

## THE INDIAN SPECIES OF ERIOCAULON

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(Continued from p. 150.)

### I. SETACEAE.

Submerged plants. Stem slender elongate and often branched, bearing leaves for several inches. Leaves very slender, or capillary, 1-5 in. long. Head numerous, 1/10 to 1/16 in., on slender peduncles usually in a terminal umbel, but often also from more than one node. Receptacle glabrous or hairy and chaffy with adherent bracts. Sepals of the male more or less free. All parts of both sexes in threes; stamens 6; anthers black.

Though placed first for convenience because differing from the rest of the genus in their very pronounced aquatic habit and elongated stem, the species which comprise this group should almost certainly be regarded not as primitive, but as aquatic offshoots from the original stock, to which the next group, SIMPLICES, are nearest.

A difficult group to work out in old collections, the heads and the flowers being small, and some confusion has crept in with regard to the species. Linnæus in Sp. Pl. Ed. 1. 1753 p. 87 founded *E. setaceum* on an Indian plant giving as synonym *Randolia malabarica* and quoting also Rheed. Mal. [Hortus Malabarius] 63. He mentioned only the 6-angled stem and capillary leaves. In Fl. Zeylanica (1747) p. 50 he had mentioned in addition the membranaceous sheath and submerged roots.\* Steudel in Syn. Pl. Cyp. (1855) took this species to be the one with glabrous floral bracts, that being the common Malabar plant. Koerniche in Linnaea XXVII p. 603 took the hairy species as Linnæus' *E. setaceum* and founded *E. intermedium* for the glabrous form on a sheet of Wight's, No. 2369. He considered that Linnæus had been in error in quoting Rheede's figure for *E. setaceum*. Hooker in F.B.I. appears to have reverted to Steudel's conception of the glabrous plant for *E. setaceum* for he described the floral bracts as black and glabrous and founded the new species *E. capillus-naiadis* for the hairy heads. He also identified forms with glabrous heads and glabrous, not villous, receptacles as *E. bifistuloseum* Van Huerck a West African species. Ruhland l.c. reinstated the hairy heads as of *E. setaceum* Linn., reducing Hooker's *E. capillus-naiadis* to that species, and restored *E. intermedium* Koern., at the same time confining *E. bifistuloseum* Van Huerck to West Africa. I find young heads often glabrous, though hairy when fully developed, and that it is impossible to determine with certainty whether the receptacle is glabrous or not, for it is often covered with short scales. I find also that the female petals vary in regard to the position of the gland, which may be well inside the margin as with other species or on it.

It seems however probable that there are in India only two species. *E. setaceum* L. with hairy and *E. intermedium* Koern. with glabrous bracts, and that other differences are casual variations. I have not seen Linnæus type

\* I am indebted to Col. Gage, I.M.S., Director of the Botanical Survey, for the copy of Linnæus' descriptions, etc. from which this is taken.

plant but assume that Ruhland did, and follow him and Koerniche in identifying the hairy heads as all *E. setaceum* Linn.

Floral bracts hairy, heads gray or white ... *E. setaceum*.  
 Floral bracts glabrous, heads black ... *E. intermedium*.

1. ***Eriocaulon setaceum*** L.; Ruhl. No. 134.; *E. capillunaidis* in F. B. I. vi 572, No. 23. Stem slender, up to 15 inches long (? or more), covered in at least the upper part with long linear leaves. Scapes umbelled at the summit of the stem. Heads 1/6 in. diam., conical, gray or white. Floral bracts acute, with short white hairs on the backs. Male flowers: sepals 3 free or nearly so; corolla lobes small; anthers black. Female flower: sepals 3 boat-shaped, concave round the seeds; petals 3, oblanceolate with distinct glands. Plate 1.

Assam; Khasia hills; Burma; Ceylon.

In some the female petals are ciliate and with distinct gland well inside the margin; in others they are glabrous with apical gland and distinct midrib.

2. ***E. intermedium*** Koern.; *Linnaea* XXVII p. 601; Ruhl. l.c. No. 135; F. B. I. probably *E. setaceum* and *E. bifistulosum*.

Similar in habit to *E. setaceum* Linn, but the floral bracts glabrous, making the heads black. Flowers as in *E. setaceum*, but female petals unequal. Plate 2.

[?] Assam; Khasia; Peninsular India; Malabar; Ceylon.

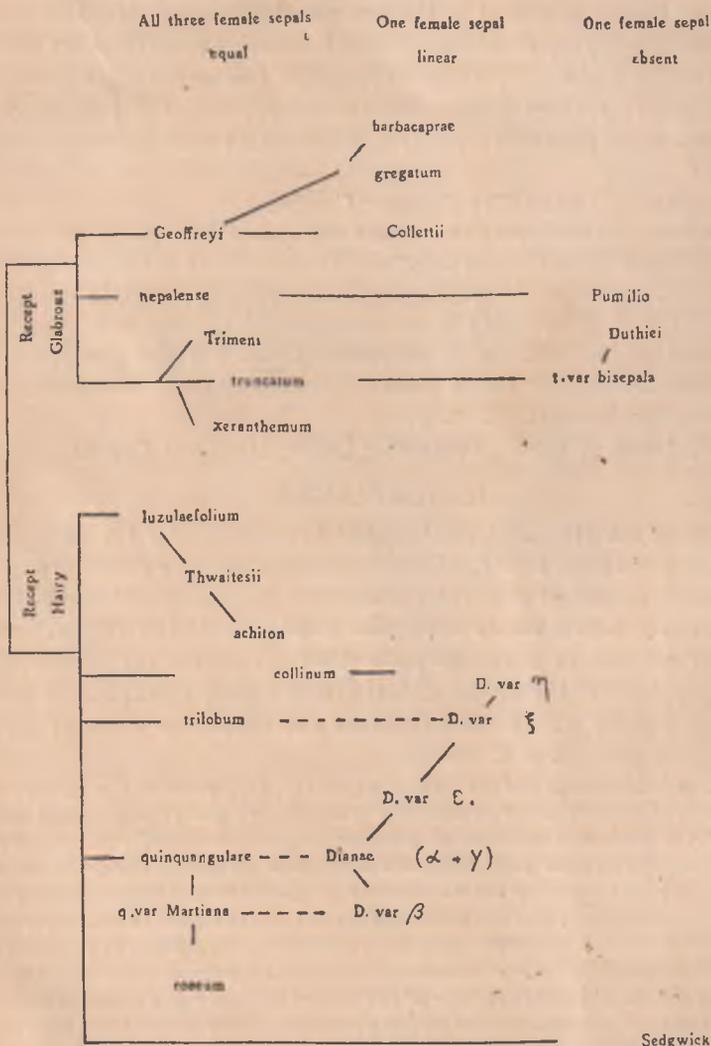
## II. SIMPLICES.

Stems usually disciform, (O), but in some species branched but short, and in most tufted. Leaves usually short, the plants growing in marshy ground or still water, glabrous. Scapes tall. Heads 1/2 in. or less. Involucral bracts black with pale (colourless or yellow) base; usually reflexed or horizontal, sometimes extending far beyond the general outline of the head. Floral bracts usually black, but covered often so densely with white hairs that the heads are white or gray. Receptacle glabrous or villous.

As noted above in the Introduction (pp. 142, 146), some of the species of this second section show remarkable variation of the female sepals with locality. There also appears a progressive lengthening of the involucral bracts as the species pass southwards\*. Thus on the Western Ghats *E. Dianae* has near Bombay bracts scarcely longer than the head, and further north bracts actually shorter and reflexed; but where more typically developed has the bracts distinctly longer, and in Calicut several times or long as the head, approaching *E. xeranthemum*. Throughout the forms are connected by intermediates. On the other side of the Bay of Bengal there appears to be a similar series, but with a fewer stages collected. They differ from their like as the Western Ghats by the female sepals all being equal, whereas in the latter one sepal is narrow or reduced to a bristle.

\* A similar lengthening of the involucral bracts is shown in other sections; see *E. cuspidatum* *E. Edwardii* and *E. lanceolatum*.

TABLE OF PROBABLE RELATIONSHIPS



SPECIES OF ERIOCAULON § SIMPLICIS.

In the table opposite giving the scheme of probable relationship the reduction of one female sepal is shown to have occurred four times and the total loss of a sepal three times. The most involved relationships are shown in the group near the bottom of the diagram. It will be seen that *E. Dianae* is through its varieties connected apparently both with *E. quiquangulare* and with *E. trilobum*. The three species form in fact a closed ring, and the first two with their varieties form a second ring. How this can have come about through descent, I do not propose to discuss here; the facts however are that the species or varieties shown connected by dotted lines are almost or quite indistinguishable except by the character of the one linear sepal, and those shown connected by firm lines are clearly related.

*E. xeranthemum* and *E. truncatum* with the female sepals 2 or 3, and *E. collinum* with them equal or unequal, contain within themselves the reduction of one sepal.

### Key to the Simplicis.

#### (a) Receptacle glabrous.

\* Female sepals 3.

† Female petals broadly oblanceolate or spatulate with large black glands.

- Scapes 10-15 in.; heads 1/2 in.; female petals visible beyond the bracts (Burma) ... 4 *E. Collettii*.  
 Scapes 1/2-2 in.; solitary or clustered; heads 1/3 in. (S. Indian Hills) ... 3 *E. Geoffreyi*.  
 Scapes 4-5 in., heads 1/4 in. stems branched densely tufted; leaves 2-3 in., linear, (Shillong) ... 5 *E. barba-caprae*.  
 Scapes 2-3 in., tufted; leaves 1-1/2 in., linear; heads 1/6 in. (Khasia) ... 6 *E. gregatum*.

†† Female petals narrow, with small or no glands; or absent.

- Scapes 4-6 in.; heads 1/6-1/4 in., globose ... 7 *E. nepalense*.  
 Scapes 1-2 in.; heads 1/8 in., do. ... 8 *E. Pumilio*.  
 Scapes 1-1/2-2 in.; leaves 1/3-1-1/4 in., heads 1/6 in. truncate at base (Ceylon) ... 9 *E. Trimeni*.  
 Involucral bracts twice as long as the head. 12 *E. xeranthemum*.

\*\* Female sepals 2, rarely 3.

- Scapes 2-4 in.; heads 1/4 in.; truncate by the very horizontal involucre (Assam to Malacca and to Ceylon) ... 10 *E. truncatum*.  
 Scapes 4-6 in.; heads 1/6 in.; bracts reflexed (Central Provinces) ... 11 *E. Duthiei*.

#### (b) Receptacle villous.

\* Female sepals 3 all equally boat-shaped or flat,

† Ls. red or drying red.

- Heads  $1/4-1/3$  in. diam., globose or ovoid  
 (plains from Bengal to Ceylon) ... 15 *E. quinquangulare*.  
 Heads  $1/8-1/4$  in. diam.; bracts much longer.  
 (Burma) ... 17 *E. roseum*.  
 † † Ls. not drying red.  
 ‡ Involucral bracts, obtuse, horizontal.  
 Scapes 4-15 in. Female. petals oblanceolate  
 (Khasia and N. Burma). ... 13 *E. luzulaefolium*.  
 Female petals linear, with long basal hairs,  
 so brush-like ... 14 *E. Thwaitesii*.  
 No female petals, heads obconic ... 15 *E. achiton*.  
 † † Involucral bracts reflexed, shorter  
 than head; Heads  $1/6$  in. (Bengal) ... 19 *E. trilobum*.  
 Heads  $1/4-1/3$  in.  
 Involucral bracts reflexed, shorter than head;  
 heads  $1/4-1/3$  in. (S. Indian Hills) ... 20 *E. Collinum*.  
 \* \* Female sepals 3, one flat or linear;  
 heads grey (Ceylon) ... 20 *E. Collinum*.  
 Heads grey or white; involucral bracts  
 short or long, horizontal or reflexed.  
 (Western Ghats). ... 21 *E. Dianae*.  
 \* \* \* Female sepals 2.  
 Scapes 4-8 in. Involucral bracts not longer  
 than floral; heads densely white villous.  
 (N. Kanara) ... 22 *E. Sedgwickii*.

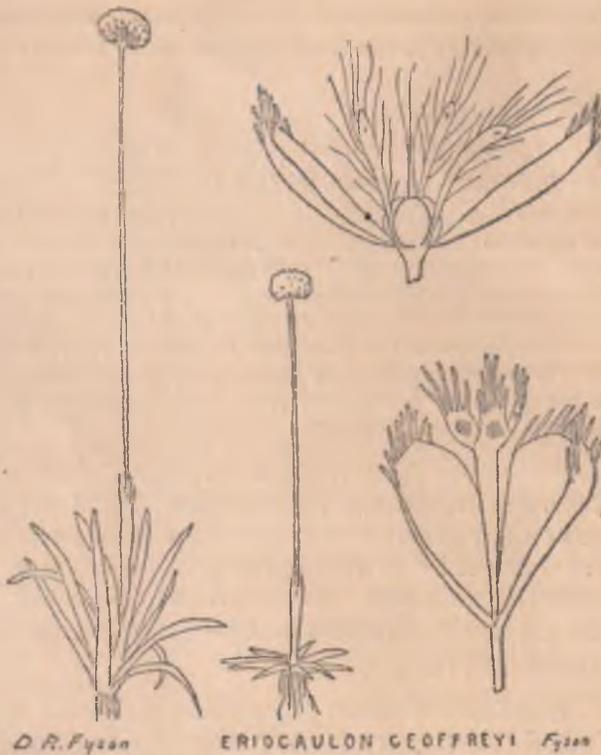
#### Sub-section (a).

3. *E. Geoffreyi* Fyson, Kew Bulletin Nov. 1914, p. 330; Flr. Nil. and Pul. Hill tops p. 432. Stem O. Leaves  $1/2-2$  in., flat tapering to the acute apex. Scapes solitary, in the type, or several, three or four times as long as the leaves. Heads gray; involucre black. Receptacle glabrous. Flowers regular, 3-merous. Petals unusually broad, the female spatulate with large glands. Fig. opp.

Peninsular India; on the Pulneys at 7000 ft.

The type plant was collected at 7500 feet on the Pulneys and is remarkable for the solitary scape rising from a rosette of stiff short leaves. It occurs all over the downs, not in particularly damp spots, and flowers in the autumn. What appears to be a dimerous variety of this species is on a sheet in Herb. Calc., dated July 5th, 1865 collected at "North Hastings."

4. *E. Collettii* Hook. f. (Chandler, Shan Hills, in Herb. Calc. marked "identified at Kew"); F.B.I. vi 575, No. 15; Ruhl. p. 114 "incognita."



Stem 0. Leaves 3-5 in. by  $1/3$ - $1/2$  in. at the base, many nerved, glabrous. Scapes several, 10-15 in., slender, glabrous. Heads  $1/2$  in. nearly globose, white; involucrel bracts black, reflexed. Receptacle glabrous. Floral bracts acute. Female flr:—Sepals 2 boat shaped, 1 flat; petals longer, broadly oblanceolate or spathulate, with large glands, and protruding beyond the floral bracts. Male flower normal, petals with large glands. Plate 3.

Upper Burma and Shan Hills.

Hooker in F.B.I. placed the species among those with the male petal longer than the others and protruding beyond the bracts, possibly (if the plants taken above as this species are correctly so named) deceived by the very similar appearance of the female petals on the outside of the head. But the male petals are quite equal, and in other respects this appears to belong to this section.

5. *E. barba-caprae* Fyson, sp. nov. (Collett at Shillong 10/10/90 in Herb. Calc.) Caulis paulum elongatus et divisus hence plantae dense caespitosae. Folia 5-8 cm. longa, basi valde dilatata, linearia, acuta. Pedunculi plures, circe 10 cm. Capitulla 6 mm. Receptaculum

altum, glabrum. Flores tri-meres. Flos. ♂—sepala spathaceo-connata, nigra; lobi corollae, sub-aeuales; antherae nigrae. Flos ♀ sepala 2 navicularia, 1 planum; petala late-oblongata, glandulis magnis. Plate 4.

Assam, Shillong (Collett !)

Species valde distincta. Descriptione, *E. miserum* Koern. similis, sed antherae eius species flavescens (Ruhland l.c. 68).

I have seen only one sheet. The densely tufted linear leaves, black when dry, suggest the name 'goats-beard'. The receptacle is tall and the heads nearly globose, not as usual by the involueral bracts being reflexed, but by their sloping upwards; but this may be because the heads are young. It answers fairly well to the descriptions both of *E. mitophyllum* Hook. f. and *E. miserum* Koern., as quoted in F.B.I. and in Ruhland (l.c.); except that in the former the receptacle is globose and in both the anthers white. In appearance too the plant is different from what I take below to be these species.

6. *E. gregatum* Koern.; F.B.I. vi 581, No. 33; Ruhland No. 69. Stem slender, tufted, 1/2-1 in. Leaves 1-1 1/2 in. by 1/20 in., acute. Scapes solitary to each stem or branch, twice the leaves. Heads 1/8-1/6 in.; involueral bracts obtuse, pale with broad black margin. Female flower: sepals 3, two boat-shaped, one flat; petals broadly oblongate, obtuse with large glands. Male flowers normal. Plate 5.

Khasia at 4-5000 ft.

7. *E. nepalense* Prescott (Fide Clarke No. 44827 in Herb. Calc.); F.B.I. vi 581, No. 32; Ruhland No. 130. Stem short or O. Leaves flaccid, flat, tapering from 1/8-1/4 in. base, 2-3 in. long, acute. Scapes many, twice as long. Heads 1/6-1/4 in. nearly globular when mature. Involueral bracts black acute, receptacle glabrous. Sepals 3 all boat-shaped. Female petals narrow hairy, seeds oblong with pappilose ribs. Plate 6.

Assam; Khasia: and "from Garwhal to Sikkim." (F.B.I.)

I have not seen the type sheet and am relying on Clarke's plant quoted above, which appears to agree with the description in the F.B.I. The female petals in it have glands, but Ruhland (l.c.) says of the species that there are no glands.

8. *E. Pumilio* Hook. f. (Duthie No. 4473 in Herb. Dehra Dun!) F.B.I. vi 581, No. 34; Ruhl. p. 116 'incognita'. Very small. Stem O, tufted. Leaves 1/4-1/2 in. acicular. Scapes 1 in. Heads 1/8. Involueral bracts obtuse, pale nearly or quite horizontal. Floral bracts cuneate-cuspidate, dark but hairy. Receptacle glabrous. Female fl: sepals 2, deeply boat shaped; petals 3. Male fl: normal. Plate 7.

Western Himalayas at 3-4,000 ft.; Kumaon and Gharwal at 8-9,000 ft. (F.B.I.): Nr. Ramri.

I have seen only the one specimen quoted above. The sepals are large, Ruhland says of the species that they are flat and concave only at the tips, but those of the specimen seen by me are quite boat-shaped for the whole length.



VARIATION IN  
FEMALE SEPALS.

Taken from a sheet of *E. truncatum* Ham. marked 47. D. Barclay, C. India, 1870.

9. *E. truncatum* Ham.; F.B.I. vi 578, No. 24; Ruhl. No. 178 Leaves usually 1-3 in. flat, narrowed from the base. Scapes several. Heads hemispheric. Involucre horizontal, scarious, not or hardly projecting beyond the head. \*Receptacle glabrous. Floral bracts very obtuse, nearly glabrous. Female sepals narrow, 2 boat-shaped, toothed at the apex, and third sepal if present acute; or 2 only. Petals 3 narrow.

Bengal, Assam, North Burma and southwards to Malacca; S. India and Ceylon.

Var. *a vera*, Tipperah, Mts. of Monghir.

This I take to be the true species, for Mart. in Wall. As. Rar. iii, p. 29 describes the flower as having a third sepal. But Koerniche in Linnaea xxvii, p. 633, Hooker in F.B.I. l.c. and Ruhl. l.c. both give the commoner 2-sepalled flower of the next variety.

Var *b* di-sepala. Female sepals 2, otherwise as in the type. The wider distribution given for the species.

For a similar variation in the female sepals see *E. Thwaitesii* Koern.

Two sheets in Herb. Calc. unfortunately without precise locality but one marked C. India, are similar in many respects, but the floral bracts are cuneate acute, not rounded. The female sepals vary in the same head, 3 equally boatshaped or one linear, or two only. Except for the glabrous receptacles these plants might be *E. Dianae*. (No. 20).

10. *E. Trimeni* Hook. f. (Bambulla Rk. 1881 in Herb. Ceylon!) Fl. Ceylon, 1900, v p. 8; Ruhl. p. 117, "incognita". Scapes 1/2-2 in. leaves 1/3-1/4 in. narrow to linear. Heads 1/10-1/8 in. Involucral bracts hyaline, as long or slightly longer than the floral, sub-erect. Floral bracts cunately oblong or obovate. Receptacle glabrous. Male flowers, sepals 3, but 2 connate; sta 6 (not 1). Female flowers, normal; seeds glistening yellow, smooth.

Ceylon.

Hooker l.c. compared this with *E. Sieboldianum*, but the black anthers and flatter head sufficiently distinguish it. Hooker also in error described the male flowers as having only one stamen. There are 6 quite clearly in the plant quoted above. It was referred to *E. truncatum* Ham. by Trimen, and though differing in its flower and in the involucre being less horizontal is clearly allied to that species.

11. **E. Duthiei** Hook. f. (Duthie No. 8436 in Herb. Dehra Dun!) F. B. I. vi 579, No. 22; Ruhl. No. 174. Stem O. Leaves  $3/4$  in. long, broadly oblanceolate acute from a  $1/6$  in. wide base. Scapes numerous 1 to 6 in. slender. Heads  $1/6$  in. Involucral bracts pale, not projecting beyond the floral. Floral bracts oblong cuspidate, nearly glabrous. Receptacle tall, glabrous or with a few hairs. Sepals 2 only, in both sexes. Female petals narrow, nearly glabrous. Seeds oval, yellowish brown with darker markings. Male flowers.—Sepals 2; otherwise normal, anthers black. Plate 7.

Central Provinces, one collection only seen.

The scapes are taller, the heads smaller and the involucre less horizontal than in *E. truncatum*.

12. **E. xeranthemum** Mart. (Wall Cat. 6081 in Herb. Calc!) F. B. I. vi 584, No. 43; Ruhl. No. 150 Leaves  $2/3-1/2$  in. Scapes slightly longer or shorter. Disc of head  $1/10-1/8$  in. Involucral bracts much longer, glistening white. Receptacle globose, floral bracts broadly obovate truncate, hairy at the tip. Female sepals narrow 3 equal or unequal or 2 only. Fig. opp.

Central Himalayas, Nepal; Assam, Khasia, Peninsular India, Malabar, Cochin, etc.

Hooker in F. B. I. describes the receptacle as hairy, but wrongly. Martius in Wall. Pi. As. Rar. Vol. iii says the hairiness is the only real reason for distinguishing *E. xeranthemoides* from this species. Hooker also gives the sepals as 2. Koerniche in Linnaea xxvii p. 626 gives them as 3, but unequal. I find both the petals and sepals of the female flowers vary in size among themselves and one sepal may be linear or absent.

13. **E. luzulaefolium** Mart. (Wall. Cat. 6071 in Herb. Calc!); F. B. I. vi 582, No. 35 in part; Ruhl. No. 131 in part. Leaves 2-4 in. narrowed from the  $1/6$  in. base, flat, many-nerved. Sheaths about as long. Scapes many, 2 to 4 times as high, slender. Heads  $1/4$  in., truncate, clasped below by the light? brown obtuse saucer shaped involucre. Floral bracts dark with white hairs, making the heads gray. Receptacle hairy. Sepals and petals three, narrow. Plate 8.

Central Himalayas, Nepal, Assam; Silhet (type sheet!); Lr Bengal; and the Shan States.

Hooker in F. B. I. has a much wider distribution extending over all India, Ruhland merely repeats this. But the sheets seen by me with that name from Madras, Kanara and other parts are not the species of the above quoted type. The Ceylon plant C. P. 796, so named, has none of the characteristic truncate appearance of the head on a saucer-shaped involucre and is *E. collinum*. Wallich's plant quoted above does not in fact resemble *E. quinquangulare* as stated by Hooker.



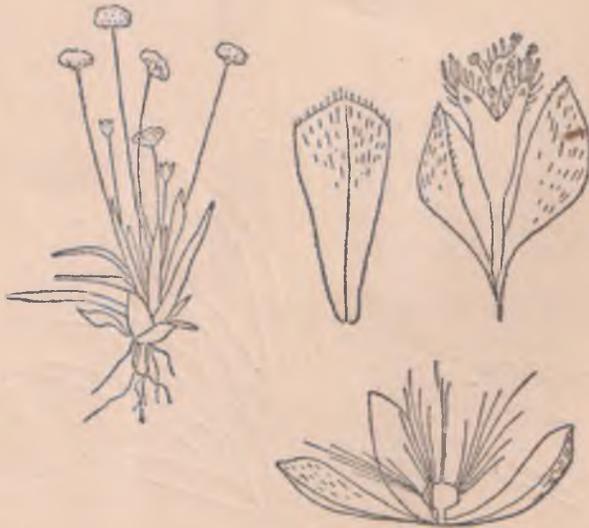
*M. V. Rungam.*

ERIOCAULON XERANTHEMUM.

*Mart.*

14. *E. Thwaitesii* Koern. (C. P. 790 and 769 in Herb. Kew. and 790 in Herb. Calc.); F.B.I. vi, 583, No. 40; Ruhl. No. 171. Leaves 1/2-2 in. oblong acute, flat. Scapes many, 1-6 in. of various heights. Heads 1/14-1/3 in. at first obconic, later truncate, dark gray. Involucral bracts very obtuse, pale. Receptacle hairy. Female sepals 3, equal and boat-shaped or 1 smaller or 2 only. Petals 3, very slender and bearing long hairs from near the base. Seeds oblong, brown.

Ceylon; South India on the Pulneys; Anamalais and Nilgiris.

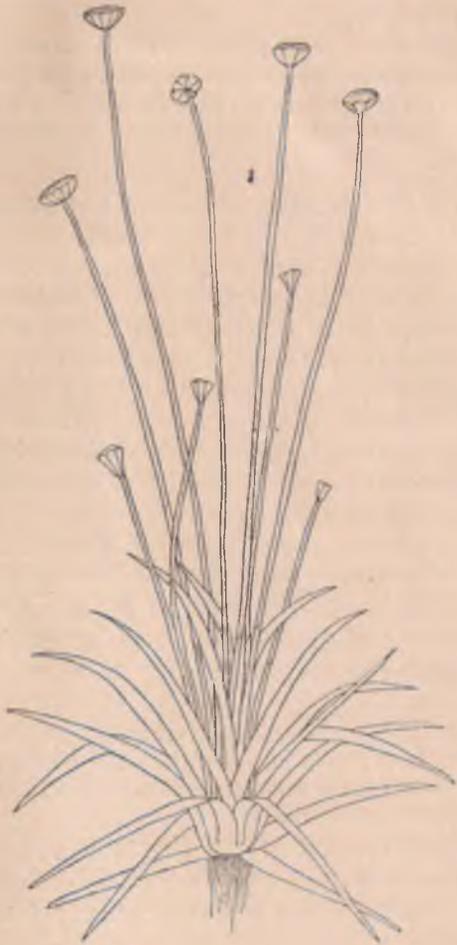


D R. F.

ERIOCAULON THWAITESII Koern. (small plant)

The plants vary much in size. Those from higher levels on the Pulneys are much smaller than the type, even only 1/2 in. high. They were described by me in Kew Bulletin 1914 as a new species, *E. Mariae*, and figured in my Flora of the Nilgiri and Pulney Hill tops under that name, since the female sepals are 3 equally boat shaped instead of 2. But I find a plant C. P. 790 in Herb. Calc. the collection quoted by Koerniche Linnaea xxvii p. 627 as in part his type, has the female sepals 3 but unequal, one being flat; and plants from 5,000 ft. on the Pulneys, in no other way distinguishable from what purports to be Koerniches type at Kew, with 3 sepals equal. It seems therefore that this is another instance of the sepals varying within the species, (c. f. *E. truncatum* Ham). At the same time since I do not find them spongy at the back, as described by Koerniche I may be wrong in so identifying these plants.

15. *E. achiton* Koern. (Clarke in Herb. Calc.); F.B.I. vi 584, No. 42; Ruhl. No. 189. A smaller plant than *E. Thwaitesii*. Leaves narrow, almost linear about 1 inch. Scapes twice as long slender.



ERIOCAULON ACHITON.

*Koern.*

Heads obconic or hemispheric. Sepals of both sexes 2 only, narrow. Female petals 0. Seeds broadly ovate, dark brown, with longitudinal lines. Fig. on p. 203.

Khasia, Eastern Bengal; Bombay, N. Kanara.

The habit and general appearance show this to be probably a derivative of *E. Thwaitesii*; it is therefore put here though there are no petals in the female flower. Koerniche however compared this species with *E. truncatum* Mart. [? Ham.].

16. *E. quinquangulare* L. (Herb. Linn. Prop!); F.B.I. vi 582, No. 36; Ruhl. No. 122.

Stem short or 0. Leaves 1-2 in. long, narrowed from the 1/4 in. base flat, usually red. Scapes numerous, 3-5 in. long, slender. Heads 1/5-1/4 in diam., globular or often conical, black gray or white. Involucre light brown, reflexed. Receptacle hairy; flowers normal; sepals flat. Plate 9.

Central Himalaya, Kumaon; Bengal; Chota Nagpur; Central Provinces; and southwards through the Peninsular India on the plains and the Mysore plateau to Ceylon. Not apparently on the higher levels and not in Burma, except Var. *Martiana*.

I have seen Linnæus' own type but not of course dissected it, and the description is taken from sheets in Herb. Calc. and living plants.

Var. b. *Walkeri* Hook. f. F.B.I. vi 583, No. 39; Ruhl. No. 123. Very similar to *E. quinquangulare vera* but differing in the much more hairy receptacle and other parts.

Ceylon.

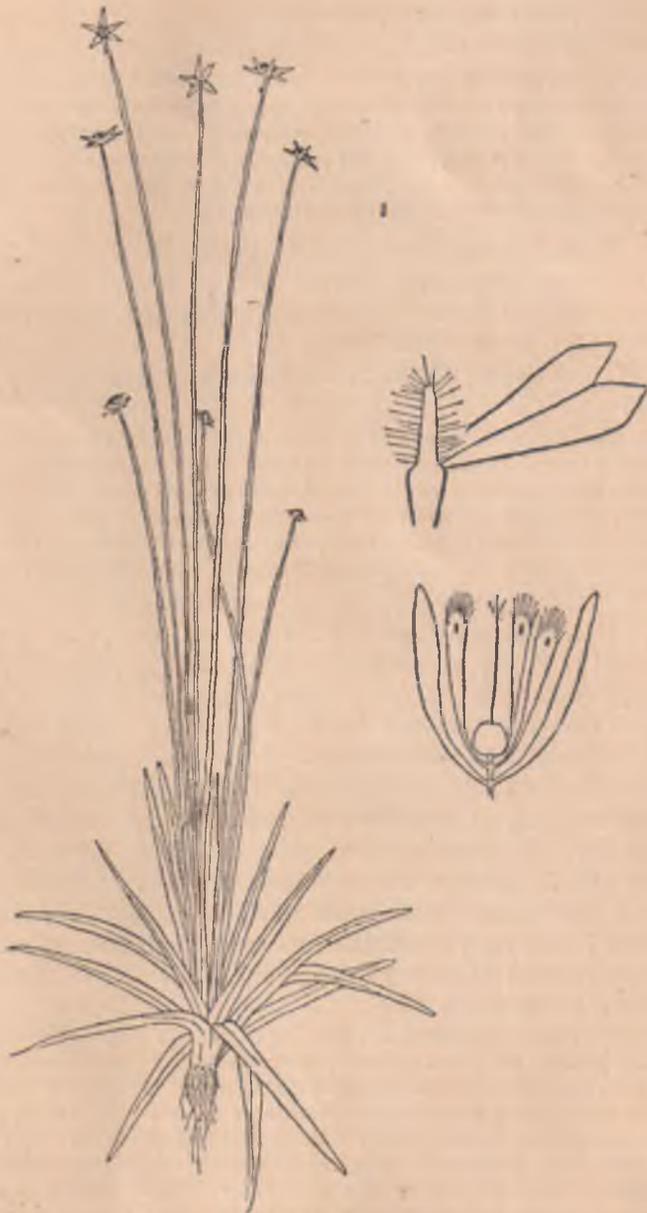
This should certainly be considered only a variety, for although Hooker in the F.B.I. states it to be a very distinct species, the type sheet in the Ceylon Herbarium is almost, if not exactly, matched by Clarke's No. 20849, collected in Bengal, and intermediates occur.

Var c. *Martiana* Wall. (Wall. Cat. 7279 in Herb. Calc. !); F.B.I. and Ruhl. l.c. under *E. quinquangulare*. Involucral bracts much longer than the floral and extending about 1-1/4 inch beyond the head.

Burma.

Hooker in F.B.I. called this plant a proliferous state of *E. quinquangulare*. But the plant with this number in the Calcutta Herbarium is not proliferous.

17. *E. roseum* Fyson, sp. nov. (Kurz. 232 in Herb. Calc.)  
Caulis perbrevis. Folia caespitosa 2-8 cm. longa, basi ad apicem contracta, plana, tenuia, in sicco rubescentia. Pedunculi plures, valde tenuia, glabra, 10-25 cm. alta. Capitula 4-6 mm., lata, sed bractae involucrantes demum 2-3 mm. longiores, tenues et reflexae. Bractae flores superantes acutae, nigrescentes. Receptaculum altum, valde villosum. Flores trimeri, flos ♂; sepala in spatian antice fissam connata;



ERIOCAULON ROSEUM.

*Fyson.*

petala parva, subequalia ; antherae nigrae. Flos ♀ :—sepala aequalia, involucentia ; petala angusta-oblongata.

Burma : Pegu, Kurz.

This may be considered a very pronounced stage in the lengthening of the involucre bracts, begun in this series by var. *Martiana* of *E. quinqueangulare* and it might perhaps be more properly considered a variety of that species. Its close relationship is shown in the very similar flowers, and the leaves being red or drying red. Of the young heads the involucre bracts are not much longer than the others, they lengthen with age.

18. *E. trilobum* Ham. ; F. B. I. vi 583, No. 37 ; Ruhl. No. 88  
Habit of *E. quinqueangulare* L., but the heads as a rule smaller, 1/8-1/6 in diam., darker, and the involucre bracts more conspicuously reflexed. Leaves not drying red. Plate 10.

N. W. Himalayas ; Kumaon ; Dharmasala ; Bengal, in rice fields (Wallich)

This species exactly resembles *E. Dianae*, var. *triloboides* in the Bombay Presidency, except in the reduction in the latter of one female sepal.

I am however uncertain of the identification of the sheets in the Calcutta Herbarium, for Koernicke describes the female sepals as "carinatae, dorso anguste spongioso alatae", which they are not in these plants, yet there does not appear to be any other plant from Bengal to answer to the rest of the description.

19. *E. collinum* Hook f. (Thwaites enum, 44, C. P. 1000 in Herb. Kew!) ; F. B. I. vi 584 No. 41 ; Ruhl. No. 127. ; Fyson Fl. N. & P. H. T. pp. 430,-1. incl. *E. Christopherei* Fyson and *E. Oliveri* Fyson  
Stem O or elongate. Leaves 1 1/2-2 1/2 in. by 1/4 in., flat obtuse or if submerged subulate. Scapes many 3-8 in. Sheath about as long as the leaves. Heads 1/4 in., dark, globose. Involucre bracts dark or the outermost or all pale, at length reflexed. Flora dark, obovate cuspidate, sparingly hairy. Receptacle conical. Flowers normal, the sepals dark. Female sepals in Ceylon two boat-shaped, one flat ; in South India all equally boat-shaped. Male petals well developed, slightly unequal.

South India ; on the Nilgiris, Pulneys, Anamalais, etc., at high elevations. Ceylon ; Newara Eliya and Highlands. Flowering in the early part of the summer.

The species varies considerably, possibly in relation only to the environment. The plants are nearly always gregarious, but sometimes in dense clumps, the scapes being numerous and tufted ; sometimes more or less free, the scapes rising each from its own rosette of leaves. The leaves in the type sheet are linear-oblong, about 1 inch by 1/10 inch, with scapes of 7 or 8 times as high, but I find every variation to leaves which may be as much as half as long as the scapes ; they may also taper from a broad base evenly to the tip or be narrow and acicular. They are usually thin or flaccid but may be coriaceous. The heads typically gray with black involucre may be almost white with colourless (pale) involucre bracts. The male petals are not quite equal and in one Pulney plant one male petal of the lowest

flowers of the head is much large and projects beyond the bracts giving the head a fringed appearance, like that of *E. longicaspis*, but much less pronounced. This feature disappears in dried specimens, but the plant is different in appearing much later on in the year, on bank above the free surface of



D.R. Fyson

ERIOCAULON COLLINUM Hook.

water, not in swamps. In the Flora of the Nilgiris and Pulney Hill tops I separated two forms as new species, but a comparison of a very large number induces me to reduce these again to *E. collinum* Hook. f. with the assumption that the female sepals may vary as between the Ceylon and the S. Indian forms.

(To be Continued.)

INDIAN SPECIES OF ERIOCAULON, PL. 1.



ERIOCAULON SETACEUM L.

INDIAN SPECIES OF ERIOCAULON, PL. 2.



ERIOCAULON INTERMEDIUM

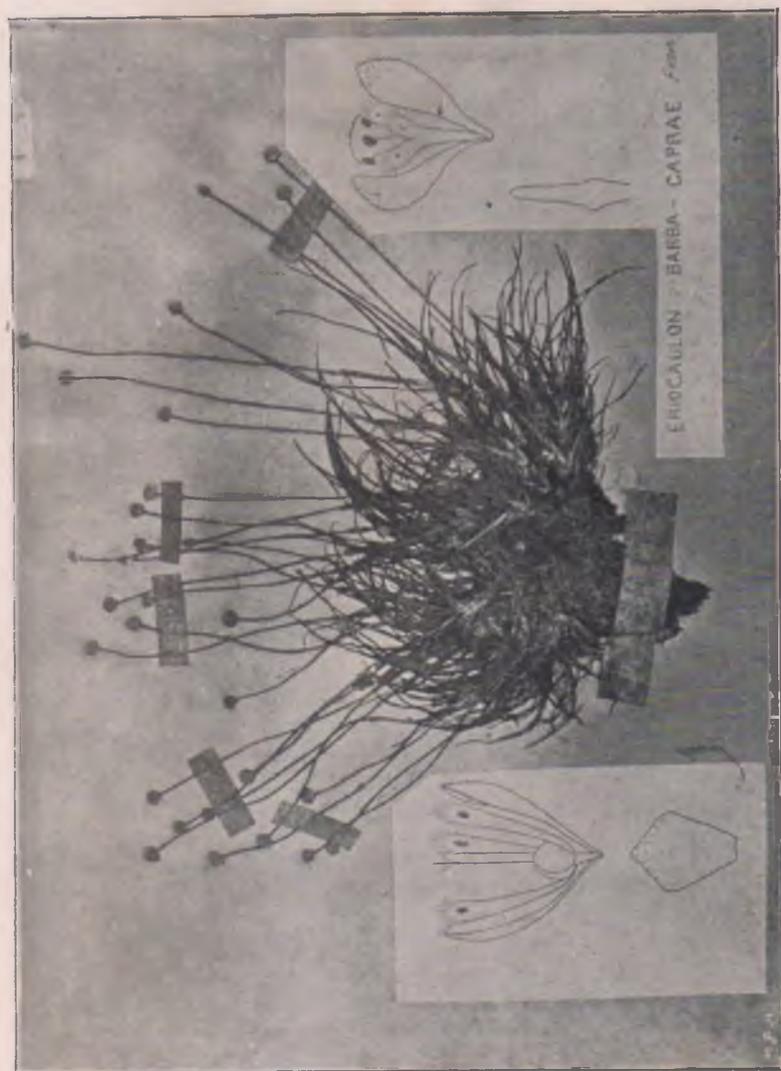
*Kern.*

INDIAN SPECIES OF ERIOCAULON, PL. 3.



ERIOCAULON COLLETTII

Hook f.

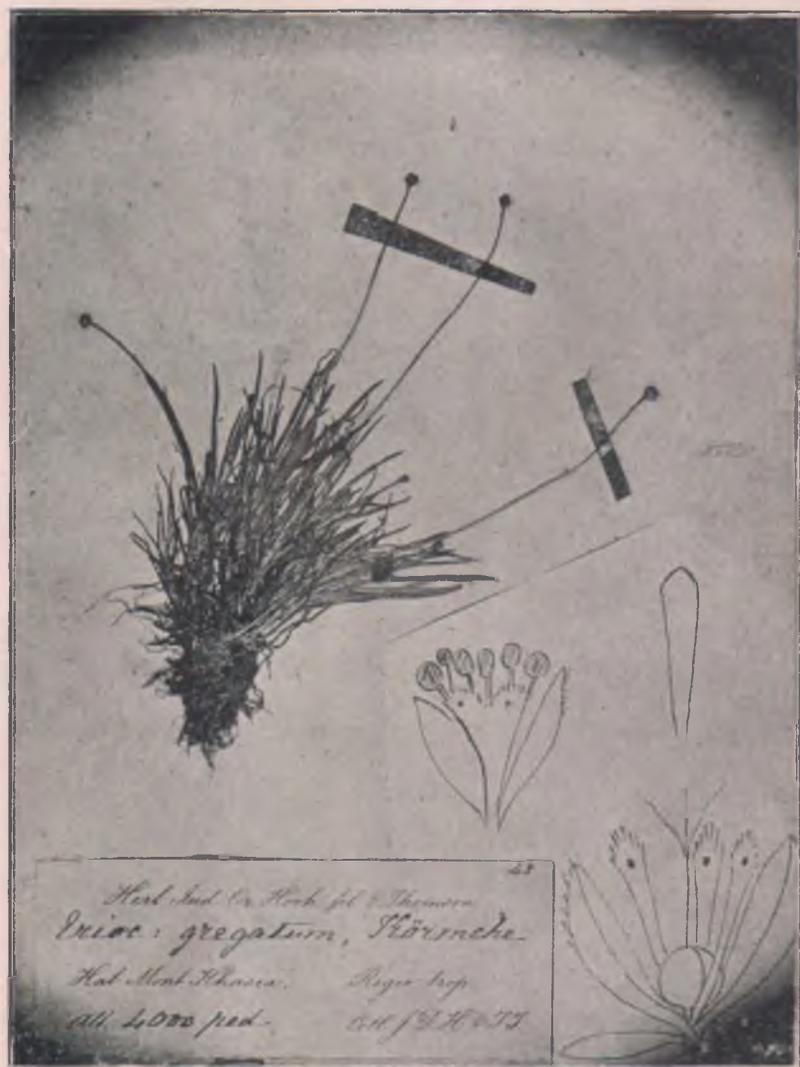


ERIOCAULON BARBA-CAPRAE *Forsk.*

*Fyson.*

ERIOCAULON BARBA-CAPRAE

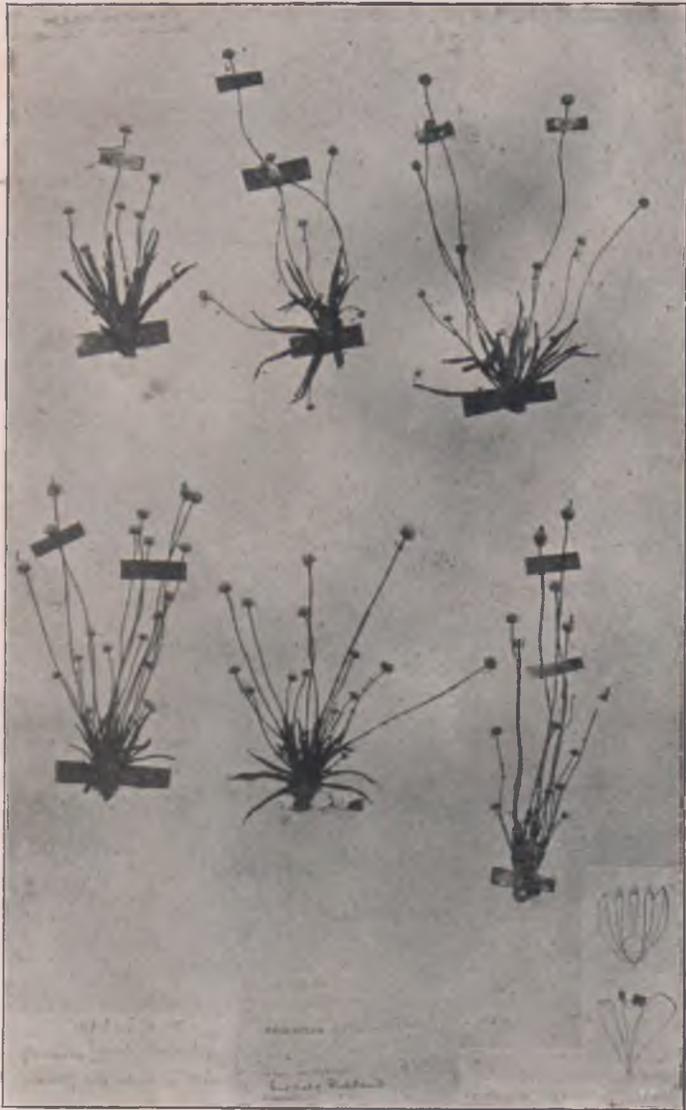
INDIAN SPECIES OF ERIOCAULON, Pl. 5.



ERIOCAULON GREGATUM

Kern.

INDIAN SPECIES OF ERIOCAULON, PL. 6.



ERIOCAULON NRPALENSE

*Trinell.*

INDIAN SPECIES OF ERIOCAULON, PL. 7.



ERIOCAULON PUMILIO

*Hook. f.*



ERIOCAULON DUTHIEI

*Hook. f.*

INDIAN SPECIES OF ERIOCAULON, PL. 8



ERIOCAULON LUZULAEFOLIUM

Mart.

INDIAN SPECIES OF ERIOCAULON, PL. 9.



*D. R. F. del.* ERIOCAULON QUINQUANGULARE L.

INDIAN SPECIES OF ERIOCAULON, Pl. 10.



ERIOCAULON TRILOBUM

*Haw.*