5b. Perianth segments ovate, overlapping, or if narrow, then the inflorescences lax and the bracts inconspicuous; the roots with many well developed tubers.....6
- 6a. Flowers laxly arranged, with minute bracts; the perianth segments narrow, reflexed in the young flowers..... C. tenuifolium
- 6b. Flowers crowded, the inflorescences sometimes branched; the bracts up to 1/2 in. long; the flowers cup-shaped with ovate, overlapping perianth segments..... C. tuberosum
- 7a. Medium sized plants. 9 - 15 ins. tall; the mature inflorescences with well developed branches, subtended by long bracts 3/4 - 2 ins. long, even on the young inflorescences the bracts of the incipient branches are usually longer than the others, which are 1/8 - 1/4 in. long; the perianth segments greenish, about 3/16 in. long; the fruits also about 3/16 in. long..... C. ukambense

- 7b. Either large plants 2 - 4 ft. tall with well developed branches to the inflorescences or smaller plants, usually with poorly developed branches on the inflorescences; the bracts, flowers and fruits not as above.....8
- 8a. Inflorescences usually 2-4 ft. tall with well developed branches, the lower ones often nearly as long as the continuation of the peduncle, subtended by large bracts; the small flowers laxly arranged in groups of 2-7..... 9
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## Perennial Lilies

### C. andongense Bak.

Often flowering before the leaves appear; the rhizomes with long swollen roots, finely furry when dried out. Leaves, when mature, 12 - 30 x 1 - 2 ins., narrowed in their lower half, hairless. Inflorescences  $1\frac{1}{2}$  -  $3\frac{1}{2}$  ft. tall, with a number of branches, the lower ones often about as long as the main axis. Flowers in groups of 3 - 8, lax or crowded. Bracts, except at the base of the branches, short, about  $\frac{1}{4}$  in. long; the pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long in flower, sometimes up to 1 in. in fruit, jointed at the middle or a little below. Flowers with narrow perianth segments,  $\frac{1}{3}$  -  $\frac{5}{8}$  in. long, greenish to white, with a dark green median stripe. Fruits oblong  $\frac{3}{8}$  -  $\frac{1}{2}$  in. long, conspicuously winged, not deeply indented at the apex.

Elgon area.

### C. bakeri Poelln.

Rhizomes made up of small, shortly fibrous, contiguous stocks, less than  $\frac{1}{2}$  in. across; the roots swollen and fleshy, shortly furry when dried out. Leaves narrow, 6 - 15 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., hairless. Inflorescences subspicate, with the odd, short, lateral branch; peduncles from a few inches to more than 1 ft. tall, the upper part shortly scabrid. Flowers crowded, with the bracts often projecting beyond them and  $\frac{1}{8}$  -  $\frac{3}{8}$  in. long; the pedicels very short, less than  $\frac{1}{16}$  in. long. Flowers white, bell-shaped, the perianth segments  $\frac{1}{8}$  -  $\frac{3}{16}$  in. long; the stamens of the mature flowers conspicuously exerted. Fruits broader than long, about  $\frac{1}{8}$  in. long, winged and deeply indented at the apex.

Machakos District, and east to Voi, Northern Frontier Province and west to the Turkana District.

### C. blepharophyllum Schweinf. ex Bak.

Shortly rhizomatous; the stocks with many narrow roots, bearing distant elongate tubers. Leaves (2-)4 - 10 x  $\frac{2}{3}$  - 1 in., narrowed in their lower half and clasping the peduncle, the sheaths and veins of the young leaves purple tinged, the margins hairy. Inflorescences (3-)6 - 12 ins. tall, usually with one or two short branches and many crowded flowers in groups of 2 - 4. Bracts relatively long,  $\frac{1}{4}$  -  $\frac{1}{2}$  (-  $\frac{3}{4}$ ) in. long; the pedicels short,  $\frac{3}{16}$  -  $\frac{5}{16}$  in. long. Flowers about  $\frac{3}{8}$  in. across, the perianth segments  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long, white with a green median stripe. Fruits oblong  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, conspicuously three-winged; the perianth segments rather persistent.

Elgon and Teita Districts.

### C. gallabatense Schweinf. ex Bak. Fig. 10

Rhizomes short, thick and fibrous, with many long, fleshy roots, finely furry when dried out, sometimes with small tubers. Leaves membranous, up to 18 ins. long and  $\frac{1}{2}$  - 1 in. wide, hairless. Inflorescences from 8 ins. to 2 - 3 ft. tall, with a number of long branches. Flowers in well separated groups of usually 2 - 4, with very short bracts, less than  $\frac{1}{8}$  in. long, except at the base of the branches; the pedicels also short, less than  $\frac{1}{4}$  in. long. Flowers  $\frac{1}{2}$  -  $\frac{1}{2}$  in. across, the segments white with a green or brown median stripe. Fruits small  $\frac{1}{6}$  -  $\frac{1}{4}$  in. long, conspicuously winged and indented at the apex.

Turkana and Elgon areas.

C. humifusum Cuf.

Rhizomatous chain of small stocks,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. across, with stout comb-like fibres; the roots wiry with small tubers on their branches. Leaves up to 10 ins. long and nearly 1 in. wide, narrowed in their lower part, very shortly hairy along the margins. Inflorescences branched from near the base, lying flat on the ground, about 6 - 10 ins. long. Flowers well spaced, solitary or in pairs. Bracts vary from  $\frac{1}{8}$  -  $\frac{1}{2}$  in. long; the pedicels slender,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers about  $\frac{1}{3}$  in. across, the perianth segments white with a short green stripe towards their tips. Fruits not seen.

Rare, Northern Frontier Province.

C. limurense Rendle

Medium sized, fibrous stocks, about  $\frac{1}{2}$  in. across; the roots rather fleshy, about  $\frac{1}{8}$  in. thick, shortly furry when dried out, some with small potato-like tubers. Leaves widest in their upper part, up to 1 ft. long,  $\frac{1}{2}$  -  $\frac{3}{4}$  in. wide. Inflorescences 8 - 18 ins. tall, lax to rather dense, sometimes with one to several short branches. Flowers usually in groups of 2 - 4, the outer bracts of each group conspicuous, about  $\frac{1}{2}$  in. long, larger towards the base; the pedicels shorter than the bracts, jointed near the middle or above. Flowers uniformly greenish white, about  $\frac{1}{2}$  in. across. Fruits  $\frac{1}{4}$  -  $\frac{5}{16}$  in. long, nearly as broad, three winged and markedly indented at the apex.

Forest and forest edges, Nairobi and the highlands.

Perhaps only a form of C. sparsiflorum Bak.

C. macrophyllum Aschers.

No material seen, but from the literature is similar to C. sp. near macrophyllum, described below, but more robust, the leaves up to 2 ft. long, narrowed in their lower half, the inflorescences up to 18 ins. tall, the perianth segments only  $\frac{1}{3}$  in. long, allegedly with a brown median stripe.

Coastal.

C. micranthum Bak.

Stocks small, less than  $\frac{1}{2}$  in. across, contiguous, fibrous; the roots fleshy with small tubers. Leaves narrow, about 6 x  $\frac{1}{4}$  in., hairless. Peduncles slender, less than 1 ft. long, the inflorescences often with one or two well developed branches and well spaced flowers, usually in pairs, the buds often nodding. Bracts small, but variable,  $\frac{1}{16}$  -  $\frac{3}{8}$  in. long; the pedicels slender,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long. Flowers small, the perianth segments about  $\frac{1}{4}$  in. long, greenish to white with a narrow green median stripe. Fruits about  $\frac{1}{6}$  in. long, three-winged.

Elgon area.

C. sparsiflorum Bak.

Very similar to C. limurense, which is probably only a form of this species, but the leaves markedly narrowed for about half their length (subpetiolate), the pedicels articulated in their lower half, the lobes of the fruits more rounded at the top.

Teita and coastal forests.

C. sp. near bakeri Poelln. Fig. 11

As C. bakeri, but the flowering stalks quite hairless. Perhaps best considered as a variety of that species.

Machakos and Nairobi Districts, Rift Valley region.

C. sp. near laxum R. Br.

Small graceful plant; rhizomatous with small stocks; the roots slender and slightly swollen, shortly furry when dried out, bearing small ovoid tubers. Leaves slender, 6 - 15 ins. long and up to  $\frac{1}{4}$  in. wide, broadest in their upper part. Inflorescences tenuous, branched from near the base, 6 - 12 ins. tall, the flowers well spaced, solitary or in pairs. Bracts small,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long; the pedicels  $\frac{1}{8}$  -  $\frac{3}{8}$  in. long. Flowers white,  $\frac{1}{3}$  -  $\frac{1}{2}$  in. across. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, broadest near the top, three-winged.

Coastal.

C. sp. near macrophyllum Aschers. Fig. 12

Rhizomatous with medium sized stocks, about  $\frac{3}{4}$  - 1 in. across; the roots fleshy, about  $\frac{1}{8}$  in. thick, finely furry when dried out, some with small ovoid tubers. Leaves broadly sword-shaped, 6 - 12 (-18) ins. long usually 1 - 2 ins. wide, narrowed only at their very base. Inflorescences up to 1 ft. tall, the greater part densely crowded with flowers, usually in groups of up to five, with a large outer bract up to 1 in. long, the lower ones longer, projecting beyond the flowers and dying off blackish. Pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers  $\frac{5}{8}$  - 1 in. across, the perianth segments narrow, white, fading slightly vinaceous at the margins. Fruits  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long, winged, indented at the apex, rather persistently shrouded by dead perianth segments.

Nairobi and Machakos Districts, and east towards the coast.

C. tenuifolium Bak. Fig. 13

Stocks medium sized,  $\frac{1}{2}$  - 1 in. across, densely fibrous; the roots thick, fleshy, usually with elliptic tubers. Leaves up to 15 x  $\frac{1}{2}$  -  $\frac{3}{4}$  in., hairless. Inflorescences up to 18 ins. tall, usually unbranched, the flowers well spaced, usually solitary, but rarely in pairs. Bracts very small, the majority not more than  $\frac{1}{12}$  in. long; the pedicels about  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long in flower. Flowers white, constricted just above the base, the perianth segments reflexed soon after the flower opens, spreading as it matures and eventually folding forward as it fades; closing at night. Segments narrow,  $\frac{1}{2}$  -  $\frac{3}{4}$  in. long; stamens three long and three short. Fruits oblong,  $\frac{5}{8}$  -  $\frac{7}{8}$  in. long, three-winged and conspicuously indented at the apex.

Nairobi, Masai District and east towards the coast, Northern Frontier Province.

C. tordense Chiov. Fig. 14

Rhizomes irregularly branched, the stocks small,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. across, fibrous; the roots stringy, some with potato-like tubers. Leaves narrow, about 6 ins. long, rarely to 1 ft.,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. wide, the outer ones hairy along the margins and sometimes on the veins as well. In the Nairobi District, at least, the sheaths are usually characteristically marked above ground level, by a tongue of brown, followed by a parallel band of white, before the green. Inflorescences 6 - 12 ins. tall, sometimes with one or two branches, the peduncles often zig-zag between the well spaced flowers, which are in groups of 2 - 3. Bracts usually less than  $\frac{1}{8}$  in. long; the pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers  $\frac{3}{8}$  -  $\frac{5}{8}$  in. across, the perianth segments narrow, white, fading slightly bronze, with a greenish brown median stripe. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in.

long, three-winged, only slightly indented at the apex.  
 Nairobi District to the Northern Frontier Province.

C. tuberosum Bak. Fig. 15

Rhizomes with rather small contiguous stocks, the fibres raffia-like; the roots fleshy, the majority bearing well developed elliptic tubers, a short way from their bases. Leaves broad, 6 - 18 x ( $\frac{1}{2}$  -)  $\frac{3}{4}$  - 1 (-1 $\frac{1}{2}$ ) ins., not markedly narrowed in their lower part, rather sparse hairs along the margins. Inflorescences 6 - 15 ins. tall, usually unbranched, the large flowers usually rather densely arranged, often in pairs. Upper bracts  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long, the lower ones longer; the pedicels short. Flowers white, cup-shaped, the perianth segments ovate, overlapping towards the base,  $\frac{5}{8}$  -  $\frac{3}{4}$  x  $\frac{1}{4}$  -  $\frac{3}{8}$  in., sweet scented, open throughout the day. Fruits oblong,  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long, three-winged, but not deeply indented at the apex.

Nairobi District, east towards the coast, Northern Frontier Province and west to Turkana District.

C. ukambense Bak.

Stocks small, about  $\frac{1}{2}$  in. across, more or less contiguous; the roots bootlace-like, slightly fleshy, some with small, distant tubers. Leaves sword-shaped, 6 - 12 x  $\frac{3}{4}$  - 2 ins., hairless. Inflorescences up to about 15 ins. tall, with usually several well developed branches and small flowers in well spaced groups of 2 - 3. Bracts narrow,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long, those at the base of the branches much longer, lowermost up to 2 ins.; the pedicels very slender,  $\frac{1}{16}$  -  $\frac{1}{8}$  in. long. Flowers green, the perianth segments  $\frac{1}{6}$  -  $\frac{1}{4}$  in. long, reflexed when fully open in the afternoon. Fruits small, about  $\frac{3}{16}$  in. long, broader than long, three-winged and deeply indented at the apex.

Machakos District and Northern Frontier Province.

C. viridescens Engl.

Stocks about  $\frac{1}{4}$  in. across, with fine fibres, not very persistent; the roots swollen, ? tuberous, finely furry when dried out. Leaves sometimes appear only after the flowers, up to 18 x 2 ins., sheathing the lower part of the peduncle. Inflorescences 2 - 3 $\frac{1}{2}$  ft. tall, with a number of well developed branches and well spaced flowers in groups of 2 - 5. Bracts  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long, those subtending the branches much larger, 1 - 3 ins. long and also scattered down the peduncle; the pedicels slender  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long. Flowers yellow or green, the perianth segments about  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long. Fruits about  $\frac{1}{4}$  in. long, winged, somewhat indented at the apex, the perianth segments rather persistent.

Coast and Northern Frontier Province.

DIPCADI Medic.

- 1a. Outer perianth segments little longer than the inner, inrolled only at the very tip, for less than  $\frac{1}{16}$  in.; sand and coral crags near the sea..... D. longifolium
- 1b. Outer perianth segments much longer than the inner, forming a distinct solid tail, more than  $\frac{1}{8}$  in. long.....2
- 2a. Mature leaves narrow, sometimes inrolled, less than  $\frac{3}{16}$  in. wide.....3
- 2b. Mature leaves  $\frac{1}{4}$  -  $\frac{5}{8}$  in. wide, not inrolled.....4

## Perennial Lilies

- 3a. Small graceful plants; leaves inrolled, less than 1/16 in. wide, about 1/8 in. wide when unrolled, rarely more than 10 ins. long; peduncles slender, less than 1/20 in. across, 4 - 9 ins. tall; inner lobes of the perianth conspicuously pointed..... D. arenarium
- 3b. Larger plants; mature leaves not inrolled, up to 3/16 in. wide and 1 ft. long; peduncles 1/8 in. or more across, up to 2 ft. tall; inner lobes of the perianth segments bluntly pointed, slightly hooded..... D. filifolium
- 4a. Inner perianth segments narrow, pointed; free part of the outer segments (1/2-) 5/8 - 1 in. long in mature, and up to 1 1/4 ins. long in old flowers; the tail at these stages (3/16-) 3/8 - 5/8, 7/8 in. long..... D. ?viride
- 4b. Inner lobes bluntly pointed to rounded, usually hooded; free part of the outer segments shorter, 3/8 - 5/8 in. long in mature and up to 3/4 in. long in old flowers; the tail at these stages (1/8-) 3/16 - 1/4, 3/8 in. long.....5
- 5a. Leaves distinctly hairy; the outer perianth segments with very very short tails, about 1/8 - 3/16 in. long.....D. sp. cf. platyphyllum
- 5b. Leaves hairless; the outer perianth segments of the mature flowers with tails more than 3/16 in. long..... D. sp. near viride

### D. arenarium Bak.

Bulbs 1/4 - 1 in. across, the outer sheaths papery. Leaves inrolled and very narrow, less than 1/16 in. wide and only about 1/8 in. wide when unrolled, rarely more than 10 ins. long. Peduncles very slender, 1/20 in. or less across, 4 - 9 ins. long, with a few well spaced flowers. Bracts 1/8 - 3/16 in. long; the pedicels 1/16 - 1/8 in. long in flower, up to 3/16 in. in fruit. Flowers yellowish brown to green, tube 1/10 - 1/8 in. long, the outer lobes free for about 1/2 in., the last 1/8 - 3/16 in. solid, tapering, tail-like, sometimes greatly extended, up to 3/4 in. long. Inner segments continued more or less joined together, 1/4 - 5/16 in., tips free and spreading for 1/12 - 1/8 in., narrow and conspicuously pointed. Anthers about 1/8 in. long. Fruits broadly conic, up to 3/8 in. long (? ripe).

Masai District, Rift Valley and Northern Frontier Province; not common.

### D. filifolium Bak.

Bulbs about 1 in. across, the outer sheaths papery. Leaves few, up to 1 ft. long, rarely over 1/8 in. wide. Peduncles up to 2 ft. long, with a few well spaced flowers. Bracts short, about 1/4 in. long; the pedicels about the same length. Flowers green, the tube about 1/4 in. long, the outer lobes narrow, about 3/8 - 1/2 in. long, the tips solid, tail-like, 1/8 - 3/16 in. long. Inner segments continued more or less joined together 3/16 in., the tips free and spreading, 1/16 in. long, slightly hooded, bluntly pointed. Anthers 1/6 in. long. Fruits not seen.

Northern Frontier Province.

### D. longifolium (Lindl.) Bak.

Bulbs about 1 in. across. Leaves narrow, 1 - 2 ft. x 1/8 - 3/8 in. Inflorescences 8 - 18 ins. tall, the flowers well spaced. Bracts from about 1/8 in. at the top to 1/2 in. long at the base; the pedicels (1/8-) 1/4 - 3/8 in. long. Flowers green, yellowish towards the tips, the tube 1/10 - 1/8 in. long, the outer lobes 3/8 - 1/2 in., eventually up to 5/8 in. long, scarcely tailed,



inrolled at the tip for less than 1/16 in. Inner segments continued 3/8 - 7/16 in., free in the lower part, joined where the filaments are inserted about 3/16 in. of the way up, the tips free and spreading, pointed, 1/16 - 1/8 in. long. Anthers about 1/6 in. long. Fruits 1/2 - 5/8 in. long, nearly as broad towards the top.

Coastal, sand and coral crags near the sea.

D. sp. cf. platyphyllum Bak.

Very similar to the more common D. sp. near viride, but the leaves distinctly hairy along the margins and the tails even of the mature outer lobes very short, 1/8 - 3/16 in. long.

Rare, Machakos District.

D. sp. near viride (Linn.) Moench. Fig. 17

Bulbs 1 - 1½ ins. across, the outer sheaths papery. Leaves from about 6 ins. to over 1 ft. long, usually 3/8 - 5/8 in. wide, sometimes less, hairless. Inflorescences sometimes only 6 ins., usually 1 - 2 (-4) ft. tall, with a number of well spaced to rather crowded flowers. Bracts 1/8 - 1/2 (-5/8) in. long; the pedicels 1/16 - 3/8 in. long. Flowers green, with khaki to yellowish lobes, the tube 1/8 - 1/4 (-3/8 in old flowers) in. long, the outer lobes 3/8 - 5/8 (-3/4) in. long, the tails 3/16 - 1/4 (-3/8) in. long; the inner lobes more or less joined for a further 1/4 - 3/8 in., the tips free and spreading, 1/12 - 1/8 in. long, broad and very bluntly pointed, usually slightly hooded. Anthers 1/8 - 1/6 in. long. Fruits not seen.

Nairobi and Machakos Districts, Northern Frontier Province, west to Turkana and Karamoja.

D. ? viride (Linn.) Moench.

Bulbs 1 - 1½ ins. across, the outer sheaths papery. Leaves usually flaccid, 6 - 12 x ¼ - ½ in., hairless. Inflorescences 12 - 18 ins. tall, occasionally branched, with a number of well spaced flowers. Bracts 3/16 in. long at the top to ½ in. long at the base; the pedicels 1/16 - 1/4 in. long. Flowers yellowish to green, the tube 1/8 - 3/16 in. long, the outer lobes ½ in. or a little less in young flowers, the majority 5/8 - 1 in., sometimes to 1¼ ins. long, the tails very long and slender, (3/16-) 3/8 - 7/8 in. long; the inner segments continued in a tube 1/4 - 7/16 in., the tips free and spreading, 1/8 in. long, usually not hooded, narrow, distinctly pointed. Anthers 1/8 - 1/6 in. long. Fruits up to 3/8 in. long.

Elgon area, Turkana District and Northern Frontier Province.

DRIMIA Jacq.

Inflorescences very congested, head-like, 4 - 6 ins. long; bracts large, much exceeding the buds; the pedicels about ¼ in. long in flower..... D. congesta

Inflorescences longer, more lax, up to 8 ins. long; the bracts not exceeding the buds; the pedicels ½ - ¾ in. long..... D. elgonica

D. congesta Bullock

Bulbous, the leaves not usually fully developed until after flowering, up to 8 x ½ in., with whisker-like, hairy margins at

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the flowering stage. Inflorescences to 3 ft. tall with the flowers congested into a short head at the top, about 4 - 6 ins. long. Bracts conspicuous, the lower ones up to 1 in. long; the pedicels  $1/8 - 5/16$  in. long in flower, up to  $1/2$  in. long in fruit. Flowers cream with mauve lines, the perianth segments joined into a short tube about  $1/8$  in. long, the lobes very narrow, broadened a little upwards,  $1/2 - 5/8$  in. long. Filaments tapered, inserted at the base of the perianth lobes,  $3/8 - 1/2$  in. long. Fruits about  $1/2$  in. long, shortly pointed at the apex.  
Elgon, rare.

D. elgonica Bullock

As above, the leaves and bulbs unknown, but the inflorescences longer and more lax, up to 8 ins. long. Bracts not exceeding the buds; the pedicels  $1/2 - 3/4$  in. long in flower. Flowers off-white, with a maroon throat, about the same size as those of D. congesta.  
Elgon, rare.

DRIMIOPSIS Lindl.

Leaves sword-like, erect, up to  $12 \times 1 - 1\frac{1}{2}$  ins., narrowed gradually in their lower half..... D. botryoides

Leaves ovate, in a rosette; about  $3 \times 1 - 4 \times 1\frac{1}{4}$  ins., rounded into a short petiole-like base..... D. sp.

D. botryoides Bak.

Large bulbs, up to 3 ins. across. Leaves sword-like, up to nearly 1 ft. long and  $1 - 1\frac{1}{2}$  ins. wide, narrowed in their lower half, mottled dark green, hairless or rarely with short hairs along the margins. Inflorescences 6 - 15 ins. tall, the flowers rather crowded towards the top. Bracts not apparent; the pedicels about  $1/16$  in. long. Flowers greenish white, becoming yellowish, the segments joined into a tube for about  $1/4$  of their length. Filaments  $1/16$  in. long, attenuate triangular, inserted at the top of the perianth tube, the bases contiguous, but not joined into a tube. Fruits about  $3/16$  in. long, three-lobed.  
Coastal and Northern Frontier Province.

D. sp.

Bulbous, the leaves ovate in a rosette, spotted with purple,  $3 \times 1 - 4 \times 1\frac{3}{4}$  ins., rounded into a very short, narrow, petiole-like base. Inflorescences 4 - 8 ins. tall, with a number of rather small flowers. Bracts not apparent; the pedicels about  $1/16$  in. long. Flowers small; white, cup-shaped, about  $1/8 - 3/16$  in. long, the segments joined into a tube for about  $1/4$  of their length, the lobes broad. Filaments apparently joined into a very short tube at their base, inserted at the top of the perianth tube, attenuate triangular,  $1/10$  in. long; the anthers short.  
Mt. Kenya area, rare.

ERIOSPERMUM Jacq.

Leaves bluish green, stiffly erect, leathery, up to  $8 \times 3/8 - 5/8$  in., the lower half very much narrowed, petiole-like, less than  $1/8$  in. wide; the pedicels  $1 - 2\frac{1}{2}$  ins. long..... E. abyssinicum

Leaves green, slightly narrowed towards the base, not at all petiole-like; the pedicels less than 1 in. long..... E. triphyllum

E. abyssinicum Bak.

Tubers depressed globose, 1 - 1½ ins. across, very fibrous. Leaves bluey green, leathery, up to 8 x 3/8 - 5/8 in., their lower half very much narrowed, petiole-like. Peduncles up to 1 ft. long, usually rather zig-zag, with a number of well spaced flowers. Bracts very short, about 1/16 in. long; the pedicels long, 1 - 2½ ins. Flowers small, yellow, with oblong segments, 1/4 - 3/8 in. long, very shortly joined at the base. Filaments narrow, inserted on the lobes a little above the tube, 1/8 - 3/16 in. long. Fruits with rounded lobes and hairy seeds.

Elgon area and Northern Frontier Province.

E. triphyllum Bak. Fig. 16

Tubers discoid to subglobose, red when cut, fibrous. Leaves up to 6 ins. long, usually narrow, 1/8 - 1/4 in. wide, sometimes up to ¾ in., narrowed gradually only towards the base. Inflorescences 4 - 8 ins. tall, with a number of well spaced flowers. Bracts very short, less than 1/16 in. long; the pedicels slender, ½ - ¾ in. long. Flowers yellow inside, reddish brown without, 3/16 - 1/4 in. long, the perianth segments oblong, joined at the very base. Filaments narrow, 1/8 in. long, inserted on the lobes at the top of the tube. Fruits red tinged, with rounded lobes, 3/16 - 1/4 in. long; the seeds with long white hairs.

Coast to Nairobi, Northern Frontier Province, and Elgon area.

? var. A much more robust plant, with larger leaves and longer, stout pedicels, up to 1 in. long, has been collected from Karamoja and the Northern Frontier Province. This may even prove to be a distinct species.

GLORIOSA Linn.

Small plants, rarely more than 1 ft. tall; the perianth segments 1½ - 2 x ¼ in.; the leaves always narrow, 1/8 - 5/16 (- ½) in. wide, recurved; the tendrils short or inconspicuous..... G. minor

Larger plants, often 2 ft. or more tall; the perianth segments if less than ½ in. wide, over 2 ins. long; the leaves occasionally narrow, but usually more than ½ in. wide, spreading; the tendrils usually conspicuous..... G. virescens

G. minor Rendle

Small plants, 6 - 12 ins. tall, with narrow, often recurved leaves, crowded on the upper part of the stem, the lowest opposite, the upper ones alternate; towards the stem apex the internodes are long again with one to three flowers. Leaves 2½ - 4 x 1/8 - 5/16 in., the lower ones up to ½ in. wide, only slightly and gradually tapered to the base, attenuate to the tip, which may be continued as a short tendril, 1/8 - 1/4 in. long. Peduncles 1½ - 2½ ins. long, curved in their upper part. Perianth segments scarlet or yellow at the base, shading to scarlet at the top, the segments 1½ - 2 ins. long, entire, infolded near the base. Stamens (½-) 5/8 - 3/4 in. long; the anthers about 3/16 in. long. Style at right angles to the ovary, about ¾ in. long, shortly three-branched,

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the branches  $1/20$  -  $1/10$  in. long.

Dry, usually sandy places, coast and Northern Frontier Province.

### G. virescens Lindl.

Erect plants to 3 ft. tall, sometimes much more, the leaves opposite below, alternate above, the internodes longer with several flowers towards the top. Leaves up to 5 ins. long, broadest in their lower half,  $1/2$  -  $1\frac{1}{2}$  ins. wide, rounded at the base, attenuate into a long tendril,  $3/4$  -  $1\frac{1}{2}$  ins. long, at the apex. Pedicels 2 - 4 ins. long, recurved towards the top. Flowers yellow or yellow and scarlet to dark red, the perianth segments  $1\frac{3}{4}$  -  $2\frac{1}{2}$  ins. long, broadest above the middle, the apex pointed, waisted below, with the sides infolded. Filaments about  $3/4$  in. long, the anthers  $3/8$  -  $1/2$  in. long. Style at right angles to the ovary  $3/4$  -  $1\frac{1}{2}$  ins. long, three-branched, the branches  $1/8$  -  $3/8$  in. long.

Widespread below 8,000 ft.

This is a very variable complex, possibly of several hybridising species. Certain local forms are rather distinctive e.g. one from Voi area and parts of the Northern Frontier Province has almost pure yellow flowers and very variable leaves; another from western Kenya not infrequently has pure yellow flowers and very broad leaves, the lower ones  $1\frac{1}{2}$  - 2 ins. wide; in forests of, for example the Molo area, it is reported as climbing to 15 ft. The most widespread form, found in the Nairobi District for instance, is 2 - 3 ft. tall, with medium sized flowers and leaves, the perianth segments typically red with yellow towards the base.

### KNIPHOFIA Moench.

(Red-hot Pokers)

- 1a. Flowers shortly hairy outside..... K. snowdeni
- 1b. Flowers hairless.....2
- 2a. Bracts  $1/8$  -  $1/4$  (-  $3/8$ ) in. long..... K. rogersii
- 2b. Bracts  $1/4$  -  $1/2$  in. long..... K. thomsoni

### K. rogersii E.A. Bruce                      Fig. 18

Mass of irregular, branched rhizomes. Leaves up to 2 ft. x 1 in. Inflorescences 18 - 30 ins. tall, with a rather dense head of flowers. Bracts short, up to  $3/8$  in. long; the pedicels also short, recurved. Flowers elongate, trumpet-shaped, up to 1 in. long, pendant, yellow to flame red, swollen at the base, the free lobes short, about  $1/10$  in. long, spreading. Fruits pointed ovoid, about  $3/8$  in. long.

Marshy places, Aberdares, Mau and Elgon.

Almost certainly no more than a variety of K. thomsoni, if that.

### K. snowdeni C.H. Wright

Rhizomatous, leaves up to 3 ft. long, narrow,  $1/4$  -  $3/8$  in. wide. Inflorescences usually 18 ins. to 3 ft. tall, sometimes more, the flowers densely to rather laxly arranged towards the top. Bracts  $1/8$  -  $1/4$  in. long; the pedicels less than  $1/8$  in. long. Flowers elongate trumpet-shaped, a little swollen at the base, orange-red, shortly hairy, the mature flowers 1 -  $1\frac{1}{4}$  in. long, the triangular

lobes short, about 1/10 in. long. Fruits subglobose to ovoid, about ¼ in. long.

Marshy places, Elgon area and south to Londiani.

K. thomsoni Bak.

Very similar to K. rogersii, but the bracts ¼ - ½ in. long, the mature inflorescences often rather lax.

Teita Hills and Mt. Kenya.

Intermediates with K. rogersii, which at the most might be considered as a variety, occur on the Aberdares.

ORNITHOGALUM Linn.

- 1a. Very small plants, usually only a few inches tall, with thread-like leaves and peduncles; a few small white flowers..... O. gracillimum
- 1b. Robust plants, 1 - 4 ft. tall; the leaves strap-shaped, more than ¼ in. wide; peduncles stout with many flowers.....2
- 2a. Pedicels ¾ - 1½ in. long in flower, up to 2½ in. in fruit; the perianth segments 5/8 - ¾ (- 7/8) in. long. O.sp.(=Albuca donaldsoni)
- 2b. Pedicels less than ½ in. long; the perianth segments less than ¾ in. long.....3
- 3a. Pedicels ¼ - ½ in. long; the bracts ½ - 1 in. long in flower, up to 2 ins. long in fruit; the perianth segments ¼ - 3/8 in. long..... O. longibracteatum
- 3b. Pedicels 1/16 - 1/8 (-3/16) in. long; the bracts 1/8 - ½ in. long; the perianth segments 3/16 - ¼ in. long..... O. ecklonii

O. ecklonii Schlecht.

Bulbs 1 - 3 ins. across; the leaves from 6 ins. to over 2 ft. long, ¼ - ½ in. wide. Inflorescences 18 - 30 ins. tall, the flowers crowded towards the top, becoming more lax with age. Bracts (1/8-) ¼ - ½ in. long, projecting beyond the buds; the pedicels 1/16 - 1/8 (-3/16) in. long. Perianth segments green, margined with white, 3/16 - 1/4 in. long. Filaments broad, sharply narrowed in their upper half, about 3/16 in. long. Fruits pointed ovoid, about ¼ in. long.

Elgon area.

O. gracillimum R.E. Fries Fig. 19

Bulbs small, 1/4 - 3/8 in. across; a graceful little plant with very narrow thread-like leaves, 2 - 6 ins. long. Peduncles wiry, 2 - 5 (-8) ins. long; with a few, laxly arranged flowers. Bracts about 1/8 in. long; the pedicels (¼-) ½ - 1 (-1½) ins. long, spreading. Flowers white, about ¼ in. across, the perianth segments oblong, the outer ones shortly hooded. Filaments, more particularly the inner ones, broadened. Fruits three-lobed, about 3/16 in. long.

Throughout the highlands, below about 10,000 ft.

O. longibracteatum Jacq. Fig. 20

Bulbs 2 - 3 ins. across; the leaves up to 2 - 3 ft. x ½ - 1 in. Inflorescences 2 - 4 ft. tall, with a long, sometimes rather dense head. Bracts conspicuous, ½ - 1 in. long, usually projecting beyond the flowers; the pedicels ¼ - ½ in. long. Flowers medium

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sized, cup-shaped, the perianth segments broadly oblong, green with white margins,  $1/4 - 3/8$  in. long. Filaments, especially the inner ones, broad, tapering sharply near the apex,  $3/16 - 1/4$  in. long. Fruits ovoid, bluntly pointed,  $3/8 - 1/2$  in. long.

Grassland and rocky places, Nairobi, Machakos and Masai District, north to Mt. Kenya area and Rift Valley.

O. sp. (= Albuca donaldsoni Rendle)\*

Large bulbs, about 3 ins. across; the leaves up to 2 ft. x  $1 - 1\frac{1}{2}$  ins., hairless. Inflorescences 15 - 30 ins. tall, with many rather crowded flowers on the upper part. Bracts  $\frac{3}{4} - 2 (-2\frac{1}{2})$  ins. long; the pedicels spreading,  $\frac{3}{4} - 1\frac{1}{2}$  ins. long in flower, up to  $2\frac{1}{2}$  ins. in fruit. Flowers white to cream, the outer segments green striped, the segments oblong,  $5/8 - 3/4 (-7/8)$  in. long. Filaments broad, gradually tapered,  $5/16 - 3/8$  in. long; the anthers about  $1/8$  in. long. Fruits  $1/2 - 5/8$  in. long, nearly as broad towards the top.

Dry country, Northern Frontier Province and south to Voi.

SCILLA Linn.

- 1a. Robust plants; the flowers  $5/16 - 7/16$  in. long; the pedicels  $3/16 - 1/2$  in. long; the leaves ovate or sword-shaped, 5 - 12 ins. long, 2 -  $3\frac{1}{2}$  ins. wide..... S. kirkii
- 1b. Smaller plants; the flowers less than  $1/4$  in. long; the pedicels not more than  $3/16$  in. long; the leaves usually less than 5 ins. long, less than 1 in. wide.....2
- 2a. Flowers  $3/16 - 1/4$  in. long; the leaves sometimes long and narrow, only  $1/4$  in. wide, but usually 3 - 5 x  $5/8 - 1$  in..... S. indica
- 2b. Flowers  $1/8 - 3/16$  in. long; the leaves very narrow, usually less than  $1/6$  in. wide..... S. edulis

S. edulis Engl.

Small bulbs,  $1/2 - 1$  in. across. Leaves up to 6 ins. long, narrow, broadest in their upper part, up to  $1/6$  in. wide, sometimes hairy on the lower part. Peduncles slender, 3 - 8 ins. long, sometimes hairy towards the base, a number of flowers towards the top. Bracts minute; the pedicels pale purple, about  $1/6$  in. long. Flowers reddish purple,  $1/8 - 3/16$  in. long, the perianth segments oblong, joined into a tube at the very base. Filaments narrow, attached towards the base of the segments and a little shorter than them. Fruits about  $1/6$  in. long, three-lobed, the lobes rounded at the top.

Coastal and Karamoja.

S. indica Bak. Fig. 21

More robust than the above; bulbs 1 - 2 ins. across. Leaves broadened above, usually 3 - 5 x  $5/8 - 1$  in., occasionally long and narrow, only  $1/4$  in. wide, usually with purple or dark green splotches. Inflorescences 4 - 9 ins. tall, the flowers rather crowded on the upper part. Bracts small,  $1/20 - 1/12$  in. long;

\* see footnote p.5

the pedicels  $1/16 - 3/16$  in. long. Flowers purplish,  $3/16 - 1/4$  in. long, bell-shaped, swollen at the base, the segments oblong, often reflexed, joined into a tube at the very base. Stamens as above. Fruits about  $3/16$  in. long with rounded lobes, which are usually single seeded.

Throughout the highlands.

S. kirkii Bak.

Robust plants with large bulbs 2 - 3 ins. across. Leaves ovate to sword-shaped, purple splotched,  $5 \times 2\frac{1}{2} - 12 \times 2 - 3\frac{1}{2}$  ins., hairless. Inflorescences about 8 - 18 ins. tall, with many flowers. Bracts small, up to  $1/16$  in. long; the pedicels lilac,  $3/16 - 1/2$  in. long. Flowers greenish, tinged purple, especially outside,  $5/16 - 7/16$  in. long, the segments joined at the very base, reflexed when mature. Filaments purple, attached to the perianth segments a little above the tube, about  $3/16$  in. long. Fruits with three, rounded lobes, which are usually single seeded.

Nairobi and Masai Districts, east to the coast, Northern Frontier Province.

URGINEA Steinh.

- 1a. Flowers  $5/8 - \frac{3}{4}$  in. long; the fruits about  $\frac{3}{4}$  in. long..... U. ?zambesiaca  
 1b. Flowers  $3/8$  in. long or less; the fruits less than  $1/2$  in. long.....2  
 2a. Robust plants, 2 - 6 ft. tall, with many flowers..... U. altissima  
 2b. Smaller plants, 8 - 18 ins. tall, with rather few flowers.. .... U. indica

U. altissima (Linn. f.) Bak.

Large bulbs, about 4 ins. across, often partially exposed above the ground; the torn leaf bases cotton-wool-like. Leaves usually appear after the flowers, strap-shaped, up to  $18 \times 1 - 1\frac{1}{2}$  ins. Inflorescences 2 - 6 ft. tall, with many flowers. Bracts very small, less than  $1/10$  in. long; the pedicels stiffly spreading,  $1/2 - \frac{3}{4}$  in. long in flower and up to 1 in. in fruit. Perianth segments whitish, with a broad green median stripe, oblong,  $1/4 - 5/16$  in. long, shortly joined at the base. Filaments inserted at the top of the tube, about  $1/8 - 3/16$  in. long, tapering from only a slightly broadened base. Fruits up to  $3/8$  in. long, winged; the black seeds surrounded by a conspicuous membranous wing,  $1/8 - 3/16$  in. long.

All parts of Kenya, below about 8,000 ft.

U. indica Kunth Fig. 22

Bulbs up to 2 ins. across. Leaves often appear after the flowers, strap-shaped, up to  $8 \times 3/8$  in. Inflorescences 8 - 18 ins. tall, with rather few flowers. Bracts very small; the pedicels  $1/2 - 1$  in. long in flower, up to  $1\frac{1}{4}$  in. in fruit. Perianth segments greenish brown, usually with a whitish margin, shortly joined at the base. Filaments fine,  $1/8 - 3/16$  in. long, inserted at the top of the perianth tube. Fruits  $3/8 - 7/16$  in. long, not markedly winged; the seeds black, winged,  $1/4 - 3/8$  in. long.

Machakos District and Northern Frontier Province.

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### U. ?zambesiaca Bak.

Bulbs up to 3 ins. across. Leaves usually appear after the flowers, narrow up to 12 x 3/8 in. Inflorescences 1 1/2 - 2 ft. tall, with a number of well spaced flowers. Bracts up to 3/16 in. long, soon falling; the pedicels very long, 1 - 1 1/2 ins. long in flower, up to 2 ins. in fruit. Perianth segments green with a brown stripe, 5/8 - 3/4 in. long, shortly joined at the base. Filaments inserted at the top of the perianth tube, about 1/2 in. long, broadened in their lower half. Fruits 3/4 in. or so long, nearly as broad, winged; the seeds flat and winged.

Coastal.

### WURMBEA Thunb.

### W. tenuis (Hook. f.) Bak. Fig. 23

Small plants with bulb-like corms, 1/4 - 3/8 in. across. Leaves narrow, thickened, up to 5 x 1/2 in., the upper leaves small, sheathing the peduncle, which is 1 - 6 ins. long, with a few sessile flowers towards the top. Bracts not apparent. Flowers 3/8 - 1/2 in. across, the perianth segments white, with two contiguous purple spots towards the base of each segment; the filaments attached just below these. Ovary elongate with three short, persistent styles. Fruits up to 1/2 in. long.

Highlands, above 7,000 ft.

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ANNOUNCEMENT

Ornithologists from other continents or other parts of Africa intending to work on South African birds are invited to make use of the Percy FitzPatrick Institute of African Ornithology, University of Cape Town, as their base. Office or limited laboratory accommodation would be made available; use could be made of the Institute's reference library; access to the collection of the South African Museum could be arranged; and the advice of the staff on matters requiring local knowledge would be at the visitor's disposal. Anybody interested should write to the Director, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch, Cape Province, South Africa.

COMMON PERENNIAL LILIES OF KENYA WITH EPHEMERAL FLOWERING SHOOTS

Explanation of Plates

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fig. 2 Androcymbium melanthioides Willd. var. striatum (A. Rich.) Bak., a. habit, b. flower, c. fruit, d. seed.  
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