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Miscellaneous notes on the flora of Tropical East Africa, including descriptions of new taxa, 23-28.

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This is the seventh paper [1] of a series on the above subject which the author proposes to continue.

23. *Caralluma congestiflora (Asclepiadaceae)*

Caralluma congestiflora Bally spec. nov.

Species affinis *Carallumae priogonii* K. Schum., sed floribus numerosioribus, arte congestis, corolla flavo-viridi, lobis exterioribus coronae longioribus erectis differt.

Planta succulenta multiramosa, praeter corollam admodum glabra, tota inflorescentia computa 28 cm alta. *Radix* fibrosa, radiculis tenuibus. *Rami* heteromorphi, 10-25 e basi orti, usque ad 23 cm longi, 2-2.2 cm diam., quadrangulares, lateribus planis vel tenuiter et late canaliculatis, raro subramosi; pars basalis angulis acutis, dentatis, dentibus adscendentibus, 8-10 mm distantibus, 1-2 mm longis praedita, in dentorum apicibus folia minuta subulata caduca efferens; pars superior florifera multo tenuior, virgata, quadrangularis, 7-11 cm longa, circiter 4 mm diametro lata, in angulis acutis nonnullas *inflorescentias*, 11-15 mm distantes, breviter pedunculatas, subumbellatas, 24 flores aut plures efferens. *Pedunculi* brevissimi, 1-3 in nodo uno orti, usque ad 3 mm longi, carnosi; bractea pedunculi anguste triangularis, apiculata, 5 mm longa, nonnunquam in basi sparse dentata. Bracteae pedicillorum in pedunculi apice arte glomeratae. E pedunculo uno *flores* pedicellati 24, fortasse plures singulatim producti; pedicelli 7-13 mm longi, 1-1.5 mm diam., adscendentes; calycis lobi 5, anguste triangulares, acuti, 2.5 mm longi, in basi 1 mm lati. *Corolla* 5-lobata, rotata; lobi usque ad basin divisi, lanceolati, extus virides, intus flavi, circum basin sparse virido-striati, apiculati, marginibus reflexis, circum apicem antennis paucis (2-5), purpureis, 4 mm longis, terminaliter bulbosulis muniti. *Corona*: admodum glabra et flava; lobi exteriores erecti, alte inter se

[1] Previous papers: *Candollea* **17**: 25, 53, 71. 1959; *l.c.* **18**: 9, 335. 1962-63; *l.c.* **19**: 145. 1964.

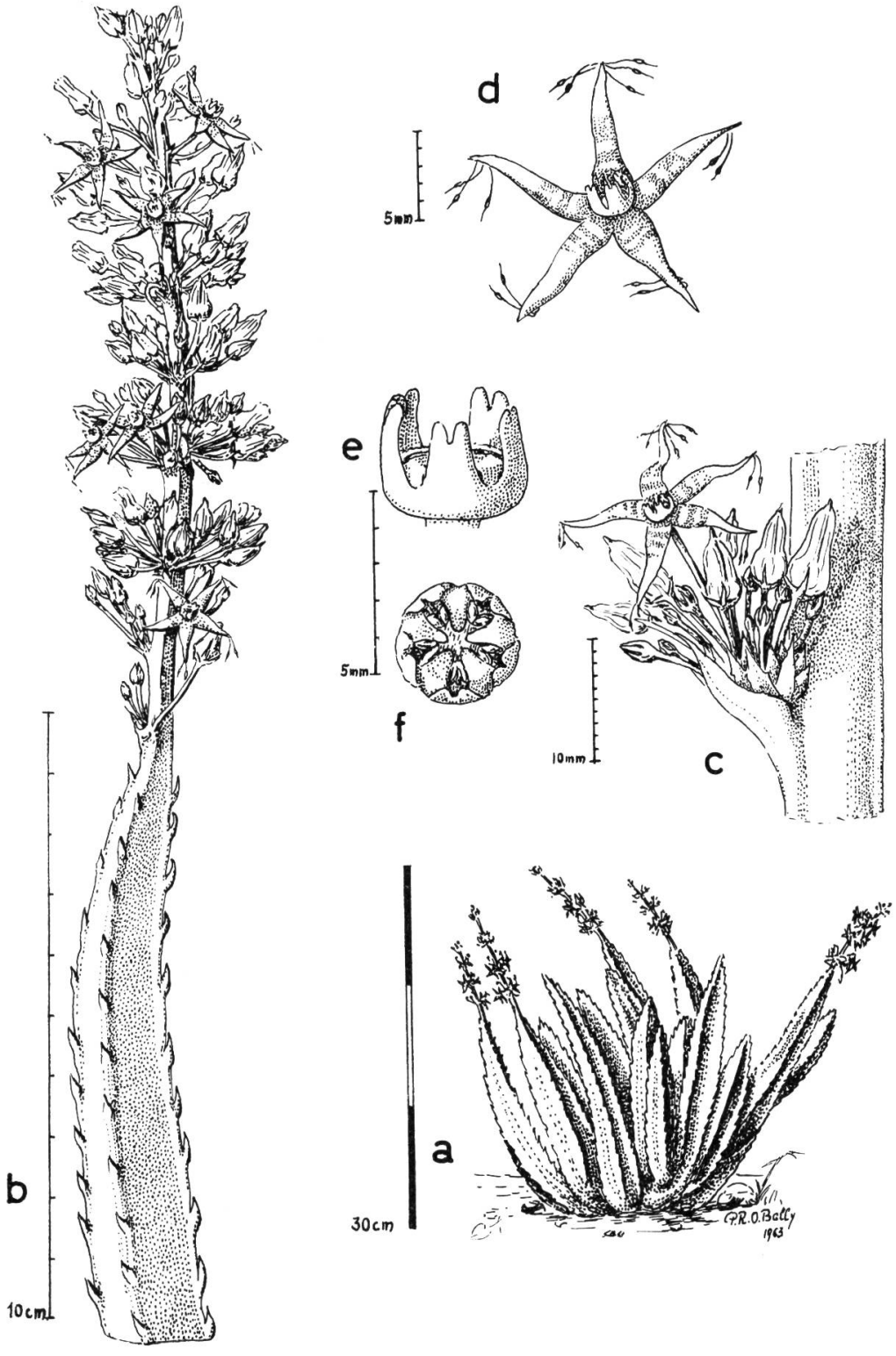

FIG. 1. — *Caralluma congestiflora* Bally spec. nov.

a, mature plant — *b*, flowering stem — *c*, inflorescence — *d*, flower — *e*, corona, side view — *f*, corona, viewed from above (drawing from the type: *B 11996*).

divisi, 2-2.5 mm longi, in apice parum bifidi, obtusi; lobi interiores anguste deltoidei, 1.5-2 mm longi, in inferiore parte erecti, in parte superiore supra gynostegium incumbentes. *Follicula* et *semina* haud visa.

A much-branched, succulent *plant*, glabrous in all parts, including the inflorescence up to 28 cm high. *Root* fibrous with thin, spreading rootlets. *Branches* heteromorphous, 10-25 produced from the base, to 23 cm long, 2-2.2 cm diam., 4-angled, angles acute, toothed, sides flat or more or less deeply channelled; secondary branchlets are occasionally produced; teeth of the basal portion of the branches ascending, 1-2 mm long, 8-10 mm distant, crowned by minute subulate, caducous leaflets. The upper, flowering portion of the branches much thinner, virgate, quadrangular, ca. 4 mm diam., tapering towards the tip, 7-11 cm long. Several subumbellate *inflorescences* disposed along the angles, very shortly pedunculate. *Peduncles* to 3 mm long, very fleshy, 1-3 in each node; peduncular bracts narrowly triangular, apiculate, to 5 mm long, occasionally sparsely serrate at the base; pedicellary bracts densely crowded on the rounded apex of the peduncle. *Flowers* pedicellate, 24 or more produced successively from each peduncle; pedicels 7-13 mm long, 1-1.5 mm thick, ascending. *Calyx* lobes 5, narrowly triangular, acute, 2.5 mm long, 1 mm wide at the base. *Corolla* 5-lobed, rotate, the lobes divided to the base, green outside, yellow with green bars inside, lanceolate; margins reflexed, apically beset with 2-5 purplish vibratile hairs 4 mm long, with a bulbous swelling near their tip. *Corona* glabrous, yellow; outer lobes 5, deeply divided, 2-2.5 mm long, obtusely triangular with shortly bifid tips; inner lobes narrowly deltoid, 1.5-2 mm long, the lower half erect, incumbent with the tips over the staminal column. *Fruits* and *seeds* not seen.

DISTRIBUTION. SOMALI REPUBLIC NORTH: Hargeisa, East of township in shelter of spiny Acacia bushes, on rocky, much eroded soil, 1350 m, 9°36′ N, 44°06′ E, 19. 11. 1954, *Bally B 11996* (holo. K, G); ibid., 27.1.1944, *E. A. Peck in Bally S 130* (photos only).

24. Caralluma huernioides

Caralluma huernioides Bally spec. nov.

Species affinis *Carallumae tubiformi* E. A. Bruce et P. R. O. Bally sed ramis haud erectis, ± decumbentibus, floribus nutantibus, intus papillosis, marginibus haud ciliatis differt.

Planta succulenta admodum glabra. *Caules* crassi, carnosi, erecto-decumbentes, usque ad 12 cm longi, 1.4 cm crassi, obtuse quadrangulares, dentati; dentes 0.5-2.5 cm distantes, acuti, usque ad 10 mm longi, pallide virides, saepe fusco-viride maculati. *Folia* in dentorum apicibus orta, minuta, squamosa, mox decidua. *Flores* 4-6 mm supra dentos pseudo-umbellati (praecipue prope apicem), singulatim nascentes. *Bracteae* minutae, subulatae, geminae, in basi pedicelli ortae, 2-2.5 mm longae. *Pedicellus* teres, usque ad 18 mm longus, 2.5 mm crassus, reflexus, fuscoviridis, sparse rubrostriatus. *Sepala* 5, anguste lanceolata, in apice tenuia, reflexa. *Corolla* campanulata, extus glabra, intus papillata, deorsum aperta; tubus 15 mm longus, ore 16 mm latus; corollae lobi triangulares, 8.5-9 mm longi, in basi 8 mm lati, apice reflexo, acuto; lobi intermedii 1 mm longi, reflexi. *Corona* 5.5 mm longa, 7 mm diametro, admodum glabra; lobi exteriores 5, sacculos rotundatos, 2m m profundos, 2 mm diam., margine integro, formantes, atropurpurei; lobi interiores lanceolato-obovati, infra erecti, gynostegium apicibus conniventibus superantes, pallide flavi. *Follicula* et *semina* haud visa.

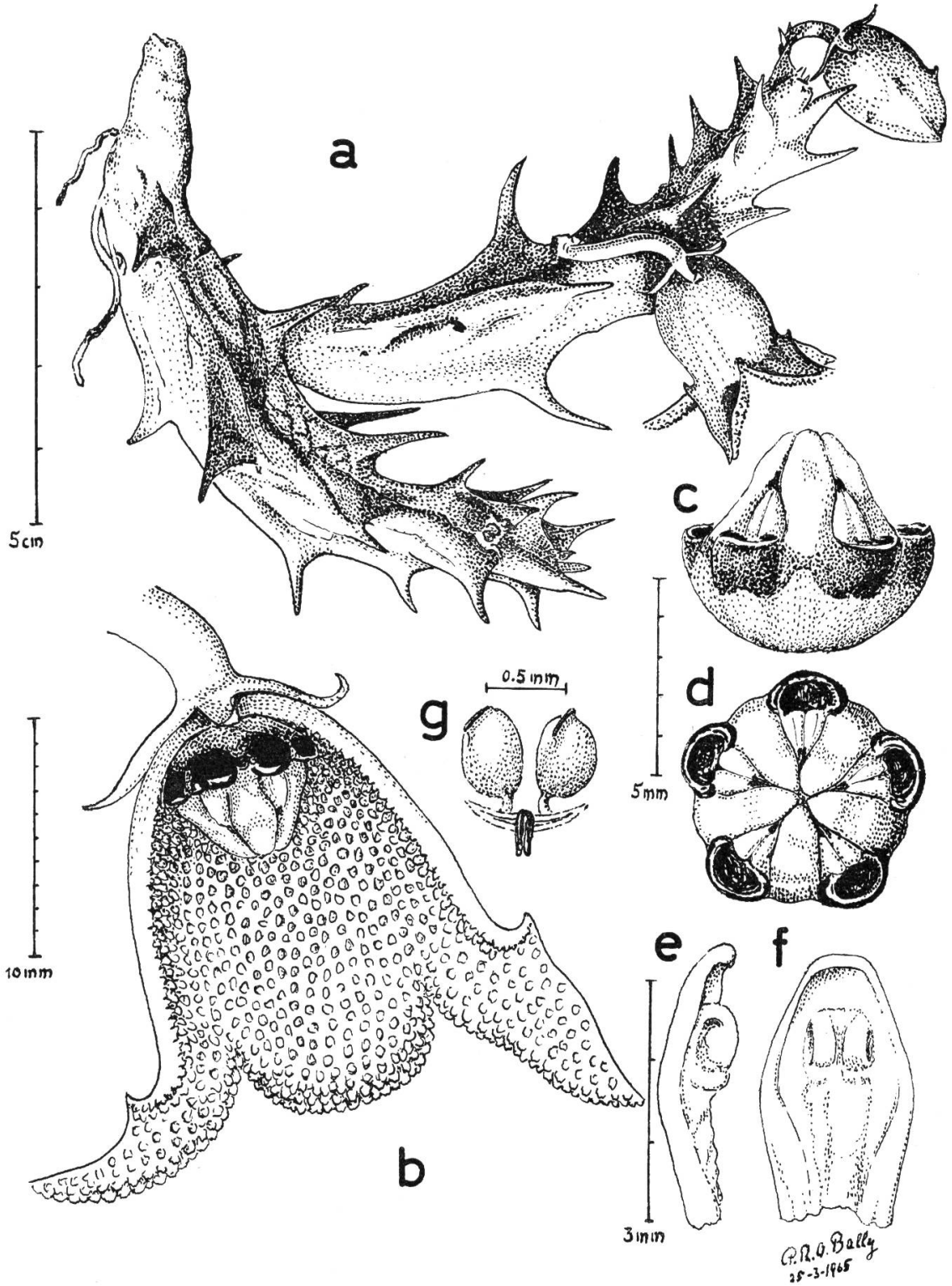

FIG. 2. — *Caralluma huernioides* Bally spec. nov.

a, flowering growth — *b*, flower, cross section — *c*, corona, side-view — *d*, corona, viewed from above — *e*, *f*, inner corona lobe — *g*, pollen carrier with pollen masses (drawing made from the type: *B 11166*)

A dwarf succulent of a prostrate or semi-erect habit. *Stems* about 12 cm long, 1.4 cm thick, obtusely 4-angled. Along the angles fleshy teeth, 0.5-2.5 cm distant, to 10 mm long, horizontal or ascending, tapering to a slender tip, 4 mm wide at the base; all fleshy parts pale green, sometimes mottled with dark green, turning to purplish maroon. *Leaves* not seen, presumably scale-like, soon deciduous. *Flowers* produced 4-6 mm above the teeth, 3-7 produced successively from each growing point, mainly towards the apex of the stems. *Bracts* subulate, 2-2.5 mm long. *Pedicel* to 18 mm long, 2.5 mm thick, reflexed, pale green with longitudinal maroon markings. *Sepals* 5, narrowly lanceolate with reflexed, filiform tips, glabrous, green. *Corolla* campanulate, turned downwards, limb 15 mm long, 16 mm wide at the throat, glabrous, pale green with sparse longitudinal green or maroon markings outside, yellow, beset with reddish brown papillae inside, the latter merging into each other at the bottom of the throat to form a star-shaped pattern. Lobes 5, broadly triangular, 8.5-9 mm long, 8 mm wide at the base, in colouring and texture the same as the tube. Intermediate lobes 1 mm long, reflexed, acute. *Corona* 7 mm diam., 5.5 mm high, glabrous, shiny; outer corona-lobes dark crimson, forming 5 pouches with entire margins, 2 mm deep, 2 mm diam.; inner lobes lanceolate-obovate, 1.3 mm wide in the middle, 3.5 mm long, erect at the base, connivent over the staminal column with their tips. Pollen-masses ellipsoid, each with a short, sharp crest at the apex, shortly pedicellate on the wing-like appendage of the pollen-carrier.

DISTRIBUTION: (one locality only known) SOMALI REPUBLIC NORTH, southern foothills of the Al Madu Range, N of Domo, on a much eroded exposed rocky slope, almost bare of vegetation, 1250 m, 10°45′ N, 48°44′ E, 17. 10. 1956, *Bally B 11166* (holo. (formalin) G, iso. K).

The nearest affinities of the new species are *C. sacculata* N. E. Br. and *C. tubiformis* Bruce et Bally with which it shares the slender-toothed stems, the considerable length of the corolla-tube and the characteristic pouches formed by the outer corona-lobes. It is distinct by the more widely bell-shaped corolla which opens downwards as with *Huernia keniensis* R. E. Fries; reminiscent of *Huernia* are also the small but quite distinct intermediate corolla lobes, and the uniformly papillate inner surface of the tube and the lobes. In *C. sacculata* and in *C. tubiformis*, its nearest affinities, small intermediate lobes are also present; though not mentioned in the descriptions they are plainly visible in the type specimens.

25. Caralluma moniliformis

Caralluma moniliformis Bally spec. nov.

Species affinis *Carallumae subulatae* Decne. sed ramis floriferis cylindricis, moniliformibus, coronae lobis exterioribus minutis indivisis distinguitur.

Planta succulenta, sparse ramosa, subaphylla. *Caulis* usque ad 14 cm altus, supra basin sparse ramosus, ramis articulatis, adscendentibus, in cauli brevioribus, obtuse quadrangularibus, ad 20 mm crassis, angulis dentatis. *Dentes* 2 mm longi, apicibus sursum flexis, obtusi; dentes et anguli rubroviolacei, lateribus inter angulos glaucoviridibus. *Folia* minutissima, squamosa, caduca, ramorum apices versus producta. *Caules floriferi* in basi tetragoni, 2 cm crassi, dentati, supra attenuatissimi, cylindrici, usque ad 22 cm longi, circiter 4 mm diam., in segmentis 6-8 mm longis constricti, glabri, glaucovirides, minute atrorubre maculati.

Inflorescentia subumbellata. *Flores* 2-3, in segmentis apicalibus singulatim producti. *Bracteae* subulatae, glabrae, 1.6 mm longae, solitariae in pedicellorum basi. Pedicellus usque ad 4.2 mm longus, filiformis, rubescens, capite incrassato. *Calyx* 5-lobatus; lobi triangulares, acuti, 1.2 mm longi, in basi 0.4 mm lati, corollae tubo adpressi. *Corolla* nutans; tubus breviter cupularis, 1.3 mm longus, 2 mm in diam. latus, intus atropurpureus, extus glauco-viridis, rubromaculatus. *Lobi* penduli, anguste triangulares, in basi subcordati, apicibus acutis conniventes, nec cohaerentes, 6 mm longi, 2 mm lati, extus obtuse carinati, marginibus setosis, setis 0.4-2 mm longis. *Corona* tubum superans, 3 mm longa, 2.2 mm diam., glabra. *Lobi* exteriores 5, triangulares, acuti, erecti vel supra gynostegium parum incumbentes, albescentes, 0.5×0.5 mm magni; lobi interiores anguste oblongi, in parte inferiore supra gynostegium conniventes, deinde erecti, 2.5 mm longi, 0.5 mm lati, atropurpurei, apice obtusi. *Follicula* et *semina* haud visa.

A sparsely branched, leafless succulent; *stems* and branches erect-ascending, obtusely quadrangular, toothed along the angles; main stem 10-14 cm high, 20 mm thick, sterile branches somewhat shorter; teeth 2-4 mm long with obtuse, upcurved tips. *Teeth* and angles dark purplish, sides of the stems between the angles glaucous green. *Leaves* minute, scale-like, produced only on the growing tips of stems and branches, caducous. *Flowering stems* heteromorphous, 22 cm long or more, lower part 4-angled, thickly fleshy, upper part cylindrical in cross section, about 4 mm diam., with regular constrictions at intervals of 6-8 mm, glabrous, glaucous green, densely dotted with minute purple spots. *Inflorescence* few-flowered, subumbellate, the flowers produced in succession in the apical constrictions of the flowering stem; only one or two umbels of 2-3 *flowers* each are produced simultaneously. *Bracts* subulate, 1.6 mm long, solitary at the base of each pedicel; peduncle absent; pedicels ca. 4.2 mm long, filiform, thickened at the tip, sepals 1.2 mm long, 0.4 mm wide at the base, triangular, acute. *Corolla*: tube cupular, 1.3 mm long, 2 mm diam., dark purplish maroon inside, glaucous green with purple markings outside, glabrous. *Lobes* narrowly triangular, deep purplish red inside, glaucous green with maroon dots outside, 6 mm long, 215 mm wide at the cordate base, longitudinally replicate, with a slightly prominent midrib, diverging with the tips curved inwards and connivent but not coherent; margins beset with numerous stiff spreading purple hairs 0.4-2 mm long, the longest towards the acute apex. *Corona*: exceeding the tube and attaining about half the length of the corolla lobes, 3 mm long, 2.2 mm diam., glabrous. Outer corona lobes erect or slightly inflexed, broadly ovate-triangular, 0.5 mm long and wide, greenish white, equalling the staminal column; inner lobes narrowly oblong, 2.5 mm long, 0.5 mm wide, incumbent over the staminal column with their basal half, connivent-erect in the upper half, apex obtuse. *Follicles* and *seeds* not seen.

DISTRIBUTION. SOMALI REPUBLIC NORTH: Eastern Al Madu Range, at Agasur (Sufli), on a rocky slope in the shelter of bushes in association with *Buxus hildebrandtii*, *Rhus somalensis*, *Ormocarpum coeruleum*, *Bauhinia somalensis*, *Euphorbia balsamifera*, *Trematospora cordatum*, 1600 m, 10°51′ N, 48°54′ E, 10. 10. 1956, *Bally 11018* (holo. G); precise locality unknown, collector unknown, John Lawrie, Pretoria cult., N° 557, received 22. 2. 1959 through John Lawrie, Hargeisa.

With its elongate-attenuate flowering stems this species belongs to the Section *Eucaralluma* K. Schum.; the few-flowered umbels and pendulous, ciliate flowers are strongly reminiscent of *Caralluma subulata* Decne. from which it is easily distinguished by the cylindrical constricted flowering stem resembling a string of beads (moniliformis). Another distinction which separates it from all other known species of *Eucaralluma* resides in the simple deltoid outer corona lobes.

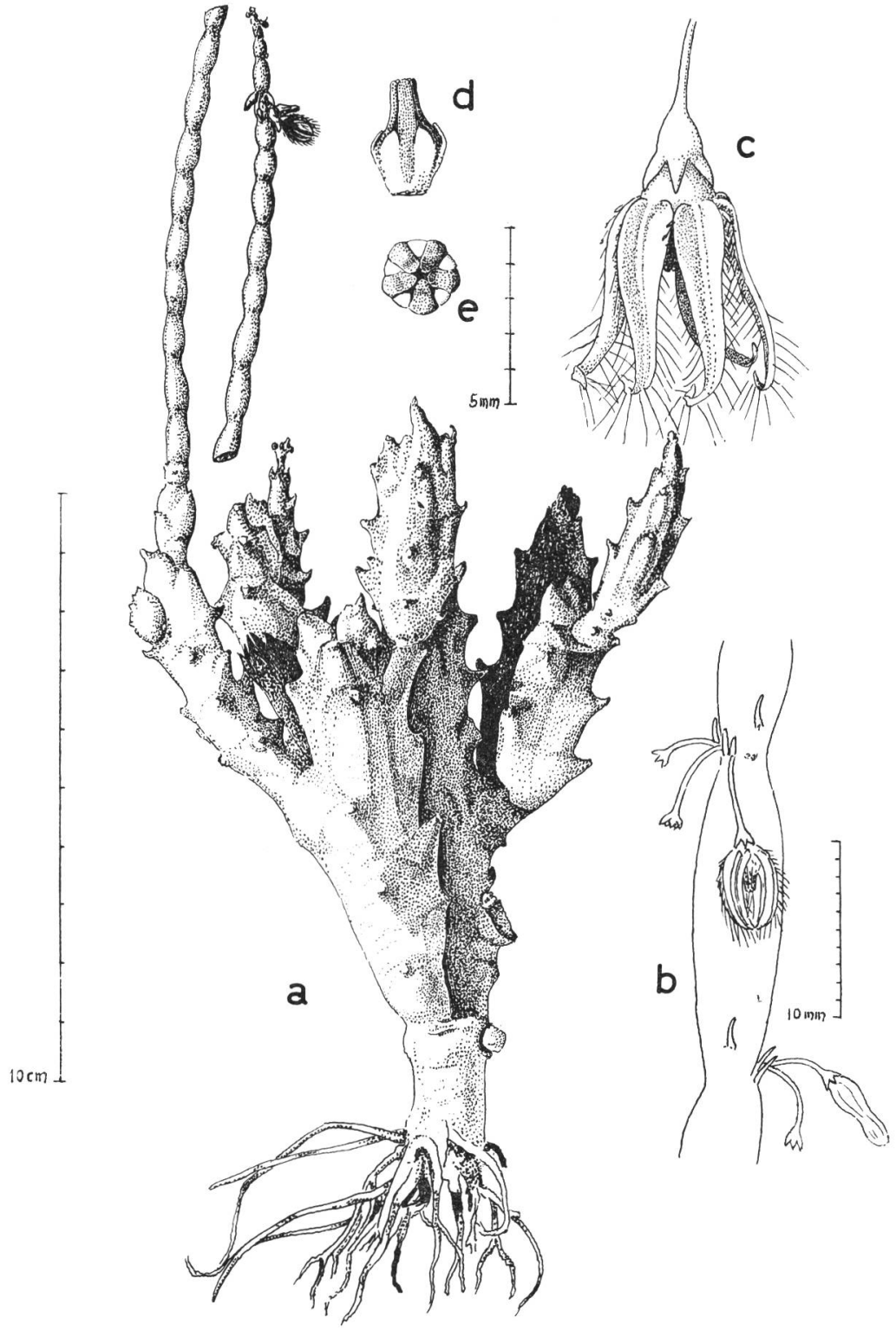

FIG. 3. — *Caralluma moniliformis* Bally spec. nov.

a, whole flowering plant — *b*, section of stem with inflorescences — *c*, mature flower — *d*, corona, side view — *e*, corona, seen from above (*a*, made from the type: *B 11018* — *b*, *c*, *d*, *e*, made from *John Lavranos* (Pretoria) *557*).

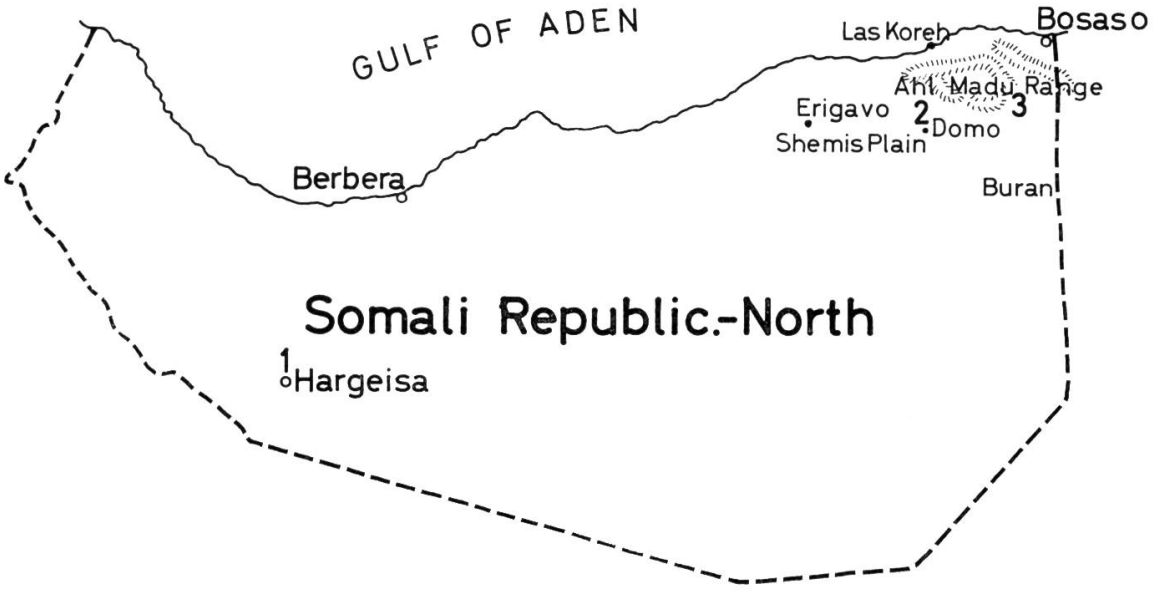

FIG. 4. — The localities of:
1: *Caralluma congestiflora*; 2: *Caralluma huernioides*; 3: *Caralluma moniliformis*

The identity of Ceropegia nilotica Kotschy

In his "Revision der afrikanischen Arten der Gattung *Ceropegia*" (*Engl. Jahrb.* **70**: 202. 1939) E. WERDERMANN put *Ceropegia brownii* Ledger in synonymy with *C. nilotica*. Commenting on this decision, he admitted that he had at his disposal only an immature flower of *C. brownii* from the type specimen to compare with *C. nilotica*; while conceding that the corolla lobes of the latter are slightly shorter WERDERMANN refrained from commenting on the difference in their respective shape, no doubt because he considered a comparison of the immature lobes of the one with the mature lobes of the other inconclusive. He merely remarked on the similarity of the colour pattern which he found to agree also with specimens obtained from a plant in cultivation in the Berlin Botanical Garden as *C. mozambicensis* but which in his opinion was *C. nilotica*.

WERDERMANN overlooked two significant characters, clearly stated in the original descriptions, which distinguish the two species:

C. nilotica: Corolla lobes deltoid, coherent at their tips only, margins beset with pilose hairs.

C. brownii: Corolla lobes deltoid at the base, linear above, erect-connivent, pilose, with very long clavate vibratile hairs at the apex.

Fig. 1, drawn by the present writer from the type material illustrates these differences more clearly than words can convey.

They are moreover sufficiently important as well as constant over a large part of Tropical East Africa to justify the resurrection of *Ceropegia brownii* as specifically distinct from *C. nilotica*.

However, WERDERMANN's pronouncement of its identity with the latter was generally accepted at the time, partly no doubt because the type of *C. nilotica* was represented by one single specimen only in the Herbarium of Vienna, while *C. brownii* was cultivated and propagated in several botanical gardens; its triangular-linear, erect-connivent lobes with their apical tuft of long, clavate vibratile hairs were thus accepted as characteristic for *C. nilotica* by subsequent authors although they do not appear in KOTSCHY's description of the species.

To give an example: In her description of *Ceropegia plicata* from Louis Creek, Barberton, Transvaal in *Fl. Pl. S. Africa* **17**: 675. 1937, Miss E. A. BRUCE quotes its affinity with *C. nilotica* in name only, while investing the latter with characters which are distinctive for *C. brownii*, such as the narrower corolla lobes and the clavate, vibratile hairs. A comparison of *C. plicata* E. A. Bruce with the type of *C. nilotica* shows their obvious identity.

The present writer fell into the same error when he published an account of East African Ceropegias in *Cactus* **52**: 132-133, Paris, April 1957, where he gave descriptions and illustrations of *C. brownii* under the name of *C. nilotica* and of *C. mozambicensis.*

H. HUBER's " Revision der Gattung *Ceropegia* ", *Mem. Soc. Brot.* **12** (1957) 1958 perpetuates WERDERMANN's erroneous conclusion which he too accepts uncritically. He confuses the issue still further by making *C. plicata* a variety, while accepting *C. brownii* as identical with *C. nilotica* Kotschy. Yet he recognizes correctly the identity of *C. constricta* N. E. Br., *C. boussingaultifolia* Dinter and of *C. mozambicensis* Schlt. with *C. nilotica.*

KOTSCHY states in his description of *C. nilotica* that the dried stems are 4-angled. This character is peculiar to this species although not always very pronounced; SCHLECHTER overlooked it in his description of *C. mozambicensis*, for in his specimen the stems were almost terete.

Along the Kenya-and Tanzania coasts the plant is wide-spread and shows considerable variation in length and width of the tube and corolla lobes, but they always agree with KOTSCHY's description as to their shape; they cannot be confused with those of *C. brownii.*

On the Mombasa-Voi road near Samburu Professor W. RAUH of Heidelberg discovered a specimen in which the 4-angled stem is so sharply pronounced and besides distinctly segmented that at first glance it appeared to be a new species *(Rauh Ke 864).* It is however nothing but an extreme local form of *C. nilotica* as evidenced by the flower.

In *C. plicata* segmented stems are also present, though they are described as terete or cylindrical.

Building further on the erronuous conception of the identity of *C. nilotica* Huber sinks *C. denticulata* K. Schum. into this species as its var. *simplex*, together with a heterogenous group of other species which are not discussed in this paper as they do not occur in East Africa.

In *C. denticulata* we find corolla lobes exactly as we have seen in *C. brownii*, i.e. deltoid at the base, linear above, with long, clavate vibratile hairs at their tip; the corona is identical. The base of the corolla lacks however the constriction which is typical for *nilotica* as well as for *C. brownii.*

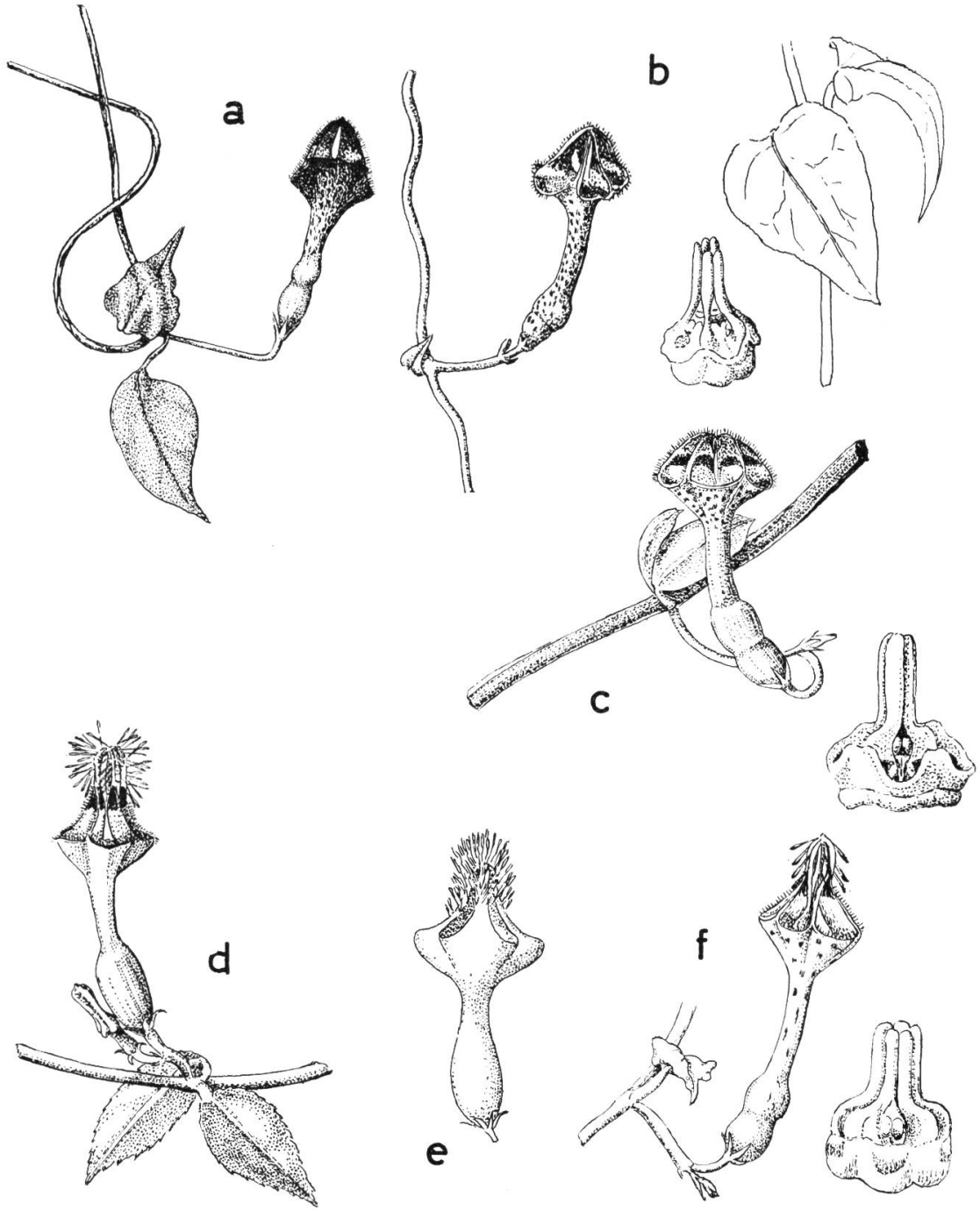

FIG. 5

a, *Ceropegia nilotica* Kotschy, drawing from the type : Sudan, Gondokoro, 4°52′ N, 31°40′ E, *Knoblecher 35* — *b*, *Ceropegia plicata* E. A. Bruce, from a drawing in *Fl. Pl. S. Afr.* **17** : 675. 1937, S Africa, Natal, Minden valley near Greytown, 30°12′ S, 31°40′ E, *Crownwright 16* — *c*, *Ceropegia nilotica* Kotschy, conform with *C. mozambicensis*, drawing made from a living plant, Tanzania, Handeni Distr. Kideleka Rock, *Bally S 182* — *d*, *Ceropegia denticulata* K. Schum., drawing made from a living plant : Kenya, Nairobi Distr., Kirichwa ndogo valley, 1°15′ S, 36°47′ E, *Bally S 45* — *e*, *Ceropegia denticulata* K. Schum., simplified drawing from *Engl. Pflanzenw. Ost-Afr.* tab. 100 : 327. 1895, after the type : Tanzania, Eastern Usambaras, Silai, *Holst 3583* — *f*, *Ceropegia denticulata* K. Schum, var. *brownii* (Ledger) Bally, drawing from the type, with permission of the Kew Herbarium Uganda, Mabira Forest, *E. Brown 466*.

At this stage of our knowledge of the genus the significance of a simple versus a constricted corolla-base for specific distinction is difficult to assess, but in all other respects *C. denticulata* and *C. brownii* are far more closely related to each other than they are to *C. nilotica.*

In view of the foregoing it is recommended that *C. denticulata* K. Schum., should be maintained as a distinct species and *C. brownii* as its closest affinity or variety of the former.

Ceropegia seticorona E. A. Bruce and an undescribed variety

This East African species was described by the late Miss EILEEN BRUCE in the *Cactus & Succulent Journal of America* **13**; 181. 1941. It was put into synonymy with *Ceropegia volubilis* N. E. Br. by H. HUBER in his " Revision der Gattung *Ceropegia* ", published in *Mem. Soc. Brot.* **12**: 99. 1957.

After a thorough examination of the type material of both species and of other herbarium sheets in Kew, Geneva and Nairobi, I am unable to agree with HUBER's conclusion; I see no alternative but to maintain *C. seticorona* as a valid species.

It would seem that HUBER himself was not entirely happy about this synonymy, for in the Appendix to his book on page 200 we find that he qualifies the synonymy of the East African plants as var. *crassicaulis.*

In publishing the new varietal name he disregards a taxonomic convention, for he selects *Milne-Redhead & Taylor 7151* as the " typus varietatis " without giving a valid description of this particular gathering; he identifies it uncritically with *Bally 7319* on which Miss BRUCE's description of *C. seticorona* is based. *M. R. & T. 7151* however, differs considerably from the original *C. seticorona* and does not fit its description; HUBER's *C. volubilis* var. *crassicaulis* must therefore be considered a " nomen nudum ".

Following HUBER further we find that he relates *C. seticorona* (under the new epithet of *C. volubilis* var. *crassicaulis*) justifiably with *C. carnosa* E. Mey. and *C. setifera* Schltr. all of which he includes in his Section *Phalaena* under Series *aristolochoides.*

N. E. BROWN's original *C. volubilis*, an Angolan species, based on *Welwitsch* N° *4272* is however in no way related to this group, as evidenced on the comparative table and illustrations on pp. 25-29.

HUBER's inconsistency becomes apparent on an herbarium sheet in Geneva: It bears *Welwitsch*'s N° *4270*, and though previously identified as *C. leucotaenia* it is identical in every respect with the type of *C. volubilis (Welwitsch 4272).* When HUBER examined the sheet in Geneva in 1955 he recognized its identity and changed the name into *C. volubilis.*

Yet, on consulting his " Revision " one discovers with surprise on page 163 that *Welwitsch 4270* is shown as *Ceropegia abyssinica* Decne., synonymized with that species as *C. leucotaenia.* As *C. abyssinica* belongs to HUBER's Section Laguncula we are faced with the conundrum of two specifically identical gatherings of *Welwitsch*'s, *4270* and *4272* (both figured on p. 29) shown in HUBER's " Revision " not only under two specific names, but in two distinct Sections.

It emerges from the above confusion that *Milne-Redhead & Taylor's N° 7151* has remained undescribed. While it is not, as we have seen, related to *C. volubilis* it has a close affinity with *C. seticorona*: It has the same glaucous-green fleshy leaves and stems; the coronas of both plants are identical. It differs from the type by the more widely inflated base, the wider throat and the longer and wider lobes of its corolla. Besides, both plants occur in Tropical East Africa.

The new variety is described hereunder as:

Ceropegia seticorona E. A. Bruce, var. **dilatiloba** Bally

Ab typo corollae basi latiori, lobis longioribus, latioribus, marginibus saepe setulosis differt. (fig. 8)

Typus: Kenya, Southern Prov., Kajiado Distr., Namanga, 1953, *E. Milne-Redhead & P. Taylor 7151* (holo K, syn. G).

DISTRIBUTION:

(a) var. *seticorona*. KENYA: S Prov., Kajiado Distr., Namanga, 1100 m, 2°33′ S, 36°48′ E, 8. 4. 1938, *P. R. O. & Joy Bally in CM 7319* (holo. K); Nyiro Desert, 1220 m, 2°24′ S, 37°32′ E, 10. 10. 1952, *Bally 8929* (S 183); Machakos Distr. Kibwezi, 920 m, 2°25′ S, 37°57′ E, 1943, *C. G. Mac Arthur* in Bally *S 120*; Kitui Distr., 2 miles S of Magongo Hill, 6 miles E of Zombi, 750 m, 1°26′ S, 38°21′ E, 7. 8. 1961, *P. G. Archer 385*; Ngiga, 30. 9. 1956, *J. H. Padwa 457*. CONGO: S of Ruwenzori, Kasindi, 1000 m, 0°4′ N, 29°41′ E, 1939, *Joy Bally s.n.* TANGANYIKA: North. Prov., Masai Distr., Engaruka, 1100 m, 2°58′ S, 35°58′ E, 9. 7. 1956, *Bally 10668*.

(b) var. *dilatiloba* Bally. KENYA: S Prov., Kajiado Distr., 4 miles S of Kajiado, 1600 m, 1°54′ S, 36°47′ E, 1. 11. 1955, *Milne-Redhead & Taylor 7151* (holo. K); Marble-Quarry road (near type locality) 1500 m, 27. 11. 1960, *P. G. Archer 387*; Narok Distr., Ngong Hills, Western foot, 1700 m, 1°26′ S, 36°37′ E, 20. 3. 1957, *P. J. Greenway* in Bally *11433*; base of Ol Esakut Mountain, 1600 m, 1°32′ S, 36°34′ E, 10. 5. 1963, *P. G. Archer 388*; Coast Prov., Likoni S of Mombasa, 4°05′ S, 39°40′ E, Nov. 1957, *P. G. Archer* in Bally *S 245*; Malindi Distr., no precise locality, 3°13′ S, 40°05′ E appr., May 1959, *S. Rawlins 639*. UGANDA: *John Wilson 1250*: Turkana Escarpment, 2°25′ N, 34°57′ E, *John Wilson 1488*.

The table 1 and the adjoining illustrations show clearly that *C. seticorona* and its var. *dilatiloba* are distinct from *C. volubilis* through:

(1) their succulence
(2) the much longer peduncles
(3) the many-flowered cymes
(4) the irregularly shaped corolla lobes
(5) the absence of clavate hairs
(6) the entirely different structure of the corona.

	C. volubilis	*C. seticorona* var. *seticorona*	*C. seticorona* var. *dilatiloba*
Vegetative parts	herbaceous	succulent	succulent
Inflorescence	few-flowered (2-4)	many flowered (12-30)	many flowered (4-12)
Peduncle	shorter or as long as the pedicels (1.7-2.15 cm)	considerably longer, often several times the length of the pedicels (2.5-7.5 cm)	
Corolla a) base	slightly inflated		much inflated
b) throat	slightly inflated		much inflated
c) lobes	margins parallel	narrowed in the middle	widened in the middle
	margins densely beset with clavate hairs	margins glabrous	margins glabrous or sometimes beset with short, thin, ciliate hairs
Corona	outer lobes shallowly divided obtusely bifid, exceeding the staminal column throughout and forming an evenly crenate margin, beset with numerous short undulate hairs	outer lobes deeply divided, to well below the top of the staminal column, acutely bifid, forming a sharply incised margin, each acute lobe-tip terminating in a single long stiff bristle, otherwise glabrous	
	Inner lobes broadened in their upper half	Inner lobes linear	Inner lobes linear

Table 1. — A comparison of the distinguishing characters of *Ceropegia volubilis*, *C. seticorona* and its variety *dilatiloba*.

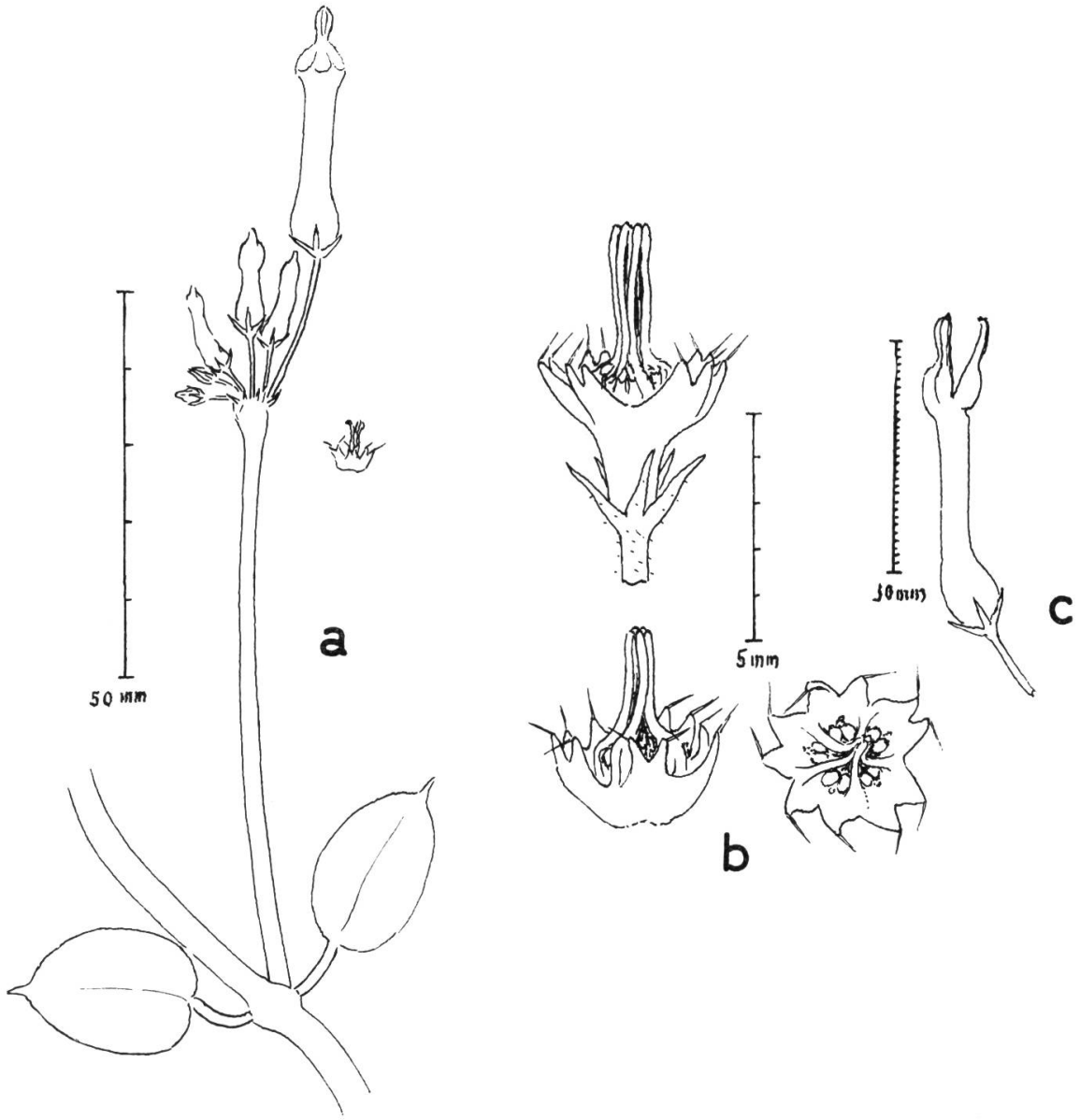

FIG. 6. — *Ceropegia seticorona* E. A. Bruce

a, reconstruction from E. A. Bruce's description — *b*, aspects of the corona — *c*, corolla.

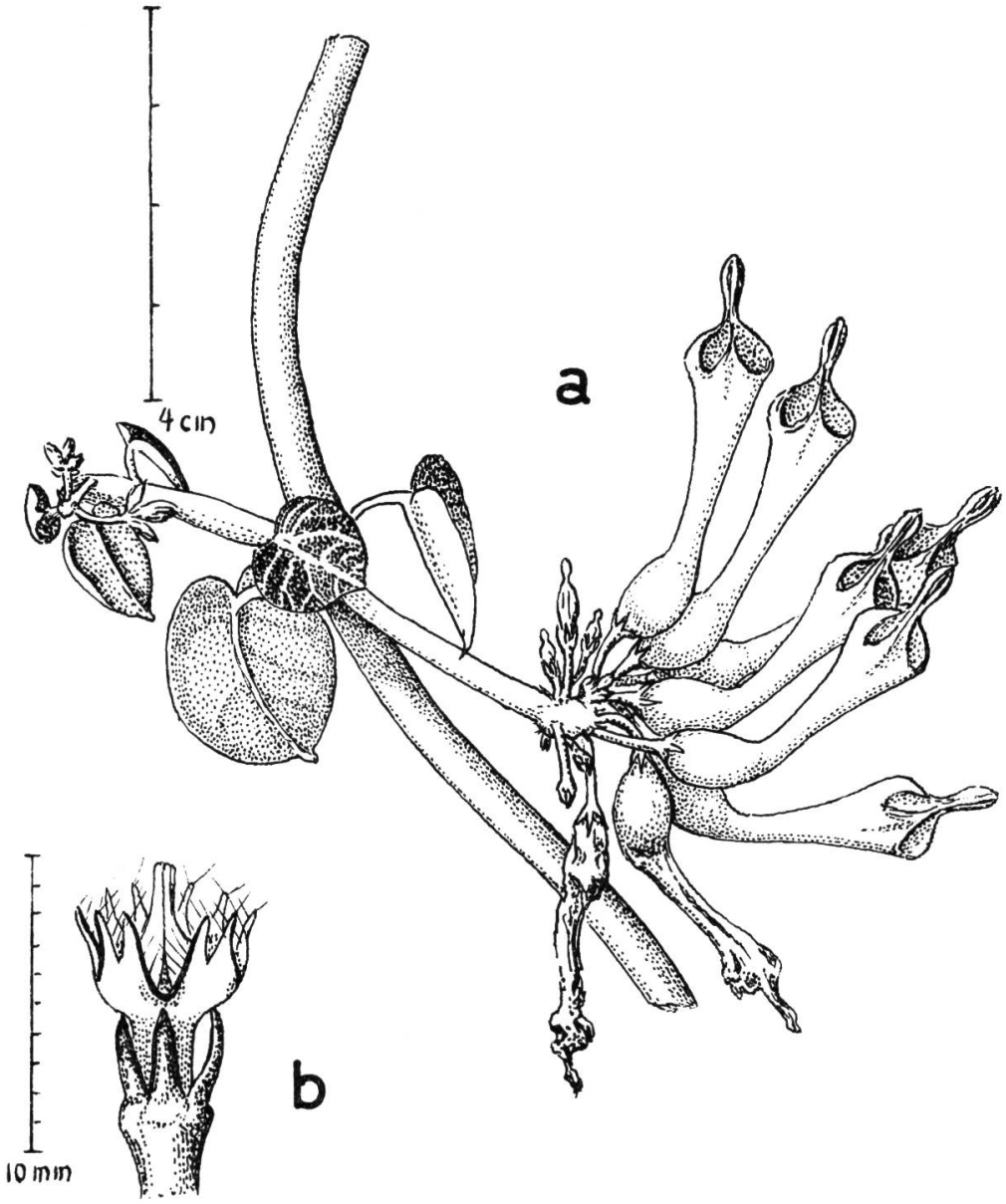

FIG. 7. — *Ceropegia seticorona* E. A. Bruce var. *seticorona*
a, flowering growth — *b*, calyx and corona (drawing from *Bally S 120*).

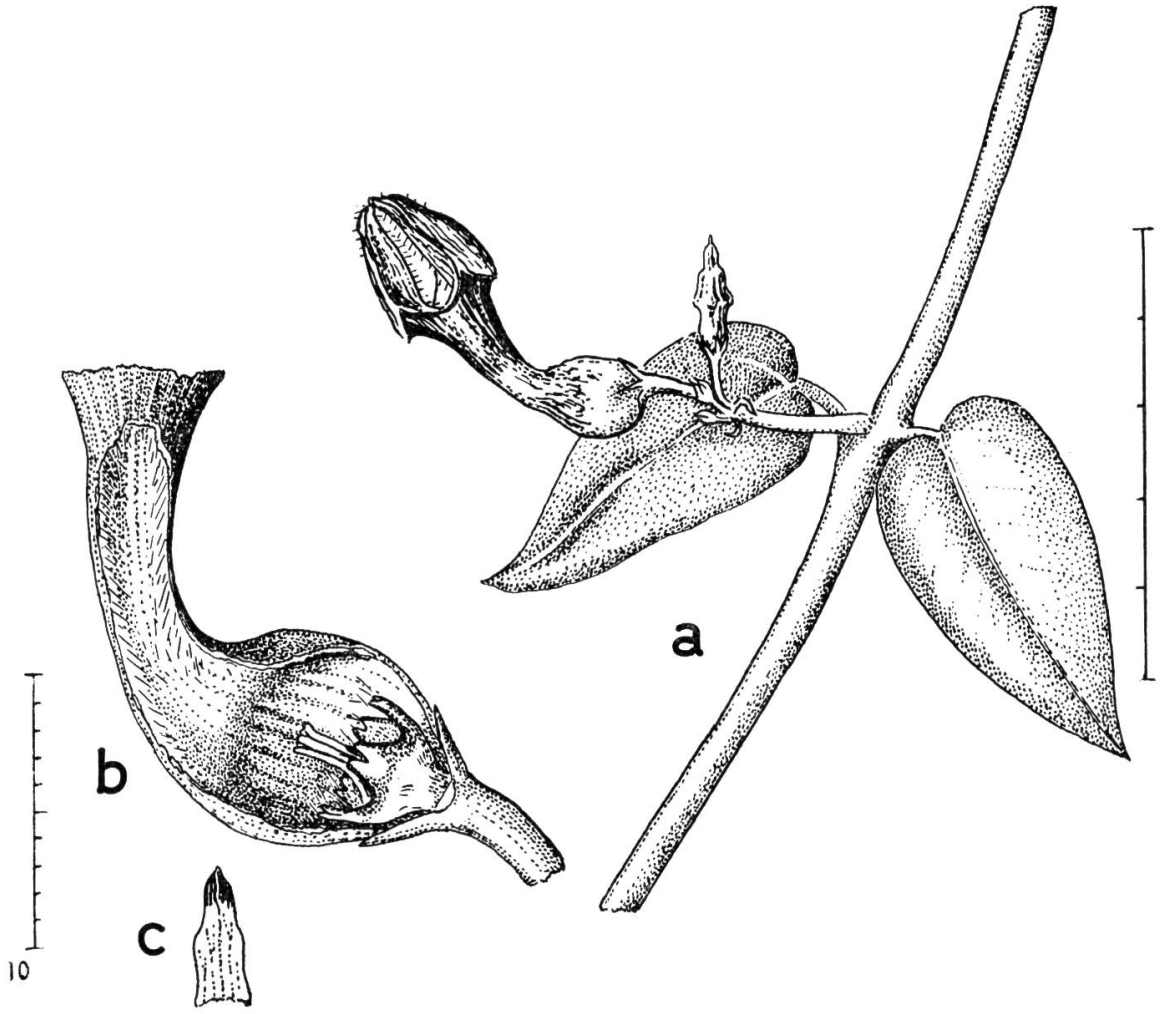

FIG. 8. — *Ceropegia seticorona* E. A. Bruce var. *dilatiloba* Bally

a, flowering stem — *b*, corolla with tube cut open — *c*, corolla-lobe (drawing from the type: *Milne-Redhead & Taylor 7151*).

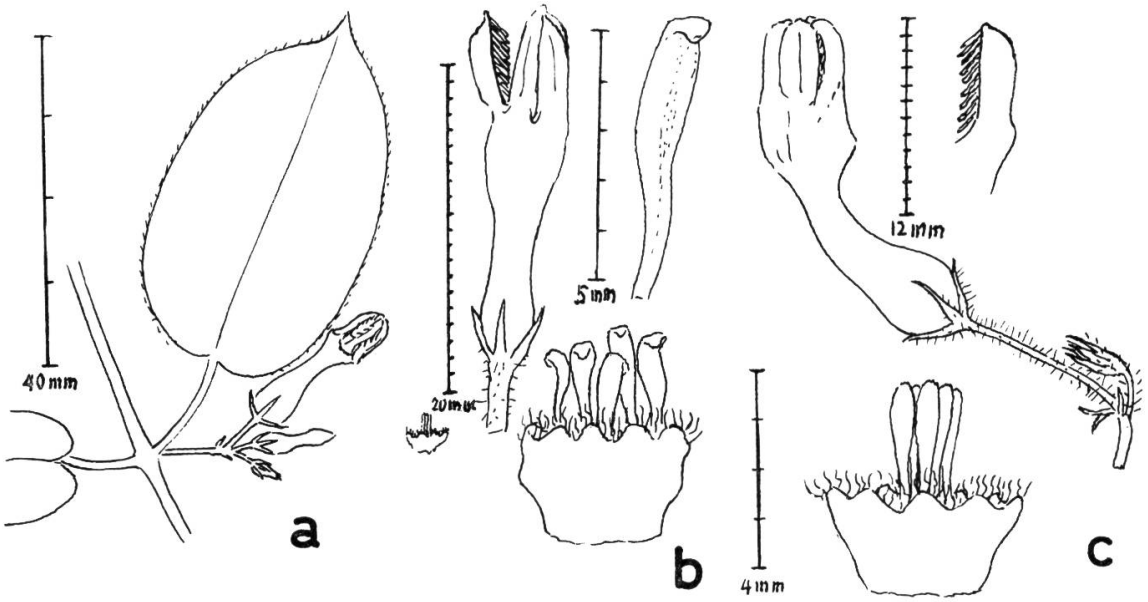

FIG. 9. — *Ceropegia volubilis* N. E. Bruce

a, reconstruction from N. E. Brown's description — *b*, corolla and corona of *Welwitsch 4270* — *c*, corolla and corona of the type: *Welwitsch 4272*.

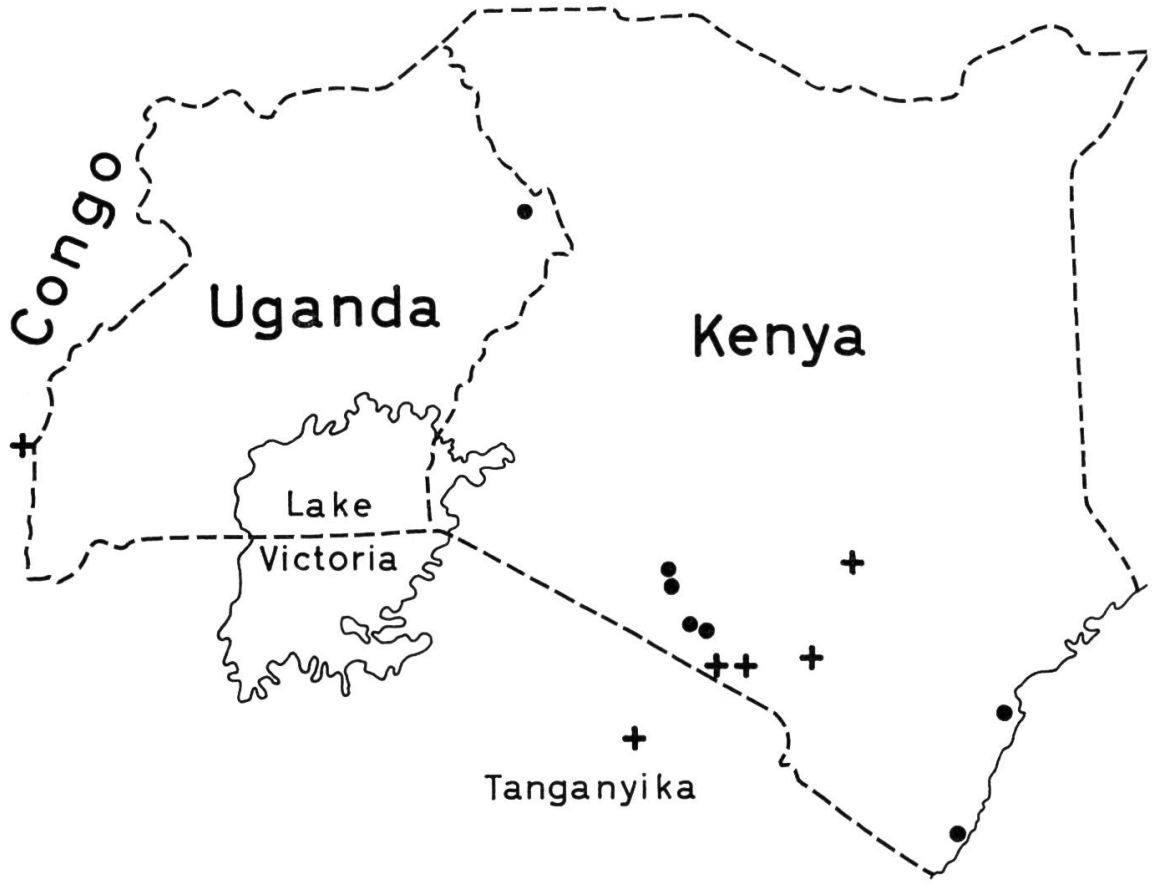

FIG. 10. — Distribution of *Ceropegia seticorona* and of its var. *dilatiloba*
+ = *C. seticorona*; ● = var. *dilatiloba*.

Euphorbia balsamifera Ait. in Arabia and in Tropical East Africa

Euphorbia balsamifera was first mentioned and briefly described by W. AITON in *Hortus Kewensis* **2**: 137. 1789, based on a plant from the Canary Islands and cultivated in Kew Gardens since 1779.

Almost 100 years later, in the spring 1886, A. DEFLERS undertook his second botanical exploration in Southern Arabia on behalf of the Musée d'Histoire Naturelle in Paris; near Aden he discovered a plant which he considered to be a new species and subsequently described it as *Euphorbia adenensis* (*Bull. Soc. Bot. France* **34**: 67. 1887). Although DEFLERS placed it into De Candolle's Section Tithymalus § Pachycladae to which *E. balsamifera* belongs and is more fully described he failed to recognize their similarity.

Possibly it did not occur to him to compare his plant with one from so distant a habitat, with the entire width of the African Continent stretching between them.

In 1942, I received a specimen from *Major E. Peck*, Burao, who had collected it in the Erigavo District of the Somaliland Protectorate.

In the subsequent years I had the opportunity to collect it myself and to study it in the field in different parts of Somaliland.

I identified it as *Euphorbia balsamifera*, though with some hesitation, for the Somaliland plants show a more compact growth and bear shorter and more glaucous leaves than the specimens from the Canary Islands which one sees in cultivation in many botanical gardens. These differences remained unchanged even after I had kept both plants in cultivation in my garden in Nairobi for several years.

The study of the Somaliland flora leads sooner or later to its links with the neighbouring Arabia, and thus the identity of the Somaliland plant with *Euphorbia adenensis* Defl. was soon established.

It remained now to search for distinctive characters between *E. adenensis* and *E. balsamifera*.

In DE CANDOLLE'S description the leaves of *E. balsamifera* are linear-lanceolate, the capsule is pubescent, the styles are divided to the base, the seed is ovoid; these characters agree in every detail with the Plate in WEBB & BERTHELOT'S: *Atlas of Histoire Naturelle des Iles Canaries* (1836-50) on which moreover the bracteoles are shown as simple and glabrous.

DEFLERS describes the leaves of *E. adenensis* as obovate-oblong, the capsule as glabrous, the styles as united in their lower half, the seeds as globose. No mention is made of the bracteoles.

Examination of the herbarium material in Geneva which consists of 8 gatherings from the Canary Islands, 5 from West-Africa, 5 from Somalia and 1 from Arabia shows that though on the whole the leaves of the Canary Islands plants are longer and narrower, in some specimens they are identical with those from Arabia and Somaliland. All capsules from the Canaries are tomentose or tomentellous, those from Somaliland are glabrous; the single specimen from Arabia is without capsules. The styles of all Canary Islands and West African plants are free to the base, those from Somaliland are united to half their length which corresponds with DEFLER'S description.

The seeds of all plants from the Western Region (Canary Islands, Senegal) are so shortly ovoid that the description " subglobose " would fit them as well as it does the plants from Somaliland and, it may be assumed, the Arabian specimens.

The bracteoles of the Canary plants are represented as glabrous on the Plate, but a specimen from Tenerife *(Pitard 354)* has densely setulose bracteoles.

In the Somaliland plants they were found to be glabrous, while an Arabian specimen (*Lavranos*, no number, cult. Heidelberg Bot. Garden) from the Dhala Plateau shows densely setulose bracteoles.

Thus far the only constant taxonomic differences between *E. balsamifera* and *E. adenensis* were the tomentose capsule and the divided pistil of the former; both characters are referred to in the respective descriptions and were borne out in the herbarium material available in Geneva.

I am greatly indebted to Mr ROGER POLHILL for examining the specimens in the Kew Herbarium; he found at least two specimens from Somaliland *(Hemming 1605* and *Glover & Gilliland 555)* with capsules definitely not glabrous, though generally the hairs are shorter and sparser in the East African specimens than those from the Canaries and West-Africa. These findings bear out a statement by Mr JOHN LAVRANOS who writes in a letter of 2. 12. 1964: *I have seen plants of* E. adenensis *with distinctely pubescent ovary and bracteoles, though such specimens were only a small minority in certain groups of plants while in other groups they were totally absent.*

The presence or absence of pubescence on the ovary must therefore be ruled out for specific distinction between *E. balsamifera* and *E. adenensis.*

The only remaining macrotaxonomic distinction is the pistil with styles divided to the base in the plants from the Canaries and from West-Africa, and united in their lower half in those from Somaliland and Arabia.

A recent examination of the pollen, carried out by Dr H. P. FUCHS places the Canary Islands plant into a different sub-group from those from Somaliland and Arabia.

However, these differences do not justify the maintenance of *E. adenensis* as a distinct species or even to reduce it to a variety of *E. balsamifera.*

At most one might concede it subspecific rank on the evidence of the relatively poor material available for examination.

The distribution of *E. balsamifera* into two distinct regions on opposite coasts of the African continent is most interesting. From its habit which is characteristic of several Canary Islands Euphorbias it seems likely that it originated there. How and when it reached the much more restricted Eastern Region is open to conjecture. In West Africa it is used medicinally, besides the sap is boiled and eaten as a jelly; sections of the branches are used as corks for closing gourds; in Senegal it is planted as a hedge plant to demarcate cultivated fields. Being thus of some economic importance, the possibility of its being brought to Arabia and to the East African coast by early seafaring people cannot be entirely ruled out.

DISTRIBUTION.

(a) ARABIA. Aden Protectorate: Aden, Eastern Peninsula, Shumsen (Shemsham)-Circus. Goldmore valley, 500 m appr., 12°46′ N, 45°41′ E, 1886, *A. Deflers s.n.*;

ibid., 10. 12. 1888, *Schweinfurth 132*; ibid., Aug. 1897, *W. S. Birdwood 104*; ibid., on rocky ridges and ledges, 500-550 m, 14. 8. 1962, *John Lavranos s.n.*; Audhali Plateau, East of Aqaba Thina on undulating rocky ground, locally common, 2200 m, 13°57′ N, 45°50′ E, 17.8.1962, *John Lavranos 1838*; Wadi Salul near Mukeiras on rocky slopes, locally common, 2000 m, 13°55′ N, 45°40′ E, 5.3.1964, *Rauh & Lavranos 2821*; Gebel el Arys (Ures), 100 m, 13°31′ N, 46°04′ E, 1886, *A. Deflers s.n.* HADRAMAUT: Mola Matr, 54 mls NNW of Mukalla on limestone spurs, locally common, 1800 m, 14°46′ N, 48°46′ E, 19.3.1946, *Rauh & Lavranos 3055*; 8 mls. N of Mola Matr, on north side of watershed, rocky flats and slopes, locally common, 1900-2000 m, 14°51′ N, 48°36′ E, 20.3.1964, *Rauh & Lavranos 3098*; 6 mls. S of Mola Matr, on limestone, 1600 m, 15°00′ N, 49°20′ E, 24.5.1955, *C. F. Hemming s.n.*; High Plateau, no precise locality, 1893, *Leo Hirsch 5*. OMAN: foot of Dhofar Mts at Merbat, 16°58′ N, 54°00′ E, 1895, *Th. Bent 197*. SAUDI ARABIA: Asir Province, Shithath, 2430 m, 20.11.1936, *H. St. J. B. Philby 146*.

(b) TROPICAL EAST AFRICA. SOMALI REPUBLIC NORTH (the former Somaliland Protectorate) Nogal, 50 miles S of Erigavo near Sufdero, 1250 m, 9°59′ N, 47°13′ E, *E. A. Peck 1942*; S of Erigavo, no precise locality, *P. E. Glover* in Herb. Bally *E 266* (cult. Bally, Nairobi, see drawing of flowering growth); 18-20 mls. SSW of Erigavo on sandy, gypsaceous alluvial plain near Yuffleh, 1680 m, 10°23′ N, 47°12′ E, 7.11. 1954, *Bally 10360* (see drawing of mature fruit); 12-15 mls. W of Erigavo, 1550 m, n'r Dayaha, 10°53′ N, 47°13′ E, 1.6.1958, *Brian Boaler 86*; ibid., 29.9.1960, *C. F. Hemming 1973*; 1 mile E of Buran, 1050 m, 10°04′ N, 48°48′ E, 5.10.1956, *Bally 10858*; Eastern Ahl Madu Mountains, Southern slope, between Baditir and Agasur, locally dominant shrub 1100 m, 10°53′ N, 48°55′ E, 10.10.1956, *Bally 11007* (male plant), *11008* (female plant).

Specimens examined (Bally). CANARY ISLANDS: *E. Asplund 19, 316, 1411*; *J. Bornmüller 2859; E. Bourgeau 472, 1510; O. Burchard 163; C. J. Pitard 354*. WEST AFRICA: *Leprieur s.n.; Perrotet s.n.; G. Roberty 16798, 16825*. EAST AFRICA: *P. R. O. Bally 10360, 10858, 11007, 11008; E. F. Peck* in Herb. Bally *E 226*; Molederu, 33 miles S of Erigavo, much-branched bush, 12-35 cm high, 1550 m, 10°9′ N, 47°15′ E, 13.1.1945, *Glover & Gilliland 555*. ARABIA: *Schweinfurth 132; Lavranos s.n.* (cult. Heidelberg).

Specimens examined (Polhill). CANARY ISLANDS: locality not specified. WEST AFRICA: *Dalziel 528; Farmar 54*. EAST AFRICA: *Bally 10360, 11008; Glover & Gilliland 555; Hemming 1605*. ARABIA: locality not specified.

BIBLIOGRAPHY. AITON: *Hortus Kewensis* **2**. 1789; BUCH: *Über die Flora auf den Canarischen Inseln*. 1819; DE CANDOLLE: *Prodromus* **15**, sect. 2: 107. 1862; DEFLERS, *Bull. Soc. Bot. France* **34**. 1887; LINDINGER: *Flora der Canarischen Inseln*. 1926; WEBB & BERTHELOT: *Histoire Naturelle des Iles Canaries*. 1836-50.

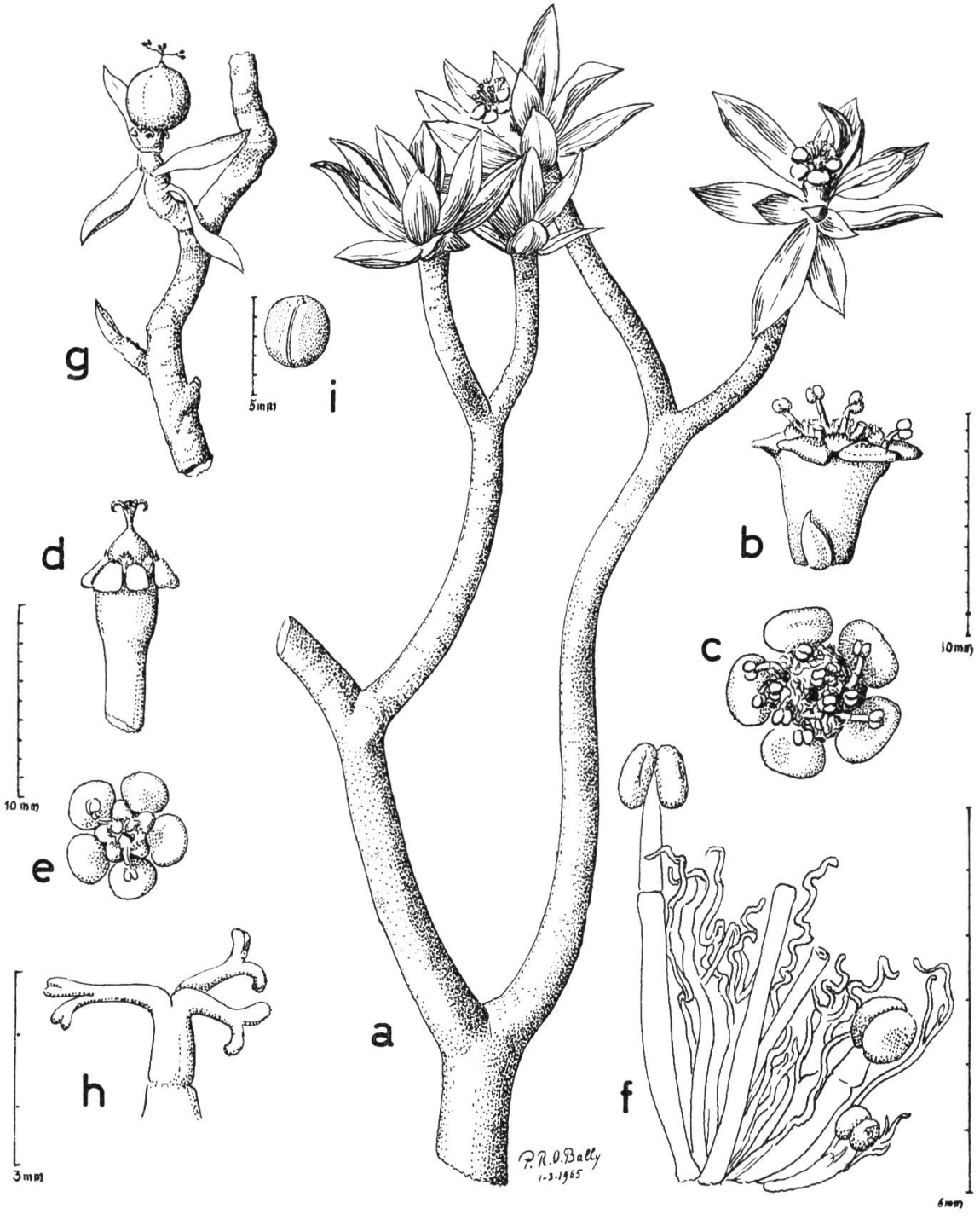

FIG. 11. — *Euphorbia balsamifera* Ait. subsp. *adenensis* (Defl.) Bally, *Bally E 204*

a, flowering branch (male) — *b*, male cyathium, side view — *c*, male cyathium viewed from above — *d*, bisexual cyathium, side view — *e*, bisexual cyathium, viewed from above — *f*, male flower with bracteoles — *g*, growth with mature capsule — *h*, pistil — *i*, seed.

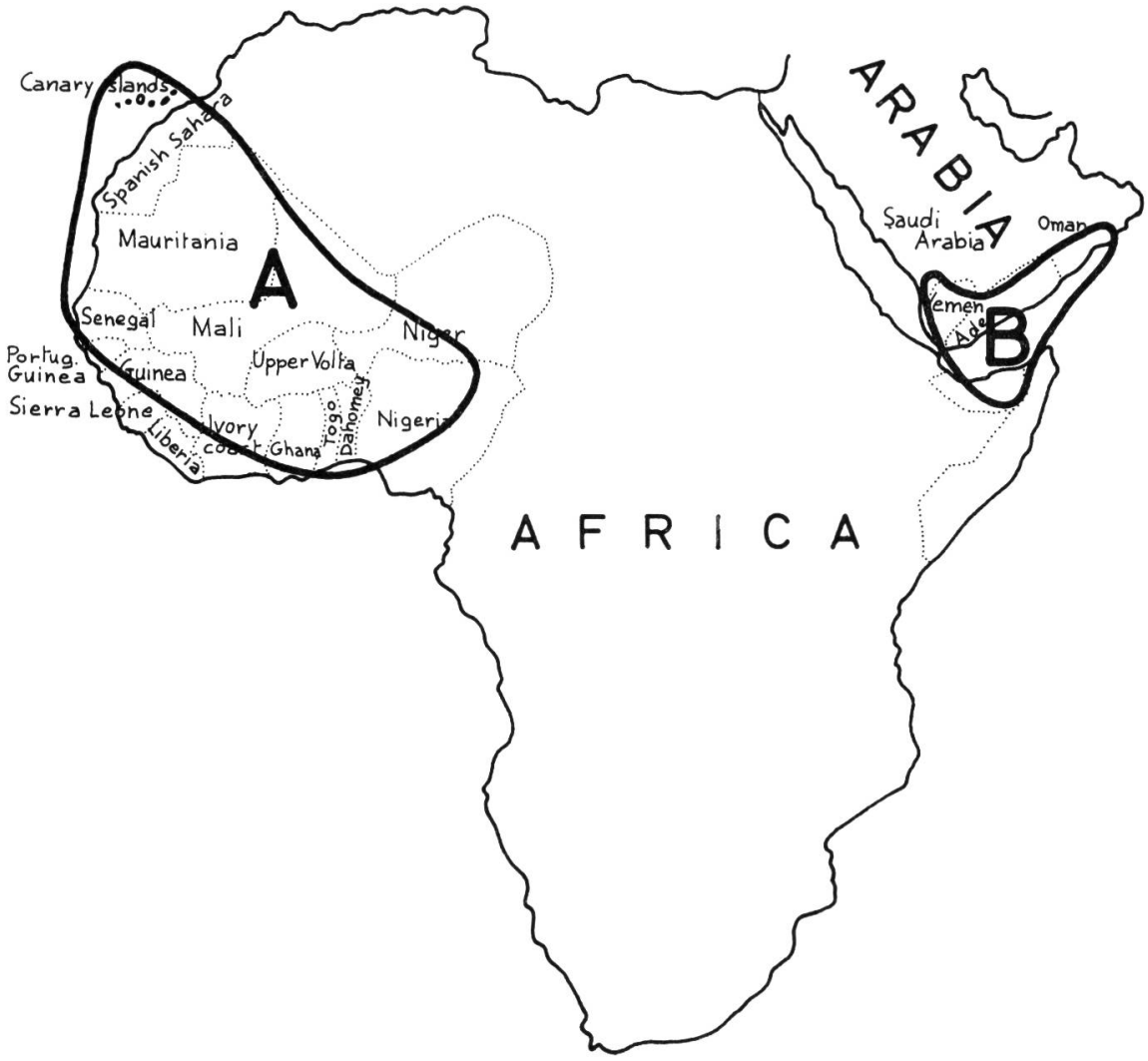

FIG. 12. — Distribution map of *Euphorbia balsamifera*

A = subsp. *balsamifera*; B = subsp. *adenensis* (Deflers) Bally.

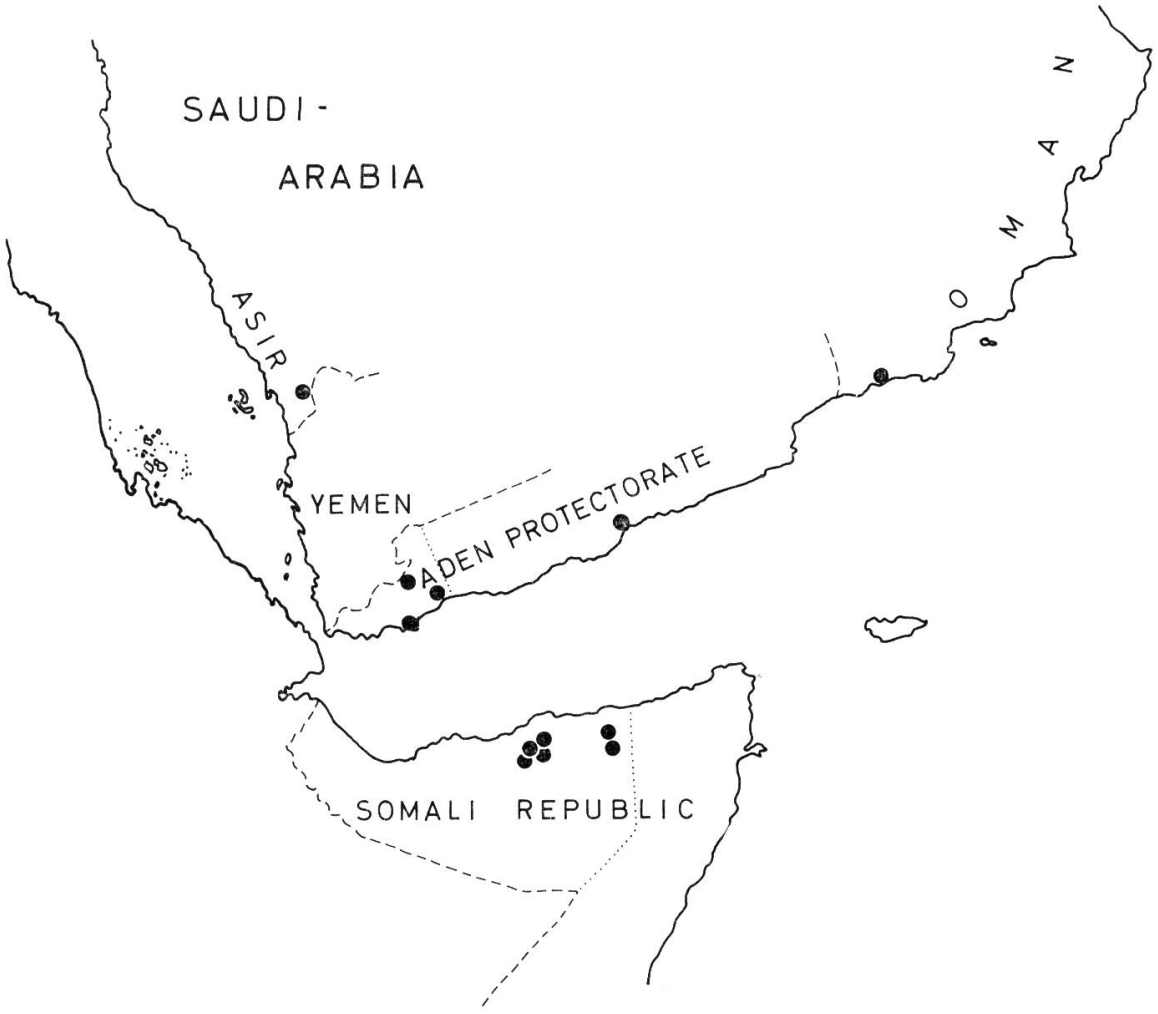

FIG. 12. — Distribution of *Euphorbia balsamifera* Ait. subsp. *adenensis* (Defl.) Bally.

26. Euphorbia barbicollis (Euphorbiaceae)

Euphorbia barbicollis Bally spec. nov.

Species affinis *Euphorbiae dracunculoidei* Pax sed habitu scandente, ramis et foliis carnosis pilosisque, cyathiis intus pilosissimis, glandularum appendicibus irregularibus differt.

Planta carnosa scandens. *Radix* tuberosa, 10-12 cm longa, 3-4 cm crassa. *Rami* pauci, volubiles, usque ad 100 cm longi, glabri, cinerei, sparse ramosi; ramuli breviores, 2 mm crassi, virides, a pilis curvatis decoloribusque sparse instructi. *Folia* alterna in ramis, congesta in apicibus, linearia, usque ad 3.7 cm longa, 3 mm lata, sessilia, carnosa, alte canaliculata, pilis curvatis decoloribus, 0.5 mm longis, in utrisque paginis instructa. *Glandulae stipulariae* minutae, hemisphericae. *Involucrum* unum, saepe terminale, nonnumquam axillare, 6 mm longum, 7 mm latum; *involucri bracteae* lineares, ascendentes, 8-36 mm longae, foliis aequilongae. *Glandulae* 5, erecto-divergentes, stipitatae (in facie stiparum interiore a setis albis, 0.5 mm longis, dense instructa) transverse ellipticae, 2 mm longae et latae, glabrae, in margine vix incrassatae, ab appendicibus membranaceis 2-4, simplicibus aut breviter bifidis, 1.3 mm longis instructae; lobi 5, subquadrangulares, 1 mm longi et lati, carinati. *Bracteolae* paucae, cuneatae aut laciniatae, 2.3 mm longae, dense setulosae. *Flos stamineus*: pedicellus teres, 3.5 mm longus; filamentum 0.5 mm longum; antherarum thecae 0.5 mm longae. *Flos femineus* solitarius, exsertus; pedicellus carnosus reflexus, usque ad 6 mm longus, 1.3 mm crassus; perianthium ad marginem vix incrassatum reductum. *Capsula* subglobosa, trilocularis, 4.5-5 mm longa, 4 mm lata, a pilis decoloribus instructa; styli 3, glabri, usque ad basin divisi, reflexo-divergentes, supra medium bifidi, in apicibus attenuatis minute puberuli. *Semina* glabra, oblonga, obtuse quadrangulares, 3 mm longa, 2 mm diametro, carunculata; carunculus subsessilis, undulato-membranaceus, 0.75 mm diametro latus.

Root a beet-like tuber 10-12 cm long, 3-4 cm thick : *stems* few, twining, sparsely branched, to 1 m long, about 5 mm thick, bark grey. *Branchlets* 2 mm thick, dark green, sparsely beset with thin transparent, curved hairs. *Leaves* alternate along the stems, rosulate at the apex, linear, to 3.7 cm long, 3 mm wide, sessile, fleshy, deeply channelled, with scattered curved transparent hairs about ½ mm long on both sides. *Stipular glands* minute, hemispherical. *Inflorescence* terminal, occasionally in the axils of the branchlets, consisting of a solitary shortly pedunculate involucre 6 mm high, 7 mm diam., glabrous outside. *Involucral bracts* linear, ascending, 8-36 mm long, indistinguishable from the leaves. *Glands* 5, erect-spreading, shortly stipitate, the inner face of the neck-like stipe beset with a dense tuft of white, ascending hairs ½ mm long (barbicollis). Gland glabrous, transversely elliptic, fleshy, its upper (inner) surface deeply pitted, with a raised margin, the outer surface smooth, with few indistinct longitudinal ridges. Glandular processes 2-4, simple or shortly bifid, 1.3 mm long, membraneous: lobes 5, subquadrangular, 1 mm long and wide, keeled, laciniate, densely beset with transparent, ascending hairs ½ mm long. *Bracteoles* few, cuneate or laciniate, densely hairy, 2.3 mm long. *Staminate flowers* reduced to a glabrous terete pedicel 3.5 mm long, a filament ½ mm long, two anther-cells ½ mm long. *Pistillate flower* solitary, exserted on a reflexed, glabrous, terete pedicel to 6 mm long, 1.3 mm thick. Perianth reduced to a slightly thickened rim subtending the capsule. *Capsule* subellipsoid, trilocular, 4.5-5 mm long, 4 mm diam., beset with thin, transparent hairs. Styles 3, glabrous, divided to the base, spreading-recurved, 3 mm long, bifid to half their length, tips tapering, acute, minutely puberulous. *Seeds* glabrous, oblong, obtusely quadrangular, 3 mm long, 2 mm diam., carunculate, caruncle subsessile, circular, undulately membraneous, ¾ mm diam.

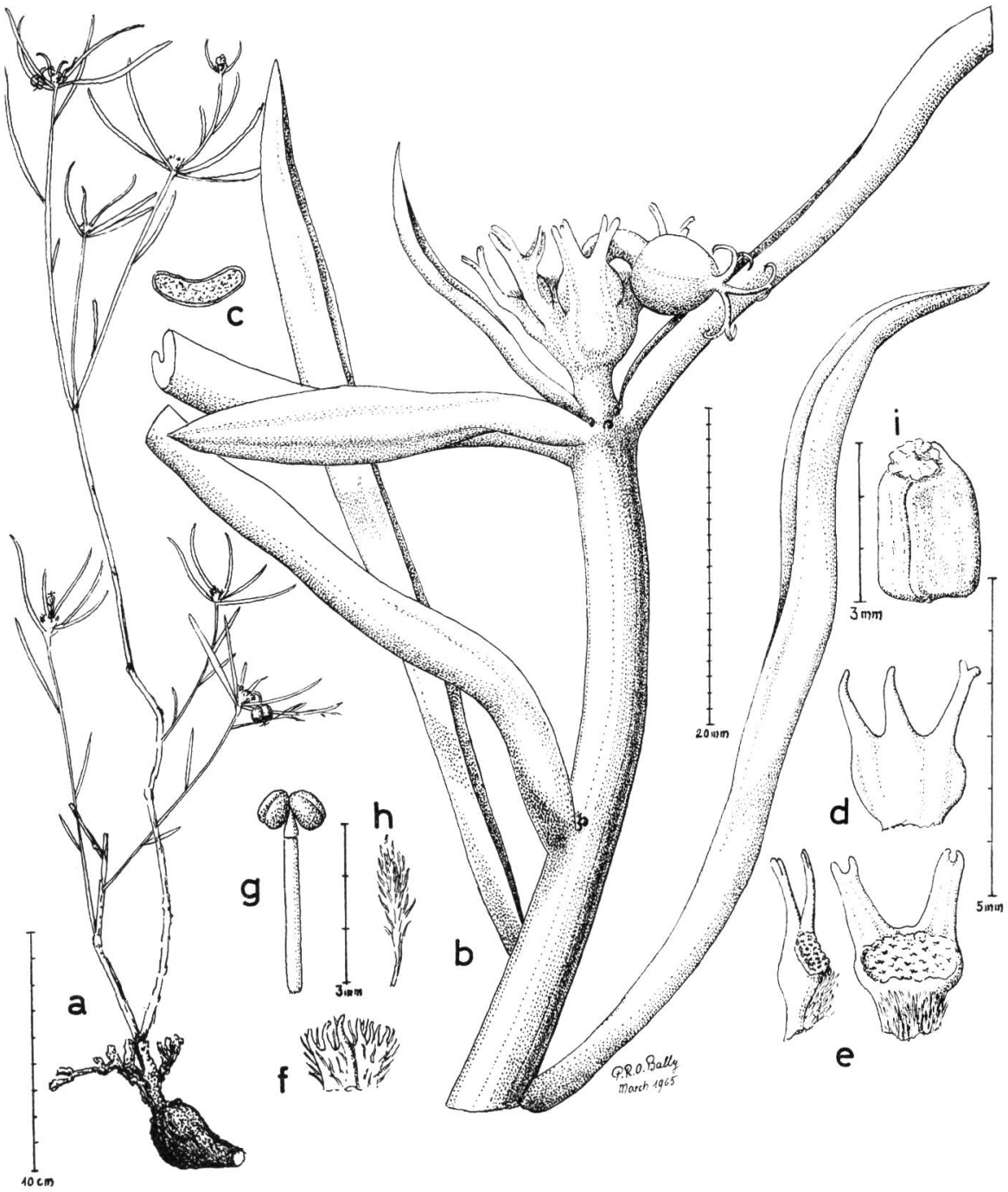

FIG. 14. — *Euphorbia barbicollis* Bally spec. nov.

a, mature plant — *b*, flowering shoot — *c*, cross-section through a leaf — *d*, gland, onter view — *e*, inner (upper) and side view — *f*, lobe — *g*, staminate fl. — *h*, bracteole — *i*, seed (drawing from the type: *B 10950*).

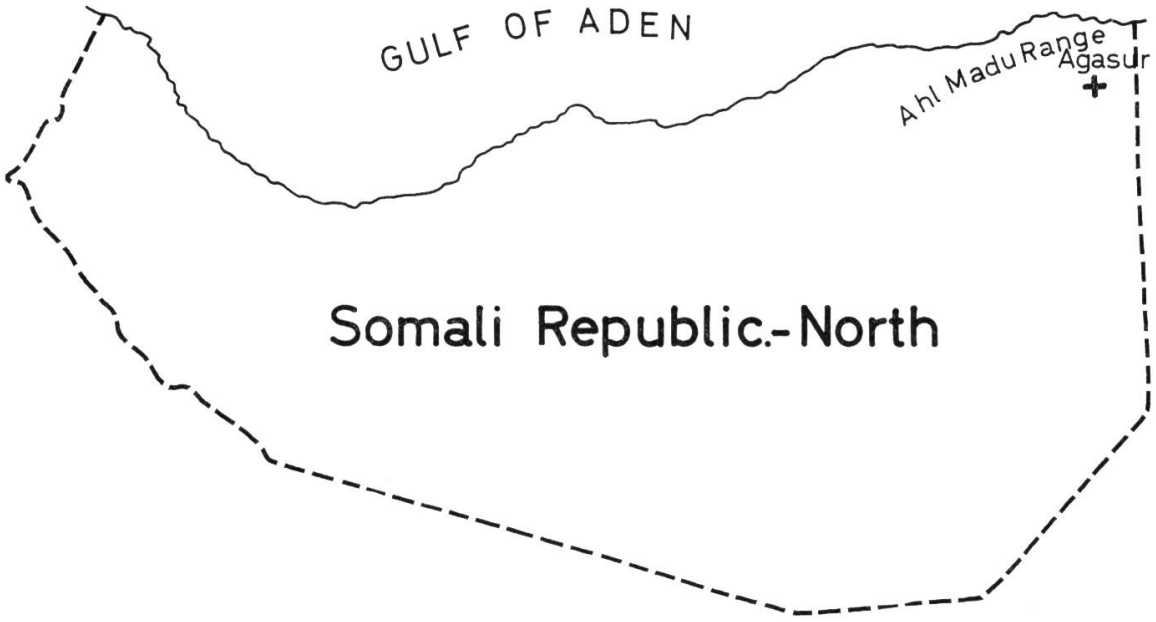

FIG. 15. — Type locality of *Euphorbia barbicollis*

DISTRIBUTION. SOMALI REPUBLIC NORTH, Al Madu Range, between Agasur and Baditir, 1150 m, 10°52′ N, 48°58′ E, 8.10.1956, *Bally 10950* (holo. G., syn. K;) ibid., 10.10.1956, *Bally 11000*; Marero-Hugeir, 1500 m, 11°13′ N, 49°30′ E, 11.9.1957, *Newbould 1088*.

27. Euphorbia ndurumensis

Euphorbia ndurumensis Bally nom. nov.

Syn. *E. taitensis* Pax nec Boiss.

In his monographic review of the African species of *Euphorbia* in the section *Diacanthium* (*Engl. Jahrb.* **34**: 61-85. 1904) F. PAX described a species from the Taita District in East Africa *(Hildebrandt 2859)* as *Euphorbia taitensis.*

The same epithet having been used previously for a shrubby *Euphorbia* from Tahiti (E. BOISSIER in his *Centuria Euphorbiarum*: 5. 1860) it follows that PAX' denomination is invalid and needs to be changed.

The epithet *ndurumensis* chosen by the present writer is again geographical and refers to the Nduruma country in Kenya, the main habitat of the plant.

DISTRIBUTION. KENYA: Coast Prov., Taita Distr., Buitchuma (Buchuma) 3°25′ S, 38°53′ E, Feb. 1877, *Hildebrandt 2895* (holo B) (destroyed, drawing made from type: K); Kwale Distr., Inepanga, 500 m, 3°56′ S, 39°30′ E, 22.3.1902, *Kässner*

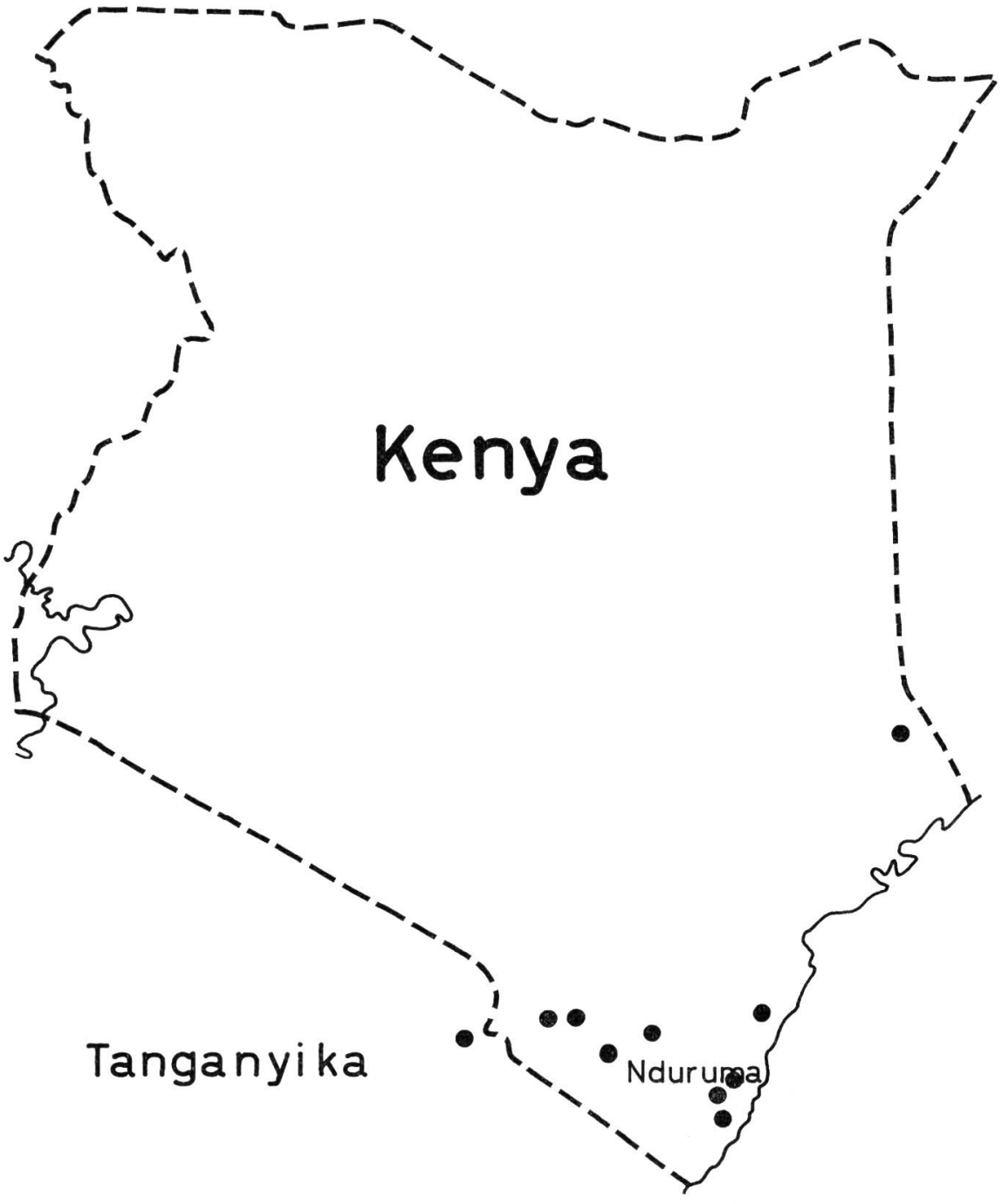

FIG. 16. — Distribution of *Euphorbia ndurumensis*

430; Taita Distr., Voi, 600 m, 3°23′ S, 38°34′ E, 7.5.1931, *E. R. Napier 988*; Maktao, foot of Taita Hills, 3°25′ S, 38°7′ E, 1938, *Bally E 9* (spirit only); Wundanyi, summit, 2610 m, 3°25′ S, 38°26′ E, 1938, *Bally E 9 (a)*; Kolbio, Tanaland, 150 m, 1°10′ S, 41°14′ E, Jan. 1940, *A. T. A. Ritchie* in Herb. Bally *E 101*; Samburu, 30 mls. E o, Mombasa, 3°47′ S, 39°16′ E, 23.7.1960, *Bally 12175*; Taru, 10 mls. W of Samburu, 5.9.1953, *Drummond & Hemsley 4182* (spirit); Taita Distr., *Verdcourt 913 a.* TANGANYIKA: Plains at North end of Lake Jipe, 1938, *Bally E 9.*

28. Pseudolithos

Pseudolithos Bally nom. nov.

In *Candollea* **17**: 53-59. Oct. 1959, I published the new genus *Lithocaulon* in the *Asclepiadaceae*, with the descriptions of two species, *Lithocaulon sphaericum* and *Lithocaulon cubiforme.*

I am indebted to Mr. J. BOGNER, Freising (B.R.D.), for pointing out to me in a letter dated Oct. 31st, 1965 that the term *Lithocaulon* has been used previously by C. J. MENEGHINI in *Paléontologie de l'Ile de Sardaigne:* 550, pl. H, fig. 7, Turin 1857, for a fossil alga from tertiary deposits in Sardinia, thus invalidating the name I have chosen.

The new generic name which now replaces it is *Pseudolithos*, with the two species:

Pseudolithos sphaericus (Bally) Bally comb. nov. and **Pseudolithos cubiformis** (Bally) Bally, comb. nov. (syn. *Lithocaulon sphaericus* Bally et *L. cubiformis* Bally nom. illeg.).