

## EAST AFRICAN SUCCULENTS.

### PART IV.

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(ALL DRAWINGS AND PHOTOGRAPHS BY THE AUTHOR.)

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### N.O. ASCLEPIADACEAE.

In this order we find an extraordinary wealth of succulent forms; first rank among these is indubitably held by the large and interesting tribe of *Stapelieae*. Other succulent species are found among the genera *Ceropegia*, *Cynanchum*, and *Sarcostemma*.

This chapter gives a complete survey of the Stapeliads known to date from Kenya, Tanganyika, and Uganda. The short individual descriptions do not claim to be in any way complete as to every botanical detail; they are intended only to give the main and the most striking features of every plant; together with the numerous and carefully selected photographs they will enable the amateur to recognize these plants in the field and, — it is hoped — to stimulate his interest in this fascinating group.

The task could not have been undertaken without the active support of Miss Eileen A. Bruce of the Herbarium, Kew, who has described most of the recently discovered species, some with the author's collaboration.

Messrs. Alain White and Boyd L. Sloane's comprehensive publication "The Stapelieae," three volumes, published by Haselton, Pasadena, 1937, was also indispensable for the present survey, and the author has quoted freely from their admirable descriptions.

Special recognition must be given in this place to Mrs. Gwendolyn Copley; Capt. A. T. A. Ritchie, Game Warden for Kenya Colony; and to Mr. C. G. MacArthur, Assistant Game Warden; for their intensive and enthusiastic collecting in remote parts of the Colony, which resulted in the discovery of several new species, besides yielding much information on the distribution of the Stapeliads.

## STAPELIEAE.

With their almost unlimited variety of form and with their strangely attractive flowers, the *Stapelieae* have arrested the attention of plant lovers more than any other group of succulents.

In the present brief summary there is no space to enter into a full description of their anatomic structure, their unique and complicated mechanism of pollination or into other interesting details; we refer our readers who seek more information on the subject to the above-mentioned monograph by White and Sloane. This excellent publication describes the world's *Stapelieae* very exhaustively, and it is magnificently illustrated.

The flower in the N.O. *Asclepiadaceae* is, however, highly specialized and for the assistance of those unfamiliar with its structure, a line drawing showing the names of the various parts is given opposite.

*Stapelieae* are at their best in Southern Africa, but in East Africa, too, they are well represented; out of twenty recognised genera, six are found in East Africa. They are:

*Caralluma* with sixteen species.

*Edithcolea* with one species.

*Stapelia* with one species.

*Duvalia* with one species.

*Huernia* with two species.

*Echidnopsis* with six species.

### GENUS CARALLUMA.

This genus has been divided up into nine separate groups, four of which are represented in East Africa.

#### GROUP *Eucaralluma*.

The group is characterized by the tapering stems which run into a long, slender point in the flowering stems.

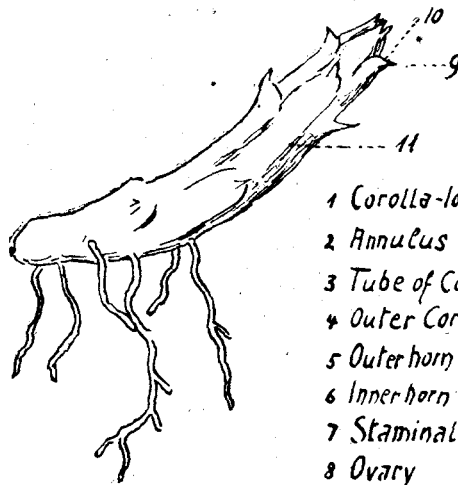
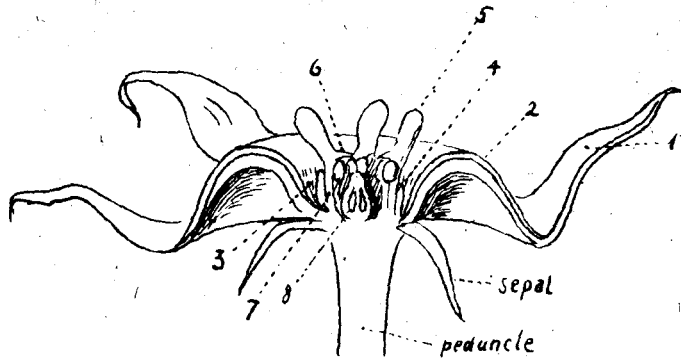
#### *Caralluma priogonium* K. Schum.

Is the largest representative of this group; its flowering stems are up to 26 inches high. They are four-angled, with toothed margins, fleshy, up to 2 inches in diameter at their base.

Twenty or more stems grow from one-rooted plant. The root system is small and fibrous. The flowers are grouped in small fascicles of 4 to 5 along the upper tapering portions of the flowering stems; they flower in sequence. The five spreading corolla lobes are fringed with vibratile hairs. Their colour is a dark maroon at the base, variegated with a few white bands, and fading into a uniform purplish-olive towards the tips. The corona which is small and not very distinctive is purple.\*

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\*In this and other descriptions, where the illustration with centimetre-scale shows the exact size of the flower or of other parts of a plant, reference to size and measurements have been left out.



- 1 Corolla-lobe
- 2 Annulus
- 3 Tube of Corolla
- 4 Outer Corona-lobe
- 5 Outer horn of inner Corona
- 6 Inner horn of inner Corona
- 7 Staminal column
- 8 Ovary
- 9 Rudimentary Leaf
- 10 Stem tooth
- 11 Groove between stem angles

The parts of a Stapeliad  
based upon **DUVALIA TANGANYIKENSIS**

The distribution of this species seems fairly limited. It was first collected in Tanganyika in the dry bush-country between the Western Usambaras and the Pare Hills, at 2,100 feet. It occurs apparently all around the foot of the Pare Hills (Kiurio, Makanya). In Kenya Colony, the only locality known so far is the Tsavo River, five miles east of Tsavo Station. Fig. 2.

*Caralluma* sp.

Perhaps only a variety of *C. priogonium*, this plant has smaller flowers. The corolla lobes are maroon except for white bands at the base; the marginal vibratile hairs are very sparse. The corona does not differ materially from that of *C. priogonium*. Collected by Capt. A. T. A. Ritchie, in Mariget, near Lake Baringo, and near Adable, in Tanaland, in 1940. Fig. 3.

*Caralluma gracilipes* K. Schum.

This and the following species of *Eucaralluma* are characterized by their sharply replicate corolla lobes. *C. gracilipes* is one of the smallest species of *Caralluma*. The erect stems are not more than  $2\frac{1}{4}$  inches to  $2\frac{3}{4}$  inches high; the flowering peduncles are about one foot long.

Little was known about the flower of this plant which was collected by Hildebrandt in 1878, and of which only one poorly preserved specimen remains in the Berlin Herbarium. Recently, the author has collected the plant again in the type locality, which was given by Hildebrandt as Kitui, Ukamba. Fig. 1 gives an accurate picture of a branch in bud and of the flower. The fleshy, quadrangular stems are toothed along the margin, and the teeth, though not very prominent, are well defined by the rudimentary lanceolate leaflets which crown them.

The narrow, pointed and sharply replicate lobes are uniformly purplish-green outside. When fully opened, the upper two-thirds of the lobe are replicate, thus showing the inner surface which is a dull-yellow, finely dotted with maroon spots. The fringing ciliate hairs are comparatively stout, club-shaped and set closely together near the base. Further up the lobe they are followed by very minute, sparsely set hairs with pointed tips. They increase in size towards the tip of the lobe. When in bud the corolla is inflated above the base, where it encloses the stalked corona.

Characteristic—and aptly expressed in its specific name—is the corona which is raised conspicuously high on the staminal column. The outer corona is dentate, the inner corona lobes are spatulate and tinged with purple at base and tip.

The species seems to occur exclusively in the Kitui District. Since its discovery no other locality has been reported. The author collected it on top of Mutomo Hill, Kitui District, Ukamba, at 3,100 feet altitude, on 19th January, 1942, and more recently Mr. MacArthur has obtained specimens on Zambani rock three miles east of Kitui. Fig. 1.

*Caralluma* spp.

There are a number of undescribed species of *Caralluma* which are closely allied to this species, although they have not the typically raised corona. The outer corona lobes are in most cases markedly bifid.

Their common characteristic is the corolla of five spreading, replicate lobes, which are speckled maroon in colour, fading to greenish-yellow towards the base. The spreading lobes give the flower an unmistakable "spidery" appearance. They have been collected in numerous parts of Kenya and also in Tanganyika; at present it would appear that they are varieties or local races of one and the same variable species, but more material needs to be compared before a definite classification can be undertaken. Fig. 4 (*Caralluma* sp. from Hola, Tana River. Flowering plant in cultivation).

*Caralluma Turneri* E. A. Bruce.

Very closely allied to the above "spidery flowered" species, this and several others have an almost identical corona. The main distinguishing feature lies in the corolla lobes, which are not spread out rigidly, but are pendulous, their bases being very narrow and apparently consisting of flabby tissue. The flowers have thus the appearance of little tassels. In growth, there is little to distinguish *C. Turneri* from the previously described *Caralluma* spp. In size, it is between *C. priogonium* and *C. gracilipes*. The stems are four-angled, acutely toothed, sometimes mottled with purple on a dull-green surface. The drooping corolla lobes are sharply replicate; they are pointed, very characteristic in shape, being widest about two-thirds of their length from the base. They are dark maroon with fairly large greenish-yellow spots. Varieties, or local races, occur which differ mainly in coloring; a uniformly dark maroon variety from Kacheliba has shorter and broader corolla lobes and the corona is slightly raised.

The species seems to have a comparatively wide distribution; it was discovered by Allen Turner on Homa Mountain, near Homa Bay, on Lake Victoria. It occurs on the western slopes of the Ngong Hills, near Nairobi, and also near Baringo, and on the Kacheliba Escarpment; there is no record of the plant having been collected outside Kenya Colony. Fig. 5.

*Caralluma* sp. nov. (Bally, S27).

This new species belongs to the "tassel-flowered" group; some distinctive features in growth and structure of the flower justify its description as another species. The stems and angles are definitely blunt-edged, and the teeth with rounded tips do not point upwards, but protrude horizontally from quadrangular stems.

The stems are grooved longitudinally and they are cross-shaped in section. The corolla lobes are very narrow and elongated, with nearly parallel sides, and with a mucronate tip. Their colour is purplish-maroon, shading to green towards the base. The shaded effect is produced by minute maroon spots which are crowded more densely towards the tips of the lobes. The base is fringed with stiff ciliate hairs, the whole length being covered with very minute purplish hairs. The corona is sessile; the outer horns are very short, the inner horns, spatulate with a constriction in the middle, are tinged with maroon.

This interesting species was discovered by Capt. A. T. A. Ritchie, near Lake Baringo, in April 1940, and, later, near Bura, in Tanaland. Fig 6.

*Caralluma* sp. nov. (Bally, S61).

This very distinctive plant combines some characters of most of the preceding species of *Eucaralluma*. Its size is small; the whole plant, including the flowering spikes being only 6 inches high. The quadrangular stems are blunt-edged and longitudinally grooved, the teeth are sharp and point upwards. The flowers grow in fascicles of two to three along the tapering portion of the flowering stems; they bloom consecutively.

The corolla lobes are pendulous and very broad, tapering abruptly to the tip; their colour is yellow, speckled with maroon. Their margins are set densely with minute vibratile hairs; at the base these hairs are scarce, stouter, and club-shaped.

The short-lobed corona is remarkable through being raised to over half the length of the flower on its inflated staminal column.

The outer corona has not developed the characteristic bifid horns; the inner corona lobes are as short as in *C. priogonium*.

The type locality for this plant is Archer's Post, in the N.F.D., Kenya Colony, where it was discovered by Capt. E. A. Peck, in December, 1941. Fig. 7.

#### GROUP *Umbellata-europaea*.

In this group the flowers are crowded in a dense cluster near, or at the blunt apex of the stem.

*Caralluma retrospiciens* var. *glabra* N. E. Brown.

This giant among the *Stapelieae* forms clumps of 6 feet or more in diameter, with thick, fleshy, quadrangular stems which attain a height of 4 feet.

The teeth along the acute edges are small, blunt, and fleshy, but well defined.

The inflorescence is very striking: it crowns the stem in a tight, spherical cluster, about the size of a tennis ball. It is composed of a great number of blackish-maroon flowers, which are in themselves comparatively small, about  $\frac{1}{2}$  inch in diameter,

and which have spreading lobes. The delicately-shaped cherry-red coronas stand out like filigree against the black corollas.

This species was first discovered in Witu, in Kenya, and it has since been found to be comparatively widely spread all over the Northern Frontier District up to the Abyssinian border. The illustration shows a longitudinal section of a flowering branch. Fig. 8.

*Caralluma tumbuctuensis* N. E. Brown.

First discovered near Timbuctu, in West Africa, by Chevalier, this *Caralluma* was believed to be a West African variety of *C. retrospectans*, owing to the similarity of the coronal structure.

It is now recognized, however, as a separate species, and in Kenya, it occurs side by side with *C. retrospectans*. The growth of *C. tumbuctuensis* brings it much nearer to *Caralluma speciosa* with which it agrees in having continuous horny margins to the stems and thorny teeth; in fact, when not in flower, it is hardly possible to distinguish the two latter species in the field.

*C. tumbuctuensis* forms clumps; the four-angled stems attain barely more than 1 foot in height. The flowering head is spherical, and composed of 120 to 140 individual flowers which are just under 1 inch in diameter; the five-lobed corolla is greenish-yellow, but it is so closely dotted with maroon papillae that the effect is that of a nearly uniform maroon. The lobes are densely fringed with club-shaped maroon vibratile hairs. The long recurved outer corona lobes are bifid and they stand out conspicuously by their lemon-yellow colour. The inner corona horns are deltoid and point towards the centre; they are speckled with maroon dots.

So far *Caralluma tumbuctuensis* has been collected at Archer's Post and on the Kamasia Plains in Kenya Colony, but judging from its occurrence in West Africa, it is probable that its distribution in East Africa is wide. Fig. 9 (drawing of a cultivated plant with poorly developed inflorescence).

*Caralluma speciosa* N. E. Brown, syn. *Caralluma codonoides* K. Schum.

While resembling *C. tumbuctuensis* very closely in habit, the difference in the inflorescence is very marked; fully open it measures nearly 5 inches across. The corolla is much larger, about 2 inches in diameter and deeply cup-shaped. The lobes are a uniform deep maroon, and the cup-shaped tube ranges from orange to yellow. A local form found at Magadi has a speckled-maroon zone between the lobes and the yellow tube. The pale lemon-yellow corona has characteristic bifid outer lobes which are flattened close against the tube.

*C. speciosa* is the most widely distributed species of this group in East Africa; it occurs from Italian Somaliland through Kenya Colony to Tanganyika, where it is found in very dry country at low altitudes. Some localities recorded are:—Kenya Colony: Magadi, 1,900 feet; Maktau, 1,800; Ndara, 1,800 feet; foot of Sagalla Hill, 1,800 feet. Galmagala and Balambala in Tanaland, about 1,500 feet. Tanganyika: Kiurio, between Usambara and Pare Hills, 1,800 feet. Fig. 10.

*Caralluma foetida* E. A. Bruce.

Closely allied to *C. speciosa*, this is a much smaller plant, growing only 4 inches to 5 inches in height. The quadrangular stems, about  $\frac{3}{4}$  inch thick at the base, have horny, toothed margins.

The inflorescence forms terminal, closely set heads composed of 30 to 50 flowers and measuring about  $1\frac{3}{4}$  inches across. The individual flowers are  $\frac{1}{2}$  inch in diameter; their corolla is blackish-purple, papillate on the inner surface. The corona is not unlike that of *C. speciosa*, but the bifid outer corona horns are erect. The double seed pods or follicles are always parallel, touching along their full length, thus distinguishing this plant from all other East African *Stapelieae* which have more or less widely diverging follicles.

The plant was discovered by W. J. Eggeling on the Moroto River, Karamoja, in Uganda.

#### GROUP *Ango*.

Is well represented in East Africa. The members of this group have their flowers not in terminal umbels, but solitary, or few together; or in fascicles at the tip and often along the sides of the stems. The stems are four-angled, often mottled purplish-red, with stout, conical, pointed teeth.

*Caralluma Dummeri* (N. E. Brown) White et Sloane.

Is a small, succulent herb up to 5 inches high, with quadrangular stems bearing well developed tapering teeth. The stems are mottled dark-green on pale-green during the wet season and during periods of growth; but the mottling turns purple during drought. The flowers are developed along the stems, preferably near the apex. They are large compared with the size of the plant, and measure about  $1\frac{1}{4}$  inches across the five pointed lobes. The greenish-yellow surface is studded densely with white papillae, each bearing a stiff, erect hair. The corona with pointed, bifid, outer corona horns is ivory-white.

This species is widely distributed over East Africa; it is possible that man has contributed to its present distribution, for many native tribes cultivate it for obscure medicinal purposes. The localities where the plant is found in Uganda (Bukoba, Kampala, Mengo) seem to indicate that the plant does



not occur there in the wild state, but only in cultivation. In Kenya Colony, *C. Dummeri* seems more widely distributed; it is common in most of the drier districts at medium altitudes between 2,400 feet to 5,500 feet. Lukenya, 5,500 feet; Mwingi (Kitui), 4,000 feet; Stony Athi, 5,400 feet; Sultan Hamud, 4,000 feet; Thika Falls, 3,800 feet; Taveta (Latema Hill), 3,400 feet.

In Tanganyika Territory: Manjara Escarpment, 3,800 feet; Ngaruka, 3,800 feet; Soko Plains (between Kilimanjaro and Pare Hills), 3,000 feet.

The above localities are only those recorded in the Herbarium of the Coryndon Memorial Museum, but it is certain that they cover only a small part of the actual distribution of *Caralluma Dummeri*. The illustration shows particularly well the curious radiating effect produced by the transparent bristles crowning the papillae on the corona lobes. Fig. 11.

*Caralluma subterranea* Bruce et Bally.

This plant, discovered by the author as late as November, 1938, in the Ngong Hills, near Nairobi, seems to have a wide distribution as well as a great variability. It is one of the smallest and least conspicuous members of the group. It is characterized by long, subterranean rhizomes which are apparently perennial, while the stems showing above ground seem to be annual or at least less persistent. Since 1938, the plant has been collected in many other parts in Kenya, and Fig. 1231 in White and Sloane's "Stapelieae," showing an unidentified *Caralluma* from Shinyanga, Tanganyika Territory, collected by the late B. D. Burtt in 1937, is without doubt *C. subterranea*.

In almost every locality the plant shows slight variation in growth, coronal structure and length of peduncle. The plants in the Ngong Hills rise rarely more than 2 inches from the ground, and the rhizomes are especially well developed. Few flowers are developed at a time. A variety which occurs in the Ngorongoro crater, in Tanganyika, has stems up to 4½ inches high, the rhizomes are much less developed, and up to fourteen buds have been counted with three flowers in bloom simultaneously. The colour of the flower also varies considerably, and apparently is not dependent on locality.

Flowers with dark-maroon lobes are often found side by side with others of a pure lemon-yellow, including the corona. The length of the peduncle varies from nought in the practically sessile flowers from Ngong Hills, to three lines in the variety from Sagalla.

The corolla is up to ¾ inch in diameter, with tapering, pointed lobes which are covered with very minute silvery bristles. The corona varies in length and in the number of horns of both outer and inner coronas.

The wide distribution of *C. subterranea* may be judged by the following recorded localities:—Kenya Colony: Gilgil, 6,500

feet; Longonot, foot of hill, 6,000 feet; Ngong Hills, 6,000 feet; Mbagathi, 5,400 feet; Narok District, 6,000 feet; Syabei Gorge, 6,000 feet; Uaso Nyiro, 6,000 feet; Ulu, 6,000 feet; Sagalla Hill, Onjika near Kisumu, 3,600 feet. In Tanganyika, the plant is found at the bottom of the crater of Ngorongoro, 5,100 feet; probably on Mount Kitumbeini, as well as in the Shinyanga District, 3,600 feet. The illustration shows a richly flowering plant from Ngorongoro in two colour varieties, in cultivation. Fig. 13.

*Caralluma subterranea* Bruce et Bally (var. *minutiflora*)?

In Mbagathi, near Nairobi, and on Juja Farm, there occurs a variety with sessile flowers, a much reduced corona, only  $\frac{1}{2}$  inch in diameter, and in which the corona shows a distinct feature in having papillate inner corona horns. Fig. 12.

*Caralluma Baldratii* White et Sloane?

The plant shown in Fig. 14 is tentatively identified as this species. Although comparative material of *C. baldratii* is not available at present, White and Sloane's description shows that there are some distinguishing features between the two. The growth of both plants seems identical: fairly slender, four-angled stems with tapering, nearly horizontal teeth, their tips pointing upwards. The structure of the flowers shows some differences. The flowers of *C. Baldratii* are sessile, while those of the plant from Kenya Colony have a peduncle  $\frac{1}{4}$  inch long. The coronal structure of the Kenya specimen answers very well to White and Sloane's description. The colouring of both plants, however, differs considerably; White and Sloane's flower has dark, mahogany-coloured corolla lobes, while the corona is described as being blackish-purple with cherry-red. The Kenya plant has dark, carmine corona lobes, which contrasts beautifully with a golden-yellow corona. If we bear in mind the considerable variation in length of peduncle and in colour shown by *C. subterranea*, we are tempted to assume that the plant discovered in Kenya is but a variety of *C. Baldratii*, known hitherto only from the high plateau near Asmara in Eritrea, many hundred miles to the north.

The Kenya specimen was discovered by Capt. A. T. A. Ritchie, in Baringo, 3,400 feet, in April, 1940. Fig. 14.

*Caralluma vibratilis* Bruce et Bally.

This species, although apparently widely distributed over East Africa, escaped discovery until recently.

The following short description is extracted from a description published by E. A. Bruce and P. R. O. Bally in the *Cactus Journal of America*, Vol. XIII, No. 11, November, 1941. The specific epithet "vibratilis" aptly describes the flower which is characterized by the mobile clavate hairs fringing the corolla

lobes. *C. vibratilis* resembles closely *C. subterranea* in its habit of growth and, like the latter, develops long underground rhizomes. The corolla is a dark purplish-maroon within, minutely spotted with yellowish-green, whilst outside it is greenish, tending to purple towards the tips of the lobes; in the campanulate form of the corolla tube the species is most nearly allied to *C. venenosa* and *C. sacculata*, in both of which the lobes are subequal to the tube.

The corona in *C. vibratilis*, however, is rather different from those in either of these species. It is dark-purple in colour and more or less spherical in shape, the lower half being cup-shaped, whilst the lobes arise from the upper edge; the outer "lobes" are divided into two small, blunt, erect teeth, whereas the inner lobes are entire and broadly linear, curving over the anthers and touching one another, so completing the "sphere."

In Kenya Colony, the plant was discovered by Capt. A. T. A. Ritchie, near Mariget, on March 25th, 1940, and simultaneously, on the same date, by Mr. C. G. MacArthur at Athi River Station, 5,000 feet. It also occurs nearby at Embakasi, where it was collected by Miss MacDonald. Later, it was collected near Nanyuki, by Mrs. Joy Bally.

In Uganda, *C. vibratilis* was collected on the flats of Lake Albert, by Mr. W. J. Eggeling.

In Tanganyika, the plant occurs also; it is cultivated at Mtotohovu, Moa, by Col. Boscawen. Fig. 15.

#### *Caralluma distincta* E. A. Bruce.

This remarkable species has a very characteristic tubular corolla. The pointed lobes with reflexed margins are suberect and the fully-developed flower appears thus to be only half open.

The structure of the corona is typical of the genus *Caralluma* and analogous to that of *C. venenosa*, but the inner horns are laterally more compressed and supplied with dorsal horns.

The growth is comparable to that of *C. piaranthoides*, inasmuch as the procumbent stems are linked together in a sequence of loose joints. They are cylindrical in cross section, with well developed, tapering teeth.

*C. distincta* was first discovered in the Uмба Steppe, in Tanganyika, by P. J. Greenway, Systematic Botanist at the Agricultural Research Station at Amani, and collected more recently in Kenya Colony near Kosi, in Tanaland, by Capt. A. T. A. Ritchie. Fig. 16.

#### *Caralluma tubiformis* Bruce et Bally.

"This new species is closely allied to *C. distincta*; both have the comparatively long campanulate corolla tube and more or less erect corolla lobes with reflexed margins. *C. tubiformis*,

however, differs in the smaller flowers which are dark purplish-maroon within and green outside with raised maroon markings; the lobes and upper part of the tube are covered with long, fine, white, downward pointing bristles which direct the insects to the essential organs of the flower and are thus an aid to pollination. The outer corona is interesting as it is divided into five very pronounced, deep, sack-like pouches. The habit of the species, in the erect, four-angled mottled stems with well developed teeth, is similar to that of *C. Dummeri*, but slightly sturdier. The form of the corona closely approaches that of *C. sacculata* and only differs in that the interior corona lobes are not erect at the tips but are horizontally inflexed over the anthers. The tubular corolla and the erect four-angled branches are also comparable to *C. sacculata*, which must be considered to be the nearest ally of *C. tubiformis*. The only known locality for this plant is Archer's Post, in Kenya Colony, on rocky ground. It was discovered by Mrs. Gwendolyn Copley in December, 1939."—(Description reprinted from the *American Cactus Journal*, Vol. XIII, No. 10, October, 1941.) Fig. 17.

*Caralluma commutata* Berg.

In general habit this species is not unlike *C. subterranea*, although no rhizomes are formed. The size of the flowers is the same, and also its general appearance, but a closer inspection shows that the corolla lobes are glabrous, and rugulose on the inner face. The corona is fundamentally different in structure, the outer corona being bowl-shaped with five bluntly rounded and slightly indented corners. The inner corona has its outer lobes adnate to the corners of the outer corona, with an abrupt, two-toothed tip incumbent over the anthers. The colour of the corolla varies from orange-brown to nearly pure-green; the corona is cherry-red.

The type locality for this plant is not definitely known; it is supposed to be in Southern Arabia. If this assumption is correct this little *Caralluma* has an unusually wide distribution; it occurs in Uganda, where it was collected by J. W. Eggeling on Lake Albert flats in Bunyoro. In Kenya, Capt. A. T. A. Ritchie found it in Mariget in the Baringo Area. Fig. 18.

*Caralluma piaranthoides* Obermeijer.

This interesting *Caralluma* shows an annular thickening of the corolla disk, which suggests a possible relationship with the genus *Stultitia*. The corolla with its comparatively short, pointed lobes is papillate on the inner surface; it is bright-yellow, and dotted with wine-red spots. The corona, five-lobed, but appearing to be ten-lobed, is irregularly toothed, and slightly convex. It is cream- to salmon-coloured, minutely spotted with red. The four-angled stems with pointed, tapering

teeth are up to 4 inches high, they are of trailing habit, linked together, and thus forming long chains, rooted at intervals.

Until recently *C. piaranthoides* was thought to be confined to Southern Rhodesia; in December, 1939, however, the species was collected near Fort Portal, Uganda, by Mrs. Joy Bally. Fig. 19.

#### GENUS *EDITHCOLEA*.

This genus is entirely East African; the two known species occur in Socotra, and in British Somaliland, Kenya, and Tanganyika respectively.

*Edithcolea grandis* N. E. Brown.

Is the largest flowered and the most strangely beautiful East African stapeliad. In Kenya, it bears the very apt name "Persian Carpet Flower." The spreading corolla measures to 5 inches across. It is broadly five-lobed halfway to the centre, the lobes terminating in recurved tapering points.

The lobes are bordered with clavate, vibratile hairs, not only along the outer margins, but also along the line which separates them from the disk.

The lobes are purple-brown without markings, often shading into a dull-green or sulphur-yellow towards the tip, with a peculiar velvety surface.

The spreading disk has a lemon-yellow surface with an intricate pattern of purplish-maroon dots which are fused into concentric rings in the central tube, and into irregularly-shaped patches towards the edge.

The tube is about  $\frac{1}{4}$  inch in diameter; it encloses the corona which is comparatively small and differs in structure from that of the genus *Caralluma* through the dilated inner corona lobes with a peculiar spiny or tuberculate upper surface.

The stems are trailing, erect at their tips only, five-angled and glabrous. The angles are armed with hard, yellowish-brown, very acute, spine-like teeth. They branch freely. The flowers grow singly from near the tips of the branches.

*Edithcolea grandis* is widely distributed over East Africa; it extends from Somaliland through British Somaliland, Abyssinia, and Kenya Colony into Tanganyika, and in suitable localities of low rainfall and at low altitudes it is sometimes extremely common; it is usually found in the half-shade of low-spreading thorn bushes. Fig. 20.

#### GENUS *STAPELIA*.

The genus *Stapelia* is characterized by the outer corona consisting of five separate lobes which are free to their base.

While Southern Africa is extremely rich in species—over one hundred have been described, and these separated into ten

well defined groups—there is only one species known to occur in East Africa to date.

*Stapelia semota* N. E. Brown.

This belongs to Section I, the *Stapelluma* group, which stands closest to the genus *Caralluma*.

It is a decumbent, fleshy plant, with four-angled stems and acute, slightly recurved teeth. The corolla consists of five long, tapering lobes, separated down to the raised disk, both corolla and disk having a rugose surface. The margins are fringed with ciliate hairs. The diameter is up to 2½ inches. The spreading outer corona lobes are variably denticulate at the apex; the inner corona lobes are horizontally incumbent over the anthers, sometimes without any processes, sometimes toothed at the apex.

The colour variation of this species is unusually wide: Flowers of an almost uniformly dark-maroon with only a few golden-yellow specks in the upper half of the corolla lobe (var. *Molonyae*) are most common in the Nairobi and Machakos Districts, and near Thika. Plants with a mottled corolla, in which maroon and yellow are about equally balanced occur in Tanganyika, near Kondoia Irangi, the type locality, where the species was discovered by the late B. D. Burtt, in 1931.

Pure-yellow varieties have also been found near Nairobi, and an attractive sport with a pale-lemon corolla contrasting with the dark-purple corona is known. Fig. 21 (maroon variety). Fig. 22 (pure-yellow variety).

#### GENUS *DUVALIA*.

The outer corona of this genus forms a solid disc; another typical feature of many *Duvalias* is the raised annulus surrounding the corona.

On the whole, *Duvalia* seems limited to South Africa with fifteen species. So far only two species have been collected outside South Africa; these are *Duvalia sulcata* from the Hadramaut in Southern Arabia, and *Duvalia tanganyikensis*. With the exception of these two isolated species the northern limit of the genus is that of *Duvalia polita* in Ngamiland.

*Duvalia tanganyikensis* Bruce et Bally.

This newly discovered species is the first record of a *Duvalia* in Tanganyika Territory and forms an interesting addition to the distribution of the genus. *D. tanganyikensis* is most closely allied to *Duvalia polita*, but it differs in the narrower, more acuminate corolla lobes which are salmon-pink in colour, the glabrous, deep wine-red annulus, and the small, blunt stem-teeth which are more widely separated from one another.

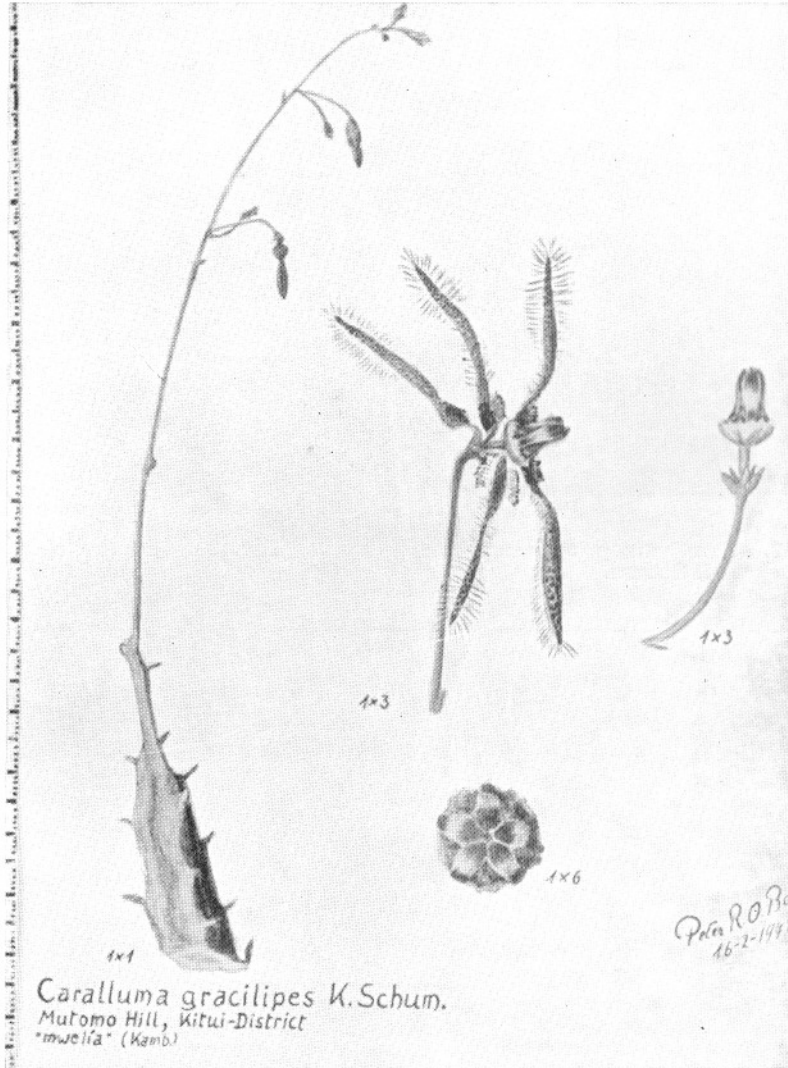


FIG. 1. *Caralluma gracilipes* K. Schum.

PLATE 44.

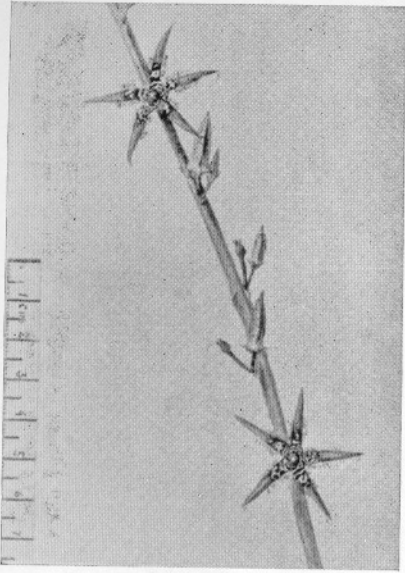


FIG. 2. *Caralluma priogonium*  
K. Schum.



FIG. 3. *Caralluma* sp.  
nr. *C. priogonium*.



FIG. 4. *Caralluma* sp. (Bally, S63).



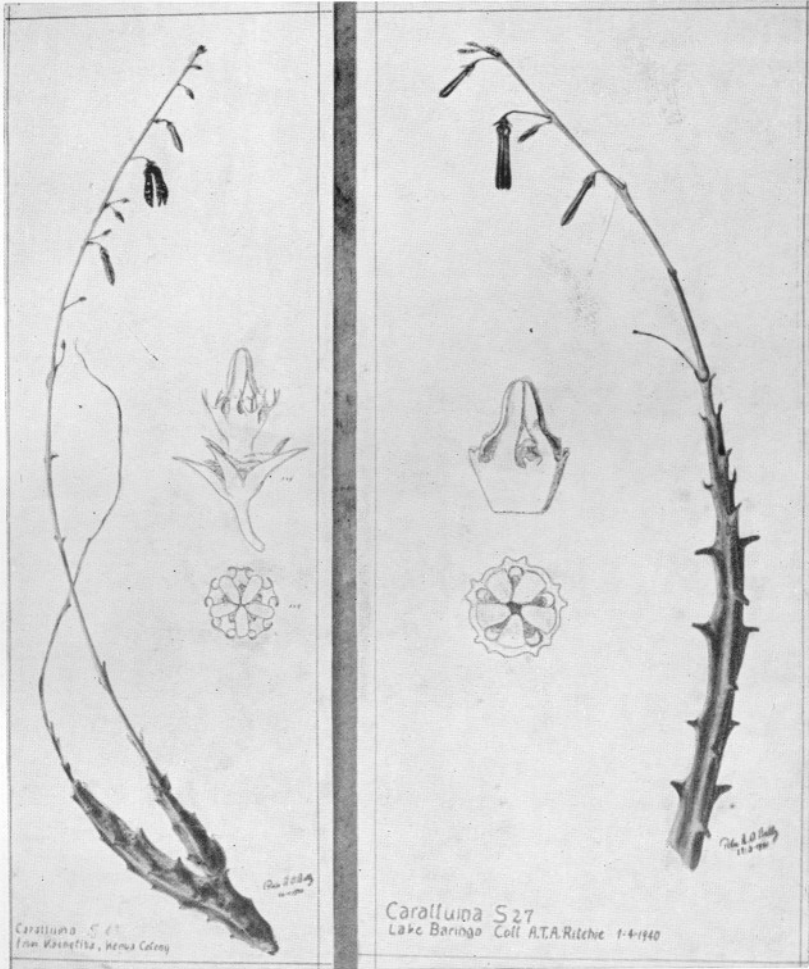


FIG. 5. *Caralluma Turneri*  
E. A. Bruce.

FIG. 6. *Caralluma* sp. nov.  
(Bally, S27).

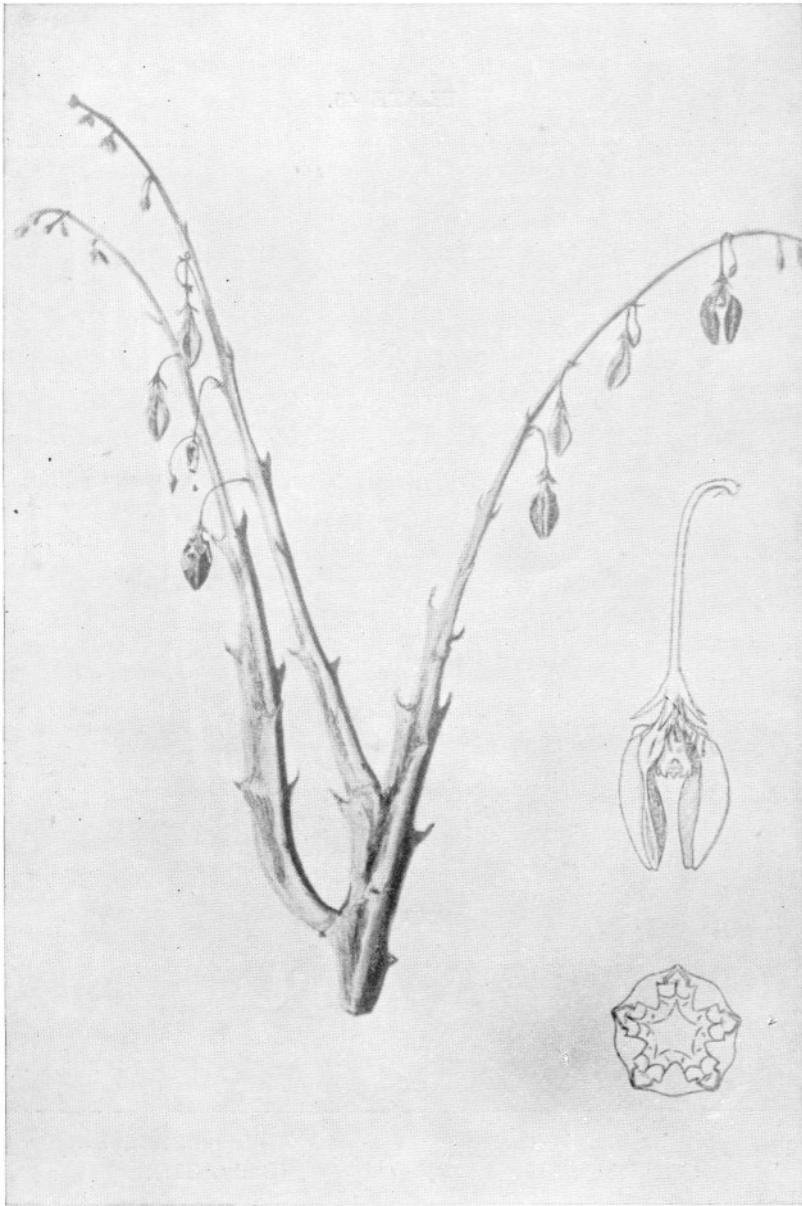


FIG. 7. *Caralluma* sp. nov. (Bally, S61).

PLATE 47.

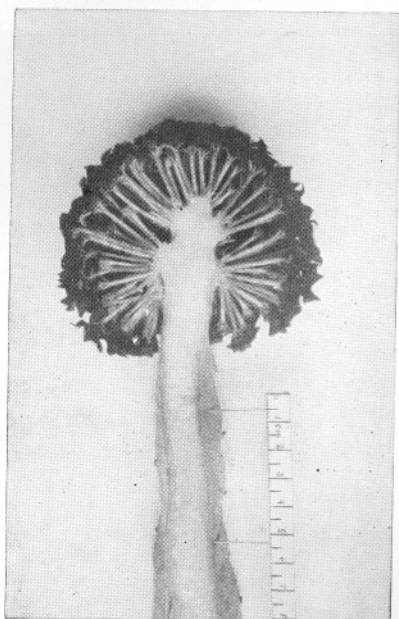


FIG. 8. *Caralluma retrospicens*,  
var. *glabra* N. E. Br.

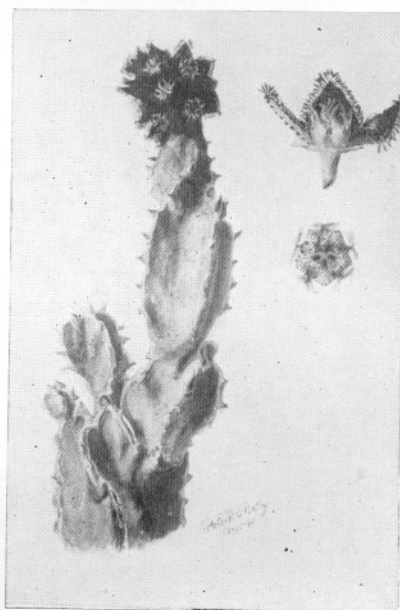


FIG. 9. *Caralluma tumbuctuensis*  
N. E. Br.



FIG. 10. *Caralluma speciosa* N. E. Br.

PLATE 48.

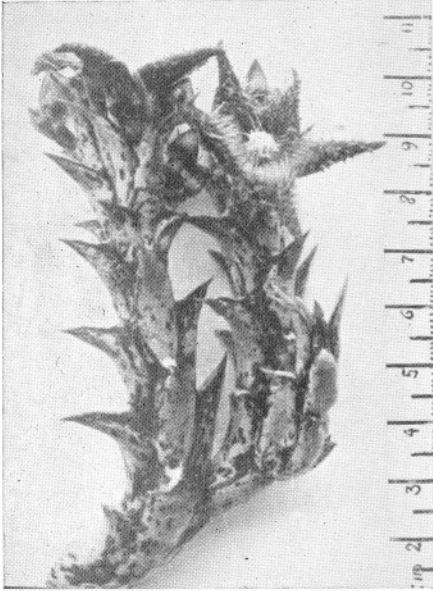


FIG. 11. *Caralluma Dummeri* (N. E. Br.)  
White et Sloane.



FIG. 12. *Caralluma subterranea* Bruce  
et Bally (var. *minutiflora*?).



FIG. 13. *Caralluma subterranea* Bruce et Bally.



FIG. 14. *Caralluma Baldratii* White et Sloane.

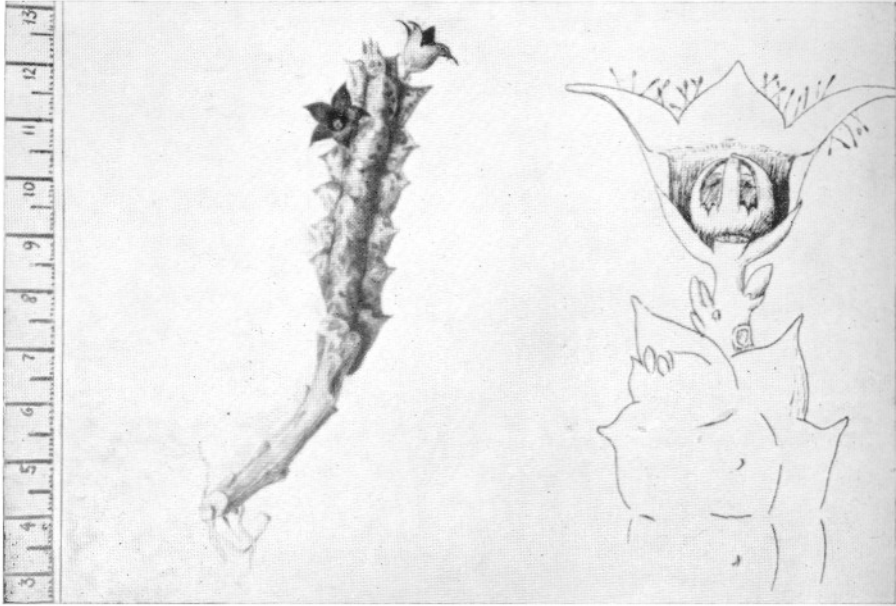


FIG. 15. *Caralluma vibratilis* Bruce et Bally.

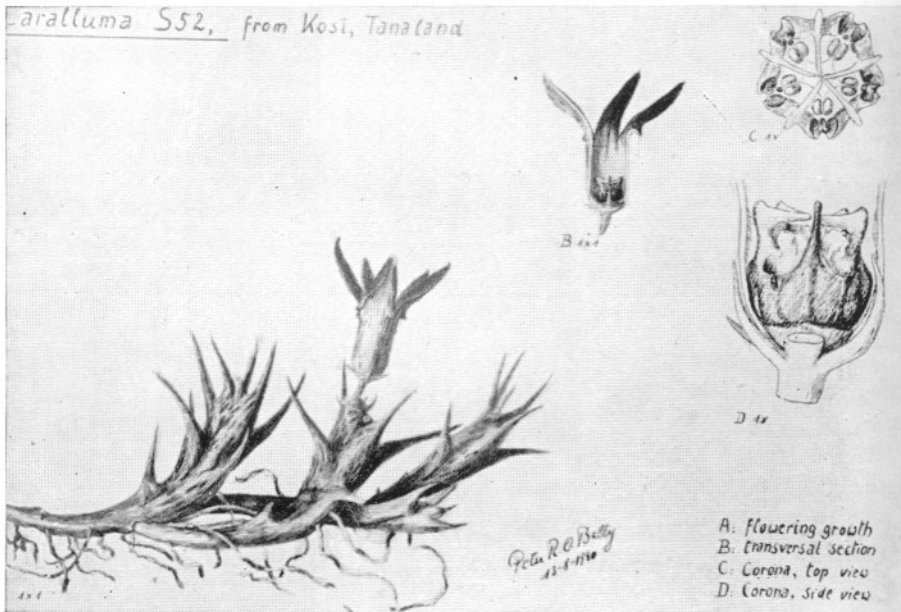


FIG. 16. *Caralluma distincta* E. A. Bruce.

PLATE 51.

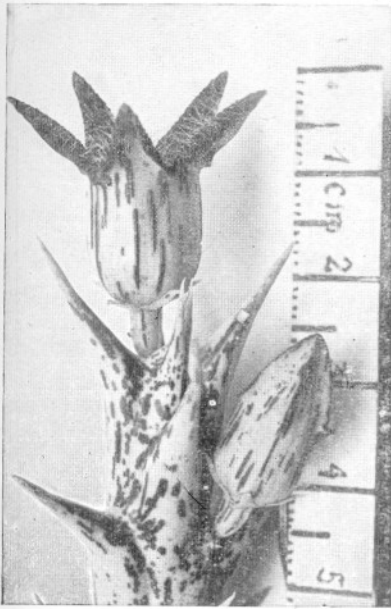


FIG. 17. *Caralluma tubiformis*  
Bruce et Bally.

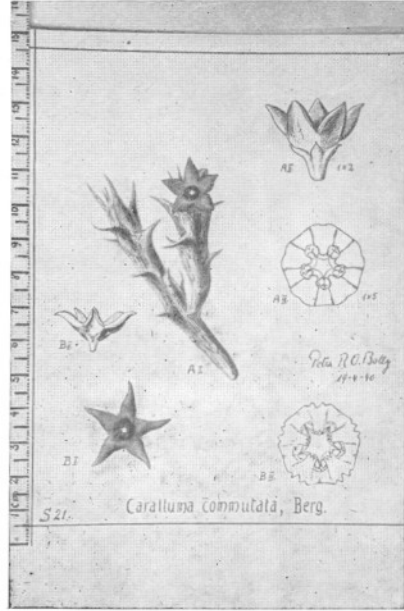


FIG. 18. *Caralluma commutata*  
Berg.



FIG. 19. *Caralluma piaranthoides* Obermeijer.



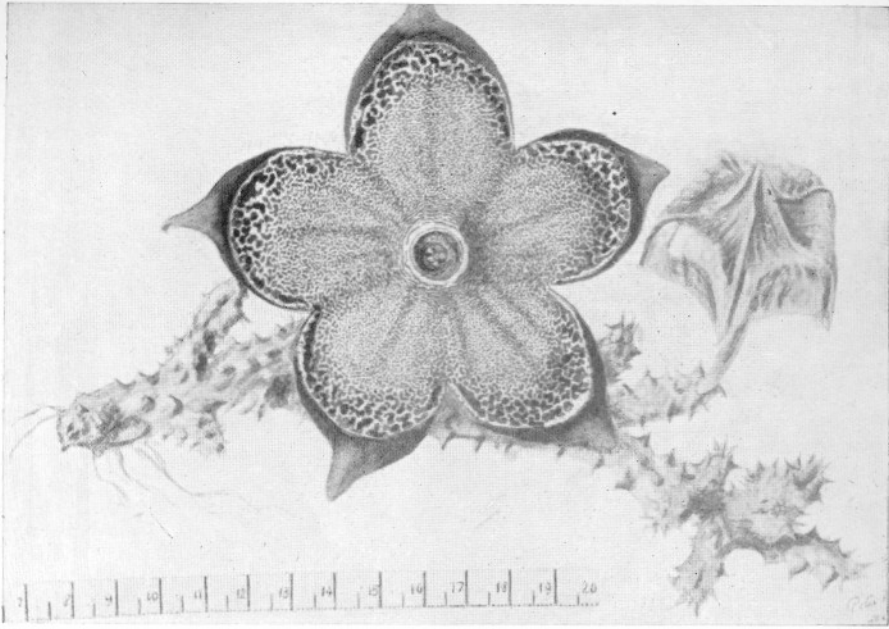


FIG. 20. *Edithcolea grandis* N. E. Br.

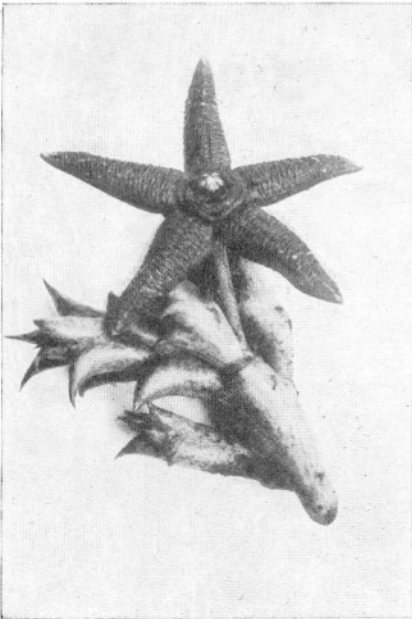


FIG. 21. *Stapelia semota* N. E. Br.  
(maroon variety).

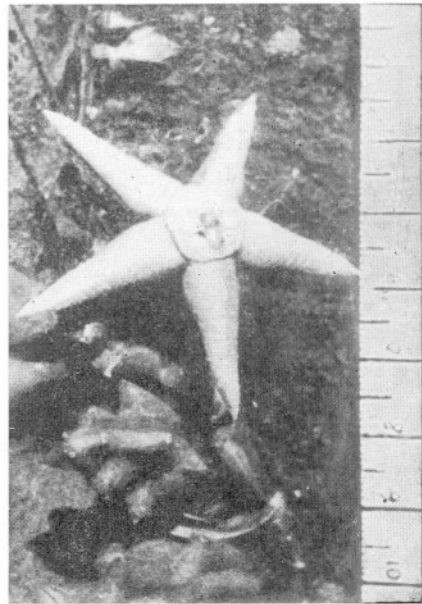


FIG. 22. *Stapelia semota* N. E. Br.  
(pure-yellow variety).





FIG. 23. *Duvalia tanganyikensis* Bruce et Bally.

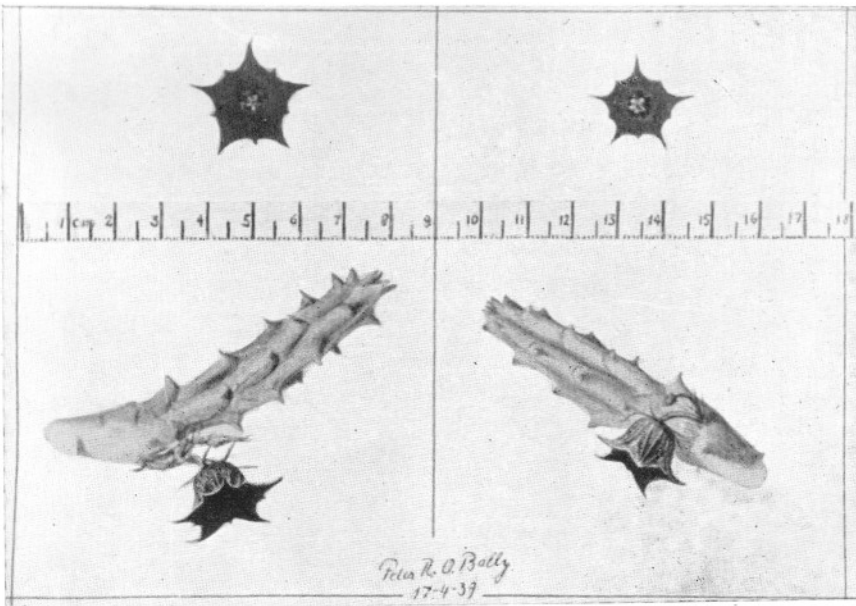


FIG. 24. *Huernia aspera* N. E. Br.

PLATE 54.



FIG. 25. *Huernia keniensis* R. E. Fries.

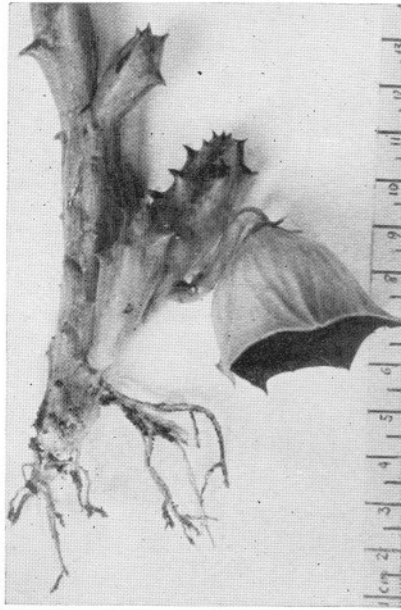


FIG. 26. *Huernia keniensis* R. E. Fries.  
var. *nairobiensis* White et Sloane.

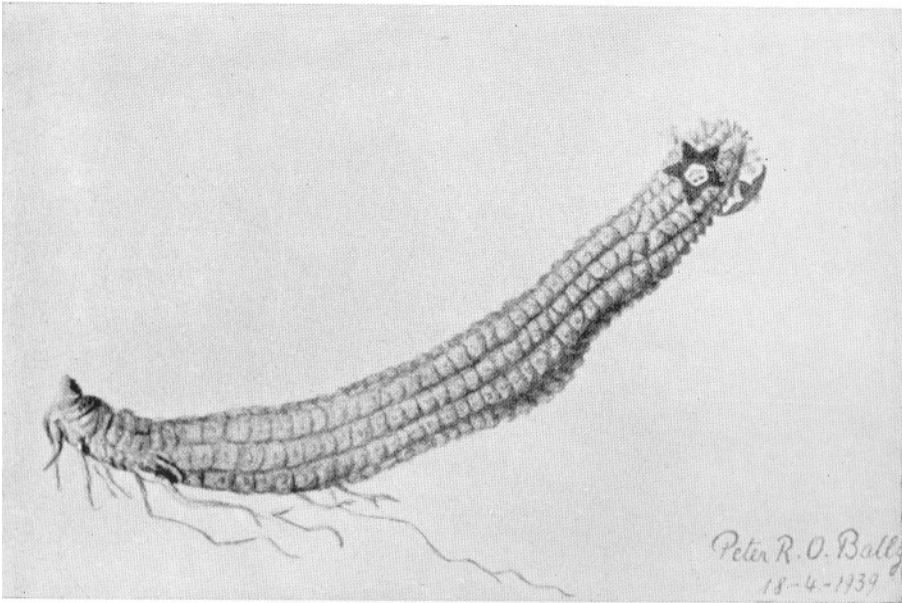


FIG. 27. *Echidnopsis Sharpei* White et Sloane.

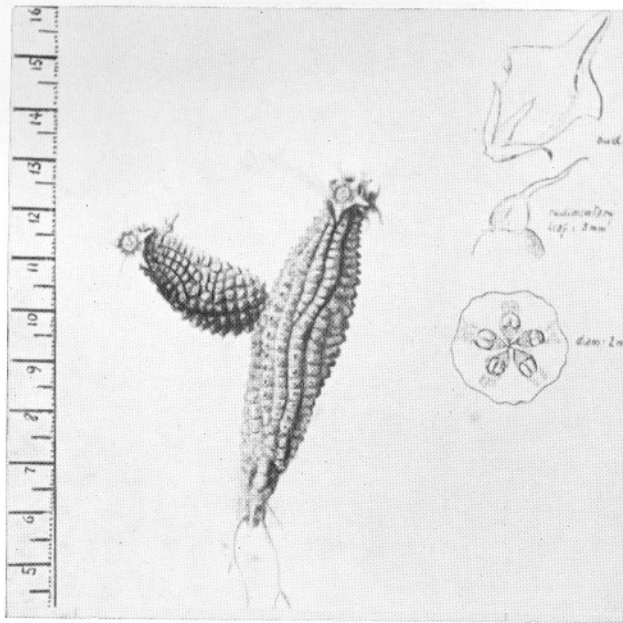


FIG. 28. *Echidnopsis angustiloba* Bruce et Bally.

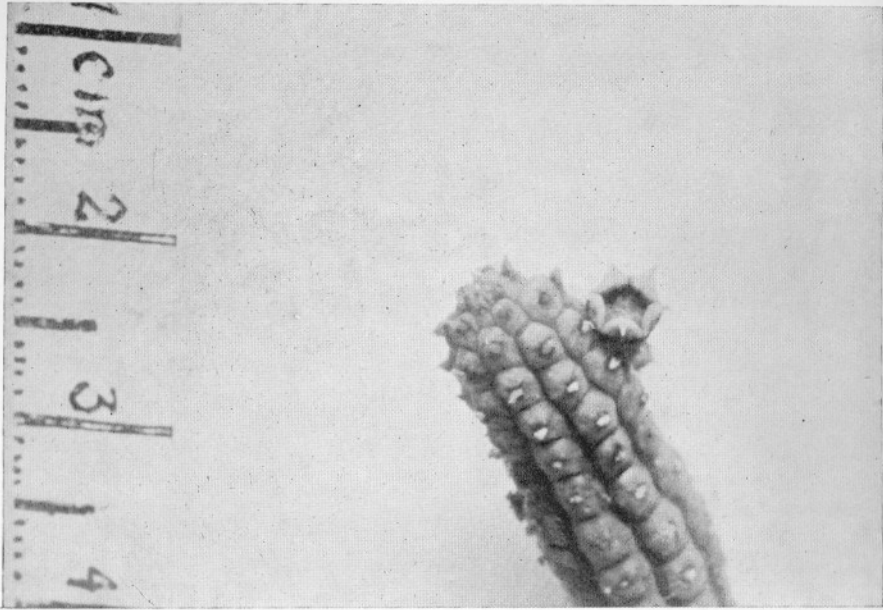


FIG. 29. *Echidnopsis* sp. nov. (Bally, S47).

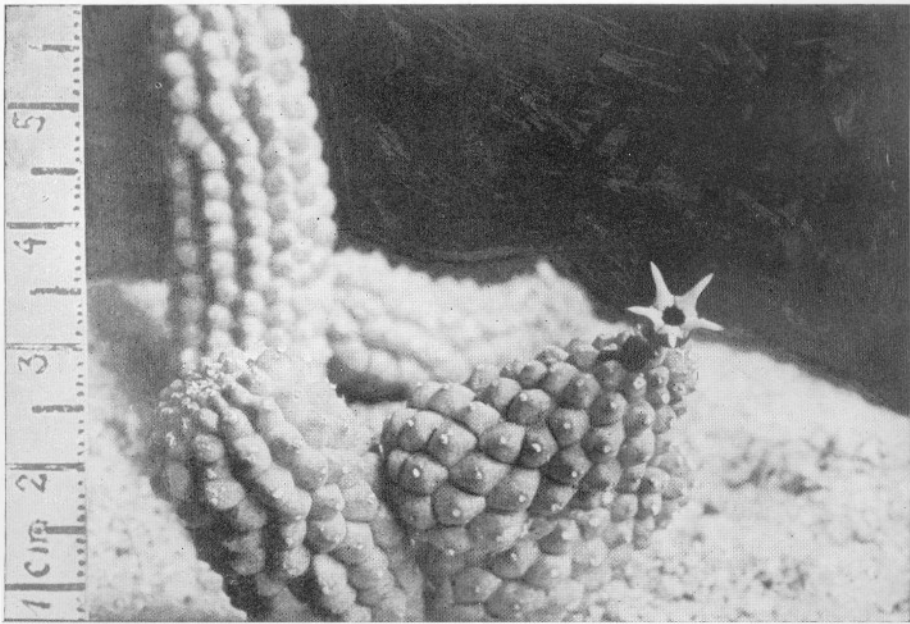


FIG. 30. *Echidnopsis* sp. nov. (Bally, S49).

The stems are decumbent, sparsely branched, four-angled with obtuse teeth rooting where the long trailing branches are in contact with the soil; in general appearance the growth is not unlike that of *Huernia aspera*. The flowering growths are developed near the apex of the stems; they are up to 2 inches long, growing as the flowers are developed in fascicles at the apex.

The flowers develop in pairs.

The species was discovered by the author on Mount Longido in Tanganyika Territory, on March 9th, 1939. Fig. 23.

### GENUS HUERNIA.

In this genus the outer corona is sessile, or adnate to the base of the corona, or it is entirely absent. About fifty species are known, most of them from South Africa; they have been sub-divided into five distinct groups.

The two East African species are closely allied to one another, and it has been suggested that they represent varieties of a single species; they belong to group I, the *macrocarpa-brevisrostris* group, in which the inner corona lobes are incumbent on the anthers and not produced above them.

The corolla is ten-pointed, the conventional five lobes being supplemented by five smaller points at the sinuses.

*Huernia aspera* N. E. Brown.

The corolla is campanulate,  $\frac{3}{4}$  inch to 1 inch in diameter, with the pointed lobes bent slightly backwards at the tip. It is about  $\frac{1}{2}$  inch deep. Outside it is a dull greenish-purple, rough with numerous small-pointed papillae. Inside it is uniformly blackish-purple and densely covered with papillae. The outer corona is closely adherent to the corolla, annular, narrow, blackish-purple, and hardly visible. The inner corona has five erect lobes, their tips very slightly upturned and contrasting vividly by their yellowish-orange colour.

The flowers, developed in small fascicles from the stems, as a rule appear successively.

In habit, *Huernia aspera* is decumbent, the trailing stems often reaching a considerable length. Stems 4 feet long and more have been measured. They branch sparsely and irregularly, are five-furrowed, and have very slightly raised angles. The teeth hardly protrude, are pointed, and are crowned with non-persistent rudimentary leaves.

The distribution of *H. aspera* reaches far inland from the coast of Tanganyika and Kenya, including possibly Zanzibar. It occurs in the Bura Area, in the Chyulu Hills, on Emali, and it is common along riverbeds on rocky ground near Nairobi. Fig. 24.

*Huernia keniensis* R. E. Fries.

This species was discovered in 1922, much later than the foregoing by the botanist brothers R. E. and Thomas Fries, at the foot of Mount Kenya. It differs from *H. aspera* by the shorter, thicker and more erect stems, by the larger and deeper corolla, and by the blackish-purple inner corona, which, is, however, very similar in structure to that of the latter.

The size and shape of the corolla seems to vary greatly; in the plant from the type locality the depth of the campanulate corolla is about equal to its diameter, the sides of the tube being nearly parallel. Plants found at the foot of Mount Elgon have a far more spreading corolla, its depth being only half of the diameter across the tips of the lobes. The inner surface of the corolla is covered with papillae which are considerably larger than those of *H. aspera*.

Since its discovery, *H. keniensis* has been collected in other localities, such as Kabarnet, and Mount Elgon, 6,000 feet. Fig. 25.

*Huernia keniensis* var. *nairobiensis* White et Sloane.

This species has a larger and more cone-shaped corolla. The outer surface is more scabrid and the inner surface is covered with very small, closely set, papillae, which give it a velvety appearance. The colour is a rich reddish-purple. This variety is known from the Ngoŋg Hills, 6,000 feet; from Kajiado, 5,300 feet; from the Siybei Gorge, 6,000 feet; and from Baragoi, 2,500 feet. Fig. 26.

#### GENUS *ECHIDNOPSIS*.

This genus of, as the name aptly indicates, "viper-like" Stapeliads, is distributed over Southern Arabia, Socotra, and Tropical and South Africa. Up to 1937, eight species only had been described (see White and Sloane's Monograph on the *Stapelieae*).

To-day we know of five species in East Africa alone, and it is more than likely that this number will be further increased with more intensive collecting.

The *Echidnopsis* are dwarfs among *Stapelieae* not only in growth, but also in the diminutive size of their flowers.

The stems of this genus are decumbent as a rule, although species with erect growth have been found, and the six-angled to thirteen-angled tessellate stems trail snake-like on the ground. The flowers are developed in the grooves of the cylindrical stems, mostly towards the tip, but occasionally at other points along the stems. According to Dr. Brown, the genus cannot be distinguished technically from *Caralluma* by its floral structure, but as all the species are well characterized by their peculiar many-angled tessellate stems, it is more convenient to keep them generically distinct.

*Echidnopsis Virchowii* K. Schum.

The decumbent stems are tessellate, six-angled, up to five lines thick, and 4 inches to 6 inches long. The minute flowers are dull greenish-yellow, dotted with purplish-brown merging into entirely purple-brown towards the apex of the lobes. They are three and a half lines in diameter. The outer corona is cupular, rising to half the height of the corolla, and to the height of the inner corona lobes, which are deltoid and extend horizontally towards the centre, but not beyond the back of the anthers. Characteristic are the cup-shaped pouches formed by the outer corona.

*Echidnopsis Virchowii* was discovered in 1890, by Hildebrandt, near Tanga, in Tanganyika; it is common on Lasa Hill, near Mkomazi, also in Tanganyika.

*Echidnopsis Sharpei* White et Sloane.

This new *Echidnopsis*, small-flowered like all other members of the genus, attracts the eye by the bright ivory-coloured outer corona which is raised above the corolla-disc surrounded by the five slightly recurved, spreading, and dark-crimson corolla lobes.

The diameter of the corolla is just under  $\frac{1}{4}$  inch. The growth is similar to that of *E. Virchowii*, but the tessellate stems are eight-angled, their surface a duller greyish-green.

*Echidnopsis Sharpei* was discovered by H. E. Sharpe in 1937, South of Lake Rudolph. It has been collected since in several localities in Tanaland. Fig. 27.

*Echidnopsis repens* Dyer et Verdoorn.

This little plant is closely allied to the two previously-described species. It has the eight-angled stems of *E. Sharpei*, and the flowers are of the same size. With *E. Virchowii* it shares the cup-shaped corolla. The coronal structure is very near that of *E. Virchowii* from which it differs by having a few long hairs on the outer corona, and by the entire tips of the deltoid inner corona horns.

The plant was discovered by J. Erens, a member of the Pole-Evans Central and East African Expedition, in 1938, near Mount Meru, in Tanganyika.

It has since been collected by C. G. MacArthur on Latema Hill, near Taveta, 3,300 feet; and near Maktau, 3,400 feet; in Kenya Colony.

*Echidnopsis angustiloba* Bruce et Bally.

This species differs from other members of the genus in the erect, eleven-angled to thirteen-angled, much-branched stem; in the profusion of simultaneously developed flowers, and in the narrow, elongated corolla lobes. The many-angled erect stems show affinity to the genus *Trichocaulon*, but the structure of the outer corona excludes it from that genus. The plant is greyish

olive-green in colour; the rudimentary leaves are reddish. The slender corolla lobes are pale lemon-yellow with a greenish tinge, whilst the central portion shows a regular, star-like pattern of dull-maroon. The flat corona is lemon-yellow. The outer corona has an undulate margin, the inner corona lobes are deltoid and their processes are prolonged beyond the anthers and meet in the centre.

*E. angustiloba* was discovered by Mrs. Gwendolyn Copley, near Archer's Post in the Northern Frontier Province, Kenya Colony, in December, 1939.

The illustration shows the type specimen (immature). Fig. 28.

*Echidnopsis* sp. nov. (Bally, S47).

This undescribed species shares the eight-angled, decumbent stems with *E. Sharpei*, from which, when not in flower, it is hardly distinguishable. The floral structure, however, is entirely different.

The corolla is deeply campanulate, showing a slight constriction at the base of the lobes which are narrow, semi-erect, and subequal to the tube.

The tube is reddish-purple, the lobes pale lemon-yellow. The outer corona with two-horned lobes spreads horizontally; the inner corona lobes are semi-erect and their long, filiform horns meet above the raised anthers.

This new species was discovered by Capt. A. T. A. Ritchie, 30 miles west of Garissa, 1,000 feet, in January, 1940. Fig. 29.

*Echidnopsis* sp. nov. (Bally, S49).

This is another undescribed species; it shares the multi-angled, deeply tessellated stems of *E. angustiloba*. The corolla has a nearly spherical tube markedly constricted at the base of the elongated lobes which are slightly longer than the tube and blunt-tipped. The tube is purplish-red, the lobes are lemon-yellow. The outer corona lobes are erect, irregularly dentate and raised to the height of the anthers. The deltoid, inner corona horns are narrow and project above the centre of the corona. It was collected by G. Adamson, on Mount Nyiro, South of Lake Rudolph, in May, 1940. Fig. 30.

With this description we close our survey of the recorded East African *Stapelieae*.

The numerous discoveries of new species made in recent years make it certain, however, that many additions will have to be made before anything like a complete record has been achieved. The author has in cultivation several *Stapeliads* from various parts of Kenya Colony, which have not yet flowered, and which are not included here.

The succulent forms evolved by the order of *Asclepiadaceae* are not limited to the tribe of *Stapelieae*; succulents are found among the interesting genus *Ceropegia*, in the genus *Sarcostemma*, and in *Cynanchum*. These will be dealt with separately at the beginning of Part V of this series.

(TO BE CONTINUED)