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membranacea nigrescentia; petiolus in foliis aequilateris 5 mm. longus ac alatus, vel 1-4 mm. longus exalatus, velutinus. *Spicae* 1.5 cm. longae, 2 mm. latae, apiculatae; pedunculus filiformis, 5 mm. longus, velutinus; bractae rotundato-subpeltatae, ciliolatae; stigmata sessilia.

BRITISH GUIANA. Moraballi Creek, Essequibo River, 1929, *Sandwith* 361 (typus) atque 19 (Herb. Kew.): low shrub in forest; leaves obscurely downy beneath.

Piper Wachenheimii *Trel.* sp. nov.

Frutex parvus, siccitate nigrescens; internodia satis gracilia, brevia, pilis rectis dense rubro-pubescentia. *Folia* lanceolata usque elliptica, subcaudate acuminata, basi cuneata, 11-15 cm. longa, 4-6.5 cm. lata, e dimidio inferiore pinnatinervia, nervis majoribus utroque latere costae 4-5, leviter revoluta, supra glabra nitida, subtus glanduloso-granulosa in nervis venisque longioribus rubro-hirsuta; petiolus circiter 10 mm. longus, rubro-hirsutus, haud vaginans. *Spicae* 0.4-8 cm. longae, cuspidatae; pedunculus 5-10 mm. longus, rubro-hirsutus. *Baccae* depresso-globosae, apice umbilicatae, granulosa; stigmata 3, sessilia.

FRENCH GUIANA. Godebert, *Wachenheim* 168 (Herb. Paris.).

BRITISH GUIANA. Moraballi Creek, Essequibo River, *Sandwith* 231 (typus in Herb. Kew.).

XLI—NEW OR LITTLE-KNOWN PLANTS FROM SOUTH INDIA: II.*

Arisaema Wightii *Schott* was first described in Bonplandia, 7, 26 (1859) from R. *Wight* 2774, now in the Herbarium of the Berlin Museum. There is no indication on the sheet as to the locality except the Kew distribution label bearing the printed heading "Peninsula Indiae Orientalis," so that *Schott's* authority for citing the habitat as: "Carnatic, Malabar," is not known to me. *Wight* 2773 in the Kew Herbarium, which contains this and another species of *Arisaema*, is from the Nilgiri Hills of S. India.

In De Candolle's *Monogr. Phaner.* 2, 555 (1879), Engler united *A. Wightii* *Schott* with the earlier *A. Jacquemontii* *Bl.*, a Himalayan plant. He did not cite *Wight's* specimen but mentioned *Hohenacker* 2164a from "Canara, Mangalor." In *Pflanzenr.* 4, 23 F, 196-7 (1920), however, Engler reconsidered his verdict and separated the two species again. Under *A. Wightii* he there quoted *Wight* 2774 together with a sheet of W. A. Talbot as derived from "Mysore, Kadua" (misprint for Kadur); but it is only Talbot's sheet that is from Mysore. This specimen is in fruit and is, I consider, not *A. Wightii* but *A. Leschenaultii* *Bl.* *Hohenacker* 2164a, previously cited, was altogether omitted under all three of the above species, unless, indeed, the citation was misprinted under the last named as *Hohenacker* 20504. As far as I am aware the *Hohenacker* numbers

*Continued from *K.B.* 1932, 247.

from S. India (collected for him by Metz) run to well below 6000, and as the next cited number is *Gamble* 20514, I think it is quite probable that 20504 is a slip for 2164a.

Professor E. Barnes of the Christian College, Madras, recently sent to Kew a number of specimens collected by him in the Nilgiri Hills, including a series of *Arisaema* most carefully and beautifully prepared, accompanied by photographs, notes and in two cases specimens in formalin. One of these is undoubtedly *A. Wightii* Schott, the others, as the collector himself points out, though allied, are distinct. These specimens have led me to revise the conception of *A. Wightii* that I had formed when working on the genus for the Flora of the Presidency of Madras, to separate out one new species which I had confused with *A. Wightii*, and to recognise two further new ones in the new material.

The material of *A. Wightii* as defined by me previously is all in a more or less dilapidated condition, hardly permitting a precise conception. From a scrutiny of the material now available and comparison with Wight's sheets (including the type, kindly lent by the Berlin Herbarium) and other sheets previously identified as this species, I have come to the conclusion that both Engler and myself confused two species and that the true *A. Wightii* Schott is confined to the Nilgiri Hills at elevations above 6000 ft. It is possible, however, if not probable, that further exploration will furnish specimens from the Anaimalai and Palni Hills. Further, I am inclined to think that Engler was right in combining *A. Wightii* Schott with *A. Jacquemontii* Bl. The absence of the plant from the areas between the Himalyas and the Nilgiri Hills does not invalidate this, since there is no region there of suitable climate and elevation. In contrast *A. tortuosum* Schott, being more accommodating, occurs in both ranges and also in intervening places at lower elevations. Nevertheless, not having seen the sheets of Jacquemont quoted by Blume, I do not at present propose to reunite them.

In view of this confusion and the rather meagre description given by Schott, I append an amplified description, based principally on Professor Barnes' excellent specimens. The three new species are also described below and the four may be distinguished as follows :

Limb of spathe expanded ; leaflets 5-7 :—

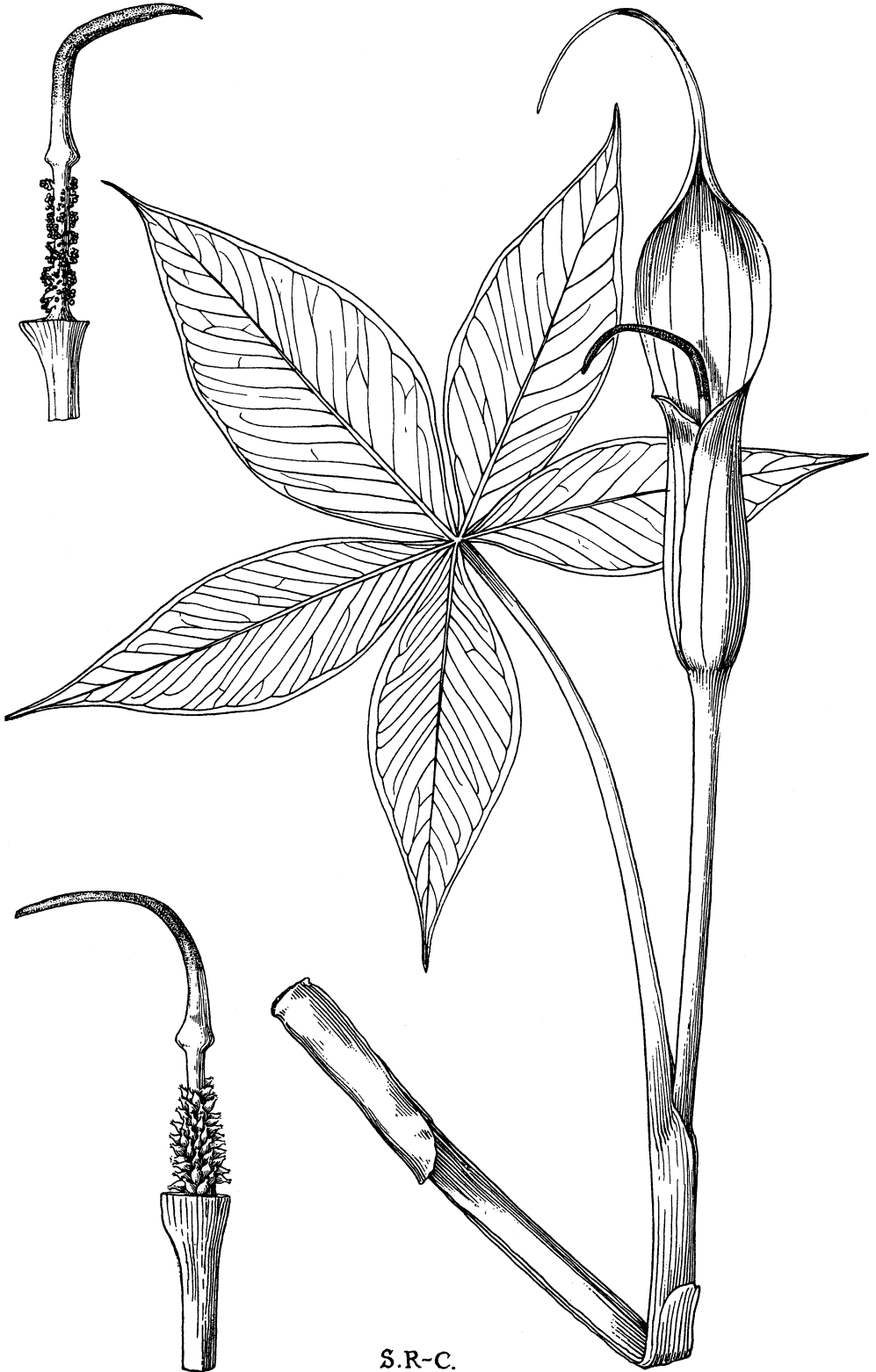
Leaflets 5, sessile or only the middle one very shortly petiolulate ; appendix abruptly swollen a little above the inflorescence.....
Wightii

Leaflets usually 7, sometimes 5, all distinctly petiolulate ; appendix not abruptly swollen :—

Limb of spathe dark-purple, tapering into a tail ; spadix not recurved*Barnesii*

Limb of spathe bright-green, suddenly narrowed into a tail ; appendix recurved at the apex.....*tylophora*

Limb of spathe cucullate ; leaflets 9-11.....*translucens*



S.R-C.

Fig. 1. *Arisaema Wightii* Schott. $\times \frac{1}{2}$.

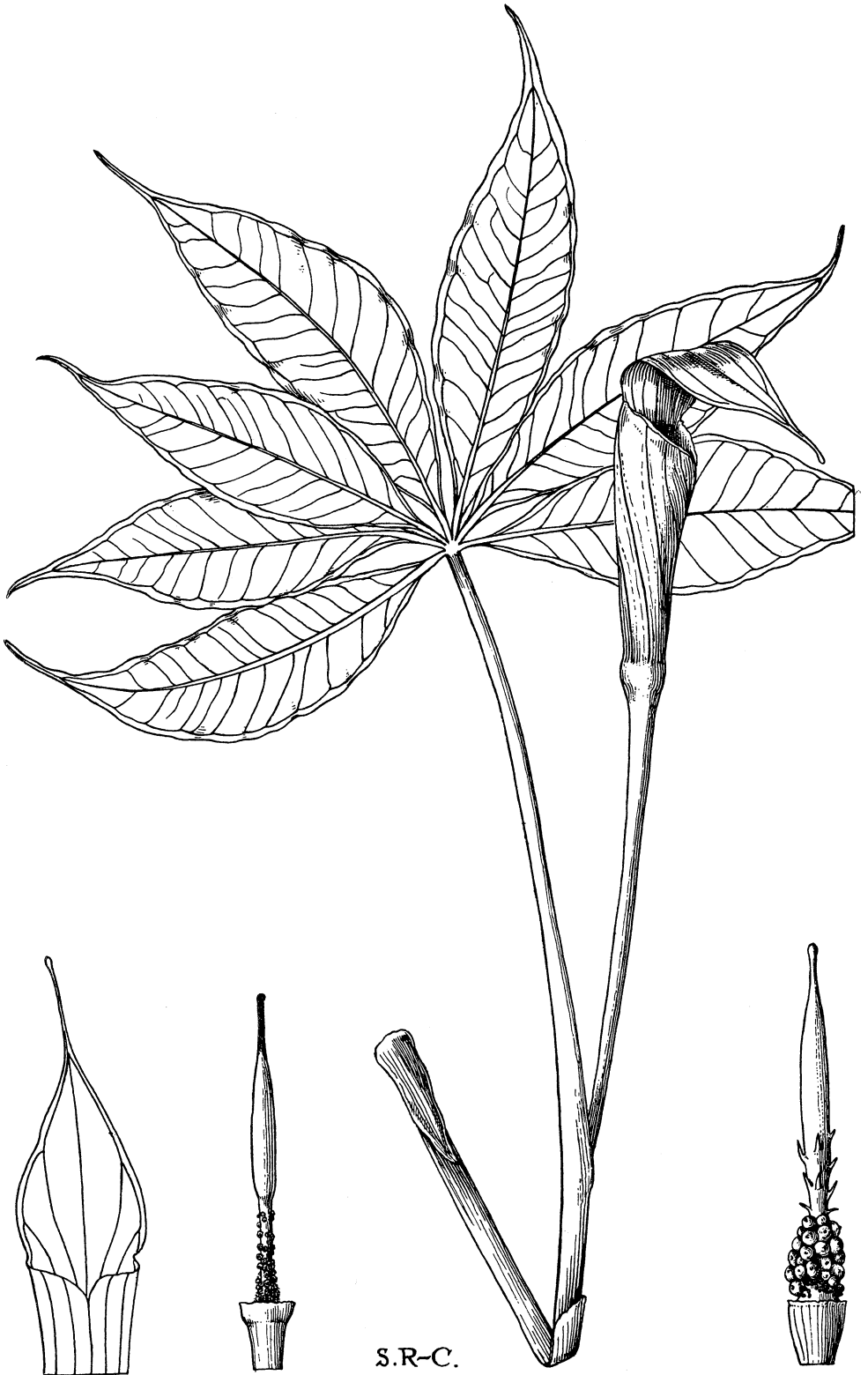
Arisaema Wightii Schott [Araceae-Aroideae].

Tuber subglobose, 1-1.3 cm. diam., flesh white. *Cataphylls* 3, lax, up to 24 cm. long, apex rounded, pale-greenish, almost white. *Petioles* 1-2, 27-48 cm. long, sheathing to above the middle, terete above, pale-green, mouth of sheath obliquely rounded; *segments* 5, radiate, elliptic-ovate to -obovate, acuminate, base acute, sessile or the median very shortly petiolulate, 2.4-10 cm. long, 1.2-5 cm. wide, primary nerves 8-12, arising at an angle of 45° from the midrib, 5-7 mm. apart, uniting in a submarginal vein 4-6 mm. from the entire margin with a more slender vein between, the nerves sometimes forked. *Peduncle* like the upper part of the petiole, usually shorter, sometimes longer, 24-49 cm. long. *Spathe* bright-green with 5 white vertical streaks and some fine white lines; tube nearly cylindrical, 3-7 cm. long, about 1.2 cm. diam. in the middle, where it is widest, margin at mouth slightly revolute; limb ovate-boat-shaped, tapering into a curved filamentous appendage 6-9.5 cm. long, the apical half of which is almost black. *Spadix* dioecious, 7-8.8 cm. usually the ♀ longer than the ♂. ♀ *inflorescence* cylindrical, 2.2-2.4 cm. long; *ovaries* crowded, pear-shaped, green with yellow streaks, 3 mm. long; *style* short, thick; *stigmas* minutely puberulous, surrounded by a black ring; *ovules* 4-5; *neuters* 0; *appendix* abruptly widened, sometimes truncately, at 5-8 mm. above the ovaries, then tapering to a long blunt point, white below, purple and recurved in the upper half. ♂ *inflorescence* 2-3.3 cm. long, cylindrical; *stamens* scattered, filaments thick, white, up to 1 mm. long; *anthers* broadly reniform, dark-purple, opening by an oblong slit; *neuters* 0; *appendix* like that of the ♀ but usually stouter, sometimes bent at a right angle and the tip more acute.

Wight 2774 without locality (type in the Berlin Herb.); Nilgiri Hills at Avalangy (Avalanche), about 7000 ft., fls. Oct., *Wight* 2773 (2 only out of 4 plants on the sheet); *Wight* without number or locality (in Kew Herb.), left hand plant only; Coonoor, fls. Sept., *G. King* without number; Shola in Hill West of Makurti Peak, 8000 ft., fls. June, *E. Barnes* AR.5.

Arisaema Barnesii C. E. C. Fischer, sp. nov. [Araceae-Aroideae]; *A. Wightii* Schott affine, sed minus, foliorum segmentis omnibus petiolulatis, spadice haud abrupte incrassata, appendice apice capitulata.

Tuber subglobose, 1-1.5 cm. diam. *Cataphylls* 3, lax, apex rounded, lowest short, becoming chaffy, uppermost up to 14 cm. long. *Leaf* solitary; *petiole* 20-40 cm. long, sheathing for about half its length, mouth of sheath oblique with 2 small rounded or subacute lobes; *segments* radiate, 5-7, distinctly petiolulate, elliptic-lanceolate, acuminate at both ends, 8-15 cm. long, 2.2-4.5 cm. wide, the lateral very slightly smaller, primary lateral nerves 9-18, 3-5 mm. apart, not very distinct from the secondaries, arising at an angle of 45° from the midrib, uniting in an intramarginal vein 2-3 mm. within the entire margins; *petiolules* 0.8-2 cm. long. *Peduncle*



S.R-C.

Fig. 2. *Arisaema Barnesii* C. E. C. Fischer. $\times \frac{3}{4}$.

terete, 8–30 cm. long. *Tube of spathe* cylindrical or very narrowly funnel-shaped, 5–7.5 cm. long, about 1 cm. diam., vertically striped with a number of dark-purple and whitish bands, margins united only at the base, slightly revolute at the mouth; *limb* horizontal, ovate, 3.5 cm. long, tapering into a filiform tail 0.8–3.3 cm. long, sometimes terminated by a minute knob, dark-purple streaked outside with green. *Spadix* straight; ♂ 5–6 cm. long, floriferous portion 1.5–2.2 cm. long, slightly tapering from a base 3 mm. in diam., bearing short, low, irregular, narrow ridges; *stamens* scattered, *anthers* subglobose, sessile or nearly so, purple, opening by a pore; *neuters* 0 or 1–2 above, subulate; *appendix* narrowly fusiform, widest at the middle, tapering to a short tail with a small minutely warty apical knob, dark-purple or pale below and the apex dark-purple, the basal portion with a few narrow ridges. ♀ *spadix* 7 cm. long, floriferous portions 1.7–1.9 cm. long; *ovaries* crowded, 3 mm. diam., subglobose, green, sometimes mixed below with a few purple stamens; *style* minute; *appendix* like that of the ♂ but rather stouter, greenish, purplish upwards, with a few subulate neuters on the lower third, above these up to halfway a few laminate ridges (fused neuters?).

Nilgiri Hills: Longwood Shola at Kotagiri, 6000 ft., fls. May, *E. Barnes* A.R.3 b. & c. (type in Kew Herb.); Gudarmalai, *E. Barnes* A.R.3a. N. Coimbatore: Bellaji, 5000 ft., fls. March, *C. E. C. Fischer* 900. S. Coimbatore: Anaimalai Hills at Sholear, 3300 ft., fls. May, *C. E. C. Fischer* 1951. "What appears to be the same plant was found in a shola near Naduvattam; the spathe of this is green and white instead of purple and white" (*Barnes*).

Arisaema translucens *C. E. C. Fischer*, sp. nov. [Araceae-Aroideae]; *A. Wightii* Schott affine, sed spathe limbo cucullato translucidovittato differt.

Tuber subglobose, 1.5 cm. diam., flesh white. *Cataphylls* 3, lax, uppermost 9 cm. long, apex rounded, pinkish-purple, lowermost becoming chaffy. *Leaf* solitary; *petiole* sheathing the peduncle below the middle, terete above, 35 cm. long, pinkish-purple with brown and pink markings or pink with brown and white markings; *segments* radiate, 9 on the ♂ plant and 11 on the ♀, narrowly elliptic-oblongate, finely acuminate, base tapered, sessile, 9–14 cm. long, 1.7–2.8 cm. wide, dull velvety green above, slightly glossy below, midrib and numerous primary lateral nerves prominent below, the latter 2–3 mm. apart, arising at an angle of about 30° from the midrib, uniting in an intramarginal vein 1–2 mm. within the revolute, erose margins. *Peduncle* about 20 cm. long, resembling the upper part of the petiole, but much more slender. *Tube of spathe* nearly cylindrical, slightly widened to the mouth, 3.5–4.3 cm. long, 1–1.3 cm. diam. at the mouth, white with a few vertical green and purple striae; *limb* 2.5 cm. long, with 6 broad purple stripes continued onto the upper two-thirds of the tube, and converging at the apex, the bands between translucent; *limb* cucullate, leaving a narrowly

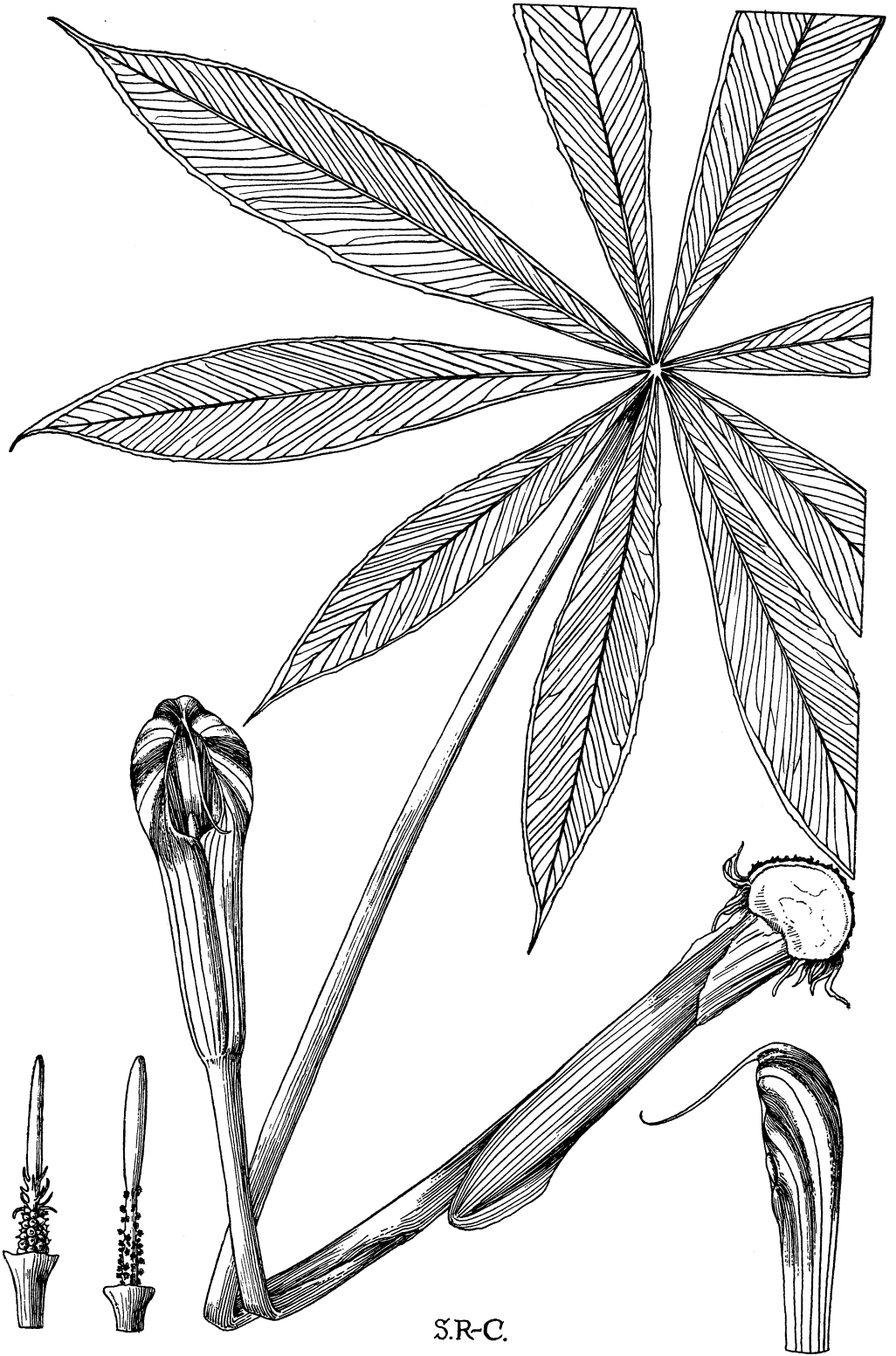


Fig. 3. *Arisaema translucens* C. E. C. Fischer. $\times \frac{3}{4}$.

obcordate opening from the apex of which depends a filiform process 2.5–3 cm. long with an upcurved tip. *Spadix* 4–5.4 cm. long, dioecious, green with faint purple striae, the apical quarter white : ♂ inflorescence 2 cm. long, nearly cylindric ; *stamens* scattered, *filaments* thick, up to 1.5 mm. long, *anthers* subglobose, purple, opening by an elliptic pore ; *neuters* 0 ; *appendix* narrowly clavate, slightly narrowed and rounded at the apex ; ♀ *inflorescence* 1–1.5 cm. long ; *ovaries* crowded, subglobose, 1.5–2 mm. diam., *style* very short, *stigma* minutely papillose, *ovules* 4 ; *neuters* above the ♀ inflorescence, scattered, subulate, 5 mm. long, rarely with an anther (functional ?) at the tip ; *appendix* awl-shaped, apex blunt, sometimes much narrowed below the apex and again slightly widened at the tip.

Nilgiri Hills : Carrington Tea Estate near Thia shola, 6000 ft., fls. June, *E. Barnes* AR.4.

Among the paintings in the Kew Herbarium is one drawn by the late Mrs. A. F. Broun at Travancore in 1929 which appears to be this plant, although the filiform appendage of the spathe is shown much longer and without an upturned tip.

Prof. Barnes writes of this species : “ A very characteristic species. I found it on the edge of a shola about a mile south of Thia shola. *Biophytum polyphyllum* is also common there. At first I thought the plant was deformed, but we (my wife and I) soon found other similar ones. The purpose of the arrangement seems fairly obvious ; flies of some kind attracted by the smell (not more noticeable than with other *Arisaemas*), settle on the thread-like appendage of the spathe. From this position they are attracted by the white end of the appendix of the spadix, which is clearly visible owing to the light that enters through the translucent parts of the spathe.

Arisema tylophorum *C. E. C. Fischer*, sp. nov. [Araceae-Aroideae] ; *A. Barnesii* *C. E. C. Fischer* peraffine, sed spathae limbo claro-viridi abrupte-caudato, spadice appendice recurvata differt.

Tuber spherical, 1 cm. diam. ; producing bulbils ; rootlets red. *Cataphylls* 3, lax, apex rounded, uppermost up to 13 cm. long, spotted with brown, becoming chaffy. *Leaf* solitary ; *petiole* sheathing below the middle, light-green marbled with brown and pink, 19–26 cm. or more long ; *segments* radiate, usually 7, sometimes 5, petiolulate, elliptic-lanceolate to elliptic-oblancheolate, acuminate or caudate-acuminate, base acute, 5.3–26 cm. long, 1.6–9 cm. wide, primary lateral nerves 8–17, 5–10 mm. apart, uniting at an angle of 45° with the midrib, uniting in an intramarginal vein 1.5–6 mm. from the erose margin, upper surface dark-green with a waxy lustre, lower bright green and very glossy ; *petiolules* 1–1.8 cm. long. *Peduncle* slender, up to 18 cm. long, coloured as the petiole. *Tube of spathe* cylindric or very narrowly funnel-shaped, 2.5–4.5 cm. long, 1–1.2 cm. diam. at the mouth, white with vertical purple stripes within ; *limb* bright-green, ovate, abruptly caudate, 1.5–2.5 cm. long, overarching, the filamentous tail 0.8–2 cm. long,

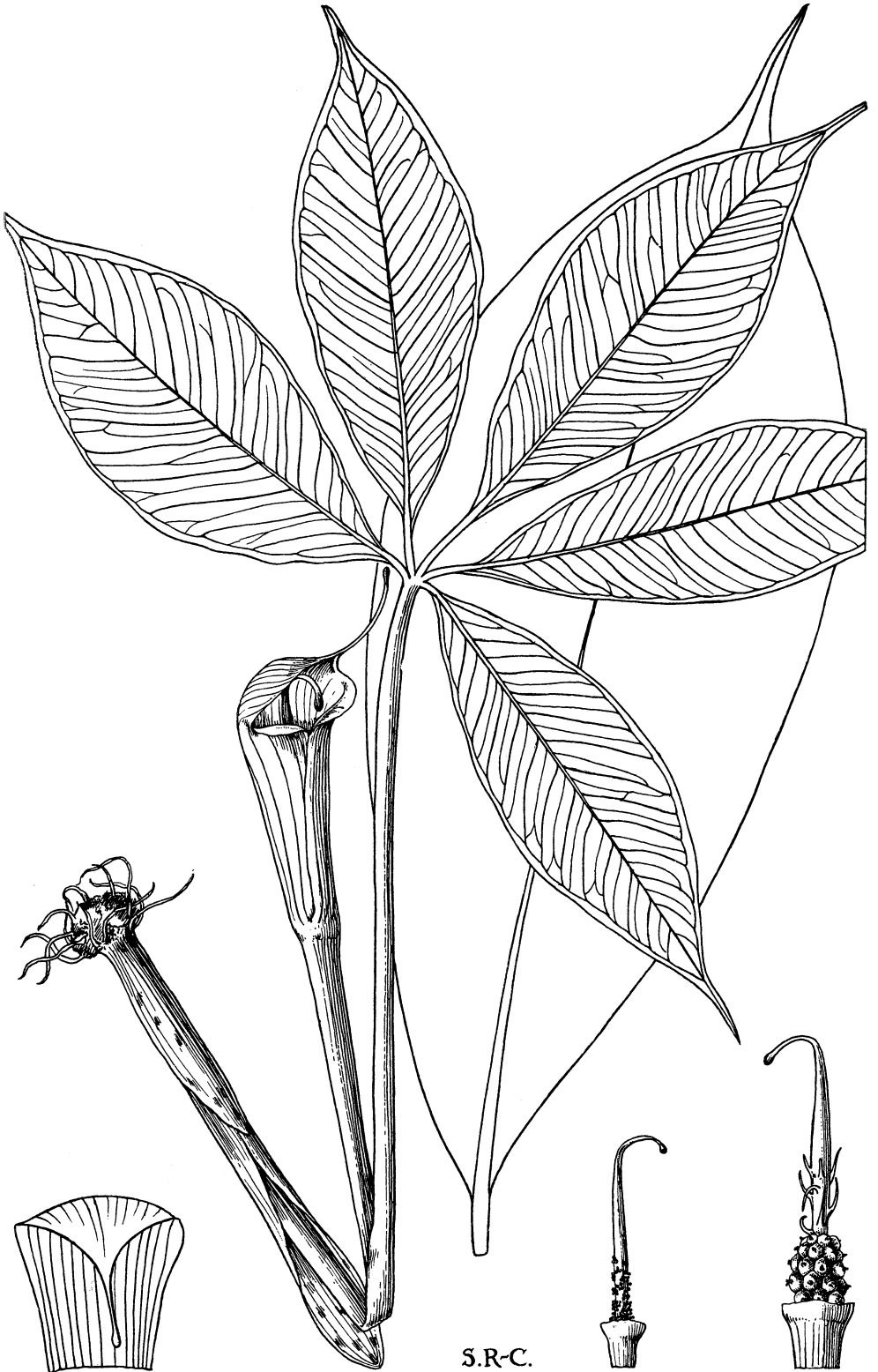


Fig. 4. *Arisaema tylophorum* C. E. C. Fischer. $\times \frac{2}{3}$.

upcurved at the apex and terminated by a distinct small spherical or clavate knob. *Spadix* dioecious or the ♀ with a few anthers among the ovaries; ♂ 4 cm. long, the floriferous portion elongate-conical, 1.2–1.7 cm. long, *stamens* scattered; *anthers* purple, spherical, sessile, opening by a pore; *neuters* 0; *appendix* nearly cylindrical, hardly thicker than the floral axis, narrowed and curved near the apex, terminating in a distinct, minutely-warted knob. ♀ *spadix* 5.5–6.5 cm. long, floriferous portion 0.8–2 cm. long; *ovaries* usually crowded, sometimes a little separated with a few anthers between, globose, green, 2 mm. diam.; *style* stout, 1 mm. long; *stigma* minutely papillose; *ovules* 4–6; *appendix* cylindrical, hardly incrassate, beset below with subulatae, rarely forked, neuters up to 6.5 mm. long, attenuate and recurved near the apex, terminating in a subclavate, minutely-warted knob.

Nilgiri Hills: Thaishola, 6000 ft., fls. June, *E. Barnes* AR.6 C, D, E (type in Kew Herb.); Gudarmalai, in wet shola, fls. May, *E. Barnes* AR.6 A, B; Avalanche bungalow, in wood, fls. April, *Viscount Gough* without number.

“ This plant was found in flower in a shola about a mile from Naduvattam beyond the Cinchona Plantation, on 17.5.1932, and also on 20.6.1932, and was found to be very common in Thaishola, where many specimens were seen flowering on 16.6.1932. In both these sholas *A. Leschenaultii* Bl. also occurred and also what appeared to be a cross or intermediate form. The spathe had the coloration of the plant described above, but the shape of *A. Leschenaultii*, the appendage was club-shaped, the leaflets were like those described above but were sessile or nearly so ” (*Barnes*).

In addition Professor Barnes has supplied the subjoined notes on two other species :

“ AR 1. *Arisaema Leschenaultii* Bl. Very common in Longwood Shola, Kotagiri, flowering in June. A census of all plants seen was taken in respect to the following factors:—(a) sex, (b) number of leaflets, (c) whether left side of spathe overlapped the right, or vice versa. (Right means observer’s right.) The following were the results:—

(a) 253 male, 28 female.

(b) *male* 2 with 5, 5 with 6, 96 with 7, 80 with 8, 50 with 9, 16 with 10, 4 with 11.

female 3 with 8, 6 with 9, 12 with 10, 4 with 11, 3 with 12.

(c) Right side over left, 7 females, 59 males.

Left side over right, 7 females, 45 males.

It is seen that the male plants are about nine times as numerous as females, that male plants mostly have 7, 8, or 9 leaflets, and females mostly have 10, and that half, or a little more, of the plants have the right edge of the spathe overlapping the left.

Female plants were generally larger than males, and were more numerous where conditions were more favourable. The largest male seen was 3 ft. 10 inches high; the largest plant seen was a female,

and had the following measurements : *height* 5 ft. 2 in., *circumference* at least 3 in. from the ground, 6¼ in. (it grew in a stream-bed partly choked up with other plants and the bottom of the stem could not be reached), *length of spathe* 11 in., *greatest width* 3¼ in., *length of spadix* 6 in., *leaflets* 13 in. by 14 in. (12 leaflets).

One plant found had no leaf, but the spathe was divided into five. Several plants had two leaves, but this is rare.

There is a definite difference in colour of plants found in different parts of the Nilgiris. In Longwood Shola the colour of the spathe is green with white striations and some purple striations inside the tube ; the plants have a tall habit. In a shola on the Kundahs near Pirmund the spathe is dark purple-red with white striations and the plants are very squat with stout stem and spadix. Near Naduvattam the spathe colouration is yellow and white. There is also a great difference in shape of leaflets ; in some plants they are so broad that they overlap, while in others they are quite narrow ; some leaflets were very frilly, while others were flat.

AR 2 *Arisaema tortuosum* Schott. Fifty specimens that were flowering in Banagudi Shola (about 5500 ft.) near Aravenu, in the first week of June were examined. 26 were found to be male, and 24 monoecious.

Monoecious—2 leaves had 7 leaflets, 5 had 8, 32 had 9, 4 had 10, 4 had 11, 1 had 12. Each plant had 2 leaves.

12 had right edge of spathe over left, 3 had left over right, the rest were open so wide as not to overlap.

Males—5 leaves had 5 leaflets, 4 had 6, 37 had 7, 6 had 8. Each plant had 2 leaves. 10 had right edge of spathe over left, 3 left over right, and rest open.

It is seen that about equal numbers of plants are monoecious and male, that the average number of leaflets for monoecious plants is 9 and for males 7, and that generally the right edge of the spathe overlaps the left.

The largest specimen seen was monoecious, and was 3 ft. high. When the spathe withers after flowering it becomes almost white tinted with orange."

Arthraxon depressus Stapf MS. sp. nov. [Gramineae-Andropogoneae]. *A. lanceolato* Hochst. proximus sed robustior, foliis rigidis latioribus, glumis majoribus edentatis differt.

An erect *herb.* *Roots* not seen. *Culms* slender, quite glabrous, leafy. *Leaf-sheaths* terete, tight, finely ribbed, glabrous, margins ciliate ; *ligules* thin, scarious, 2 mm. long, erose-truncate, glabrous or sparsely hairy ; *blades* rigid, narrowly lanceolate, to ovate or elliptic-oblong, acuminate or cuspidate, base cordate, 5–9 cm. long, 1–2.6 cm. wide, 9–15 nerved, glabrous except for short hairs scattered along the midrib below, margins minutely tubercled, often with stiff cilia from the tubercles. *Inflorescence* terminal, of 2–4 simple or branched peduncled spikes 2–5 cm. long ; peduncles long- or short-exserted,

puberulous or pubescent, at least near the apex; partial peduncles slender, pubescent, 1–2 cm. long; joints of the rhachis slightly compressed, very little enlarged at the apex, 3.5–4.3 mm. long, long-ciliate; pedicels linear, flat, 2.2–3.5 mm. long, long-ciliate, devoid of glumes. *Spikelets* narrowly elliptic. *Callus* 0.07–0.08 mm. long, short-hairy. *Glumes* brown or olivaceous; the lower subcoriaceous, narrowly lanceolate, apex acute, minutely 2-toothed, 2-keeled with inflexed margins, back nearly flat, 5–6.8 mm. long, 6–7-nerved, nerves, especially the marginal, spinulose at least in the apical half; the upper chartaceous, deeply plicate-navicular, acuminate or mucronate, 5.4–7 mm. long, keel scaberulous towards the apex. *Lemmas* hyaline, plicate, sometimes brownish, margins ciliate; the lower 4.6–6.2 mm. long, epaleate and empty; the upper 4.2–5.6 mm. long, sometimes very shortly 2-lobed, bearing on the back just above the base a geniculate awn 10.7–12 mm. long, the longer part below the knee partly black, striate, glabrous, above slender, pale-brown, minutely ascendingly barbellate; palea hyaline, narrowly oblong, subacute, 2.5 mm. long. *Floret* ♀, stamens 3, anthers 2.5–3.6 mm. long. *Grain* not seen.

Peninsula, precise locality not indicated, *Herb. Wight* 3372 (type in Kew Herb.); Mysore State, Agalatti, 3500 ft., Nov., *Meebold* 10545.

The narrowly lanceolate leaves and the shorter glumes are found in Meebold's specimen.

Arthraxon villosus C. E. C. Fischer, sp. nov. [Gramineae-Andropogoneae]; ab omnibus congeneribus spicularum sessilibus glumis inferioribus anguste alatis villosis recedit.

A slender *herb.* *Roots* not seen. *Culms* very slender, branched, glabrous except the sparingly hairy nodes. *Leaf-sheaths* lax, much shorter than the nodes, ribbed, sparsely hairy from minute tubercles, ciliate; ligules very short, membranous, truncate, ciliate; blades flaccid, lanceolate, acuminate, base subcordate, 3–4.5 cm. long, 1–1.5 cm. wide, softly hairy on both sides and ciliate, all the hairs from minute tubercles. *Racemes* 2, digitate, 2–2.5 cm. long; peduncles long or shortly exserted, glabrous; partial peduncles slender, angular, one very short with 1 or 2 solitary sessile spikelets differing from and larger than the rest, followed by a long joint, the other peduncle up to 1 cm. long; joints of the rhachis slender, depressed plano-convex, 3.5 mm. long, back 3-nerved, white villous, sides long white-ciliate. *Spikelets* 2-nate, except the 1–2 lowest, one sessile the other pedicelled; pedicels like the joints but wider and not nerved on the back. *Sessile spikelets* at the base very narrowly lanceolate; lower *glume* with a glabrous oblong callus 1 mm. long, narrowly linear-lanceolate, acuminate, 7–8 mm. long, 7-nerved, back subcoriaceous, slightly convex, margins widely hyaline, 3-keeled above the middle, keels hispidulous; upper glume plicate, acuminate, chartaceous, white with wide hyaline margins, keeled, glabrous; *lemmas* hyaline, plicate, acuminate, 4.3 mm. long, the

upper bearing a geniculate awn 11–12 mm. long from a little above the base on the back, paleas 0, floret ♂. The remaining *sessile spikelets* linear-lanceolate; *glumes* dissimilar, the lower with a semi-circular hairy callus 0.6 mm. long, narrowly lanceolate, acuminate, 5.4–6 mm. long, 7-nerved, back slightly convex, subcoriaceous, densely villous, 2-keeled, the membranous, villous margins widely inflexed, keels narrowly winged, wings densely ciliate; upper glume 4.7–5.3 mm. long, plicate, acuminate, white, thinly chartaceous with hyaline margins, keel and sides below the middle puberulous; *lemmas* hyaline, epaleate, lower narrowly oblong, obtuse, 2.7–3.2 mm. long, empty, the upper plicate, acute or acuminate, 3–3.7 mm. long, bearing on the back from a little above the base a fine geniculate awn 11.5–13 mm. long, the shorter portion below the knee pale-brown, smooth, the upper portion darker, at least below, minutely ascendingly barbellate, its floret ♂, lodicules minute, stamens 2 or 3, anthers linear, 1.3–1.9 mm. long. *Grain* not seen. *Pedicelled spikelets* without callus; *glumes* dissimilar, the lower ovate-lanceolate, acute, slightly convex, membranous, 6–8-nerved, 4–4.5 mm. long, pubescent, 2-keeled towards the apex, keels hispidulous; upper glume thinly membranous, white, plicate, acute, 3-nerved, glabrous or sparsely ciliate; *lemmas* hyaline 2.4–2.7 mm. long, narrowly oblong, epaleate, empty.

Bababudan Hills, April, *Sir A. G. and Lady Bourne* without number (type in Kew Herb.).

The single sheet has 3 separate sections of stem, all apparently from the same plant, but the lower part is lacking.

Dimeria bialata C. E. C. Fischer, sp. nov. [Gramineae-Andropogoneae]; *D. pusillae* Thw. var. *Lawsoni* Hook. f. similis, sed rhachibus latioribus, glumis inferioribus alatis differt.

An annual *herb*; culms slender 7–40 cm. high; nodes 3–6, short at the base and increasing in length upwards, the uppermost often much exserted. *Leaves* erect, more or less densely beset with lax, spreading hairs from bulbous bases; sheaths closely embracing the culm, finely striate; blades linear, flat, sharply acute, nearly continuous with the sheaths, 2.5–7 cm. long, 2–5 mm. wide, midrib prominent below, continued into the sheath as a keel, lateral nerves 4, indistinct, margins revolute; ligules membranous, semicircular or shortly oblong, glabrous. *Racemes* 2-nate, divaricate, 0.7–2.7 cm. long; rhachis flat, 1 mm. wide, with a zig-zag blunt keel on the face, margins more or less densely ciliate; internodes less than half as long as the upper glume; pedicels short; callus short, white hairy. *Spikelets* 10–30, oblong-lanceolate, wider than the rhachis. Lower *glume* linear-oblong, acute or acuminate, 3–4 mm. long, margins hyaline, keel narrowly winged and ciliate; upper glume oblong-lanceolate, 3.4–4.2 cm. long, acuminate, margins hyaline and ciliate, keel broadly winged and ciliate, the wing rather corky. *Lemmas* hyaline; lower spatulate, 1.5–2.5 mm. long, sparsely ciliate;

upper 2.5–3.6 mm. long with a slender, geniculate awn 9–11 mm. long. *Anthers* 2, oblong, 1 mm. long.

S. Kanara District at Siradi, Nov., *A. Meebold* 10548 (type), 10752. "Abundant, predominant in places."

Ischaemum Rangacharianum *C. E. C. Fischer*, sp. nov. [Gramineae-Andropogoneae]; *I. semisagittato* Roxb. peraffine, sed foliis haud sagittatis, spicularum sessilium glumis inferioribus angustis nodulis marginalibus plus minus carinatis differt.

Perennial tufted herb. *Stem* erect or ascending from a prostrate, rooting base, 25–40 cm. high, leafy; nodes glabrous. *Leaf-sheaths* lax, ribbed, glabrous or more or less hairy along the margins and at the apex; ligules membranous, oblong, rounded, 1.5–4 mm. long, glabrous or pubescent; blades linear to linear-lanceolate, acuminate, base rounded or emarginate, sessile or petioled, 2–8.5 cm. long, 0.3–1 cm. wide, glabrous or more or less hairy on both faces, margins smooth or scaberulous; petioles 0–2.2 cm. long. *Peduncles* usually long-exserted, usually somewhat enlarged at the apex, glabrous. *Racemes* usually binate, rarely solitary, 2.5–7 cm. long; rhachis undulate; joints acutely trigonous in section or the outer angle blunt, enlarged to the 3-toothed apex, 3.7–4.8 mm. long, outer angle long hairy. *Spikelets* 2-nate, one sessile the other pedicelled; pedicels 1.8–2.5 mm. long, similar to the joints of the rhachis, separated from the lower glume by a groove. *Sessile spikelet*: *callus* turbinate, 1.2–2 mm. long, hairy below, separated from the glume by a groove; *lower glume* obliquely lanceolate, 4.6–6.5 mm. long, nearly flat, 2-keeled with narrowly inflexed nearly straight margins, basal portion stiffly chartaceous with 2–6 coriaceous, rather acutely ridged nodules on each margin, the back between smooth, apical part membranous, 5–7-nerved, the keels winged, wings broad on one side and narrow on the other, minutely ciliate, often purplish or reddish, the glume glabrous or minutely puberulous, sometimes with a few long hairs on the upper half; upper glume membranous, boat-shaped acuminate, strongly keeled, sometimes shortly cuspidate, 4.5–5.7 mm. long, minutely puberulous; *lemmas* hyaline, the lower narrowly lanceolate, acute, margins narrowly inflexed, its palea similar but with wider marginal flaps, containing two narrowly oblong to broadly obtusate lodicules with truncate or lobulate apex and shortly produced outer angles and 3 stamens with linear anthers 3 mm. long; the upper lemma narrowly oblong or elliptic-lanceolate, 3.6–4.7 mm. long, 2-lobed for $\frac{1}{2}$ – $\frac{3}{4}$ of its length, lobes acute, with a geniculate awn from the sinus, awn 1–1.7 cm. long, the portion below the knee shorter, compressed, dark, smooth, the upper part pale-brown, compressed below and setaceous at the apex, minutely barbellate, the palea lanceolate with widely inflexed margins, containing 2 lodicules similar to those of the lower floret, 3 stamens and a pistil; grain ellipsoid, slightly compressed, 2 mm. long, smooth, brown. *Pedicelled spikelet*: *lower glume* narrowly lanceolate sometimes oblique, acute, flat, chartaceous, 2-keeled, 4.6–6.7 mm.

long, glabrous or sparsely hairy, one keel with a wide wing, sometimes toothed at the apex, the other very narrowly winged at the apex, margins narrowly inflexed, sometimes with 1-4 marginal nodules on one or both sides below the middle; *upper glume* similar to that of the sessile spikelet, 3.5-5.3 mm. long; *lemmas* hyaline, the lower similar in all respects to that of the sessile spikelet, the upper boat-shaped, acuminate and sometimes shortly aristate, keeled, margins with wide flaps at the apex and narrower below; 2.8-3.7 mm. long, the palea shorter, linear-lanceolate with inflexed margins, containing lodicules and a pistil and sometimes anthers as in the sessile spikelet.

Malabar District: Shoranur, Nov., *K. Ranga Achariyar* (type in Kew Herb.); Pudupadi, Nov., *K. Ranga Achariyar*; Melarkode, Dec., *Madras Herb.* 16356. Travancore: Courtallam, Dec., *M. Rama Rao's* Collector 2104; "Beyond Varkalay Bridge," Nov., *Madras Herb.*; "On the way from Kulathurpuzha to Rockwood Estate," *K. Venkoba* 4102, 4104; without precise locality, *V. Narayanaswami* 1743.

Fig. 130 of *Ischaemum aristatum* K. Ranga Achariyar non Linn. in *K. Ranga Achariyar's* "Handbook of Some South Indian Grasses" appears to have been drawn from the type sheet or that from Pudupadi.

***Ischaemum travancorense* Stapf MS.** sp. nov. [Gramineae-Andropogoneae]; *I. magno* Rendle affine, foliis glabris, petiolis tomentosis, lemmate superiore spicularum sessilium profunde 2-lobato differt.

A perennial herb. Culms subrobust, erect or ascending, up to 80 cm. high; nodes glabrous. *Leaf-sheaths* terete, smooth, the lower somewhat inflated and longer than the internodes, the upper close and shorter than the internode; ligules scarious, subacute or rounded, up to 4 mm. long; blades narrowly lanceolate, acute or acuminate, base rounded, often contracted into a very short tomentose petiole, margins spinulose-scabrid, otherwise glabrous. *Racemes* terminal, spiciform, 2-nate; peduncles shortly or considerably exserted, rigid, erect; rhachis slightly undulate; joints stout, obtusely trigonous in section, 3-6 mm. long, hollow, glabrous or sparsely ciliate on the back; pedicels 2.5-3 mm. long, similar to the joints, sometimes curved. *Sessile spikelet*: *callus* semi-annular, confluent with the bases of the joint and pedicel, 0.5-0.7 mm. long, glabrous or sparsely hairy; *lower glume* oblong, acute, 4.5-6 mm. long, 2 mm. wide, the basal $\frac{2}{3}$ coriaceous with 2-6 marginal nodules on either side, the disc between smooth or shallowly transversely rugose, the apical $\frac{1}{3}$ chartaceous, darker, 2-keeled with narrowly inflexed margins, often one or both keels narrowly winged; *upper glume* boat-shaped, acute, acutely-keeled, as long as the lower glume; *lemmas* hyaline, the lower lanceolate, acute, with narrowly inflexed margins, 4-5 mm. long, containing 3 stamens with linear anthers 3 mm. long, the upper narrowly oblong, 3.5-4.5 mm. long,

acutely 2-lobed for about half its length, with a geniculate awn up to 1 cm. long from the sinus, sometimes the awn not exceeding the lobes or even absent, the palea linear-oblong with widely inflexed margins, containing 3 stamens and a pistil. *Pedicelled spikelet*: *lower glume* oblong-lanceolate, often oblique, acute, 4-7 mm. long, 3 mm. wide, subcoriaceous, pale, smooth or rugulose towards the base, 2-keeled with narrowly inflexed margins, the exterior keel with a broad wing, the other narrowly winged; *upper glume* and *lower lemma* similar to those of the sessile spikelet; *upper lemma* hyaline, lanceolate, acute, entire, margins inflexed, 3.5-5 mm. long, its palea linear-lanceolate with widely inflexed margins, containing 3 stamens and a pistil.

Travancore: Alleppy in backwaters, Dec., *M. A. Lawson* 130 (type in Kew Herb.); Kumaragam near Kottayam, aquatic, *K. Venkoba Rao* 4070. Wynaad: Mudumallai, without number or collector's name (probably a *Beddome* specimen), in Kew Herb.

Ischaemum corollatum Nees ap Steud. Synops. 369, has been placed among the "doubtful species" by both Hackel (Monogr. Phan. 6, 252) and Hooker (Fl. Brit. Ind. 7, 139). Having seen the type sheet (*Royle* 264) I find that it is identical with *Phacelurus speciosus* (Nees) C. E. Hubbard (= *Andropogon speciosus* Nees ap Steud Synops. 1, 375), the type of which (*Royle* 263) is also in the Berlin Herbarium. In the first-named specimen the pseudospike is solitary and in the latter there are four.

Rottboellia divergens Hack. was described in De Candolle's Monogr. Phanerog. 6, 292 from a plant collected by Huegel, which is now in the Royal Museum at Vienna. The locality of collection is cited as "Asia (versimiliter India or)."

Lisboa in the Journ. Bomb. Nat. Hist. Soc. 6, 195 (1891), referred a plant collected by himself at Mahableswar to this species, but expressed his doubts of the correctness of the determination. In the Fl. Brit. Ind. 7, 155 (1897), Lisboa's as well as some plants collected by Ritchie are referred to this species and the habitat is given as: "East Indies, *Huegel*. The Concan and Canara; Belgaum, *Ritchie*; Satara and Mahableswar, *Lisboa*."

By the courtesy of the Director of the Vienna Museum I have been able to compare Lisboa's and Ritchie's plants and some further material collected by Meebold with the type specimen and find that none of them agrees with it. These specimens, therefore, represent a distinct species.

R. divergens is described as having the lower glume of the sessile spikelet "cancellato-foveolata" on the back. These pits are due to the crossing of deep longitudinal grooves by very narrow transverse laminae or lines of papillae. The specimens quoted above are distinguished by the corresponding glumes being furnished with hooked spinules and long awns.

As shown by O. Kuntze, the section of the genus *Rottboellia* to which the species in question belongs should be segregated under the generic name *Manisuris* Linn. f.

As Lisboa's, Ritchie's and Meebold's plants are not *M. divergens* (Hack.) O. Ktze., a new specific name must be provided for them, and I propose *forficulata* in view of the resemblance of the lower glume of the sessile spikelet to a pair of shears.

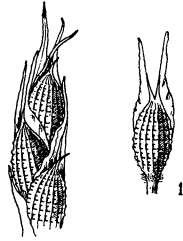


Fig. 5. *Manisuris divergens* (Hack.) O. Ktze.
Lower glume of sessile spikelet. $\times 4$.

Since the closely allied species *M. acuminata* (Hack.) O. Ktze. and *M. Talboti* (Hook. f.) both come from the Bombay Ghats and coast, it is probable that Huegel collected his specimen in the hills East of Bombay on his way to the Himalayas.

As the material of *M. forficulata* previously available was scanty, an amplified description based on all the material seen by me is appended.

Manisuris forficulata C. E. C. Fischer, nom. nov. [Gramineae-Andropogoneae]; *M. divergens* (Hack.) O. Ktze. affinis, sed spicularum sessilium glumis inferioribus marginibus spinulosis differt.

Annual herb. Culms tufted, very slender, 6.25 cm. high, terete, slightly enlarged below the racemes, glabrous or more usually softly subappressed-hairy; nodes 2-3, glabrous, marked by a dark-coloured (when dry) constriction. Leaves basal and cauline, hirsute with fine hairs from minute tubercles; sheaths lax, compressed, striate; ligules membranous, rounded, short, glabrous or ciliate; blades narrowly linear, conduplicate or flat, finely acuminate, 4-12 cm. long, 1-5 mm. wide. Racemes terminal, solitary, spiciform, 2-6 cm. long; joints of the rhachis 2.5-3.3 mm. long, subclavate usually glabrous, sometimes minutely puberulous, especially on the margins, the apex truncate or slightly emarginate, the outer angle, at least, ciliate or with a tuft of long hairs, disarticulating and falling off together with both spikelets. Spikelets appressed to the rhachis, straw-coloured or pale-brown, the upper part and awns sometimes purple-tinted. Sessile spikelet with a very short transversely oblong or subrhomboid, glabrous callus; lower glume coriaceous, lanceolate or oblong-lanceolate, acute, 2.6-3 mm. long (excluding the awns), terminating in two diverging, ascendingly barbellate, often unequal, awns 5.5-6.7 mm. long, glabrous or minutely puberulous, the lower

$\frac{1}{2}$ – $\frac{2}{3}$ of the back convex, 4–5-nerved and usually 4–6, grooved, with 5–9 marginal spinules often as long as the glume is wide, with ciliate tips bent forwards at nearly right angles, the disk smooth or with a few similar spinules in the middle or the marginal spinules connected by regular rows of spinules, sometimes, again, the spinules fused together into continuous or discontinuous crenelated and ciliate laminae, the upper portion of the back flat with narrowly inflexed, winged margins, the wings membranous, more or less crescent shaped and continued onto the basal part of the awns, their margins minutely ciliate; *upper glume* chartaceous or membranous, lanceolate or elliptic-lanceolate, acuminate, convex, 2.5–3.2 mm. long, glabrous or minutely puberulous, margins inflexed; *lemmas* hyaline, lanceolate, margins ciliate, the paleae shorter, the lower lemma 2.5–3 mm. long, empty, the upper 2.2–2.5 mm. long, containing a bisexual flower; *lodicules* minute; *stamens* 3, anthers linear; 0.8 mm. long; *grain* ellipsoid, compressed, brown, smooth, 1.3–1.6 mm. long, embryo $\frac{1}{2}$ – $\frac{2}{3}$ as long. *Pedicelled spikelet* with a *pedicel* similar to and completely fused with the joint of the rachis, as long or rather shorter, apex not ciliate; *glumes* chartaceous or subcoriaceous, glabrous or puberulous, the lower lanceolate to ovate, acute, convex, 2.4–3.5 mm. long with a terminal, ascendingly barbellate awn 6.8–10.7 mm. long, 5–9-nerved, one margin broadly winged, occasionally wingless, the wing continued onto the lower part of the awn, its margin ciliate; the *upper glume* boat-shaped, acute, 2.4–3.2 mm. long, terminated by a slender, often curved arista, 2.5–4.5 mm. long, the keel winged above, wing oblong, continued onto the lower half of the arista or higher, its margin entire, truncate, rounded or with two large teeth at the apex, ciliate; *lemmas* sometimes absent, if present hyaline, paleate or not, empty.

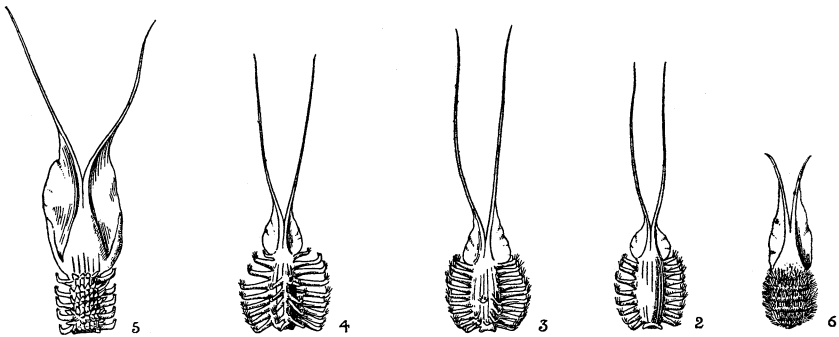


Fig. 6. *Manisuris forficulata* C. E. C. Fischer (nos. 2–5), and *M. forficulata* var. *hirsuta* C. E. C. Fischer (no. 6). Lower glumes of sessile spikelets. $\times 4$.

Bombay Presidency, Mahableshwar, Sept., *Dr. J. C. Lisboa*, without number (type in Kew Herb.); Belgaum, *Dr. Ritchie* 808, 827; Khandala, Sept., *A. Meebold* 8850, "on sheet rock"; N. Kanara at Castle Rock, Oct., *A. Meebold* 10558; Belgaum District,

Amboli Ghat, Oct., *W. A. Talbot* 4305. Cochin State at Kavalay, 3000-4000 ft., Nov., *A. Meebold* 13331.

var. **hirsuta** *C. E. C. Fischer*, var. nov. ; a typo nodis, pedicellis glumisque inferioribus generaliter dense hirsutis, spicularum sessilium glumarum inferiorum spinulis minoribus plus minusve indumento celatis, aristis curtioribus interdum glumis minoribus, spicularum pedicellatarum glumis superioribus cuspidatis, haud aristatis, ala cuspis apicem superante differt.

S. India : Bababudan Hills at Kalhatti, 6000 ft., Nov., *A. Meebold* 10559.

XLII—RESEARCHES ON *SILENE MARITIMA* AND *S. VULGARIS**† : XI. E. M. MARSDEN-JONES AND W. B. TURRILL.

GENETICS OF PETAL SIZE AND OF OTHER CHARACTERS IN *S. MARITIMA*.

The experiments recorded in this paper were carried out in order to investigate the genetics of petal size. All the material was of known wild origin and the parental stock-plants are fully described in the third paper of this series (*Kew Bull.* No. 5, 1929). The stock-plant 13, which is the most important subject of the experiments here considered, is unique in our collections in having very poorly developed petals which scarcely project beyond the calyx. The corolla is thus markedly contrasted with ordinary *S. maritima* corollas as exemplified in stock-plants 2 and 5.

Selfings.

N. 14. S.-P. 5 was selfed and produced a generation of 40 plants. The generation was uniform and like the parent in habit, leaves, inflorescence, calyx, corona, presence of anthocyanin blotch, filaments, stigmata, immature seeds, and capsules. All plants produced fully developed petals and hermaphrodite flowers.

N. 16. S.-P. 13 was selfed and produced a generation of 59 plants. The generation was uniform and like the parent in habit, leaves, inflorescence, calyx, corona, absence of blotch, anthers, filaments, stigmata, and immature seeds. All plants produced poorly developed petals. One plant had some flowers with normal sized petals in addition to flowers with poorly developed petals.

*Continued from *K.B.* 1932, 394.

† As a footnote to the first paper of this series (*Kew Bull.* 1928, 1) we pointed out that we agreed with the arguments, as at that time presented, of our colleague, Dr. T. A. Sprague, in favour of the name *Silene vulgaris* (Moench) Garcke for the common bladder campion. In a paper published in *Kew Bull.*, 1933, 151, evidence has now (i.e. since the Cambridge International Botanical Congress) been advanced in favour of the name *S. cucubalus* Wibel. As, however, it seems undesirable to change a name in the middle of a series of papers which are being published under one general title, we have decided to retain the name *S. vulgaris*. If *S. maritima* and *S. vulgaris* are combined in one species, as is done by some authors, the former name is apparently the correct one for the composite species.